The Great Barrier Reef for all generations

A Diverse and Vibrant Ecosystem

Located off the Queensland coast of Australia, the Great Barrier Reef encompasses an area of 344, 400 square kilometres. It is so vast that it is visible from space (Great Barrier Reef Foundation, 2020). Formed by 3, 000 individual reefs and over 1,050 islands of coral cays, continental islands and inshore mangrove islands, this vast habitat provides shelter to many unique marine species that make up its rich tapestry of biodiversity. The Great Barrier Reef houses over 1, 625 species of fish, 215 species of birds and over 600 types of corals (WWF- Australia, 2020). Its ecological importance is internationally renowned, its outstanding value even being safeguarded as a World Heritage Area.

The reef is the world's largest coral reef ecosystem. Consequently, it is the most significant living structure on the planet (Great Barrier Reef Marine Park Authority 2019; WWF- Australia, 2020). The incredibly diverse ecosystem varies in-depth, from shallow estuarine areas to deep oceanic waters off the Australian continental shelf, allowing an abundance of habitat for 25% of all known **marine species in the world** (Hopley, Smithers and Parnell, 2007; Great Barrier Reef Foundation, 2020). Furthermore, the reef provides substantial benefits to the region, in the form of tourist, fisheries and coastal protection from damaging waves (Rogers, Blanchard and Mumby, 2014; Ferrario et al., 2014). The economic, social, and iconic value of the Great Barrier Reef to Australia was valued at AU$56 billion (Deloitte Access Economics, 2017).

Increasing Vulnerability and Uncertainty

Despite being one of the world's most popular tourist attractions, its **future sustainability** is wavering. The increasing effects of human-induced **climate change** and additional pressures are having synergistic impacts on the health of the Great Barrier Reef (Johnson and Marshall, 2007). In only six years, severe disturbances have resulted in the most extensive loss of coral habitat ever recorded on the Reef (Great Barrier Reef Marine Park Authority, 2019).

In the summer of 2016 and 2017**,** **intense heat exposure** due to **rising surface temperatures** triggered mass bleaching of the coral reef in the northern and central regions (see Figure 1) (Great Barrier Reef Marine Park Authority, 2019). Coral bleaching is a phenomenon that occurs when a change in environmental condition induces stress on the coral and causes it to lose the symbiotic algae that live within it, killing the coral and whitening it in the process (Brown, 1997).

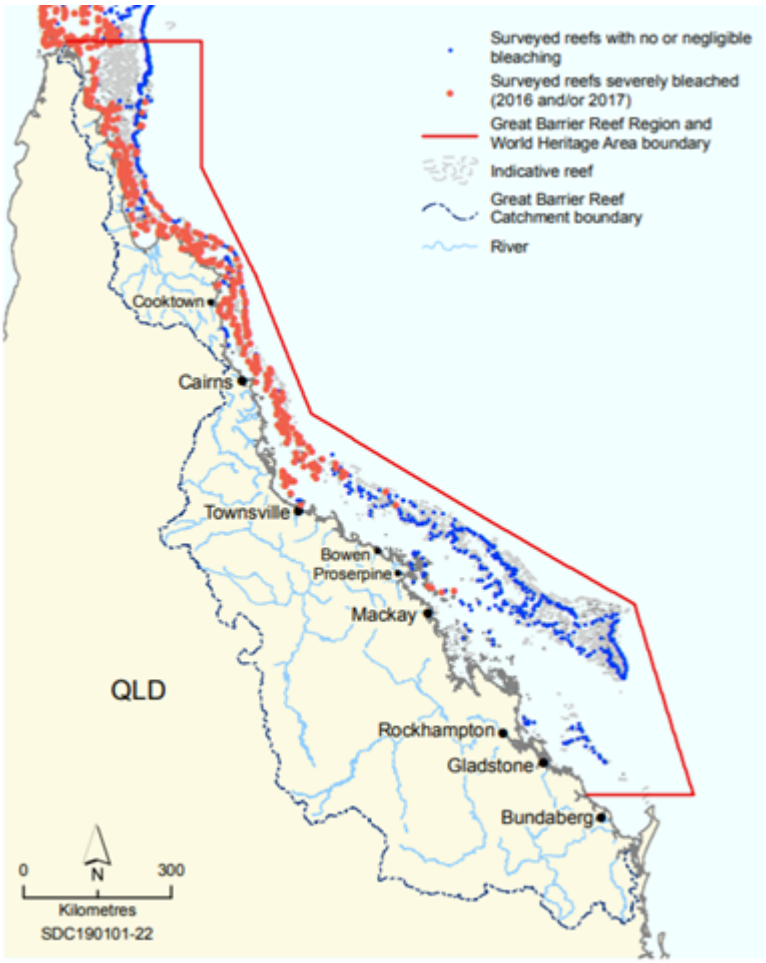

Figure 1: Mass coral bleaching in the Northern, central regions of the Great Barrier Reef during the summers of 2016 and 2017 (Great Barrier Reef Marine Park Authority, 2019).

Additional, the severity of tropical cyclones during the summer monsoon season has greatly affected various parts of the reef since 2014, with destructive storm waves being particularly damaging to the Reef (Johnson and Marshall, 2007). Scientists predict that the effects of **climate change in Australia** will see a rise in the intensity of tropical cyclones between 2020 and 2050 (Johnson and Marshall, 2007). Furthermore, the introduced species, crown-of-thorns starfish that feeds on coral, has significantly impacted on many reefs within the Great Barrier Reef. In the right conditions, they can reach plague proportions and

reduce coral communities drastically, making them the second-highest threat to coral in the region, after coral bleaching (Australian Institute of Marine Science 2018).

The compilation of these factors has led to the most widespread decline in coral coverage ever seen in the history of monitoring in the Great Barrier Reef (Australian Institute of Marine Science 2018). Considering how quickly the severity of these impacts has escalated, the future **sustainability** of this incredible ecosystem is uncertain.

Altering the Course of Decline

Ensuring that **sustainability matters** in your lifestyle can provoke **cumulative change**, capable of altering the Great Barrier Reef's adverse trajectory. Reducing energy consumption, choosing **renewable energy**, and taking alternative transport are powerful ways to decrease **greenhouse gas emissions**, as well as **reduce the rise in global ocean temperatures**; effectively preventing the bleaching of coral reefs due to heat stress (Great Barrier Reef Foundation, 2020).

Additionally, seeing this vibrant underwater world for yourself by supporting sustainable reef tourism contributes to the proper management of the marine area. It spreads education about the importance of its preservation (Great Barrier Reef Foundation, 2020).

For more guidance on how you can instigate change for a more sustainable and thriving future, please visit ***THRIVE* Project**, providing you with a framework to achieve a better world.

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