



EERHPOLICYBRIEF

"Yes we can ..." : Valuing protection of the Great Barrier Reef John Rolfe¹²

Valuing improved protection for the Great Barrier Reef has addressed a major policy gap.

Governments and policy makers are regularly asked to fund environmental protection and other worthy goals. But when should governments become involved and how much funding should be committed to these issues?

The challenges for governments and policy makers are to:

1. Identify when a problem is worth addressing with public funding
2. Decide the extent of the support to address the problem.

Efficiently allocating resources and public funds is an economic issue. Applying economic principles to environmental issues has been limited, however, because of gaps in our knowledge of how the community values environmental protection.

The role of economists is to compare the benefits of intervention against the costs involved. The benefits of protecting environmental assets are often diverse – they span a range of ecosystem services, direct uses and preservation values. The costs of protection may involve public and private funding, as well as other impacts on communities.

Cost benefit analysis

Economists use cost benefit analysis to bring together a range of different costs and benefits (such as social and environmental impacts not revealed in markets) so they can be evaluated in a consistent way.

One of the main challenges of cost benefit analysis is to value the environmental benefits of public policy programs in monetary terms. This can be done using specialist non-market valuation techniques, although in Australia to date there have been a limited number of these applications.

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The Great Barrier Reef case study

Protecting the Great Barrier Reef (GBR) is a major policy issue in Australia because of its iconic status and international significance. The area of approximately 35 million hectares is protected by the Australian and Queensland Governments as a marine park, and has had World Heritage site status since 1981.

While the GBR remains one of the most healthy coral reef ecosystems in the world, its condition has declined significantly since European settlement and the overall resilience of the reef has been reduced. The 2009 GBR outlook report released by the Great Barrier Reef Marine Park Authority (GBRMPA) identifies climate change, declining water quality from catchment run-off, and impacts from fishing as three of the key issues reducing the resilience of the GBR.

The Australian and Queensland Governments have been investing significant effort to avoid current and future declines in condition of the GBR. Examples of increased protection include:

- increasing conservation zones to 33 per cent of the reef (2004)
- reducing commercial fishing in the reef (ongoing)
- improving water quality entering the reef lagoon (the Reef Rescue program)
- proposals to limit the emissions of greenhouse gases.

These initiatives have public and private costs. A key policy issue is to identify whether the benefits of increased protection outweigh the costs. This type of economic analysis can also help determine whether further investment in protection will bring additional benefits.

Additional protection of the GBR may be valued by Australians for a number of reasons. Values for direct uses, such as fishing, tourism and recreation, have already been assessed. But we still lack information about values people hold who don't directly use the Reef. These information gaps include:

- existence values for maintaining the asset
- bequest values to ensure it is available to future generations
- option values to allow future use and avoid irreversible losses.

These benefits are known as 'passive' or 'non-use' values. They can be estimated together by applying techniques such as choice modelling. Choice modelling involves the presentation of contingent scenarios about future protection measures to a random sample of households in the community of interest. The choices households make of preferred scenarios reveal the protection the community prefers. Including protection costs in the contingent scenarios provides additional information about how people trade off increased protection against the investment needed. This allows estimates of value to be generated.

The Environmental Economic Research Hub study assessing non-use values of the GBR focused on:

- estimating marginal values (small changes in protection)
- testing whether the types of management options used are important (or just the end protection)
- testing whether the level of certainty that protection will occur is important
- testing whether values vary across different population groups.



To help develop the survey instrument we consulted a range of people and held a number of focus groups in Brisbane, Rockhampton and Townsville. To estimate protection values and conduct a range of different tests, more than 4,000 households in Queensland completed the choice modelling survey between 2008 and 2010. This involved more than 30 different versions of the survey to test how protection values were sensitive to different information and protection options.

Protection values for the Great Barrier Reef

Results of the choice modelling valuation experiments show that the average annual household willingness to pay (annually for five years) is \$26.37 per 1 per cent of the GBR that has improved condition. The 95 per cent confidence interval has been estimated at between \$20 and \$34 per household.

In area terms, average willingness to pay per household (annually for five years) is \$7.53 per 1,000 square kilometres of the GBR that has improved condition.

Net present values for improved protection of the GBR can be assessed from these estimates. Using a ten per cent discount rate, and assuming that all 1.5 million households in Queensland hold similar values, the total value of Queenslanders for each 1 per cent improvement in the condition of the GBR is approximately \$150 million. When interstate population values are included, total protection values will be higher.

When the health of the GBR is expressed in terms of key elements instead of a single GBR measure, the average household values (each year for five years) per 1 per cent improvement are estimated at:

- area of coral reefs = \$12.45
- number of fish species = \$8.00
- area of seagrass = \$6.10

Whether the improvements are certain to occur was found to be very important in the way people made choices. The average value for each 1 per cent improvement in the certainty of protection outcomes was estimated at \$2.42 per household.

Including information about how environmental protection is managed generated higher values. Highest values to protect the GBR were attached to options for increasing marine conservation zones. Slightly lower values were associated with improving water quality, while lowest values were associated with reducing greenhouse gas emissions.

Few significant differences in values could be identified when the area to be protected was the whole GBR or just one of the four GBR regions. These results suggest people treat the GBR as a single asset (there is a very strong iconic effect).

Values held by people in regional cities close to the GBR (such as Townsville) were consistently higher than people in Brisbane. This is likely to be because regional people have higher potential use of the GBR. As well, people in the GBR regional centres were more likely to think that the condition of the asset had declined, and wanted to see greater protection.



Environmental Economics Research Hub

These research results allow some preliminary assessment of Reef Rescue and other protection measures. The benefit estimates imply that for the Queensland public to receive the full benefit of the \$200 million invested in the Reef Rescue five-year funding program, there would need to be between a 1.2 per cent and 1.5 per cent improvement in the condition of the GBR. Alternatively, an improvement over an area of between 4,100 and 5,300 square kilometres would be needed.

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The Environmental Economics Research Hub brings together leading economic and social scientists to look at new and improved ways of valuing environmental assets and determining the benefits and costs of different actions. This work extends across terrestrial and marine biospheres. The overarching focus of the research hub is to develop economic models and tools, especially for policy makers. It employs leading edge economic principles and practices to address key environmental policy issues such as the design of marine reserves, development of incentives and tools for improving water efficiency, policies for promoting environmental stewardship, multi-species and ecosystem management for biodiversity, and adapting to climate change.

For further information, see
http://www.crawford.anu.edu.au/research_units/eerh/index.php
<http://www.environment.gov.au/about/programs/cerf/>



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