

**Senate Standing Committee on Environment and
Communications inquiry into recent trends in and
preparedness for extreme weather events**

**NORTHERN TERRITORY GOVERNMENT
SUBMISSION**

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Senate Standing Committee on Environment and Communications

Inquiry into recent trends in and preparedness for extreme weather events

(a) recent trends on the frequency of extreme weather events, including but not limited to drought, bushfires, heatwaves, floods and storm surges;

Evidence of extreme weather events in the Northern Territory has been building over the last decade, particularly in the last two years, both in the Top End and Central Australia. High rainfall events and above average annual rainfall has caused unprecedented local flooding in some areas and, in recent times, the intensity of the rainfall has been on the increase. The Northern Territory is also becoming warmer with temperatures expected to continue to rise.

The impacts of extreme weather events have been felt in terms of flash flooding and storm/cyclone wind speeds. The impacts are not as evident in terms of storm surge. It is noted that surface water flow due to water table rise is a hidden impact of extreme weather conditions as saturated catchments lead to prolonged overland flooding.

Some examples of recent record-setting extreme weather include the floods of Katherine in 1998, the Rapid Creek flooding and Darwin rainfall records set during Cyclone Carlos in February 2011, the Edith River bridge failure and train crash due to Cyclone Grant in December 2011, and (Category 5) Cyclone Monica in 2006 and Cyclone George in 2007 that affected western Arnhem Land.

(b) based on global warming scenarios outlined by the Intergovernmental Panel on Climate Change and the Commonwealth Scientific and Industrial Research Organisation of 1 to 5 degrees by 2070:

(i) projections on the frequency of extreme weather events, including but not limited to drought, bushfires, heatwaves, floods and storm surges;

In 2011, the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and the Bureau of Meteorology (BOM) developed climate scenarios and projections, including projections on the frequency and intensity of extreme weather events, for the Northern Territory. In summary, the projections indicate that higher temperatures and sea level rises were highly likely; while more severe thunderstorms, floods and more intense tropical cyclones were likely.

The Northern Territory Government's own projections are that while average rainfall across the Northern Territory will remain mainly unchanged, the number of rain and cyclone events will reduce while the intensity of rainfall and cyclones, as well as temperature and evaporation, will increase significantly. Tropical cyclones are likely to occur less often, but those that occur are likely to be more intense.

It is noted that a lack of data does not allow complete modelling of the impacts of extreme weather events especially in Central Australia.

(ii) the costs of extreme weather events and impacts on natural ecosystems, social and economic infrastructure and human health,

Extreme weather events will continue to create increased service requirements at both a human and infrastructure level.

As the Northern Territory expects that extreme daily rainfall events are likely to increase in intensity, primarily in the northern region, an increase in flash flood occurrence causing damage to infrastructure or loss of life is likely.

Severe thunderstorms and tropical cyclones have the potential to destroy and damage infrastructure and houses, particularly as a result of storm surge. The impact and extent of storm surge will be affected by sea level rise.

In the Top End, unprecedented flood events have occurred which have resulted in significant impacts on transport and residential infrastructure as well as agriculture resulting in high social and economic costs. However, there has been little reported impact to natural ecosystems as they have adapted to the Wet-Dry climate of the north with its attendant flooding and dry spell events.

In Central Australia, there has been also been significant impacts to transport infrastructure with attendant impacts upon the economy. The change in vegetation and animal populations due to a recurring pattern of wet and dry conditions has resulted in extreme fire events (due to vegetation loads) and feral animal issues. These two issues have had impact on communities, due to infrastructure damage/destruction and on natural ecosystems - specifically vegetation change caused by recurring fires and over-grazing and native animal population changes due to fire and vegetation changes.

Advances in planning, preparation, response and recovery are required to help mitigate the costs of extreme weather events. Environmental health responsibilities will need to increase as a result of the adverse impacts of global warming on ecosystems, including water and food security.

Infrastructure

Potential extreme weather events in future years are likely to see:

- Increased flood situations, through either more intense or frequent events, which will affect the Northern Territory road network.
- Increased exposure to coastal issues such as storm surge / rise in water level. While there is limited Northern Territory Government infrastructure exposed to these effects, available infrastructure is vital for servicing remote regional areas.
- Increased occurrence of extreme temperatures will likely have a longer term impact through reducing infrastructure life and increasing maintenance demands.

Health

The Department of Health has invested time and finances into increasing the level of planning and preparedness across the full range of disaster events. The small population and geographical distance between health infrastructure in the Northern Territory makes management of a disaster event difficult and the costs, both human and financial, are significantly higher than for most other jurisdictions.

Primary Industry and Fisheries

The Northern Territory Primary Industries sector is particularly vulnerable to extreme conditions from cyclones, flood, wildfire and drought. While wildfire and drought affect large parts of the Northern Territory, they are frequent enough to mean that producers address them as part of their management systems. Cyclones and flooding are harder to plan for but affect a smaller number of producers.

Cyclones are a regular threat to coastal and island communities of the Northern Territory. In most of these areas there is little agricultural development but horticultural producers in the Darwin rural area are at risk. Floods are a particular problem for the horticultural sector in the Katherine region as the levee soils are heavily used for production. There have been three significant floods in the area in the last 15 years.

Bushfire is a constant threat to extensive pastoral properties and considerable effort is made to prepare fire breaks and fight fires. Fires are most common in the north but some of the most significant damage has been caused by fires in Central Australia leaving stations severely short of feed.

Drought is frequent occurrence in Central Australia and can exceptionally affect the Barkly region. In the context of national drought reform processes, a report on alternatives to its Northern Territory Drought Assistance Arrangements is being prepared by the Northern Territory Drought Committee. The Pastoral Industry is strongly supportive of the process and keen to see results.

The effects of increasing frequency and severity of flooding, storm surge and cyclones are a major threat to the wild harvest and aquaculture sectors as they impact on the environment supporting the aquatic resources harvested, and the infrastructure used in their harvest and culture.

(iii) the availability and affordability of private insurance, impacts on availability and affordability under different global warming scenarios, and regional social and economic impacts

Pressure on the public health sector will increase as the availability and affordability of private health insurance decreases. The effect of this will be seen at the coal face with an increase in public patient numbers, patient waiting times and increasing pressure on health management/budget, including clinical.

It is the Northern Territory Government's understanding that insurance cover for cyclone, storm surge and riverine flood is available in the Northern Territory. The Territory Insurance Office provides cyclone, storm surge and riverine flood cover as part of its standard household policy. Commercial insurers would probably charge a premium for riverine and cyclone cover, particularly for households/businesses that are located in cyclone and flood prone areas of the Northern Territory. However, commercial insurers would be better placed to comment on this.

Given that an effective market for the provision of commercial disaster insurance exists, any reforms should focus on information dissemination for consumers to make informed decisions on purchasing insurance, for governments to make appropriate planning decisions with regards to residential development and infrastructure provision and for insurers in terms of pricing risk.

(c) an assessment of the preparedness of key sectors for extreme weather events, including major infrastructure (electricity, water, transport, telecommunications), health, construction and property, and agriculture and forestry;

Health

Northern Territory Government health services plan for the Northern Territory to be affected by at least one extreme weather event annually and in recent years there has been significant advancement and consolidation of the health sector's planning, preparedness, response and recovery. Preparation and planning is structured around this expectation with each of the three regions (Greater Darwin, Katherine and Central Australia) tailoring their disaster preparation efforts to the type of risk which is most likely to affect their area. Health is the lead agency in a pandemic and Environmental Health is a key stakeholder during recovery, maintaining public safety in relation to food, and water contamination.

Each of the three regions has a designated Medical and Environmental Health Group Leader who commands and controls the medical and environmental health responses in an event but also oversees the planning and preparations of each region's capacity and resources.

Developments in the Department of Health's Disaster (including from extreme weather events) preparedness and capacity include:

- The National Critical Care and Trauma Response Centre with a comprehensive trauma management system to respond to disasters.
- The disaster team at the National Critical Care and Trauma Response Centre is constantly working to ensure that health services across the Northern Territory and Royal Darwin Hospital are "equipped, prepared and ready" to respond to emergency events. This includes the ability to develop Australian Medical Response teams (AusMAT) capable of responding both nationally and internationally.
- Members of the National Critical Care and Trauma Response Centre team work closely with the Australian Health Protection Committee and the Health All Hazards Working Group to address issues of national importance around disaster preparedness.

Disaster Education continues to be a key focus for the Centre, providing training on a local, national and international platform. Disaster training is provided through simulations, Remote Disaster Trauma Courses, Major Incident Management and Support courses (MIMMS), available to health, defence and emergency service personnel both within the Northern Territory, interstate and for regional partners such as Timor Leste, Papua New Guinea and Indonesia.

- AusMATs can be considered in two tiers, state responses (intra or inter state), and national responses. This will be in conjunction with a large cache of medical and self-sufficiency equipment that is stored in the Northern Territory, and is pre-packed ready for multiple health disaster scenarios. Nationally, the Australian Health Protection Committee has put the NCCTRC on standby for AusMAT response 24/7 for all of 2012, with support from a rolling roster of other states in three month blocks.

The network of health response agencies represented on the three NT Medical response groups has been extended to include additional stakeholders including private and public hospitals; Remote Health service providers; Community Health/Aged and Disability; NT Pharmacy Guild; Red Cross Blood Service; Medicare Local; Careflight/Retrievals/RFDS; St John Ambulance Service.

Transport and Infrastructure

The Department of Transport has capacity to immediately engage with a range of stakeholders who are prepared for extreme weather events. Stakeholders include Commercial Operators for air, road and sea transport and other Government and non-government agencies.

The Department of Transport participates in national committees that develop strategies to address environmental, social and economic impacts of roads and road networks due to climate change. The Department, in conducting transport planning, includes environmental considerations in the strategic road network decision-making process.

The Department will continue to review relevant engineering standards, building codes and practices with reference to identified climate change predictions on an on-going basis including through:

- developing design specifications for critical transport routes within flood-prone areas;
- reviewing road designs utilised across the Northern Territory; and
- designing bridge works to ensure that flood levels are modelled to the best available data.

The Northern Territory Government has had a rolling program for a number of years developing public cyclone shelters across the Top End of the Northern Territory for those residents whose homes are not up to cyclone code standards.

Mining

The Department of Mines and Energy has a strong interest in preparedness for extreme weather events insofar as such events may lead to situations on mine sites that could have serious economic, social and environmental consequences. The frequency and magnitude of extreme rainfall events results in high intensity, localised rainfall events which could have catastrophic consequences if structures containing contaminated water and/or process residues (tailings) fail.

When assessing Mining Management Plans the MECD pays particular attention to the Water management provisions and the contingency planning related to extreme weather events. Mining operators are encouraged to consider the changing weather and climate patterns when developing their water management strategies.

Apart from the obvious risk to human life and the adverse environmental impacts, a catastrophic failure of containment structures could result in a total economic loss for the business which is unable to sustain the financial cost of clean-up and reconstruction. This has severe flow on impacts on communities associated with the operation, some of which are exclusively dependent on the mining operation for their ongoing viability.

A current example of where extreme weather information is being used in a regulatory process is at the Ranger Uranium Mine. This mine is surrounded by Kakadu National Park and a major environmental risk is the potential for failure of the containment of the tailings storage facility following a severe weather event. The most significant risk to the environment is the overtopping of the wall of the facility following excessive rainfall. The facility has no spillway as discharge of the contaminated waters is not permitted to happen at any time. Overtopping of the dam would inevitably result in loss of containment of both the process water from the facility as well as the solids of the tailings themselves and the destruction of the structure.

To mitigate the risk of overtopping, the structure, a dam, is required to be built to meet standards set by the Australian National Committee on Large Dams and is to be operated in accordance with a maximum operating level set by reference to the height of the impermeable core of the dam as certified by the engineer who designed and supervised construction of the dam, and the amount of rain that is estimated to fall in a Probable Maximum Precipitation event over a 120 hour period. Different maximum operating levels are set for the wet and dry seasons, using the data provided by the Bureau of Meteorology.

While these requirements relating to extreme weather events are in place for new dams, many older structures, both water dams and tailings dams, have been built without taking such considerations of extreme weather events into account. Previous design standards, such as the use of an estimated rainfall from a storm of 72 hours duration with a return frequency of 100 years, have been shown to be of limited relevance as actual storm rainfalls have exceeded these estimated levels in recent years.

As such, there are many such structures within the Northern Territory where the risk of failure following extreme weather events may be significantly higher than is desirable. The availability of extreme weather forecasts is essential in advising mining operators when assessing risks to the environment related to waste, residues and water management on mine sites and mineral processing facilities. Such data is also an essential input to best practice designs for new facilities and infrastructure.

Primary Industries and Fisheries

As indicated above, the Northern Territory Primary Industries sector is vulnerable to extreme conditions from cyclones, flood, wildfire and drought. While wildfire and drought affect large parts of the Northern Territory, they are frequent enough to mean that producers address them as part of their management systems. Cyclones and flooding are harder to plan for but affect smaller number of producers.

In the context of national drought reform processes, a report on alternatives to its Northern Territory Drought Assistance Arrangements is being prepared by the Northern Territory Drought Committee. The Pastoral Industry is strongly supportive of the process and keen to see the results.

The aquaculture and fishing sectors of the Northern Territory have been active in the area of climate change preparedness, risk management and adaptive management at a local and national level, participating in the formulation of appropriate management frameworks and business models, and the development and implementation of Australia's Climate Change Adaptation Framework.

Commercial, recreational and Indigenous stakeholders operating in the sector operate in a dynamic environment in which climate change is another factor to be considered in long term plans for current and future fishing and aquaculture activities. The adaptive business models and management arrangements in place supporting sustainable fishery and aquaculture enterprises have been developed to ensure they are capable of incorporating changing weather patterns by responding to changes in stock structures and business practices within existing frameworks.

Essential Services

Over the past two years the Northern Territory Power and Water Corporation has focussed significant resources on improving its infrastructure resilience to improve asset capacity and reliability.

The Corporation has current risk and emergency management arrangements in place, under an overarching Crisis Management Plan. The Plan links to the Northern Territory All Hazard Emergency Management Arrangements, and is underpinned by business and event specific plans designed to prepare for, respond to, and recover from major threats to power and water infrastructure, including extreme weather events that typically affect the Northern Territory such as cyclones, floods and fire.

Power and Water Corporation emergency management plans reflect the lessons learned from recent events, including top end cyclones in February 2011 and March 2012, as well as emergency management exercises in key aspects of the business.

The risks from extreme weather events which the Power and Water Corporation continue to face are:

- Being a sole supplier of power generation and distribution, not linked to the “national grid”.
- Electricity and water infrastructure which covers extensive urban, rural and remote areas with high costs and community expectation of service delivery including emergency response and recovery.
- Surge capacity limited by distance between population centres.

Urban and Regional Planning

The Northern Territory Government releases storm surge maps for Darwin area which advises of the increasing risk of storm surge combined with a predicted 0.8 metre sea level rise. The maps identify properties ‘at risk’ from a 1 in 100 year event and 1 in 1000 year event. The maps are expected to be reviewed every five years. Sea level rise, major storm events and other climate change impacts are considered in all major coastal projects. Under the NT *Planning Act*, all major coastal projects need to demonstrate mitigation measures as part of any coastal rezoning or major project assessment processes.

Telecommunications

In recognition of the increasing frequency of natural disaster events and the high percentage of transient visitors to the Northern Territory, the Northern Territory Government developed a single web site for preparation, planning and information on emergencies. This site, known as SecureNT, also includes other ways of ‘pushing’ information or warnings out to the public using Facebook and twitter and is ‘live’ during major emergency events, with information and warnings constantly updated on the home page.

The Department of Corporate and Information Services is responsible for the provision and management of the Northern Territory Government’s communication network and has well established processes and procedures for the preparation and response to natural disasters and extreme weather events. A well-established protocol exists that works closely with the Department of the Chief Minister’s Security and Government Services division’s framework for the management and coordination of response to natural disasters and extreme events.

Extreme weather will affect telecommunications. Fast moving water will tear up optic fibre; wind will cause misalignment of microwave towers or flatten them. Telstra, as the primary provider of telecommunications in remote areas, has undertaken the necessary preparation to ensure remedial work can occur rapidly and efficiently. There is now a greater proportion of optic fibre in the Northern Territory than 10 years ago which better protects against extreme weather. However, there are still vulnerable areas using radio, particularly the island communities. The NBN will not change this situation, given the current proposed approach of providing satellite only connections to remote communities.

Within reasonable economic bounds Telstra have provided a communications network that functions well under the climatic conditions in the Northern Territory.

Other

The Department of the Chief Minister has undertaken a number of projects (funded under the Natural Disaster Resilience Program) to improve the Northern Territory's ability to face and overcome extreme weather events such as:

- development of evacuation centre guides for each major town or city across the Northern Territory in the event of a disaster requiring a small or large scale evacuation;
- development of a Greater Darwin cyclone relief arrangements and early recovery plan;
- a calendar competition for all Northern Territory primary schools students to draw a picture that reinforces key safety messages about three of our highest risk hazards: fire; cyclones and flooding; and
- commencement of an emergency management training framework that will encompass training needs for all four phases of emergency management (prevention, preparation, response and recovery – PPRR) catering for all levels of expertise.

(d) an assessment of the preparedness and the adequacy of resources in the emergency services sector to prevent and respond to extreme weather events

The Northern Territory Police, Fire and Emergency Services (NTPFES) is prepared to respond to extreme weather events that affect the Northern Territory. Through the Natural Disaster Resilience Program, targeted projects and public education campaigns have reduced risks to communities and increased their resilience and ability to respond and recover from extreme weather events.

The Northern Territory has a well defined and practiced whole of government 'All Hazards' approach to emergency management. Legislative arrangements in the Northern Territory appoint identified police officers as local, regional or territory counter disaster controllers and specific response and recovery plans exist at these levels throughout the Northern Territory. Government departments and emergency operations centres throughout the Northern Territory utilise WebEOC, a web-enabled crisis information management system that provides secure, real time information sharing to help emergency managers make sound decisions quickly.

Strong, cooperative and support arrangements exist between the Northern Territory emergency services sector and the crisis coordination sector of Emergency Management Australia. Excellent relationships exist between Northern Territory Government departments and the Bureau of Meteorology for the preparation, planning and response to cyclones.

The Northern Territory Emergency Service (NTES) is responsible for the preparation, maintenance and exercising of the counter disaster plans throughout the Northern Territory, which is done annually prior to the commencement of the wet season. The geographic displacement of remote communities and the limited number of NTES staff means this activity has to commence six to eight weeks prior to wet season.

In most locations where NTES units exist there are sufficient numbers of volunteers who are presently well equipped and trained to respond to extreme weather events. In most cases this will be a coordinated response that is controlled by the counter disaster controller, supported by the relevant counter disaster committee and will utilise all resources available in the immediate vicinity of the event. Volunteer units are provided with the appropriate equipment and training to respond to the identified risks and threats in the associated counter disaster plan.

The Northern Territory Fire and Rescue Service (NTFRS) and Bushfires NT contribute to the Bushfire Cooperative Research Centres seasonal assessment of fuel loads and potential for areas to be rated higher than average at the commencement of each season. This information is provided by 'on ground' assessments of fuel types, fuel loads and curing potential.

This model allows Northern Territory organisations to identify risk at locations where we can work with landholders and local brigades in constructing fire breaks or undertaking other fuel reduction strategies through slashing, mowing or burning. The latter being the most efficient. This assessment also focuses the two organisations on pre-positioning appliances, staff and volunteers, sometimes from other regions of the Northern Territory, to assist with mitigation programs or fire events. Incident Management teams are also deployed to assist the local contingent.

The Northern Territory potentially has a northern and a southern fire season, so portability amongst regions of personnel, appliances and equipment to manage the fire threat is more manageable than other jurisdictions experience in one season. However, climate change is bringing these two seasons closer together and the windows of opportunity to undertake fuel reduction burns is shortening. The Northern Territory also has a very sound, sustainable fire permit and infringement system in place.

The NTFRS and Bushfires NT have purpose built grass fire units and tankers that are suitable to the environment and can go off road to meet the fire. NTES also have a basic grass fire capability in some remote communities where no NTFRS assets are present. Arrangements through the Australasian Fire Authorities Council provide cross jurisdictional arrangements where task force or strike teams could assist the agency seeking support.

The Northern Territory Department of Land Resource Management services the emergency services sector through the provision, on a 24/7 basis, of the following:

- Flood information – river heights, rainfalls, flood intelligence etc
- Flood Forecast - flood prediction for flash flood systems.

Flood monitoring is however constrained by the ability of telecommunication providers to respond to network failures during extreme weather. Further, the capacity to respond to systemic or multiple flood monitoring site failures is constrained by the necessary knowledge residing within a small number of resources.

The Department of Health provides a front line medical and environmental health emergency response within the All Hazards framework outlined above.

e) the current roles and effectiveness of the division of responsibilities between different levels of government (federal, state and local) to manage extreme weather events

Northern Territory Government agencies are clear as to their current roles and responsibilities.

The Department of Health has a very clear mandate and the division of responsibilities between the three levels of government supports this. The delineation of role and function is very clear and documented across all agency disaster and emergency management plans.

The role of the Department of Transport is to coordinate Northern Territory wide policies and plans to ensure the provision of transport support during the preparation, response and recovery phases of an emergency.

For the Greater Darwin Region, this includes:

- coordinating the provision of transport support as required by a Hazard Management Authority and other functional areas;
- maintaining as far as practical, the normal operations and activities of public and commercial transport services;
- provision of advice to the Territory Controller and Counter Disaster Council on measures to improve transport arrangements in the event of a disaster; and
- provision of advice to the Territory Controller (through Regional Controllers) and the Recovery Coordination Group on transport issues impacting on response and recovery measures.

In the Alice Springs Region, this includes:

- provision of public transport services, school bus services and the transport of vulnerable and homeless people in the event of an emergency disaster situation;
- provision of regulatory services (permits etc) to facilitate the supply and operation of all necessary plant and equipment required to implement disaster prevention measures and for the clearing and restoration of Northern Territory Government roads, bridges, airstrips and buildings;
- assist with the enforcement and monitoring of road closures and restricted load access on NT Government road assets;
- coordinate the provision of transport support as required by a Hazard Management Authority and other functional areas;
- maintaining as far as practical, the normal operations and activities of public and commercial transport services;
- provision of advice to the Regional Controller on measures to improve transport arrangements in the event of a disaster; and
- provision of advice to the Regional Controller and the Recovery Coordination Group on transport issues impacting on response and recovery measures.

The Power and Water Corporation engages effectively with all levels of government to manage extreme weather events. This engagement includes:

- Regular liaison with the Bureau of Meteorology.
- Access to National Disaster Relief and Recovery Arrangements (NDRRA) through the NT Government.
- Membership of the NT Counter Disaster Council and its operational response and recovery Committees in all regions across the NT.
- Leadership of the NT Public Utilities Emergency Response and Recovery Group.
- Participation in Local Counter Disaster Committees in rural and remote communities.
- Partnerships with Shire Councils to employ and support Essential Services Officers in remote communities, to deliver local power and water emergency response.

The Power and Water Corporation is actively involved in national critical infrastructure resilience networks and initiatives including the Energy Sector Group and Water Services Sector Group. The Sector Groups actively share information and experiences, and conduct sectoral and cross-sectoral emergency exercises.

Issues which the Power and Water Corporation recognises are:

- Surge capacity limited by distance between population centres and distance from other states or federal assistance.
- Time and red tape involved in seeking and obtaining Commonwealth support post emergency event.

(f) progress in developing effective national coordination of climate change response and risk management, including legislative and regulatory reform, standards and codes, taxation arrangements and economic instruments

No comment proposed.

(g) any gaps in Australia's Climate Change Adaptation Framework and the steps required for effective national coordination of climate change response and risk management

A possible gap is the definition of 'drought'. There is a need to recognise a drought event in the Top End as two consecutive years of less than average rainfall (<1200mm in the Darwin Region). While this level of rainfall would not be considered a drought nationally, it has a similar effect as one in the Top End.

This is due to the vast majority of aquifers only having a seasonal lifespan, and most (natural and human) behaviour sees groundwater levels depleting over a season. There will be serious water shortages in most places outside Darwin and the Daly Basin - especially in remote communities and the pastoral industry as it predominantly relies on seasonal aquifers. It should also be noted that Darwin River Dam (that services Darwin) only has three years storage, so three years of below average rain would create significant hardship in Darwin.

Another gap relates to data paucity. As indicated above, robust data on extreme weather events are critical to enable modelling of impacts which is necessary to enable appropriate prevention, planning, response and recovery strategies to be implemented.

(h) any related matter

No comment proposed.