

# Background Information:

## CYCLONES

Tropical Cyclones are formed over the ocean in the area around the equator, between the Tropic of Cancer and the Tropic of Capricorn. In order for a cyclone to form, the ocean waters need to be warm, at least 26°C. Above the warm ocean, water evaporates and forms clouds. If there is low air pressure where the clouds are formed, it pulls them in and they begin to rotate. It is the Earth's rotation and spinning on its axis that causes the cyclone's clouds to rotate. Clouds will continue to form and begin spinning more.

This is the stage when it can develop into a mature cyclone, or lose its momentum. Even if it has developed into a mature cyclone, it can still grow in size and increase its wind speed. Once cyclones arrive over land, their strength weakens and they begin to fade out. This is due to the lack of moisture and heat compared to the ocean over which it was formed. Every year between November and April, the coastal regions of Queensland, Northern Territory and Western Australia are at risk of being hit by cyclones.

The Bureau of Meteorology issues a cyclone warning when a cyclone is expected to hit within 24 hours. Warnings identify communities likely to be affected, the name of the cyclone, its position, intensity, severity and movement. Communities under threat will be advised to take certain steps.

- **Category 1** - wind gusts less than 125 km/hr
- **Category 2** - wind gusts 125 to 169 km/hr
- **Category 3** - wind gusts 170 to 224 km/hr
- **Category 4** - wind gusts 225 to 279 km/hr
- **Category 5** - wind gusts more than 280 km/hr

Cyclones can also bring flooding rains, which cause further damage to property, and increase the risk of drowning. Many cyclones also bring about storm surge, which is a rapid rise in sea level that moves inland very quickly. Storm surge can damage buildings and cut off evacuation routes and be the cause of injuries and sometimes death. While most deaths from cyclones occur as a result of drowning, many lives have been lost due to collapsing buildings or flying debris which can become lethal in high winds.

### Names of cyclones

Each cyclone is named by the Bureau of Meteorology from a list that has been derived for each year. The names start from the top of the list and take it in turns to be a male or female name. Once the end of the list is reached it begins again. (Refer to Attorney General's Department, Emergency Management for Schools: Cyclones, for more information and the list of names.)

### East Coast Lows

East Coast Lows (ECLs) are intense low-pressure systems which occur on average several times each year off the eastern coast of Australia, in particular southern Queensland, NSW and eastern Victoria. Although they can occur at any time of the year, they are more common during Autumn and Winter with a maximum frequency in June. East Coast Lows will often intensify rapidly overnight making them one of the more dangerous weather systems to affect the NSW coast. East coast lows are also observed off the coast of Africa and America and are sometimes known as east coast cyclones.

This information is derived from

Emergency Management Queensland: <http://www.emergency.qld.gov.au/emq/css/cyclone.asp>

Attorney General's Department, Emergency Management for Schools: Cyclones:

[http://www.ema.gov.au/www/ema/schools.nsf/Page/GetTheFacts\\_Cyclones\\_Cyclones?open&query=Cyclones](http://www.ema.gov.au/www/ema/schools.nsf/Page/GetTheFacts_Cyclones_Cyclones?open&query=Cyclones)

Bureau of Meteorology: <http://www.bom.gov.au/nsw/sevwx/facts/ecl.shtml>

East Coast Lows may form in a variety of weather situations. In summer they can be ex-tropical cyclones. At other times of the year, they will most often develop rapidly just offshore within a pre-existing trough of low pressure due to favourable conditions in the upper atmosphere. ECLs may also develop in the wake of a cold front moving across from Victoria into the Tasman Sea. The sea surface temperature gradients associated with the warm eddies of the East Australian Current (EAC) also contribute to the development of the lows.

The gales and heavy rain occur on and near the coast south of the low centre, while to the north of the low there can be clear skies. The challenge for forecasters is to accurately predict the location and movement of the centre of the low.

ECLs can generate one or more of:

- Gale or storm force winds along the coast and adjacent waters.
- Heavy widespread rainfall leading to flash and/or major river flooding.
- Very rough seas and prolonged heavy swells over coastal and ocean waters which can cause damage to the coastline.

Falling trees and flash flooding have caused fatalities on the land, many small craft have been lost off the coast and larger vessels have run aground during these events.

### **What is the difference between an East Coast Low and a Tropical Cyclone?**

Tropical Cyclones develop over very warm tropical waters where the sea surface temperature is greater than 26°C. They have relatively long life cycles, typically about a week, and severe tropical cyclones (category 3 or greater) can produce significant property damage with wind speeds over 180km/h near the centre, heavy rainfall and coastal inundation through storm surge. Tropical Cyclone "Justin", which affected the Queensland Region in March 1997, lasted for 18 days!

East Coast Lows generally have much shorter lifetimes than Tropical Cyclones and last only a few days. They develop over the Tasman Sea close to the NSW coast and can intensify rapidly in the 24 hour period. Unlike Tropical Cyclones, where the warm seas provide the energy source, East Coast Lows are driven by the temperature gradient between the Tasman Sea air and cold air in the high levels of the atmosphere over the continent. They can produce gale to storm-force winds, very heavy rainfall and in some cases coastal inundation. While maximum wind speeds recorded are lower than in severe tropical cyclones, a gust of 165 km/h was recorded at Newcastle associated with the east coast low that sunk the bulk carrier *Syigna* in 1974. During the first of the ECLs in June 2007, when the bulk carrier *Pasha Bulker* ran aground, gusts of 105 km/h at 6:21am on 8 June and 124 km/hr at 1:32am on 9 June were recorded at Newcastle.

## **Safety in cyclones**

Now and always:

- Compile a list of emergency phone numbers and keep it somewhere that is visible to all family members
- Nominate an interstate family member or friend to be a point of contact in case you and your family become separated during a cyclone
- Find out if your home is located in an area that could be prone to storm surge or flooding by contacting your local council

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Attorney General's Department, Emergency Management for Schools: Cyclones:

[http://www.ema.gov.au/www/ema/schools.nsf/Page/GetTheFacts\\_Cyclones\\_Cyclones?open&query=Cyclones](http://www.ema.gov.au/www/ema/schools.nsf/Page/GetTheFacts_Cyclones_Cyclones?open&query=Cyclones)

Bureau of Meteorology: <http://www.bom.gov.au/nsw/sevwx/facts/ecl.shtml>

- Identify the strongest part of the house (usually the smallest room) and ensure everyone knows where this is in case you need to seek shelter in your home
- Ensure at least one person in your household knows first aid
- Prepare an emergency kit
- Contact your local council to check that your home has been built to cyclone standards
- Check your home and contents insurance
- Check the condition of your roof and repair any loose tiles, eaves or roof screws
- Ensure windows are fitted with shutters or metal screens
- Trim any branches overhanging your house
- Clear gutters of leaves and debris

#### Before a cyclone:

- Listen to your portable radio and watch the Bureau of Meteorology website
- Locate and check your Emergency Kit
- Check that your neighbours are aware that a cyclone watch or warning has been issued
- Clear your property of all loose items
- Secure any boats and caravans and move vehicles under cover
- Fill buckets and bath with water in case the water supply becomes restricted. Ensure you have sufficient water purification tablets to make the water drinkable
- Prepare an Evacuation Kit
- Withdraw a sufficient amount of cash to cover essential items. Place this in your Evacuation Kit
- If fitted, close window shutters securely. If not, tape windows in a criss-crossing fashion using strong packing tape. This may not prevent windows from shattering but it will help hold the broken glass in place. You may also board or block windows.
- Bring children and pets indoors and remain inside until further advice is given

#### During a cyclone:

- Turn off all electricity, gas and water and unplug all appliances
- Keep your Emergency Kit close at hand
- Bring your family into the strongest part of the house
- Keep listening to the radio for cyclone updates and remain indoors until advised
- If the building begins to break up, immediately seek shelter under a strong table or bench or under a heavy mattress
- **BEWARE THE CALM OF THE EYE OF THE CYCLONE.** Stay inside until you have received official advice that it is safe to go outside
- If an official evacuation order is issued then you and your family must leave your home immediately and seek shelter with friends or family who are further inland or on higher ground
- If you are visiting or holidaying in cyclone prone area and do not have family or friends to shelter with, contact your accommodation manager immediately to identify options for evacuation

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