

# COASTAL CAPITAL: Tobago

## The Economic Contribution of Tobago's Coral Reefs



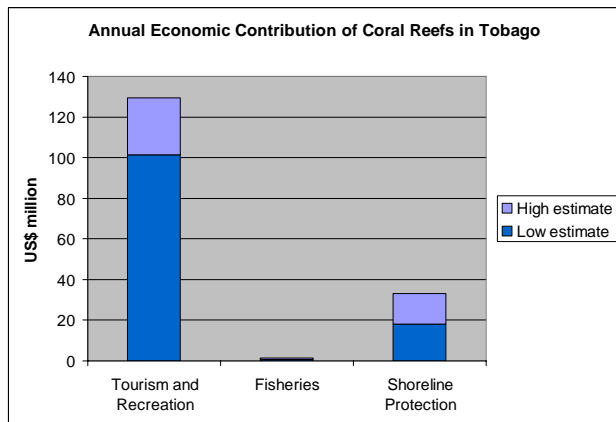
Coral reefs are integral to the economy of Tobago—they are a magnet for tourism and recreation, provide food and livelihood to Tobago's residents through coastal fisheries, and shelter its shorelines from ravaging storms. Tobago's reefs are beautiful and highly diverse, and possess yet unknown bio-pharmaceutical values. The economic values that coral reefs support are often overlooked or underappreciated in coastal development, management and policy evaluations, resulting in decisions that do not maximize the long-term economic potential of coastal areas.

This summary for Tobago is based on the report,  
*Coastal Capital – Economic Valuation of Coral Reefs in Tobago and St. Lucia*,  
World Resources Institute (WRI) 2008  
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Available online at [www.buccooreef.org](http://www.buccooreef.org) and  
[www.wri.org/project/valuation-caribbean-reefs](http://www.wri.org/project/valuation-caribbean-reefs)

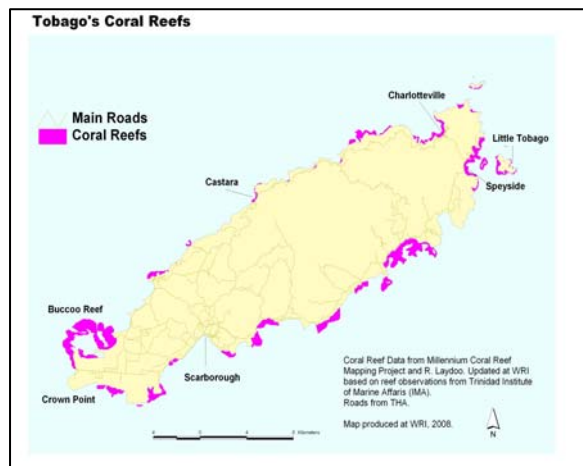
## Findings

The World Resources Institute (WRI) led an economic valuation of Tobago's coral reefs, in collaboration with many partners in Trinidad and Tobago (see credits at back). The study evaluated the overall annual economic contribution of coral reef-associated tourism and recreation, fisheries, and shoreline protection services. **Coral reef-associated tourism and recreation is estimated to contribute between US\$100 and \$130 million to the national economy in 2006. Coral reef-associated fisheries are an important cultural tradition, safety net, and livelihood, with annual economic benefits estimated at between US\$0.8 – 1.3 million. Coral reefs also provide shoreline protection services in reduced erosion and wave damage valued between US\$18 and \$33 million per year. These economic contributions are significant compared to Tobago's GDP, which was \$286 million in 2006. Coral reefs provide other important values not estimated in this study, and these numbers should be regarded as a lower bound estimate.**



## Policies to Manage Coral Reefs

In Tobago, coral reef-associated tourism and recreation and shoreline protection services in particular make a **significant contribution to the island's economy** when compared to GDP. An awareness of these values is critical to making **informed policy, investment, and development decisions**. In southwest Tobago, for example, discharge of untreated sewage and runoff of pollutants from the land degrade water quality and threaten the Buccoo Reef. Decisions on land use—for example, the type and location of development, the need for sediment controls along



streams, or decisions on sewage treatment—can all have significant effects on coastal water quality and coral reef health. Managing the pressures from fisheries and tourism is also a delicate process with important consequences for reef condition. At the heart of many of these management concerns is the need to assess trade-offs. For example, investing in better enforcement, capping tourist numbers, or limiting coastal development all have economic consequences for individuals and for the economy. However, the potential of longer-term revenue streams and societal benefits from the goods and services provided by healthier reefs are often not included in these management discussions.

In many areas, coastal and marine management policies and regulations exist to limit pressure on coastal ecosystems, including coral reefs. However, these regulations are often not enforced—even in Marine Protected Areas—often due to a lack of resources for enforcement, such as staff, boats, and fuel. For example, the enabling legislation of the Buccoo Reef Marine Park (BRMP) establishes the park as a no-fishing area, but this regulation is not enforced—and today, the Buccoo Reef is threatened by overfishing. This economic valuation suggests that the increased cost of enforcing this regulation would be small compared to the long-term benefits of increased tourism.

## Tourism and Recreation

Tourism is Tobago's largest economic sector, contributing about 46% of GDP and employing about 60% of the workforce in 2005, according to the World Travel and Tourism Council. Coral reefs are an important attraction for tourists visiting Tobago, with over half of all international tourists



Photo: BRT

visiting the Buccoo Reef and many engaging in diving and snorkeling on many of the island's reefs. Visiting white sand beaches of coralline origin is also popular with both visitors to the island and local residents. Decisions on how to manage coastal tourism development and visitation pressure on reefs have important implications for coral reef health, and therefore for the future attractiveness of Tobago as a destination.

Our valuation focuses on tourists visiting at least in part due to coral reefs—estimated conservatively at 40% of all visitors to Tobago. In 2006, spending by these tourists on accommodation, reef recreation, and miscellaneous expenses is estimated at US\$ 43.5 million, which comprises about 15% of Tobago's GDP. Additional indirect economic impacts, including materials and services to support tourism (such as boats, towels and beverages) contribute another US\$ 58 – 86 million to the national economy of Trinidad and Tobago. Combined, these result in a total economic contribution of between US\$ 101 and 130 million in 2006 from coral reef-associated tourism. The study also estimated “local use”, an important value not captured within the economy. The University of the West Indies conducted a survey of local residents' use of the reefs and coralline beaches and estimates this value to be between US\$ 13 and 44 million per year in Tobago.

## Fisheries

The economic valuation of fisheries focused on species associated with coral reefs for at least a portion of their lives, including snappers, groupers, parrotfish, squirrelfish, lobsters and sea urchins. Available data suggest that fishing of coral reef-associated species in Tobago is near its sustainable limit. Fishing above this limit would result in diminished potential for future catch.



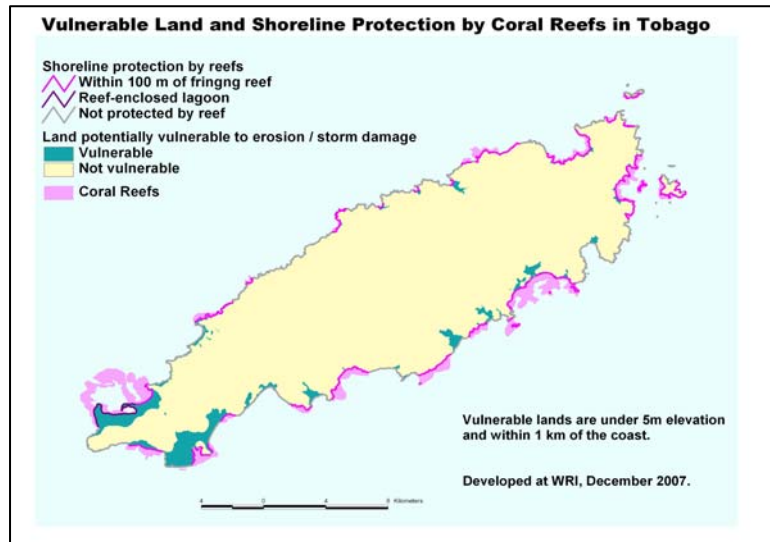
Photo: BRT

For Tobago, the annual direct economic contribution of coral reef associated fisheries is estimated at US\$ 0.7 – 1.1 million. Additional indirect impacts from the need for boats, fuel, nets, etc. is estimated at about US\$ 0.1 – 0.2 million, resulting in a total economic impact of about US\$ 0.8 – 1.1 million per year in Tobago. Coral reef-associated fisheries have a small economic impact compared to tourism, but provide other important values including jobs, cultural value, and a social safety net.



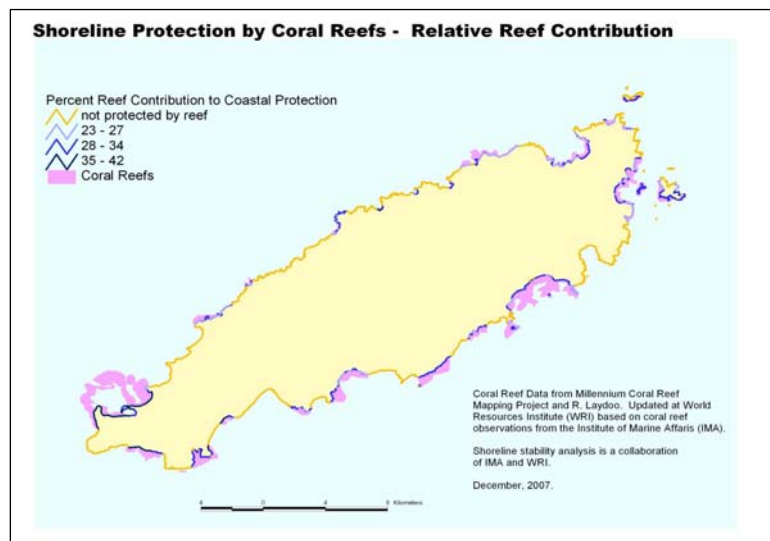
## Shoreline Protection

Valuable tourist resorts and residential developments dot Tobago's shoreline. Coral reefs play a vital role protecting this shoreline from both routine waves as well as the harsher conditions associated with storms. About 50 percent of Tobago's shoreline is protected by coral reefs. (Reef protected shoreline is shown as magenta and purple lines in the map below). About six percent of land in



Tobago was identified as vulnerable to erosion and damage from waves (shown as turquoise shading in the map). Much high value development is in low-lying areas in southwest Tobago, where the coastline is protected by the Buccoo Reef and other fringing reefs.

The relative share of protection provided by coral reefs varies greatly with coastal context—the elevation and slope of the shore, the geologic origin of the area (and resistance to erosion), and the wave energy along the coast. This project developed and applied a new, innovative method for evaluating the role of reefs in shoreline protection. In all areas where corals are present in Tobago, they are estimated to provide at least 20 percent of the shoreline stability, while in some areas, this



share is over 40 percent. (Coastline segments where coral reefs provide the greatest share of protection are shown as dark blue lines in the map below). Using an “avoided damages” approach, the annual value of shoreline protection services provided by coral reefs is estimated to be between US\$ 18 and 33 million for Tobago in 2007. The importance of coral reefs in protecting the shoreline will increase with the rising sea level and increased storm intensity associated with climate change and warming seas.

## Possible Futures for Buccoo Reef Marine Park

The Buccoo Reef is an important focal point for marine-based tourism. Surveys have shown that more than 60 percent of all visitors to Tobago visit the reef on glass-bottom boat and snorkeling trips. The Buccoo Reef encloses the Bon Accord lagoon. Sewage discharge and nutrient and sediment runoff into the lagoon are major problems, resulting in the poor condition of the inner reef, while the outer reef is relatively healthy. The Buccoo Reef Marine Park (BRMP) was established in 1973 as a no-fishing area, with authorization for entrance fees. However, at present, the no-fishing restrictions are not enforced, and fees have never been instituted.

Our project explored several management options for BRMP which would promote increased reef health, and thereby support sustainable tourism and recreation:

- **Enforcement of the no-fishing Area established for BRMP.** This would lead to higher levels of fish and conch inside the reserve, larger fish and more appeal for snorkeling and diving. As has generally been seen in other Caribbean islands with well-managed no-fishing areas, this can lead to increased tourism revenue. Enforcement would likely have benefits to fisheries outside of the reserve as well.
- **Re-routing of a drain currently coming into Bon Accord Lagoon.** The Bon Accord Integrated Development Drain currently discharges both sewage and fish processing waste into the lagoon in an area between Buccoo village and Pigeon Point. This drain could be diverted into a wetland area, the Pigeon Point Ponds. The effluent could then be filtered by the wetlands, before discharging into more open water.
- **Integrated watershed management.** Nutrient and sediment delivery to the Buccoo Reef area and Bon Accord Lagoon could be reduced through the installation of sediment traps, and by routing sewage discharge and nutrient-laden runoff through wetlands. The GEF-funded *Integrating Watershed and Coastal Area Management in Small Island Developing States of the Caribbean (IWCAM)* project is currently focused on such management issues in this area.
- **Sewage Treatment.** Communities near Bon Accord Lagoon lack adequate sewage treatment, though the Water and Sewage Authority has plans to develop a sewage treatment plant in the area within the next few years. In the meantime, additional development is proceeding, and there is the potential that the new developments might incorporate sewage treatment sooner.



Photo: BRT

With political commitment, the first three management options described above could be implemented at relatively moderate cost within the year or two. Enforcement of the no-fishing regulations at BRMP would require hiring a park manager and investment in boats and fuel. These modest costs could be financed through the implementation of a visitor fee to the park. Re-routing of the drain in Bon Accord would require only moderate engineering, with likely benefits significantly outweighing costs.

Development of sewage treatment infrastructure for the area will take more time and represents a much larger investment. Although improved sewage treatment is essential for the long-term health of the Buccoo Reef, adding a park manager, rerouting the drain, and making improvements in watershed management would begin to improve the health of the reef.

**Costs of Losing Buccoo Reef.** Because the reef protects a large, low-lying and developed section of Tobago, its shoreline protection value is very high. **“Damages avoided” due to the presence of the Buccoo Reef are estimated at between US\$140 and 250 million over a 25-year time period.** In addition, the economic contribution of current tourism and recreation associated with the Buccoo Reef is estimated to be between US\$7.2 and \$8.8 million a year (in 2006), which equates to about US\$128 to \$156 million in net present benefits over a 25-year time period. The economic contribution of glass bottom boat and snorkel tours, alone, are approximately US\$1.4 million per year. Therefore, the economic benefits of just the shoreline protection and tourism services of the reef over a 25-year period are likely to be over \$250 million. Cost estimates of interventions such as re-routing the drain in Bon Accord or increasing enforcement of regulations in BRMP are not currently available, but should be significantly smaller in comparison. The Soufriere Marine Management Area in St. Lucia, for example, which is similar in size to BRMP, has total operating costs of under US\$150,000 per year.

## Recommendations for Tobago

- Improve coastal water quality through sewage treatment and integrated watershed management. Good coastal water quality is a benefit to both people and reefs.
- Maintain coastal mangroves, as these filter pollutants and help protect the shoreline from waves and storm surges.
- Establish an entrance fee to BRMP and use revenue to hire a park manager, maintain boats, and enforce the no-fishing regulations.
- Track number of snorkelers and divers and manage reef recreation within sustainable limits.
- Improve mapping of coral reefs and mangroves for Tobago. Monitor reef condition to have timely information on degradation or improvement
- Improve fishing survey design, data collection and information management at the Tobago House of Assembly, to allow tracking of fishing effort and catch over time.
- Use the coral reef valuation methodology and Tool available from [www.wri.org/project/valuation-caribbean-reefs](http://www.wri.org/project/valuation-caribbean-reefs) to track the economic contribution of coral reefs over time—for Tobago or for smaller areas such as the Buccoo Reef.



Photo: L. Burke

### Economic Valuation of Coral Reefs in the Caribbean

*The full report, **Coastal Capital – Economic Valuation of Coral Reefs in Tobago and St. Lucia**, is available online. Also, a full description of the economic valuation methodology developed under this project, along with an Excel-based “Coral Reef Valuation Tool” guiding users through the implementation of the methodology is available at [www.wri.org/project/valuation-caribbean-reefs](http://www.wri.org/project/valuation-caribbean-reefs).*

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*The analysis was led by the World Resources Institute (WRI), in collaboration the Buccoo Reef Trust (BRT), Institute of Marine Affairs (IMA), Tobago House of Assembly, Environment Management Agency and University of the West Indies-Sustainable Economic Development Unit. The method for evaluating shoreline protection services from coral reefs was developed jointly by WRI and IMA. Many organizations contributed data and guidance to this valuation effort, including: the Central Statistics Office, Caribbean Natural Resources Institute, Environment Tobago, Save our Sea Turtles, Travel Foundation, R&Sea Divers, Fisherfolk Association, and Tobago Reef Operators Association.*

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