

# Great Barrier Reef World Heritage – Nature in Danger

## Introduction

The Great Barrier Reef is inscribed on the World Heritage List for its natural values, including an abundance of marine life and exceptional aesthetic qualities. These attributes together with the enormous scale of the Reef, which stretches some 2,300 kilometres along the northeast Queensland coast, distinguish it as unique and a place of “Outstanding Universal Value”. Protection and management of the Reef is thus focused on the conservation of the listed natural attributes, which include aesthetic qualities but not landscape values.

In the twentieth century, protection of the Great Barrier Reef was largely focused on mitigating mechanical impacts and physical harm in localities impacted by activities such as coral collecting, reef walking and boat anchoring. These direct impacts could, to a large extent, be managed through local regulation and efforts to change human behaviours at the Reef. By the second part of the twentieth century the widespread and devastating impacts of Crown-of-Thorn Starfish outbreaks and coral bleaching had become major threats. Even though these too were human induced changes, unlike the local mechanical damage, they had their origins outside the boundaries of the Great Barrier Reef World Heritage Area. The Great Barrier Reef Marine Park Authority (GBRMPA) therefore expanded its conservation measures from a focus on fishers and tourists to consider local communities on the adjacent mainland. However, by the early twentieth-first century it was apparent that the threats to the Great Barrier Reef were even more diverse and could not be managed by simply altering local behaviours. Global issues of marine pollution and climate change wreak extensive damage on the Great Barrier Reef, undermining its integrity and status as a World Heritage property.

Global warming, an increasing number of extreme weather events such as cyclones, floods and fires, and the constantly warming oceans have had a dramatic impact on coral reefs globally, including coral bleaching of large tracts of the Great Barrier Reef. While these events and impacts are occurring at alarming rates, arresting the root cause remains a considerable political and practical challenge. As global leaders and environmentalists struggle to reign in climate change, scientists at the Reef have turned to a number of radical interventions to try and create a more resilient Great Barrier Reef. In the face of an irreversible climate change, Reef management no longer seeks to change human behaviour, but to change the Reef itself. This paper considers the implications of such interventions for the status of the Great Barrier Reef as a World Heritage site of *natural* significance.

## World Heritage Listing of natural values

The Great Barrier Reef was inscribed on the World Heritage List in 1981, seven years after the Australian Government became a signatory to the UNESCO World Heritage Convention. At the time, World Heritage assessments were made under either cultural or natural nominations, and the Reef was listed under all four of the then natural criteria.

Since that time, the World Heritage criteria have been updated on several occasions as the system responded to emerging issues and attempted to reflect a broader range of approaches and expectations about how heritage should be identified and managed. A continuing challenge for World Heritage derives from its historic and ingrained separation of natural and cultural values, including the provision of two separate lists of criteria for inscribing natural and cultural World Heritage properties (Burke & Smith, 2010; Harrison, 2015; Lee, 2016; Lowenthal, 2005). This separation created a bias in

the World Heritage List with places of cultural significance almost entirely represented by European monuments and grand buildings, while natural properties were characterised as pristine, untouched wilderness (Smith, 2013). This dualism brought to the fore how the World Heritage List was not genuinely representative of the heritage of all humanity. Notably, properties inscribed under ‘natural’ ignored the ways in which natural areas are frequently a product of human perception, management and intervention. This is particularly problematic for Indigenous worldviews which regard nature and culture as indivisible (Lee, 2016; Lilley & Pocock, 2018). Efforts to redress the division between nature and culture in the World Heritage system include the introduction of a criterion enabling the recognition of cultural landscapes and the integration of World Heritage criteria into a single list.

The introduction of the cultural landscape criterion in 1992 aimed to capture a broader range of heritage properties, and the *Operational Guidelines for the Implementation of the World Heritage Convention* (Operational Guidelines) encouraged nominations of mixed natural and cultural values (Aplin, 2007; J. Brown, 2015; S. Brown, 2012; Cleere, 1995; Rössler, 2002, 2006; Smith, 2013). To a large extent World Heritage Cultural Landscapes focus on the capacity of this criterion to capture associated values; the types of values that more recently would usually be termed social or intangible values. As Smith (2013) argues, the landscape criterion has had limited impact on integrating natural and cultural values, and it is primarily through associative values that cultural landscapes have most effectively recognised this integration. One of the systemic issues that perpetuates this issue, is the way in which the landscape criterion remains embedded in the separation of nature and culture. The Operational Guidelines define Cultural Landscapes as follows:

*Cultural landscapes are cultural properties and represent the “combined works of nature and of man” designated in Article 1 of the Convention. They are illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal.* (UNESCO World Heritage Centre, 2019, p. 20)

While the separate criteria for natural and cultural listings were combined into a single set of criteria after 2004, the Operational Guidelines make it clear that Article 1 defines cultural heritage, and this includes cultural landscapes, whereas the Article 2 defines natural heritage which makes no reference to landscape or associative values. Further, while the criteria are now listed together, there is still a clear distinction between the first six criteria that relate to cultural heritage and the last four that pertain to natural values. It is thus easy to map the criteria used for earlier listings across to the new single list. For the Great Barrier Reef, which was listed under all four natural criteria in the earlier system, these relate directly to the single list of criteria outlined in Table 1.

As I have argued elsewhere (Pocock, 2002, 2020, In press [2021]), criterion vii is capable of reflecting associative values for the Great Barrier Reef and thus constitutes a form of cultural heritage, but the continued division of cultural landscapes as a category of cultural heritage denies this possibility. Instead, the Great Barrier Reef, a large-scale land- and seascape, is definitively recognised as a purely natural heritage site under the World Heritage Convention. While this has long been a problematic categorisation, responses to the environmental crises facing the Great Barrier Reef in the twentieth century exacerbate doubts whether the categorisation of the Reef as natural heritage is sustainable.

Table 1: World Heritage Criteria for which the GBR is listed

World Heritage Criteria for which the Great Barrier Reef is Listed	
(vii)	to contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance.
(viii)	to be outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features.
(ix)	to be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals.
(x)	to contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.

### The cultural values of Great Barrier Reef aesthetics

Many aspects of the Reef that are presumed to be natural are in fact produced by human knowledge and skill. While there is some superficial acknowledgement of Indigenous attachments to the Great Barrier Reef (McIntyre-Tamwoy, 2004, p. 23), there persists almost no understanding of how the Reef might within non-Indigenous perceptions be considered cultural. Understanding the region as a single phenomenon, for instance, is a product of human experience and imagination – made palpable through mapping, aerial photography and satellite imagery (Pocock, 2004, 2006, 2009). These technologies are all culturally produced. Similarly, beneath the surface, the astounding richness of underwater life; the diversity of brilliant corals, sponges and the abundance of colourful fishes, turtles and other lifeforms are made accessible and communicable to others through technology.

#### *A singular Great Barrier Reef*

Initial European accounts of the Reef focused on the navigational dangers it posed to their fragile timber ships. Their perception of the Great Barrier Reef came about through the charting and map making to avoid collision with the myriad of shoals and reefs. Contemporary understandings of the complexity and dangers of the Reef remained entwined with early colonial histories. This includes the voyage of the Endeavour in which James Cook came perilously close to catastrophe when the ship collided with the now eponymous Endeavour Reef in 1770. But it was Matthew Flinders some 30 years later who realized that the region comprised a multitude of ‘great barrier reefs’ and named it as such. The plurality of this naming, however, tends to be overlooked in contemporary understandings of the Great Barrier Reef as a single entity. The idea of the Great Barrier Reef as a single phenomenon thus has origins in the deeply enculturated practices of European mapping that allow the viewer to see at scale a single entity gathered from a multitude of individual, diverse and complex phenomena.

While maps are cultural products, so too are photographs, but the latter are more readily accepted as representations of an external reality. Aerial photography and satellite imagery often appear to give a reality to the maps created in earlier era, and even inform and replace present day mapping. These aerial images in turn produce aesthetically pleasing vistas that are synonymous with the expanse and beauty of the Great Barrier Reef. This is manifested in how the Great Barrier Reef is recognised for its aesthetic qualities under natural criterion vii. Thus photographic reproduction of the Reef as a single phenomenon is a powerful consolidation of public acceptance that the Great Barrier Reef is not a composition of multiple reefs, islands, shoals and regions, but is a single observable entity. Photography further produces aesthetic qualities recognised as holding ‘Outstanding Universal

Value'. This is fundamental to the status of the Reef as a natural wonder of the world and as a World Heritage site of natural significance. The naturalness of this phenomenon is, however, only conceivable through the powerful cultural lenses of mapping and photography.

### **Underwater life**

Photography has also produced the iconic imagery of the underwater that ignites the popular imagination and underscores the significance of Great Barrier Reef as a World Heritage property. Aboard the earliest European ships to navigate the Reef were a number of scientists who first glimpsed the colourful life of reefs from the decks of ships. Like all other resources of the new colonies, the waters of the Great Barrier Reef were originally studied for their economic potential and the work of the late nineteenth-century biologist William Saville-Kent remains a masterpiece of detailed study of the coral reefs. (maybe footnote this as he is unlikely to be known by the readers)

A broader interest in the natural underwater world emerged as part of a naturalist tradition. Early excursions to the Reef were undertaken by ornithological groups from New South Wales and even South Australia, and by the beginning of the twentieth century the Australian Museum in Sydney had established a regular program of research at the Great Barrier Reef. Queensland naturalists, by comparison, were less involved, and research on the Reef was of negligible interest to the Queensland Museum. Rather it was an expedition from Britain that highlighted the natural significance of the Great Barrier Reef when a group of scientists spent a year living on the Low Isles in 1928-29. There was great public interest in this expedition, and the British team was joined by scientists and journalists from Sydney, many associated with the Australian Museum. Descriptions of the wonders of the coral reefs were widely reported and published in newspapers, magazines and popular books far beyond scientific outlets, and this inspired many to follow (Pocock, 2010, 2020).

The Great Barrier Reef was a dangerous navigational obstacle, overwhelming in scale and difficult to reach. The model of Reef expeditions based on offshore islands was one of the only practical ways to experience the Reef firsthand. Boat voyages to the islands were very limited from the adjacent mainland, and the Outer Reef was all but inaccessible. The earliest holidaymakers thus accompanied Australian Museum expeditions to islands, staying with them for lengthy periods over the summer holidays. The most regular and celebrated of these expeditions were organised by a New South Wales school teacher, Mont Embury, and were led by both amateur and professional scientists through the 1920s and 1930s. Holidaymakers emulated scientific activities; learning from scientists, assisting in research and undertaking their own studies. Thus, both science and tourism developed through a single approach to understanding the Reef (Pocock, 2010, 2020). And the cultural practice of tourism too became enmeshed in the science of nature, amplifying the Reef's natural heritage for lay audiences.

For all involved, access to the underwater held particular challenges. The most common way to view the living reefs was to wait patiently for the right tidal conditions. Visitors typically waited for the opportunity to peer into coral pools left by the receding tide, where from the surface they could observe fish and other life forms in a miniature form of the Reef. Waterscopes, also known as water glasses, could be used to view the underwater even when observation was obscured by deeper water or when the surface was rippled by wind or movement. These vignettes were a source of great delight and interest to scientists and holidaymakers alike. But studying life at closer quarters often required removing living creatures from their environment to where the dying or dead could be studied in greater detail.

These constraints remain for many aspects of scientific investigation, but more direct access to the underwater world through scuba diving equipment and underwater photography has greatly enhanced research and study of living reefs. Photography in particular has been very influential in bringing the wonder and diversity of the coral reefs to a broad public (Pocock, 2009). Images of vibrant, colourful

and extraordinary lifeforms are synonymous with the Great Barrier Reef. Together with the aerial images, these constitute the aesthetic significance of the Reef as a place of 'Outstanding Universal Value.'

Public access to these images was itself significant in garnering support for the Great Barrier Reef marine park and the eventual World Heritage Listing. Some of the most vociferous advocates for Reef conservation only ever experienced the region through the extraordinary array of photographic imagery. Images made possible by human technology including underwater cameras, motion cameras, colour emulsion and increasingly sophisticated digital technology. Images are enhanced by filters, night photography and other techniques that seldom equate to the direct human vision underwater. They thus inspire action to conservation and shape management in the present.

### Contemporary Environmental Challenges

Though arguments about the cultural nature of aesthetic appreciation might appear largely theoretical, the responses to contemporary environment challenges make the cultural nature of the Reef manifest.

European Great Barrier Reef conservation concerns have existed for more than a century. At the beginning of the twentieth century EJ Banfield created a sanctuary on Dunk Island to protect birds from the wanton destruction of shooters (Banfield, 1908). By the mid-century, government sanctioned threats to the Reef emerged through proposals for sandmining and mineral exploration on offshore cays and reefs during the Sir Joh Bjelke-Petersen era (Daley & Griggs, 2006; Wright, 1977). And tourism inspired by a love of the Reef paradoxically also led to significant damage to the corals and reefs. Coral and shell collecting was a popular activity for much of the twentieth century, to the extent that some reefs were stripped bare (Daley & Griggs, 2008; Pocock, 2020). At the same time, walking across the reefs at low tide, whether to fossick or simply to look at the coral pools, killed the sensitive and fragile polyps that grow the coral. Reef walking and the anchoring of tour boats on the reefs continued until prohibited towards the end of the century. These forms of mechanical damage had significantly detrimental impacts of the coral, or the potential to do so, but to a large degree such threats were confined to particular localities. Consequently, solutions to these problems could be addressed through immediate action. Other impacts could be addressed by management policy and the implementation of policies that demanded change to localised human behaviours, such as prohibiting collecting and anchoring on reefs. While such localised damage could be remedied through relatively direct interventions, other problems emerged that had less immediate causes.

The idea that impacts in one part of the Reef could impact another was central to the initial successful campaign to protect the Great Barrier Reef from mining and other impacts. And in turn, the recognition of the Great Barrier Reef as a single phenomenon was key to the creation of the Great Barrier Reef Marine Park and subsequent World Heritage Listing (Bowen & Bowen, 2002; Wright, 1977). A key argument in the original battle to save the Great Barrier Reef drew on the then emerging field of ecology. With its principles of holism and interconnectivity a scientific argument could be made to understand the interconnection of many reefs and shoals as a single Great Barrier Reef (McCalman, 2017). Despite the importance of this argument for establishing the Great Barrier Reef Marine Park and the World Heritage Listing, an ecological approach to management only emerged much later in response to new kinds of problems (Olsson et al., 2008). Foremost among these were the outbreaks of Crown-of-Thorn-Starfish (COTS). A naturally occurring species on the Reef, COTS eat coral polyps as many Reef species eat one another. However, conditions which lead to outbreaks of plague proportions of COTS left a trail of destruction during a series of outbreaks beginning at Green Island in 1962 and 1979 and the third was first detected near Lizard Island in 1993 (Miller et al., 2015). Attempts to manage these outbreaks initially followed established management approaches of localised intervention through physical removal of the invading starfish from heavily infested

areas. However, these efforts appeared futile against a growing tide of COTS outbreaks. The discovery that COTS larvae thrive on phytoplankton which increase in nutrient rich waters (Fabricius, Okaji, & De'ath, 2010) brought the realisation that human activity was a major contributor. Fertiliser runoff from agricultural businesses on the adjacent Australian mainland was shown to have a direct and negative impact on Reef health even though ostensibly some distance away. Management strategies thus had to shift from thinking about local Reef-based behaviours and solutions to engaging with communities further afield. A program of working with farmers to reduce runoff and fertiliser use has offered some benefits (Deane et al., 2018). However, cyclones and other events that bring increased sedimentation to the Reef are not as easy to control, and laborious manual eradication of COTS remains the most effective method of protecting reefs from outbreaks (Westcott et al., 2020). Sustaining the idea of distinctive Reef natural heritage flounders in the face of COTS outbreaks and other impacts that have their origin in diffuse and global human activity.

The longstanding conservation practice of creating protected areas to preserve biodiversity and other natural values is challenged globally by environmental issues that originate elsewhere but have widespread local impacts. These originate in behaviours that are both anonymous and belong to all of us. Issues such as plastic pollution, warming oceans, and increasing and more extreme climatic events including cyclones, floods and bushfires now impact many parts of the world. Such changes do not recognise the boundaries of national parks or marine conservation areas (Tweed, 2010). The impacts are widespread and devastating to the Great Barrier Reef World Heritage Area. The increased frequency and intensity of cyclones inflicts mechanical damage on reefs and creates broader conditions detrimental to Reef resilience, such as generating conditions that support significant increases in numbers of COTS. While reefs can recover between COTS outbreaks, this can take between ten and twenty years. The increased frequency of cyclones means that recovery becomes less and less likely as areas are repeatedly subjected to COTS threats without sufficient time to recover (Westcott et al., 2020). More broadly, warming oceans that lead to widespread coral bleaching are having a devastating impact on coral reefs globally, including the Great Barrier Reef.

#### *World Heritage Committee Reactive Mission 2012*

The extreme impact of climate change on the Great Barrier Reef led the World Heritage Committee to request an investigation in the form of a reactive monitoring mission to the Great Barrier Reef in 2012.

The mission found that earlier threats to the Reef were being well managed, including previously noted issues such as oil and gas development, recreation, fishing and tourism, and “most recently water quality from catchment run-off, and that these were “likely be further improved in the future.” While the Mission prioritised water quality and port activity as the most immediate threats to the Outstanding Universal Values of the Great Barrier Reef, it secondarily acknowledged that climate changes, including increased numbers of cyclones, were having direct and indirect impacts on the Reef. However, despite finding that the World Heritage Area was affected by a number of current and potential threats, and that the environmental quality of some Reef ecosystem had declined since it was inscribed in 1981, the joint mission by the International Union for the Conservation of Nature (IUCN) and the International Committee on Monuments and Sites (ICOMOS) found that the Reef continued to retain its Outstanding Universal Value (Douvere & Badman, 2012). In other words, it found that the Great Barrier Reef remains a property of outstanding *natural* value.

While the IUCN and ICOMOS report emphasises reducing environment impacts to enhance the natural resilience of the Great Barrier Reef, there is a growing body of research that suggests that “conventional management approaches will be insufficient to protect coral reefs, even if global warming is limited to 1.5 °C” and that emerging technologies are needed to stem the decline of these *natural assets*” (Anthony et al., 2017, emphasis added). There is thus a trend towards management interventions to support and enhance the resilience of reefs. Management of the Great Barrier Reef

now includes some experimental methods including seeding rain, reducing sunlight and engineering more heat tolerant coral species. For instance, a chemical sunshade is being trialled to reduce the amount of sunlight penetrating the water. Increasingly too, scientists are experimenting with using coral larvae collected during the annual coral spawning events to repopulate areas of the Great Barrier Reef that have been damaged by mass bleaching events (Great Barrier Reef Foundation, 2017; Suggett et al., 2019).

These new management activities are a long way from seeking simply to reduce or remove human threats. Rather, they actively intervene in biological processes to produce the range, tolerance and growth of corals in areas where it has become unsustainable due to temperature, water acidification and pollution. There is no doubt that the cultivation of more resilient species and similar interventions, such as providing structural supports, and growing, nurturing and replanting broken corals, are actually cultural activities.

### Natural Values in Danger

The aesthetics of the Great Barrier Reef can thus be argued to be as cultural as much as natural. Indeed, photography and Reef science are so strongly intertwined that they are mutually constitutive (Pocock, 2009). The interconnections between scientific research, photographic technology and heritage aesthetics of the Great Barrier suggest that in reality the Reef is a nature-culture landscape. This conceptualisation might appear abstract to those who research, study and explore the Reef through a scientific tradition which regards the natural world as external, measurable and objective and apart from human experience. Such a separation of humans from nature is at the heart of Western thinking and research, and it is embedded in how the World Heritage system has assessed, and largely continues to assess, nature and culture by using distinct criteria. This dualism has, however, been challenged for creating imbalance and an unrepresentative World Heritage List, and the World Heritage Centre has responded by adapting and creating new criteria for assessing World Heritage. Despite these efforts, the integration of culture and nature is still largely regarded as an issue for the 'other'—for Indigenous and local custodial knowledge systems — rather than as a core reconsideration of World Heritage processes. However, contemporary issues now facing the future of the Great Barrier Reef are bringing the cultural nature of the Great Barrier Reef to the fore.

While the joint mission by IUCN and ICOMOs found that the Reef continued to retain its Outstanding Universal Value, it also warned that future threats to the Reef would come from increased water temperatures, and more frequent and more intense weather events (Douvere & Badman, 2012). These are threats experienced by coral reefs world over. A special World Heritage Committee meeting on the resilience of coral reefs recognised that the only way to ensure coral reef survival is through limiting increases in global warming, an issue that can only be addressed at a global scale (UNESCO 2019). Despite this knowledge, conservation scientists to some extent accept that global warming is inevitable, and they have initiated radical new interventions to sustain the Reef, including attempts to create corals that can withstand the changes of our time and to reseed bleached corals. Their effectiveness in keeping the Reef alive is yet to be seen. However, if this is the only way that the Great Barrier Reef can continue into the future, then its status as a place of outstanding natural value must surely be brought into question. While intended to conserve the Reef, new scientific approaches appear to undermine the very qualities that underpin its status as a natural phenomenon. Even the most elemental dualistic understanding of 'nature' and 'natural' are surely unsustainable as the Reef becomes increasingly a physical product of human labour. The World Heritage system continues to grapple with how to integrate cultural and natural values, largely in response to a need to integrate non-Western and Indigenous understandings of landscape into its processes. However, the future of the Great Barrier Reef appears to rest on cultural interventions as much as it does on biological processes and recognising this integration may be critical to its World Heritage status in future. As

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technological advances become more necessary to counter global impacts that threaten to place the Reef on the list of World Heritage in Danger its status as a *natural* property is already in danger.

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