



Working from the same page consistent messages for CDEM

PART B: Hazard-specific information



Approaching thunderstorm, Wellington. Photo: MetService

Thunderstorms

- ▶ **Learn about your community's risks from hazards created by thunderstorms.**
- ▶ **Visit the MetService website www.metservice.co.nz to find out about risks from thunderstorms.**

In this chapter

Awareness messages

Why talk about thunderstorms?.....	3
What is a thunderstorm?	3
Forecasting /warning.....	4

Action messages

What to do before a thunderstorm	7
During a thunderstorm or if a thunderstorm is imminent.....	8
After a thunderstorm	10
What to do if someone is struck by lightning	11
Insurance.....	11

Thunderstorms general information

Media and community education ideas	13
Fiction and facts	13
Useful links	14
Useful numbers.....	15

CORE ACTION MESSAGES IN THIS CHAPTER (p7)

- ▶ **Learn about thunderstorm risks.**
- ▶ **Get your household ready.**
- ▶ **Keep an 'in case of thunderstorm' to-do list.**

For general readiness, every household should create and practice a Household Emergency Plan and assemble and maintain Emergency Survival Items and a Getaway Kit. In addition, every household should take thunderstorm specific precautions and plan for and practice what to do if a thunderstorm happens.

Please note: Core Action Messages should be read in conjunction with the rest of the text in this chapter.

Awareness messages

Why talk about thunderstorms?

Thunderstorms are short-lived, existing for no more than one or two hours, and dangerous. With each thunderstorm comes lightning (thunder is just the sound of lightning) along with very heavy rain and sometimes hail, strong straight-line winds and tornadoes.

Rain associated with a single thunderstorm falls over a small area. Thus, while no single thunderstorm will produce widespread flooding, the suddenness and sheer intensity of the rainfall over a localised area can be hazardous. In urban areas, the result is often an overloading of the stormwater system and surface flooding. The same amount of rainfall in the catchment of a small stream can rapidly transform it into a raging torrent.

In New Zealand, the hail associated with thunderstorms is generally small by international standards. Nevertheless, it can be large enough to devastate crops, damage roofs and break glass. When it falls in large quantities, small hail can be centimetres deep and a significant driving hazard.

Thunderstorms commonly have strong winds associated with them. Irrespective of whether these are straight-line or tornadic (rotating), these winds are sudden, violent and short-lived, and can cause large amounts of damage to the built and natural environment. As with the rain or hail from a single thunderstorm, the strong winds are confined to a small area. If the thunderstorm is moving, the extent of rain, hail or strong winds is typically no more than a few hundred metres wide and a few kilometres long.

There are more than 50,000 lightning strikes per year in New Zealand, with one death reported every five to ten years.

What is a thunderstorm?

A thunderstorm is a local storm produced by a cumulonimbus cloud. In the photograph on the front page, the tall cloud in the middle of the frame with an anvil-shaped top is a cumulonimbus cloud. Thunderstorms are the result of the strong updraught of air throughout a considerable depth of the atmosphere over a small area.

In New Zealand, thunderstorms tend to be associated with:

- Vigorous, fast-moving cold fronts moving from west to east across New Zealand. These occur at any time of the year, night or day.
- Southerly changes along the east coast, especially Canterbury, and especially during the warmer part of the year.

In these situations, the thunderstorms are commonly arranged in lines along or near the front/southerly change. In New Zealand, thunderstorms are also associated with:

- Afternoon and evening “build-ups” inland during the warmer part of the year.
- Humid north or northwest windflows driven up over high ground.

In these situations, the thunderstorms occur more randomly.

**Forecasting /
warning**

Every morning and evening, MetService publishes a Severe Thunderstorm Outlook for all of New Zealand for the current and following day at www.metservice.com/default/index.php?alias=thunderstormoutlook.

The Severe Thunderstorm Outlook states, in broad terms, the likelihood that severe weather – including tornadoes – associated with thunderstorms will occur. The current day part of the Severe Thunderstorm Outlook is published around 8.30am, with the following day information published later, at about 11.00am.

In New Zealand, MetService defines Severe Thunderstorms as those which produce:

- Heavy rain (from thunderstorms): Rainfall of 25 millimetres per hour, or more; and/or
- Large hail: Hailstones 20 millimetres in diameter, or larger; and/or
- Strong wind gusts (from thunderstorms): Gusts of 110 kilometres per hour (60 knots) or stronger; and/or
- Damaging tornadoes: Fujita F1 (wind speeds greater than 116 kilometres per hour (63 knots)) or stronger.

Example: Severe thunderstorm outlook

Situation Statement:

The atmosphere is expected to be very unstable today with thunderstorms expected in many areas.

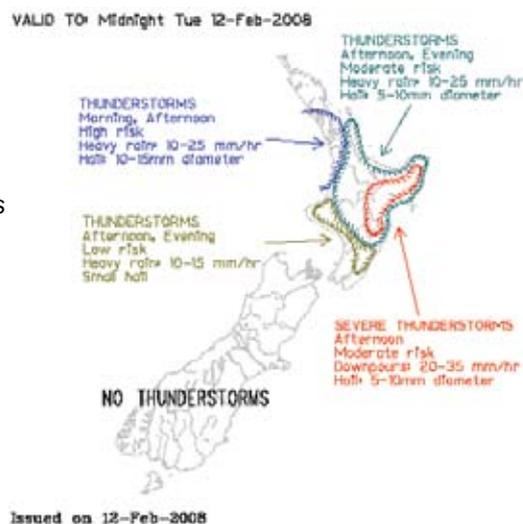
A band of rain and thunderstorms will move onto western parts of the North Island late morning, bringing a high risk of thunderstorms to western areas from the Kaipara Harbour to Awakino, with localised heavy rain and hail.

This band will weaken as it moves eastwards across the North Island, however scattered heavy showers and thunderstorms are expected to develop from afternoon cloud build-ups in many areas from Coromandel Peninsula to Taihape and Hawkes Bay. Localised heavy rain and hail will accompany these storms.

In inland parts of Gisborne, Hawkes Bay, eastern Bay of Plenty and possibly Taupo, the afternoon and evening thunderstorms are expected to be slow-moving and therefore have the potential be severe with rainfall rates as high as 35mm/hr.

Rainfall rates of this intensity can cause surface and/or flash flooding, especially about low-lying areas such as valleys, streams and drains.

There is also a much lower risk of afternoon thunderstorms about inland Taranaki, the Wanganui hill country and Wairarapa as indicated on the chart.



If there is a high likelihood of severe thunderstorms within the next 6 to 12 hours, MetService will issue a Severe Thunderstorm Watch. If tornadoes are expected to be associated with the severe thunderstorms, they will be mentioned in the Severe Thunderstorm Watch. As with the Severe Thunderstorm Outlook this is for all New Zealand, is usually valid for no more than six hours and describes the likelihood of tornadoes in fairly general terms. The Severe Thunderstorm Watch is available at www.metservice.com/default/index.php?alias=thunderstormwatch . A text version is also available by email: to receive it, follow the instructions at www.metservice.com/default/index.php?alias=warningemail .

Example: Severe thunderstorm watch

SEVERE THUNDERSTORM WATCH

Issued by MetService at 11:05 am Tuesday 12 February 2008

Valid until: 08:00 pm Tuesday 12 Feb 2008

Daytime cloud build-ups are expected to produce scattered showers and thunderstorms about Gisborne, Hawkes Bay (from about Hastings northwards), and near the ranges of eastern Bay of Plenty and eastern Taupo this afternoon and evening.

A few of these thunderstorms are likely to be severe, especially about the inland hills and ranges where rainfall rates may reach 35mm/hr.

Rainfall rates of this intensity can cause surface and/or flash flooding, especially about low-lying areas such as drains, streams and rivers.

Issued by: John Crouch

This watch will be updated by: 03:00 pm Tuesday 12 February 2008



In New Zealand, weather radars are located at or near Auckland, New Plymouth, Wellington, Christchurch and Invercargill. By mid 2011, additional weather radars will be installed near Mahia, in Northland, in the Bay of Plenty and on the South Island's West Coast.

MetService provides Severe Thunderstorm Warnings. Because weather radar is required to accurately detect and track thunderstorms, Severe Thunderstorm Warnings are only available within 180km of a weather radar, and are issued once severe thunderstorms have been identified and are valid for a maximum of two hours. As shown in the example below, they are much more specific about the location and timing of expected severe weather. Because tornadoes in New Zealand are too small and too short-lived to be reliably tracked by weather radar, Severe Thunderstorm Warnings do not contain forecast tornado paths.

Awareness messages

Severe Thunderstorm warnings are published on MetService's web site (www.metservice.com), available through the broadcast media and by email. The very short lead time for a Severe Thunderstorm Warning means you will have to be prepared to act quickly.

Example: Severe thunderstorm warning

SEVERE THUNDERSTORM WARNING FOR TORNADOES, LARGE HAIL AND HEAVY RAIN

Issued by MetService at 2:11 pm Monday 32nd December 2008
Valid until 3:00 pm today

This warning affects people in:

HOROWHENUA, RANGITIKEI and WANGANUI districts.

At 2:00pm, MetService weather radar detected severe thunderstorms offshore Kapiti. Severe thunderstorms are forecast to move northeast and lie near Levin, Foxton and Sanson at 03:00pm.

Tornadoes, large hailstones and very heavy rainfall are possible with these storms.

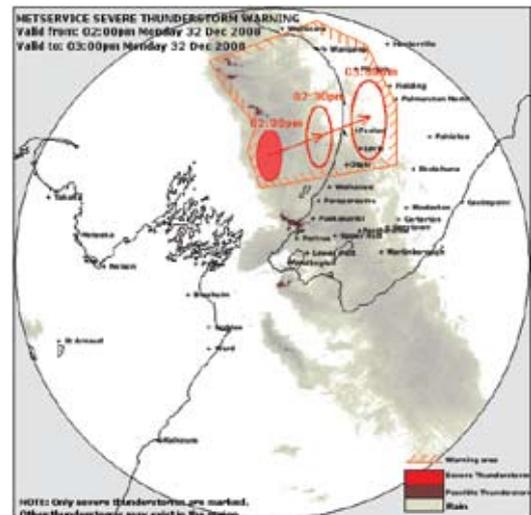
As storms approach people should:

- take shelter
- put vehicles under cover

During and after the storm people should:

- beware of fallen trees and power lines
- avoid creeks and drains as you may be swept away

This Severe Thunderstorm Warning will be updated by 3:00 pm



CORE ACTION MESSAGES

- ▶ Learn about thunderstorm risks.
- ▶ Get your household ready.
- ▶ Keep an 'in case of thunderstorm' to-do list.

For general readiness, every household should create and practice a Household Emergency Plan and assemble and maintain Emergency Survival Items and a Getaway Kit. In addition, every household should take thunderstorm specific precautions and plan for and practice what to do if a thunderstorm happens.

What to do before a thunderstorm

1. Discuss thunderstorm safety with members of your household. Be aware that a thunderstorm could produce a tornado. Tornadoes develop from severe thunderstorms along, and ahead of, cold fronts.
2. Pick a safe place in your home for household members to gather during a thunderstorm. This should be a place where there are no windows, skylights, or glass doors, which could be broken by strong winds or hail and cause damage or injury.
3. Learn how to crouch low to the ground on the balls of your feet. Place your hands on your knees and your head between your knees. Minimise your body's surface area, and minimize your contact with the ground. Lightning currents often enters a victim through the ground rather than by a direct overhead strike.
4. Make a list of items to bring inside in the event of a severe thunderstorm. Having a list will help you remember things that may be broken or blown away in strong winds.
5. Keep trees and shrubbery trimmed. Make trees more wind resistant by removing diseased or damaged limbs, then strategically remove branches so that wind can blow through. Strong winds frequently break weak limbs and hurl them at great speed.
6. Remove any debris or loose items from around your home and outbuildings and from pastures. Branches and firewood may become missiles in strong winds.
7. Protect your animals. Ensure that household animals are protected in the same way as your home. When installing or changing fence lines, consider placing them in such a way that your animals are able to move to higher ground in the event of flooding.
8. Move livestock to secure paddocks that are sheltered, away from buildings, single trees and power lines. Ensure adequate food and water and that there is no risk of flooding or landslide.
9. Consider installing permanent shutters to cover windows. Shutters can be closed quickly and provide the safest protection for windows.

10. Install lightning rods on your home and on sizeable sheds or any other buildings that house animals. Lightning rods will carry the electrical charge of lightning strikes safely to the ground, greatly reducing the chance of a lightning-induced fire.
11. Fit surge protectors.
12. Listen to the radio or television to keep you informed of weather warnings issued in your area.
13. If planning a trip or extended period of time outdoors, be aware of the weather forecast. Knowing what the weather could be will help you to be prepared to respond if necessary. Having a raincoat, umbrella, and Emergency Survival Items available will make it easier to deal with severe weather if it occurs.
14. Postpone outdoor activities if thunderstorms are imminent.
15. Keep an eye on the sky. Pay attention to weather clues around you that may warn of imminent danger. Look for darkening skies, flashes of lightning, or increasing wind, which may be signs of an approaching thunderstorm.
16. Be aware of your surroundings. Look for places you could go if severe weather threatens.
17. Listen for the sound of thunder. If you can hear thunder, you are close enough to the storm to be struck by lightning. Go to safe shelter immediately.
18. Even if there is no official weather warning, if you see signs of a thunderstorm, take precautions.

**During a
thunderstorm or if a
thunderstorm is
imminent**

19. **GO INSIDE!** If you hear distant thunder or see a flash of light, get indoors immediately. A sturdy building is the safest place to be during a severe thunderstorm. Avoid gazebos, rain or picnic shelters, golf carts, and other isolated structures in otherwise open areas because such places are often struck by lightning. In addition, gazebos and picnic shelters are often poorly anchored and subject to being uprooted and blown around in strong thunderstorm winds. They also offer little protection from large hail.
20. Listen to a radio or television station. Local authorities will provide you with the best information for your particular situation.
21. Avoid natural lightning rods, such as golf clubs, fishing poles, tractors, bicycles, and camping equipment. Lightning is attracted to metal and poles or rods.
22. If time, secure outdoor objects such as outdoor furniture that could blow away or cause damage or injury.
23. Bring your companion animals and pets indoors and maintain direct control of them. Many animals are unsettled by thunderstorms and it is more comforting and safe for them to be with you.
24. Do not allow horses or livestock to gather under an isolated tree or anything that otherwise presents a risk from a lightning strike.
25. Shutter windows and close outside doors securely. This will help protect your home from damaging winds or flying debris.

26. Avoid electrical equipment and telephones. Lightning could follow the wire. Television sets are particularly dangerous at this time. Use a battery-powered radio or television.
27. Avoid bathtubs, water taps, and sinks because metal pipes and plumbing can conduct electricity if struck by lightning.
28. Draw the blinds and curtains over windows. If windows break because objects are blown by the wind or large hail, the curtains will help prevent glass from shattering into your home.
29. Unplug appliances and avoid using the telephone or any electrical appliances. If lightning strikes, telephone lines and metal pipes can conduct electricity. Leaving electric lights on, however, does not increase the chances of your home being struck by lightning.
30. Turn off any air conditioners or heat pumps. Power surges from lightning can overload the compressor, resulting in a costly repair job.

If you are outdoors:

31. Find shelter immediately. If you are boating or swimming, get to land, get off the beach, and find shelter immediately. Stay away from rivers, lakes, and other bodies of water. Water is an excellent conductor of electricity. When lightning strikes nearby, the electrical charge can travel through the water. People are killed by nearby lightning strikes while in or on the water.
32. Take shelter in a substantial, permanent, enclosed structure, such as a reinforced building. A sturdy building is the safest place to be. Avoid gazebos, rain or picnic shelters, golf carts, and other isolated structures in otherwise open areas because such places are often struck by lightning. In addition, picnic shelters are often poorly anchored and subject to being uprooted and blown around in strong thunderstorm winds. They also offer little protection from large hail.
33. If there is no reinforced building in sight, take shelter in a vehicle. Keep the windows closed and avoid convertibles. Rubber-soled shoes and rubber tyres provide no protection from lightning. However, the steel frame of a hard-topped vehicle provides increased protection if you are not touching metal. Although you may be injured if lightning strikes your vehicle, you are much safer inside a vehicle than outside.
34. If you are in the bush, find an area protected by a low clump of trees. Never stand beneath a single large tree in the open. Be aware of the potential for flooding in low-lying areas.
35. As a last resort, and if no suitable structure or vehicle is available, go to a low-lying, open place away from trees, poles, or metal objects. Make sure the place you pick is not subject to flooding. Crouch low to the ground on the balls of your feet. Place your hands on your knees and your head between your knees. Minimize your body's surface area, and minimize your contact with the ground. Lightning current often enters a victim through the ground rather than by a direct overhead strike.

36. Avoid tall structures, such as towers, tall trees, fences, telephone lines, and power lines. Lightning normally strikes the tallest objects in an area.
37. If caught in a boat, crouch down in the centre of the boat, away from metal hardware. Avoid standing in puddles of water. Rubber boots offer little protection.
38. Avoid hilltops, open spaces, wire fences, metal clothes lines, exposed sheds, and any electrically conductive, elevated objects.
39. Stop tractor work, especially when pulling metal equipment, and dismount. Do not seek shelter under the equipment. Tractors and other implements in metallic contact with the ground are often struck by lightning.
40. At construction sites, move to a location beneath a solid roof. Avoid openings such as windows or doors.

If you are in a car:

41. Pull safely onto the shoulder of the road and stop, making sure you are away from any trees or other tall objects that could fall on the vehicle.
42. Stay in the vehicle and turn on the hazard lights until the heavy rain subsides. Heavy rain produced by thunderstorms can greatly reduce visibility. Hazard lights will alert other drivers that you have stopped. Keep the windows closed. You are safer from lightning in a vehicle than out in the open.
43. Avoid contact with metal or other conducting surfaces outside or inside the vehicle. Avoid contact with potential conductors to reduce your chance of being shocked.
44. Avoid flooded roads. Many flood fatalities are caused by people attempting to drive through water or people playing in high water.

After a thunderstorm

45. Continue listening to a radio or television station for updated information and instructions. Access may be limited to some parts of the community or roads may be blocked.
46. Help people who require special assistance - infants, elderly people, those without transportation, large families who may need additional help in an emergency situation, people with disabilities, and the people who care for them.
47. Stay away from storm-damaged areas to avoid putting yourself at further risk from the residual effects of severe thunderstorms. Sightseers cause additional problems and hamper local responders assisting those in need.
48. Watch out for fallen power lines and report them immediately. Reporting potential hazards will get the utilities turned off as quickly as possible, preventing further damage and injury. If assistance is needed in your area and telephone communications are disrupted, go to your nearest fire or police station to request assistance.

49. Watch animals closely. Keep all of your animals under your direct control. Animals may become disoriented before, during, and after severe thunderstorms. If there has been wind damage, animals may be able to escape from your home or your fence may be broken. In addition, the behaviour of animals may change dramatically after a severe storm, becoming aggressive or defensive, so be aware of their well-being and take measures to protect them from hazards and to ensure the safety of other people and animals.

What to do if someone is struck by lightning

50. Call for help. Get someone to dial 111. Medical attention is needed as quickly as possible.
51. Give first aid. If the person has stopped breathing, begin rescue breathing. If the person's heart has stopped beating, a trained person should give CPR. If the person has a pulse and is breathing, look for other possible injuries and care for them if necessary.
52. Check the person for burns in two places. The injured person has received an electrical shock and may be burned both where the current entered and where it exited his or her body. Being struck by lightning can also cause nervous system damage, broken bones, and loss of hearing or eyesight.
Note: People struck by lightning carry no electrical charge that can shock other people, and they can be attended to safely.

Insurance

If your property suffered any damage ring your insurer as soon as possible. In almost all cases the insurance company will send an insurance assessor to look at your property. They will confirm what repairs and replacements are needed and covered by your policy.

Ask the insurance company:

53. How long it will be before the insurance assessor visits.
54. If you are to clean your property or if they will get a company to do it for you.
55. Always make your own record of your damaged property using photographs or video.
56. List the damage to your property and belongings.
57. Ask your insurance company or landlord if they will provide you with temporary accommodation, if required. This could be a nearby bed and breakfast, a static caravan or a rented house.

Things to help with your insurance claim:

58. Confirm the insurance company will pay for any service or equipment you need.

Action messages

59. Make a note of all telephone calls. Record the date, name and what was agreed.
60. Keep copies of all letters, emails and faxes you send and receive.
61. Keep receipts.
62. Don't throw anything away until told (except ruined food).
63. Depending on your policy, the insurance company may only offer to clean and repair something, not replace it.
64. If you rent your property, contact your landlord and your contents insurance company as soon as possible.
65. If you do not have insurance, your local council should be able to provide information on hardship grants or charities that may be able to help you.

Thunderstorms general information

Media and community education ideas

66. Ask your local newspaper or radio or television station to do a series on the dangers of thunderstorms
67. Do a story featuring interviews with local officials about thunderstorms.
68. Highlight the importance of staying informed about local weather conditions.
69. Run public service ads about how to protect yourself and your property during severe weather.
70. Encourage schools to talk about hazards and invite experts.
71. Periodically inform your community of local hazards, warning systems and the importance of emergency plans and survival items.
72. Interview agents from various insurance companies about what kinds of severe thunderstorm and lightning damage homeowners' insurance does and does not cover.
73. Ask a local meteorologist to speak to school and youth groups about the dangers of thunderstorms, lightning, and hail.

Fiction and facts

Fiction: Lightning never strikes the same place twice.

Fact: Lightning has "favourite" sites that it may hit many times during one storm.

Fiction: If it is not raining, then there is no danger from lightning.

Fact: Lightning often strikes outside of heavy rain and may occur far away from any rainfall.

Fiction: The rubber soles of shoes or rubber tyres on a car will protect you from being struck by lightning.

Fact: Rubber-soled shoes and rubber tyres provide NO protection from lightning. However, the steel frame of a hard-topped vehicle provides increased protection if you are not touching metal. Although you may be injured if lightning strikes your car, you are much safer inside a vehicle than outside.

Fiction: People struck by lightning carry an electrical charge and should not be touched.

Fact: Lightning-strike victims carry no electrical charge and should be attended to immediately.

Fiction: "Heat lightning" occurs after very hot summer days and poses no threat.

Fact: What is referred to as "heat lightning" is actually lightning from a thunderstorm too far away for thunder to be heard. However, the storm may be moving in your direction!

Useful links

Facts about thunderstorms

- www.teara.govt.nz/EarthSeaAndSky/ClimateAndAtmosphere/Weather/5/en
- en.wikipedia.org/wiki/Thunderstorm
- www.fema.gov/hazard/thunderstorm/index.shtm
- www.usatoday.com/weather/resources/basics/thunderstorms.htm
- www.niwa.co.nz/our-science/natural-hazards

Insurance companies

- www.ami.co.nz/products/contents/
- www.state.co.nz/
- www.tower.co.nz/Web_Home.asp
- www.vero.co.nz/
- www.icnz.org.nz/

Maps and weather

- www.metservice.co.nz/public/weatherWarnings/warningMap.html

Preparedness

- www.getthru.govt.nz
- www.fema.gov/hazard/thunderstorm/index.shtm
- www.weather.gov/om/brochures/ttl.pdf
- www.rural-support.org.nz/
- www.maf.govt.nz/mafnet/rural-nz/adverse-events/

Thunderstorms general information

Useful numbers

Your important emergency telephone numbers. Fill this out and keep this leaflet with your emergency items.

Contact	Details
Local authority emergency helpline	
Insurance company 24-hour	
Insurance number and policy number	
Local radio station (Frequency)	
School	
Family and neighbours	
Bank phone number and details	
Work phone numbers	
Medical Center/GP	
Local police station	
Vet/kennel/cattery	
Local hotel or B&B	
Gas supplier and meter number	
Electricity supplier and meter number	
Water supplier and meter number	
Electrician	
Plumber	
Builder	

