

Management of the Great Barrier Reef

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The Great Barrier Reef



Figure 1. Map of the Great Barrier Reef and boundaries (GBRMPA, 2014).

Implementing marine zoning

The Act provided direction regarding the implementation of a marine zoning plan, which outlines the objectives of this planning strategy. The purpose of zoning in the GBRMP prioritises protection, conservation, aesthetic reservation and scientific research. Other objectives included the management of the anthropogenic uses of the GBR in order to prohibit overexploitation of its resources while promoting sustainable practices (GBRMPA, 2004). The region's various zoning uses are depicted in Table 1 and includes general use, habitat protection and scientific research. It also highlights the corresponding area (km²), closest percentage it makes up of the region and closest conservation of nature category equivalent.

The Great Barrier Reef (GBR) contains a complex coral reef system, home to Australia's diverse marine life and ecosystems. It is a World Heritage Area, located off the coast from the tip of Cape York in northern Queensland to north of Bundaberg in the north-east (Figure 1). Its natural beauty makes it an attractive location to locals and tourists alike. However, the GBR is facing alarming change with warming waters inevitably bleaching coral reef systems.

With once primary concerns deriving from impacts of mining and biological destruction of coral reefs in the 70s, the major worries began to shift to climate change influence, runoff, overfishing and land modification, which has effectively reduced aquatic size and populations (Bellwood et al., 2004). Consequently, The Great Barrier Reef Marine Park Act (the Act) was established to better prohibit harmful use (Kenchington et al., 2002). It is a region dedicated to the protection of the imperative, diverse coral reef systems and abundant marine species due to its susceptibility to damage (Beeton et al., 2006). The Act appointed The Great Barrier Reef Marine Park Authority (GBRMPA) to oversee management plans such as prohibitions regarding harmful activities and prioritisation of management and protection methods.

Zone type	Zone area (km ²) ^a	Fraction of GBR Marine Park (%)	Closest equivalent International Union for Conservation of Nature category
General Use Zone	116,530	33.8	VI
Habitat Protection Zone	97,250	28.2	VI
Conservation Park Zone	5,160	1.5	IV
Buffer Zone	9,880	2.9	IV
Scientific Research Zone	155	<1	Ia
Marine National Park Zone	114,530	33.3	II
Preservation Zone	710	<1	Ia
Commonwealth Islands Zone ^b	185	<1	II
Total	344,400	100	VI (Ia, II, IV and VI)

Table 1. The zoning areas of the GBRMP and its corresponding zone area, fraction of the GBR and the closest equivalent for Conservation of Nature category (Day et al., 2019). (Highlighted b refers to areas derived from Days & Dobbs, 2013).

The zoning plan has also undergone revision, expanding ‘green zones’ which were implemented to separate regions used for environmental preservation and extractive activity (Hughes et al., 2003). Zoning in 2004 resulted in various neutral-positive impacts, but it is suggested that the probability of a high rated outcome can be due to the implementation of zoning management and correlates with the concept that biodiversity values can be exemplified if perceived through objectives of long-term conservation (Fraser et al., 2019).

Despite these policy changes made to cater to the prosperity of the GBR, methods of protection via zoning may not always secure protection from other threats such as coral bleaching via ocean acidification, induced by climate change processes. This will not be accommodating for marine zoning in the GBRMP (Hughes et al., 2017).

Further improvements on the GBR

The GBR has faced critical mass bleaching events, with various occurring within a shorter time span (2016, 2017, 2020 and 2021) (Cheung et al., 2021). Key stressors surrounding coral bleaching are essentially climate-driven, such as increasing sea temperatures. Others include weather-related events that can be enhanced by climate change, including severe cyclones and floods (Great Barrier Reef Marine Park Authority et al., 2022).

Current efforts in examining, assessing and ultimately responding to the impacts of climate change on the GBR is heavily dependent on restorative management and data collection to further understand the reef. In-water surveys are especially ideal when observing coral reef data in response to changing sea temperatures. Additionally, aerial surveys can view these systems through larger perspectives (Great Barrier Reef Marine Park Authority et al., 2022).

Climate change impact on the GBR

While the GBRMPA continues to improve management systems of the GBR, factors which induce climate change continue to enhance. This includes the preference of mining to secure economic growth into the future, despite it being an unreliable and dangerous pretence for sustainability (Conde, 2017). However,

there is increasing anti-coal sentiment to current preferences, centred on social and local community and concern (Jolley & Rickards, 2019).

Jolley & Rickards (2019) further elaborate on potential environmental harm that mining projects, such as the operation of the Carmichael coal mine (referred to as Adani herein), can have on the GBR. More specifically, Adani can morbidly contribute 4.7 million tonnes of carbon dioxide emissions (Reddy & Armin, 2018). These critical conditions will only become even likelier without protesting against these projects. Advocating for climate policies is important and the dangers surrounding climate change impact must be voiced for the preservation of our future, and also, the health of Australia's GBR.

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