

Research on the Impact of COVID-19 on the GBR Ecotourism

Yonglin Huang^{1a*}, Yoshiyuki Kimura^{1b}, Zhaohui Han^{1c}

^{1a}*Ocean College, Zhejiang University, Zhoushan, Zhejiang Province, China, 316021*

^{1b}*School of Bioscience, University of Nottingham, Nottingham, United Kingdom, NG7 2RD*

^{1c}*Arts and Sciences Environment, McGill University, Canada, H3A 0G4*

^{1a*}*annawonghyl@gmail.com, ^{1b}kimura.yoshiyuki3@gmail.com, ^{1c}Zhaohui.han@mail.mcgill.ca*

ABSTRACT

Today marine ecotourism is a style of ecotourism including recreational activities that involve travel away from one's place of residence and which have as their host or focus the marine environment [1][2]. Among marine ecotourism, Great Barrier Reef (GBR) is one of the most famous marine ecotourism destinations in Australia and have a concern of negative impact brought from COVID-19 pandemic in the world. This paper investigated on status of coral reef and marine ecosystems during COVID-19 from government reports, ecotourism organizations and further developed a scheme for future ecotourism in GBR. The effect of decreasing human intervention from ecotourism was found to be having both positive and negative effects. With decreased human supervision, some species such as whales benefited from fewer pollutants and increased number at habitats, while some species under protection of human activities were threatened by decreasing nutrition provided by human supports. For future ecotourism schemes, there should be a balance between governance and the activity of local firms. Though marine ecotourism is supportive for environmental ecosystems, there is still a certain amount of negative effects from it and the government has to limit the level of human activity in GBR. Conversely, local firms require economic activity to survive from the damage caused by COVID-19. Therefore, game theory was applied to the ecotourism planning and the Nash equilibrium strategy could be used for maximizing payoff for both governance and local firms.

Keywords: *GBR, ecotourism, blue reset/ recovery, COVID-19*

1. INTRODUCTION

According to findings of an Ecotourism Australia membership analysis, Australia's ecotourism industry contributed a combined annual revenue of \$1.6 billion, which increased 14% in 2018-2019 [3]. However, while marine ecotourism is often viewed as sustainable, it can have a negative impact on the local environment. Studies over three decades in New Zealand conclude that the detrimental impacts of marine tourism on cetaceans are evident [4]. Moreover, the barrier reef is a fragile marine environment that is vulnerable to growing numbers of visitors.

The rapid-growing ecotourism industry is not immune to COVID-19 outbreak. Actually, tourism is one of the most severely affected. In 2020, visitation of coral viewing, one of the most popular ecotourism programs in GBR, is just a quarter of that in 2019 [5]. The reduction of visitors has brought opportunities and challenges to the

local environment. The purpose of this paper is to explore the influence of COVID-19 on GBR ecotourism. This review focuses on a series of consequences caused by the decrease of visitors, including the restoration of habitat and the harm to species protection caused by the shortage of funds. The expectations and suggestions for the GBR ecotourism after the COVID-19 are also put forward. For a sustainable future environment, the marine ecosystem will be crucial not only in GBR but worldwide areas. Therefore, conducting this investigation could lead to the initial step for protecting natural ecosystems in the world.

2. EFFECT OF COVID-19 ON GBR ECOTOURISM

During the financial year ending June 30, 2021, the total number of visitors to the Great Barrier Reef Marine Park was 1134500 [5]. Coral cover in Figure 1 has dropped by about 52% compared with the previous average level of COVID-19 (2011-12 to 2018-19 years)

in the past 8 years. Therefore, the impact of the decrease of visitors on reef related-industries and communities is significant.

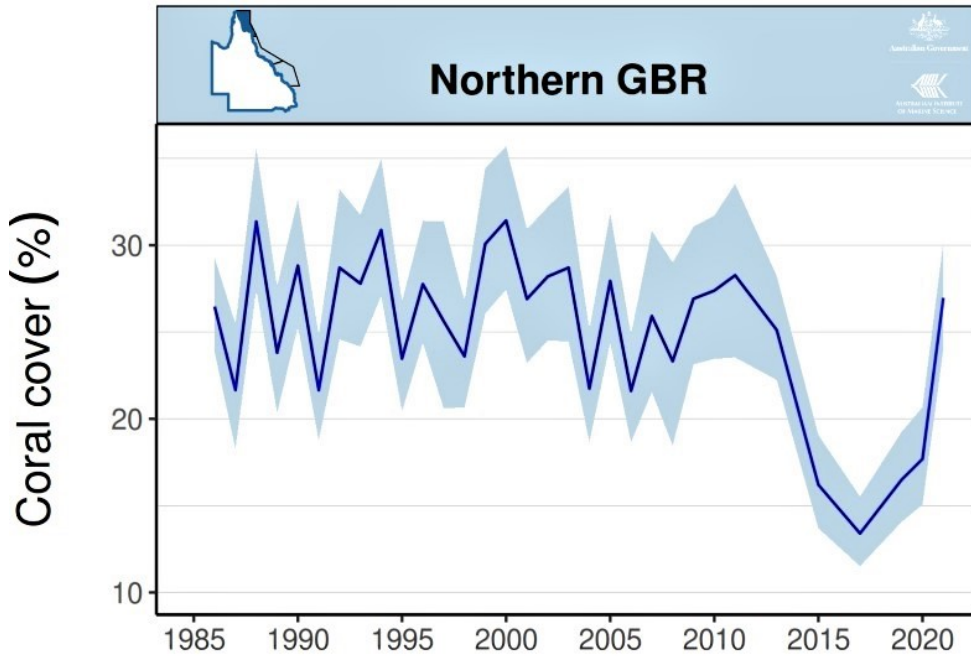


Figure 1 Percentage of coral cover in Northern GBR [6]

COVID-19 tourism restrictions provide the possibility of implementing initiatives to repair the ecological environment of the Great Barrier Reef. One of the most famous species living in GBR is coral reefs and is part of protection schemes. Without intervention, all climate scenarios resulted in precipitous declines in GBR coral cover over the next 50 years. The most effective strategies in delaying decline were combinations that protected coral from both predation (CoTS control) and thermal stress (solar radiation management) deployed at a large scale [7]. Successful implementation could expand opportunities for climate action, natural adaptation and socioeconomic adjustment by at least one to two decades [8]. The closure of the resort caused by COVID-19 offers the GBR an opportunity to restore its habitat. Installing reef stars have been a solution to coral

reef recovery these days and 50 reef stars were planted during COVID-19 lockdown. By planting reef stars, the designs of hexagonal and sand-coated steel structure help the regrowth of coral by providing a stable base for coral fragments to grow [9]. Coral bleaching has been a problem for a long time due to climate change. However, reefs have been recovering more during the period of 2020-2021 from long term monitoring program by the Australian Institute of Marine Science (2021) as in Figure 2. Through all areas, hard reef cover has an increasing trend and a decreasing bleaching severity. For crowns of thorns starfish outbreaks, it has a decreasing trend in the central and southern area of GBR but not in the northern area. With the results above, it can be argued that decrease in human activity during COVID-19 had directly affected coral reef inhabitants positively.

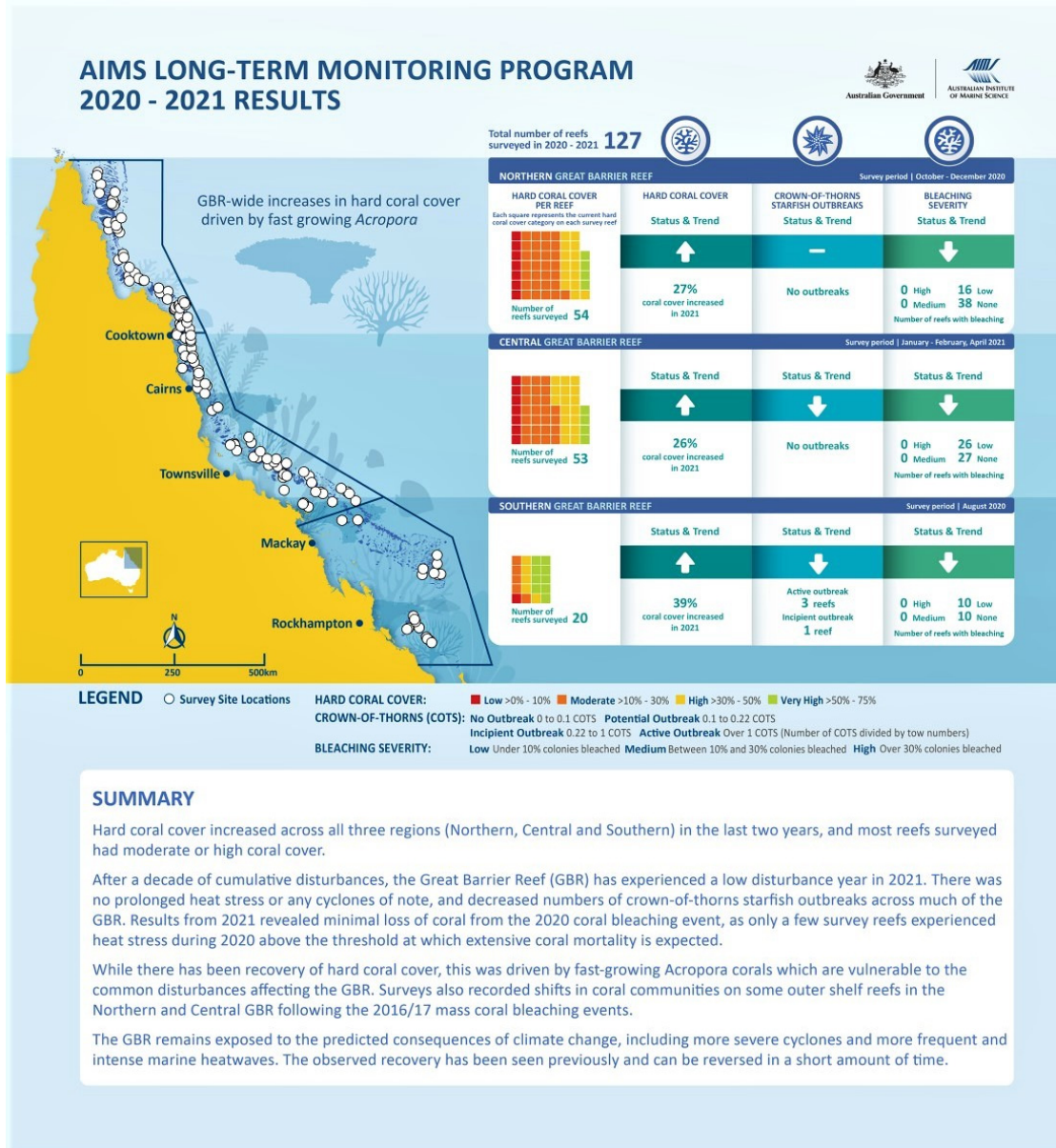


Figure 2 Trend of coral reef coverage in GBR in 2020-2021 [6]

From the restrictions of travel due to the COVID-19, the worldwide wildlife has been less affected by anthropogenic disturbs. For instance, human-made noises disturb the primary sensory systems of animals to communicate, recognize the cues to avoid predators, find mates, and further influence the habitat quality and animal population [10]. With the decrease in human activity due to the pandemic around the world, it could be estimated that inversely, animal activities were stimulated in areas where often interfered with by human previously. Since human activity declined, possible changes in animal behaviour are the migration of habitats [10]. For animals sensitive to human activity, they used to avoid areas where human often had activity. However, restriction of human activity had led to migration of species back to their natural habitats. For instance, from May to September, whales make the trek from Antarctica to the Reef's warmer waters to court, mate, and give birth

or rear their calves. Whale migration had been observed in 2020 August at a dive site called Sunset in GBR [11]. It was a juvenile humpback whale observed at the site which was very rare as it was on the south side of GBR where relatively close to the coast with shallow water and often visited by divers [12]. GBRMP reported that footage of a rare and endangered ornate eagle ray was sighted near Lady Elliot Island in April 2020. There are only about 50 sightings recorded for this species worldwide [12].

While some ecosystems recovered from pandemic, some protected species had a negative impact from covid restrictions. With the covid restriction on human activity, species protection or restoration were unable to be proceeded and prolonged pandemic could endanger the lives lacking sufficient food [10]. The outbreak of COVID-19 has hindered species protection in fragile

environments. COVID-19 travel restrictions continually limited the number of in-water surveys conducted during 2020, including post-bleaching and mortality surveys which are significant to the recovery of corals reef from large scale bleaching in 2019 [12]. COVID-19 has also made it difficult to stop illegal poaching. During and after the epidemic, threats to biodiversity in African protected areas intensified. Due to the national blockade and the collapse of eco-tourism, poaching, animal trafficking and forest logging activities increased without tourists to inject money into the local economy and keep watching on the ground [13]. Much like how poaching has resumed increased in an African wildlife reserve, the protection of species and habitats on Australia's Great Barrier Reef has also been affected by COVID-19. According to the report from National Geographic, when the Great Barrier Reef resort was temporarily closing, a large number of illegal fishing boats came in within days. GBRMP has to patrol with bright lights at night every hour on the shores to warn people off from illegal fishing [14]. Artificial light at night has been shown to affect the physiology and community dynamics of marine organisms, including the reproductive cycle of corals [15]. Such measures are harmful to the GBR ecosystem and the sustainability of ecotourism.

3. DISCUSSION

With advantages and disadvantages from COVID-19 effects on ecotourism, the future of ecotourism in GBR should be discussed to protect species existing. This will be considered through different perspectives of tourists, governors and local firms.

From the previous analysis, a decrease in eco-tourists in GBR brought an increase in short term coral reef cover and provided more species to be back to the ecosystem with less human activity existing these days. On the other hand, species under protection of human activity were endangered with fewer nutrition providers and had increased poaching occurring. With the restrictions of international travelling, there could be less support from countries aside from Australia and the government has to deal with poaching occurring alongside GBR as well. For local resource providers, a decrease in ecotourists means a decrease in profits where local economics should be considered to continue ecotourism in GBR.

First of all, for the sustainable environment in GBR, ecotourism should be kept going on to keep coral reefs in recovering state. To encourage this, more investigation should be done as the marine ecotourism sector remains understudied compared to its land-based counterpart [16] and there is a distinct lack of research on the supply side of marine ecotourism [17].

Marine ecotourism prior to COVID-19 was not delivering quadruple bottom line benefits. Post pandemic, demand for marine ecotourism will increase,

but this growth must be carefully managed to ensure that it delivers benefits to local communities and contributes to a healthy marine environment. To achieve these sustainable development outcomes, marine ecotourism must be factored into ecosystem-based management. It is essential that host communities inform and guide measures of what constitutes success for marine ecotourism. It is also vital that a clearer national picture is generated of the definition, size and shape of the sector. For instance, there is a multitude of studies over three decades in New Zealand on the impacts of marine tourism on cetaceans concluding that detrimental impacts are evident and suggesting research now moves onto how to prepare for and mitigate the risks [4]. This study could be applied in GBR toward species both currently inhabiting and possibly newly inhabit at GBR.

While encouraging ecotourism by studying the marine environment more deeply, the restrictions should be settled for ecotourism as well. While marine ecotourism is often portrayed and viewed as sustainable it can have adverse environmental impacts so activities must be managed in such a way that they create a positive contribution [4]. Alongside potential damage to sensitive marine environments by increased visitor numbers the "loss of natural quiet" in the New Zealand Conservation estate is also highlighted as an area for concern [18]. Marine ecotourism often takes place in 'pristine' and fragile marine environments that are vulnerable to growing numbers of visitors. Therefore, extra research will be required on how increasing visiting by ecotourism could affect the marine environment negatively so the number of visitors could be limited to the least amount to keep the environment in recovering phase. Furthermore, in coral reef industry workers' perspective, the number of visitors should be controlled, so the employers could help them manage workings hours and resting breaks to help the workers recover from fatigue due to providing high quality tourism services [19].

When comes to the final plan for future ecotourism after the COVID-19 pandemic occurred, with the investigation of how GBR marine tourism could be developed and the way of decreasing human effect on the ecosystem, local firms could make efficient resource providing. Therefore, marine ecotourism at GBR could be stimulated and gain incentives for different stake holders to sustain the ecotourism market. For example, one research shows that stakeholders' perception become aligned towards environmental conservation goals after mass coral bleaching event due to climate change. This will potentially help practitioners to achieve success of decision making by reduce the disagreement between each other [20]. In addition, when talking about the cost and profits of future ecotourism, there should be a balance between environmental costs and human interaction payoffs. From the game theory perspective, this situation could be described as two parties of government and local firms. While local firms are aiming

for gaining profits from ecotourism, government tends to restrict it to limit human intervention on ecosystems. Therefore, the game will be played and the Nash equilibrium [21] will be the pay-off level for both players which should be investigated during the planning for ecotourism in GBR during post COVID-19 period.

4. CONCLUSION

This paper focuses on the effect of COVID-19 on marine ecotourism in GBR since its pandemic between 2019 until 2021. Through the analysis on data sets and articles, there were both positive and negative effects remained. While species threatened by human activities recovered from decreasing trends such as coral reefs, species under human protection especially for rare species were threatened by illegal poaching. Coral reef had been protected by human intervention as planting reef stars and recovered by high percentage during COVID-19 season. However, for such a short term recovery, it could not be kept for long and further protection should be considered for coral reefs and other species relying on the reef environment. Therefore, ecotourism after the COVID-19 season should support the recovery of the GBR ecosystem in long term which requires further study of the effect brought by human visiting on each specific species in GBR. With sufficient data available, measurements on ecotourism encountering decreasing species could be done more rapidly and could lead to build a secured sustainable environment in GBR in future.

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