



Government, you and what to do

A Guide to Natural Disasters in NSW



July 2012

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Cover images

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Preface

Across NSW, and indeed Australia, all communities have to deal with natural disasters. While some of us deal with floods or bushfires depending on seasonal factors, most of us deal with storms in some shape or form during the course of a year.

For this reason, all Governments have been working together to improve how we plan and prepare for, respond to and recover from natural disasters.

In NSW, we are working to further enhance how we work together across Government and with non-Government organisations and the community. This cuts across all things that we do, but in this case the focus is on natural disasters. This Government's complete vision for NSW is laid out in NSW 2021: *A plan to make NSW number one*.

We have recently completed a review of how Government can better manage natural disasters with and on behalf of the community. A number of areas of priority have been identified and work will be undertaken on these areas over the next few years.

However, it is not just about Government and what we can do. The current focus in Australia and overseas is encouraging resilience across the whole community. Resilience can be defined in many ways, but resilient communities can be generally said to:

- Function well while under stress
- Successfully adapt to new situations
- Be self-reliant
- Support each other through being preparedⁱ.

This does not mean that Governments and emergency services organisations can rest easy while the community does all of the work. It does mean that we all need to take responsibility for making sure that we have all done all that we can to become more resilient.

This document, and the accompanying website www.emergency.nsw.gov.au, provide you with information about what Governments are doing, but also provides information on what to do before, during and after a natural disaster. It brings together information that a range of individual agencies in the Government and community sectors have produced to help in resilience building.

I hope that you find this useful and that we continue to build on the good work that has been done already to further enhance how we come together before, during and after natural disasters.



The Hon M J Gallacher MLC
Minister for Police and Emergency Services



Overview

Resilience is not a new concept. In many countries, members of the community understand the importance being able to be self-reliant during the first 72 hours following a natural disaster or other emergency.

For a long time, Governments in Australia have been encouraging communities to take action to ensure that we have done all we can to plan and prepare for, respond to and recover from natural disasters.

It is vitally important that we all:

1. Recognise that natural disasters are inevitable – they are infrequent, but they do happen
2. Build self-reliance – we all need to be prepared for the unexpected
3. Acknowledge that we all have a role to play in understanding more about natural disasters and how we can prepare for them
4. Understand the importance of looking after each other
5. Learn from experienceⁱⁱ.

To assist in this, all States and Territories have recently completed a process examining risk management from a natural disaster perspective.

In NSW, we have completed this process and have identified some areas where improvements could be made. Work on these will continue over the next 3-5 years.

Part of this process involves the development of a publication that provides information to you on:

1. The NSW natural hazard context – what natural hazards we face in NSW
2. The community context – volunteering, how to find out what hazards might impact on you, how to find out what vulnerable members of the community might need your help
3. What can be done before a natural disaster occurs
4. What should be done during a natural disaster
5. What happens after a natural disaster
6. Who works with you – what Government agencies work with the community
7. Links to more detailed information and agencies that may provide assistance

For readers from culturally and linguistically diverse communities, each emergency services organisation has representatives who can help you with any questions that you might have. Contact details for these organisations follow on page 19.

Within this publication:

- A natural hazard refers to a naturally occurring potential or existing condition that may cause harm to people, or damage to property or the environmentⁱⁱⁱ
- A natural disaster is a serious disruption to a community or region caused by the impact of a naturally occurring event that threatens or causes death, injury or damage to property or the environment and which requires significant and coordinated multi-agency and community response^{iv}. Not all natural hazards will cause a natural disaster.
- An emergency means an event, actual or imminent, which endangers or threatens to endanger life, property or the environment, and which requires a significant and coordinated response^v.

The majority of this publication focuses on how individuals, households and businesses might plan and prepare for, respond to and recover from natural disasters.

In this document you will find:



Tips



Checklists



Actions

The next page highlights the key things that you need to think about before, during and after a natural disaster. Make sure you take note and then work through the subsequent sections that provide you with more detailed information.

The fundamentals



Before something happens

- ❖ Know what natural disasters might impact on you or your home
- ❖ Get in touch with the relevant Government agency if you are at risk of a particular type of natural disaster – bush fire, flood, tsunami, storm etc.
- ❖ Make a Household Emergency Plan
- ❖ Make a Household Emergency Kit
- ❖ Prepare your home, yourself and your family
- ❖ If you want to volunteer, do it now

Go to Section 3:
What can be done before something happens?



During a natural disaster

Help may not come – be prepared to look after yourself.

- ❖ Act on your plan but be flexible and adapt it when you need to
- ❖ Be aware of what is going on around you
- ❖ Monitor traditional media sources (TV, radio, etc) and social media

Go to Section 4:
What should I be doing during a natural disaster?



After a natural disaster

Again, be prepared to look after yourself if help does not come

- ❖ Stay aware – keep watching and listening and look at what is going on around you
- ❖ Check on your neighbours and other vulnerable people in your community
- ❖ Contact your insurer

Go to Section 5:
What happens after a natural disaster?

1. The NSW natural hazard context

All communities across NSW are impacted by natural hazards in some shape or form. Even if you do not live in an area that can be impacted by bush fires or floods, storms can strike anywhere.

Not all natural hazards have disastrous consequences; some have a relatively minor impact, while others are more severe. The more severe natural disasters will require a wide range of government and non-Government agencies to come together to provide help and support to communities.

Appendix B provides you with information about some of the natural hazards that impact on NSW. Information is provided on:

- Bush fire
- Cyclone
- Earthquake
- Flood
- Heatwave
- Landslide
- Storm
- Storm surge
- Tornado
- Tsunami

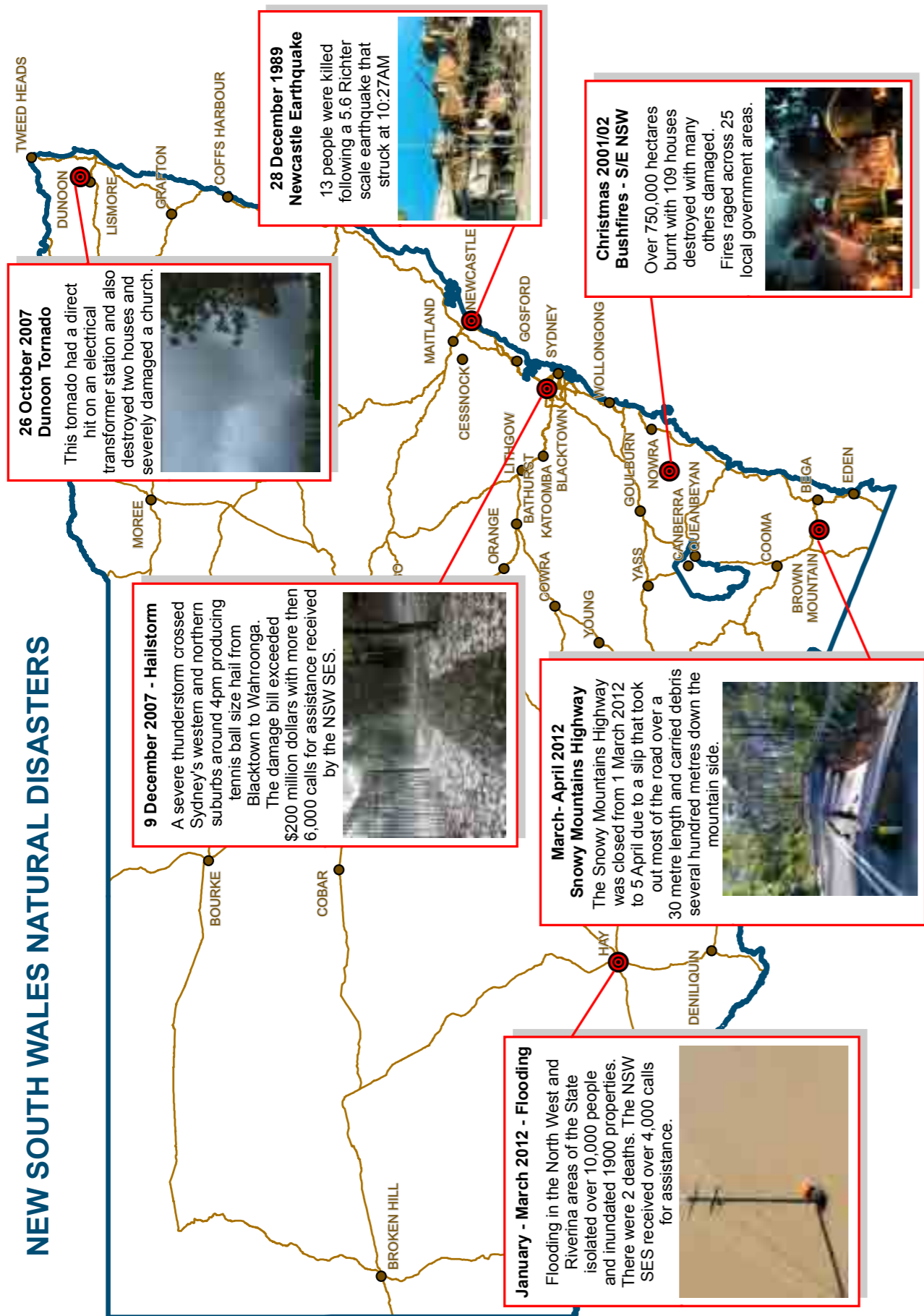
Where more detailed information does exist, links are provided.

Disaster map

Natural disasters can happen anywhere. The map on the following page provides you with just a few examples of some of the natural disasters to impact NSW in recent history.



NEW SOUTH WALES NATURAL DISASTERS



Images in map courtesy of NSW Rural Fire Service, NSW State Emergency Service, The City of Newcastle, NSW SES Volunteers Association^{vi}, Darren Marsh and Jimmy Deguara.

2. The NSW community context

Disaster resilience is the collective responsibility of all sectors of society, including all levels of government, business, the non-government sector and individuals.

If all sectors work together with a united focus and a shared sense of responsibility to improve disaster resilience, they will be far more effective than the individual efforts of any one sector^{vii}.

Community resilience refers to how well a community copes during and after a natural disaster. This is directly influenced by how well prepared a community is and is often a reflection of how informed and actively involved individuals within communities are with each other.



Know your natural hazards

Depending on where you live, you may face particular natural hazards.

Not everyone might live in a bush fire prone area or on a floodplain, but nonetheless we all need to plan and prepare for these hazards. You may still visit a location prone to a particular natural hazard and all areas face the prospect of storms.

Every natural hazard, even it does not become a natural disaster, brings with it specific things that you need to do to prepare and plan for, respond to and recover from it.

The relevant emergency service organisation can provide detailed advice about this and references follow in Section 7 from page 33 to help you decide where you can go to get more information.

However, there are some things that you and your household can do irrespective of what natural hazard might be threatening your community.



Know your local area, know your hazard

Do your research. Identify the kinds of natural hazards that could impact on you. Find out if your home is in an area that is at risk of natural hazards such as floods, or bushfire and work out what can do to prepare. Some natural hazards such as storms can happen anywhere!

Contact details for emergency services organisations that provide assistance to communities impacted by natural hazards follow on page 19.

Make sure that everyone in your house knows what to do. Children and other vulnerable members of your household should be part of these conversations. By providing them with information about what might happen, they are also less likely to be fearful or anxious.

Vulnerable communities

There was a time when communities knew who needed to be looked after during natural disasters or other times of crisis. It is still important that we are all aware of who might be more vulnerable and what we can do to help them.

However, there are groups of people or individuals in our communities who may need help. Although they may be resilient, it is important that we all know who lives in our community and see if they may need additional support.

Know who is around you and see if they would like you to help them before, during or after a natural disaster. Share information with them. You may need help one day also! Vulnerable groups might include:

- The aged – in particular those living alone or who do not have family around them
- Families with young children – particularly those living alone or who do not have family close by
- People living with a disability
- Individuals or families from culturally or linguistically diverse backgrounds
- Chronically ill individuals such as dialysis patients or people on a ventilator.



Many emergency services organisations have programs which can assist or advise vulnerable communities or people before, during and after a natural disaster or other emergency. One example is the NSW Rural Fire Service AIDER program which assists elderly, infirm or disabled residents with preparing their property. **Talk to your local emergency services organisation** to find out if programs are available in your area.

There is also a lot of information available from emergency services in other languages, or in other formats, which can help people stay informed and be better prepared. Information may also be available through services like telephone typewriter, online or translation services.

Volunteering

Volunteers make an enormous contribution before, during and after natural disasters and other emergencies in NSW. Without these volunteers many people may have lost their lives, their homes or have taken much longer to get back on their feet after being involved in a natural disaster or other emergency. Detailed information about volunteering is included as Appendix C.



Keen to volunteer?

Contact your local emergency services or non-Government organisation. The Office of Volunteering can also help – <http://www.volunteering.nsw.gov.au>. **Think ahead** – becoming a volunteer should happen before something happens. A variety of roles are available from frontline emergency management to important support roles like communications, catering or transport.

3. What can be done before something happens?

Natural disasters can occur anywhere and when they do happen, everyone in the area is often affected in some way.

As outlined in Section 2, it is important to **understand what natural disasters might impact your area**. Find out about your area, so you can prepare for it. Check Bush Fire Prone Land Maps or Flood Plans which can be found on the websites of local councils.

Talk to teachers at your school and encourage them to access teaching resources or request visits to the school from emergency services organisations. All are more than happy to visit schools and share information about how we can all manage natural disasters and other emergencies.

Emergency services organisations also conduct a wide range of other community engagement activities. For instance, many brigades or emergency service units conduct training or information sessions for residents (FireWise groups, street meetings, workshops) which can help residents understand and prepare for hazards in their area.



There are some useful guides and checklists that you can use if you live in an area that is at risk from a particular hazard. These include:

- Bush fire survival plans – http://www.rfs.nsw.gov.au/file_system/attachments/Attachment_BushFireSurvivalPlan.pdf
- FloodSafe – <http://www.ses.nsw.gov.au/community-safety/floodsafe/>
- StormSafe – <http://www.ses.nsw.gov.au/community-safety/stormsafe/>
- TsunamiSafe – <http://www.ses.nsw.gov.au/community-safety/tsunami>

Prepare yourself

Consider your mental, physical and emotional preparedness. Any natural disaster can be a distressing experience and you or members of your family may feel stressed.

Prepare your home

Prepare your home and keep it prepared. Homes which are prepared are more likely to withstand a natural disaster such as a bush fire or storm.

This also means ensuring that you've got adequate levels of insurance – consider all types including home, contents, motor vehicle, health or ambulance cover, income protection, boat and others.

Specific information to assist older people, people living with a disability and members of culturally or linguistically diverse communities follows as part of Appendix A.

Plan, plan, plan^{viii}

Natural disasters and other emergencies can strike with little or no warning. However if you plan, you can reduce the impact to you, your family and your property. Make a plan so you know what to do, when to leave, where to go, what you might take and what you can do with animals.

It also helps to prepare an Emergency Plan for your household with everyone who lives there – there is a checklist to start you off in Appendix A.

This will give you an idea of things you need to think about in advance of something happening.

You need to know your triggers to take action. For example, in a bush fire, you may use a total fire ban or Catastrophic fire danger rating as your trigger to leave – well before a fire. In a flood, your trigger may be when an evacuation warning is issued, giving you time to make final preparations around your property.

You should also think about what you'll do if roads are closed or blocked, power goes out or if you're separated from your family.

Keep this plan secure as it may include sensitive information such as bank account details, the daytime location of children and their schools.



Prepare an emergency plan for your household



Do you want more information on how to prepare and plan for specific hazards?

SES – 1 800 201 000

RFS – 1 800 NSW RFS



Emergency kits

An Emergency Kit can help save precious time during a natural disaster or other emergency. It provides items you might need if you have to stay in your home for an extended period of time or if you need to leave your home in a hurry.

Keep your Emergency Kit in a waterproof storage container in a location that is easy to get to and that the whole family knows about. This will make it quick and easy to find when you need it.

On a regular basis, check your Emergency Kit (remember to check use-by dates on batteries, gloves and other items).



Prepare Emergency Kits

Get everyone in the family to prepare their own Emergency Kit – you may wish to prepare one for the family and then each family member might like to think about what they would like to take with them in the case of a natural disaster or other emergency – what is precious for one person is most likely to be different for another! A checklist in Appendix A will provide you with some ideas to start with.

Think about your animals

Stockowners should have in place a plan for protecting livestock during natural disasters or other emergencies, especially in floods and fires where losses can be high. This can include flood mounds for stock, plans for the movement of stock from the impact area and safe havens such as cleared paddocks in fire season. When developing your stock protection plan, consider such things as access to fodder and transport access.



Owners of pets and companion animals should make plans for their care in the event of a natural disaster or other emergency. Consider whether pets will be evacuated or simply moved to a safe location. Think about equipment needed such as food, water, containers, collars, leads, medicines, vet records, cat litter, and other items. Identify and move larger pets such as horses to a safe area on the property or prepare them for removal. Ensure equipment is identifiable (name, address and contact details).

Owners of large animal holding establishments should implement a plan on how large numbers of animals will be protected or transported in the event of a natural disaster or other emergency. These include feedlots, vet clinics, pet shops, animal care facilities and pounds.



Businesses^{ix, x}

Preparing for a natural disaster makes good business sense – it is a vital part of any business continuity planning process.

Your business is critical to your financial wellbeing and could also be a necessary service to your community, so it's important to protect what you can in times of crisis.

Emergency management is about successfully adapting your business to changes in its environment. Resilient businesses prepare for possible risks, take appropriate action during natural disasters, and recover.

When thinking about businesses and natural disasters, business owners need to consider:

- The direct impacts from the natural disaster on the business itself
- Obligations to people that work within the business
- The impacts on customers.

Impacts on your business

The Australian Government has developed a range of guidance materials to provide information for businesses that may be impacted by natural disasters. These provide detailed information to assist businesses in agreeing their natural hazard exposure.

These guidance materials provide links to a range of checklists that businesses can access and use to enhance how they manage their natural disaster risk exposure.

These checklists can be found at <http://www.business.gov.au/business/topics/emergencymanagementandrecovery/pages/default.aspx>.



Review Australian Government guidance material

Impacts on people who work in your business

In operating your business you may have employees working for you. You could also be the type of business that is supported by a volunteer workforce. Generally, employers must ensure the health, safety and welfare at work of everyone who works in a business under the *Work, Health and Safety Act, 2011*.

Employers must provide:

- Safe premises
- Safe machinery and substances
- Safe systems of work
- Information, instruction, training and supervision for workers
- Suitable working environment and facilities.

Businesses are also responsible for the health and safety of others in your workplace, such as visitors and customers. Directors or managers hold the same responsibilities as an employer for the areas that are under their control or influence. When using labour hire, responsibility for workers is shared with the labour hire company.



All of the above is relevant to the natural disaster context. Employers must ensure that they have taken all reasonable actions to implement systems and processes that support workplace safety during a natural disaster.

Impacts on your customers^{xi}

The obligations that a business has to protect its customers are similar to those described above for employees.



Get your employees involved in the Emergency Planning processes – they will know things about your business that you may not!



Hazard specific help for business:

Business Floodsafe: <http://www.ses.nsw.gov.au/community-safety/floodsafe/bus-floodsafe/about>

Bush fire safety: http://www.rfs.nsw.gov.au/dsp_content.cfm?cat_id=1264

Fire safety: <http://www.fire.nsw.gov.au/page.php?id=3>

4. What should I be doing during a natural disaster?



Key contact numbers in an emergency

Bush fire – 1 800 679 737

Cyclone – 132 500 (SES)

Flood – 132 500 (SES)

Storm – 132 500 (SES)

Tornado – 132 500 (SES)

Tsunami – 132 500 (SES)

Traffic information and road closures – 132 701

In a life threatening emergency, call 000

Depending on the natural disaster that you are being impacted by, you may not have a lot of time to react. This is why you need to spend time planning and preparing yourself, your family and your business for what may happen.

Put your plan into action. Don't wait and see. The time that you have spent planning will help you to be ready to react if something happens – use it now!

Some natural disasters or other emergencies can happen or spread so quickly there may not be time for a warning – **so don't wait for one!**

Emergency services workers and volunteers may not be there when you need them. Be prepared to be self-reliant.

If a warning is provided, **listen** to the advice being provided by emergency services organisations and take action based on what is said. Sometimes it may tell you to watch and wait for more advice, other times the message will tell you to take action.



Now is the time to put your plan into action!

Likely **sources of information** about a natural disaster will be:

- Local radio
- Your neighbours and other people in the community
- TV
- Social media sites such as Facebook and Twitter – in particular those that belong to emergency services organisations
- Emergency Alert messages to your mobile phone or landline.

Look at what is happening around you:

- Are there fire trucks or other emergency vehicles in your street?
- Can you see emergency services workers or volunteers doorknocking?
- Can you smell smoke, see a fire, see floodwaters or other natural hazards?



Subscribe to social media sites for your local radio station and emergency services organisations



The Standard Emergency Warning Signalⁱⁱ is a distinctive siren sound which may be played on radio or television during a natural disaster or other emergency. If you hear it, you should stop what you're doing, listen and follow the instructions given. Make sure that all members of your family know what this sounds like and what it means.

This is a link to an audio file so that you can hear what it sounds like.

Standard Emergency Warning Signal: <http://www.emergency.nsw.gov.au/sews>



Do follow the instructions of your emergency services organisations – they know better than anyone what you should do.

If you are in trouble and need help, ask someone in a uniform or ring the relevant phone number for help.

Depending on the scale of the natural disaster, a public information line may be advertised – keep monitoring the media.

Know your trigger. Work out when you will leave and what you'll take.

Grab your **Emergency Kit** and add important items such as cash, ATM cards,

mobile phone, important documents and fresh drinking water.

Make sure that you have considered what you will do if you can't put your plan into action, or if your plan fails. You cannot plan for every event or everything that might happen.

Being prepared will help you if your plan fails.

Do not use the emergency contact numbers for traffic updates or other non-life threatening emergencies.



Triple Zero

- Is someone seriously injured or in need of urgent medical help?
- Is your life or property being threatened?
- Have you just witnessed a serious accident or crime?

If you answered YES call Triple Zero (000).

Triple Zero calls are free.

When you call Triple Zero (000)

- Do you want Police, Fire or Ambulance?
- Stay calm, don't shout, speak slowly and clearly. Tell the operator exactly where to come.
- Give an address or location.



Animals in your care

Listen to advice given by emergency services and plan early. **Prepare any pets/companion animals for evacuation or relocation.** In the case of evacuations, pets should be taken with you. They will be housed in emergency accommodation.

The NSW Department of Primary Industries coordinates the care of pets during natural disasters and other emergencies.

NSW Department of Primary Industries may provide emergency assistance during natural disasters and other emergencies where it is safe to do so.



Livestock owners should make decisions regarding the relocation of at risk stock as early as possible

Social media links

A number of emergency services agencies have social media sites that you can access for more information.

	Twitter	RSS	Facebook links	Youtube Links
NSW Ambulance Service	@ASNSW	No	http://www.facebook.com/pages/Ambulance-Service-of-NSW/182198321867671	http://www.youtube.com/user/nswambulance
Fire & Rescue NSW	@FireRescueNSW	No	http://www.facebook.com/frnsw	http://www.youtube.com/user/fireandrescuensw
Marine Rescue NSW	@MarineRescueNSW	No	http://www.facebook.com/MarineRescue	n/a
NSW Police Force	@nswpolice	Not direct	http://www.facebook.com/nswpoliceforce	http://www.youtube.com/user/TheNSWPolice
NSW Rural Fire Service	@nswrfs	Yes	http://www.facebook.com/nswrfs	http://www.youtube.com/NSWRFS
NSW State Emergency Service	@nswses	Yes	http://www.facebook.com/NSW.SES	http://www.youtube.com/user/NSWSES

For up to date social media sites for emergency services agencies and emergencies, refer to www.emergency.nsw.gov.au/socialmedia

Evacuating

If you decide to evacuate or are told to do so, **try to stay with family or friends**. Otherwise, evacuation centres may be set up, depending on the scale of the natural disaster or other emergency.

Evacuation orders are only issued if absolutely necessary and are designed to protect both members of the community and volunteers and other emergency services workers.

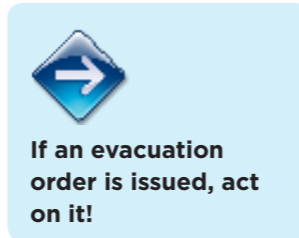
You will not be able to access the normal range of services in your area as local businesses will not be operating.



Keep monitoring local media for updates.

Only return home when you have been advised that it is safe to do so.

In natural disasters such as a bush fire, you should also be aware of other shelter options such as a Neighbourhood Safer Place. These are places of last resort and should only be used if your plan fails or you don't have time to put your plan into action.



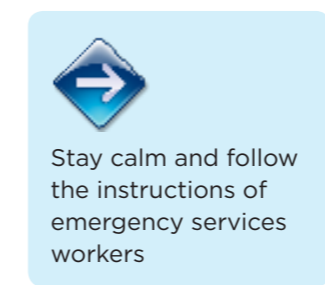
5. What happens after a natural disaster?

Immediately after....

Stay up to date – seek out information and share it with those around you.

Check on your neighbours or other vulnerable members of your community who may need your help or support.

Keep listening to the media, including social media, and follow the instructions of the emergency services.



Seek medical attention if you have been hurt. Make sure that emergency services are able to get to your house. If they are unable to access your home then ask the police to provide you with a safe alternate route, remembering that your usual route to the hospital may be inaccessible.

Take safety precautions including not using your water which may be contaminated and being mindful that your home, trees and the other structures on your property may be unstable.

Safeguard your property. Gather up your most prized possessions and find a safe place to keep them. If your home is damaged and easy to access then thieves may try to take advantage of the situation. Secure your property the best that you can with temporary materials.

Contact your insurance company. Your homeowners or renters insurance may or may not cover the particular natural disaster which hit your area. Contact your insurance company to discuss your policy and file your claim.

Contact your creditors. It is important to contact your creditors to let them know what happened and to provide them with a temporary address if you are unable to receive mail at your usual residence. You may even be able to negotiate an agreement to reduce payments or spread them over a longer period.

Contact your employer. You may not be able to get to work. Make sure that your employer is aware of this.

Notify power and phone companies. If your home is unliveable or destroyed, they can stop billing for services not provided or unavailable.



Once things settle down...

After a disaster has occurred, it is important to return to a normal life in the shortest possible period of time. This will help relieve the stress and anxiety associated with having gone through a natural disaster or other emergency.^{xii}

Repair or relocate. Once your immediate needs have been met you are going to have to decide if you should repair your home or relocate to a new dwelling.

Think about what you could do differently next time and discuss this with your family.



Look after yourself and other people in your care. This can be a stressful time and you, or they, may need support.

Think about the young people in your care:

- Where possible, keep the family together. They have been through a traumatic time and need the comfort of having their parents or primary carers around. In particularly severe events where there has been a great deal of destruction, children are in danger of believing their parents will not return.
- Calmly explain the situation to children. Tell them what you know about what has happened and explain what will happen next.
- Encourage children to talk. Allow and encourage them to express their feelings.
- Include children in recovery activities. Give them tasks and responsibilities, so they feel they are contributing. Having a task will also help them understand that things will get better.
- Reassure them. This will help them realise life will eventually return to normal.

Conduct an inventory: Make a preliminary list of damaged property and the degree of damage to each. If possible, photograph items or video tape them to compare with pre-disaster records. This will help you identify what is missing and what you should be looking to include on an insurance claim.

File an insurance claim

- When you submit a claim to your insurance company be as detailed as possible and take photos that show the state of your property and contents. Take time to prepare a full list of all the items lost or damaged. Make a copy of any claim you submit.
- You don't have to prove whether the damage was caused by a natural disaster, this is up to your insurer.
- Make a detailed record of all damage and include photos where possible.
- Where practical, talk to your insurance company before you start to clean up - they may want to see the damage.
- If you are concerned about your legal position, seek advice.

If you have a query relating to insurance you can call the Insurance Council on 1300 444 557. This service is available to all.



Where to get more help

For immediate psychological assistance:



- **Lifeline** - 13 11 14
- **Mensline Australia** - 1300 789 978
- **beyondblue information line** - 1300 22 4636
- **Kids Help Line** - 1800 511 800
- **Rural Mental Health Support Line** - 1800 201 123
- **Relationships Australia** - 1300 364 277
- **SANE Helpline (office hours)** - 1800 187 263
- **The Australian Psychological Society** - 1800 333 497 (to find a psychologist)

Disaster welfare support

The NSW Government has a dedicated disaster welfare support team. This team supports people who have been impacted by disasters such as floods, storms, bush fires and other emergencies.

The Disaster Welfare Assistance Line (1800 018 444) can provide you with information about disaster relief grants for contents and structural repairs, available to low income earners with no insurance. The provision of these grants is not dependent on a natural disaster being declared.

The NSW Government works together with the Australian Red Cross, Anglicare, ADRA and the Salvation Army in supporting communities during natural disasters.

Agency	Responsibility	Service
	Personal support	The Australian Red Cross provides personal support services including care and comfort, information, referral, interpersonal help and other measures such as outreach.
	General support	Anglicare provides general support to other organisations that require increased capacity during natural disaster and other emergency operations.
	Emergency accommodation	ADRA provides emergency accommodation assistance to people affected by disasters.
	Welfare	The Salvation Army arranges food and refreshments for disaster affected people and agency volunteers and workers.



Consider your animals...

For companion animals and pets, NSW Department of Primary Industries coordinates the care of pets after the natural disaster or other emergency until an evacuation order is lifted, or when the natural disaster or other emergency phase is determined to have ended.

In the case of livestock owners, NSW Department of Primary Industries can coordinate assistance for the care of stock such as fodder and water, veterinary assessments and the destruction and/or burial of dead/injured stock.

Natural disaster declarations and financial assistance

Depending on the scale of the natural disaster, you may hear that the Government has issued 'natural disaster declarations' for specific geographic areas.

This means that people who live in those areas may be able to access financial support under Natural Disaster Relief and Recovery Arrangements. Some eligibility criteria apply.

More information about these schemes is included in Appendix D.



6. Working together

Governments at all levels have a role in managing natural disasters. Emergency services organisations and other agencies in Government and the wider community work together in the pursuit of this endeavour.



What is Government doing to manage natural disaster risks?

The short answer is – a lot!

Emergency management involves a range of programs and arrangements designed to prevent, prepare for, respond to and recover from the effects of natural hazard impacts on the community.

Australia's emergency management system reflects the fact that States and Territories have responsibility for the protection of the lives and property of their citizens. State and Territory Governments exercise control over most of the functions which are essential for effective prevention of, preparation for, response to and recovery from emergencies through:

- Legislative and regulatory arrangements
- Provision of emergency services organisations and supporting agencies. In NSW these supporting agencies provide services that include agricultural and animal, communications, energy and utilities, engineering, environmental, health, public information, transport and welfare services. These are referred to as Functional Areas.

Local Government plays a major role, as do volunteer organisations, given their intimate links with the communities they serve. The concept is simple. In the first instance, dealing with a natural disaster or other emergency is the responsibility of the individuals who are directly involved.

When it becomes apparent that they cannot reasonably cope, they seek help – normally from the local emergency management organisations which include the local government authority.



Thus, responsibility for response and recovery starts at the lowest level of government – and passes up through to the State and National levels as capacities and/or capabilities are exceeded and access to resources is required.

NSW emergency management resources^{xiii}

NSW has a well-resourced emergency management capability. As well as providing support to members of the NSW community, NSW emergency management personnel are often called upon to assist people in other jurisdictions, both in Australia and overseas.

During a truly major event, the full resources of the NSW Government as well as other Governments can be called upon to help.

	<ul style="list-style-type: none"> • Employs over 4,000 people with 90% of these involved in front-line service delivery • One of the largest and most modern public ambulance fleets in the world, made up of over 1,500 vehicles, of which 999 are front line ambulance vehicles • Provided over 1,149,820 total responses (both emergency and non-emergency) in 2010-11, equivalent to a call every 27 seconds
	<ul style="list-style-type: none"> • 338 fire stations across NSW with a fleet of 650 fire engines, ladder, rescue and hazardous materials units • 6,900 firefighters, over 7,000 community fire unit volunteers • The largest provider of non-fire rescue services in NSW • Responsible for hazardous materials emergencies statewide • Responsible for the receipt of all 000 and automatic fire alarm calls for both Fire & Rescue NSW and the NSW Rural Fire Service
	<ul style="list-style-type: none"> • Over 15,900 police officers • 80 local area commands operate from more than 426 police locations • Specialist commands complement the general duties operational capability, covering land, sea and air operations
	<ul style="list-style-type: none"> • A community-based fire service covering more than 95% of NSW and the leading agency for coordinated bush fire fighting • RFS volunteers are also responsible for structure fires in rural fire districts, including over 1,200 villages • Comprises approximately 2,100 volunteer rural fire brigades with a total volunteer membership of around 70,000, supported by a fleet of more than 4,000 tankers • In 2010-11, responded to almost 19,000 incidents
	<ul style="list-style-type: none"> • A volunteer-based response and rescue agency • Has over 10,000 dedicated volunteers across 228 units, supported by 17 regional headquarters and the State headquarters • The nominated agency responsible for providing assistance in floods, storms and tsunamis • Responded to over 20,600 requests for assistance in 2010-11

These organisations are supported in their efforts by specialists or Functional Areas within other NSW Government agencies that provide support across:

- Agricultural and animal services
- Communications
- Energy and utility services
- Engineering services
- Environmental services
- Health
- Maritime services
- Public information
- Transport
- Welfare services



Government agencies are also supported by the Non Government Sector. Community partners such as the Salvation Army, ADRA, Anglicare and the Red Cross provide a range of assistance to support people and communities in time of need.

Local government plays a key role. As noted earlier, responsibility for managing natural disasters starts at the local level. This is done through local government and through Local Emergency Management Committees (LEMCs). LEMCs are made up of local representatives from emergency services organisations, local government and other members of the community from local businesses and non-Government and volunteer organisations. A primary role of the LEMC is to prepare a Local Disaster Plan. This details arrangements for, the prevention of, preparation for, response to and recovery from emergencies within that local area.

Also, the Australian Government Bureau of Meteorology Regional Office in Sydney works very closely with the NSW emergency services organisations during major fire, flood and storm episodes, providing a range of warning products and conducting specialised briefings on observed and forecast weather warning information.

What improvements can be made to how we work together?

Although a lot of good work is being done Australia wide to manage natural disaster risk, there is always a need to review what is done so that we can all do better. NSW and other States and Territories have recently been completing statewide natural disaster risk assessments to support this process.



In NSW, we examined how our agencies work together and identified those factors that impact on our ability to work with and on behalf of the community to manage natural disaster risk. As part of this process, individuals from a range of agencies across the sector worked together to identify and assess these risks. This included identifying what more could be done and how we could do it.

This process is now complete. From this, work is underway in some key areas to further review how agencies work together and with the community. These projects will focus on the following priority areas:

1. Reviewing community awareness and community engagement programs

Emergency services agencies all have responsibility for providing information to the community about natural hazards. This includes providing advice to individuals and business about what should be done before, during and after an emergency. These activities are vitally important in improving community resilience.

Work will include:

- Undertaking a stock take of current activities
- Looking at the use of social media
- Undertaking research to better understand community expectations and behaviours during a natural disaster
- Examining current warning tools and messages
- Identifying how we can improve community awareness and engagement programs.



2. Strengthening infrastructure capability and capacity

There are many physical works that are undertaken to assist in reducing the impact or likelihood of some natural hazards. These include construction or maintenance of levees or fire trails.

A range of factors impact on the success of these works including weather conditions, funding and accessing the right people or equipment. This project will:

- Identify what policies and practices are used to deliver mitigation works
- What issues impact on their successful delivery
- Identify how these projects are funded
- Agree how improvements might be made to allow for the successful delivery of these works.

3. Improving land-use planning

Land use planning, through the use of development controls and building standards, can help communities and emergency services organisations by ensuring that developments consider the risk of natural hazards. This should include all natural hazards in all communities. This work will examine:

- How land use planning guidelines and building standards support hazard management
- What improvements could be made
- How this information might be shared with the community.

4. Undertaking resource management and volunteer capacity review

Natural disasters can extend over a long period of time and create a huge demand on emergency workers and volunteers. This demand can extend over many months, across large areas of NSW. This process will:

- Identify what skills and resources currently exist
- Identify what skills and the level of resources that are needed to support our communities
- Agree how we might encourage increased volunteerism
- Identify how we can better manage and support the people that work with communities during natural disasters.

5. Enhancing capability

In today's world, skills and capabilities should be continually improved. Some specific areas have been identified, across hazards, which would benefit from change or improvement. This includes looking at content, delivery of and access to training programs.



6. Improving information sharing and knowledge management

It is important to make sure those individuals and agencies who work together before, during and after a natural disaster have access to the information that is needed to get the job done. Often, this means knowing who to speak to and where information can be found. This project aims to:

- Identify what information would assist in making decisions before, during and after natural disasters
- Agree what changes are needed to our current information sources to assist decision makers.

7. Reform governance and coordination arrangements

Governance refers to the set of responsibilities and practices, policies and procedures, used in agencies to ensure that services are delivered to the community and Government^{xiv}. It is important to ensure that these arrangements are working to achieve what the community expects from Government and that agencies are supported by the right legislation, policies and procedures. This project will include:

- Identifying what legislation, policies and procedures currently exist
- Agree what changes, if any, are needed to ensure that governance structures allow agencies to deliver services to the community.

7. Additional resources

There is a wealth of information available for you and your family, schools, parents and other carers, businesses and rural landholders to find out more about natural disasters and what you need to do.

The lists that follow are not all encompassing but provide links to some resources that might be of assistance.

Teaching resources	
Ambulance Service of NSW	http://www.ambulance.nsw.gov.au/Community-Info/Community-Education-Programs/Emergency-Helpers.html
Emergency Management for schools	http://www.ema.gov.au/www/ema/schools.nsf
Fire & Rescue NSW	http://www.fire.nsw.gov.au/page.php?id=949
Geoscience Australia	http://www.ga.gov.au/education.html
NSW Rural Fire Service	http://www.rfs.nsw.gov.au/dsp_content.cfm?cat_id=1012
NSW State Emergency Service	http://www.ses.nsw.gov.au/community-safety/schools/

Games	
Triple Zero Kids Challenge	http://kids.triplezero.gov.au/
Stop Disasters Game	http://www.stopdisastersgame.org/en/home.html

Hazard specific information	
Bureau of Meteorology – severe weather fact sheets	http://www.bom.gov.au/nsw/sevwx/facts/index.shtml
Bureau of Meteorology: <i>Stormy Weather, a century of storms, fire, flood and drought in NSW</i>	http://www.bom.gov.au/nsw/sevwx/facts/stormy-weather.shtml
Bush fire – NSW Rural Fire Service	http://www.rfs.nsw.gov.au/
Bush fire – rural communities	http://www.dpi.nsw.gov.au/agriculture/emergency/bushfire
Cyclone – NSW State Emergency Service	http://www.ses.nsw.gov.au/community-safety/tropical-cyclones/
Earthquake – Emergency Management Australia – earthquake action guide	http://www.em.gov.au/Documents/Action_Guide_Earthquake.pdf
Flood – NSW State Emergency Service FloodSafe program	http://www.ses.nsw.gov.au/community-safety/floodsafe/

Hazard specific information	
Flood – rural communities	http://www.dpi.nsw.gov.au/agriculture/emergency/flood
Heatwave – NSW Health	http://www.health.nsw.gov.au/campaigns/beattheheat/prepare_for_heat_wave.asp
Landslide – Queensland Government guidance	https://www.qld.gov.au/emergency/dealing-disasters/landslides.html
Landslide – NZ Government guidance	http://www.getthru.govt.nz/web/GetThru.nsf/web/BOWN-7GZVAV?OpenDocument
Storm – NSW State Emergency Service StormSafe program	http://www.ses.nsw.gov.au/community-safety/stormsafe/
Storm surge – NSW State Emergency Service StormSafe program	http://www.ses.nsw.gov.au/community-safety/stormsafe/
Tornado – NSW State Emergency Service StormSafe program	http://www.ses.nsw.gov.au/community-safety/stormsafe/
Tsunami – NSW State Emergency Service Tsunami Safe program	http://www.ses.nsw.gov.au/community-safety/tsunami

Animals	
Pets and livestock generally	http://www.emergency.nsw.gov.au/pets_livestock
Department of Primary Industries – pets	http://www.dpi.nsw.gov.au/agriculture/emergency/management/publications-advice/advice-pet-owners-emergencies
Department of Primary Industries – animals more generally	http://www.dpi.nsw.gov.au/agriculture/emergency/management
Department of Primary Industries – animal holding establishments	http://www.dpi.nsw.gov.au/agriculture/emergency/management/publications-advice/emergency-guide-animal-holding-establishments
Department of Primary Industries – horse owners	http://www.dpi.nsw.gov.au/agriculture/emergency/management/publications-advice/emergency-assistance-for-horse-owners
RSPCA	http://kb.rspca.org.au/What-preparations-should-I-make-for-my-pets-in-case-of-an-emergency_455.html

More generally	
Disaster welfare	http://www.emergency.nsw.gov.au/disaster_welfare
Food safety in emergencies	http://www.foodauthority.nsw.gov.au/consumers/keeping-food-safe/emergencies/
NSW Health	http://www.emergency.health.nsw.gov.au/
Red Cross	http://www.redcross.org.au/emergency-resources.aspx

More generally	
Rural Assistance Authority	http://www.raa.nsw.gov.au/
Rural emergency card	http://www.workcover.nsw.gov.au/formspublications/publications/pages/WC04839_RuralEmergencyCard.aspx
Standard Emergency Warning Signal	http://www.emergency.nsw.gov.au/sews
Emergency Alert	http://www.emergencyalert.gov.au/

Businesses

Businesses should consider their exposure to natural hazards as part of a wider business continuity or risk management planning process. However, some specific materials exist that may provide some specific help.

Hazard specific	
Business FloodSafe	http://www.ses.nsw.gov.au/community-safety/floodsafe/bus-floodsafe/about
Bush Fire safety for business – NSW Rural Fire Service	http://www.rfs.nsw.gov.au/dsp_content.cfm?cat_id=1264
Fire safety – Fire & Rescue NSW	http://www.fire.nsw.gov.au/page.php?id=3

More generally	
Australian Government Emergency Management and Recovery guidance documents	http://www.business.gov.au/business/topics/emergencymanagementandrecovery/pages/default.aspx
Small business safety checklist (includes emergencies)	http://www.workcover.nsw.gov.au/formspublications/publications/Documents/small_business_safety_checking_out_your_workplace_checklist_1284.pdf
Small Business NSW – Dealing with disaster	http://www.smallbiz.nsw.gov.au/run/strategy/pages/dealingwithdisaster.aspx
NSW Natural Disaster Assistance Schemes	http://www.emergency.nsw.gov.au/nddassistance
Financial and other relief arrangements – targeting small business	http://www.business.gov.au/Newsandfeatures/2011/Jan/Pages/Emergencyrelieffordisasteraffectedbusinesses.aspx
Natural Disaster Relief Scheme – from a rural or regional perspective	http://www.raa.nsw.gov.au/assistance/natural-disaster-relief
Business continuity planning	http://toolkit.smallbiz.nsw.gov.au/chapter/18/92
OH&S and volunteers in NSW	http://www.workcover.nsw.gov.au/formspublications/publications/Documents/bushfire_emergency_serv_rescue_volunteers_info_5736.pdf
sydneyAlert	http://www.emergency.nsw.gov.au/sydneyalert

Appendices

Checklists

The checklists within this section provide some basic guidance regarding natural disasters.



Household Checklist



Household Emergency Kit

Specific information also follows for:



Older people



People living with a disability or with special needs



Members of culturally or linguistically diverse communities



For hazard specific information please contact the relevant emergency services organisation.

- Bush fire survival plans – http://www.rfs.nsw.gov.au/file_system/attachments/Attachment_BushFireSurvivalPlan.pdf
- FloodSafe – <http://www.ses.nsw.gov.au/community-safety/floodsafe/>
- StormSafe – <http://www.ses.nsw.gov.au/community-safety/stormsafe/>
- TsunamiSafe – <http://www.ses.nsw.gov.au/community-safety/tsunami>



Household Checklist

Before a natural disaster or other emergency

- Have you identified the hazards which exist in your area?
- Have you completed a specific plan for the hazards in your area?
- If there was a natural disaster or other emergency, what would be your trigger to take action?
- If you need to leave, where will you go, when will you leave and what will you take?
- Have you prepared an emergency kit?
- Have you prepared your property for the types of hazards in your area?
- Have you thought about animals or pets in your care?
- Write down important contact details now

Family contact details			
In a life threatening emergency call 000			
Bush Fire Information	1800 679 737	Hospital	
Floods, storms, tsunami	132 500	Doctor	
Traffic information	132 701	Council	
Water		Vet	
Electricity		Telephone service/s	
Gas company		Internet provider	
School/s		Insurance company/ies	
Child care		Bank/s	

During a natural disaster or other emergency

- If you have a plan for a particular type of natural disaster or other emergency such as a bush fire or flood, refer to it and take action
- If you can, move to a safer location
- Where will you get information?

Bush fire	www.rfs.nsw.gov.au	1800 679 737	@nswrfs
Storms, floods and tsunami	www.ses.nsw.gov.au	132 500	@nswses
Other emergency information	www.emergency.nsw.gov.au	-	@nswpolice
Local radio stations (list)			

After a natural disaster or other emergency

- Stay aware – keep watching and listening and look at what is going on around you
- Check on your neighbours and other vulnerable people in your community
- Contact your insurer



Household Emergency Kit checklist

Basic home Emergency Kit
<input type="checkbox"/> Battery operated radio (with spare batteries)
<input type="checkbox"/> Torch (with spare batteries)
<input type="checkbox"/> First aid kit and manual
<input type="checkbox"/> Personal hygiene and toiletry supplies
<input type="checkbox"/> Copies of home and medical insurance policies in waterproof bags or scanned documents on a USB stick
<input type="checkbox"/> Copies of important family documents (birth certificates, passports and licences) in waterproof bags or scanned documents on a USB stick
<input type="checkbox"/> Copy of your Emergency Plan in a waterproof bag or scanned documents on a USB stick

Evacuation Emergency Kit

If it seems likely that you may have to evacuate you should add the following to your basic home Emergency Kit:

Evacuation Emergency Kit
<input type="checkbox"/> Bottled water
<input type="checkbox"/> Mobile phone, spare batteries and charger
<input type="checkbox"/> Supplies of prescribed medications (including prescriptions)
<input type="checkbox"/> Spare clothes and blankets
<input type="checkbox"/> Spare home and car keys
<input type="checkbox"/> Cash and credit cards
<input type="checkbox"/> Food and medications for your pets



Older people^{xv}

Everyone has different needs and abilities and there are steps you can take to prepare for all kinds of natural disasters or other emergencies. In addition to your personal Emergency Plan, you should:

- Create a support network of people (more information below) who will help you prepare for and cope with a natural disaster or other emergency.
- Consider how an emergency might affect your individual needs.
- Create a medical information list with details of your illnesses/conditions, doctors and medications (more information below).

Support network

If you think that you might need help during a natural disaster or other emergency, talk to people you trust, such as family and friends, who can be part of your personal support network. These people should know what your abilities and needs are and be able to help at short notice. It's best to include a minimum of three people, including someone who can check on you immediately if something occurs.

Write down and share each aspect of your personal Emergency Plan with everyone in your support network.

Medical information list

Your medical information list should include:

- Medical conditions you have
- Emergency contact details for your doctors and other medical providers
- The names of medications you take, their dosages and other instructions
- The name and phone number of the doctor who prescribed them
- The type of health insurance you have, your membership number and the provider
- Any adaptive equipment you use
- Any allergies you have
- Your blood type
- Any physical limitations you have
- Any communication/cognitive difficulties you have.





Do you have a disability or do you have special needs?

What can you do to reduce the effects of the disaster and to develop an Emergency Plan?

Start by considering the following actions:

- Create a support network of people who will help you prepare for and cope with a natural disaster or other emergency
- Consider how you may be affected in a natural disaster or other emergency
- Complete a personal assessment of your needs
- Create an emergency information list
- Create a medical information list
- Create and regularly review your evacuation plan
- Create a list of your disability related supplies and special equipment

Support network

If you think that you might need assistance during a natural disaster, talk to people you trust (such as family and friends) who will be part of your personal support network. The people on your list should know what your capabilities and needs are and be able to offer help at short notice. It's best to include a minimum of three people, including someone who can check on you immediately if a natural disaster or other emergency occurs.

Write down and share each aspect of your personal Emergency Plan with everyone in your support network.

How will you be affected?

In the event of a natural disaster or other emergency you may not be able to:

- Do anything that requires electricity (eg cook, cool/heat your home, charge your mobile phone, turn the lights on, use your television or radio)
- Make or receive calls
- Use teletype equipment
- Use devices such as oxygen, suction devices or home dialysis equipment

Personal assessment

It is important to think about what you will be able to do for yourself and what you will need help with in the case of a natural disaster or other emergency.

Start by making a list of personal needs and the resources available, using the questions below as a guide.

Think about the basics:

- What sort of personal care assistance will you need in the event of a natural disaster or other emergency (e.g. help with bathing, dressing)?
- Do you need special utensils to prepare or eat food independently?
- Do you need access to electricity for equipment such as dialysis machines, electric lifts etc?

Mobility issues

- If you use a specially equipped transportation vehicle, will you need help to use it following a natural disaster or other emergency?
- What will you do if your access ramp is unusable?

Will you need help?

- What will you do if the person you depend upon is not available?
- In the event of an evacuation, will you need help to leave your home?
- If the lift in your building is not working or cannot be used, is there another exit you can use?
- Will you need help to use this alternative exit?
- How will you let someone know that you need help to leave the building?
- What will you do if you do not have access to mobility aids (e.g. wheelchair or guide dog)?
- How will you care for your guide dog or pet during and after a natural disaster or other emergency?

Emergency information list

An emergency information list will let others know who to call if you are unable to communicate during a natural disaster or other emergency. Keep copies of the list near your telephone and on your fridge.

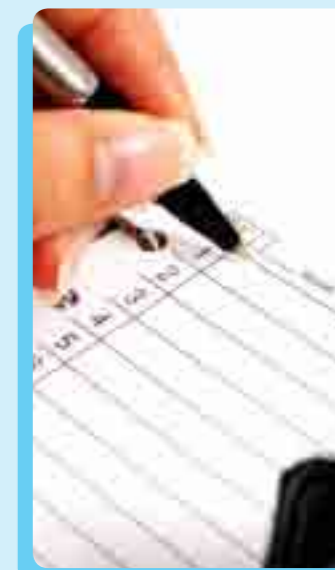
Write down how it would be best to communicate with you in a natural disaster or other emergency. You should also list the name, phone number/s and address for each person (including your own details). People on your list should include:

- Your doctor
- Your care worker (if you have one)
- A close relative or friend.

Medical information list^{xvi}

You should also prepare a medical information list, which should include:

- Medical conditions you have
- Emergency contact details for your doctors and other medical providers
- The names of medications you take, their dosages and other instructions
- The name and phone number of the doctor who prescribed it
- The type of health insurance you have, your membership number and the provider
- Any adaptive equipment you use
- Any allergies you have
- Your blood type
- Any physical limitations you have
- Any communication/cognitive difficulties you have.



Evacuation plan

1. Talk to your care worker (if you have one), family and friends to develop a simple evacuation plan. Your plan should include information on how you will contact each other in the case of a natural disaster or other emergency (don't rely solely on a home telephone as this service may not be available).
2. Show the people who will help you how to operate and safely move any equipment that you use for your disability and practise with it.
3. If you have a guide dog, make sure it knows the people who will help you, as this will make it easier for the dog to accept instructions from them in a natural disaster or other emergency.
4. Draw a floor plan of your home, marking up the primary escape route, secondary escape routes, the location of equipment and medications you need and a central meeting place outside your home (e.g. letterbox).
5. Prepare a care plan for your guide dog/pets (remembering to take a collar, harness, identification tags, food and medical records).
6. Give a copy of your evacuation plan to the relevant people and keep a copy on your fridge.
7. Practice your evaluation plan with the relevant people.

Disability related supplies and special equipment

Write a list of your disability related supplies and special equipment you will need in the event of a natural disaster or other emergency.

Include a description of what they look like and where they can be found.

**Are you a member of a culturally or linguistically diverse community?**

Emergency services organisations in NSW all have programs that can assist you to plan and prepare for natural disasters and other emergencies.

A summary of the fundamentals has been developed and translated into a range of community languages. This can be found at www.emergency.nsw.gov.au.

The Commonwealth Government has also prepared information sheets in pictorial form that provide information on cyclone, earthquake, flood, heatwave, severe storm and lightning.

These can be found at the Emergency Management Australia website: <http://www.em.gov.au/Emergencymanagement/communityengagement/Pages/Communitysafetyactionguides.aspx>

Natural hazards

The following pages provide more information on some natural hazards that occur in NSW from time to time.

You will find information on:

- Bush fire
- Cyclone
- Earthquake
- Flood
- Heatwave
- Landslide
- Storm
- Storm surge
- Tornado
- Tsunami

Bush fire^{xvii, xviii}

While bush fire activity in Australia occurs in most landscapes that carry fuel (e.g. grasslands, forests, scrub and heath lands), the two main bush fire types in Australia are grassland fires and forest fires.

The level of bush fire hazard is influenced by several factors; however fire behavior is usually driven by weather conditions, fuels and the landscape at the location of the fire.



High winds can contribute to the impact of a fire by increasing the spread rate of the fire, as well as by carrying burning embers further downwind (causing 'spotting'). Significant and rapid changes in the wind direction associated with cold fronts can result in rapid increases in the size of the fire front, as was the case with bush fires on Ash Wednesday in Victoria and South Australia in 1983. Local wind effects caused by the landscape also make it difficult to predict how a fire may progress.

The dryness of fuels is directly affected by rainfall amounts preceding a bush fire and the atmospheric conditions, such as relative humidity, at the time of the fire.

Relative humidity is an indication of the amount of water vapour in the atmosphere and this has a significant impact on fire activity. Very low relative humidity levels coupled with a series of hot days can rapidly dry out fire fuels like leaves, grass and twigs – producing the ideal conditions for fires.

Fuel load is the other main contributor to bush fire hazard. A region with less available fine fuel will result in a lower intensity fire compared to a region with a higher fine-fuel load, assuming all other factors are equal. As the type and arrangement of available fuel affects the intensity and spread of a fire, specific fuel management practices, such as prescribed burning or mechanical slashing, can have a significant impact on bush fire intensity. Fire agencies in NSW work all year to reduce the intensity of fires by undertaking strategic hazard reduction burns and fire mitigation activities, like mechanical slashing.

In NSW, the peak bush fire risk usually occurs in spring and early summer. Typically bad bush fire weather occurs when a deep low pressure system is located south of Tasmania, which results in hot, dry, desert westerly winds blowing over the State.

Severe bush fire activity is associated with specific weather conditions. These include a lack of rain, high temperatures, low humidity and high winds. While there are bush and grass fires every year in NSW, the climatic and weather conditions that give rise to very severe bush fire conditions occur less frequently.

Causes of bush fire include human and natural factors. Human factors including arson and accidental ignitions are a major cause of fires across NSW. Lightning associated with thunderstorm activity is also a significant cause of bush fire. While thunderstorms can occur at any time, there is a marked tendency for thunderstorm activity between October and March each year.

Timing

Bush fires occur during periods of hot weather. 'Bush fire weather' is generally of a short term nature within the climatic variation typical for Australia. Whilst bush fires can be expected any time in the summer season, the worst bush fires tend to occur during the following meteorological conditions:

- an extended drought, or after six to eight weeks of dryness in south-eastern Australia
- unstable atmospheric conditions
- air temperature 37°C or higher
- average wind of 55 kph in the open, or faster
- relative humidity of 15% or less.

No one can forecast accurately when significant bush fire activity will occur. What is certain is that the longer a district goes without bush fire, or without simulating the effects of mild bush fire, the more severe a bush fire will be when it comes.

In NSW there are a number of people living in areas that have been deemed 'bush fire prone'. This is an area of land that can support a bush fire or is likely to be subject to a bush fire attack. Bush fire prone areas are identified on a bush fire prone lands map which have been prepared for most councils across NSW. The map identifies bush fire hazards and associated buffer zones within local government areas. To find out if you live in a bush fire prone area, contact your local council and ask to view your local bush fire prone land map.

It is important people take steps to protect their lives and property before a bush fire hits.

When threatened by bush fires, people will often leave it too late to make critical decisions and often have few safe options left. There are things that people can do now to prepare and to understand their level of risk. The first step is having a Bush Fire Survival Plan which can be downloaded from www.rfs.nsw.gov.au.



September / February 2002-03 – South Eastern NSW^{xix, xx}

The frequency of extreme fire weather days was unprecedented, running from early spring 2002 to late summer 2003. This was coupled with an extreme drought. Another factor contributing to the severity of some fires was the significant and widespread lightning activity that occurred early in the season in the northern half of the state and in mid-summer in the south. Because fuels were extremely dry, the lightning strikes caused more fires than is normally the case.

Three people died in NSW and almost 1.5 million hectares were burned. Catastrophic fires burned into the southern suburbs of Canberra on 18 January 2003 claiming four lives, causing 450 injuries and destroying 488 houses. Damage exceeded \$350m.

Cyclone^{xxi, xxii}

A tropical cyclone is a low-pressure system which develops in the tropics and is sufficiently intense to produce sustained gale force winds of at least 63 kilometres/hour extending at least half-way around its centre. If the sustained wind reaches hurricane force of at least 118 kilometres/hour the system is defined as a severe tropical cyclone. In other parts of the world they are called hurricanes or typhoons.

Tropical cyclones develop over very warm tropical waters from pre-existing tropical weather disturbances. They have relatively long life cycles, of the order of up to about two weeks. Weather systems originating as tropical cyclones in the Coral Sea or the Gulf of Carpentaria do sometimes affect NSW bringing very strong winds, flooding rains, very high seas and storm surges. High seas and storm surges may cause erosion of sand dunes and in severe cases may expose landward areas to sea water inundation.

The primary impacts from cyclones are severe wind, heavy rainfall and storm surges. The northern parts of the state, especially the coastal areas, are the most affected but the impacts of these systems can extend as far south as Sydney.

Examples include ex-Tropical Cyclone Nancy, which crossed the NSW coast at Byron Bay in February 1990, and ex-Tropical Cyclone Zoe which crossed at Coolangatta / Tweed Heads in March 1974. Ex-Tropical Cyclone Violet caused very high seas between Coffs Harbour and Ballina in March 1996 and flash flooding in coastal areas. A cyclone in 1954 which crossed the NSW coast around Tweed Heads caused extensive flooding and resulted in 26 deaths.

Cyclone season in Australia is between November and April, but cyclones can still occur in the month of May.

20 February 1954^{xxiii}

On 20 February 1954 TC137 crossed the coast near Tweed Heads as a severe tropical cyclone, then moved southwards inland from Ballina, Coffs Harbour and Port Macquarie as a category 1 cyclone. Twenty six people died in NSW during this event.



Earthquake^{xxiv, xxv, xxvi, xxvii}

The effects of an earthquake depend on many factors, such as the distance from the epicentre (the point on the Earth's surface directly above where the earthquake originated), the originating depth and the local ground conditions.

Although recognition of earthquake hazard in Australia is low amongst the general public, earthquakes in Australia do occur and can be considered low probability but high consequence events.

The Australian insurance industry is very aware of the earthquake risk and annually transfers in the order of \$200-300 million to re-insurance companies overseas in order to reduce their exposure. The reinsurance companies rate an earthquake in Sydney within their 20 top risk exposures worldwide.^{xxviii}



Earthquakes occur throughout NSW with events of moderate magnitude being recorded sporadically throughout the State. However, there are several clusters of greater seismic activity.

- Newcastle region – earthquake risk maps did not note the Newcastle region as being of particularly high seismicity until the damaging earthquake there in December 1989. In retrospect, the historical record shows seven felt events in the region in the previous 100 years.
- The Dalton Gunning region in the Southern Tablelands has long been noted as an important source of seismic activity. Damaging earthquakes were located there in November 1934 (magnitude 5.6) and March 1949 (magnitude 5.5).
- Earthquakes near Sydney – many of the earthquakes felt in Sydney have originated to the south of the city. Significant earthquakes have occurred near Picton (1973), and near Bowral (1961).
- West of Sydney, the Kurradjong fault near Lapstone shows evidence of large earthquakes occurring in recent geological times (between 10,000 and 200,000 years ago).

Newcastle – 1989

At 10.27am on Thursday 28 December 1989 a 5.6 Richter scale earthquake shook Newcastle and was felt as far as 500 kilometres away.

In Newcastle it caused damage, ranging from small cracks to total collapse, to over 35,000 homes, 147 schools, and 3,000 commercial and other buildings/structures. Many vehicles were also damaged by falling debris. Numerous buildings beyond the immediate region, as far away as Scone, Gladstone (near Kempsey) and Sydney also suffered minor damage, with an estimated total of damaged buildings to 50,000 throughout central-eastern NSW.

The shaking only lasted about five to six seconds but was felt (particularly in tall buildings) over large distances from the epicentre. There were very high uninsured infrastructure and commercial/industrial losses. Total losses have been estimated at around \$4.5 billion. Approximately 70,000 insurance claims (64,000 home/contents and 6,000 commercial) were paid in the months following the disaster.

Nine of the 13 people killed during the earthquake died at the Newcastle Workers Club, where walls and multiple floors collapsed, sending 300 tonnes of concrete plummeting to the ground-floor car park. At the Kent Hotel in Beaumont Street, Hamilton, another three people died. One other person died of earthquake induced shock.

Flood^{xxix, xxx}

Within this section, the focus is on flooding caused by rainfall or dam failure.

Characteristics of rainfall flooding

Rapid onset or 'flash' flooding occurs very soon after the rain which causes it and in the same general area. It can occur anywhere in the state when the intensity of the rainfall overwhelms natural or artificial drainage systems. Such flooding commonly occurs from stormwater drains in built-up areas, on the headwaters of rivers and on short creeks. Less frequently, it happens over large areas of the NSW inland.



Flash flooding is especially a problem in the larger urban areas of Sydney, Newcastle, the Central Coast and Wollongong, in near-coastal environments where communities have developed on and immediately below steep escarpments (such as at Coffs Harbour) and in developed areas on or immediately below the western side of the ranges (headwaters of the Murray-Darling river system). Such flooding usually abates very quickly but in steeply-sloping areas can be of dangerously high flow velocities.

Slow onset or 'riverine' flooding differs in characteristics between the coastal and inland areas of the state. Most of the coastal streams are short and of relatively steep gradient, floods rise quickly, flows can be of high velocity and inundation even on the low-lying floodplains near the coast proper usually lasts only for days.

In the low-lying, flat, western parts of the state, the results of overland flooding from heavy rain can last for long periods with very slow flow towards main rivers.

Flooding on the lower reaches of coastal streams and around the lakes along the coast can be worsened by their interaction with ocean conditions, including tide conditions and storm surges.

Characteristics of dam failure flooding

This is extremely rare in NSW with dams with the potential for significant impacts being closely monitored. There have been cases of very small farm dams failing, leading to limited and very localised flooding. Several significant dams in NSW have been identified as being 'deficient' as their spillway capacities are insufficient to pass their design floods. Hence, during very severe floods their walls may be overtopped leading to a strong chance of failure. Such severe flooding, however, should be recognised as being rare. Dam owners have programs in place to enhance dams so that they can safely pass their design floods.

Timing and influences

Floods can occur at any time of year in any part of NSW but are generally more frequent in the northern half of the State during summer and the southern half of the State during winter.

Flooding is more frequent where there is a positive SOI (Southern Oscillation Index) in 'La Nina' weather patterns but flooding can still occur even during periods of drought.



January 2012 - various regions

Heavy rain just prior to Australia Day, 2012 resulted in major flooding on the NSW North Coast. In the following days the north west of the State received very heavy rain that resulted in the flooding of 340 properties in Moree and the lengthy isolation of many towns including Walgett, Collarenebri, Brewarrina, Goodooda and Mungindi.

On the 27th of February, torrential rain in the Snowy Mountains, followed a few days later by downpours in the Riverina resulted in the worst flooding in that part of the State for a generation. Nearly 2,000 properties were affected by over-floor flooding including North Wagga Wagga, Yenda and The Rock and towns around Griffith and along the Billabong Creek.

The NSW SES received over 4,000 calls for help including 155 flood rescues.



Heatwave^{xxxii}

Heatwaves are estimated to cause more deaths in Australia than any other natural hazard except disease. Research suggests that during the period from the 1800s to the 1990s, heatwaves have been responsible for at least 4,287 fatalities in Australia^{xxxii}.

Human vulnerability to heat-related illness is determined by physiological, behavioural, environmental and social factors. While the entire community is at some risk of heat-related illness, certain groups are especially vulnerable. These include:

- the elderly
- infants and young children
- people with chronic medical problems or taking certain medications
- people who are socially isolated
- people who work outdoors.

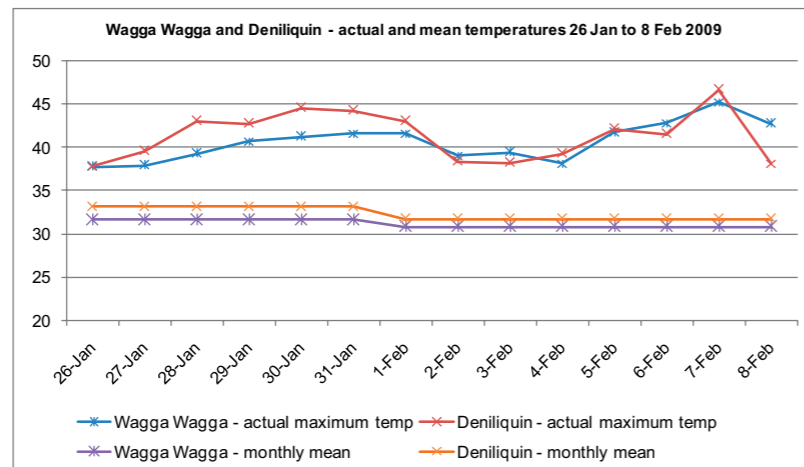
Recent events, both in Australia and internationally, have demonstrated the severe impacts of heatwaves on the health of people. For example, the 2003 European heatwave is estimated to have caused 15,000 deaths in France alone^{xxxiii}. In Victoria, 374 deaths were attributed to the prolonged period of hot weather in January 2009^{xxxiv}, with an estimated 500 deaths in Adelaide and Melbourne combined.

This 2009 heatwave in southern Australia was exceptional — producing severe, extensive and prolonged heat exposure, with extreme heat stress and a bushfire disaster. While the 2009 heatwave was well predicted in the three to seven day lead up, the seasonal forecasts did not anticipate such severe conditions^{xxxv}. Many emergency management services relied on responsive solutions to the emerging impacts caused by the heatwave. Communication and cross-agency cooperation generally lagged behind the demands from the overwhelming situations that emerged during the heatwave.

Heatwaves impact on human health, infrastructure, transport, emergency management and primary industries. Whilst NSW has well established systems in place to counter potential problems, any disruptions to utilities or transport could exacerbate the impact that heatwaves have on human health.

January / February 2009 - South Eastern Australia^{xxxvi}

The 2009 heatwave impacted a large area across SE Australia. It is considered one of the most extreme in the region's history. Although Victoria and South Australia were impacted most severely, areas of Southern NSW also experienced severe weather conditions.



Landslide^{xxxvii,xxxviii,xxxix, xl}

In Australia, landslides cause more problems than are generally recognised. They can vary in size from a single boulder in a rock-fall to tens of millions of cubic metres of material in an avalanche.



Landslides have caused loss of life. Many small events kill one or two people at a time, and do not receive media coverage. A total of 83 people are known to have been killed by 37 landslides in Australia since 1842. The number of fatal events may actually be much higher. An additional 85 people are known to have been injured.

Landslides have caused many instances of damage and disruption to houses, roads, railways, and pipelines. Total damage is estimated to total billions of present-day dollars.

Examples of areas in NSW which are known to be landslide prone include:

- coastal cliffs and the coastal hinterland of NSW
- the Great Dividing Range along the east coast
- the Illawarra Escarpment near Wollongong
- Sydney's northern beaches and the city's hinterland
- Razorback area, Southern Highlands
- Alpine regions
- Castle Hill and West Pennant Hills area
- Gosford, Lake Macquarie and Newcastle suburban areas

The most common trigger for landslides is intense rainfall. The rainfall threshold values for slope failure are in the range 8-20 mm over one hour, or 50-120 mm over a day, depending on geology and slope conditions^{xli}. Unfortunately it is difficult to predict with any accuracy where and when these types of trigger events will occur.

Nelligen - 2012

The Kings Highway was closed to traffic in both directions on the Clyde Mountain near Pooh Bear corner, west of Nelligen on Friday 20 April 2012 at around 1pm after a landslide. The road was closed for six days and more than 1,400 tonnes of rock and debris was cleared from the road, including unstable trees from the mountain. Temporary rock fall protection barriers have been installed and a reassessment of the geotechnical risks on Clyde Mountain is being undertaken to determine the most appropriate form of permanent rock fall protection to be installed.

Storm^{xlii,xliii}

Storms are the most costly natural disasters to affect NSW.

The Australian Bureau of Transport Economics estimates that storms cause an average of \$220 million annually in damage. The most damaging storm in NSW to date was the April 1999 Sydney hailstorm which resulted in a cost of \$2.2 billion.

On average, about four people in NSW die each year because of their direct effects (for example, lightning strikes and trees falling on houses) but there are additional deaths caused by indirect effects (for example, those relating to hazardous driving conditions on roads).

Storms can include damaging or destructive winds, heavy rain, snow, sleet, hail, ice and/or lightning and thunder. Features such as tornadoes or waterspouts, caused by severe thunderstorms, can also occur.

Storms can be local events affecting a town or a few suburbs such as a thunderstorm or large atmospheric circulations such as 'East Coast Lows' that affect very large areas causing both local flash flooding and riverine flooding. Such weather systems may also cause coastal erosion, as a result of the combined effects of large waves and increases in the sea level because of storm tide.

Often, the main wind damage from these synoptic storms or extratropical cyclones occurs in coastal areas and along mountain ranges. A notable example is the severe storm that tragically affected the Sydney-Hobart yacht race in December 1998.



Thunderstorms

The term 'thunderstorm' is a general term for relatively small-scale convective processes that develop when warm, humid air near the ground receives an initial upward push from converging surface winds and rises rapidly in an unstable atmosphere.

Thunderstorms bring associated lightning, thunder, hazardous wind gusts and heavy rain and can cause large hail up to cricket ball size.

Severe thunderstorms are the most common and most damaging storm agents in NSW, accounting for the great bulk of the total cost of damage. They are small-scale systems, with damage often only affecting areas a few kilometres across and they have short life spans ranging from tens of minutes up to several hours. One class of thunderstorms known as a 'supercell' is particularly severe with life spans up to six hours or so and extensive damage tracks.

The severe thunderstorm of 21 January 1991 that occurred over the northern suburbs of Sydney, for example, had a hail and damage path around ten kilometres wide and over 40 kilometres long.

Mid-Latitude Low-Pressure Systems (including East Coast Lows)

Intense low-pressure systems known as East Coast Lows generally develop over the Tasman Sea close to the coast and often intensify dramatically overnight. They have a compact size and deep low-pressure centre, and like tropical cyclones, can produce gale to storm-force winds, heavy rainfall and in some cases very high seas and storm surges. They commonly cause damaging winds, riverine and flash flooding and coastal erosion by large waves. The June long weekend floods and storms in the Hunter Valley in 2007 are a good example. The NSW SES received nearly 20,000 calls for assistance and major flooding occurred on the Hunter River. Nine people died as a result.

Low Pressure Troughs

Regions of low pressure that do not possess a closed circulation are known as low pressure troughs. Although they lack the damaging winds typical of cyclones and East Coast Lows, these systems are often the focus for thunderstorms and rain. Troughs on or near the east coast, combined with strong onshore winds, have been responsible for very severe flash flooding events such as at Coffs Harbour in November 1996 and Wollongong in August 1998.

Cold Fronts and Southerly Busters

Frontal activity can produce strong winds that generally shift from the west or northwest around to the southwest as they pass a location. Southerly Busters mostly affect coastal locations and the eastern flanks of the Great Divide, are common during the warmer months, and can produce damaging winds.

Cold Outbreaks

During the colder months, significant outbreaks of cold air may result in unseasonably cold temperatures and snowfalls on the ranges as far north as the Queensland border. These conditions can result in road closures and snow can bring down trees affecting roads and power and causing property damage and isolation. Examples of such events occurred in July 1965 and August 2005.



14 April 1999 - Eastern and Southern Sydney Hailstorm^{xliv, xlv}

This storm was a very intense and unusually long-lived supercell thunderstorm. It formed at about 4.25pm near Berry and tracked through the Kiama, Albion Park and Shellharbour areas where it deposited hail in large quantities. It then moved offshore before crossing the coast again near Helensburgh at about 7.00pm. Thereafter it headed north across the Sutherland Shire, Botany Bay (including Kingsford Smith airport) and the eastern suburbs of Sydney.

This was principally a hail event, although wind gusts of up to about 80 kilometres/h were recorded. Individual hailstones of at least 9cm diameter (soft-ball sized) were confirmed as having fallen.

The biggest storm damage operation ever conducted in Sydney was mounted. During the four weeks after the storm there were at times more than 3,000 emergency workers deployed from the SES, the NSW Fire Brigades, the Rural Fire Service, the Army, the Volunteer Rescue Association and the National Parks and Wildlife Service. SES crews from Victoria, Queensland, South Australia and the ACT joined the response.

The scale of the repair task was massive and the permanent repairing of roofs took months to complete. The total insurance payout, a year after the storm, was estimated at \$1.7 billion.

Storm surge^{xlvi}

A storm surge is a rise above the normal water level along a shore that is the result of strong onshore winds and/or reduced atmospheric pressure. Storm surges accompany a tropical cyclone as it comes ashore. They may also be formed by intense low-pressure systems in non-tropical areas.

The combination of storm surge and normal tide is known as a 'storm tide'. The worst impacts occur when the storm surge arrives on top of a high tide. When this happens, the storm tide can reach areas that might otherwise have been safe. On top of this are breaking waves and run-up which can further inundate low-lying areas.

Storm surge and storm tide will affect low lying coastal land and in extreme events can reach areas some metres of elevation above highest normal tide and can penetrate well inland if the topography is flat, or nearly so. Large open bays and areas adjacent to large expanse of shallow open water can be at more risk because these features can amplify the storm surge as it comes closer to the shore.

Storm surge in NSW occurs as a result of intense low pressure systems offshore of the NSW coast. These low pressure systems include tropical cyclones, ex-tropical cyclones and east coast lows.

The effects of storm surge may be intensified if storm surge conditions occur during periods of spring or extreme tides or in association with other tidal anomalies.^{xlvii}

Storm surge is a relatively uncommon source of flooding by comparison to riverine flooding and the likelihood is directly linked to that of the severe storm or cyclone event that induces it.^{xlviii}

Sydney 1974^{xlix}

Fully developed extra-tropical depressions similar to tropical cyclones occurred off the NSW coast. Extensive damage was caused with two large vessels driven ashore, a number of private yachts wrecked and six people killed. A feature of the storms was the manner in which heavy waves and swell were generated, particularly when the systems remained semi-stationary.

Tornado^{i,ii,iii,iiii}

Tornadoes are extremely damaging weather events that occur in conjunction with some severe thunderstorms. A tornado itself is an intense, localised, funnel-shaped vortex that extends from the thunderstorm cloud base to the ground. Tornadoes range in size from a few tens of metres across up to around one kilometre in diameter. Because of their relatively small size, damage is normally restricted to a small area but it can be very intense and may include the complete destruction of buildings.



While most common in North America, tornadoes have been observed across Australia. Approximately 360 tornadoes were recorded in NSW from 1795 to June 2003, but the incidence is certainly far greater given that many tornadoes occur in uninhabited areas and go unreported.

Tornadoes can also form over water associated with a line of showers or thunderstorms. Tornadoes that form over water are known as waterspouts, but if they move over land they are then referred to as a tornado and local damage can result.

Tornadoes are ranked using the Fujita F-scale (from F1 weakest to F5 strongest) which estimates wind speed based on the extent and severity of damage. Tornadoes seldom exceed F2 in Australia but these are still quite damaging and dangerous.

Most tornadoes in NSW occur in late spring and summer when thunderstorms are most active but they have been known to occur at all times of the year. Tornadoes have been reported across NSW including Sydney, Bulahdelah, Port Macquarie, Cobar, Gilgandra, Dubbo, Moree, Tumbarumba, Merimbula, Pambula and Tucabia. However, given the relationship between thunderstorm and tornado, it can be generally stated that tornadoes could occur anywhere in NSW.

Waterspouts in NSW are most common from late autumn into the winter period but can occur at any time of the year.

Tornadoes are thought to be formed by the interaction between regions of strong updrafts and downdrafts of air within severe thunderstorm clouds. The formation of some waterspouts is due to opposing surface wind directions. A thunderstorm does not always need to be present.

Lennox Head - 3 June 2010^{liv,lv}

12 houses were destroyed and debris was sent flying when the tornado careered in off the sea about 7:30am (AEST). The tornado caused "widespread devastation" and police said more than 30 houses were damaged. No deaths or major injuries were reported.

The local chamber of commerce estimated the tornado - spinning at about 150 kilometres/h and stretching more than one kilometre into the sky - caused \$1 million worth of damage to power lines and about \$250,000 worth of damage to public infrastructure such as bus shelters.

Tsunami^{lvi, lvii}

A tsunami is a series of ocean waves generated by a sudden displacement of large volumes of water. Tsunami may be caused by any one or combination of the following:

- vertical movement of the sea floor as a result of a large earthquake
- sub-marine or coastal volcanic eruptions
- meteor impacts
- coastal landslides and slumps, either land-based or sub-marine.

The size of tsunami can range from centimetres resulting in strong and unusual currents to tens of metres causing the flooding of coastal land.

Earthquakes have generated the majority of tsunami that have occurred in the Pacific and recorded on the Australian coast. However, no clear relationship exists between earthquake intensity and tsunami magnitude.

Tsunami travel outward in all directions from their point of origin and can strike coastal areas at great distances from the source. The generation of waves, however, is not necessarily symmetrical, and larger waves may travel in particular directions from the tsunami source.

Tsunami are primarily characterised by their long wave length, which can range from 10 to 500 kilometres long and tsunami speed is dependent on water depth. In deep water and in the open ocean, waves can reach speeds of 800 kilometres per hour. Heights of tsunami waves in deep water are only slight and the waves can go unnoticed. As a tsunami wave enters shallow water, its speed decreases rapidly. This causes the length of the wave to decrease and the height of the wave to increase.

At some locations, the advancing turbulent front will be the most destructive part of the wave. In other situations, the greatest damage will be caused by the outflow of water back to the sea, between successive tsunami waves.

Destruction from tsunami is the direct result of three factors: inundation, wave and debris impact on structures, and erosion. Strong tsunami-induced currents can lead to the erosion of foundations and the collapse of bridges and sea walls. Flotation and drag forces can move buildings and overturn vehicles. Tsunami associated wave forces can demolish buildings. Considerable damage is also caused by debris, including boats, uprooted vegetation, structural materials, cars and other vehicles that are swept along by the force of the water. Coastal erosion is another significant feature of tsunami.

Tsunami magnitude at the coast is dependent on the configuration of the coastline, the shape of the ocean floor, reflection of waves, tides and wind waves. Narrow bays, inlets and estuaries may cause funnelling effects that enhance tsunami magnitude. The combination of these factors means that the flooding produced by a tsunami can vary greatly from place to place over a short distance.

A tsunami is not one wave, but a series of waves. The time between the successive waves is usually between 5 and 90 minutes. Destructive waves may continue for a number of hours, and several days may pass before the sea returns to its normal state. The first wave in the series may not be the largest.

The initial appearance of a tsunami may also be as a rise or recession of coastal waters.

Tsunami impacting on harbours and bays can create damaging wave activity and currents. In these enclosed environments, maximum wave magnitudes may possibly occur somewhat later than the arrival of the initial wave. Even small tsunami can generate currents strong enough to cause damage to boats and associated facilities.

Tsunami warning time will differ depending upon the distance of the NSW coast from the point of tsunami generation.

The tsunami hazard in NSW can be generally linked to the location of undersea earthquakes. As previously noted, earthquakes are one of primary causal factors for tsunami. The earth's outer layer or crust is broken into pieces called tectonic plates which are constantly moving towards, away from or past each other. Because continents are part of these plates, they also move. An earthquake occurs when the rocks break and move as a result of stresses caused by plate movements.

Most earthquakes occur on the edge of plates, especially where one plate is forced under another.

Regional earthquake sources are major contributors to the tsunami threat facing NSW. The largest sources are the Vanuatu Trench, Tonga-Kermadec Trench and the Puysegur Trench (South Tasman Sea).

Distant earthquakes have the potential to generate tsunami which can affect NSW. Within European history, the largest tsunami have come from South America (1960, 1877 and 1868).

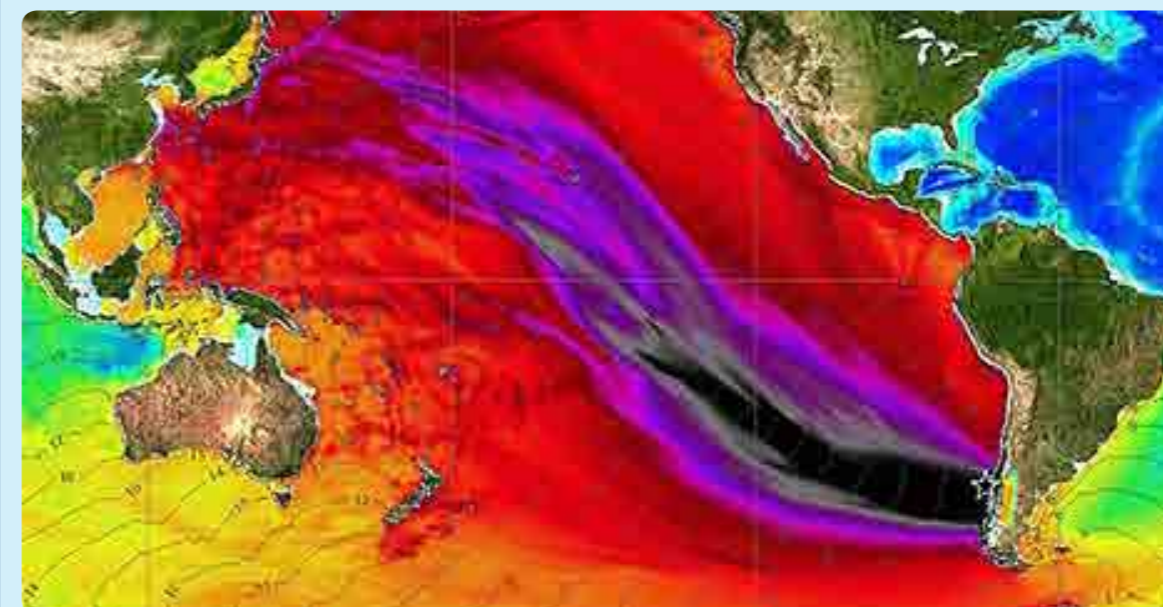
23 May 1960 - Chilean tsunami^{lviii}

The most significant tsunami impact on the NSW Coast in recent times occurred on 23 May 1960 following a magnitude 9.5 earthquake in Chile about 17 hours earlier. This tsunami provides an example of the worst case scenario for a distant source.

The tsunami measured up to one metre in Sydney Harbour, 1.2 metres at Iluka and 1.8 metres at Eden.

It caused rapid fluctuations in water levels in many enclosed harbours including Evans Head, Newcastle, Sydney, Batemans Bay and Eden.

In Sydney Harbour, boats were damaged when torn from their moorings. The Chilean earthquake is to date the largest recorded by modern instruments. The amplitude and course of the tsunami is shown below:



Volunteering

Section 2: *NSW Community context* discussed the importance of volunteers. More details are provided here about volunteer opportunities and volunteering more generally. Volunteers can be involved in directly dealing with the emergency through roles such as firefighting, rescue or storm recovery, or through important support roles like catering, communications and transport.

Examples of volunteer opportunities follow.

NSW Rural Fire Service	The NSW Rural Fire Service (RFS) relies on volunteer fire fighters. The RFS has over 70,000 volunteers across NSW who attend bush fires and other emergencies. There is a role for almost everyone, from firefighting to communications, community engagement, logistics or aviation support.
Fire & Rescue NSW	Fire & Rescue NSW relies on over 7,100 volunteers who form the Community Fire Unit program. This program trains and equips residents of communities in bushfire prone areas to prepare their homes and reduce bushfire risk. The 577 Community Fire Units also assist with ember extinguishment following a bushfire.
NSW State Emergency Service	The NSW State Emergency Service has more than 10,000 volunteers based at 228 locations throughout NSW. These volunteers assist their communities during floods, storms and other emergencies.
St John's Ambulance	St John's Ambulance provides training to first aid volunteers.
Volunteer Rescue Association	The Volunteer Rescue Association (VRA) is an affiliation of 63 community based rescue squads accredited by the NSW Minister for Police and Emergency Services to provide primary rescue services. The VRA provides general land, motor vehicle, industrial, rural, vertical (high angle), inland water (rivers, dams, etc), caves, underwater (search and recovery), wilderness, aerial observation, alpine search and rescue and communications.
NSW Ambulance Service	The Ambulance Service of NSW works with over 130 Honorary Ambulance Officers who, along with paid staff, provide first aid to the sick and injured as well as first aid response to incidents in remote areas of NSW.
NSW Police Force	Volunteers in Policing (VIPs) provide a range of administrative voluntary tasks which are not competitive with established police roles. Around 800 VIPs perform duties at 120 locations across the state. VIPs assist Police in victim support, customer service, supporting witnesses in attending court and in the promotion of crime prevention initiatives including maintenance of local community registers.
Marine Rescue NSW	Marine Rescue NSW supplies three core services: <ul style="list-style-type: none"> • Search and rescue for marine emergencies • Boating safety education and training • Radio coverage along NSW coastline
ADRA	The Adventist Development and Relief Agency (ADRA) provides emergency accommodation services during emergencies.

Australian Red Cross	The Australian Red Cross provides resources to help during and after disasters in Australia. This includes providing personal support in evacuation centres, disaster recovery centres or the State Enquiry Centre. For further details you can contact the Red Cross NSW Emergency Services.
Anglicare	Volunteers are a vital part of Anglicare, and are involved at many levels within the organisation. Contact the Volunteer Support Manager for more information.
The Salvation Army	The Salvation Army Emergency Services teams are often found in the midst of crisis and disaster situations nationally and internationally. The teams specialise in food services - providing for displaced victims as well as the SES, other emergency services and support staff.



The NSW Department of Education and Communities has information on these and other organisations through the Office of Volunteering at <http://www.volunteering.nsw.gov.au>.

But....think ahead!

The time to register your interest in becoming a volunteer is not during a natural disaster or other emergency. This is something that you should consider before something happens, alongside other planning activities.

During a natural disaster or other emergency, the organisation that you may be interested in becoming a part of will be focused on providing help to those in need. Although well intentioned, contacting them during this time may distract resources from where they are most needed.

Remember that **volunteers need training** and may put themselves and others in danger if they are placed in situations that they are not prepared for. This is why it is important to think ahead and contact the organisation that you are interested in before something happens.

Volunteers – know your rights!

Many employers are strong supporters of volunteers and during a natural disaster or other emergency; volunteers might be required to spend time away from their job. Volunteers are entitled to protection from any negative impacts from employers during these periods. Depending on the scale of the natural disaster, the government may provide protection above and beyond that which is standard under the Commonwealth *Fair Work Act 2009* and the *NSW Work, Health and Safety Act, 2011*. Talk to your employer – know your rights!

Protecting volunteers^{ix}

Under the Civil Liability Act 2002 volunteers cannot be sued for something they did or failed to do, if they are acting within the scope of the work and directions given to them by the community organisation. It is therefore important to become a volunteer in advance of something happening and follow instructions carefully when helping people before, during or after a natural disaster.

Financial assistance schemes

When a natural disaster has been declared, the following support may be available to provide assistance to people impacted by a natural disaster. Announcements will be made at the time of the natural disaster to notify affected communities.

Assistance schemes may change. Please refer to www.emergency.nsw.gov.au/nddassistance for up to date information on financial assistance schemes available to communities in affected and declared areas.

Personal Hardship and Distress Assistance	Disaster relief grants are available for eligible individuals and families whose homes and essential household items have been destroyed or damaged by a natural disaster. People with limited financial resources and no insurance may be eligible for assistance for essential household items and structural repairs to the home. Inquiries about the disaster relief grants and the eligibility criteria may be made by calling 1800 018 444.
Primary Producers – Loans	Loans of up to \$130,000 are available (subject to certain eligibility criteria), at a concessional interest rate for those in urgent need. These loans may be used to meet carry-on requirements and the replacement and repair of damage not covered by insurance. The NSW Rural Assistance Authority administers this scheme. Inquiries should be directed to the Authority on 1800 678 593.
Primary Producers – Transport subsidies	Transport freight subsidies of up to 50% on the carriage of livestock and fodder are available to help primary producers. The maximum subsidy available is \$15,000 per annum. Inquiries should be made to the nearest Livestock Health and Pest Authorities (LHPA) office. For general enquires, call (02) 6391 3242.
Australian Government Disaster Recovery Payment (AGDRP)	The Australian Government Disaster Recovery Payment (AGDRP) gives you short-term financial assistance if you are adversely affected by a major or widespread disaster. The Commonwealth Attorney-General may determine that an event is a major disaster if satisfied that the event has such a significant impact on individuals that a government response is required. Centrelink staff are available to provide assistance to families and children affected by disaster. We will help you to access the range of payments and support services available. Centrelink can be contacted on 180 22 66.
Small business	Loans of up to \$130,000 are available at a concessional rate to small businesses affected by disasters and which meet certain eligibility criteria. This finance is available to those unable to obtain assistance through normal channels. The NSW Rural Assistance Authority administers this scheme. Inquiries should be directed to the Authority on 1800 678 593.
Motor Vehicle Stamp Duty Relief	Duty relief on motor vehicles is available. If you replace a comprehensively insured vehicle that was written off as a result of a declared natural disaster, you may be eligible for a refund of duty paid on the registration of the replacement vehicle. Details of eligibility requirements, application forms and a list of declared natural disaster areas are available at www.osr.nsw.gov.au or call 1300 139 814.

Sporting Clubs	<p>A special scheme is available to assist sporting clubs in meeting the costs of restoration of essential club facilities that have been damaged or destroyed. The assistance is made available to those clubs which do not have the financial capacity to meet restoration costs from their own resources, but which have the capacity to repay any loan that may be granted. This finance is available to those unable to obtain assistance through normal channels.</p> <p>Under these arrangements the maximum assistance available is \$12,000, including a grant of up to \$2,000 and the balance by way of repayable advance with interest. NSW Treasury administers this scheme. The public enquiry number is (02) 9228 5181.</p>
Trustees of Parks and Reserves	<p>Provided the facilities concerned constitute “public assets”, grants may be made available to those parties (e.g. trustees) responsible for managing Crown Land, parks and reserves, who do not have the financial capacity to meet restoration costs from their own resources.</p> <p>Department of Primary Industries – Catchments and Lands Division administers this scheme. The inquiry number is (02) 8258 7424</p>
Assistance for Councils	<p>Grants are available to meet the additional costs of emergency work to restore essential services, including the provision of emergency levee banks, which are in excess of normal operations. Grants are available to meet 100% of eligible emergency works and 75% of eligible restorations works up to \$116,000 with 100% cost recovery beyond that level. The Department of Finance and Services (NSW Public Works) administers this assistance. The contact number is (02) 9372 8871.</p> <p>Grants are also available to help Councils to permanently restore roads and bridges to pre-disaster standards. These grants meet 75% of the first \$116,000 expenditure and 100% beyond that level. This assistance is administered by the NSW Roads and Maritime Services. The contact number is (02) 8588 5480.</p>
Churches and Voluntary Non-profit organisations	<p>Loan assistance is available to churches and voluntary non-profit organisations for the restoration of essential facilities that have been damaged or destroyed. Eligible groups will usually perform a service for the community or environment and are funded by grants or donations.</p> <p>Non-profit organisations that perform a commercial function, charge a fee for a service or represent commercial or industrial groups, e.g. industry bodies are not eligible for assistance. These organisations can recover costs from their members or through fees. As with other schemes, assistance is only available to those organisations which do not have the financial capacity to meet restorations costs from their own resources, insurance and are unable to obtain assistance through normal channels. Advances are subject to a maximum of \$25,000 at a concessional interest rate per annum. NSW Treasury administers this scheme. The public enquiry number is (02) 9228 5181.</p>

Glossary

Bush fire	A fire in vegetation. The predominant bush fire types in NSW are grassland fires and forest fires.
Community	Groups of people; whether they are stakeholders, interest groups, citizen groups, etc. A community may be a geographic location (community of place), a community of similar interest (community of practice), or a community of affiliation or identity (such as business or sporting club).
Cyclone (tropical)	Are low pressure systems. They form over warm tropical waters and have gale force winds near their centre. Technically they are defined as a non-frontal low pressure system of synoptic scale developing over warm waters having organised convection and a maximum mean wind speed of 34 knots or greater extending more than half-way around near the centre and persisting for at least six hours.
Displan	The NSW Disaster Plan which details emergency preparedness, response and recovery arrangements for NSW to ensure the coordinated response to emergencies by all agencies having responsibilities and functions in emergencies.
Earthquake	Is the shaking and vibration of the surface of the Earth caused by underground movement along a fault place, or by volcanic activity.
Emergency	An event, actual or imminent, which endangers or threatens to endanger life, property or the environment, and which requires a significant and coordinated response (Source: Emergency Management Australia thesaurus).
Emergency Services Organisation	In NSW, means the NSW Police Force, Fire & Rescue NSW, NSW Rural Fire Service, Ambulance Service, NSW State Emergency Service, Volunteer Rescue Association or any other agency which manages or controls an accredited rescue unit.
Evacuation order (flood)	An order to evacuate immediately. Issued when the intent of the SES Operations Controller is to instruct a community to immediately evacuate in response to an imminent threat (Source: State Flood Sub-Plan).
Evacuation warning (flood)	An alert or warning issued to a community to advise them to prepare for evacuation. Issued when the intent of an SES Operations Controller is to warn the community of the need to prepare for a possible evacuation (Source: State Flood Sub-Plan).
Flood	An overflowing or influx of water from its normal confines onto land not normally submerged and which as a consequence threatens human, life, property or activity.

Flood warning	A gauge specific forecast of actual or imminent flooding. Flood Warnings specify the river valley, the locations expected to be flooded, the likely severity of flooding and when it will occur (Source: State Flood Sub-Plan).
Flood watch	A notification of the potential for a flood to occur as a result of a developing weather situation and consists of short generalised statements about the developing weather including forecast rainfall totals, description of catchment conditions and indicates catchments at risk. The Bureau of Meteorology will also attempt to estimate the magnitude of likely flooding in terms of the adopted flood classifications. Flood Watches are normally issued 24 to 36 hours in advance of likely flooding on a catchment wide basis (Source: State Flood Sub-Plan).
Functional Areas and Functional Area sub committees	Categories of services that are coordinated in support of emergency preparations and operations. These Functional Areas are diverse and consequently Functional Area activity varies from sector to sector. These include: a) Agriculture and Animal Services; b) Communication Services; c) Energy and Utility Services; d) Engineering Services; e) Environmental Services; f) Health Services; g) Public Information Services; h) Transport Services; and i) Welfare Services.
Hazard	A potential or existing condition that may cause harm to people, or damage to property or the environment (Source: Emergency Management Australia thesaurus).
Heatwave	Considered as a set of meteorological conditions that is described by the Bureau of Meteorology as a Heatwave which may affect a part or the whole of the state. Generally this is a sequence of 3 days of abnormally hot conditions. Thresholds of heatwave will vary depending on the area of impact (Source: NSW Heatwave Sub-Plan).
Landslide	Is the movement of rock, debris or earth down a slope. They result from the failure of the materials which make up the hill slope and are driven by the force of gravity. Landslides are known also as landslips, slumps or slope failure.

Natural disaster	A serious disruption to a community or region caused by the impact of a naturally occurring event that threatens or causes death, injury or damage to property or the environment and which requires significant and coordinated multi-agency and community response. Such serious disruption can be caused by any one, or a combination, of the following natural hazards: bushfire; earthquake; flood; storm; cyclone; storm surge; landslide; tsunami; meteorite strike; or tornado (Source: Natural Disasters in Australia. Reforming Mitigation, Relief and Recovery Arrangements. A report to the Council of Australian Governments by a high level officials' group, August 2002, Department of Transport and Regional Services, Canberra).
Natural hazard	A naturally occurring potential or existing condition that may cause harm to people, or damage to property or the environment (Source: Emergency Management Australia thesaurus).
Neighbourhood Safer Places	Are places of last resort for people whose personal bush fire survival plans are either overwhelmed or by circumstances which prevent implementation. NSPs are designated by the NSWRFs, and a register of these is maintained and is accessible through the NSWRFs website (Source: State Bush Fire Plan).
Non Government Agency	Non-profit making organisations operating at the local, national, or international levels. Distinct from a governmental organisation, having no statutory ties with a national government (Source: Emergency Management Australia thesaurus).
Preparation	Arrangements to ensure that, should an emergency occur, all those resources and services which are needed to cope with the effects can be efficiently mobilised and deployed (Source: Emergency Management Australia thesaurus).
Prevention	A measure to eliminate or reduce the incidence or severity of emergencies (Source: Emergency Management Australia thesaurus).
Public awareness	The process of informing the community as to the nature of the hazard and actions needed to save lives and property prior to and in the event of disaster (Source: Emergency Management Australia thesaurus).
Recovery	The coordinated process of supporting emergency affected communities in reconstruction of the physical infrastructure and restoration of emotional, social, economic and physical well being (Source: Emergency Management Australia thesaurus).
Rescue	The safe removal of persons or animals from actual or threatened danger or physical harm (Source: Emergency Management Australia thesaurus).

Resilience - community	The capacity of communities to respond positively to crises. It is the ability of a community to adapt to pressures and transform itself in a way which makes it more sustainable in the future. Rather than simply 'survive' the stressor or change, a resilient community might respond in creative ways that fundamentally transform the basis of the community (Source: Australian Social Inclusion Board, 2009).
Resilience - disaster	The capacity to prevent/mitigate, prepare for, respond to and recover from the impacts of disasters (Source: National Partnership Agreement on Natural Disaster Resilience).
Response	Actions taken in anticipation of, during, and immediately after an emergency to ensure that its effects are minimised, and that people affected are given immediate relief and support (Source: Emergency Management Australia thesaurus).
State Emergency and Rescue Management Act 1989 (SERM Act)	Provides the legislative basis for co-ordination of emergency preparedness, response and recovery operations. The Act provides for: <ul style="list-style-type: none"> the preparation of a State Disaster Plan (Displan) and subordinate plans to ensure a coordinated response for necessary operations the establishment of Emergency Management Committees at State, District and Local Government levels arrangements for controlling emergency operations.
Storm	Atmospheric disturbances usually characterised by strong and hazardous winds, frequently combined with heavy rain, snow, sleet, hail, ice and/or lightning and thunder.
Storm surge	A rise above the normal water level along a shore that is the result of strong onshore winds and/or reduced atmospheric pressure.
Tornado	An intense, localised tunnel shaped vortex that extends from a thunderstorm cloud base to the ground.
Tsunami	A series of ocean waves generated by a sudden displacement of large volumes of water.
Vulnerability	The degree of susceptibility to a hazard (Source: Emergency Management Australia thesaurus).

Endnotes

- i Adapted from National Strategy for Disaster Resilience, 2011
- ii National Strategy for Disaster resilience – key leadership messages
- iii Emergency Management Australia thesaurus
- iv Emergency Management Australia thesaurus
- v Emergency Management Australia thesaurus
- vi Image used by permission Steve Cliffe, Illawarra/South Coast SESVA Region Delegate, NSW SES Volunteers Association
- vii National Strategy for Disaster Resilience, 2011
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- ix Image courtesy graur codrin
- x Australian Government: <http://www.business.gov.au/business/topics/emergencymanagementandrecovery/pages/default.aspx>
- xi Image courtesy koratmember
- xii <http://www.cloncurry.qld.gov.au/web/guest/recovering-from-a-natural-disaster>
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- xvi Image courtesy Stuart Miles
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- xviii Webster, J. *The Complete Bushfire Safety Book*. Random House, 2000, at 24. or [http://www.parliament.nsw.gov.au/prod/parlment/publications.nsf/0/87CF62366063879DCA256ECF00077084/\\$File/05-02.pdf](http://www.parliament.nsw.gov.au/prod/parlment/publications.nsf/0/87CF62366063879DCA256ECF00077084/$File/05-02.pdf)
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- xxiv Image courtesy of The City of Newcastle: www.newcastle.nsw.gov.au
- xxv Geoscience Australia: <http://www.ga.gov.au/hazards/earthquakes/earthquake-basics/what.html>
- xxvi University of Sydney, School of Geosciences: http://www.geosci.usyd.edu.au/research/re_seismology.shtml

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- xlvii NSW Storm Plan: <http://www.mpes.nsw.gov.au/plans/subplans/storm>
- xlviii NSW Flood Plan: <http://www.mpes.nsw.gov.au/plans/subplans/flood>
- xlx Ministry of Police and Emergency Services website:
<http://www.mpes.nsw.gov.au/content.php/643.html>
- I NSW State Storm Plan: <http://www.mpes.nsw.gov.au/plans/subplans/storm>
- li Geoscience Australia: *Natural Hazards in Australia: Identifying Risk Analysis Requirements*, M. Middelmann, 2007
- lii Bureau of Meteorology: <http://www.bom.gov.au/nsw/sevwx/tornadofact.shtml>

- liii Image courtesy Jimmy Deguara -
<http://www.australiasevereweather.com/video/stills/2007/1026jd155.jpg>
- liv ABC Online: <http://www.abc.net.au/news/stories/2010/06/03/2917141.htm> and SMH website:
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- lviii Image from UNSW website from NOAA source:
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