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Rohan Lloyd

Through the Reef: Settler Politics, Science, and the Great Barrier Reef

Accounts of the Great Barrier Reef written before 1975 usually begin with a list of the reef's physical features: Australians, while familiar with the Reef, were still establishing its importance within their collective consciousness. Scientists, natural historians, travel writers, and politicians promoted an awareness of the reef as a place rich in splendour but also, and quite literally, wealth. However, the establishment of the Great Barrier Reef Marine Park Authority (GBRMPA) in 1975, following a protracted environmental campaign, marked the ascendance of science in the management of the reef and was thought to herald a golden era of reef preservation.

The GBRMPA was established to manage conflict over the uses of the reef, and the values attached to it. After 1975, the reef became partitioned—zoned for specific user groups and agendas. Understanding threats to the reef, both in terms of human behaviour and of naturally occurring phenomena, became the paradigm of Australian coral-reef science. Reef scientists pursued their investigations in marine research stations from Lizard Island in the Reef's north to One Tree Island in the south. Australian coral reef scientists quickly caught up with, and then led, coral reef research throughout the world. This regime, however, was predicated on the notion that the reef's health was mainly impacted by local events (such as cyclones, heavy rains, pollution, and Crown of Thorns); the impact of global climate shifts had not entered into discussions of the reef's future in the 1970s.¹ Today, that issue is paramount in understanding coral reef, and indeed the Great Barrier Reef's, health. While the Great Barrier Reef is one of the best-protected coral reef systems in the world, scientists have lamented the way governments, industry, and even the GBRMPA itself have sidelined their voices, been slow to implement effective management policies and, in the case of the expansion of coal exportation, disregarded advice completely. Consequently, in the twenty-first century, a new understanding of the Reef is emerging, one that acknowledges that its declining health is a sign of the harmful impacts of global climate change.

1 Crown of Thorns starfish (*Acanthaster planci*) is a native coral-eating starfish common to the reefs of the Indo-Pacific region. While it can play an important role on a reef by feeding on the fastest-growing corals, the starfish has, according to the Australian Institute of Marine Science, been responsible for nearly half of all coral decline over the last 30 years on the Barrier Reef. The most significant damage occurs when outbreaks of the starfish occur. The first reported outbreak occurred in the early 1960s on the popular reefs near Cairns. Since then there have been three further outbreaks, the most recent starting in 2010.

A history of the Great Barrier Reef reveals that the contemporary tensions between the desire for economic growth and protection of the reef have a long past. Appreciation of the reef's social and economic value increased dramatically as settlement spread along the Queensland coast after 1860. With greater access to the reef, however, came greater human-caused damage to its varied marine environments. As environmental loss became more obvious and less socially palatable, and anxieties over reef resources emerged, the Australian federal and Queensland state governments were compelled to act to protect and preserve various reef features through the establishment of sanctuaries, prohibitions on shell and coral collecting, and regulation of industrial exploitation of the reef's biological and geological resources. This paper will give a brief overview of these developments to provide context on contemporary issues and on predictions of the reef's future.

190 THE AUSTRALIAN MUSEUM MAGAZINE. JUNE 15, 1951.



Upolu Bank, near Green Island, off Cairns, Queensland. A typical small mound (cay) resting atop a large coral bank. Except for the sparse vegetation, the composition is carbonate of lime—gravels and fine sand.

Photo.—H. Chargeis, F.R.P.S.

Wealth in Coral Gravels

By FRANK McNEILL.

Figure 1:
Frank McNeill was an Australian marine zoologist working for the Australian Museum. His article explained that "vast accumulations of detritus along the Great Barrier Reef have lain dormant and unnoticed for centuries...It will be interesting to see how long a time will elapse before this source of national wealth is turned to account."

From the time of the reef's settlement, appreciation of its economic potential (and its aesthetically pleasing and environmentally valuable attributes) was evident. Before the underwater world was easily accessible, the reef's migratory bird species and turtles formed an identifiable and spectacular treasure of its unique ecosystem. The birds that flocked to the reef's cays and islands received widespread admiration and subsequently official protection. Turtles received various levels of protection in the interwar and post-war periods as a result of concern over dwindling numbers and the magnitude and cruelty of their slaughter. The reef's aesthetic and environmental virtues had been broadcast by natural historians both amateur and professional, such as William Saville-Kent, Edmund Banfield, C. M. Yonge, and Theodore Roughly. Journalists and nature writers such as Sydney Elliot Napier and Charles Barrett had also publicised the reef's appeal. Politicians keen to draw attention to the economic possibilities of the reef wrote lyrically about its environmental splendour. Collectively, these writers encouraged a sympathetic regard for the reef and the protection of its most important natural features. Additionally, all were eager to highlight the reef's potential for economic development and exploitation. More importantly, they asserted the worth of the reef to the Australian public. Within this view, its islands could be sites of agricultural, pastoral, or fishery development, while other islands, less suitable to productive development, could be set aside as tourist and nature reserves. A sense was building in the early twentieth century that the reef, a wonderful showcase for Australian nature, had economic potential that had barely been realised.

While reef tourism had existed in rudimentary form since the nineteenth century, isolation, poor infrastructure, and obstructionist lease arrangements slowed the development of a truly modern tourism industry. In 1947, the development prospects of reef tourism prompted concern from the Queensland Tourist Development Board and the National Parks Association of Queensland about the reef's preservation. Tourists, they argued, were poorly informed about the impacts of shell and coral collecting, and island rangers (responsible for protecting the reefs) were found to be illegally collecting and selling corals and shells. There was a growing conviction that accessible reefs were being plundered. In response, the Parks Association advocated that either the entire Barrier Reef, or at least the popular tourist islands of the Whitsundays Passage, be amalgamated into a single Barrier Reef National Park. Their latter proposal suggested that individual islands like Long, Whitsunday, South Molle, and Hook would lose their individual names and be referred to collectively as the National Park. The Parks Association considered



Figure 2:
Exposed coral reef
at Lodestone Reef,
off Townsville, 1951.
Image held by Townsville
City Libraries.

such a move would both dramatically improve the islands' management and bring about greater international recognition and tourism. The government disagreed, no notable changes to the reef's preservation status were made, and development of the tourism industry continued, as did the expressions of concern surrounding the reef's degradation.

In the postwar era, concerns were raised by local citizens, scientists, and conservation groups about the increasingly obvious human impacts on the reef. Exploration for oil and minerals, the first outbreak of the coral-eating Crown of Thorns starfish, and terrestrial pollution's impacts on marine environments reinforced the notion that new forms of regulating human engagement with the reef were required. At the end of 1966, Don McMichael, a marine biologist at the Australian Museum, decried what he saw as complacency about the possible loss of the reef. He wrote that "most people have regarded the Reef as something completely permanent, of great age and with a future stretching ahead just as long as its past. They would probably agree that nothing we could do would conceivably affect the future of this enormous complex of coral reefs."² McMichael asserted that further "positive steps towards safeguarding the Reef's future" would need to be taken in order to protect the reef from the major "alterations to the environment" he foresaw. But the scientific community remained eager to manage development rather than arrest it, and to ensure that the reef's economic resources could be exploited while its natural values were enjoyed and maintained.

The "Save the Reef" campaign took place in this context. That campaign, which lasted from 1967 to 1975, was at first concerned with protecting a particular section of reef from limestone mining, but it came to defend the entire reef from oil drilling. It gave impetus to the national discussion of how the reef would be managed into the future. One of the major concerns of the campaign was whether or not reef tourism and oil

2 Donald McMichael, "The Future of the Great Barrier Reef," *Australian Natural History* 15, no. 8 (1966): 269–70.

extraction were compatible. While pro-oil exponents suggested the two could coexist, the prospect of oil spills and oil rigs ruining the aesthetics of the reefscape loomed large in the imaginations of Australians. This scenario was made all the more compelling by contemporary images of the 1969 Santa Barbara oil spill off the coast of California.

In 1970, the campaign to save the reef had gained such popularity that a trade union “black ban” halted the oil rig construction on the reef, necessitating the intervention of a Royal Commission. In Australia, the term black ban refers to the mass refusal by trade union workers to supply or purchase goods or services. Eventually the term “green ban” was coined in 1973 to distinguish traditional black bans from those with a distinct environmentalist agenda. Most historians consider the earliest green bans to have been conducted in Sydney in 1971; however, few could doubt the environmentalist underpinnings of the reef black ban. As a result of this union intervention, the future of the reef’s management came under far greater public scrutiny. Again, attention was drawn to the possible loss in tourism revenue that would come about by ruining an environment with significant natural value and tourism potential. A bill was introduced to the Commission that sought to reconcile the conflicting and multiple uses of the reef while ensuring its preservation. The bill dictated that a single authority would manage the reef’s conservation, exploitation, and research. In 1975, less than a year after the Commission’s report was distributed, the Commonwealth government passed the *Great Barrier Reef Marine Park Act*, the founding principle of which was for the GBRMPA to manage the reef in line with a multi-use approach.

Accompanying the conservation campaign was a significant increase in investment in reef research in Australia. A major hurdle for pre-1975 reef management was the scarcity of reliable scientific research. The conservation controversies demonstrated the necessity of informed science to the ongoing management of the reef. Consequently there has been a considerable increase in the number of coral reef observatories in Australia since the early 1970s, along with a significant increase in research output. Initially this research was directed towards establishing, rationalising, and monitoring the various management zones along the reef region. Since its inception, the GBRMPA has been regarded by coral reef scientists as a paragon of marine park management. Some of its successes include the maintenance of mangrove communities; the establishing of sustainable fisheries; increases in whale populations; the prohibition of oil and mineral mining; positive responses to sewage and effluent discharge in the form of state and fed-

eral government cooperation and legislation; and strong action on pilotage, including introducing restrictions on shipping sewage discharge and provisions for the full cost of environmental rehabilitation following incidents in the Marine Park.³ Yet it is precisely because the management regime has been so successful that signs of the reef's general decline are so concerning. Since the late 1980s there has been more of a focus on the causes of coral reef decline. Consequently, coral reefs have become identified as major losers in a warming climate. Scientists have highlighted the inefficiencies of a management system that is unable to mitigate, without significant changes, the decline in the Barrier Reef's health. Three major issues have been identified as concerns for the reef's response to climate change.⁴

The first, and the one which the GBRMPA has been able to address, is water quality decline. While the reef is well protected and managed, its catchment area is less well maintained. It is estimated that the amount of runoff into the reef has increased to 5.5 times the pre-European load levels, or 17, 000 kilotons a year. The consequences of increased terrestrial loads are multiple: sediment runoff has resulted in a reduction in coral settlement, increases in juvenile mortality, reductions in coral diversity, and other issues that are attributable to reduced light. Additionally, corals are dependent on low nutrient levels to thrive. Increased nutrient loads are considered to be the primary cause of outbreaks of the Crown of Thorns starfish.

The second and third causes of the reef's decline are direct results of global anthropogenic climate change. While increased ocean temperatures might seem beneficial for coral growth, since they thrive in warm, tropical waters, corals are acutely sensitive to elevated sea temperatures. Higher-than-normal sea temperatures can result in a breakdown of the symbiosis between corals and their algae symbionts, causing an event known as coral bleaching. Coral bleaching is often described as the bushfire of

3 See: J. Brodie and J. Waterhouse, "A Critical Review of Environmental Management of the 'Not So Great' Barrier Reef," *Estuarine, Coastal, and Shelf Science* 104–5 (2012): 3–12.

4 These concerns are reflected in a massive number of articles that focus on both the Barrier Reef and on global reef system declines. The following are important for both the frequency with which they are cited and the impact of the research: Ove Hoegh-Guldberg, "Climate Change, Coral Bleaching, and the Future of the World's Coral Reefs," *Marine and Freshwater Research* 50, no. 8 (1999); D. R. Belwood et al., "Confronting the Coral Reef Crisis," *Nature (London)* 429, no. 6994 (2004); Glen De'ath, Janice M. Lough, and Katharina E. Fabricius, "Declining Coral Calcification on the Great Barrier Reef," *Science* 323, no. 5910 (2009); J. E. Brodie et al., "Terrestrial Pollutant Runoff to the Great Barrier Reef: An Update of Issues, Priorities, and Management Responses," *Marine Pollution Bulletin* 65, no. 4–9 (2012); Glenn De'ath et al., "The 27-Year Decline of Coral Cover on the Great Barrier Reef and Its Causes," *Proceedings of the National Academy of Sciences of the United States of America* 109, no. 44 (2012).

the marine world. It leaves the corals white and devoid of life, and reportedly smelling like rotting animals. Initially observed in the late 1970s, coral bleaching, including the large-scale phenomena known as mass bleaching events, has become one of the major concerns of global reef science. In 1998, during one of the largest mass bleaching events on record, bleaching occurred on nearly every major reef system in both hemispheres. On the Barrier Reef, the damage was extensive in 1998, 2002, and locally severe in the reef's southern regions in 2006. Reports of the extent of the damage caused by the 2016 event have suggested that only seven per cent of the reef escaped bleaching. While there are no human casualties in a bleaching event, the images of white, lifeless reefs along Australia's coast have invoked widespread concern for the Great Barrier Reef's future in a changing climate.

Also associated with anthropogenic climate change is the increasing acidification of the world's oceans. As a result of this, organisms with calcium carbonate skeletons, such as corals, are inhibited from calcifying and building crucial tissue. There have been notable declines in the rates of calcification of corals that correlate with increases in water acidity in the reef. The ocean acidification has led some to assume that a temperature-driven decline in coral reefs, manifesting in bleaching, will eventually be displaced by an acidification-driven degradation of coral reefs, even if global warming is limited to under 2° Celsius.

Despite our increased understanding of reef ecosystems, uncertainty remains over the future of coral reefs. Research using geochemical and geological records suggests that coral reefs have survived previous CO₂-driven climate changes. It is, however, unknown whether corals will be able to acclimatise or adapt to the rapid rate of change that is underway today. Given that some predict that mass bleaching events will be annual occurrences by 2050, and that by 2020 the average rate of bleaching will be equivalent to the 1998 mass bleaching event, there is little room left for optimism for the future of the Barrier Reef.⁵

Yet it is important to acknowledge the source of whatever optimism remains. Scientists are increasingly revealing mechanisms of resilience within corals and their symbiont partners to the changing climatic conditions and are identifying species-specific abilities to acclimatise and adapt, despite the pace of change. Additionally, identifying those

5 See: Hoegh-Gulberg, "Climate Change, Coral Bleach, and the Future of the World's Coral Reefs," 853.

characteristics that correspond to positive responses to bleaching has allowed scientists to predict, to some extent, future responses. A key factor in coral resilience to both bleaching and acidification, and indeed to any major disturbance, is water quality. Since 2003, improving the water quality of the Barrier Reef has been one of the major environmental initiatives of the Queensland and Commonwealth governments.

While new biological evidence provides some room for optimism, the past can be a source of optimism too. The reef is a biological wonder, protected by its World Heritage listing since 1981. It contributes a disproportionate amount of Australia's biodiversity, protects the Queensland coast from the Pacific Ocean, and contains important sites of Indigenous cultural heritage. Additionally, the reef is of considerable economic value. Reef-based industries generate nearly six billion Australian dollars of revenue annually. Tourism's share of Australia's economy is nearly three per cent and the reef, which generates just over five billion dollars annually, remains a significant tourist destination for both domestic and international travellers. The importance of reef tourism for Queensland coastal communities in particular, struggling now in Australia's post-mining boom slump, was made even more apparent by recent protest flotillas at Great Keppel Island calling for the approval of a gaming licence for a proposed island resort. In the "Save the Reef" campaign, the prospect of an oil industry was considered to be in direct opposition to the needs of the tourism industry. In 2016, the tourist industry is once again aligned with conservation movements. Reef tourism operators who are concerned with the decline in reef health and the consequences it would have for their businesses are routinely amongst the most vocal supporters of reef conservation and action against climate change. After the bleaching in 2016 was widely broadcast, tourism operators raised concerns that their businesses would suffer because of a decline in the reef's health: potential tourists would not be inclined to visit an environment that is scarred and dying. Both this episode and the Great Keppel Protest exemplify the entangled visions of the reef's worth, but are also expressions of the importance the reef has for the communities who live alongside it.

As scientists and many others assert, the Great Barrier Reef needs to be protected because of its multiple values to human actors. These values have a past. They are part of the reef's heritage, manifested in the episodes in which people sought to ensure its protection. If the history of the reef has a lesson to teach us, it is that these values are not the reasons why the reef should be saved; they are likely the reasons it will.

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