



Reef-Adjacent Tourism Value of Caribbean Coral Reefs

A new study by The Nature Conservancy

The glistening waters and vibrant coral reefs of the Caribbean attract visitors from all over the globe and have done so for a long time.

An important new study led by The Nature Conservancy, and supported by JetBlue, the World Travel & Tourism Council and Microsoft, brings to light and quantifies the extraordinary value that coral reefs contribute to the Caribbean economy through tourism. Using an innovative approach that has increasingly attracted scientists and researchers in recent years, the study combines the analysis of coral reef images and related text gathered through social media outlets with data gathered from a review of existing literature.

The study reveals that **total values for all reef-associated tourism are estimated at over \$7.9 billion of expenditure annually from more than 11 million visitors, with average values of 660 visitors and \$473,000 per square kilometer of reef per year.** These dollar values represent 23% of all tourism expenditure and are equivalent to over 10% of GDP in the region. The study delves deeper by examining the remarkable value of reefs through reef-adjacent tourism activities alone.



What Is Reef-Adjacent Tourism?

It is the segment of the tourism sector that depends on coral reefs but does not make direct use of them in the way that diving or snorkeling do. Reef-adjacent tourism value comes from beach activities, coastal views, delicious seafood and tranquil waters for swimming and boating—all the reasons people flock to the Caribbean that don't directly involve contact with coral reefs. Examining reef-adjacent tourism is critical to understanding the true value coral reefs bring to this industry.

While many tourists engage in on-reef activities like diving and snorkeling, many also enjoy reef-adjacent activities like swimming, kayaking, sailing, recreational fishing, walking along the beach and eating fresh seafood. Coral reefs are a driving force behind tourist engagement in these activities, whether tourists see the reefs or even know of their presence when visiting. In fact, previous studies estimate that in the Caribbean about half of the value generated from reefs comes from on-reef activities while the remaining half comes from reef-adjacent benefits—making this study and its revelations an essential part of the equation in the fight for investments in and awareness about reef conservation.



How Did the Study Work?

As one of the most prevalent ways people communicate today, social media channels provide valuable insight into how the general public spends their recreational time and, importantly, their discretionary income.

This study differs from those that have used social media data in the past in that social content was analyzed using machine-learning, a type of artificial intelligence that allows computers to autonomously learn and make determinations.

The study developed machine-learning algorithms to analyze over 86,000 social images and nearly 6.7 million social text posts for visual and

language identifiers that indicated reef-adjacent activities, like white beaches, turquoise waters, reef fish and sea turtles. To identify images, the Microsoft Cognitive Services Computer Vision API was used, allowing computer recognition of the target images. Then, images were selected that had geotags less than 30 kilometers from a coral reef and not more than two kilometers inland, which revealed patterns of geographic intensity of reef-adjacent activities.

The social media metrics were layered with sourced data from government and industry, such as surveys from visitor centers, sales figures reported by tourism-associated businesses and economic data from government accounting systems. Through the integration of social media and more traditional data, the study resulted in estimated reef-adjacent economic values for 32 Caribbean countries and territories.



The Future of Coral Reefs and Tourism

Revelations from the study are striking and shed light on the near ubiquitous use of reefs throughout the region to generate income, sustain livelihoods and stabilize economies. They also point to the tenuousness of the tourism industry in the Caribbean as the impacts of climate change and other threats to coral reefs, like overfishing, pollution and coastal development, continue to escalate. As tourism is an essential pillar of all Caribbean economies, threats to the industry translate to grave economic and community risks. In the Caribbean, the tourism sector accounts for over 15% of GDP and 13% of jobs—the highest proportion worldwide, making the Caribbean more dependent on tourism than any other region across the globe.

What Did the Study Reveal?

The findings from this unique study put into sharp focus the value coral reefs provide to the critically important tourism industry in the Caribbean.



- Reef-adjacent tourism generates an estimated \$5.7 billion per year from roughly 7.4 million visitors.
- The Dominican Republic and Puerto Rico benefit from visitor expenditure of over \$1 billion per year directly linked to coral reefs. The Bahamas, Cayman Islands and Puerto Rico receive the equivalent of over 1 million visitor trips per year directly linked to coral reefs.
- The top 10% highest-value reefs generate over \$5.7 million and 7,000 visitors per square kilometer per year. These reefs are scattered in almost every country and territory with the exception of Haiti. Barbados, Puerto Rico and the U.S. Virgin Islands have a large proportion of high-value reefs, each with an average expenditure value of over \$3 million per square kilometer per year.
- The countries most dependent on reef-adjacent tourism include many small, developing island nations, like Anguilla, Antigua & Barbuda, Bermuda, St. Kitts & Nevis and St. Martin, where there may be relatively few options for earning income outside of reef-associated tourism.
- Only 35% of reefs are not used by the tourism sector, indicating that there are scarce options for movement of reef-associated activities to new areas. Most of those not used for tourism are in remote locations.

By mapping and quantifying the economic value that coral reefs provide, this study serves as a critical tool to inform and motivate governments to protect and restore coral reefs and use them sustainably. In addition, armed with the knowledge that 65% of the Caribbean's coral reefs generate tourism dollars and the study's other key findings, tourism-associated businesses—including cruise lines, airlines and hotels—become more invested in sustainable coral reef management. Working together, conservation organizations, the tourism industry and government can form a powerful voice to catalyze meaningful conservation action for the Caribbean's iconic and precious coral reefs.