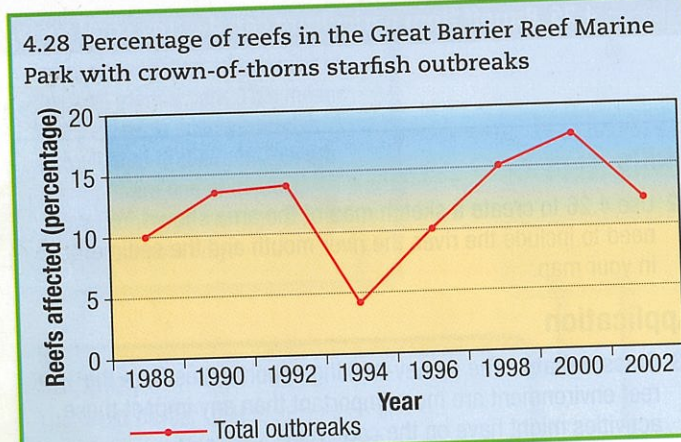


Natural threats to coral reefs



As well as the human threats to coral reefs there are also some natural threats that put the reef environment at risk. This unit examines two of the natural threats to the Great Barrier Reef.

4.27 Damage caused by the crown-of-thorn starfish. In order to eat coral polyps, the crown-of-thorns starfish forces its stomach out through its mouth and releases a special enzyme that breaks down the polyp. After four to six hours the polyp is absorbed, the stomach is retracted back through the animal's mouth and the starfish moves on.



PEST INFESTATIONS

Another type of natural threat to reef environments comes from plants and animals that threaten areas by growing to plague proportions.

One of the animals found on many coral reefs of the world is the crown-of-thorns starfish. The starfish are a normal part of reefs. However, at times there has been an outbreak of them, causing severe damage.

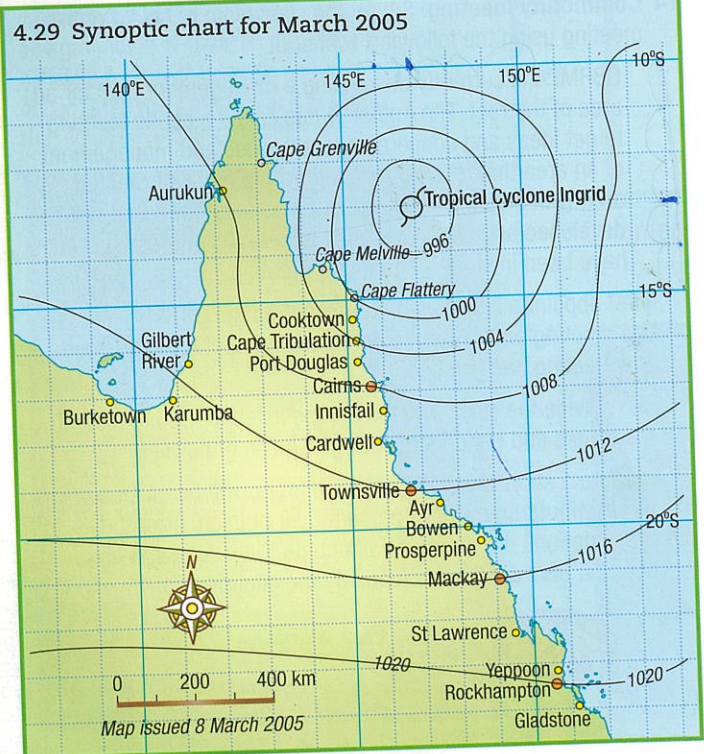
One theory on the cause of these infestations is that changes in the balance of the reef ecosystem occur when nutrients from urban areas, septic tanks and agricultural activities enter the water. These nutrients encourage the growth of algae, which is the favoured diet of the crown-of-thorns starfish. This increased food supply causes starfish numbers to increase. When this happens it does not take too long before parts of the reef are destroyed due to the starfish's preferred diet of coral polyps.

TROPICAL CYCLONES

A tropical cyclone is a natural hazard event. Cyclones form over the warm oceans of the tropical regions of the world. They are intense tropical storms that create large waves and big tides that are sometimes large enough to wash completely over coral cays. Tropical Cyclone Ingrid occurred in March 2005 and threatened the Great Barrier Reef.

GEOGRAPHY FOCUS

Each crown-of-thorns starfish eats between 5 and 6 square metres of coral per year.



STUDY REVEALS CYCLONE DAMAGE TO CORAL REEFS 100 KILOMETRES FROM EYE OF CYCLONE



4.30 A section of the Great Barrier Reef before Tropical Cyclone Ingrid

17 August 2005

When Tropical Cyclone Ingrid crossed the far northern Great Barrier Reef it left a trail of destruction to 260 coral reefs across a path over 200 kilometres wide. Researchers from the Australian Institute of Marine Science (AIMS), such as Dr Katharina Fabricius, were keen to find out about the level of damage.

'We investigated the impact of seven types of cyclone damage to the reef: coral breakage, movement of massive corals, stripping of soft corals, coral sand movement, scarring of coral by debris, algal blooms, and removal of plants from the reef.

'These surveys examine how wave damage to coral communities differs between sheltered and exposed sites. The corals on outer reefs appear to be more resistant to breakage compared with the more fragile inshore reefs.

'The reef provided its own protection from wave damage, leaving many corals in the protected areas intact. These surviving corals will help restore the worse affected areas,' Dr Fabricius said.

Corals at the outer edge will probably take 2-3 years to recover, those at ground zero were stripped bare and could take up to two decades to bounce back.

Estimates from the Australian Bureau of Meteorology suggest that wind speeds reached at least 250 kilometres per hour and wave heights as high as 10 metres occurred within the Great Barrier Reef area.

Activities

Knowledge

- 1 What is another name for the intense tropical storms that cause damage to coral reefs? Describe why these storms are so destructive to the reef.
- 2 Read the newspaper article and study the synoptic chart in 4.29:
 - a How many coral reefs were damaged by the cyclone?
 - b Name the seven types of cyclone damage to reefs the researchers investigated.
 - c What role will the surviving corals play in repairing the damage to the reef caused by the tropical cyclone?
 - d What was the wind speed and wave height caused by the cyclone? Why would these have caused damage to the coral reef?
 - e Compare the date when Tropical Cyclone Ingrid formed over the Great Barrier Reef and the date the newspaper article was written. Explain why they are different.
 - f Estimate the air pressure on 8 March at Cairns, Townsville, Mackay, Aurukun, Cardwell, St Lawrence and Yeppoon.
 - g Estimate the latitude and longitude of Tropical Cyclone Ingrid on 8 March 2005.

- 3 Name the three sources of nutrients that are believed to cause the outbreaks of the crown-of-thorns starfish.
- 4 Describe how increased nutrients in seawater are believed to cause an increase in the crown-of-thorns starfish numbers.
- 5 Describe the way the crown-of-thorns starfish eats the coral polyps.

Skills

- 6 Refer to 4.28:
 - a What was the total outbreak of the crown-of-thorns starfish in 1992, 1998 and 2002?
 - b Which year did the total outbreak have the least impact on the reef?
 - c Which year did the total outbreak have the greatest impact on the reef?
 - d Rank the years in order from greatest percentage of reefs affected to least percentage of reefs affected in terms of the total outbreak of the crown-of-thorns starfish.

Surf

