



Is marine conservation a good deal? The value of a protected reef in Belize. Author: Venetia Hargreaves-Allen

Because coral reefs provide a variety of benefits to people, their protection can be an attractive public investment. The first step in determining whether such protection makes economic sense is to measure the goods and services flowing from the reef ecosystem. Few studies give a comprehensive accounting of those services. That is the goal of our recently completed study on the Gladden Spit and Silk Cayes (GSSC) Marine Reserve in Belize.

Marine protected areas (MPA) can reduce the overfishing, dredging and mangrove removal as well as damage often done by careless divers. Reduced impacts, in turn, improve ecosystems' resilience to outside pressures such as pollution and climate change and also have positive spillover effects, as species nurtured within the MPA's boundaries spread to other areas.

The GSSC Marine Reserve we studied is frequented by fishermen from local mainland communities as well as Saertanejan fishers, whose income is largely dependent on fishing the length of the Belizean coast. The reserve also draws dive guides and their clients with its large schools of reef fish and with spectacular seasonal gatherings of whale sharks. In addition to these commonly studied beneficiaries, we also measured the local recreational and non-use values derived by Belizeans who live near the MPA. Non-use values are associated with simply knowing an area exists and will remain for future generations. We also calculated non-use values held by

foreign visitors to Belize who did not choose to visit this particular reserve. Field data for all of our valuations were gathered in 2007-2008.

We estimate that the total use value for the area is at least US\$1.25 million per year, net of costs. Including option and non-use values, the figure rises to US\$4.05 million per year. To value these net benefits over time, we "discount" them, a process in which future values are adjusted downward to account for people's tendency to prefer current income over that received in the future (see note 3). The adjusted figures are called "present values." we use discount rates of 10

percent and 1 percent for comparison. If we assume a more conservative rate of 10 percent, the net present value over the next 25 years is US\$13 million for use values alone and US\$41 million for all values. If we use 1 percent, net use values are worth US\$29 million and all net values US\$93 million.

As Table 1 shows, the largest aggregate values are option and non-use values held both by visitors and non-visitors, fishing profits and tour operators' profits. The former (option and non-use) values are large because they apply to

almost 30,000 tourists. High net use values indicate strong profits in the fishing and tourism sectors, which is not always the case in coastal areas, where many people compete for fish and tourist business. The local community's fishing, tourism, recreation and non-visitor values are modest in absolute terms, but significant on a per household basis. The average family

Table 1. Values for the Gladden Spit Marine Reserve

Beneficiary	Value	Population applies to	Net aggregated annual value (US\$ '000)
Tourist	Visitor day trip CS	4,221*	60
Tourist	Visitor Whale shark interaction CS	2,032	19
Tourist	Visitor lifetime option & non-use value	6,253*	437
Tourist	Non-visitor lifetime option & non-use value	39,570	2,354
Local village community	Annual fishing access	180 households	29
Local village community	Annual tourism access (taking tourists)	180 households	50
Local village community	Annual recreational value (own recreation)	180 households	23
Local village community	Annual non-visitor value	180 households	3
Belizean fishers	Annual fisher profits (PS) for fishing inside GSMR	3453 days fishing	395
Belizean tour operators	Annual profits (PS) for tour operator trips to GSMR	20 operators hotels	678
	ALL USE VALUES	n/a	1,253
	ALL VALUES (use + option + non-use)	n/a	4,047

* corresponds to the number of visitors in 2007.

CS = Consumer surplus (difference between people's willingness to pay for something and its price); PS = Producer surplus (profits)

within the nearest village to the reserve enjoys \$373 in annual benefits, equal to around 2 percent of average annual income.

It is impossible to perform an accurate cost-benefit analysis of investments in this marine protected area, or any other, based on one year of data. Calculating the value of these resources with and without protection would require that we make many (sometimes questionable) assumptions and collect time series data at Gladden Spit and at unprotected “control” sites. Nonetheless, by estimating the current value of this marine ecosystem, we get an idea of the value that is at risk in the absence of sound marine protection. This is important given the threats reefs face from coastal development and ship groundings within this region. Indeed, the fragile

nature of these resources is underlined by the recent inclusion of this area in the “world heritage at risk sites” list.

Our findings suggest that further investment in MPAs like this one are likely to have an attractive return. Management expenditures of US\$315,000 for 2007 helped to secure net annual benefits of at least US\$4 million. Further, the benefits are widely distributed among both locals and international tourists and business owners. Belizeans enjoy 24% of all the net aggregated value despite the relatively small number of them included in these calculations.

But financing protected areas is a challenge. Fees collected by the

reserve currently are insufficient to fully support the level of marine management needed and well below what visitors say they are willing to pay. The entry fee is US\$10, with an added US\$5 charge if the visit includes viewing whale sharks. Visitors willingness to pay is US\$25 generally or US\$40 including the whale shark experience. Increases in reserve entrance fees could be considered to bolster funding for the MPA’s management. In Belize, there is at least one other relatively untapped source of cash: airport departure taxes. At the time of this research, travelers to Belize paid environmental departure taxes (as part of general airport departure taxes) of US\$3.25 per person. Our surveys suggest that even non-visitors have a significant willingness to pay for the GSSC Marine Reserve’s conservation. Earmarked departure taxes would be a convenient mechanism to capture this value.

Despite the economic value of marine reserves and the very real cost of providing marine protection, reserve managers

have historically operated with little or no economic information and so are unlikely to have maximized management effectiveness. CSF’s policy-oriented valuation research can help managers prioritize investments, identify reserve financing strategies, and provide a baseline against which future values, can be compared. Note that measuring local community values, non-use values and costs is essential to producing accurate valuation estimates. Repeated future research at Gladden Spit and similar sites can help better reveal the role of MPAs in providing economic benefits to society.

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Notes:

1. Photo credits: *Denise Garcia (Reserve Biologist), Southern Environmental Association*

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3. For an explanation of net present value consult: http://www.en.wikipedia.org/wiki/Net_present_value