# Major Incidents

OF THE YEAR 2016-2017

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# Contents

# Introduction

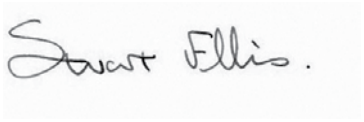
This report provides an overview of major incidents that have involved the fire and emergency services sector during the financial year 2016-17.

It records incidents that have been identified by the sector as significant in the context of their day-to-day business, provides background information about the incident and the response to it.

This is not intended as a comprehensive account of all major incidents over the period. It represents a selection of incidents that the fire and emergency services sector have identified as having been particularly significant for them. Nor does this report identify key lessons: while in future years it may do so, for 2016-17 it is limited to identifying major incidents.

Of course, any incident is significant for the people caught up in it. The intent of this report is to highlight incidents that presented unusual challenges to the fire and emergency service agencies involved in managing them.

AIDR wishes to acknowledge the assistance of Paul Considine, Manager National Resource Sharing Centre in compiling this report.



**Stuart Ellis, AM**
Chief Executive Officer
AFAC


Lennon Bartlett rows a boat to his parents house next door to where he lives in central Lismore. Source: AAP

# Flooding

## South-east Australia, September 2016

September 2016 was an exceptionally wet month across south-eastern Australia, with over twice the long-term average rainfall over inland New South Wales and Queensland, outback South Australia, north and west Victoria and the Northern Territory. This followed above-average rainfall through the preceding winter, which had already led to many catchments being saturated. The result was significant flooding in central New South Wales, western Victoria, parts of western Queensland, and areas around Adelaide.

In Queensland major flood levels were recorded on the Balonne River at St George, the Warrego River at Cunnamulla Bridge and the Macintyre River at Goondiwindi; with significant impact on the road network. Although flood levels were not unusual in absolute terms, they were atypical for the time of year.

In New South Wales significant flooding occurred in the Bogan, Macquarie and Lachlan Rivers. On the Lachlan River major flooding was recorded at sites including Forbes Iron Bridge and Condobolin Bridge. At Forbes Iron Bridge flood levels peaked at 10.67 m on 25 September. This was the highest peak since 1952 and the second highest on record. Evacuations were ordered in parts of Ungarie and Forbes, affecting close to 1,200 people across 350 properties, while more than 100 properties were damaged by floodwaters. The persistence of heavy rain and flooding throughout September and into October resulted in many roads being closed for weeks at a time, with over 2,650 requests for assistance and a total of 105 flood rescues during September, including animal rescues and medical transports.

In Victoria, major flooding was recorded in a number of catchments including the Avoca, Glenelg, Wimmera and Loddon rivers. Major flooding on the Avoca River at Charlton Township peaked at 7.55 m on 17 September with up to 10 houses experiencing flood damage. Major flooding on the Glenelg River at Casterton peaked at 6.1 m on 11 September, flooding several premises and isolating up to 40 more. One person drowned when his ute was washed away in Wallacedale, south of Hamilton. VICSES received 1,500 calls for assistance between the 9 and 19 September and performed more than 20 flood rescues. 13 schools and more than 190 roads were closed at some point around mid-month, with 25 local government areas affected and parts of some towns subject to evacuations.

A low pressure system deepened near the coast of south-east South Australia early on 14 September, with gusts of 90 km/h to 100 km/h over parts of Kangaroo Island, Adelaide and the Mount Lofty Ranges. Many trees and tree branches came down, leading to over 200 calls for assistance to emergency services. A band of moderate to heavy rain accompanied the low. The heaviest rain rates and largest totals occurred around the Mount Lofty Ranges. 135 mm fell during the 48 hours to 9.00am on the 15th, with 60 mm falling in the six hours to 4.00pm on the 14th. The rain resulted in flash flooding in many of the metropolitan creeks, the worst since November 2005, and riverine flooding in the Onkaparinga River. About 80 homes were inundated, roads were undermined and eroded and there was significant other property damage. Releases from Mount Bold Reservoir led to flooding of about 20 homes in Old Noarlunga.


### Acknowledgements

Monthly Weather Review September 2016, Bureau of Meteorology (BoM); Special Climate Statement 58 – record September rains continue wet period in much of Australia, BoM.


Montacute Road in the Adelaide Hills will be closed for several months after it was extensively damaged in the storms. Source: Adelaide Hills Council.

# Severe weather

## South Australia, September 2016

An intense low pressure system affected South Australia at the end of September 2016. On 28 September a strong cold front crossed the state bringing thunderstorms, destructive winds, large hailstones and heavy rain.

By the mid-afternoon a number of tornados had developed in association with the thunderstorms, primarily in the Mid-North, which damaged 23 transmission towers and at 3.48pm triggered a 'black system event'—a state-wide power outage.

Power was restored to Adelaide within several hours, but significant areas of the state remained without power for several days. Businesses and the community suffered losses caused by the consequences of the loss of power and the damage inflicted by the weather.

This weather event was forecast well in advance and public warnings had been issued. State emergency arrangements were in place and briefings were provided to the Emergency Management Council in the lead up to and during the event.

At 5.30pm, the State Coordinator declared the event a 'Major Incident' and the Chief Executive of the Department of Communities and Social Inclusion was appointed as Assistant State Coordinator Recovery.

Storm damage at Blyth. Source: Andrew Manuel, *Plains Producer.*

The geographical spread of flooding and storm impacts spanned from Port Pirie and Whyalla in the north through the Mid-North, Barossa, Clare Valley, Mount Lofty Ranges, and Adelaide Metropolitan area through to Naracoorte in the state's south-east.

The response to this event was multi-agency; during the emergency response phase the SES, CFS, MFS, SAAS, SAPOL, ADF and interstate agencies worked together to protect the community.

SA ESOs and other supporting agencies responded to and provided support for many different activities including:

- storm damage
- removing fallen trees
- flood mitigation including filling and laying sand bags and pumping water away from/out of assets
- door-knocking to notify residents of potential problems
- assisting with traffic control
- ongoing response to other emergencies such as road accidents
- providing incident management personnel

The MFS and CFS provided strike teams (four response vehicles and a command vehicle), to assist SES at a number of locations performing a variety of functions. Interstate resources were deployed to South Australia from Victoria and New South Wales to support SA SES in managing the after-effects of this event.


### Acknowledgements

Independent Review of the Extreme Weather Event South Australia 28 September – 5 October 2016, Gary Burns et al; Monthly Weather Review September 2016, BoM

# Severe hailstorms

## SA, VIC & NSW, November 2016

On Friday 11 November thunderstorms affected South Australia, Victoria and New South Wales. Severe thunderstorms associated with a cold front crossing the south-east of Australia developed over South Australia, with 2 cm hail widespread over Adelaide and golf ball-size hail recorded in places. The storms were accompanied by strong wind gusts of up to 130 km/h.

In the Broken Hill area of New South Wales the storms were associated with wind gusts of 100 km/h, localised flash flooding, and 5 cm hail. The storm caused widespread damage including downed trees and power lines, broken windows and skylights, damaged roofs, and dented cars. The SES received over 100 calls and reports of power outages affected 12,000 premises.

The most significant effects were felt in the Mildura area of Victoria, where the storms impacted Mildura, Merbein and Red Cliffs. VIC SES received around 430 calls related to building damage, trees down and fallen powerlines. SES and CFA crews attended four reports of building collapse with persons trapped, although in the event no rescues were required.

Agriculture in the area was also severely impacted, with vineyards, almond growers and stone fruit growers being affected along with 21,000 hectares of field crops.

The Insurance Council of Australia declared the event a catastrophe, bringing special arrangements for insurance claims into play. Total insured losses across the three states exceeded $250 million, with over 30,000 claims being lodged for domestic, commercial and agricultural losses.


### Acknowledgements

Monthly Weather Review November 2016, BoM; Insurance & Risk at www.insuranceandrisk.com.au/mildura-hailstorm-claims-hit-256-2-million; ABC News at www.abc.net.au/news/2016-11-12/mildura-storm-mini-tornado-damages-buildings-power-outages/8019976


The storm hits Mildura. Source: Kim Kreuzer-Cofield.

# Thunderstorm asthma outbreak

## Melbourne, November 2016

Monday 21 November 2016 was Victoria's hottest day since March. As the temperature in Melbourne reached 35°C, the Bureau of Meteorology (BoM) issued a severe thunderstorm warning at 1.58pm for damaging winds, heavy rainfall and large hailstones in Victoria's Mallee, South West, Wimmera, and parts of Northern Country districts.

The State Control Centre (SCC) was operating at a Tier 2 readiness level in response to the declaration of a Total Fire Ban for the Mallee region and in preparation for the potential heat impacts and the forecast thunderstorm. At 4.00pm the BoM extended its warning to other parts of Victoria, including Geelong and Melbourne.

The gust front reached Geelong at 5.00pm and during the next hour moved rapidly eastwards across metropolitan Melbourne, as many people were making their way home after work.

Hot, dry northerly winds ahead of the change contributed to a high pollen count, mostly from rye grass on the plains to the north and west of Melbourne. Moisture from the storms then caused the pollen grains to break apart into particles small enough to penetrate the lungs, causing an asthmatic reaction.

On the evening of 21 November, the Emergency Services Telecommunications Authority (ESTA), Ambulance Victoria and hospital emergency departments across Melbourne experienced an unprecedented surge in people with asthma and respiratory distress. Initially, the cause was unknown.

The peak of calls to Triple Zero gradually decreased. However, between 9.00pm and midnight ESTA still answered calls for emergency ambulance at volumes of 147 per cent above forecasted levels.

Although primarily a health emergency, this event impacted the Metropolitan Fire Brigade (MFB) in its Emergency Medical Response (EMR) capability. The event saw an increase in EMR calls, and the MFB also provided 11 emergency responses to support Ambulance Victoria.

At approximately 7.00am on Tuesday 22 November, Triple Zero emergency ambulance calls dropped below expected numbers for the first time in 13 hours. A high number of people with breathing problems continued to present at hospitals and other health providers. The Department of Health and Human Services (DHHS) received reports of deaths that might be attributable to respiratory problems associated with the storm of the previous evening.

The Victorian Department of Health and Human Services has attributed nine deaths to this thunderstorm asthma event.


### Acknowledgements

Review of response to the thunderstorm asthma event of 21–22 November 2016 – Final Report, Inspector-General of Emergency Management, Victoria 2017; Monthly Weather Review November 2016, BoM; Victorian Government at www2.health.vic.gov.au/emergencies/thunderstorm-asthma-event


Thunderstorm in Melbourne. Source: Bureau of Meteorology.

# Kaikoura earthquake

## New Zealand, November 2016

Shortly after midnight on 14 November 2016 a 7.8 magnitude earthquake struck the South Island of New Zealand 95 km from Christchurch. The quake lasted approximately two minutes and was considered notable for the complexity of the ruptures involved.

Cape Campbell, at the north-eastern tip of the South Island, moved to the north-northeast by more than 2 m and rose almost 1 m. Kaikoura moved to the northeast by nearly 1 m and rose 70 cm. The east coast of the North Island moved west by up to 5 cm, and the Wellington region moved 2 cm to 6 cm to the north. Christchurch moved 2 cm to the south.

A tsunami followed the earthquake and reached its highest level at Goose Bay, with data indicating a maximum run-up height above tide level at the time of the tsunami of 6.9 m. At Oaro, the height was 5.3 m. Marine flora and fauna were found 250 m inland from the high tide mark on the day of the survey.

Two people died in the earthquake. A man was crushed and died when the historic Elms Farm homestead near Kaikoura collapsed. Two other people were rescued from the rubble of the house. A woman also died in a log house that was damaged at Mount Lyford.

In the city of Wellington, widespread damage occurred to buildings, many communities suffered power outages, and damage to docks impaired ferry traffic across Cook Strait. By February 2017, business insurance claims had passed NZ$900 million. The Wellington region had two thirds (65 per cent) of the total losses, followed by the upper South Island at 25 per cent, Canterbury at 8 per cent and the remaining 2 per cent from other North Island claims. The New Zealand Earthquake Commission had received around 38,000 residential claims for damage caused by March 2017. Serious damage to road and rail infrastructure was also experienced with repairs projected to take up to a year.

The New Zealand Fire Service dispatched urban search and rescue teams to Wellington and Kaikoura. There was also a response from the Defence Forces of New Zealand, Australia, Canada, the United States and Japan which were coincidentially in New Zealand for the 75th anniversary celebrations of the Royal New Zealand Navy.


### Acknowledgements

Wikipedia, 2016 Kaikoura Earthquake; New Zealand Herald at www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=11751775; Insurance Council of New Zealand, press release, 1 February 2017; NZ Earthquake Commission at www.eqc.govt.nz/news/update-on-kaikoura-earthquake-claims


The fault rupture zone near Waiau, North Canterbury. Source: Tonkin + Taylor.

# Robinsons Road plantation fire

## NSW, December 2016

On Wednesday 21 December 2016 a fire started around 11.00am originating from a spark ignited and running through needle fall from a previous fire in the area on 4 December, originally started by lightning. This fire was contained; mopped-up and being patrolled, however, the fire jumped into an adjacent plantation before crews spotted it and from there it was virtually impossible to control. Weather conditions on the day were not particularly severe, rather it was the age (continuous fuels from ground to crown) and condition of the plantations that limited and hindered control options and capabilities.

The Robinsons Road fire burnt a total area of approximately 1,040 hectares, which resulted in the loss of 716 hectares of young plantation in Whiporie State Forest.

The estimated cost of plantation loss in broad figures is around $2 million to re-establish this area of plantation. This area would have grown on to produce $15 million of revenue to the Forestry Corporation of NSW.

There were no significant predominant winds driving this fire, rather it was creating its own fire weather. The fire generally ran to the north but was spreading just as aggressively on the flanks, making control difficult, if not impossible.

Forestry Corporation NSW firefighters were supported by NSW RFS resources in their firefighting efforts. Aviation support was provided by the State Air Desk, including a drop of retardant by the DC10 Very Large Air Tanker.

The ongoing mop-up and patrol involved out-of-area crews until well after Christmas. Even on 10 January 2017 there was evidence of smouldering logs and concern around more needle drop fires potentially starting: this was after 75-100 mm of rainfall.


### Acknowledgements

Forestry Corporation of NSW


A fire burning in the pine plantation in the Whiporie State Forest.. Source: NSW RFS.

# Severe flooding

## Western Australia, February 2017

Atmospheric moisture from low pressure systems in the north of Western Australia produced a number of significant cloud bands bringing persistent rainfall to the south-west of the state in late January and early February. This led to many daily and monthly rainfall records being broken.

A tropical low formed to the north of Western Australia early in February. It moved across the Pilbara coast on the 8 February, bringing record-breaking February daily rainfall to 210.6mm at Karratha Aerodrome—the second highest amount for any month behind 212.4 mm on 10 January 2006. A cloud band associated with this tropical low developed over south-west Western Australia and brought widespread rainfall to the region. Daily totals over 50 mm were reported from the 8 to 11 February, whilst at the peak of the event on a number of sites in the Lower West, including Perth and in the Great Southern recorded between 100 mm and 150 mm.

Many sites recorded their highest February daily rainfall during the event. Perth Metro recorded a daily total of 114.4 mm on 10 February, its second-highest recorded daily fall for any month since 1876—behind 120.6 mm on 9 February 1992. Six-day rainfall totals from 7 to 12 February were between 150 mm and 200 mm, nearly 10 times the monthly average.

The February flood event affected much of the Kimberley, Pilbara, Midwest Gascoyne, Metropolitan, Wheatbelt, Goldfields-Esperance and Great Southern, causing widespread impacts across a large proportion of the state. Significant damage was caused to road and bridge infrastructure, particularly around Esperance, and agriculture was severely affected with major damage to vineyards in the Swan Valley near Perth. Tragically, two fatalities were recorded in separate incidents of vehicles driving into floodwaters.

In anticipation of the flood event, DFES regions prepared Heightened Readiness and Risk Actions (HRRA). These resulted in the prepositioning of seven IMT's, four Natural Hazard strike teams and provided supplementary staffing to Regional Operational Centres in the Kimberley, Pilbara, Great Southern, Goldfields Midlands and Metropolitan regions. Operational Area Support Groups (OASG) were also established pre-emptively. Agencies that participated in the OASG's included local governments, Department of Water, Main Roads, Bureau of Meteorology, WA Police, Health, Department of Aboriginal Affairs, and utilities.

Of the 11 DFES Regions state-wide, all were involved in preparatory actions and all but one, were actively involved in response. The response included the resupply of four remote communities and in excess of 10 air drops plus land based support over a period of eight weeks. The flooding event was an eligible disaster under the Western Australian Natural Disaster Relief and Recovery Arrangements; 91 of the 138 local governments in Western Australia being eligible to receive assistance.


### Acknowledgements

Bureau of Meteorology, Special Climate Statement 60, February 2017; WA Department of Fire and Emergency Services; ABC news at www.abc.net.au/news/2017-02-18/ravensthorpe-cut-off-as-floodwaters-claim-bridge-into-town/8282806; www.abc.net.au/news/2017-02-13/premier-declares-natural-disaster-over-swan-valley-flood-areas/8265464


Severe flooding caused significant damage to roads. Source: DFES WA.

# Heatwave and associated bushfires

## NSW, February 2017

Summer 2016–17 saw prolonged and, at times, extreme heat over New South Wales, southern Queensland, South Australia and parts of northern Victoria. January 2017 saw the highest monthly mean temperatures on record for Sydney and Brisbane, and the highest daytime temperatures on record for Canberra.

In January and February, there were three distinct heatwaves in south-east Australia, with the highest temperatures recorded from 9 to 12 February 2017. The periods between the waves of extreme heat also saw above average temperatures over large areas of east and south-east Australia.

The exceptional heat peaked from 9 to 12 February, with many records set. South Australia and Queensland had sites that recorded the states' hottest February day on the 9th and 12th respectively. In New South Wales, Walgett Airport recorded the state's second-hottest February day. When averaged across the whole state, New South Wales recorded both its hottest and second-hottest February days on record of 44°C and 42.4°C respectively, and the second-hottest day for any month, behind 14 January 1939.

On 12 February, Catastrophic fire weather conditions prevailed across large parts of central NSW and the Hunter. Conditions were described as the worst-ever fire weather experienced in New South Wales.

A number of large fires soon broke out, including the Sir Ivan, White Cedars Road near Mudgee, Barnards Road at Gloucester, Pappinbarra Road near Wauchope and Spring Hill Road near Dongdingalong. Over 80 fires were burning in the state at one time with in excess of 2,500 firefighters engaged.

The Sir Ivan fire was caused by a lightning strike on 11 February, and burned through approximately 55,000 hectares in the Warrambungle Shire, much of it in the Catastrophic conditions prevailing on the 12th. NSW RFS said it damaged about 5,700 kilometres of fencing, and killed 2,000 sheep, 56 cattle, 90 goats, 26 dogs and cats, 36 poultry and 3 alpacas. The toll from the fire included 35 homes destroyed, 11 homes damaged, one church destroyed, 1 community hall destroyed, 131 outbuildings destroyed, and 42 damaged.

Considerable overall losses were experienced with a total of 70,106 hectares burned, 45 homes and over 150 other buildings destroyed.

Despite the scale of the fires and severity of the weather, no lives were lost in these fires and NSW fire agencies had no requirement to call interstate assistance to help with fire suppression.

Just a few days later on 17 February, a fire at Carwoola near Canberra destroyed 11 dwellings and 45 outbuildings. The ACT Emergency Services Agency provided firefighting resources to support NSW RFS crews engaged in fighting the fire. The fire extended over 3,500 hectares: two firefighters were injured during suppression operations.


### Acknowledgements

BoM: Special Climate Statement 61—exceptional heat in southeast Australia in early 2017; NSWRFS Assessment of last week's fire affected areas completed, February 2017; NSW RFS Initial assessment of Carwoola fire affected area, February 2017; NSW RFS Bush fire season draws to a close, March 2017; ABC news at www.abc.net.au/news/2017-02-19/crews-contain-carwoola-blaze-but-11-homes-destroyed/8283848


The front yard of "Wongalea" on Vinegaroy Road near Cassilis. Source: The Land.

# Port Hills Fire

## Christchurch, New Zealand, February 2017

On 13 February 2017 at about 5.45pm a fire was reported near the Early Valley Road in the Port Hills south of Christchurch. The fire spread quickly and by 6.40pm had spread about 1.5 km, destroying one dwelling and damaging three others.

At about 7.10pm on the same day, another fire was reported some 5 km to the east-northeast on Summit Road. This fire also expanded rapidly, burning well into the evening.

By 11.25am the next day the fires were measured respectively at 496 hectares and 28 hectares. By this time the Early Valley fire had destroyed two dwellings and damaged four more. Both fires grew slowly throughout 14 February. Although by the morning of 15 February the fires remained separate, a late morning wind change caused them to merge together to become the Port Hills complex of fires. By 1.00pm the complex measured about 1,000 hectares with a 40 km perimeter; by the morning of 16 February the fire had burned about 1,600 hectares with a 57 km perimeter, destroyed nine dwellings and damaged another five.

Approximately 200 firefighters from the Rural Fire Authority and the New Zealand Fire Service were involved in combatting the fires, supported by Civil Defence and Emergency Management personnel. Tragically, a helicopter pilot lost his life on 14 February while directly engaged in fire suppression operations.

Suppression and mopping-up activities on the Port Hills complex lasted for over three weeks, with a final extent of 1,661 hectares and perimeter of 61 km. This makes it one of the largest fires in New Zealand since the Wither Hills fires of 2000, and the largest in the Canterbury region since the Balmoral forest fire of 1955.


### Acknowledgements

New Zealand Fire Service


The Port Hills Fire at its peak. Source: Mark Hannah Photography.

# Severe hailstorm

## Sydney, February 2017

On 18 February 2017 severe thunderstorms affected much of northern Sydney. From around 4.00pm, large hail affected a number of suburbs ranging from 4 cm hail recorded in Hornsby, Thornleigh and Pymble up to 9 cm hail in Annangrove.

NSW SES received over 2,700 requests for assistance in relation to damage from the storm, while they were still dealing with a workload from storms in the greater Sydney area the previous day. Over 1,000 of these were concentrated in the northern Sydney area which was worst-affected by the large hail.

Three people were injured when they were struck by lightning near Bowral, south of Sydney.

Insured losses from this event were substantial. Over 50,000 insurance claims were received with estimated losses exceeding $328 million.


### Acknowledgements

BoM, Monthly Weather Review February 2017; Insurance Council of Australia, Media Release, 10 March 2017; SBS News at www.sbs.com.au/news/article/2017/02/18/nsw-ravaged-destructive-storms ; Australian Institute for Disaster Resilience Knowledge Hub https://knowledge.aidr.org.au/storm-north-sydney-hailstorm/


Photo: Hailstones at Thornleigh, NSW. Lew Short.

# TC Debbie and associated flooding

## QLD & NSW, March 2017

Tropical Cyclone (TC) Debbie first reached cyclone strength on 25 March 2017, before developing over the next two days into a Category 2 cyclone. TC Debbie was forecast to increase rapidly in intensity before making landfall on the Queensland coast; this prediction was borne out as TC Debbie made landfall as a Category 4 Severe Tropical Cyclone near Airlie Beach on 28 March 2017.

From Airlie Beach TC Debbie tracked inland on a south-westerly track, losing tropical cyclone intensity at about 3.00am on 29 June. Ex-TC Debbie continued south, turning onto a south-easterly track and passing over the coast of northern New South Wales and out to sea on the 31 March.

The impacts of TC Debbie were twofold. Storm damage resulted from both the high winds associated with the cyclone, and y the very heavy rain that came in the wake of Debbie's track. The highest wind gust recorded in Queensland in recent times, at 263 km/h, was noted at Hamilton Island as TC Debbie passed over, and damage occurred throughout the Whitsundays, in coastal towns such as Proserpine and Bowen, and inland to Collinsville.

Observed rainfall totals included Greenmount and Dumbleton Rocks on the Pioneer River, both recording 92 mm in 60 minutes on 29 March, 118mm in 6 hours at Rathdowney, 119 mm in 6 hours at Round Mountain, 148 mm in 6 hours at Rudds Lane (on the Logan–Albert River), 156 mm in 6 hours at Beaudesert, and 190 mm in 6 hours at O'Reillys on 30 March.

Lismore in NSW recorded 324.8 mm of rain in the 18 hours to 3.00am on the 31st, its wettest March day in more than 100 years of record. The Tweed River catchment also recorded an average of 374.1 mm of rain on 31 March, the wettest day on record for any month. Significant riverine flooding ensued in a number of catchments including the Condamine, Burnett, Fitzroy, Logan, and Tweed Rivers. At the height of the flooding in NSW, evacuation orders affected more than 30,000 people and approximately 17,000 people were isolated by flood water.

Significant fire and emergency service resources were mobilised to support operations following on the impact of TC Debbie, both from the affected states and interstate. Personnel from South Australia, Victoria, ACT and Tasmania were involved, and New South Wales resources deployed into Queensland as well as operating in their home state. Sadly, at least ten fatalities resulted from the flooding and severe weather associated with TC Debbie, and hundreds of dwellings were severely damaged by the impacts of high winds and inundation.


### Acknowledgements

Monthly Weather Review March 2017, BoM


Photo: Flooding in the Lismore CBD. NSW SES

# Edgecumbe floods

## New Zealand, April 2017

The effects of ex-TC Debbie continued to be felt as the system tracked across the Tasman Sea in the first days of April, bringing persistent heavy rain to the Bay of Plenty area on 4 and 5 April with over 200 mm falling in places. Whakatāne had its wettest April day on record (since 1952) on the 4 April with 137 mm of rain. Te Puke in the Western Bay of Plenty recorded 290 mm of rain from the event, twice the normal April rainfall in just four days.

The town of Edgecumbe was inundated when a stopbank (levee) on the Rangitāiki River failed on the morning of the 6 April. It was estimated at the time that the flow in the river exceeded the design parameters of the stopbank by 30 per cent. Fast-flowing water entered the town, large parts of which lay below the level of the river. An order to evacuate the town followed, affecting some 580 households and a population of approximately 1,600 people.

Police and fire crews made house-to-house searches to ensure no one remained trapped, and boats were used to rescue residents in some areas. Resupply operations also had to be undertaken in the Whakatāne district by helicopter as up to a further 2,000 people were cut off by the floodwaters.

Damage to properties in the flood-affected area was made worse by the speed of the water flowing through the breached Edgecumbe stopbank. Hundreds of properties were inundated; about 70 per cent of the town was said to have been affected. Of those, around 10 houses were assessed to be beyond repair. About 170 residents were able to return home by 14 April: as at May 2017, it was estimated that around 100 homes were still uninhabitable due to flood damage.


### Acknowledgements

Radio New Zealand at www.radionz.co.nz/news/national/328549/sir-michael-cullen-to-head-review-over-edgecumbe-flood; www.radionz.co.nz/news/national/329810/edgecumbe-home-owners-to-get-repair-help; MSN News www.msn.com/en-nz/news/national/about-10-edgecumbe-homes-beyond-repair/ar-BBzHmL5?li=AA59FU; NZ Herald at www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=11833669 ; NIWA National Climate Centre New Zealand Climate Summary April 2017


The devastated Bay of Plenty town of Edgecumbe as photographed from the air. Source: Sky View Photography NZ.

Sheep and cattle manoeuvre around a dam to avoid a fast running grass fire south of Uarbry as the Sir Ivan fire front moved East. Source: Dean Sewell

# Further resources are available at the Australian Disaster Resilience Knowledge Hub

Every year Australians experience the damaging effects of disasters caused by severe weather or human behaviour. Bushfires, floods and storms wreak havoc on lives, property and livelihoods. Transport accidents or health emergencies can wipe millions from the economy. Criminal acts strike fear in local communities. These disasters and their impacts remind us of the need to continue improving our resilience to disasters.

Part of improving our disaster resilience, and taking a 'shared responsibility' approach lies in access to knowledge. While we can't change the fact that disasters occur, learning from the past can enable us to reduce their impact.

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- and resources for teachers.

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