Coral reefs

Human-induced climate change is the primary threat to the Great Barrier Reef and poor water quality can exacerbate climate-related impacts. Good water quality is critical for healthy and resilient coral reefs and supports recovery from disturbances such as mass bleaching and extreme weather events. Poor water quality continues to have detrimental impacts on inshore coral reefs.

Why are coral reefs of the Great Barrier Reef important?

The coral reefs of the Great Barrier Reef are globally recognised for their ecological, social, economic, and cultural (including Indigenous and non-Indigenous) heritage values.

Ecological values

Connection to Country

Recreational fishing

Commercial fishing

Tourism

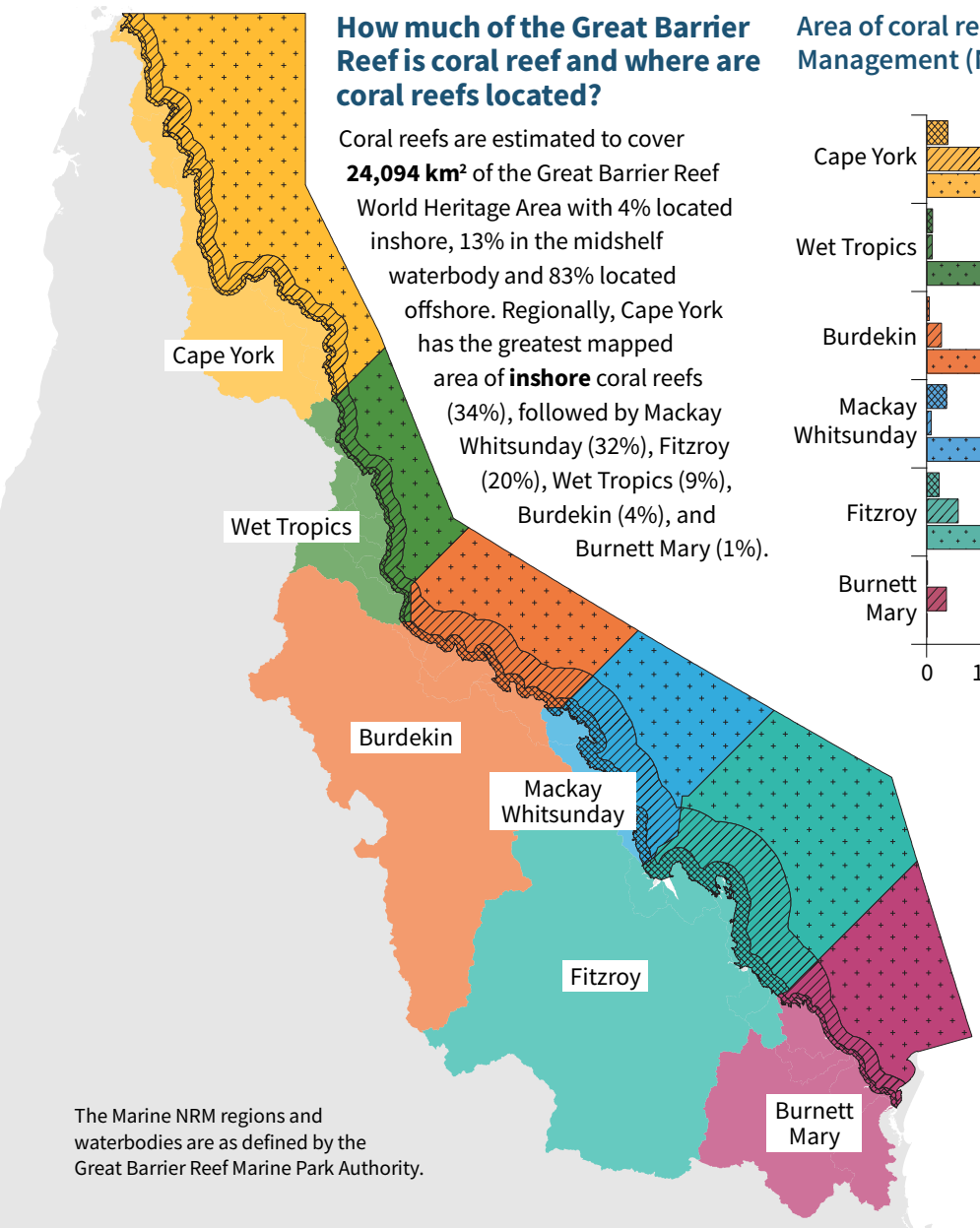
The Great Barrier Reef's coral reef ecosystems are very diverse with 450 types of hard corals and at least 1,000 species of soft corals and sea pens. They support a vast array of marine life including fish, turtles and sharks, and provide many ecosystem services and related livelihoods that are important for local communities.

450
types of hard coral

1,000
species of soft corals and sea pens

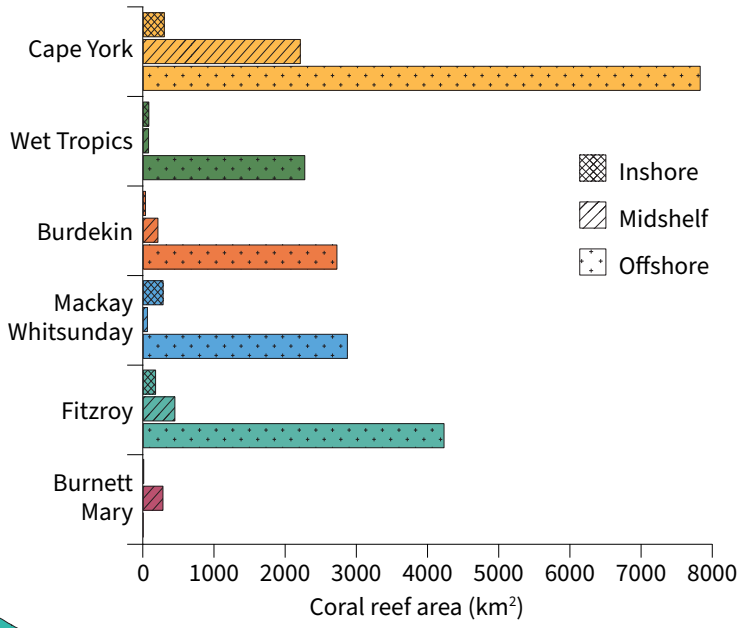
How much of the Great Barrier Reef is coral reef and where are coral reefs located?

Coral reefs are estimated to cover **24,094 km²** of the Great Barrier Reef World Heritage Area with 4% located inshore, 13% in the midshelf waterbody and 83% located offshore. Regionally, Cape York has the greatest mapped area of **inshore** coral reefs (34%), followed by Mackay Whitsunday (32%), Fitzroy (20%), Wet Tropics (9%), Burdekin (4%), and Burnett Mary (1%).



The Marine NRM regions and waterbodies are as defined by the Great Barrier Reef Marine Park Authority.

Area of coral reefs by Marine Natural Resource Management (NRM) region and shelf position



What's the condition of coral reefs on the Great Barrier Reef?

Since the 2017 Scientific Consensus Statement, the condition of **inshore coral reef ecosystems has declined**, while coral cover on **shallow mid- and outer shelf reefs has shown clear recovery** following repeated mass bleaching, tropical cyclones and/or crown-of-thorns starfish outbreaks.

Coral reefs

Threats

Land-based runoff
Sediments, nutrients and pesticides run off the land into river systems when it rains and are carried to the Great Barrier Reef in flood plumes

The influence of runoff decreases with distance from river mouths

The influence of land-based pollutants varies between locations and times, and is greatest in freshwater, estuarine, coastal and inshore marine environments

Rising sea temperatures and heatwaves
can lead to bleaching of corals, anemones and clams

Cyclones
can cause physical damage to corals, and increase sediment resuspension and supply of marine nutrients

Crown-of-thorns starfish (COTS) outbreaks
can reach plague proportions and decimate coral reefs

Ocean acidification
results from oceans absorbing CO_2 from the air and turning more acidic, which can reduce coral growth and increase erosion rates on reefs

Water quality impacts

Chronic **poor water quality and discharge events** slow reef recovery following disturbances

Sediments can reduce water clarity and light which can cause sublethal stress and partial mortality of corals within days. **Nutrients** lead to increased phytoplankton biomass which can also reduce light.

Increased **sediment and particulate nutrient loads** can smother corals and other reef-associated organisms, affect the composition of reef communities, lower coral diversity, and reduce the depth range where corals can live

Sediments can affect the pelagic larval phase of corals and make it hard for new corals to find a suitable surface to settle on

Some sensitive species found on coral reefs are not found in areas where sediment and nutrient concentrations are high

Excess **nutrients** can:

- promote macroalgae growth. Large amounts of macroalgae can have a negative effect on corals, particularly through competition for space
- negatively affect coral growth and reproduction and may make corals more susceptible to bleaching and disease
- lead to phytoplankton blooms that increase food supply for COTS larvae

Pesticides are harmful to aquatic species and can increase species vulnerability to other stressors, including heatwaves and reduced light

Related questions and confidence ratings

Q1.1 HIGH CONFIDENCE
Q1.2 HIGH CONFIDENCE
Q3.2 MODERATE CONFIDENCE
Q4.2 MODERATE CONFIDENCE
Q5.1 MODERATE CONFIDENCE

For more information on the questions addressed in the 2022 Scientific Consensus Statement, scan the QR code

C2O coasts | climate | oceans

The 2022 Scientific Consensus Statement is jointly funded by the Australian and Queensland governments.

These Topic Summaries were prepared based on the data used in the 2022 Scientific Consensus Statement which includes evidence up to the end of 2022.