

# Lady Elliot Island Climate Change Trail



Australian Government

Great Barrier Reef  
Marine Park Authority

## Key

- Climate Change Trail
- 10--- Trail Stop
- ..... Reef Walk & Snorkel Trail
- Lighthouse Area of Interest

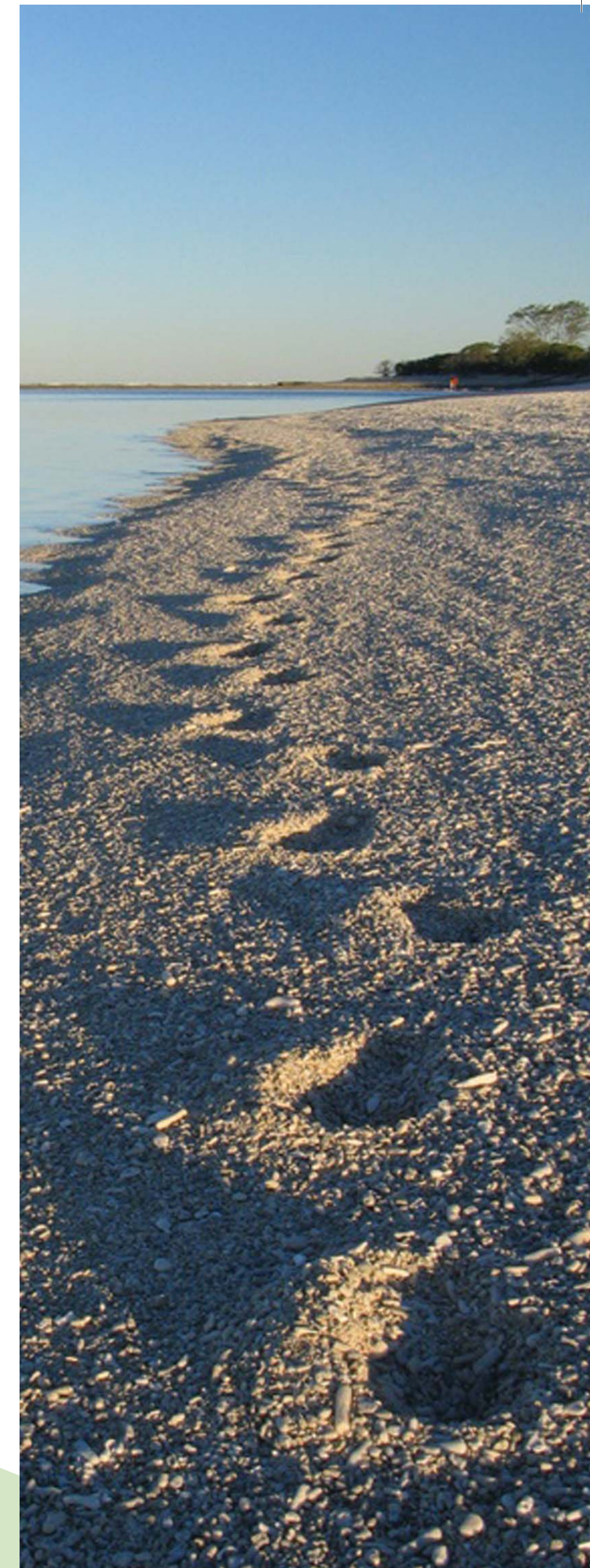
## Our changing island

Lady Elliot Island is one of the most spectacular places on the Great Barrier Reef but this beautiful island paradise may be on a slow journey of destruction.

Humans are causing changes to the climate that have not been seen for hundreds of thousands of years. Climate change is likely to affect coral cays and their surrounding reefs through:

- Increased sea and air temperatures
- Increased carbon dioxide in the air, increasing weed growth
- Increased frequency of intense storms
- Changed rainfall, drought and run-off patterns
- Rising sea level
- Ocean acidification
- Changing ocean currents.

Follow the climate change trail to learn how climate change will affect fragile island eco-systems. Take a moment to imagine what Lady Elliot Island would be like if all these changes were to take place.





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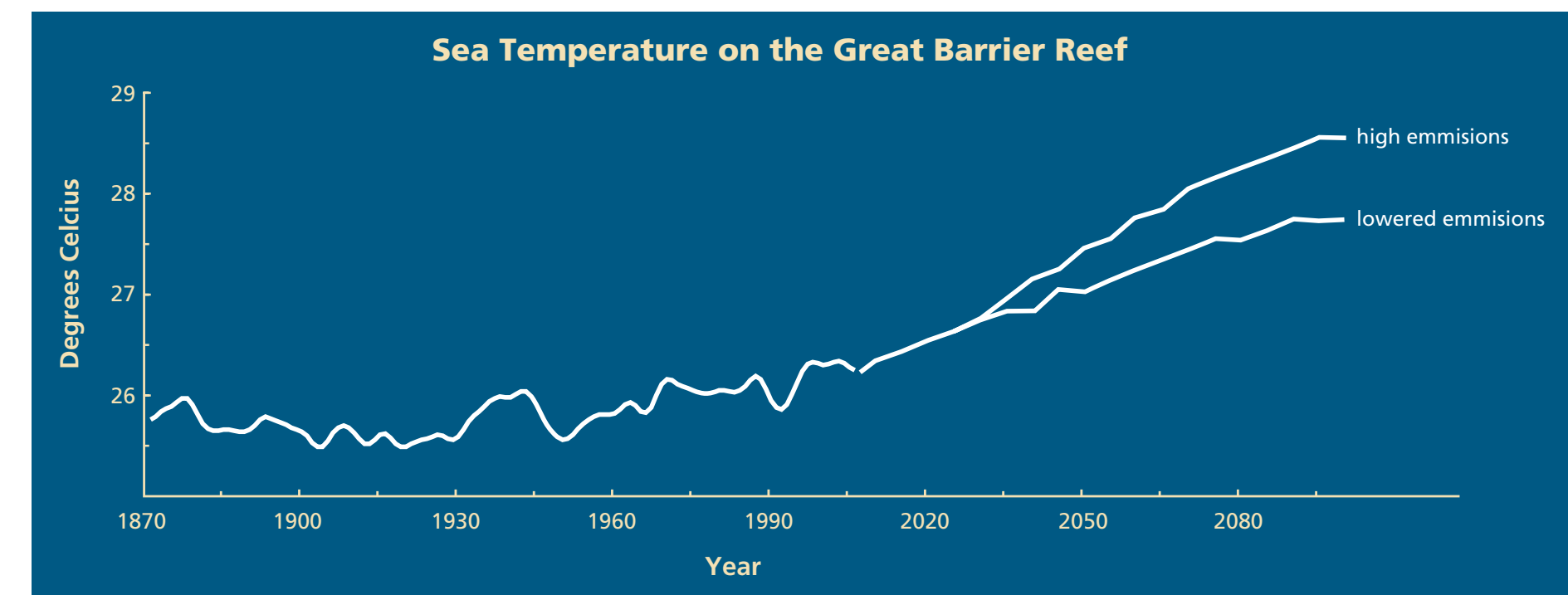
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## Life's a bleach!

Corals are very delicate animals and are very sensitive to change. Temperature increases of just a couple of degrees can cause corals to become stressed and bleach. If ocean waters stay too warm for too long, bleached coral may die. Reefs damaged by bleaching are likely to become dominated by slimy algae instead of hard corals.

Warmer waters caused by climate change are threatening the future of corals and coral reefs. In the last few decades the Great Barrier Reef has experienced unprecedented levels of coral bleaching. Within a decade corals around Lady Elliot Island could bleach every summer. Imagine snorkelling the island's fringing reefs amid a sea of white or algae-covered corals.



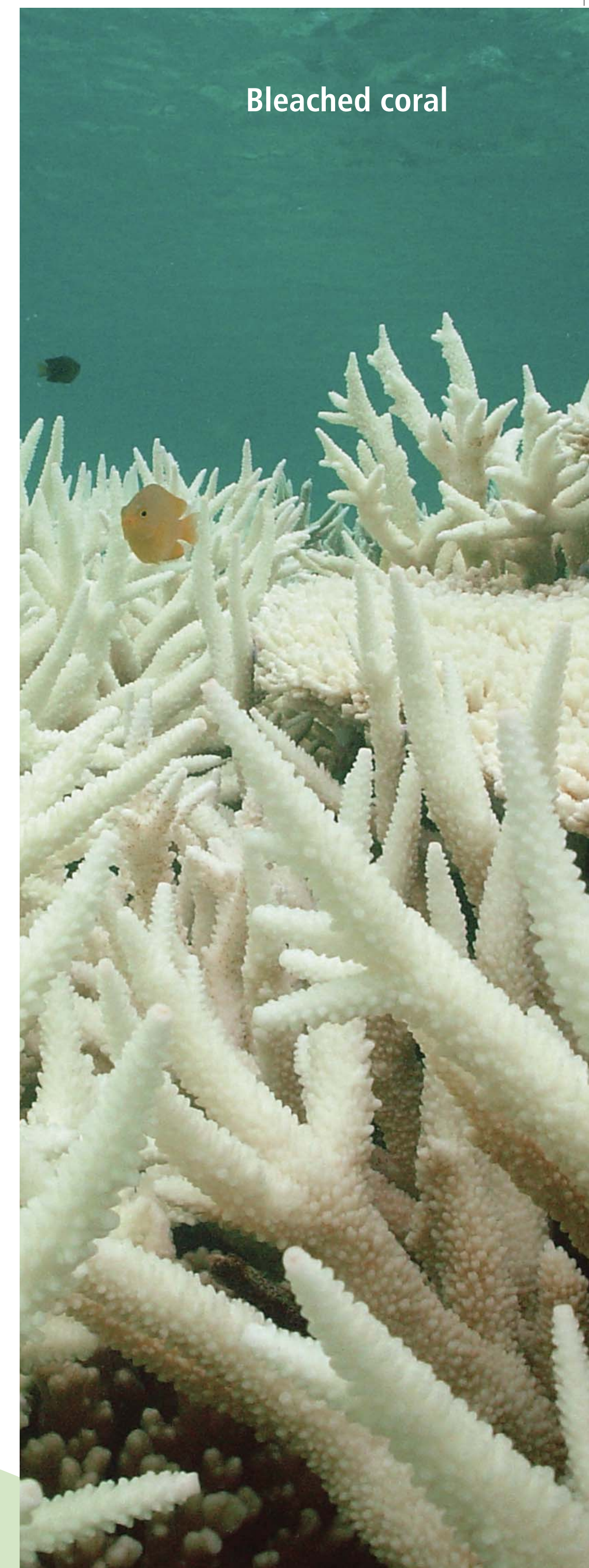
## Do your bit

*When snorkelling or diving, stay clear of coral to prevent damage. Healthy corals will be better able to survive climate impacts.*



### Delicate relationship

The brown colour of this healthy coral polyp is due to microscopic algae called zooxanthallae that live within its tissue. When corals are stressed the algae leave and the corals lose their colour. This is called coral bleaching.





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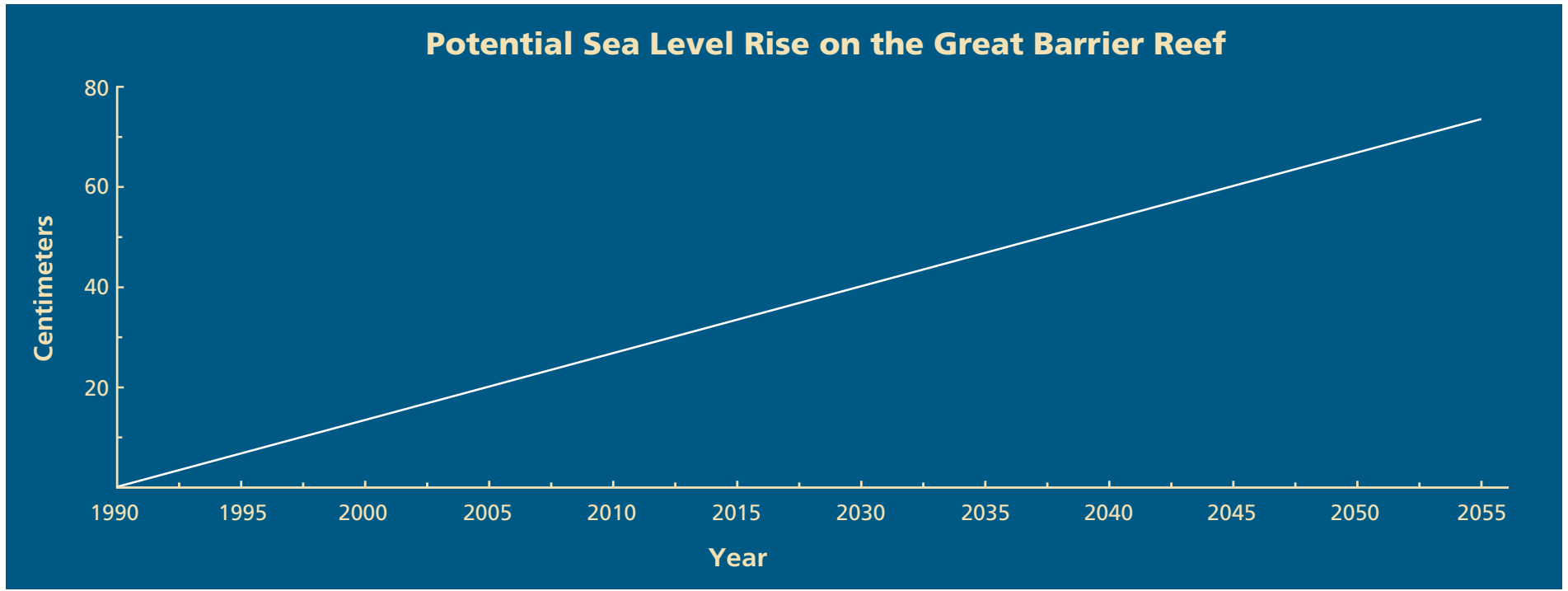


## The ever-rising tide

According to sea level rise predictions, this sign could be underwater within the next 100 years. If the devastating effects of climate change continue, Lady Elliot Island, like many low lying coral cays, could be submerged by the end of the century – or sooner if ice sheets melt faster than expected. There would no longer be a place for plants and for animals to live and nest and the resort would cease to exist. Can you imagine the place you’re standing now under water?

### Do your bit

*Set your airconditioner at 25 degrees to help reduce your carbon emissions and slow sea level rise.*



### Rising sea level

Increased sea levels elevate the risk of coastal flooding from storm surges and intensify coastal erosion. Rising seawater can flood important bird and turtle nesting sites, wetland areas, mangroves and coastal towns. By 2100, sea levels could rise as much as 1m above 1990 levels.



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## Gender bender

Sand temperature determines the gender of turtle hatchlings – warmer temperatures produce females and cooler temperatures produce males. Climate change is having a devastating impact on sea turtles. As the weather warms up, turtle rookeries will produce more females, resulting in a gender imbalance. Lady Elliot Island is an important nesting site for green and loggerhead turtles but in the next 60 to 100 years, all our hatchlings could be females. If temperatures get too hot, turtle eggs will literally be cooked in their nests.

## Do your bit

*While on holiday and at home, switch off unnecessary lights and appliances when you leave a room. This helps reduce greenhouse gas emissions which in turn will help stabilise temperatures.*



### Climate change - a cold blooded killer

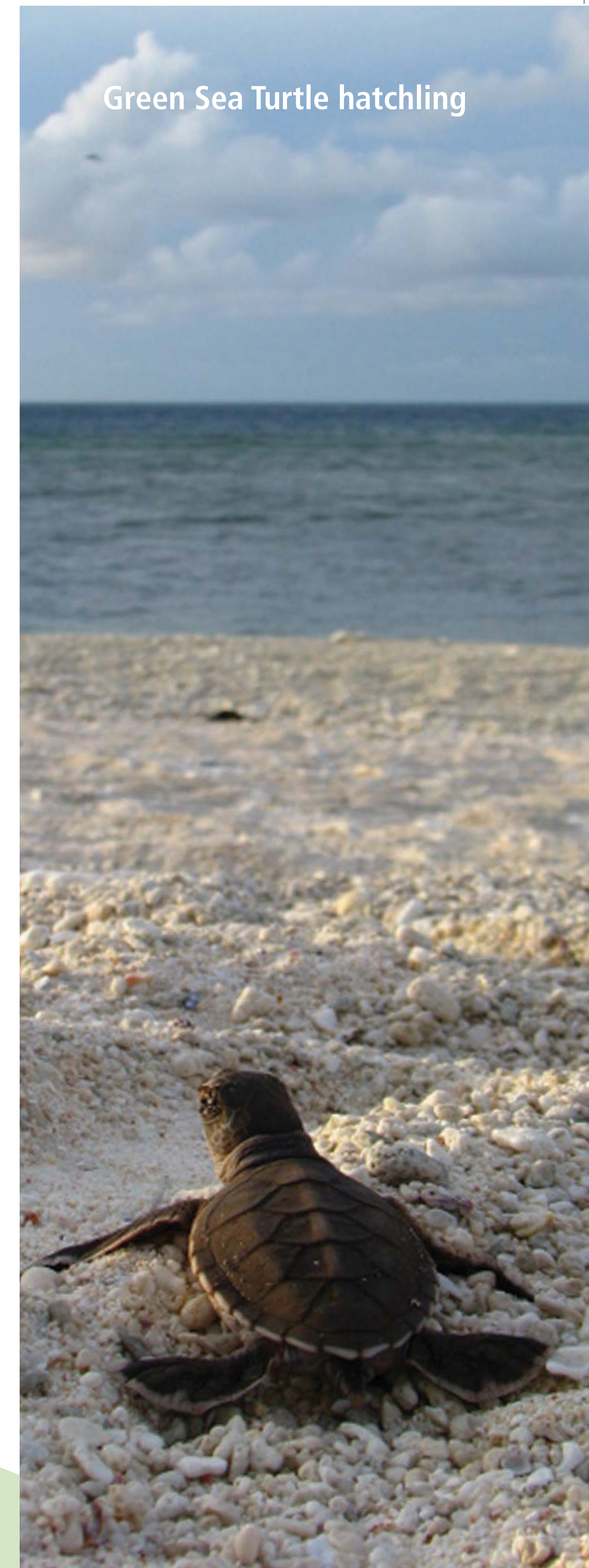
Sea turtles are 'cold blooded' ectotherms. This means their body temperature changes with the temperature of their environment. If sea temperatures become too warm or too cold, ectotherms, like sea turtles, can't survive.



### Precious cargo

A female Green Sea Turtle lays between 100 and 200 eggs every time she ventures onto land.

Green Sea Turtle hatchling





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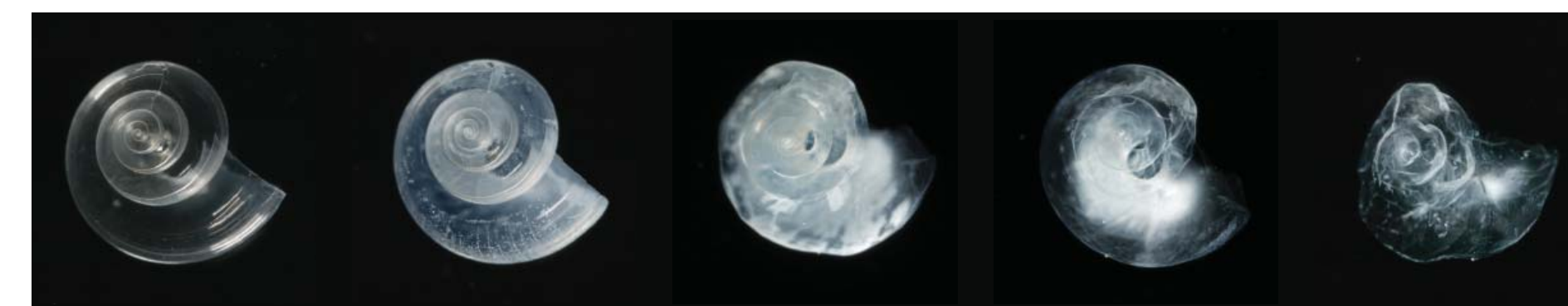
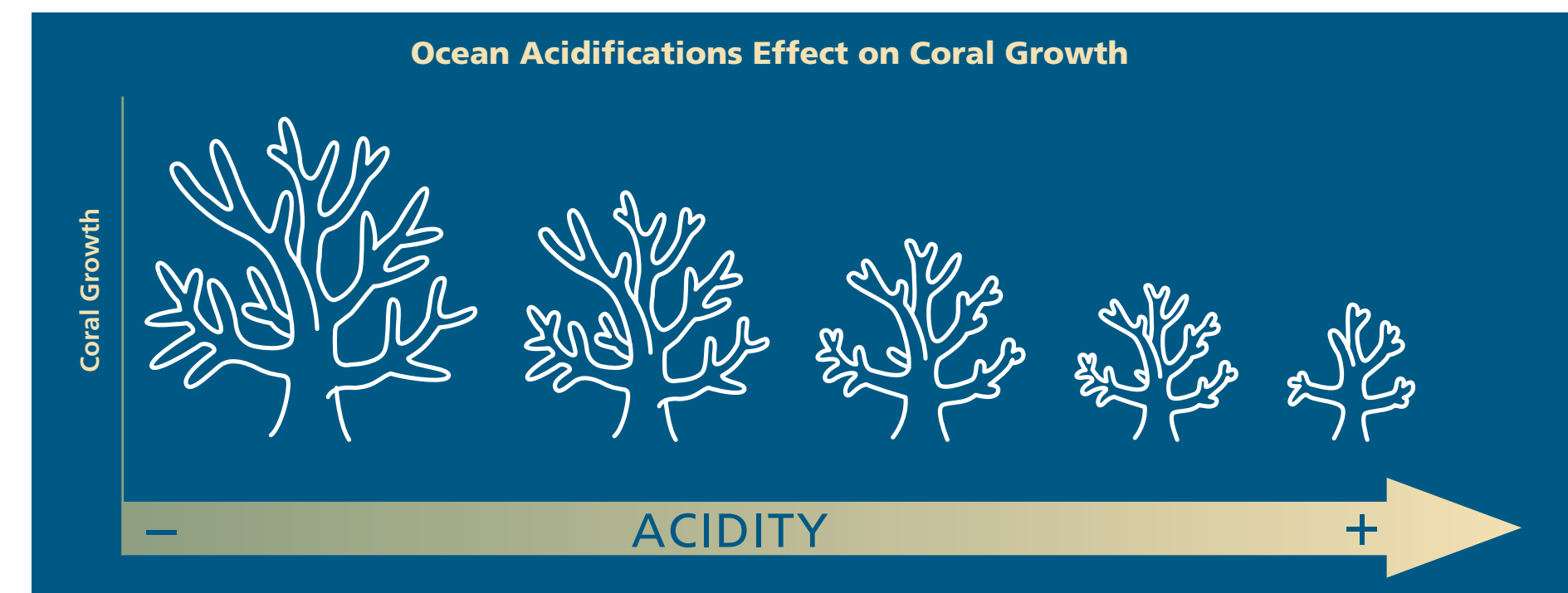
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## A hidden menace

Like teeth and bones, shells and corals need calcium to be strong. Ocean acidification is depleting our oceans of calcium and causing shells and corals to become weak and brittle – the effect is similar to osteoporosis. Ocean acidification is caused by rising levels of carbon dioxide in sea water. Every time we start a car or turn on the lights, one-third of the carbon dioxide we emit is absorbed by the ocean, making it more acidic. More acidic waters have already slowed growth of some corals on the Great Barrier Reef by 14 per cent since 1990. The waters around Lady Elliot Island are becoming more acidic than they have been in hundreds of thousands of years.

## Do your bit

*Keeping drains clean and free of chemicals helps reduce the pollutants carried from the land to the sea. Cleaner sea water means corals will be healthier and better able to cope with climate change.*



## Corrosive impacts on marine life

Increased acidity reduces calcium carbonate – the mineral used to form the shells of many shellfish and molluscs. This slows growth and makes shells weaker. In theory, pH levels could drop enough that shells may literally dissolve.

hermit crab





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## Shifting sands

The ground you are walking on is changing. Increasing storms, ocean swells, wind and strong wave action caused by climate change are causing the island to move and change rapidly. While some parts of the island are being built up by deposits of sand and coral rubble, other areas are eroding causing trees to be washed out like you see here. New parts of the island are born and colonised by plants, birds and turtles while other parts of the island die. If the situation gets worse, severe storms and cyclones could literally wash this island away.

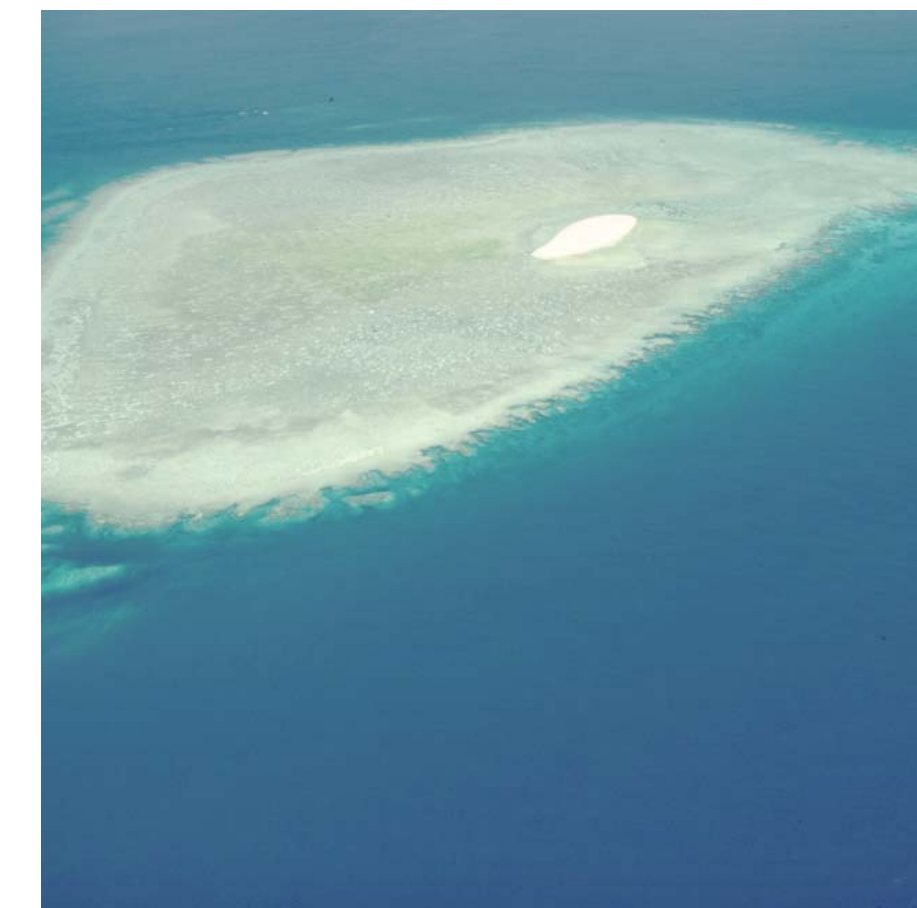
## Do your bit

*Reuse your bath towels and sheets to save on energy and help slow climate change.*



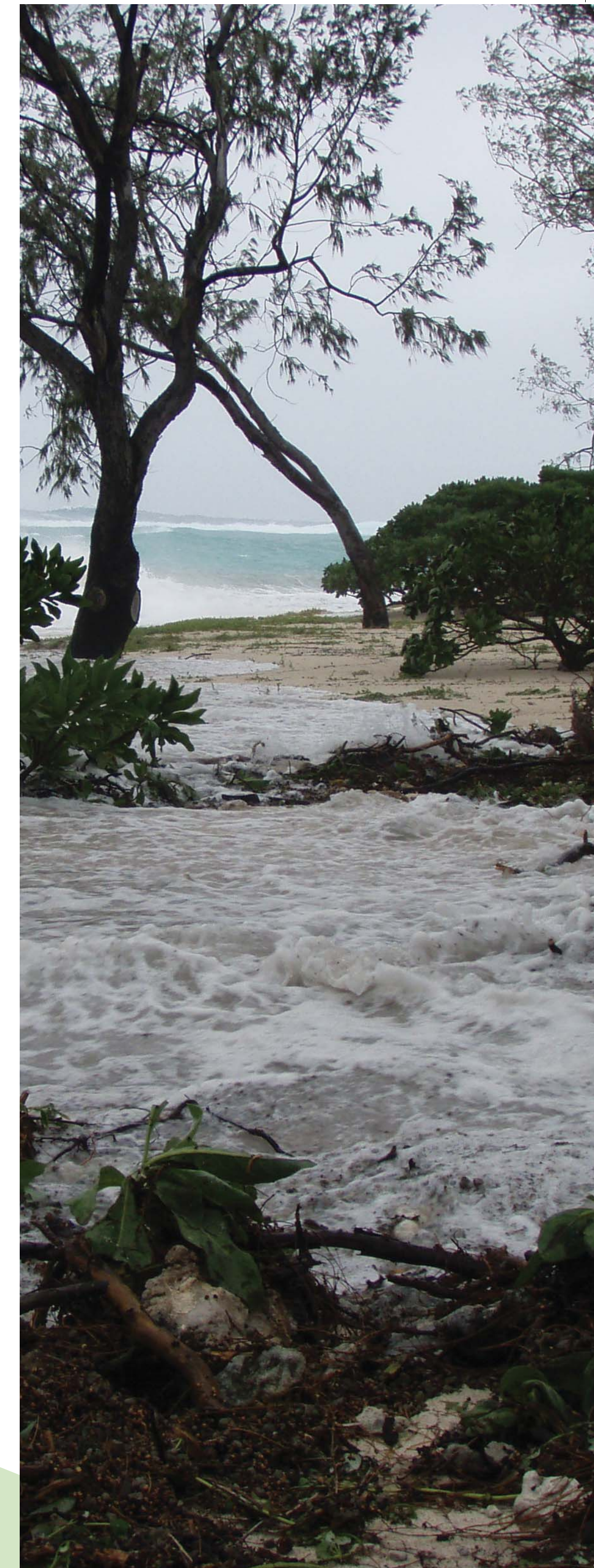
### Increasing frequency of intense storms

More intense storms will magnify physical impacts on coastal areas, mangroves, seagrass beds, shallow reef habitats, islands and coral cays in the Great Barrier Reef.



### What does the future hold?

With increased storm intensity sandy coral cays like Lady Elliot Island may look very different in the future.





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## Occasion for invasion

Coral cay ecosystems hang in a delicate balance. Introduced plants and animals interfere with this balance and can wreak havoc on the island. Increasing air temperature, increasing carbon dioxide and changing rainfall provide optimal conditions for many weeds and pests to spread. Keep an eye out for invaders and imagine what the island would like if they became more abundant.

### Invaders:

big-headed ant  
centipedes  
cockroaches  
sparrows  
lantana  
mother of millions  
snakeweed

## Do your bit

*When you travel, reduce transport of weeds and seeds by carefully cleaning yourself, your luggage and your shoes before going to a new location.*



### Big-headed ant

This tiny ant is one of the island's biggest pests. It eats seeds from native plants, preventing them from reproducing. This big-headed ant also farms leaf-eating insects, increasing their numbers to the point where they could defoliate trees or maybe even entire islands.



### Sparrow

Invading birds like this sparrow compete with native birds for food and nesting space. As climate change impacts decrease available resources, the competition to survive will become even more fierce.



Snake Weed



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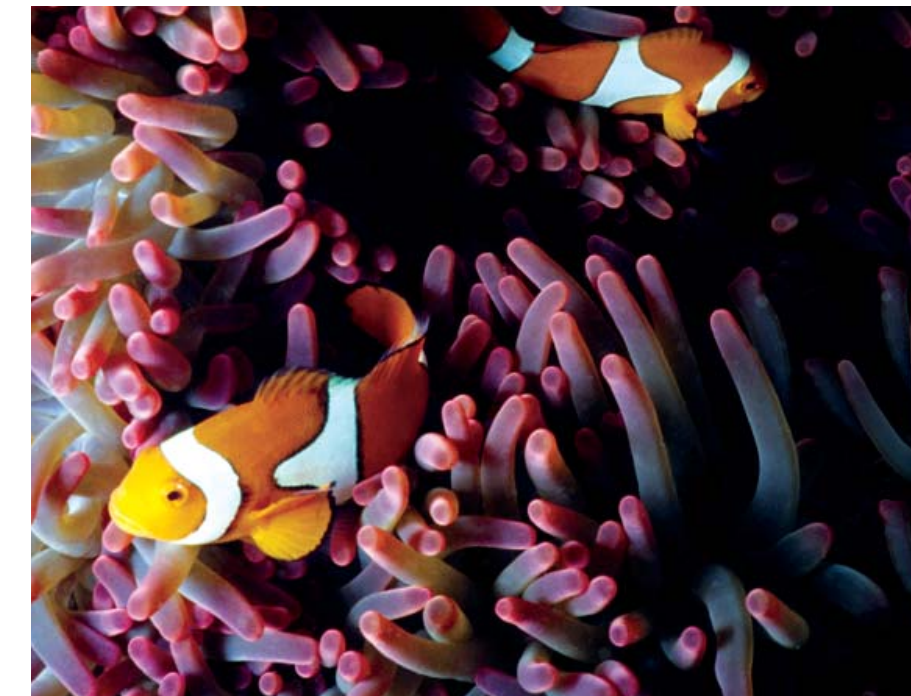
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## Something fishy going on here

More than 1500 species of fish live on the Great Barrier Reef. They have many important roles like tending gardens of algae, cleaning, and sculpting the Reef. Without fish, the Reef would look very different. Climate change is already affecting fish by destroying fish homes, flooding fish nursery habitats, changing currents that transport fish between reefs and altering fish food supplies.

## Do your bit

*When fishing in the Great Barrier Reef Marine Park, adhere to zoning and bag and size regulations and take only what fish you need. This will help keep fish populations healthy in the face of climate change.*



### Nemo won't be coming home

Clownfish are swept away from their home reef into the open ocean as tiny babies and use their acute sense of smell to find their way back again. Ocean acidification caused by climate change interferes with the ability of clownfish to smell their way back to their home reefs. Scientists fear that fish could completely lose their sense of smell in about 150 years.



### Damsels in distress

Acidic waters also interfere with the growth of symmetrical ear bones, which can prevent damselfish from finding their way back to reefs. Damselfish rely on hearing, rather than smell, for direction.



Big Eye Trevally



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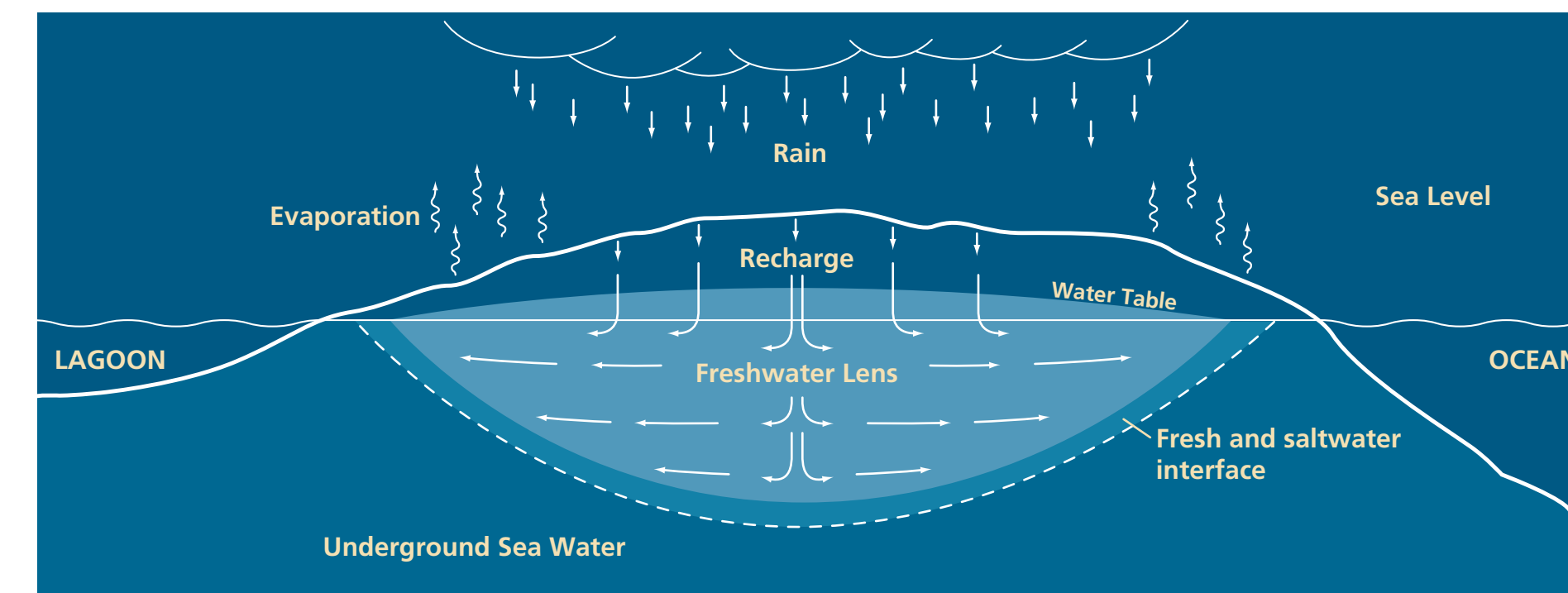
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## Would you like salt in your water?

A freshwater lens is the critical source of fresh water on an island. When rain falls on a limestone island, it quickly sinks through the porous calcareous rock, picking up minerals as it seeps through the island. Eventually, the freshwater meets with sea water which has permeated the island's rocky base. Because fresh water is less dense, it 'floats' on top of the saltwater. The weight of the freshwater depresses the surface of the saltwater, creating an underground pool of freshwater shaped like a lens. As rain falls, the lens becomes thicker. If the sea level increases or if the freshwater source is depleted by overuse, seawater can intrude and pollute the freshwater. The freshwater lens provides the stable water supply for any vegetation growing on the island.

## Do your bit

*Support your local bird populations by planting native plants. Composting*



## Freshwater Lens

The freshwater lens is the life blood of a coral cay. Climate change is altering rainfall, drought and run-off patterns. Some islands are getting drier while others are receiving more rain. Intense rain or drought changes the freshwater lens and impacts the plants and animals that live on the island. Without access to freshwater, native plants will be replaced with drought tolerant shrubs and birds that rely on natives trees could lose their nesting sites.



Freshwater Lens



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## Seabirds go hungry

During the summer, the short grassland you see here is home to a nesting colony of crested terns. Lady Elliot Island is an important nesting ground for many species of seabirds including tropic birds, noddies and roseate terns. The seabirds that nest on the island feed from fish found in surrounding waters. As climate change warms the ocean and fish move to deeper, cooler waters, seabirds can't find enough food for themselves and their chicks. Across the Reef, seabird populations are declining. In addition to food shortages, seabirds that nest in burrows, tussock grass or in low shrubs are threatened by sea level rise which could flood their nesting habitat.

## Do your bit

*To help slow climate change:  
reduce, reuse, recycle  
and dispose of rubbish  
appropriately to protect  
marine animals. These actions  
reduce your environmental  
footprint.*



### Signs of decline

Climate change is already threatening seabird populations and has been blamed for dramatic declines in seabird populations on the Great Barrier Reef with tens of thousands of seabirds failing to breed due to food shortages caused by warming waters.



### In search of fish

As climate change warms coastal waters, fish move further away trying to find cooler water and seabirds have difficulty finding food. Sometimes seabirds can't find enough fish to feed their chicks and in cases of extreme weather, none of the chicks survive.

White Heron





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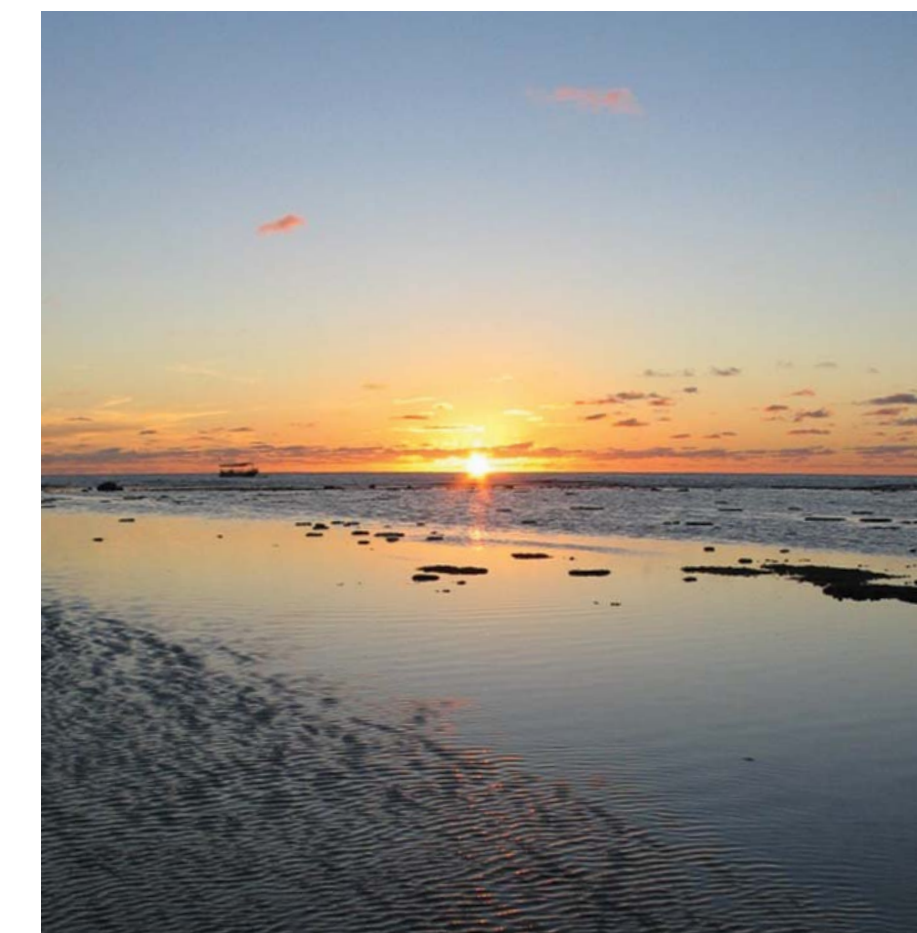
## An island powered by the sun

Here on Lady Elliot Island we are doing our bit to combat climate change and protect our Reef. By making small changes to the way we work, we achieved a 24 per cent reduction in energy use. The hybrid solar power station you see here replaced three diesel powered generators and reduced our carbon emissions by a further 40 per cent. That's a 64 per cent reduction and we're still looking for ways to cut back our energy use.

You can help too. Using energy wisely while you are here on the island and reducing your energy use at home and at work is the first step to a better future. Let's work together to be part of the climate change solution and ensure beautiful places like Lady Elliot Island remain for future generations to enjoy! To learn more continue the self-guided tour of the power station, visit our climate change display inside the Reef Education Centre or go to [www.gbrmpa.gov.au](http://www.gbrmpa.gov.au)

## Do your bit

*Invest in solar panels for your own home, offset your household's greenhouse gas emissions, or consider purchasing green energy from your energy supplier. These actions will help create a better future for people and for the Reef.*



### A brighter future

With 143 square meters of solar panels and 48 solar battery cells, our hybrid power station is one of the largest off-grid systems in Queensland. Lady Elliot Island Resort is working towards using 100 per cent renewable energy.



Solar panels

Black Noddy