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MARINE ECOSYSTEM SERVICES PARTNERSHIP

Working Paper

INFLUENCE OF COASTAL ECONOMIC VALUATIONS IN THE CARIBBEAN: ENABLING CONDITIONS AND LESSONS LEARNED

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EXECUTIVE SUMMARY

Across the Caribbean, national economies are heavily dependent on coastal ecosystem services. Coral reefs, mangroves, and other coastal ecosystems provide fish habitat, attract tourists, and protect shorelines from storm damage. However, coastal habitats continue to degrade due to local and global pressures. For example, more than 75 percent of the Caribbean's coral reefs are currently threatened by human activities. These threats to coastal ecosystems stem from both a lack of awareness of the benefits these ecosystems provide and the costs of insufficient protection, and a lack of political will to protect and sustainably manage these ecosystems. Many of the activities that damage coastal ecosystems arise from short-sighted and poorly informed decisions that fail to take long-term ecosystem values and the full range of benefits from coastal ecosystem services into account.

Economic valuation can contribute to better informed and more holistic decision making about resource use and identify opportunities for effective conservation. Over the past 30 years, the economic valuation literature on the Caribbean's coastal and ocean resources has increased substantially. More than 200 coastal economic valuation studies of the monetary value of marine ecosystem goods and services in the Caribbean currently exist. However, despite this wealth of valuation studies and estimates, it is not clear whether these efforts have had a meaningful impact on policy or decision making concerning the management and use of these valuable natural resources; to date, there has been no assessment to address this critical question. It is also not immediately clear why some valuations have been more influential than others.

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Suggested Citation: Kushner, B., R. Waite, M. Jungwiwattanaporn, and L. Burke. 2012. "Influence of Coastal Economic Valuations in the Caribbean: Enabling Conditions and Lessons Learned." Working Paper. Washington, DC: World Resources Institute. Available online at http://www.wri.org/coastal-capital.

To get a more complete picture of the influence of past coastal valuations in the Caribbean, and to identify the key "enabling conditions" for valuations to influence policy, management, or investment decisions, the World Resources Institute (WRI) and the Marine Ecosystem Services Partnership (MESP) conducted semi-structured interviews with more than thirty marine conservation and valuation experts. Several of these interviews took place in the five countries where WRI had conducted coastal valuations. WRI also reviewed past valuation studies in the Caribbean that informants identified as influential. The findings of this review are based on expert opinion and documented cases of influence. Given the large number of total valuations and the difficulty of tracking influence, this review is not exhaustive. This paper identifies a number of variables that likely influence policy, management, and investment outcomes; however, it does not identify the extent to which each variable contributes to influence. We encourage future research on this topic.

Overall, we found that although valuation studies have helped raise awareness about the economic importance of coastal ecosystems in the Caribbean, few have actually had a positive influence on conservation and management-oriented policy, legislation, or investment in the region. We identified only thirteen valuation studies that have influenced policy. For example, valuation helped to convince the government of St. Maarten to establish the country's first national marine park, and the government of Belize to legally ban bottom trawling. Still, these success stories highlight the potential for economic valuation to have influence. We were able to draw out key contextual, procedural, and methodological conditions that likely led to success.

The elements increasing the likelihood of policy influence included:

- a clear policy question
- local demand for valuation
- strong local partnerships and stakeholder engagement
- good governance with high transparency
- opportunities for revenue-raising
- effective communications and access to decision makers and/or media
- a clear presentation of methods, assumptions, and limitations.

This analysis suggests that getting the methodology right—a principal concern of economists—is only part of the equation. Valuation practitioners who aspire to achieve impact must also consider wider contextual and procedural factors (such as governance and stakeholder engagement) when assessing the likelihood that their valuation will be influential. Furthermore, absolute accuracy is not always essential, as many stakeholders use valuation results as a ballpark figure to guide decision making. For this reason, valuation should be done on a scale appropriate to the policy question, minimizing costs as far as possible. More precise valuation may be necessary for questions relating to fees and taxes. In all cases, clear presentation of methods, assumptions, and limitations is critical in order to address critiques and legitimize results.

In the Caribbean, interest in ecosystem valuation to inform smart choices about coastal resource conservation and management and associated land use continues to grow. However, based on the results of this analysis, it is clear that valuation practitioners need to do much more to ensure that valuation studies have greater influence. In order to achieve more meaningful impacts, greater effort is necessary to strategically choose, design, and execute valuation studies; communicate valuation results to target audiences; and share successes and failures of influence with other practitioners. We conclude with next steps for building on this analysis, including:

- Conduct further consultations with experts and decision makers in the Caribbean and beyond to enlarge the catalog of valuation success stories, and explore additional opportunities for qualitative and quantitative analysis of trends and causality.
- Develop standardized approaches to monitor and evaluate the influence of coastal valuations.
- Research the "return on investment" of economic valuation for coastal conservation and management in relation to other conservation tools.

The results of this review will inform WRI and our partners' efforts to produce a standardized framework for economic valuation of coastal ecosystems in the Caribbean. A standardized valuation framework would help produce comparable and credible values across the Caribbean, legitimizing their use among decision makers and increasing their uptake. Drawing from this review, the framework will also contain advice on how to make future economic valuations

as influential as possible, so they can realize their potential to catalyze positive changes in policy, management, and investment—helping both to restore the productivity and increase the economic contributions of coastal resources, while safeguarding the Caribbean's valuable coastal and marine resources for future generations.

Box 1 | **Standardized Framework for Valuation**

Under the *Coastal Capital* project, the World Resources Institute (WRI) conducted coral reef valuations in five Caribbean countries (St. Lucia, Tobago, Belize, Jamaica, and the Dominican Republic) between 2005 and 2011. The results from these studies have been used to identify and build support for policies that help to ensure healthy coastal ecosystems and sustainable economies. Building on our *Coastal Capital* series, WRI is now working with partners to develop a standardized framework for coastal ecosystem valuation in the Caribbean. A number of valuation methodologies have been used and applied across various contexts, resulting in a heterogeneous understanding of the Caribbean's marine resources. As a result, the variety of coral reef economic valuation methods can be confusing and yield results that are not comparable, particularly across countries and time. The absence of standardized approaches that produce comparable regional results ultimately undermines their credibility among decision makers. This common framework will be a guide to conducting coastal valuations using best practices, and will yield comparable, credible valuation results that should be more likely to influence policymaking.

WRI has convened a broad partnership of marine conservation and valuation experts to develop and publish a joint framework for coastal ecosystem valuation in the Caribbean. The partnership includes the Marine Ecosystem Services Partnership (MESP); Centre for Resource Management and Environmental Studies (CERMES), University of the West Indies (UWI); Nicholas Institute for Environmental Policy Solutions, Duke University; Conservation Strategy Fund; MARES Program, Forest Trends; The Nature Conservancy; University of North Carolina Wilmington; Conservation International; and CARIBSAVE. In addition to this discussion paper on the influence of previous coastal valuations in the region, the partnership has identified key policy and management questions for the Caribbean that could be addressed using economic valuation. Our next steps are to draft the valuation framework and pilot test it in several Caribbean countries.

INTRODUCTION

Economic valuation—which puts a monetary value on ecosystems such as coral reefs or mangroves—is increasingly being emphasized in public policies, regulations, and investment decisions. The Economics of Ecosystems and Biodiversity study (TEEB), initiated by the G8+5 environment ministers, recognizes valuation as an influential tool to inform holistic decision making about resource use. New initiatives have emerged to incorporate ecosystem valuation in decision making, including the World Business Council for Sustainable Development's guide to corporate ecosystem valuation. Additionally, new global partnerships, such as the World Bank's Wealth Accounting and Valuation of Ecosystem Services (WAVES), are generating new opportunities to incorporate ecosystem services into national accounting and investment decisions.

In the Caribbean, there is also growing interest in ecosystem valuation to inform smart choices about coastal conservation and management. For example, the Jamaican National Environment and Planning Agency is currently working to incorporate ecosystem valuation into its environmental impact assessments, and the Caribbean Large Marine Ecosystem (CLME) project—which is working to promote an ecosystem-based management approach throughout the region—is gathering marine economic valuation data to support policy making. Furthermore, over the past 30 years, valuation literature on the Caribbean's coastal and ocean resources has increased substantially. There are now more than 200 valuation studies of the monetary value of marine ecosystem goods and services in the Caribbean.[1]

Unfortunately, the Caribbean's coastal ecosystems have significantly degraded over the past several decades. Despite these ecosystems' value—in providing fish habitat, attracting tourists, protecting shorelines and coastal communities from storm damage, and more—their health and productivity continues to decline due to human activities. For example, more than 75 percent of the Caribbean's coral reefs are threatened by local pressures, such as coastal development, overfishing and destructive fishing, watershed-based pollution, and marine-based pollution, as well as global pressures, including ocean warming and acidification.[2]

While interest in valuation continues to grow, the extent to which valuations have had a positive impact on policy or decision making concerning the conservation and management of coastal resources remains unclear. It is also not immediately clear why some valuations have been more

influential than others. To get a fuller picture of the influence[3] of past coastal valuations in the Caribbean, and to identify the key "enabling conditions" for valuations to influence policy, management, or investment decisions, the World Resources Institute (WRI) and the Marine Ecosystem Services Partnership (MESP) conducted a review of past valuation studies in the Caribbean that assessed the influence of those studies. After a broad review, including consultations with partners and key experts in the region, we found that valuation studies have generally helped to raise awareness about the economic importance of coastal ecosystems. However, only a few valuation studies have had an influence on policy, conservation priorities, coastal zone management, or investment in the region.

The results of this review will assist WRI and our partners' efforts to produce a standardized framework for economic valuation of coastal ecosystems in the Caribbean. A standardized valuation framework would help produce comparable values across the Caribbean, legitimizing their use among decision makers and increasing their uptake. However, this analysis suggests that getting the methodology right is only half of the equation; valuation practitioners must also consider wider contextual and procedural factors when assessing the likelihood that their valuation will be influential. Ultimately, the biggest challenge is making sure that valuation methods and studies address well-articulated policy questions from the start. Too many valuations have been conducted with only a vague focus on the policies they could potentially address.

The analysis includes an examination of valuation studies identified by partners in the Caribbean and in other regions, as well as a review of the influence of WRI's *Coastal Capital* studies. Using these results, we draw out lessons learned and enabling conditions that we hope will help to increase the influence of future valuations.

INFLUENCE OF COASTAL VALUATION STUDIES IN THE CARIBBEAN

From March to August 2012, WRI conducted semi-structured interviews with nearly 20 marine conservation and valuation experts to identify influential coastal valuations in the Caribbean. The interviews were intended to help understand why these studies had been influential and to identify key enabling conditions that determine the policy influence of valuation studies. Additionally, Megan Jungwiwattanaporn, a former graduate student at Duke University and part of the Marine Ecosystem Services Partnership (MESP), interviewed fourteen project partners from the five *Coastal Capital* countries during this time period, focusing on the influence of these studies (see Appendix 1 for the full results of the *Coastal Capital* survey and Appendix 2 for the *Coastal Capital* survey questions).[4] We summarize and present common and notable responses among interviewees in this paper. Given the large number of valuations and the difficulty of tracking influence, this review is not exhaustive.

Of the Caribbean marine valuation studies we reviewed, we were able to identify thirteen that have had a positive influence (see Appendix 4). We found "success stories" in the following countries and territories: the Bahamas, Belize, Bonaire, Dominican Republic, Mexico, St. Maarten, and the United States (Box 1). However, many valuations have been less successful in influencing policy. For example, in Jamaica, we identified seventeen valuation studies, but found that none have had significant influence. Additionally, of the six sustainably financed marine protected areas in the Caribbean, two—Belize's Hol Chan Marine Park and Bonaire National Marine Park—were established or financed due to economic valuation. Respondents indicated that valuation only directly influenced the setting of user fees in Bonaire Marine Park and Hol Chan Marine Reserve. But van Beukering et al. (2007) suggest that valuation's success in demonstrating that self-financing was viable in Bonaire may have led to other MPAs in the region establishing sustainable financing mechanisms, and thus had an indirect type of influence. Although not the focus of this review, we also identified eight additional success stories from other tropical regions, including the Philippines, Sri Lanka, Hawaii, and Costa Rica (see Appendix 4).

In this review, we draw heavily from the Bonaire case, where valuations influenced policy in Bonaire National Marine Park (BNMP). More information about influence was available for this site than any other. The BNMP adopted user fees (which were later increased) based on the results of several valuation studies, making it one of the few self-financed marine parks in the Caribbean (see Appendix 3 for enabling conditions specific to the successful application of user fees).[5] Below, Box 1 provides selected examples of coastal valuation success stories in the Caribbean.

Table 1 | **Selected coastal valuation success stories in the Caribbean**

COUNTRY	STUDY SITE	ECOSYSTEM	ECOSYSTEM SERVICES VALUED	POLICY INFLUENCE OF ECONOMIC VALUATION	STUDY REFERENCE
Belize	National-level	Coral reefs / mangroves	Tourism / fisheries / shoreline protection	Supported action on multiple fronts, including (a) a landmark Supreme Court ruling to fine a ship owner an unprecedented and significant sum for a grounding on the Mesoamerican Reef; (b) the government's decision to enact a host of new fisheries regulations (a ban on bottom trawling, the full protection of parrotfish, and the protection of grouper spawning sites); and (c) a successful civil society campaign against offshore oil drilling.	Cooper et al. (2008)
Dominican Republic	La Caleta Marine Reserve	Coral reefs	Dive tourism	Findings were used to justify a significant increase in user fees. Additional revenue has been used to help establish an aquatic center, a conservation fund to support park management, and a community fund to support local development projects.	Wielgus et al. (2010)
Netherlands	Bonaire National Marine Park	Coral reefs	Dive tourism	Justified the Bonaire Marine Park's adoption (and later increase) of user fees—making it one of the few self-financed marine parks in the Caribbean.	Dixon et al. (1993); Uyarra et al. (2010); Thur (2010)
St. Maarten	Man of War Shoal Marine Park	Coral reefs	Tourism	Used by the government of St. Maarten to establish the Man of War Shoal Marine Park—the country's first national park. The valuation results are currently being used to sue for damages caused by the sinking of a boat inside the Man of War Shoal Marine Reserve.	Bervoets (2010)
United States	Florida Keys National Marine Sanctuary	Coral reefs	Tourism	Established a schedule of escalating fines for injury to living coral based on the area of impact, resulting in the Florida Keys National Marine Sanctuary recovering millions of dollars for reef restoration after ship groundings.	NOAA (1991)

Note: Please refer to Appendix 4 for a complete table of all valuation success stories identified during this review.

KEY ENABLING CONDITIONS FOR POLICY INFLUENCE

Based on the interviews and literature review described above, we identified the key enabling conditions that seem to affect whether or not coastal ecosystem valuations influenced policy, legislation, or investment. We split these enabling conditions into three categories: *contextual* (largely outside of the valuation practitioner's control), *procedural* (inside the practitioner's control), and *methodological* (related to the economic valuation method used).

Contextual Enabling Conditions

DEPENDENCE ON COASTAL RESOURCES | Valuation is more likely to influence policy when dependence on coastal resources is high. In Bonaire, for example, ocean tourism (particularly coral reef diving and snorkeling) is the mainstay of the economy. More than half of the country's GDP is derived from tourism, particularly dive tourism. Dive tourism relies on a small number of visitors with high disposable income. The industry would suffer from the loss of even a few tourists, which would happen if the reef degrades. As a result, the government of Bonaire has invested in the protection of economically important coral reefs. Likewise, residents' dependence on the coastal tourism industry allowed valuations to be influential in Belize, Mexico, and Costa Rica. Trinidad and Tobago, on the other hand, has an economy that relies more heavily on the oil and gas industry than on coastal ecosystem goods and services, and as a result coastal valuation efforts have been less influential there. Additionally, valuation in the Bahamas—where tourism is less focused on nature-based activities—has also had limited influence. Although these examples emphasize national-level economic dependence, coastal resource dependence refers to a reliance on a variety of goods and services, including food, income, shoreline protection, medicine, and culture, which can vary among nations, communities, and individuals.

IN-COUNTRY CHAMPIONS | In-country champions—that is, local people who understand economic valuation, can communicate results effectively, have good access to decision-makers and media, and can help integrate valuation results into policy applications or market mechanisms—are critical to success. Champions can be the face of the effort and coordinate stakeholders and other champions within agencies, who can help navigate political and bureaucratic processes.

GOOD GOVERNANCE | Good governance seems to be a key component of successful influence. It comprises several criteria, including:

- *High transparency and public participation*. Transparency and public participation in decision making promotes credibility and provides opportunities for stakeholders to introduce new information, such as valuation results. Valuation results appear to have had more influence in cases characterized by relatively higher transparency and participation; for example, in the United States, in Bonaire and St. Maarten (which are part of the Kingdom of the Netherlands), Belize, and Costa Rica. Transparency and public participation are critically dependent on clear laws or mandates that support participatory and open decision making.

- *Existence of a legal framework and ability to enforce laws*. The existence of a legal framework and the ability to enforce laws to protect marine resources are essential. Valuations have more likelihood of being influential where marine resources are protected by law and government has the legal authority to adopt conservation-oriented policy, legislation, or investments (such as to collect user fees, establish protected areas, or levy fines for ship groundings), as well as the capacity to enforce laws. In other countries without such a progressive legal framework or enforcement capacity, valuation could help encourage this framework to be put in place or to increase investments to build enforcement capacity.

- *Nongovernmental management of revenue*. Nongovernmental management arrangements that make provisions for the autonomous or separate management of revenue—through sanctioned and legally recognized co-management institutions—may allow for greater flexibility to utilize valuation. For governments, it is generally difficult to segregate revenue from user fees or payments for ecosystem services for management of the protected area, since all government income is often expected to be paid into the national treasury and allocated according to national priorities. For example, La Caleta Marine Reserve, the only marine protected area co-managed by a local NGO in the Dominican Republic, is also the only marine reserve in the country to adopt user fees.

- *Local control over resource management*. Local management of coastal resources may also allow for greater flexibility to utilize value estimates to influence policy or decision making, as local authorities will be less constrained by bureaucratic processes. Furthermore, local management capacity can support and facilitate valuation efforts; that is, they can collect necessary data, understand results and their policy implications, and effectively communicate these to stakeholders.

LOW ORGANIZATIONAL TURNOVER | Low organizational turnover—within governments, NGOs, and other influence targets—leads to a retention of institutional knowledge and ultimately an increased commitment to use valuation results. For example, the current manager of the BNMP (Ramon de Leon) has been in charge of the marine park for almost ten years (since 2003). His understanding of economic valuation—and his relationships with different valuation experts working in Bonaire through the years—has facilitated the BNMP's continued commitment to use valuation results to inform decision making.

VISIBLE THREATS TO RESOURCE AND ECONOMIC HEALTH | Visible threats to resource and economic health—such as poaching from neighboring countries, pollution, and competition for tourists from nearby countries—encourage demand for valuation and the likelihood of uptake. In Bonaire, the threat of losing dive tourists to other Caribbean countries (and to other regions) with healthier and better managed coral reefs contributed to the adoption of user fees to pay for marine conservation efforts.

COUNTRY SIZE | Country size, including population and geographic extent, may matter. For example, it is easier to communicate national-level information and target national-level decision makers in a smaller country like Belize or St. Maarten. However, if a valuation's influence target is at a lower level—for example, a county/state/province or locality—this factor may not be influential.

Procedural Enabling Conditions

SET REALISTIC EXPECTATIONS | Valuation practitioners should set realistic expectations about what valuation can achieve given budget and time constraints (e.g., potential findings, level of accuracy, and policy applications) and clearly state assumptions, objectives, and limitations. Limitations in ecosystem valuation—including limited technical, economic, and ecological knowledge—present persistent constraints to identifying, calculating, and ranking all values. However, the goal for valuation is not to estimate or rank all values, but rather to identify the most important values that will inform the decision at hand. The fact that valuation is a human-centric exercise means that we often focus on valuing goods and services that are of closest proximity to us, ignoring ecosystems that are more expensive or challenging to value but nonetheless contain enormous wealth (such as option, existence, bequest, and spiritual values). Furthermore, not all values can be reduced to monetary terms. It is often difficult to compare monetary values in a single currency of different groups of people due to the presence of inequalities in international markets; thus valuation may be biased in favor of the values of developed countries over developing countries and urban over rural. In the end, valuation will not provide a formulaic solution to environmental problems, as choices must ultimately be made in accordance with multiple criteria, including politics, social justice, ethics, and development concerns. Just because something is economically sound does not necessarily mean that it is ethically justifiable. Valuation is simply a useful conservation tool (amongst a suite of tools) that can be used to engage decision-makers to help make more holistic, visionary, and thoughtful decisions. Given these constraints, valuation practitioners and stakeholders must determine whether or not valuation is a worthwhile exercise or if the same outcome could be achieved using other tools (e.g., education, training and building capacity, communication, monitoring, research) that may be more cost-effective and less controversial.

IDENTIFY CAUSAL LINKS | Valuation practitioners must clearly identify causal links between ecosystems, ecosystem services, and resource users. For example, *Coastal Capital: Belize* identified how mangrove and coral reef ecosystems contribute to tourism, fisheries, and shoreline protection services to fishers, tour operators, etc. Identifying these relationships helps to ensure that the valuation approach is appropriate and engages stakeholders with vested interests. The identification of beneficiary groups and their specific needs or concerns—such as storm protection, recreation, food, or livelihoods—also can help determine their willingness to pay to finance the protection of critical ecosystem services. The identification of these causal links can also highlight potential poverty and equity issues; that is, winners and losers under decision-making scenarios or tradeoffs that will need to be made.

DEVELOP A STRATEGY FOR WIDESPREAD AND TARGETED DISSEMINATION | An effective strategy for widespread and targeted dissemination—which should identify influence targets and outline tangible opportunities to access decision makers and apply valuation results—is critical to success. Whenever possible, valuations should target immediate opportunities for application, including market mechanisms (such as payments for ecosystem services, user fees) or policy processes (such as legislation, regulations, permitting). Furthermore, a well-developed communication and outreach strategy, drawing on diverse media platforms such as traditional and social media, allows for both widespread and targeted communication of results. For example, the BNMP provides outreach materials, brochures, leaflets, posters, and signboards explaining how user fees are collected and used. Dive operators also actively promote coral reef conservation and responsible diving to tourists. For valuation results, in-country advocates presented results through a variety of formats (such as conferences, videos, research papers, and newsletters) and to diverse audiences, including the Ministry of the Environment and tour operators.

PACKAGE RESULTS STRATEGICALLY | Results should be packaged according to stakeholder interests (such as the percent of GDP or change in tourism revenue) to increase the likelihood they will be locally relevant and used. In *Coastal Capital: Belize*, for example, valuation results were presented as a percent of GDP to target government decision makers.

BE TIMELY | An influence strategy should target "windows of opportunity" whenever possible. Outreach and dissemination should be opportunistic to reflect changing circumstances. For example, the release of valuation results from *Coastal Capital: Belize* coincided with important local events (Year of the Reef Gala) and activities (release of the HRI Reef Report Card). Furthermore, the release of the valuation results came out only two months before a major ship grounding on the Belize Barrier Reef. Dissemination and outreach of valuation results by local partners around these events helped to assure successful influence, including a landmark Supreme Court ruling to fine a ship owner an unprecedented and significant sum for the ship grounding on the Belize Barrier Reef.

ENGAGE STAKEHOLDERS | At all phases of the valuation, stakeholder engagement supports local capacity building, data collection, ownership, credibility of results, identification of opportunities for influence, leveraging existing work of local organizations, tracking of influence (because valuation practitioners may not have time and funds to track this), and ways to collectively overcome obstacles. To encourage stakeholder engagement, it may be helpful to integrate key sectors—such as the tourism industry—that can facilitate communications with decision makers and communities. Furthermore, it is important to allow local stakeholders to assist in the development of the policy questions the study is designed around and the valuation's objectives, and involve them in the valuation whenever possible, so as to foster buy-in and reduce potential future opposition to uses of valuation results. Unfortunately, economists and researchers often have different objectives for the outcome of valuation research compared to local stakeholders, since their funding may be predicated on methodological innovation or results as opposed to local use or specific policy change. Additionally, studies that are done on-site—with local data, in collaboration with local partners and experts—may further encourage local engagement to foster buy-in and facilitate follow-up. For example, WRI's strong existing partnerships in Belize, as well as partners' good access to decision makers, helped its *Coastal Capital* valuation become influential. Local partners requested the valuation, were deeply engaged throughout the valuation, and are still using the results to further their advocacy, including a damage assessment, a campaign against offshore oil drilling, and a ban on bottom trawling.

Methodological Enabling Conditions

A CLEAR POLICY QUESTION | It is critical to have a clear policy question answered by valuation, as it determines the appropriate valuation method, level of accuracy required, data needs, costs, scale, and time constraints. For example, studies in Bonaire and the Dominican Republic were conducted to answer the specific question of the appropriate level of user fees to achieve sustainable financing for MPA management. Valuations done in Florida and Hawaii were used to determine appropriate fines to compensate for ship groundings on coral reefs. A valuation of St. Maarten's coral reef-related tourism and fisheries was used to justify the establishment of the Man of War Shoal Marine Park.

THE TYPE OF METHODOLOGY HAS LESS SIGNIFICANCE THAN THE QUALITY OF ITS APPLICATION AND OTHER ENABLING CONDITIONS | Although practitioners may have a preference for certain valuation methodologies over others, a variety of methodologies and analyses were used for the thirteen influential valuation studies identified in this

paper, including economic impact analysis, effect on productivity, financial analysis, hedonic pricing, contingent valuation, benefits transfer, and replacement cost. This breadth of methodologies in influential studies suggests that the particular methodology used does not determine the likelihood of successful influence of the valuation. In each case, practitioners chose appropriate methodologies, executed the studies well, and other procedural and contextual enabling conditions were present. Methods and assumptions should be transparent.

USE A METHODOLOGY THAT PRODUCES RELATIVELY ACCURATE NUMBERS | Using a methodology that produces relatively accurate numbers is critical to legitimize valuation results and encourage uptake. Respondents noted that an accuracy level of at least 80 percent could be adequate for policy making. It is important to produce results quickly and relatively cheaply in order to foster local buy-in and keep the valuation timely and policy-relevant.[6]

THE TYPE OF ECOSYSTEM SERVICE BEING VALUED MAY MATTER | The type of ecosystem service being valued may matter, as some ecosystem services may be less understood and more complex—such as the complex problem of "spillover" of fish populations from mangrove nurseries versus the more straightforward measurement of recreational benefits provided by coral reefs. As a result, it is not always possible to value the service in question with any reasonable accuracy. In addition, a particular ecosystem service may be more difficult to monetize (e.g., it is easier to pay for nutrient reduction than pollination protection from mangroves).Therefore, results may not resonate well with stakeholders and avenues for revenue-raising (or otherwise using the results) may not be available.

Influence of Coastal Valuation Studies in Other Regions

We also contacted partners to get a sense of the influence of valuations done in other tropical regions, particularly Southeast Asia (see Appendix 4).Our discussions with partners suggest that there are many examples of influence in Southeast Asia relative to the Caribbean. However, due to our Caribbean focus, and limited time to consult additional partners, we were unable to explore this topic in greater detail. Overall, we identified similar methodological, procedural, and contextual conditions that contribute to influence in other regions. These conditions included good governance, high dependence on coastal resources, sound and transparent methods, high local capacity, strong partnerships, and well-developed communication and outreach strategies.

Nevertheless, our research also highlighted several key differences between the Caribbean and Southeast Asia in terms of the influence of coastal valuation studies. The capacity to implement economic valuations of coastal resources may be higher in Southeast Asia than in the Caribbean, due to long-standing efforts by governments and development institutions (such as the Asian Development Bank) in Southeast Asia to incorporate coastal resource values into decision making. Additionally, many natural resource managers in Southeast Asia have had some business training, resulting in more interest in and uptake of valuations. According to a respondent, coral reef-related fisheries in Southeast Asia are also more productive than those in the Caribbean and dependence on these fisheries is relatively higher. As a result, decision makers in Southeast Asia are more likely than their Caribbean counterparts to invest in their protection.

CONCLUSION

This review has revealed several successful cases of influence as a result of coastal valuation studies in the Caribbean, including:

- Belize saw both policy making and fruitful NGO advocacy as a result of valuation, including a damage assessment, a campaign against offshore oil drilling, a ban on bottom trawling, the full protection of parrotfish, and the protection of grouper spawning sites.
- The Bonaire Marine Park adopted, and later increased, user fees—making it one of the few self-financed marine parks in the Caribbean.
- The Man of War Shoal Marine Park in St. Maarten was established as the country's first national park.
- The Florida Keys National Marine Sanctuary recovered millions for reef restoration after ship groundings—just one of several U.S. examples (see Appendix 4).

These success stories highlight the potential for economic valuation to have influence, while also identifying key contextual, procedural, and methodological conditions that are critical to influence.

The elements of success in these cases included:

- a clear policy question
- local demand for valuation
- strong local partnerships and stakeholder engagement
- good governance with high transparency
- opportunities for revenue-raising
- effective communications and access to decision makers and/or media
- a clear presentation of methods, assumptions, and limitations.

The process (and quality of application) of a given methodology matters, although the type of methodology used may not have a significant bearing on the ultimate influence. Valuation should be done on a scale appropriate to the policy question, with efficient implementation, possibly including use of standardized methods that are appropriate for the policy question, a well-developed communication and outreach strategy, and with strong stakeholder engagement throughout. Absolute accuracy is not always essential, as many stakeholders use valuation results as a ballpark figure to guide decision making. However, clear presentation of methods, assumptions, limitations, and policy relevance is critical in order to address critiques and legitimize results.

Despite several success stories, we have identified only a few examples of economic valuation leading to influence, relative to the high total number of studies conducted. In Jamaica, for example, we identified over a dozen coastal valuations and none had demonstrable influence. Furthermore, of the six sustainably financed marine protected areas in the Caribbean, we found two (BNMP and Hol Chan MPA) that have been influenced by economic valuation.[7]

The absence of the contextual, procedural, and methodological enabling conditions listed above may explain why so few valuations have achieved influence; however, the lack of identifiable influence may also be due to the complexity of tracking the impact of valuation studies, the lack of a standardized approach to monitoring and evaluating influence, and the absence of a regional or global platform to report on valuation impact. The influence of valuation estimates may take years to come to fruition, as new windows of opportunity emerge, awareness of economic valuation grows, and political processes evolve. Valuation methodologies and results, which are often distributed widely to regional and global audiences, may also result in undocumented influence; for example, the Bonaire National Marine Park valuation approach was replicated in Fiji, Indonesia, Honduras, Mexico, and Hawaii by the Coral Reef Alliance. Unfortunately, information on influence often goes unreported, failing to capture the contextual, procedural, and methodological lessons that can be drawn from them. Furthermore, valuation results are often only one component of a larger effort to influence policy, legislation, or investment (e.g., a line in a speech or preamble to a piece of legislation); as a result, it is often difficult to derive from valuation estimates the degree to which they directly contribute to a policy success or investment decision. These gaps in tracking and reporting impact greatly inhibit our ability to understand the degree to which economic valuation has achieved influence. Possible next steps to build on this analysis to improve our understanding of the influence of coastal valuation include the following:

- Conduct further consultation with marine conservation and valuation experts, as well as with decision makers in the region, to review our analysis and to possibly identify additional valuation success stories. Additional research and review of the influence of coastal valuations should also be explored in other regions. An enlarged catalog of valuation success stories may offer additional opportunities for qualitative and quantitative analysis of trends and causality. Furthermore, the identification of opportunities and leverage points to integrate existing valuation results into decision making should be explored.

- Research the extent to which each enabling condition contributes to influence in developed and developing countries. A better understanding of the key conditions for valuation influence could help prioritize valuation efforts or design projects that can adapt to environments where critical conditions are absent.

- Develop approaches and standards to monitor, evaluate, and report on the influence of coastal valuations. As a first step, the MESP database—which includes coastal and marine valuations from all over the world—could also include a field to describe the known influence of each valuation study.

- To achieve a more complete understanding of how valuation can promote the financial sustainability of MPAs, conduct research to explore how influence can be achieved when MPAs do not have strong ties to

tourism. The goal of achieving sustainably financed MPAs typically focuses on valuation efforts for the establishment of user fees from tourism, which may bias conservation (valuation) efforts toward tourism-based MPAs. Research and the identification of case studies that explore how MPAs without strong ties to tourism can achieve sustainable financing (e.g., damage fees, PES) will contribute to a more holistic understanding of how valuation can achieve influence.

- Research the "return on investment" of economic valuation for coastal conservation and management, in relation to other tools used to influence protection of marine ecosystem services.

- Research whether or not valuations have influenced decisions about proposed developments that could have negative environmental impacts; for example, because the valuation of ecosystem services was incomplete, or indicated a small or large sum in relation to projected revenue from a proposed development.

Despite the lack of widespread influence to date, interest in economic valuation of ecosystems for improved decision making continues to grow across the Caribbean, particularly within governments. The capacity to conduct valuations—in governments, universities, NGOs, and the private sector—is growing as well. Many stakeholders also have requested more economic analysis and training, as well as standardized methodologies that produce comparable results.

Based on the trends identified in this analysis and growing interest and capacity for valuation, it is clear that we need to do much more to ensure that valuation has greater influence, as well as work to understand and communicate our successes and failures. We need to continue researching and analyzing the influence of previous valuation studies in order to work toward designing and executing valuation studies that will yield more meaningful impacts and help to improve the conservation and management of coastal resources, so as to both restore their productivity and increase their economic contributions while safeguarding the Caribbean's valuable coastal and marine resources for future generations.

ENDNOTES

1. Schuhmann, P. 2011.The Valuation of Marine Ecosystem Goods and Services in the Caribbean. Wilmington, NC: University of North Carolina Wilmington.

2. Burke, L., K. Reytar, M. Spalding, and A. Perry. 2011. Reefs at Risk Revisited. Washington, DC: World Resources Institute.

3. We define "influence" as a positive change in policy, management, or investment (e.g., increased marine area under "no take" designation, increased treatment of sewage, increased financial support of MPAs, better enforcement of fishing regulations), which support generally recognized marine conservation strategies to reduce threats and promote the long-term ecological health of the marine environment.

4. Jungwiwattanaporn, M. 2012. "Towards More Standardization in the Collecting and Reporting of Marine Ecosystem Service Valuations." Chapel Hill, NC: Duke University.

5. In 1991, an annual US$10 admission fee for SCUBA divers was instituted by law for the Bonaire National Marine Park (BNMP). The admission fee was increased in 2005 to an annual fee of US$25 for SCUBA divers and an annual US$10 Nature Fee for other water users. Revenue from the admission fees is used to finance all of the research, monitoring, education, and management activities of the BNMP and the Washington-Slagbaai National Park.

6. The Slootweg et al. (2008) review of influential valuation studies reached a similar conclusion, finding that "due to the complex links between ecosystems and society, economic valuation of ecosystem services is often faced with methodological difficulties. However, for comparison of alternatives, absolute valuation figures are not necessarily needed; a relative value measure provides enough information for decision making."

7. Sustainably financed marine protected areas in the Caribbean include: Nelson's Dockyard National Park, Antigua; Bonaire Marine Park; British Virgin Islands system of marine protected areas; Saba Marine Park, Netherlands Antilles; Hol Chan Marine Reserve, Belize; and Soufriere Marine Management Area, St. Lucia.

APPENDIX 1: EVALUATION OF THE INFLUENCE OF THE *COASTAL CAPITAL* STUDIES: SURVEY OF KEY INFORMANTS FROM BELIZE, THE DOMINICAN REPUBLIC, JAMAICA, TOBAGO, AND ST. LUCIA

WRI's *Coastal Capital* series was launched in 2005 and aims to provide decision makers in the Caribbean with information and tools that link the health of coastal ecosystems with the attainment of economic and social goals. WRI and its local partners have conducted economic valuation studies of coral reefs and mangroves at national and subnational levels in five countries: Trinidad and Tobago (Burke et al. 2008), St. Lucia (Burke et al. 2008), Belize (Cooper et al. 2009), the Dominican Republic (DR) (Wielgus et al. 2010), and Jamaica (Kushner et al. 2011; Maxam et al. 2011; Waite et al. 2011). We began the *Coastal Capital* project with the intention of using a standardized valuation method, resulting in the development of several Excel-based valuation tools—a Tourism and Recreation Valuation Tool, a Fisheries Valuation Tool, and an MPA Economic Impact Tool (available at: http://www.wri.org/project/valuation-caribbean-reefs/tools). However, for a variety of reasons our valuation methods changed a good deal for our fourth and fifth countries (the DR and Jamaica). This was largely due to the differences in the nature of the reef-related tourism across the countries, as well as different economists leading the effort.

In an effort to evaluate the influence of these past *Coastal Capital* valuation studies and draw out enabling conditions for influence, Megan Jungwiwattanaporn, a graduate student at Duke University and part of Marine Ecosystem Services Partnership (MESP), interviewed fourteen project partners from the five *Coastal Capital* countries (January–March 2012). Below is a summary of the key findings of her evaluation of the past *Coastal Capital* projects. *[WRI has added text in italics to provide further background and our reaction to several responses].*

Belize

Overall, WRI's *Coastal Capital* results have been widely disseminated and used to advance the marine conservation agenda in Belize. Results were used in both policy making and advocacy, with more emphasis on the latter. *Coastal Capital* analysis supported action on multiple fronts, including (a) a landmark Supreme Court ruling to fine a ship owner an unprecedented and significant sum for a grounding on the Mesoamerican Reef; and (b) the government's decision to enact a host of new fisheries regulations (see WRI's video "Making Big Ideas Happen", which profiles valuation success stories from Belize). Outreach by NGOs has been critical to this success—particularly from the Healthy Reefs Initiative (HRI). Timing was also identified as an important enabling condition, as the release of the *Coastal Capital* results coincided with important local events (Year of the Reef Gala) and activities (release of the HRI Reef Report Card). Furthermore, the release of *Coastal Capital: Belize* came out only two months before a major ship grounding on the Belize Barrier Reef. WRI's engagement of local organizations and stakeholders during and after the valuation project was also instrumental in its success.

Given Belize's small size, national numbers were generally considered adequate, although MPA-level values would also be useful (assuming data needs could be met). Respondents thought that the accuracy of results was important, although they noted that more flexibility may be warranted in certain situations (e.g., a less precise valuation could be fine for educational purposes, but not legislation). Respondents felt that values should be updated regularly (e.g., every 5 years). Respondents thought that time series data with future predictions would be helpful, but were concerned about potential inaccuracies. Respondents also would like additional education and awareness of economic valuation, including targeted outreach to key decision makers (tourism, government, and development agencies). *[Coastal Capital in Belize benefited from strong and committed partners who had requested the valuation. These partners also had good access to high-level government officials. In addition, WRI staff made multiple visits after the release of the results, which supported further dissemination and use.]*

Dominican Republic

In general, WRI's *Coastal Capital* results were not widely disseminated or used in the Dominican Republic. Several factors were cited for lack of use, including government corruption, high turnover of government officials and NGO staff, and apathy ("politicians are driven by politics, not data"). Respondents noted that more could have been done to target key stakeholders, particularly one-on-one meetings (developers, tourism industry, and the government). There is not much interest in new valuation studies, although respondents were more interested in local numbers. Respondents thought that accuracy was desirable, but that flexibility also was important. *[During the Coastal Capital project in the DR, a new valuation method was developed specifically for the DR. This may have reduced the amount of time available to emphasize outreach by our local partners.]*

Jamaica

Results for Jamaica were released in June 2011 and were widely disseminated. Since release, the valuation results have been used to educate the general public and for advocacy, but influence has been limited. *[In general, the valuation values were relatively small due to the methodology focusing on marginal values, rather than annual economic contribution—as in Belize. Several Jamaican colleagues responded that "big numbers" would have been more useful to capture the attention of decision makers. WRI also consolidated and summarized fourteen previous economic valuation studies of Jamaica's coastal resources to bring these past studies to light. (There had been little influence from these previous studies.)]* The initial launch (media blitz) of the *Coastal Capital* results successfully targeted government leaders, but recent elections resulted in a change in leadership. One respondent also felt that outreach materials should have been better designed to target decision makers (e.g., 1-page briefs instead of the 8-page summary). Additionally, involving more local scientists and experts in the development of the final report could have improved its credibility and local ownership. *[WRI wishes to note that several local scientists and experts—from the University of the West Indies and an NGO—were deeply involved in developing the analysis results.]*

Despite the challenges listed above, there is a high level of interest in new valuation studies. The Jamaican government is currently discussing how to integrate natural resource valuation into its environmental impact assessment process. In addition, there is interest in economic valuation studies outside the often-researched North Coast; Kingston and the Black River may serve as potential new opportunities. In particular, there is strong interest in understanding how management actions may result in a change in value. Respondents were interested in both local and national values, as well as time series data with future predictions. All respondents consider accuracy important, but acknowledge that time and financial constraints also should be considered.

Tobago

Overall, *Coastal Capital* results were widely distributed to a diverse group of stakeholders and key actors. The brochure of results and seminars were effectively used to engage decision makers; furthermore the results are still being quoted in speeches, presentations, and at universities. However, the *Coastal Capital* results were not very influential in Tobago *[despite strong local partnerships]* due to the dominant interests of oil and gas (much larger share of economy than tourism).

Respondents varied in their thoughts about what scale would be most useful, and also about the level of accuracy required. One respondent felt that future valuations should focus more on how values change with a shift in management action, and that accuracy is highly important. The other respondent was more interested in island-wide estimates, and thought that accuracy should be driven by local needs and demands. Respondents were highly interested in time series data. Both respondents emphasized the importance of strategically targeting policy makers for future valuations, including using social media and video for outreach.

St. Lucia

The *Coastal Capital* results have been used for both advocacy and policy influence, although respondents provided no tangible examples. In general, results have been referenced in reports, presentations, and interviews. Despite at least one person currently working in the Fisheries Department having received training, the department does not use the *Coastal Capital* fisheries tool. The absence of a clear strategy and tangible examples on how to use the results and tools limited its impact. In addition, a lack of interest by policy makers and the limited availability of the overburdened conservation community resulted in little follow-up. There is also a need for better outreach and dissemination of results to policy makers, the general public, and youth. *[For St. Lucia, WRI only released a technical report—but not a short pamphlet as was done in other countries—as there was insufficient time before the launch / end of project. We are currently looking at filling this gap by doing a "policy brief" for St. Lucia, which includes the valuation results.]* Currently, there is no strong public forum (television and social media) to convey conservation messages. Valuations must also frame results to highlight how individuals are impacted. Respondents are interested in site-specific values, as long as these values can be combined to provide a broader summary, as well as national values. The respondents favor accuracy and time series analysis, but also note that costs and the availability of data must be considered. At least one respondent felt that valuation studies should be repeated about every 5 years (in line with election cycles).

Other Applications–Influence in St. Maarten

During this review, we identified an influence success story in St. Maarten that used the *Coastal Capital* Tourism and Recreation Valuation Tool and Fisheries Valuation Tool to highlight the economic value of St. Maarten's coral reef-related tourism and fisheries (US$58 million per year), supporting the establishment of the Man of War Shoal Marine Park—the country's first national park. The park, which covers 1,500 hectares, includes the island's most ecologically, economically, and culturally important marine habitats, including coral reefs and seagrasses.

The government's recognition of the economic importance of coastal ecosystems, and the establishment of the country's first national park, are milestones for conservation and sustainable development in St. Maarten. Furthermore, in the wider Caribbean region—where economies are heavily dependent on coastal ecosystems, but where 75 percent of coral reefs are threatened by human activities—this recent success sets a precedent for other countries for how to "make the political case" for protecting ecosystems for the sake of people and the planet.

Key Takeaways

- Respondents felt that WRI's methods were solid and produced accurate numbers. *[Granted, partners might not have grasped all of the nuances, assumptions, and disclaimers of our methodology.]*
- There was a high level of uptake of results by NGOs to further their advocacy, but lower levels of uptake for policy making and by the private sector (easier to "preach to the converted," harder to reach those whose opinions we are trying to sway).
- *[The projects had varying levels of stakeholder engagement across the five countries (both during and after the project). At project inception, we had a very well-developed partner network in Belize relative to the other countries. Also, use of an existing method helped the Belize effort.]*
- Media strategies were effective across the five countries, in that WRI's findings were widely reported in the local press around the release of results. However, outreach materials (e.g., summaries, multimedia) could have been better targeted for decision makers in order to increase the influence of the results (through even shorter summaries).

In general, respondents are interested in:

- More valuation studies focused on coastal ecosystem services.
- Updated valuations, such as every 5 years.
- Relatively high accuracy, although costs and time constraints need to be taken into consideration; accuracy is more important for policy influence than advocacy. Respondents mentioned an accuracy level of 70–80 percent could be adequate for policy making.
- Time series and future projections based on trends or scenarios, which must be balanced with costs, time constraints, and data needs.

There seemed to be a 50-50 split on whether respondents preferred large (total economic contribution) or marginal numbers (how management action results in a change in value). This is likely due to their different intended uses (large for awareness raising and advocacy, and marginal for decision making and demonstrating management effectiveness). Some partners would like to see both. Respondents also differed in their preferences regarding geographical scale; national-level and MPA-level seem to be the two most frequently mentioned scales.

APPENDIX 2: WRI *COASTAL CAPITAL* SURVEY QUESTIONS

[Introduce self and explain project]

My first set of questions examines the usefulness and influence of WRI's coral reef valuation in [country].

1. How has the WRI *Coastal Capital* valuation (and possibly other marine valuations in the Caribbean) been useful/influential?
    a. Did you find it useful?
    b. How has it been used?
        i. Who is using it?
        ii. How are they using it?
        iii. For advocacy/raising awareness? For policy/management/decision making?
    c. What would have made it more useful?
        i. Would some other type of valuation or use of another valuation method been more useful?
        ii. Were the numbers large enough to achieve impact?
    d. What would have made the valuation more used?
        i. Was there adequate dissemination, communication, and outreach?
        ii. Were the right people reached?

I am also interested in your thoughts on how future coastal and marine economic valuations—whether led by WRI or anyone else—could be most useful, beneficial, and influential.

2. What kinds of valuations would be most useful/influential in the future?
    a. What geographical scale(s) are most useful? Are overall values for a country or site-specific (such as MPA) numbers more useful?
    b. What types of values are of most use (i.e., do you want to examine the overall value of the coral resource or the marginal changes in value due to management or policies)?
    c. What level of accuracy is necessary? (More precise valuations require much more data collection, so are more expensive. Is it enough to just have ballpark values?)
    d. Is it enough to measure values during a given year, or are time series data (or predictions of future value) more useful?

Are there other people you think would be useful to contact?

APPENDIX 3: ENABLING CONDITIONS FOR THE SUCCESSFUL APPLICATION OF USER FEES

During this review, we also identified several enabling conditions that influence the successful application of user fees, as many tropical coastal valuations aim to determine the appropriate level of user fees to achieve sustainable financing for MPA management. Enabling conditions include:

- Low availability of substitutes. Bonaire is one of the best diving destinations in the world, and as a result there are few alternative options for tourists, making the establishment of higher user fees more politically feasible.
- Unique or exceptional sites or opportunities for wildlife viewing.
- High visitor support for user fees. In Bonaire, visitors are typically educated, conservation minded, have more disposable income, well-traveled, more active divers, and are repeat visitors.
- Ability to exclude non-payers and collect fees with low transaction costs.
- Fee structure honors both ability and willingness to pay. Local circumstances are an important consideration when developing user fees. Fee levels can vary for locals and foreigners. In some places, locals do not have to pay a fee unless they go diving.
- Shoot high and be bold, and then listen to the market. It is best to set a realistic user fee from the start. Most MPAs charge low user fees (US$2–3) because they are afraid of consumer backlash. It is better to start bold and high, and then adjust numbers according to how the market reacts.
- Provision of extra facilities, especially education-focused ones.
- User fees are part of a bigger package. User fees are used not only to address the financial needs of a park, but also to give visitors some benefits (including educational talks about reef biology and dive tags, which users like to show off).
- Impacts of user fees are tangible. Supported by user fees, there are more than 100 well-maintained moorings in Bonaire and regular patrols and educational materials distributed.
- Efficient and accountable fee collection. It is best if new financing mechanisms tap into existing infrastructure and fees are easy to collect and enforce. Dive operators administer the collection of the fee on behalf of the BNMP by making it part of their standard diver check-in procedure. Divers receive uniquely numbered tickets and tags to verify payment of park fees, and are required to display the plastic tag on an item of dive equipment they have with them in the water. Copies of these tickets are returned to the Bonaire Marine Park together with revenues generated on a weekly basis. This way, no overhead or administrative costs are incurred and there is good accountability for the funds. Visitors often have higher willingness to pay when they are well-informed as to the use of the funds obtained.

APPENDIX 4: EXAMPLES OF VALUATIONS OF TROPICAL MARINE ECOSYSTEMS THAT HAVE HAD INFLUENCE

COUNTRY	STUDY SITE	ECOSYSTEM	ECOSYSTEM SERVICES VALUED	INFLUENCE	STUDY REFERENCE	KEY INFORMANT
Caribbean / Atlantic Ocean						
Bahamas	Andros Island	Coral reefs / beaches / wetlands / forest / mangroves	Use & non-use	Justified the protection of the west side of Andros Island. The Bahamas Science and Technology Commission is also using the results to inform coral reef damage estimates; furthermore, valuation results are being used to raise awareness of the economic benefits of conservation to decision makers and the general public.	Hargreaves-Allen (2010)	V. Hargreaves-Allen
Belize	National-level	Coral reefs / mangroves	Tourism / fisheries / shoreline protection	Supported action on multiple fronts, including a landmark Supreme Court ruling to fine a ship owner an unprecedented and significant sum for a grounding on the Mesoamerican Reef; the government's decision to enact a host of new fisheries regulations (a ban on bottom trawling, the full protection of parrotfish, and the protection of grouper spawning sites); and a successful civil society campaign against offshore oil drilling.	Cooper et al. (2009)	M. McField M. Jungwiwattanaporn
Belize	Hol Chan Marine Park	Coral reefs	Tourism	Justified the Hol Chan Marine Park's increase in user fees, making it one of the few self-financed marine parks in the Caribbean.	Trejo (2005)	M. Alamilla
Belize	Gladden Spit Marine Reserve	Coral reefs	Tourism / fisheries	Justified funding requests for ongoing planning and management of the Gladden Spit Marine Reserve, resulting in increased donations; additionally, valuation results helped the Gladden Spit Marine Reserve facilitate a historically strained dialogue with fishers and tour operators.	Hargreaves-Allen (2008)	V. Hargreaves-Allen
Dominican Republic	La Caleta Marine Reserve	Coral reefs	Dive tourism	Findings used to justify significant increase in user fees. Additional revenue has been used to help establish an aquatic center, a conservation fund to support park management, and a community fund to support local development projects.	Wielgus et al. (2010)	R. Torres
Mexico	Cancun	Coral reefs	Tourism	Justified the collection and distribution of revenues from tourist user fees to support local MPAs.	Rivera-Planter et al. (2005)	J. Dixon
Netherlands	Bonaire National Marine Park	Coral reefs	Dive tourism	Justified the Bonaire Marine Park's adoption, and later increase, of user fees, making it one of the few self-financed marine parks in the Caribbean.	Dixon et al. (1993); Uyarra et al. (2010); Thur (2010)	J. Dixon E. Wolfs R. De Leon

COUNTRY	STUDY SITE	ECOSYSTEM	ECOSYSTEM SERVICES VALUED	INFLUENCE	STUDY REFERENCE	KEY INFORMANT
Caribbean / Atlantic Ocean						
St. Maarten	The Man of War Shoal Marine Park	Coral reefs	Tourism / fisheries	Used by the government of St. Maarten's to establish the Man of War Shoal Marine Park—the country's first national park; furthermore, the valuation results are currently being used to sue for damages caused by the sinking of a boat inside the Man of War Shoal Marine Reserve.	Bervoets (2010); WRI 2008a (tourism); WRI 2008b (fisheries)	T. Bervoets
United States	Florida	Beaches	Tourism	Helped justify the passage of a US$4 billion Save our Coast Trust Fund to buy up beaches in order to provide access to the public.	Bell and Leeworthy (1986)	B. Leeworthy
United States	Florida	Coral reefs	Recreational fisheries	Justified the issuance of state-wide saltwater fishing licenses, which raised revenue for enforcement.	Bell et al. (1982)	B. Leeworthy
United States	Florida	Coral reefs / beaches	Tourism	Justified Broward County (Florida) revision of its beach renourishment plans to minimize damage to reefs from sedimentation related to pumping sand on the beach; furthermore, valuation results have been used by counties in Florida to justify investments in artificial reefs to support economic development.	Johns et al. (2001)	B. Leeworthy
United States	Florida	Marine reserves	Tourism / fisheries	Supported the design of the regulatory alternatives adopted by government agencies, including the Tortugas Ecological Reserve; Florida Keys National Marine Sanctuary; furthermore, the integration of socioeconomic information has resulted in increased regulatory compliance, lower enforcement costs, and the development of cooperative management processes with stakeholders.	Leeworthy and Wiley (2000); NOAA (1997)	B. Leeworthy
United States	Florida Keys National Marine Sanctuary	Coral reefs	Tourism	Justified a schedule of escalating fines for injury to living coral based on the area of impact; as a result, the Florida Keys National Marine Sanctuary has recovered millions of dollars for reef restoration after ship groundings.	Leeworthy (1991)	B. Leeworthy
Southeast Asia						
Philippines	Pagbilao mangrove forest	Mangroves	Carbon storage	Highlighted the benefits of wetlands as carbon sinks, which helped to justify investments in mangrove reforestation — particularly from the private sector.	Slootweg et al. (2008); Janssen et al. (1999)	NA

COUNTRY	STUDY SITE	ECOSYSTEM	ECOSYSTEM SERVICES VALUED	INFLUENCE	STUDY REFERENCE	KEY INFORMANT
Southeast Asia						
Philippines	Puerto Princesa, Palawan	Mangroves	Use & non-use	Convinced the local government to ban shrimp aquaculture projects and to restore mangrove ecosystems.	Farley et al. (2009)	J. Farley
Philippines	Palawan Island	Coral reefs	Fisheries / dive tourism	Banned logging in Palawan, established EL Nido Managed Resources Protected Area (a marine reserve), and promoted eco-tourism development.	Cesar (2000); Hodgson et al. (1988)	NA
Philippines	Olango Island reef	Coral reefs / mangroves	Use & non-use	Justified investment in management and protection at the municipal and city levels, increased investment in the Gilutongan MPA, helped to establish the Talima MPA, justified increases in MPA user fees, and encouraged eco-tourism development.	White et al. (2009); White et al. (1998)	A. White
Pacific						
Costa Rica	Térraba-Sierpe National Wetland Reserve	Mangroves	Use & non-use	Informed the Térraba-Sierpe National Wetlands Management Plan, which was completed by stakeholders in the Térraba-Sierpe community in 2008.	Earth Economics (2010)	B. Aguilar-Gonzalez
United States	Hawaii / Big Island and Maui	Coral reefs	Use & non-use	Supported the creation of a Reef Fund for dive and snorkel operators to collect voluntary donations from clients to fund marine protection programs.	Slootweg et al. (2008); Beukering et al. (2004)	NA
United States	Hawaii	Coral reefs	Use & non-use	Justified the establishment of administrative penalties for damage to coral reefs in Hawaii.	Slootweg et al. (2008); Cesar et al. (2000)	NA
Indian Ocean						
Sri Lanka	National-level	Coral reefs	Tourism	Supported a ban on coral mining in Sri Lanka, which was adopted; additionally, influenced the development of national strategies to promote conservation, including Coastal Zone Management plans (which are updated every 5 years).	White et al. (1997)	A. White

Note: Several studies such as Slootweg et al. (2008) include information about policy influence; in these cases, no key informants were interviewed.

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ACKNOWLEDGMENTS

We are indebted to the following people and organizations for their generous assistance providing information, valuation studies, and guidance: Miguel Alamilla (Hol Chan Marine Park), Bernardo Aguillar-Gonzalez (Fundación Neotropica), Tadzio Bervoets (Man of War Shoal Marine Park), Nadia Cazubon (Soufriere Marine Management Association), Ramon de Leon (Bonaire National Marine Park), John Dixon (environmental economist), Joshua Farley (Gund Institute for Ecological Economics), Venetia Hargreaves-Allen (environmental economist), Robert Leeworthy (National Oceanic and Atmospheric Administration), Rick MacPherson (Coral Reef Alliance), Anne-Marie Martin (Nelson's Dockyard), Melanie McField (Healthy Reefs Initiative), Azur Moulaert (Earth Economics), Joseph Smith (BVI National Parks Trust), Ruben Torres (Reef Check Dominican Republic), Alan White (The Nature Conservancy), Esther Wolfs (WolfsKater International Consultancy Services), and Kai Wulf (Saba Conservation Foundation). John Dixon, Venetia Hargreaves-Allen, Robin Mahon (Centre for Resource Management and Environmental Studies), Linwood Pendleton (Duke University), and Peter Schuhmann (University of North Carolina Wilmington) provided advice and reviewed this paper.

At WRI, we thank the many staff who assisted with fundraising, administration, and communication of results, including Beth Bahs-Ahern, Rich Barnett, Hyacinth Billings, Craig Hanson, Ashleigh Rich, David Tomberlin, Brian Tracy, Elsie Velez-Whited, and Robert Winterbottom. The content of this report benefited tremendously from internal review and editing by Evan Branosky, Joseph Foti, Todd Gartner, and Beth Gingold.

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Marine Ecosystem Services Partnership (MESP) is both a spatial portal and a community of practice where policy makers can find data on marine ecosystem services and the researchers who study them. The MESP website offers a searchable database of ecosystem valuation studies and connects its partners through a variety of web-based tools. MESP seeks to improve the estimation, dissemination, and use of valuation data by improving communication among users and easing access to data. (www.marineecosystemservices.org)

PROJECT PARTNERS

This review of the influence of coastal economic valuations in the Caribbean was implemented in collaboration with the Marine Ecosystem Services Partnership (MESP); Centre for Resource Management and Environmental Studies (CERMES), University of the West Indies (UWI); Nicholas Institute for Environmental Policy Solutions, Duke University; Conservation Strategy Fund; MARES Program, Forest Trends; The Nature Conservancy; University of North Carolina Wilmington; Conservation International; and CARIBSAVE. This working paper would not have been possible without the financial support of the Family Alliance Foundation.