



National Environmental
Research Program

TROPICAL ECOSYSTEMS *hub*

A Synthesis of NERP Tropical Ecosystems Hub
Project 10.2 Research Outputs 2011-2014

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Socioeconomic Systems and Reef Resilience

The Great Barrier Reef is famous for its spectacular coral, rich biodiversity and natural beauty. But how are these attributes valued by the people that live amongst them and by those that travel to experience them? And what are the consequences if development eroded these values?

Researchers from James Cook University explored the interaction between economic variables and biophysical variables thought to be related to reef resilience i.e. would clouding of the famous clear water of the Great Barrier Reef result in less visitors and, consequently, less visitor revenue?

The project's overarching aim was to improve our understanding of the way in which the economy and the Great Barrier Reef interact, making it easier to judge (a) which economic variables are most important to monitor, and (b) how to interpret trends in those variables (i.e. whether changes are likely to be 'good' or 'bad' for the reef).

Results indicate that residents of, and visitors to, the Great Barrier Reef catchment area feel that environmental non-use values are more important than recreational values which are, in turn, more important than market-based values.

Degradation of those environmental non-use values is likely to have real financial impacts in the tourism industry and could also have a financial impact on non-tourism related businesses.

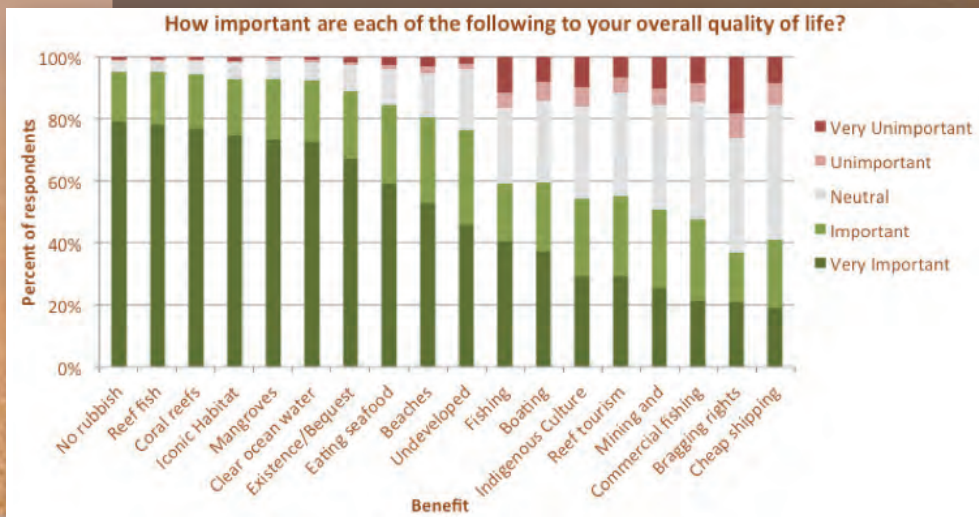
The project establishes a framework for longer term monitoring for use by government agencies and tourism bodies, particularly in terms of the demographic composition of the population, and its economic structure; and the 'values' of different demographic groups and of those associated with different industries.

It is clear that different groups of people have different values. Changes to the economic and demographic composition of the region will thus change social constructs of values, affecting priorities and decisions about the future. This, in turn, emphasises the importance of monitoring these changes over time.

Residents 'Values'

A survey of 1,592 residents living adjacent the Great Barrier Reef found that environmental non-use values were at the centre of the most important management priorities.

Overall, residents felt that environmental 'values' (no visible rubbish, healthy coral reefs and reef fish, clear sea water etc.) are more important to overall quality of life than recreational values (being able to go fishing or spending time at the beach



etc.) and the jobs and incomes from a range of different industries.

The relative importance of environmental non-use, recreational, and industry 'values' differed for people according to gender, education, income, ages, industries of association, places of origin, places of residence and marital status.

For example, highly educated females and people dependent upon the government sector for income allocated more importance and were less satisfied with the current condition of non-use values than other respondents.

Alternatively, relatively less educated males and people whose households were dependent upon the mining and fishing industries placed more importance on non-market use values, such as fishing and boating, than other participants.

The fastest growing demographic group in the region is young, lesser educated males working in the mining and associated industries receiving relatively high incomes. If this segment of population continues to increase, environmental 'use' (recreation) values and market values could become relatively more important compared to environmental non-use values.

Importantly, residents value the environment and lifestyle opportunities afforded to them from living in proximity to the Great Barrier Reef ahead of a development pathway that might diminish these values.

Visitors 'Values'

A survey of 2,743 visitors to the Great Barrier Reef catchment area found that visitors feel that environmental factors are more important regional 'draw-cards' than a range of other factors, such as good quality accommodation.

Overall, visitors who experienced clearer water and/or maximum

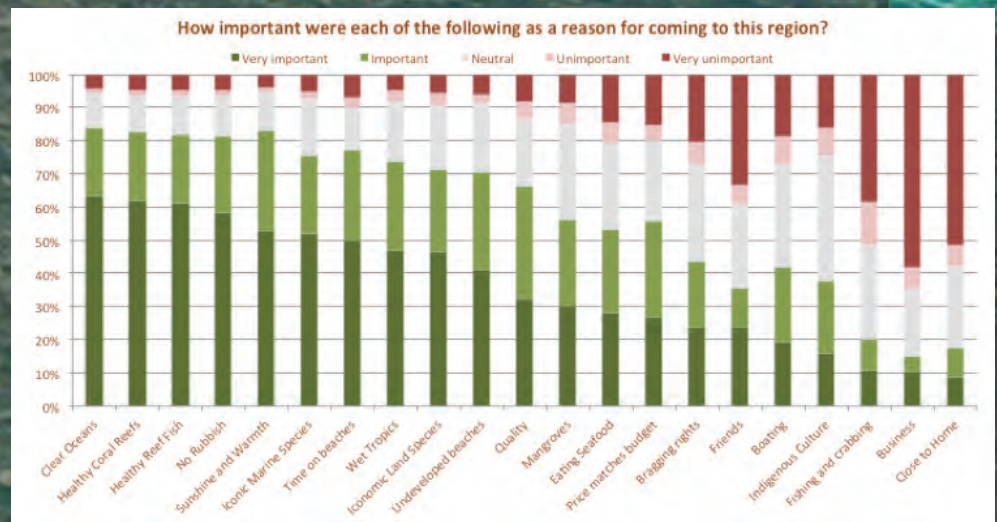
daily temperatures that were close to 29 degrees Celsius while in the region had higher levels of overall trip satisfaction than other tourists.

Like residents, visitors felt clean ocean, healthy reefs and fish, and no visible rubbish were important values. In fact, they reacted more negatively to the prospect of degradation of the environment than to the prospect of a 20% increase in prices.

Changes to the environment would likely influence choices about whether to return or how long visitors would stay. An example was changes to water clarity, whereby a 10% increase in turbidity in the Great Barrier Reef lagoon could result in losses of about \$430,000 per annum in tourist revenues across entire Great Barrier Reef catchment.

Perceptions about environmental quality were found to influence values and willingness to pay to help improve the environment. In fact, visitors were willing to pay about \$14.50 per visit to help improve water quality, although this figure differed markedly among visitors. Theoretically, however, it could be possible to raise substantial additional revenue from visitors for the purpose of water quality improvement.

These results indicate that 'development' impacts tourism directly, and indirectly, through the environment, which has important implications for current and future development priorities and choices.



Conclusions

Residents and visitors perceive the 'productive' values of the Great Barrier Reef and catchments to be less important than non-productive values, which suggest strong preference for developments that keep those non-productive values intact. As such, developments or changes that degrade those values are likely to be met with some resistance.

Degradation of environmental values are likely to have real financial impacts in the tourism industry, with reductions in visitor satisfaction and hence less repeat visitation, reduced numbers of tourists visiting the region and/or tourists staying for shorter periods of time.

Reductions in aesthetic and/or recreational values could also have a financial impact on non-tourism related businesses. Workers will trade-off wages for lifestyle, so businesses located adjacent the Great Barrier Reef may enjoy a wage 'discount', largely attributable to the regional environmental amenity and attractive 'lifestyle' offered to workers. Degradation of lifestyle values may mean that businesses need to pay workers higher salaries in order to keep them.

This research highlights the importance of ongoing monitoring. Changes to the economic and demographic composition of the population will likely change prevailing values, and this will affect the broader economy as well as the priorities and decisions about future developments.

Monitoring systems should thus keep track of the demographic composition of the population, and its economic structure; and the 'values' of different demographic groups and of those associated with different industries within the region, particularly in regions undergoing rapid economic and or demographic change.

Further Reading

Farr, M., Stoeckl, N., Esparon, M., Larson, S., & Jarvis, D. (2014a). The importance of water clarity to tourists in the Great Barrier Reef and their willingness to pay to improve it. *Tourism Economics*.

Larson, S., Stoeckl, N., Farr, M., & Esparon, M. (2014a). The role Great Barrier Reef plays in resident wellbeing and implications for its management. *AMBIO*, DOI 10.1007/s13280-014-0554-3.

Larson, S., Farr, M., Stoeckl, N., Chacon, A., & Esparon, M. (2014b). Does Participation in Outdoor Activities Determine Residents' Appreciation of Nature: A Case Study From the Great Barrier Reef, Australia. *Environment and Natural Resources Research*, 4(3), 211-226.

Stoeckl, N., Farr, M., & Sakata, H. (2013). What do residents and tourists 'value' most in the GBRWHA? Project 10-2 Interim report on residential and tourist data collection activities including descriptive data summaries. Report to the National Environmental Research Program. Reef and Rainforest Research Centre Limited, Cairns, pp. 112.

Stoeckl, N., Farr, M., Larson, S., Adams, V., Kubiszewski, I., Esparon, E., & Costanza, R. (2014). A new approach to the problem of overlapping values: a case study in Australia's Great Barrier Reef. *Ecosystem Services*, 61-78, DOI: 10.1016/j.ecoser.2014.09.005.

Research team

Zula Altai, Leon Appo, Adriana Chacon, Jon Brodie, Taha Chaiechi, Bob Costanza, Michelle Esparon, Marina Farr, Cheryl Fernandez, Margaret Gooch, Diane Jarvis, Ida Kubiszewski, Silva Larson, Stephen Lewis, Bruce Prideaux, Hana Sakata, Louisa Yee-Sum, Michelle Thompson, Natalie Stoeckl, Renae Tobin



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