

# Manual Marine Protected Area Economic Impact Template

World Resources Institute – May 2009

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This document provides a detailed guide to using the World Resources Institute’s *Marine Protected Area Economic Impact Template*. The template emphasizes the collection of basic economic data at the Marine Protected Area (MPA) level, and calculates an estimate of the current economic contribution of tourism and fisheries revenues associated with an MPA. This approach is a streamlined version of WRI’s method for assessing gross reef- and mangrove-related fisheries and tourism revenues at the national level as part of the *Coastal Capital* project. A description of the full economic valuation methodology, as well as working papers and short summaries describing the results of applications in St. Lucia, Tobago, and Belize are available at WRI’s website: <http://www.wri.org/project/valuation-caribbean-reefs>. Also available on this site are Excel-based tools for calculating the economic contribution of coral reef-related fisheries and tourism at the national level.

The first section of this manual offers an introduction to potential uses for the template and basic guidance on its use. The rest of the document discusses the information needs for the worksheets on the Tourism and Fisheries sectors.

For a more thorough introduction to economic valuation concepts and methods, please download WRI’s *Economic Valuation Methodology for the Caribbean*, available at the website above.

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## **Introduction**

This template was designed with the help of local partners in Belize, and has been road tested in several Marine Protected Areas in that country. It has not yet been applied more broadly, and your comments will be especially helpful in assessing future changes that will make it a useful tool for MPAs across the region. For the results of an early MPA-level analysis, see the Glover's Reef case study in *Coastal Capital: Belize*, available at <http://www.wri.org/project/valuation-caribbean-reefs>.

### **Uses for the MPA template**

This template can help MPA managers, non-governmental organizations (NGOs), and government officials assess the economic contribution of fisheries and tourism services provided by the coral reefs and mangroves protected by an MPA. In many cases, economic impact can be an important element in an argument to governments and donors for increased financial support for management of a reserve.

The template is designed to provide a snapshot of **current use**, but can also be adapted for application in planning and scenarios. The scope of the assessment includes the economic impact of fisheries and tourism services on residents and businesses that rely upon the MPA. The focus is **not** exclusively on revenues captured by the marine reserve itself—in this way it is different from some financing tools already available to MPAs. The template also provides the option of using a multiplier to estimate the wider (indirect) economic impact of the tourism activities associated with the reserve.

### ***Some more about economic impact***

This template measures the direct economic impact of tourism and fisheries associated with the MPA. *Direct impact* is estimated by calculating gross revenues from these industries. *Indirect impact*, or the secondary effects on the wider economy of MPA-related spending, can be estimated as well, although these estimates are generally less reliable. Gross revenues are a good indicator of the economic activity generated by the use of these resources, and have the advantage of being easily understood by decision-makers. However, economic impact is not the same thing as economic value.<sup>1</sup> This template focuses on economic impact as a useful and achievable starting point for looking at the full value of an MPA.

### **Limitations**

Because this analysis focuses on economic impact and looks at only two out of many ecosystem services provided by a Marine Protected Area, it does not capture the total value provided by an MPA. The results always should be presented as *economic impact* and not *value*. Total economic value is usually greater than (direct) economic impacts, since it takes into account the many non-use and

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<sup>1</sup> Economic value is a measure of the contribution of these services to the wellbeing of society, as measured by producer and consumer surplus (see WRI's full economic valuation methodology or Pendleton 2008:1-13 for a good introduction to economic value vs. impact). The results of this template could be used as an intermediary step to a full economic valuation. Subtracting operating costs from the estimated direct impacts (gross revenues) will produce the net rent or *producer surplus* from MPA-associated activities. Survey-based methods can be used to estimate *consumer surplus*, or the value of the enjoyment an MPA visitor receives above what he or she pays for the experience. Together, these make up the economic value of a service.

indirect-use values provided by the ecosystem. This analysis will be most useful for MPAs that are relatively well established and are actively used for tourism and/or commercial fishing. For newer or less heavily visited MPAs, approaches that focus explicitly on economic value may be more appropriate. For example, survey-based methods that assess the Willingness to Pay (WTP) of visitors to use the reserve can help to set or raise entrance fees for a reserve. Contingent Valuation surveys can be used to assess people's willingness to pay for improved reef health or environmental quality. These studies can then be used to argue for taxes or fees to pay for better management, improving the experience of visitors to an MPA.

Because the template only provides an estimate of current levels of use, it does not assess whether the fisheries or tourism activities within an MPA are sustainable. Economic impact is not a good measure of sustainability – if the fishery is overexploited, for example, an impact analysis cannot capture the loss of utility suffered by fishermen who now have to dedicate more time and resources to catch the same amount of fish. In recognition of this shortcoming, we recommend that users of the template consider assessing costs in addition to revenues, particularly for the fishing industry.<sup>2</sup> Net revenues are a better indicator of the choices faced by individual resource users. Information on operating costs can be more difficult to find than revenues, so this is included as an optional component.

Finally, although we try to cover the major sources of revenue associated with the tourism and fisheries sectors in MPAs, it is always possible that an important activity at the study site is not included. The template is simple enough in design that it is possible to modify it to the needs of a particular MPA. To make additions, you will need to “unprotect” the worksheets (Tools Menu → Protection → Unprotect Sheet). We have made the formulas used on the calculations page as transparent as possible, in an effort to avoid the “black box” problem of many tools. **Please note:** When adding fields, pay close attention to how these totals are added into the calculations and summary worksheets at the back of the template.

## Data Collection

Beyond the goal of estimating economic impact, this template is also designed to highlight some of the key information managers should be collecting on levels of use of an MPA. In addition to using this information to make an economic argument for the importance of MPAs (and the case for greater financial support), these data are important in their own right, as indicators of the interest in and use of the reserve. Information on levels of use can also improve management, highlight shortcomings in current fee collection efforts or fisheries regulations, and protect resources from unsustainable levels of use. This information should be an important complement to biological data on ecosystem health that is already being collected in many MPAs.

Where possible, all use and price information entered into the template should come from the same year (or as close as possible). Alternatively, average prices and annual levels of use can be averaged over a several-year period. Some of the information needed to complete the economic impact calculations is not readily available to Marine Protected Area managers, and will require some outside research (this is particularly true for prices).

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<sup>2</sup>The Template does not calculate net benefits. It does include a section to note costs. A net revenue calculation can be done in a simple spreadsheet.

If the MPA does not collect or have access to some of the information needed, reasonable estimates can be entered into the missing fields. This will produce an approximation of current economic impact which can be improved upon as data collection improves in the future. It is important to clearly note when estimates are being used in place of data collected by the MPA, and to document the source of the estimate. The template also offers the option of establishing ‘ranges’ where an estimate is being used. This will be covered in greater detail for some of the fields in the sections below.

## **Worksheet 1: General Information**

### **1. Basic Information**

Fields for the name of the Marine Protected Area, person and organization leading the analysis, and date of the study are included at the top of the worksheet.

**Currency:** Choose a single currency (either the local currency or the US dollar) and convert all revenues to that currency while working through the current worksheet. On the calculations page, the template notes the currency chosen for each worksheet, and when calculating the combined impact of fisheries and tourism, converts to US dollars for consistency. Both current and historic exchange rates are available online at sites such as *oanda.com*. If available data on fisheries, tourism, etc. are primarily a year or two old, the average exchange rate from that earlier year can be substituted for the current rate. **Note:** *If you choose to use US dollars, enter a 1 for exchange rate.*

### **2. Area and Habitat**

Enter relevant background information about the study site. This includes the terrestrial and marine area covered by the Marine Protected Area, the extent of coral reef and mangrove habitats inside the reserve, and the presence of coralline (white sand) beaches. This information should be available for most MPAs, but is not essential for the analysis. It is used only as background information and to provide context.

### **3. Management**

This worksheet also includes fields for basic information on management of the MPA, including the organization(s) responsible for managing the reserve, the annual cost of management, and the aspirational, or target, level of funding for successful management (as defined by the organization managing the MPA or filling out the Template). Current and aspirational funding levels are useful figures to have in mind when analyzing the results of the economic impact assessment. In Belize, where this template was first applied, we found that some MPAs were bringing ten times as much money into the economy as was invested in managing them.

For the most part, the information on this worksheet is descriptive and can provide context for a policy argument or when comparing the study site to other Caribbean MPAs. For instance, the size of the MPA or the extent of different habitats inside the MPA will have implications for management costs as well as for carrying capacity.

## Worksheet 2: MPA-Associated Tourism

The tourism worksheet calculates gross revenues generated by three components of MPA-associated tourism: accommodation (including hotels, yachts, and liveaboards), reef- and mangrove-related recreation (diving, snorkeling, sport fishing, and boating), and “other spending” (on food, transport, etc.) by tourists on MPA-associated days. It can also produce a rough estimate of taxes and service charges associated with any of the above categories. The template is designed to capture a snapshot of one year of tourism activity associated with a reserve; it can also be used to estimate the effects on the local economy of changes in MPA visitation.

### Ranges

Many of the fields in the tourism worksheet have a column for estimating a confidence range for the data you have entered. Where data are poor or you are using multiple sources to arrive at an estimate, this allows you to demonstrate the level of uncertainty around the figure. Enter or select from the dropdown menu the range you would like to use, from (+/- 1%) to (+/- 50%) (integers only). In the two columns to the right, the worksheet will display the range this creates around your estimate. These figures are then used to calculate the high and low estimates for total economic impact on the calculations page. Note that because the ranges applied to each line compound one another in the final calculation, applying ranges to many fields will produce a very large range in the final estimate (this is fine if it accurately represents a high level of uncertainty in the data).

### 1. Basic Information

Fields for the name of the Marine Protected Area and date of the study are included at the top of each worksheet, to allow users the flexibility of sharing each sheet separately.

**Currency:** Select the currency that is most useful for collecting data on revenues in the tourism sector. Many tourism businesses in the Caribbean quote prices in US dollars, so this is often a good currency to work in. The template requires that all price data in a worksheet be converted into a single currency—be sure to do this as you enter information into each field. Both current and historic exchange rates are available online at sites such as *oanda.com*. Enter the appropriate exchange rate into the field provided.

### 2. Visitor Fees

If the MPA collects fees, use this section to record the types of fees collected, fee levels, and number of visitors paying each fee in a given year. Common examples include foreign and domestic visitor

fees and activity fees (such as camping, fishing, etc.). Additional lines can be added if necessary, but be sure to change the formula in the “Total Fee Revenues” line to include the added lines in its total.

This section also includes fields for:

- Total recorded visitors to the MPA / year
- Recorded foreign visitors
- Recorded domestic visitors

Undercounting of visitors is a challenge for many MPAs. The template provides a field for estimating the amount of visitation that goes uncounted. This can be used for reference, or the user may wish to use the template to produce an economic impact estimate that reflects “true” visitation. Undercounting of visitors can be estimated in different ways. Reserve managers may be able to estimate undercounting as a percent of recorded visitors. Alternatively, if good information is available from tour operators and nearby hotels (assessed in the following sections), these data could be used to estimate visitation from the “ground up.” Be sure to make it clear when results are calculated using an estimate of visitation rather than recorded visitors. Other evidence on levels of use should also be compiled to support these estimates. The template can also be used to produce scenarios for estimating estimate economic impact at different visitation levels and activity types.

### **3. Accommodation**

#### **Accommodation Breakdown**

This section requires users to enter information on where visitors to the MPA spend the night. The focus is on foreign visitors, since they are the most likely to be paying for accommodation. Accommodation options include hotels, liveaboards, privately chartered yachts, and cruise ships. Many MPAs do not count or collect fees from visitors on yachts and liveaboards, so the total number of visitors may exceed the number of recorded visitors entered in the fees section above. There is also a section for recording visitors to the MPA that stay outside of the defined study area (e.g. in another country). This will likely be a factor for only a few MPAs. The Template sums visitor numbers from all five categories to arrive at **total number of foreign visitors**.

**Please note:** Information on where visitors stay is usually not collected by MPAs. The purpose of this template is to produce an informed estimate of these and other expenditures by MPA visitors. In many cases, the first application of the template will require users to estimate some of these breakdowns, but this should be done with an eye towards expanding and improving data collection at the MPA level in the future. The number of visitors on yachts, for example, is often not counted—even in MPAs where this is a significant user population. These visitors often spend more money per day to visit the MPA than the average visitor, so it is worthwhile to estimate their impact on the national economy. Beginning to collect yacht data now will also make it possible to improve these numbers in the future. *(For an example of how to estimate the number of yacht visitors per year, see the yachts and liveaboards section below.)* This section can be seen as an opportunity to improve estimates of MPA visitation. For MPAs where undercounting of visitors is a problem, information on occupancy rates and number of tourists who visit the MPA from area hotels can be a good way of crosschecking recorded visitation.

## Visitors staying inside the MPA

-----OR use this section to record all-inclusive hotels-----

Some Marine Protected Areas have hotels inside the reserve. This section provides the option of recoding these visitors separately from the other categories (below). Hotels inside MPAs can sometimes be considerably more expensive (e.g. boutique resorts) or less expensive (e.g. campgrounds) than hotels in nearby towns.<sup>3</sup> Enter the percent of rooms inside the reserve that are at all-inclusives.

Alternatively, use this section to record room rates and visitor numbers for **all-inclusive** hotels in and around the reserve. The next section will then be used to record all regular (non-all-inclusive) hotels in the area. Because all-inclusives include all expenses in room rate, they should be recorded separately from regular hotels if possible. If you choose this option, enter 100% in the line for percent of rooms that are at all-inclusives (ignore the “inside the reserve” distinction).

## Visitors staying in hotels outside the MPA

Enter the number of visitors to the MPA that stay in hotels outside the reserve on the day of their visit. Do not include day-trip visitors who are staying at hotels outside the *study area* (e.g. in another country) – enter these visitors in the separate section below. Use available information to estimate what percent of visitors stay in each major town or city near the MPA. For instance, if you know where all of the dive companies that visit the reserve originate from, and roughly how they break down by percent of visitor traffic, this could be used to estimate where visitors are staying. Internet research or information published by the Tourism Board or Tourism Ministry can be used to enter the average room rate by town. Be sure to note whether rates are *per room* or *per person*. **If rates are per room, divide the rate by two to convert to a per person price** (this assumes, on average, hotels have two guests per room). Taxes are generally not included in published room prices, so the template uses this assumption as the default. If taxes are included, subtract them from the room prices. Estimate the percent of rooms in the towns outside the reserve that are in all-inclusive hotels. If you use the section above to separate out all-inclusives, this percent should be zero.

Please keep in mind that the purpose of this section is to estimate the amount spent on accommodation by MPA visitors each year. If detailed information on the towns stayed in and average hotel rates are not available or are too difficult to gather, a working estimate can be produced using national-level information. Enter 100% of overnight visitors into Town 1, and use the average room rate for hotels in the country (generally published by the Tourism Board or Ministry).

## Yachts and Liveaboards

The MPA will hopefully have a record of the number of yachts that visit per year. If one does not currently exist, a straightforward way of estimating this is to divide the year into high and low seasons, and ask the reserve manager to estimate a) how many yachts visit the MPA per week in the high and low seasons, respectively; and b) the number of days, on average, that a yacht spends in the

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<sup>3</sup> If there is a big range in hotel prices within the reserve, it may be preferable to separate out one of these groups of hotels and count them as a “town” in the following section. This will allow for a more accurate tally of revenues.

MPA. To estimate total visitors on yachts, a basic internet search or call to a major charter company can provide information on the average number of people per yacht.

The term “liveaboard” is used here to represent mid-sized vessels (often 15-30 passengers) that cater to people interested in diving and snorkeling in marine and coastal areas, typically for periods of three to ten days. It is not uncommon for liveaboards to spend a day or two in a Marine Protected Area. In this section, enter the number of liveaboard visitors to the MPA per year and the fraction of a trip that is spent in the MPA. Some research may be required to discover the price and length of the trips for vessels that visit the reserve (liveaboard itineraries are usually provided on the company website). There are typically only a few companies operating in a given area, so this should be relatively straightforward. If liveaboard visitors do not pay MPA fees and are not directly counted by the reserve, the capacity and average occupancy rates of visiting boats can be used to generate a rough estimate of visitor numbers.

For both yachts and liveaboards, be sure to answer the “are taxes included in advertised prices?” question, or taxes will not be calculated for these components.

### **Cruise Ship Visitors**

In this section, record the number of visitors to the MPA that come from major cruise ships. In places that do attract cruise visitors, these groups usually visit an MPA on a snorkel or dive boat run by a local company. If exact numbers of cruise visitors are not available, an estimate could be compiled using information from these operators.

### **Visitors Staying Outside the Study Area**

In this section, record the number of visitors that are coming on day trips from outside of the country or the defined study area. This will not be a factor for most MPAs, but may be important in some places. For instance, Marine Protected Areas that are close to a national boundary may get a large number of visitors on day trips from neighboring countries. Since most of the tourism revenues associated with those visitors will accrue to businesses outside of the study area, they are not counted here.<sup>4</sup>

### **Taxes and Service Charges**

In this section, enter the tax rates for the accommodation sector. The template includes tax revenues and service charges as part of an MPA’s economic contribution to the country as a whole. It currently assesses only sales taxes that are added onto the prices charged to consumers (hotel tax, sales tax, etc.), and not business taxes or other secondary taxes. As a result, this should produce a conservative estimate of tax revenue.

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<sup>4</sup> Note: Unless you are including more than one country in the study area, revenues from guided tours and other reef recreation coming from neighboring countries should also be separated out and counted in a separate template.

The template also includes a field for service charges. In many places, only a subset of hotels include a service charge, so users are asked to enter an estimate of the percent of hotels that include it. This can be filled in either with a national estimate or, ideally, an estimate for hotels in the areas serving the MPA. If unsure about service charges, leave this section blank.

In some places, taxes are levied on yachts and liveaboards on a percentage basis (i.e. 10% of sale price), while in others, passengers pay a per person head tax. Choose one of these options and enter the appropriate tax rate. In both cases, taxes will be pro-rated by the percentage of a trip passengers spend inside the MPA.<sup>5</sup> In most places, MPA-associated taxes on liveaboards and yachts will be negligible, so this component can be skipped if information is not readily available.

#### **4. Reef- and Mangrove-Related Recreation**

Use this section of the template to record information on the number of visitors that participate in different coral reef- and mangrove-related activities inside the Marine Protected Area. As was the case in the accommodation sector, this information will be used to estimate annual gross revenues associated with use of the MPA. Data collection on activities inside marine reserves varies considerably between MPAs, making it difficult to recommend a single approach to calculating revenues. Since reef use data is important for management purposes as well as for making an economic argument, it is important to improve data collection in this area. For MPAs that still have gaps in information, managers should be able to produce approximate estimates of the number of divers, snorkelers, and other recreators per year using information from dive shops or estimates from rangers. These estimates can be used to produce a rough estimate of revenues, but should be replaced as data collection improves.

**Note:** WRI's national-level Tourism Valuation Tool (<http://www.wri.org/project/valuation-caribbean-reefs>) offers three options for estimating dive or snorkel volume:

- a) (total number of overnight visitors) x (percent of visitors that dive)
- b) (total number of divers (if already known)) x (avg. # dive trips per person)
- c) Information collected by dive shop (# dive trips sold per year). If shops are not willing / able to share a complete record of divers per year, they may be willing to estimate the average number of trips sold per week, high season and low.

Users may wish to download the national-level Tool and use it to calculate reef recreation volume using one of these methods, or simply do the calculations in a blank spreadsheet.

#### **Diving**

Enter the number of dive trips to the MPA purchased each year and the average price of a dive trip. See the section above for tips on estimating the number of dive trips if this information is not collected at the MPA level. The number of dive operators is used for reference only.

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<sup>5</sup> Since information on the full length of yacht trips is rarely available, we use seven days as an estimated average – this should be a conservative estimate for most places (i.e. this makes the MPA portion of the trip a fairly small percentage of the total, whereas in many places, people will charter a yacht for a shorter period).

Dive trips are split into trips sold to people staying at hotels inside and outside the MPA. This is because the prices for people staying inside a reserve are often significantly lower. If the study site does not have any accommodation or dive operations based inside the reserve, the “inside the MPA” fields can be left blank.

The average price of dive trips can easily be found through an internet search or by speaking with local dive shops. Be sure to ask whether taxes and park fees are included in the trip price. If park fees are included, subtract these out before entering the price, to avoid double counting fees. The template does not offer the option of breaking out the prices for one, two, or three dive trips, relying instead on an average price.<sup>6</sup>

The template also asks for an estimate of the number of dive trips that are purchased as a part of an all-inclusive hotel package. If the price of diving is already included in a room rate, the template will be double-counting those revenues. The template will use this percentage to subtract out the percent of dive trips that are sold at all-inclusives from total dive revenues.

**Important:** If the average room rates entered for all-inclusives **do not** include the activities offered at these resorts (for instance, if diving is sold separately, even though it is technically an all-inclusive resort) **enter a 0 on this line**. Double-counting will not be a problem in these cases.<sup>7</sup>

In the final field of the section, enter the sales tax rate and the proportion of dive shops that include taxes in advertised trip prices. Since dive shops compete with one another for customers, this will usually be either 100 percent or zero percent of shops, depending upon the study site. You must enter a number in this line, or no taxes will be calculated for this activity.

## Snorkeling

Enter the number of snorkel trips to the MPA purchased each year and the average price of a snorkel trip. See the section on diving, above, for explanations of how to estimate or collect data for the individual fields in this section.

## Sport Fishing

The template assumes sport fishing trips are purchased in one of two ways: 1) serious anglers hire a guide and a boat for the day; or 2) people purchase a spot on a group boat (or “party boat”) for a day of fishing on the reef. Guides often offer their services at a daily rate, regardless of the number of anglers (usually 2 or 3), whereas group boats often price the trip per person. If this does not reflect the breakdown at this study site (for instance, all trips are sold on a per person basis), you can choose to use only one of the two options, or modify as needed.

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<sup>6</sup> If the “inside the park” fields are not being used, these could be used instead to divide trips into single-dive and two-dive trips, to more accurately capture dive revenues. In many places, a significant majority of people purchase the same length trip (often 2 dives), so this distinction may not be an issue.

<sup>7</sup> For example, the Belize Tourism Board informed us that the room rates they publish for Belize cover accommodation price only—including for resorts that sell rooms as a part of an all-inclusive package.

Enter the number of sport fishing trips—either guided or by “party boat”—to the MPA each year. The average price of trips can be obtained from guides or from an internet search. Where the template asks for the average number of anglers per guided boat, this does not need to be a whole number (i.e. 1.5 is acceptable). Note the percent of sport fishing trips that are sold as a part of all-inclusive packages (see the discussion of all-inclusives in the diving section, above).

If there is a sales tax on sport fishing, enter the tax rate here, and note the percent of guides and operators that include tax in advertised trip prices (as opposed to adding the tax on top of the advertised price).

### **Kayaking or Other Rentals**

Canoe and kayak rentals are an important enough activity for some MPAs that they are included here. Enter the estimated number of rentals per year, and the average price of a rental. If this information is not collected by the MPA, it can be estimated by asking operators the average number of rentals per week, in the high and low seasons. Also ask operators what percent of customers rent boats for 1 hour, 2 hours, or some other length of trip.

Since boats are often rented by the hour, the average rental price entered here should take the average trip length into account. Example: In one MPA, the average kayak rentals cost \$5 per hour. Fifty percent of people rent kayaks for 1 hour and fifty percent rent them for 2 hours. The average rental price (or “trip price”) is \$7.50.

As for the diving and snorkeling sections above, estimate the percent of kayak rentals that are sold through all-inclusive resorts.

### **Coralline Beach Use**

White sand beaches are a major tourism draw for some MPAs. Coral reefs are important not only as a source of sand, but also for their role in reducing wave energy, protecting beaches and creating calm waters desirable for swimming. MPA beaches may be quieter, cleaner, and less crowded than public or hotel beaches outside of a protected area; if they are sheltered by the nearby reef, they may have calm water good for swimming. In some reserves, visitors can walk to the beach on their own, and no additional fee is charged beyond the park entrance fee. In that case, the number of visitors can be entered in this section, but no additional revenues should be counted due to beach use. It is nevertheless important to note if this is a major source of the MPA’s popularity.

If there are additional revenue streams attached to beach use, such as a beach fee or boat operators that offer trips to the beach, these can be entered here. (**Note:** Be sure to check whether tour operators include the beach fee in their trip price, to avoid double-counting fee revenues.)

## **5. Other Spending**

This methodology counts all expenditures (including food, transportation, etc.) on the day that a person visits a Marine Protected Area as “MPA-associated.” There are several ways to estimate daily

expenditures by MPA visitors. If time and resources permit, the best option would be to coordinate with local hotels or the local tourism bureau - or use a volunteer - to administer a basic questionnaire, asking tourists a) if they have visited or plan to visit the MPA, and b) what their average daily expenditures are, per person. If you would like to be even more specific, the survey can ask visitors to estimate their expenditures on a day they visited the MPA. Be sure to have them include accommodation in the total spending estimate, as the template assumes this is included and subtracts it out. Enter average daily spending from the survey results into the field provided.

If a survey-based approach is not realistic, another option is to look at national statistics on visitor expenditures. The Tourist Board, Tourism Ministry, or a national statistics office often publishes an estimate of average daily expenditures by tourists. It may be necessary to adjust the national average up or down if prices in the area near the MPA are very different from the national average.

Spending on food and other items is assumed to be included in the room rates for all-inclusive hotels, so this section asks for an estimate of the number of overnight visitors staying *outside* all-inclusive hotels. If you have separated out all-inclusive from regular hotels in the accommodation section, enter the number of visitors staying at regular hotels here. Otherwise, estimate the percentage of overnight visitors that stay in regular hotels, multiply total hotel visitors by that number, and enter the result here. Since a tourist's daily expenditures will include any taxes on goods and services purchased, the template asks for the sales tax rate, and uses this information to subtract taxes from the estimate of other spending. Taxes will be counted separately, along with other tax revenues.

On the calculations page, the template will calculate total daily spending by overnight tourists staying in non-all-inclusive hotels, and then subtract spending on accommodation and reef recreation from the sections above.<sup>8</sup> If this produces a negative number, it probably means that the figure used for average daily expenditures is low. For instance, if national numbers were used to estimate daily spending, average tourist expenditures for the country may be lower than average spending on MPA-associated days - this is often true if there are a lot of expensive activities associated with the MPA (such as diving), or if hotels in the area are more expensive than average. Utilize available information and expert opinion to produce an appropriate estimate of daily spending by MPA visitors in the area.

## 6. Multipliers

In addition to direct revenues stemming from the tourism sector, there are multiplier effects on the wider economy from spending by MPA-associated tourists. For example, food purchased by visitors may be sourced from local farmers; fuel used for transportation is purchased from local fuel distributors, etc. These secondary industries benefit indirectly from tourist spending on MPA-associated days. Indirect impacts are difficult to estimate accurately, and are an optional element of the analysis.

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<sup>8</sup> Revenues from reef recreation are weighted by: **hotel visitors / (hotel visitors + cruise visitors)**. This assumes that only people coming from cruise ships or staying in hotels are buying reef recreation trips from operators on the mainland (most liveaboards and yachts include dive and snorkel prices in a pre-paid package). If this assumption does not apply to the study site, users will have to change this formula on the calculations page.

The most common way to estimate the magnitude of indirect or secondary impacts is to use a multiplier. A multiplier of 1.6, for example, represents 60 cents of additional impact for every \$1 in direct tourist expenditure. The size of the multiplier is influenced by the portion of goods and services required by tourism operators that is produced domestically, such as linen, beverages, food, dive equipment, construction materials, etc. Research will be required to see whether a tourism multiplier is available for the country in which you are working.

## Worksheet 3: MPA-associated Fisheries

The commercial fisheries worksheet calculates gross revenues from two components of the commercial fisheries sector: fish production (catch and sale) and fish processing. It does not examine costs and benefits to individual fishermen; rather, it assesses the economic impact of the industry on the wider economy. Fish sales are divided into local and export sales, and average prices for both categories should be collected over the course of a year, if possible. This worksheet is a very basic summary template, and assumes that information on annual fish catch has been collected or estimated beforehand. See **Annual MPA Catch and Distribution**, below, for a further discussion on producing catch estimates.

### 1. Basic Information

Fields for the name of the Marine Protected Area and date of the study are included at the top of each worksheet, to allow users the flexibility of sharing each sheet separately.

#### Currency

Select the currency that is most useful for collecting data on revenues in the fisheries sector. The template requires that all price data in a worksheet be converted into a single currency—be sure to do this as you enter information into each field. Both current and historic exchange rates are available online at sites such as *oanda.com*. For reference, and also so that the template can convert final numbers to a single currency, enter the appropriate exchange rate into the field provided.

**Note:** *If you choose to use US dollars, enter a 1 for exchange rate.*

#### Background Information

This section provides fields for basic information on the population of fishermen utilizing the reserve. It is important to have a good idea of the number of fishermen as well as how many are part-time, full-time or seasonal users. This information can be used to estimate total catch if catch data are available for only a sub-sample of the fishing population (see below for more information).

### 2. Annual Gross Revenue from MPA-Associated Fisheries

#### Annual MPA Catch and Sales Distribution

In this section, enter total annual catch for the MPA by major fish type. A typical breakdown into lobster, conch, and finfish is provided in the existing cells, but you may choose to change these fish

types. The template currently calculates revenues for only four major types of catch. This was intended to keep the analysis simple, and reflects the fact that finfish are often grouped together and sold for similar prices. If there is demand for greater flexibility, this element may change in future versions of the template.

This table simply summarizes existing information; it assumes that information on annual fish catch is collected by the MPA or fisheries department or has been estimated separately by the user. Depending on the source and method of data collection, it may be preferable to average annual catch over a multi-year period—up to five years—to smooth some of the gaps and errors in data.

The national-level Fisheries Valuation Tool available on the WRI website (<http://www.wri.org/project/valuation-caribbean-reefs>) provides three different methods for estimating fish catch: (1) by landings; (2) by fisherman (catch per unit effort); or (3) by the extent and productivity of the reef. Although it was designed for a national-level analysis, it is possible to fill in basic site information and use these sections of the tool to calculate MPA-associated catch. Download the *Fisheries Tool* and *User's Manual* for full detail on how to use the tool to estimate catch using these approaches.

After entering annual catch in pounds,<sup>9</sup> the template asks users to break down where catch is sold over the course of a year (local sales, export sales, and subsistence use). Previous studies of the fishing industry or interviews with fishermen will be needed to estimate this distribution. If subsistence fishing is not a significant factor for fishermen using the MPA, this column can be left blank.

### **Fish Sale Prices (Before Processing)**

In this section, enter sale price by fish type, averaged over the course of the year. Sales are broken down into export sales, local sales (to markets, restaurants, and other local buyers), and fish kept for personal consumption (subsistence). Average export prices may be available from the major distributors—in Belize, the Fishermen's Co-ops—or from the Fisheries Department or a national statistics office. This table is only for recording the price of fish **before cleaning and processing**. If the value added from cleaning and processing is already included in a sale price, record it in the “Sale Prices After Processing” section below. Information on average sale prices in the local area can be collected at local markets, averaged over several seasons of the year if possible. To estimate the value of subsistence fishing, a conservative estimate would be to use 50 percent of the local sale price, reflecting the fact that in many places, fishermen keep lower quality fish for consumption. It is worth interviewing local fishermen to assess whether this is the case for the study site.

### **Fish Processing**

Estimating the value added from fish processing is complicated slightly by the “top-down” approach used in this template (i.e. we look at the final sale price of fish to estimate economic impact). As a result, it is important to use the processing table to record:

- a) local and export sale prices of processed fish; and

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<sup>9</sup> If a different unit of measure is more appropriate, this can be changed. Be sure to change the unit each time it appears in the template (several times on the fisheries worksheet and once on the calculations worksheet).

b) the percent of sales represented by processed fish.

For example, in Belize, 100% of lobster exports are processed at the Fishermen's Co-ops. In the previous table, \$0 is entered for the export sale price before processing, because this type of sale does not exist. The export price after processing (\$19.39) is entered in this table, and 100% into the "percent processed" field.

### **Additional Catch:**

If applicable, use this section to estimate the amount of fish caught in the MPA by non-residents of the country, and then sold in a neighboring country. This is typically a problem for MPAs that are near national boundaries, and represents a challenge for enforcement and engagement with fishermen. Since these fish sales do not contribute to the national economy of the MPA host-country, they are not counted here. However, this field allows users to estimate "leakage" (as a percent of total catch) and can be used to highlight the existence of an additional source of fishing pressure.

### **3. Taxes**

In this section, record the sales tax rate applied to local and export sales (if it is the same for both, enter the same rate in both fields). If taxes are already included in the prices given in the sections above, put a 100 in the next field; if they have not been included and need to be added on top of the prices listed above, enter a zero. As was done in the Tourism worksheet, the template will either subtract or add taxes onto total fish revenues, as appropriate.

### **4. Indirect Impacts**

For the time being, the MPA Economic Impact Template does not include a section for indirect impacts from the fisheries sector. For most Caribbean countries, the multiplier effects (see *Multipliers* in the Tourism section, above) from MPA-associated fisheries tend to be extremely small. In addition, it can be very difficult to find the appropriate multiplier to use for the fisheries industry, making it difficult to accurately assess the impact of this sector.

## **Calculations and Summary Sheets**

The Calculations page draws information from the data-entry worksheets to calculate total revenues and economic impact from MPA-associated fisheries and tourism. To the extent possible, we have made the formulas transparent, so that it is possible to see where the data are coming from and how they are added together. The template uses named cells to draw information from General Information, Tourism, and Fisheries worksheets. Cell names on these three sheets can be found by selecting a cell and looking in the upper left hand corner of the screen. The Summary sheet pulls together a smaller summary of information on revenues and economic impacts to a single page format.

<b>Summary: Estimated Economic Impact from MPA-associated Tourism and Fisheries per Year</b>		
Number of recorded visitors to the MPA	-	
Estimated "true" visitation to the MPA	-	
Current annual spending on MPA management	\$ -	
Aspirational spending level	\$ -	
	<b>Low Estimate</b>	<b>High Estimate</b>
<b>Accommodation</b>	-	-
Total revenue from MPA-associated accommodation	\$ -	\$ -
Taxes and service charges	\$ -	\$ -
Tax revenue from cruise visitors	\$ -	\$ -
<b>Reef Recreation</b>		
Revenue from diving	\$ -	\$ -
Revenue from snorkeling	\$ -	\$ -
Revenue from sport fishing	\$ -	\$ -
Revenue from boat rentals	\$ -	\$ -
Revenue from beaches	\$ -	\$ -
Total taxes from MPA-associated reef recreation	\$ -	\$ -
<b>Other Tourist Spending</b>		
Other tourist spending on MPA-associated days	\$ -	\$ -
Taxes associated with other spending	\$ -	\$ -
<b>MPA-associated tourism totals</b>		
Revenue from MPA fees	\$ -	\$ -
Total MPA-Associated Tourism Revenue	\$ -	\$ -
Total Taxes & fees (including MPA fee)	\$ -	\$ -
<b>Direct Economic Impact of MPA Tourism</b>	<b>\$ -</b>	<b>\$ -</b>
Indirect Economic Impact of MPA Tourism	\$ -	\$ -
<b>Total (dir + ind) Economic Impact of MPA Tourism</b>	<b>\$ -</b>	<b>\$ -</b>
<b>MPA-Associated Fisheries</b>	<b>USD</b>	<b>USD</b>
Total catch inside the MPA (lbs / yr)		
lobster	\$ -	\$ -
conch	\$ -	\$ -
finfish	\$ -	\$ -
other	\$ -	\$ -
Total MPA-Associated Fisheries Revenue		
lobster	\$ -	\$ -
conch	\$ -	\$ -
finfish	\$ -	\$ -
other	\$ -	\$ -
TOTAL	\$ -	\$ -
Total export revenue minus taxes	\$ -	\$ -
Tax revenue from export fish sales	\$ -	\$ -
Total local sale revenue minus taxes	\$ -	\$ -
Tax revenue from local fish sales	\$ -	\$ -
Subsistence revenue	\$ -	\$ -
<b>MPA-associated fisheries totals</b>		
<b>Direct Economic Impact MPA Fisheries</b>	<b>\$ -</b>	<b>\$ -</b>
<b>Tourism and Fisheries Totals</b>		
<b>Direct Economic Impact MPA Fisheries and Tourism</b>	<b>\$ -</b>	<b>\$ -</b>
<b>Total (dir + indir) Impact MPA Fisheries and Tourism</b>	<b>\$ -</b>	<b>\$ -</b>