

Review of “Long-Term Sustainability Plan for Great Barrier Reef”

By Amandeep Kaur – HOPE researcher NSW (December 2021)

Introduction

World heritage sites are irreplaceable places that have an outstanding universal value ranging from superlative natural beauty to habitat of biological diversity. Australia’s Great Barrier Reef is one of the most astonishing natural wonders of the world, comprising the world’s largest coral reefs and number of islands. Great Barrier Reef World heritage area covering an area of 344,400 km² off Queensland’s coast is the only living structure on earth visible from space (NOAA, 2021). It is known for its treasure of marine life including 1625 types of fish, 133 varieties of sharks and rays, and 650 types of hard and soft corals (Reef 2050 plan).

Highly vulnerable reef

The Reef system is considered amongst the best managed marine ecosystems in the world (Mary et al., 2008) but like all other coral reefs around the world, it is under pressure by natural and man-made factors (Table 1). Among these problems, climate change is still the biggest challenge (Outlook 2019).

Table 1. Major threats to Great Barrier Reef

Problem	Major reasons	Result
Climate changes	Mining and burning of coal and gas	Ocean acidification, increased temperature, devastating mass coral bleaching
Water pollution	Chemicals from land-based activities, overuse of fertilizers	Algal blooms, buildup of pollutants, and reduced light
Commercial and recreational fishing	Gillnets indiscriminately kill iconic threatened species like dugongs, turtles, sawfish, and dolphins	Ecosystem out of balance, removal of predators like sharks
Dredging projects	Development of new or expansion of existing port facilities, Disposal of dredged material	Smothering coral, seagrass beds, and ruined water quality
Storms and flood	Wave-driven marine flooding due to climate change	Plumes laden with sediments and nutrients
Marine debris	Trash such as plastic bags, bottles, and discarded fishing gear	Kills marine life (smother coral, entangle wildlife, or be ingested by animals), blocks sunlight
An outbreak of crown-of-thorns starfish	Increase in phytoplanktons (their food) by the accumulation of fertilizers and other nutrients	They feed on coral thus resulting in coral loss

Government policies for reducing the Reef stress

The GBRMPA (Great Barrier Reef Marine Park Authority) together with the Australian government is continuously making efforts through strong legislative protection and targeted investment to ensure that the integrity and safety of the Great Barrier Reef will not be compromised and continues to increase with time. Government policies regarding capital dredging projects in the Great Barrier Reef provided great help, and a permanent ban has been imposed on the disposal of dredged material in Reef Marine Park and the World Heritage Area. In addition to this, the proposal of five major industries to use Great Barrier Reef Marine Park as a disposal site for capital dredged material has been reduced to zero within 18 months. Moreover, water quality entering the reef through catchment areas is improving, all through efforts by the Australian Government and GBRMPA. Not only this, GBRMPA has introduced several programs for the betterment of reef including the **Marine Monitoring Program** that annually checks water quality, inshore seagrass and coral reefs; **Eye on the Reef monitoring and assessment program** keeps an eye over the reef health, marine animals and incidents; the **crown of thorns starfish management program** supports the recovery and repair of reefs (GBRMPA; www.gbrmpa.gov.au/). Recently, GBRMPA together with 30 other protected area agencies around the world has signed a statement on climate change and biodiversity loss for protecting biodiversity and to deal with climate change (Mirage News).

Combating problems through Reef 2050 Plan

Joint efforts of GBRMPA, Scientists, Industries, Government, and Non-government Organizations have contributed to the development of the Reef 2050 Long-Term Sustainability Plan for the resilience of the Great Barrier Reef in response to serious threats. An important feature of the plan includes protection, maintenance, monitoring, management, improvement, and investment. These features target ten broad topics:

- Prohibiting capital dredging for development/ expansion of ports
- Monitoring the health of Gladstone harbour
- Checking the quality of water entering the reef
- Appointed a Queensland Minister for the Great Barrier Reef
- Establishment of Reef Trust to plan investment for improving water quality
- Protecting Fitzroy Delta including Curtis Island and Keppel Bay
- Released the Shipping Management plan, in October 2014
- Development of laws against poaching and sustainability agreements to reduce marine debris
- Projected investment for research and management activities on the Reef
- Helping businesses transition to eco-friendly production and fishing industries

Strategies to tackle problems



Climate change: Australian government together with international engagements is committing to reduce its emissions. Funding of \$A2.55 billion is in place to support businesses and households in minimizing emissions (Reef Plan 2050).

Recommendation: We cannot deal with climate change without the contribution of everybody. Efforts to control climate change start with our homes. So, wherever possible we should use renewable sources of energy, electrical vehicles or public transport, plant trees, use rooftop solar, encourage solar farms, reduce food waste and consider responsible refrigerant management.

Improving water quality: Water entering the reef from agriculture is continuously improving. Reduction in pesticide (↓ 28%), sediment (↓ 11%), dissolved inorganic nitrogen (↓ 16%), and nitrogen (↓ 10%) load has been observed compared to the 2009 baseline. Further targets of reducing dissolved nitrogen loads by 80% by 2025, sediment loads by 50%, and pesticide loads by 60% are in priority areas (Reef Plan 2050).



Recommendation: Switching to green agriculture/organic farming is more convenient and reduces the further load of pollutants. Proper disposal of trash and supporting green-oriented companies can add to improvement. Supporting researchers and scientists in finding better ways for the management of water from industries that enter our oceans can contribute to water quality improvement.



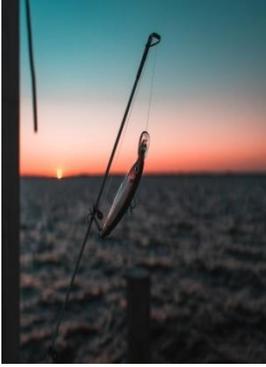
Ports and dredging: The Australian Government will use its regulatory powers to permanently ban the disposal of capital dredge material in the Great Barrier Reef Marine Park (Reef plan 2050). Restricting capital dredging for new or expansion of port facilities to within the regulated port limits of Gladstone, Hay Point–Mackay, Abbot Point and Townsville has been implemented(Reef Plan 2050).

Recommendation: Use of dredged material in an environmentally friendly way should be considered. This material (especially sand and gravel) can be used in construction industries.

Shipping safety: Shipping movement in the Great Barrier Reef is low in comparison to many other world heritage areas. Reef 2050 plan focuses on 1) increasing resources for State port control inspections 2) use of emerging ship tracking technology to provide early alerting of ship breakdowns 3) industries to introduce electric chart display in ships trading to ports in the region and have bunker oil tanks fitted in protective locations (Reef Plan 2050).

Recommendation: Shipping safety can be further improved by banning antifouling containing biocides and proper check on limits of sulfur used in fuels. Further, NOx emission can be reduced by using techniques such as water injection and exhaust gas reticulation.





Ecologically sustainable fishing: The Queensland Government is establishing net-free zones and has allocated up to \$A10 million to buy-back fishing licences. This will improve the ecological sustainability of fishing in the Great Barrier Reef (Reef 2050 plan).

Recommendation: Never leave fishing junk behind on coastlines as it promotes pollution; as well, it can be consumed by the innocent animals/creatures near coastlines resulting in suffocation and even death of animals. The public should be made aware of sustainable fishing and encouraged to choose sustainable seafood (MSC blue fish tick label).

Resilience of Reef

Several examples/events show that the efforts of government, non-government organizations and scientists are paying off and reefs are recovering from damages that occurred in previous years particularly in 2016, 2017 and 2020 (AIMS report). Recently, a spectacular event of coral spawning was observed off the coast of Cairns, (Queensland) in the Great Barrier Reef on November 23 (Australian Geographic report). Scientists and researchers from James Cook University previously reported that only 1.7 percent of individual reefs had avoided bleaching by climate change (Leggat et al., 2019), thus coral spawning can prove to be a boon for resilience. Another example is the recovery of humpback whales and southern green turtles in comparison to the previous population. Cyclone Yasi and floods had impacted the breeding rates of urban coast dugongs which are improving now.

Although reefs are recovering, it still requires continuous monitoring. Dr. Mike Emslie (The Australian Institute of Marine Science) monitoring corals in reefs said “they are fast to grow, they are often the first to go—they are susceptible to cyclones, coral bleaching and are the favorite food for crown-of-thorns starfish”. Thus, proper management strategies are the only way we can preserve this world heritage for ourselves and future generations.

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