

DATE OF RECEIPT:

## PROJECT/PROGRAMME PROPOSAL

### PART I: PROJECT/PROGRAMME INFORMATION

PROJECT/PROGRAMME CATEGORY:	REGULAR PROJECT
COUNTRY/IES:	<b>BELIZE</b>
SECTOR/S:	
TITLE OF PROJECT/PROGRAMME:	<b>BELIZE MARINE CONSERVATION AND CLIMATE ADAPTATION PROJECT</b>
TYPE OF IMPLEMENTING ENTITY:	<b>MULTILATERAL IMPLEMENTING ENTITY</b>
IMPLEMENTING ENTITY:	<b>THE WORLD BANK</b>
EXECUTING ENTITY/IES:	<b>PROTECTED AREAS CONSERVATION TRUST</b>
AMOUNT OF FINANCING REQUESTED:	<b>\$6 MILLION (in U.S Dollars Equivalent)</b>

### PROJECT / PROGRAMME BACKGROUND AND CONTEXT:

#### **Global and regional climate change impacts**

1. Belize is a small, upper-middle income country with a population of 310,000 and a per-capita GDP of US\$4,115 (2009). It is situated on the Caribbean coast of Central America with Mexico to the north and Guatemala to the west and south. It lies between 15°45' and 18°30' north latitude and 87°30' and 89°15' west longitude. Total national territory covers 46,620 km<sup>2</sup>, which includes 22,960 km<sup>2</sup> (8,867 miles<sup>2</sup>) of land and 1,060 cayes. Many of these cayes are located along the barrier reef shelf, while the country's three atolls—the Turneffe Islands, Lighthouse Reef, and Glover's Reef—rest beyond the protective shelter of the barrier reef. Belize has a typically moist tropical climate. In accordance with the United Nations Framework Convention on Climate Change (UNFCCC), Belize chose the year 1994 for its first National Inventory of Sources and Sinks of Greenhouse Gases. The results of the Inventory reveal that Belize is a net sink for greenhouse gases, i.e., it absorbs more than it emits<sup>1</sup>. A second National Inventory using base years for 1997 and 2000 and carried out in 2009 reveal similar findings<sup>2</sup>. Yet, Belize is extremely vulnerable to adverse impacts of climate change. Therefore, the national objective is focused on identifying feasible adaptation options to address climate change. Through its membership in the Caribbean Community (CARICOM), Belize is a partner

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<sup>1</sup>Belize First National Communication to the Conference of the Parties of the United Nations Framework Convention on Climate Change 2002

<sup>2</sup>Belize Greenhouse Gases Inventory of Emissions and Sinks 1997 and 2000. Enabling activities for the preparation of the 2<sup>nd</sup> National Communication to the UNFCCC. GEF/UNDP

in the Alliance of Small Island States (AOSIS). Its UNFCCC negotiating position is therefore coordinated within this body. Belize is also a member of the Central American Commission on Environment and Development (CCAD). It attempts to reconcile the negotiating positions of these two groups into a larger unified voice to achieve the objectives of the Convention.

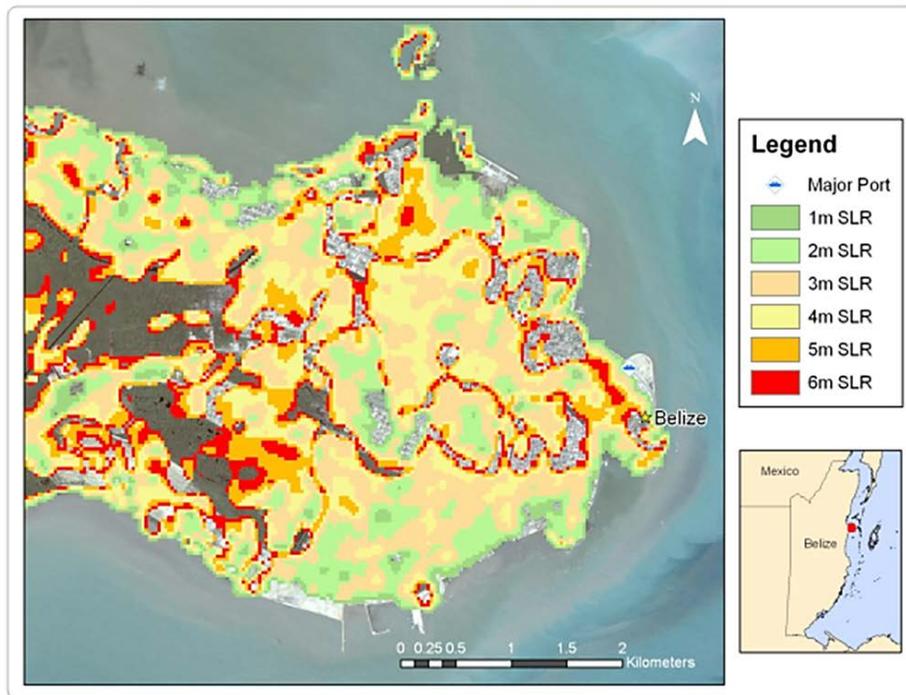
2. Global climate change remains arguably the most serious challenge to the development aspirations of the CARICOM countries. Observational data for the Caribbean already indicates an approximate increase in sea surface temperature of about 0.6°C above the global mean temperature in the 20th century. At the same time, mean sea level rose over the past century between 2 and 6 mm/year. In addition, rainfall variability that appears to be closely related to the El Niño Southern Oscillation (ENSO) has increased<sup>3</sup>. Due to these changes that have already taken place, climate change related events have started profoundly impacting the region's geophysical, biological and socio-economic systems and depleting national budgets. It is well-established that the countries of the Caribbean are among the most vulnerable to global climate change (IPCC, 2007). While the severity of the impacts will vary from country to country, there is a suite of priority concerns directly linked to climate change that is virtually ubiquitous across the region. Sea level rise (SLR) will combine a number of factors resulting in accelerated coastal erosion, increased flood risk and in some areas permanent loss of land. This may be exacerbated further by increases in the destructiveness of tropical storms, the impacts of which will be greater due to sea-level rise even without increases in storm intensity. The impacts of sea-level rise will be further exacerbated by the loss of protective coastal systems such as coral reefs. The Caribbean has experienced widespread coral loss in recent decades due to a variety of interacting factors including bleaching, which has become more frequent due to higher ocean surface temperatures, a trend which will continue into the future as a result of climate change (Gardner et al., 2003, 2005). Loss of coral will also affect livelihoods, for example those dependent on tourism and fisheries. Sea-level rise will also be associated with saline intrusion into coastal aquifers, affecting the availability of freshwater, which will combine with drought to increase water stress. The IPCC projections indicate a reduction in precipitation across most of the Caribbean throughout the year, with the largest reductions occurring in the boreal summer (Christensen et al., 2007). Hurricane intensity may increase as a result of anthropogenic climate change, although there is uncertainty about the future behavior of hurricanes and tropical storms in general (Vecchi et al., 2008). Belize, like most of the countries in the Caribbean, is also low-lying, with some coastal areas below mean sea-level. In all countries a high percentage of the population and much critical infrastructure are located along the coast<sup>4</sup>. These factors will be exacerbated by the projected adverse effects of climate change.

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<sup>3</sup>Intergovernmental Panel on Climate Change (IPCC 2007), "Fourth Assessment Report, Climate Change 2007: Synthesis Report, An Assessment of the Intergovernmental Panel on Climate Change

<sup>4</sup>See the First National Communication to the UNFCCC sub mitted by CARICOM countries.

**Figure 1: Vulnerability of Belize City to Combined SLR and Storm Surge<sup>5</sup>**



3. The United Nations Human Development Report (2008) and the State of the World Report (2009) of the World Watch Institute have identified a 2°C increase in the average global temperature as the threshold beyond which irreversible and dangerous climate change impacts become unavoidable. On the basis of the vulnerabilities of the marine and coastal ecosystems, this threshold for irreversible damage is probably even lower for the Caribbean region. While most nations and natural capital assets in the region are likely to be heavily impacted, Belize presents an early case of potential negative ecosystem-wide impacts on its coral reef induced by climate change-related damages that are further exacerbated by unsustainable uses of reef resources. Belize is a country with extensive, low-lying, coastal areas vulnerable to climate-related disasters through tropical cyclones and flooding. Furthermore, the economy is small and concentrated, along with most centers of population, in these very areas that are most vulnerable. Consequently, the UNFCCC recognizes Belize as one of those countries most vulnerable to the adverse impacts of climate change due to it: a) having a long, low-lying coastline, b) having over 1,060 small islands, c) having the second longest barrier reef in the world (and the largest reef in the Western Hemisphere and the Americas), and 17,276km<sup>2</sup> of forest cover, each of which support fragile ecosystems, and, d) being very prone to climate-related disasters, especially hurricanes. Hence the vulnerability of the country to the foreseeable adverse physical, environmental, and economic impacts of climate change indicates that priority attention must be

<sup>5</sup>Simpson, M.C., 1,2 Scott, D., 2,3 Harrison, M., 4 Silver, N., 5 O’Keeffe, E., 6 Sim, R., 3 Harrison, S., 4 Taylor, M., 7 Lizcano, G., 1 Rutt, M., 3 Stager, H., 2,3 Oldham, J., 3 Wilson, M., 7 New, M., 1 Clarke, J., 2 Day, O.J., 2 Fields, N., 2 Georges, J., 2 Waithe, R., 2 McSharry, P. 1 (2010) Quantification and Magnitude of Losses and Damages Resulting from the Impacts of Climate Change: Modelling the Transformational Impacts and Costs of Sea Level Rise in the Caribbean (Summary Document), United Nations Development Programme (UNDP), Barbados, West Indies.

directed towards implementation of viable adaptation measures targeting the most vulnerable sectors and ecosystems.

4. Indeed recent climate trends and projections of future climate for Belize indicate that climate change will exert increasing pressure on the country<sup>6</sup>: a) **Temperature**: Mean annual temperature has increased by 0.45°C since 1960, an average rate of 0.10°C per decade. The average rate of increase is most rapid in the wet seasons (MJJ and ASO) at 0.14-0.15°C per decade and slower in the dry seasons (NDJ and FMA) at 0.08-0.09°C per decade. The frequency of particularly hot days and hot nights has increased significantly since 1960 in every season. The average number of ‘hot’ days per year in Belize has increased by 67 (an additional 18.3% of days) between 1960 and 2003. More importantly, the mean annual temperature is projected to increase by 0.8 to 2.9°C by the 2060s, and 1.3 to 4.6 degrees by the 2090s. The range of projections by the 2090s under any emissions scenario is 1.5-2°C; b) **Precipitation**: Mean annual rainfall over Belize has decreased at an average rate of 3.1mm per month per decade since 1960, but this trend is not statistically significant. Whilst all seasons appear to have shown decreasing precipitation trends since 1960, only FMA has a statistically significant trend. Projections of mean annual rainfall from different models are broadly consistent in indicating decreases in rainfall for Belize. Projections vary between -64% and +20% by the 2090s with ensemble median values of -11 to -22%; c) **Tropical cyclones**: Whilst evidence indicates that tropical cyclones are likely to become, on the whole, more intense under a warmer climate as a result of higher sea-surface temperatures, there is great uncertainty in changes in frequency, and changes to storm tracks and their interactions with other features of climate variability (such as the El Niño Southern Oscillation) which introduces uncertainty at the regional scale (Christensen *et al.*, 2007); and d) **Sea level rise**: The coastal lowlands in Belize are highly vulnerable to sea-level rise. Sea level in this region is projected by climate models to rise by the following levels by the 2090s, relative to 1980-1999 sea level: 0.18 to 0.43m under SRES B1, 0.21 to 0.53m under SRES A1B, and 0.23 to 0.56m under SRES A2.

### **Climate challenge to the Belize Barrier Reef**

5. Belize is remarkably diverse ecologically with substantial natural capital along its coast, represented by the largest coral barrier reef and associated ecosystem in the Americas<sup>7</sup>, as well as significant areas of mangroves, tropical forest and inland wetlands. The Belize Barrier Reef has been classified as one of the world’s marine hotspots with an abundance of globally and locally significant biodiversity<sup>8</sup>: it consists of six UNESCO World Heritage sites and is home to a variety of endemic species, many of them endangered and under some degree of protection, including sea turtles (green, loggerhead, leatherback, and hawksbill turtles), queen conch, West Indian manatee<sup>9</sup>, splendid toadfish, crocodiles (American and Morelet's), Nassau grouper, and black coral. Two of the most important reef-building coral species in the Caribbean – elkhorn (*Acropora palmata*) and staghorn (*Acropora cervicornis*) – are listed as critically endangered by

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<sup>6</sup>McSweeney, C., M. New & G. Lizcano. 2008. Belize: UNDP Climate Change Country Profile. University of Oxford, UK.

<sup>7</sup>A UNESCO world heritage site.

<sup>8</sup>The reef system is home to more than 66 stony coral species, 350 mollusk species and more than 500 fish species.

<sup>9</sup>The Barrier Reef is home to one of the world’s largest populations of manatees with an estimated population of 1,000 to 1,500.

the IUCN Red List of Threatened Species. Locally, the reef system provides livelihoods for communities and contributes to the national economy through fisheries and growing tourism revenues. It also shelters the coastal zones from intense tropical storms and high velocity winds that cause erosion and coastal damage. It has been estimated that the value of ecosystem services (fishing, tourism, shoreline protection) generated by the coral reefs and mangroves contributes between 15 and 22 percent of GDP in Belize.

6. **Belize derives very large benefits from the ecosystem services generated by the coral reefs and mangroves.** Approximately US\$60-78 million of Belize’s tourism revenue per year stems from the presence of healthy mangroves and mangroves contribute approximately US\$3 to \$4 million in fisheries value per year. Coral reef contributes up to US\$176 million for tourism and up to US\$14 million for fisheries. The Belize Barrier Reef and mangrove systems not only supports vibrant tourism and fishing industries, but also shelters Belize’s coast from high-velocity winds that cause erosion and coastal damage. According to the World Resources Institute (WRI 2009), about two-thirds of the mainland coast is protected by coral reefs.

**Table 1: Reef or Mangrove Protected Shoreline for Belize**

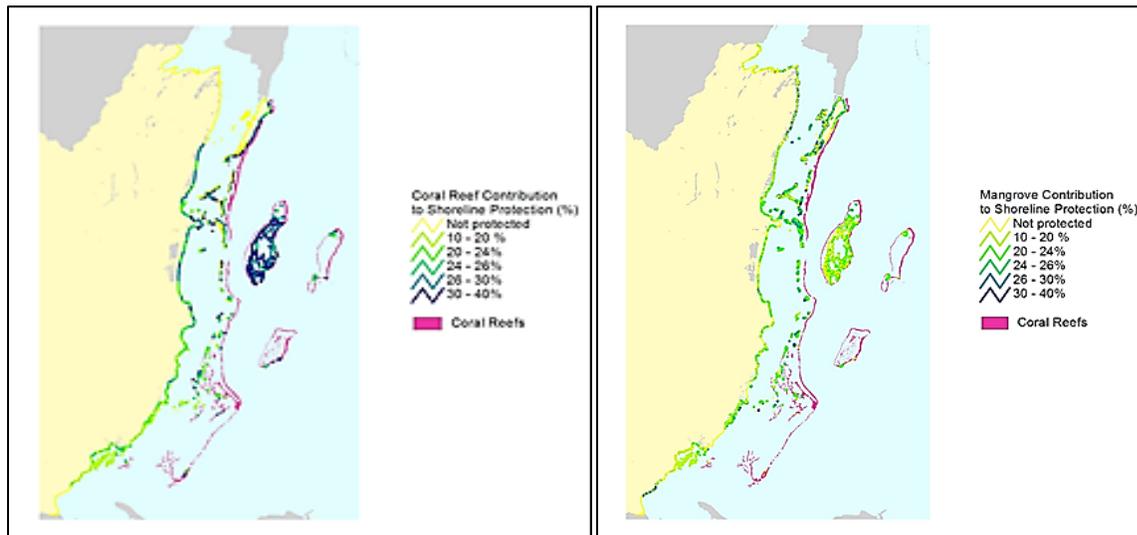
Location	Coastline length (km)	Reef-protected coast (km)	Percent protected	mangrove-protected coast (km)	Percent protected	Reef and mangrove-protected coast (km)	Percent protected
<b>Mainland</b>	<b>518</b>	<b>342</b>	<b>66%</b>	<b>260</b>	<b>50%</b>	<b>189</b>	<b>37%</b>
Offshore	1,288	928	72%	972	75%	690	54%
Total	1,805	1,270	70%	1,232	68%	879	49%

*Study focused on vulnerable land within 1 km of the coast, and on mangroves within the same 1 km coastal buffer.*

Source: Cooper E, Burke L, and Bood N. (2009) “Coastal Capital: Belize. The economic contribution of Belize’s coral reefs and mangroves.” WRI working Paper. World Resources Institute, Washington, DC. 53p .

7. Where reefs protect the shoreline, they can contribute between 12 and 39% of the shoreline stability. Where mangroves are present, they contribute between 10 and 32% of shoreline stability. The degree of protection varies with reef type, depth and distance from shore, as well as with the elevation and slope of the shore, the geological origin of the area, and the wave energy along the coast. Emergent reefs, such as the Barrier Reef, can mitigate over three-quarters of wave energy. Reefs close to shore provide the most protection, because waves have less chance to regenerate. The reef off Ambergris Caye, for example, contributes about 40 percent of the coast’s stability due to its close proximity to the shore. The atolls and Barrier Reef, although further offshore, also contribute to the protection of the cayes and mainland coast. Mangroves protect the immediately adjacent shoreline and mitigate the force of both the waves and the storm surge, protecting 50 percent of the mainland’s coastline and 75 percent of the cayes’ shoreline.

**Figure 2: Share of protection attributed to Reefs or Mangroves for each segment of shoreline**

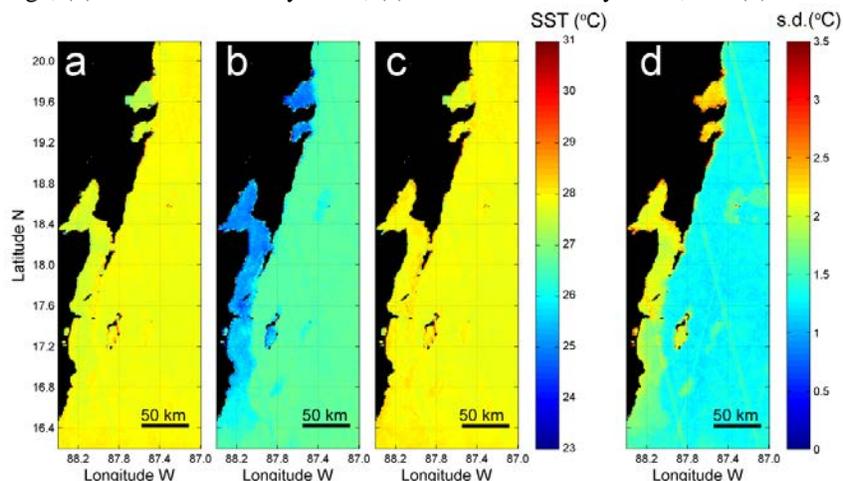


Source: Cooper E, Burke L, and Bood N. (2009) "Coastal Capital: Belize. The economic contribution of Belize's coral reefs and mangroves." WRI working Paper. World Resources Institute, Washington, DC. 53p .

8. **Belize is highly vulnerable to natural hazards and climate change.** Belize's long low-lying coastal areas are especially vulnerable to more intense and frequent tropical storms and hurricanes, flood damage, and rising sea levels. Like the rest of the Caribbean, Belize has experienced frequent natural disasters of catastrophic proportions, and most recently suffered the impact of a Category 1 hurricane (Richard in October 2010) and widespread flooding in 2008. Tropical Storm Arthur (May 2008) caused extensive damage to infrastructure and the agriculture sector. Hurricanes Keith (2000) and Iris (2001) struck Belize each causing damages reaching 45% and 25% of GDP, respectively. In 1961, Hurricane Hattie destroyed Belize City and prompted the Government to build a new administrative capital 50 miles inland in Belmopan. Beyond economic and social losses, climate-related natural disasters have contributed to large fiscal deficits and debt accumulations that required Belize to restructure its public debt in 2007. These severe budget constraints, in turn, have limited Belize's ability to finance climate change adaptation and mitigation activities.

**Figure 3: Sea surface temperature patterns in Northern Belize**

(a) average, (b) minimum monthly mean, (c) maximum monthly mean, and (d) standard deviation



Source: P. J. Mumby, *et al.*, Marine Spatial Ecology Laboratory at the University of Exeter (UK)

9. Of the ecosystems in Belize, the barrier reef is assessed as being highly vulnerable and identified as a “Critical Area for Conservation: [with] high species richness and potentially severe climate-induced destabilization.”<sup>10</sup> Several indicators attest to this: severe coral mortality induced by warmer sea surface temperatures (Fig. 1) and increasing ocean acidification; reduction of coral cover; and reduction in fisheries annual catch.<sup>11</sup> While some of these indicators respond to local stressors (e.g., sedimentation, nutrient pollution from agrochemicals, overfishing, etc.), they are all exacerbated by the consequences of global warming. Gradual and consistent increases in sea surface temperatures have yielded increasingly frequent bleaching events (1993, 1998, 2003, 2005, 2008, 2009, and 2010), which cause wide-scale bleaching throughout the Caribbean Region. Recovery from such large scale coral mortality will depend on the extent to which coral reef health has been compromised and the frequency and severity of subsequent stresses to the system. More than one bleaching event over a short timeframe can be devastating (Christensen *et al.* 2007).

10. A recent analysis indicates that high sea surface temperature anomalies will have significant impacts on the coral reefs in the Caribbean especially if no significant large-scale adaptation measures are undertaken.<sup>12</sup> Figure 2 summarizes the results of this analysis that simulates the response of coral reefs in the Caribbean to continuous increases in sea surface temperature (SST), as anticipated under the A1B emission trajectory of the Inter-governmental Panel on Climate Change (IPCC). Optimal water temperatures for Caribbean corals range from 25 to 29°C, with a few important exceptions. A few individual corals of many species are able to tolerate higher temperatures for a few days or weeks, depending on the magnitude of the

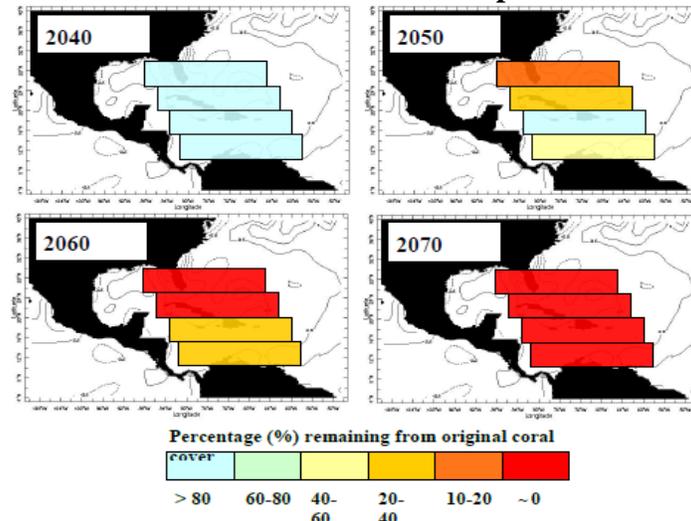
<sup>10</sup>From CATHALAC/USAID study of regional biodiversity and climate change, 2008.

<sup>11</sup>It is estimated that between 60 to 70 endemic species of corals in the Caribbean are endangered.

<sup>12</sup>Vergara *et al.*, “The Potential Consequences of Climate-induced Coral Loss in the Caribbean by 2050-2080”, *Assessing the Potential Consequences of Climate Destabilization in America*, LCR Sustainable Development Working Paper No. 32, World Bank, January 2009.

temperature elevation. There is strong evidence that corals have the ability to adapt to higher temperatures if given enough time and removed from other types of chronic stress (e.g., over-fishing, pollution, rapid coastal development, etc.). Therefore, adaptation measures for coral reefs must include broader management measures such as controlling overfishing and associated ecological imbalances through the establishment of no-take marine reserves, as well as controlling land-based threats to reefs.

**Figure 4. Evolution of relative coral covers over time for the four different latitudes under the A1B scenario with 2°C temperature sensitivity**



Source: Vergara, W. *et al*, 2009. Subjacent map obtained from [www.portal.iri.columbia.edu](http://www.portal.iri.columbia.edu).

11. The anticipated intensification and an increase in the frequency of hurricanes threaten the survival of coral reefs. The increase in major hurricanes is indicative of a broader increase in average tropical cyclone wind speeds as sea surface temperature rises, as well as a shift in the intensity distribution toward a greater number of Category 4 and 5 hurricanes. An analysis of the global tropical cyclone intensity data since 1970 indicates an average increase in intensity of 6 percent for a 0.6°C SST increase. High-resolution climate models indicate a 2 percent intensity increase when scaled for a 0.6°C SST increase, and potential intensity theory yields an increase between 2.7 percent and 5.3 percent.<sup>13</sup>

12. Hurricane events lead to disturbance and mortality of coral recruits by sediment scouring, direct mechanical breakage, and the removal of substratum. Post-hurricane events such as an ephemeral bloom of blue-green and filamentous green algae may also create further stress.<sup>14</sup> Hurricanes cause a devastating reduction in live coral cover when it coincides with a bleaching event. An observation reported that a mass-bleaching event coinciding with hurricane Mitch in 1998 resulted in a 48 percent reduction in live coral cover across the Belize reef system. The

<sup>13</sup>J. Curry *et al.*, “Potential Economic Impacts of Hurricanes in Mexico, Central America, and the Caribbean ca. 2020–2025”, *Assessing the Potential Consequences of in America*, LCR Sustainable Development Working Paper No. 32, World Bank, January 2009.

<sup>14</sup>Mumby, P. J., “Bleaching and hurricane disturbances to populations of coral recruits in Belize”, *Marine Ecology Progress Series*, Vol. 190, 27-35, December 1999.

corals showed signs of recovery in 1999 in fore-reef habitats of the outer barrier reef and offshore platforms. In contrast, coral populations on reefs in the central shelf lagoon died off catastrophically<sup>15</sup>.

13. Further reduction in the reef cover would weaken its ability to provide the associated local and global economic and environmental services. Specifically, in the wake of coral collapse, major impacts on fisheries, tourism, and coastal protection are anticipated, as well as severe loss of biodiversity in terms of species extinction and impacts on ecosystem integrity. Once the corals die, the reef structure breaks down with no easy way to regain the ecological goods and services of habitat, fisheries, tourism and storm protection.<sup>16</sup> The economic losses associated to 90 percent coral collapse in the Caribbean have been estimated at between 9 and 12 billion dollars per year (Vergara et al., 2009).

**Table 2: Value of annual losses of economic services of coral reefs (Lecon), in 2008 US\$ million**

	50% Corals in Caribbean are lost		90% Corals in Caribbean are lost	
	Low estimates	High estimates	Low estimates	High estimates
<b>Coastal protection</b>	438	1,376	788	2,476
<b>Tourism</b>	541	1,313	973	2,363
<b>Fisheries</b>	195	319	351	574
<b>Pharmaceutical uses</b>	3,651	3,651	6,571	6,571
<b>Total</b>	4,824	6,659	8,674	11,985

Source: Vergara et al, 2009, op.cit.

14. Warmer sea water threatens the coral reefs that attract thousands of tourists for snorkeling and scuba-diving activities. Loss in the percentage of coral cover with a concomitant loss in reef-related species of invertebrates and fishes will lead to a general decline in the attractiveness of reef sites used for snorkeling and scuba diving. Presently, the majority of tourism in Belize is marine-based, with approximately 70% of hotels located in the coastal zone. Over 60% of visitors are interested in visiting the cayes. Tourism accounts for over 15% of GDP, is the largest source of foreign exchange earnings, and generates significant employment. The economic impact of climate change on Belize’s tourism sector has been estimated at BZ\$48.3 million, which includes the effects of reduced tourism demand and the loss of facilities (from sea level rise), beaches (from coastal erosion) and reef-based ecotourism. Thus, any decline in marine tourism will have a direct effect on the economy of the country. With a loss in coral cover there will also be a related loss in biodiversity. Coral reefs are one of the most diverse systems on earth, and the reefs of Belize comprise some of the best in terms of general reef health and diversity in the Caribbean region.

15. Given Belize’s location and vulnerability to climate change, one effective way of adapting to climate change is through promotion of ecosystem-based adaptation measures that

15 Aronson, R.B. *et al.*, “The 1998 bleaching event and its aftermath on a coral reef in Belize”, *Marine Biology* (2002) 141: 435–447, DOI 10.1007/s00227-002-0842-5

16 Hoegh-Guldberg *et al.*, “Coral Reefs under Rapid Climate Change and Ocean Acidification”, *Science* 14 December 2007: 1737-1742.

strengthen the resilience of the reef and associated habitats. An effective approach to protect corals is by strengthening and improving the overall health of the ecosystems associated with the coral reef. A recent study shows that bleached corals recover to normal growth rates more quickly when they have clean water and plentiful sea life at their side. The researchers found that following a major bleaching event Mountainous star coral (*Montastraea faveolata*) on various reefs in Honduras and Belize was able to recover and grow normally within two to three years when the surrounding waters and reef were relatively healthy. In comparison, those corals living with excessive local impacts, such as pollution, were not able to fully recover after eight years<sup>17</sup>.

16. In addition to the adaptation benefits, there are direct co-benefits associated with ecosystem-based adaptation measures with regard to GHG emissions (i.e., climate change mitigation). While further work is needed to identify the magnitude of emissions from near-shore marine ecosystems such as seagrass beds, it is clear that improved management of these ecosystems would slow or reverse current loss of carbon sequestration capacity (Crooks *et al.*, 2011). Natural coastal habitats (marshes, mangroves, seagrasses, etc.) sequester and store large quantities of carbon in plants and the soils below them - termed “Blue Carbon”. Currently, greenhouse gas emissions that occur as a result of the management of such coastal and marine habitats are not being accounted for in international climate change mechanisms (e.g., UNFCCC, Kyoto, CDM, etc.) or in National Inventory Submissions. This represents a missed opportunity globally and for countries like Belize that are richly endowed with coastal and marine ecosystems of global importance. Over the past couple of years, scientific work has documented the carbon management potential of a number of coastal ecosystems: tidal saltmarshes, mangroves, seagrass meadows, kelp forests and coral reefs. The evidence shows that the carbon management potential of these selected marine ecosystems compares favorably with and, in some respects, may exceed the potential of carbon sinks on land. This potential can be effectively maintained and enhanced through management approaches such as marine protected areas, marine spatial planning, area-based fisheries management approaches, regulated coastal development, and ecosystem rehabilitation. Sustainable management of coastal wetlands and near-shore marine ecosystems offer a wide range of co-benefits, including shoreline protection, nutrient cycling, water quality maintenance, flood control, habitat for birds, other wildlife and harvestable resources such as fish. Together, these increase the resilience of coupled ecological and social systems to the impacts of climate change. Indeed, there are calls to identify conservation and management actions for coastal wetlands and near-shore marine ecosystems as components of developing countries’ Nationally Appropriate Mitigation Actions (NAMAs).

## ■ PROJECT / PROGRAMME OBJECTIVES:

17. The **objective** of the project is **to implement priority ecosystem-based marine conservation and climate adaptation measures to strengthen the climate resilience of the Belize Barrier Reef System**. Specifically, the project will support:

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<sup>17</sup>Carilli JE, Norris RD, Black BA, Walsh SM, McField M (2009) Local Stressors Reduce Coral Resilience to Bleaching. PLoS ONE 4(7): e6324. doi:10.1371/journal.pone.0006324.

1. Improvement of the reef's protection regime including an expansion and enforcement of the marine protected areas (MPAs) and replenishment zones in strategically selected locations to climate resilience;
2. Promotion of viable and sustainable alternative livelihoods for affected users of the reef; and
3. Raising awareness and disseminating information regarding the overall health of the reef ecosystem and the climate resilience of coral reefs.

18. The Marine Conservation and Climate Adaptation Project embodies a two-track approach which combines **ecosystem-based adaptation** with enabling policy and legal frameworks as an effective long-term approach to help strengthen the resilience of the reef system to the adverse effects of climate change. Indeed, reef scientists recommend not only a stabilization of CO<sub>2</sub> and other greenhouse gas concentrations, but also a slight reduction from the current level of 388 ppm (2010) to 350 ppm, if large-scale degradation of reefs is to be avoided. Attaining this challenging target will take time, and require immense global efforts. In the meantime, the best approach to adapt to climate change requires ecosystem-based approaches that strategically plan to enhance local-scale reef resilience through targeting critical areas, building networks of protected areas that include (and replicate) different parts of the reef system, as well as include areas critical for future reef replenishment. Such efforts may represent an opportunity to “buy time” for reefs, until global greenhouse gas emissions can be curbed. Thus, this Project would produce long-term economic, environmental, and social benefits by addressing the challenges posed by climate change on marine ecosystems and on the livelihoods of current and future generations in Belize.

19. **Investing in measures that protect and improve the ecological health of the natural ecosystems (such as the Belize Barrier Reef) is the best way to anticipate climate change while enhancing resilience to climate change impacts.** While globally there has previously been heavy emphasis on engineering approaches (e.g., dikes, storm shelters, building codes and storm resistant houses, drainage canals, sea walls, etc.) to adapting to climate change related hazards (such as hurricanes and storms), empirical evidence is showing that the importance of natural ecosystem buffers and their role in climate change adaptation may indeed be higher than initially thought. Such ecosystem-based adaptation measures have little or no risk of maladaptation and may in fact be more cost effective. For example, a very rigorous data-rich analysis by Saudamini Das (2007)<sup>18</sup> sought to answer three key questions: (a) do mangroves provide storm protection?; (b) how do they fare vis-à-vis the other approaches like early warning, storm shelters, dikes, sea walls, etc?; and, (c) is mangrove preservation an economically viable adaptation strategy to climate change? The analysis empirically established that mangroves were highly effective in reducing casualties during the 1999 Super Cyclone in Orissa - India, whether of humans, buffaloes or cattle. Indeed mangrove conservation was found to be effective against the wind and wave surges during climate-related hazards which are frequent in the area. Specifically, the analysis found that: (i) mangroves reduced human death, livestock loss and house damages during the T-7 Super Cyclone of October 1999; (ii) human death toll would have been nearly doubled in the absence of mangroves; and, (iii) annualized storm protection benefit

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<sup>18</sup>Saudamini Das (2007) Storm Protection by Mangroves in Orissa: An Analysis of the 1999 Super Cyclone. South Asian Network of Development and Environmental Economics Paper # 25-07.

of mangroves for reducing the damages was found to be higher than annual return from land hence justifying mangrove conservation as a viable adaptation strategy to climate change. In the proposed Project intervention area in Belize, the Barrier Reef shelters the coastal zones from intense tropical storms and high velocity winds that cause erosion and coastal damage. Furthermore, it has been estimated that the value of ecosystem services (fishing, tourism, storm and shoreline protection) generated by the coral reefs and mangroves contributes between 15 and 22 percent of GDP in Belize. This shows that investing in measures that protect marine ecosystems such as mangroves and coral reefs is indeed a viable and cost-effective adaptation strategy in the face of limited resources and increasing climate change impacts. (See Part II Section C)

20. **Reducing the fishing pressure by enforcing No-Take Zones and MPAs would immediately have a positive impact on the reef ecosystem, allowing it to maintain and strengthen its health to become resilient to climate change impacts.** One of the key local stressors to the reef is overfishing especially of big fish and sharks, which reduces fish populations and disrupts food webs on the reef. The most valuable catch for the fishers is spiny lobster (*Panulirusargus*) which is also important for the health of corals because it preys on coral predators such as snails and fire-worms. Elevated summer temperatures have been shown to strengthen coral pathogens while weakening the coral host, with optimum water temperatures for infectious agents being higher than the optimal temperatures for corals. Recent increases in the frequency and virulence of disease outbreaks on coral reefs suggest that the trend of increasing disease will continue to strengthen as global temperatures increase. Coral disease is an important aspect of climate change for coral reefs, and disease resistance in corals is an important aspect of adaptation, allowing adapted coral genotypes to survive over time. Overfished reefs tend to have overabundant *Stegastes* populations, and associated high disease rates. No-take areas tend to have fewer of these disease-spreading fish, likely because of greater abundance of *Stegastes* predators (e.g., groupers). This is yet another example of how no-take zones help coral reefs survive warmer waters and adapt to climate change. Lowering coral predator (e.g., coral eating fire-worm and snails) abundance should be possible through the implementation of no-take zones on reefs, which would then have higher levels of snail and fire worm predators (lobsters and triggerfish). Hence, the enforcement of no-take marine protected areas, as it results in better ecological balance, is considered an important climate change adaptation measure for coral reefs. The target areas would cover identified fish spawning sites, resilient coral reef sites that have survived/recovered from the bleaching events, and climate refugia to ensure the reef's capacity to recover from extreme climate events by providing a sufficiently large and resilient seed stock of critical biodiversity and sustain productivity in the long-term.

21. This Project would specifically **mainstream climate change adaptation into the on-going activities.** The adaptation measures to be implemented would complement on-going efforts by the Government of Belize and other funding sources aimed at marine protected areas (MPAs). While the on-going measures have been crucial in protecting this critical ecosystem, they have been lacking in programmatically mainstreaming specific climate adaptation into their activities. In line with the core principles of country-drivenness and country ownership, the proposed activities would specifically address the key adaptation measures identified in Belize's First and Second National Communications to the UNFCCC (See Section D). In particular the First and Second National Communications identify enforcement of conservation and sustainable use of marine and terrestrial ecosystems, establishment and management of protected areas,

inclusion of biodiversity conservation into sectoral adaptation strategies, and creation of alternative livelihoods away from coastal systems, as some of the climate adaptation measures that need to be urgently undertaken. The design and implementation of these activities is meant to enhance climate resilience and also address the anthropogenic stressors (specifically overfishing, uncontrolled coastal development and marine dredging, unsustainable tourism practices on the reef, etc.) impacting the reef ecosystem. (See Part II Section I for justification for funding)

22. The activities are carefully selected based on the concept that the best chance of enhancing the resilience (resistance and recovery potential) of natural systems to climate change impacts is to reduce local stressors which undermine the innate resilience to external shocks that is characteristic of healthy, robust ecosystems and to strengthen the coral reefs health and thermal resilience.

## ■ PROJECT / PROGRAMME COMPONENTS AND FINANCING:

23. Project components relate to the four main outcomes, and the outputs identified to achieve them. The outcomes deliver the project objective. Outputs represent deliverables produced by the activities. Details of outputs and activities and their rationale are provided in Part II, Section A, and the specific output budgets, summarized below, are explained in Part III, Section D: Results Framework.

PROJECT/ PROGRAMME COMPONENTS	EXPECTED OUTCOMES	EXPECTED CONCRETE OUTPUTS/INPUTS	AMOUNT (US\$)
1. Improving the protection regime of marine and coastal ecosystems.	A. MPAs and replenishment zones expanded and secured;	1.1. Realignment and expansion of replenishment zones and management areas within selected MPAs (the Turneffe Atoll Marine Reserve , Corozal Bay Wildlife Sanctuary, and the South Water Caye Marine Reserve)	365,000
		1.2. Supporting the management of the selected MPAs including replenishment zones	350,550
		1.3. Re-population of coral reefs	400,000
	B. Coastal zones effectively managed	1.4. Strengthening the legal framework for the MPA network and the management of the coastal zone	884,450
<b>Sub-total Component 1:</b>			<b>2,000,000</b>
2. Support for viable and sustainable alternative livelihoods for affected users of the reef.	C. Livelihoods of affected users of the reef diversified;	2.1. Community Mobilization for Alternative Livelihoods	150,000
		2.2. Business planning for economic alternatives and diversification sub-projects	200,000
		2.3. Skills training	60,000
		2.4. Sub-grants mechanism for community-based business ventures	2,040,000

<b>Sub-total Component 2:</b>			<b>2,450,000</b>
3. Raising awareness, building local capacity, and disseminating information.	D. The value of marine conservation and impacts of climate change are understood by local people	3.1. A climate change knowledge, attitude and behavioral practice (KAP) survey	90,000
		3.2. A behavior change communication (BCC) campaign to develop climate resilience strategy among local communities	205,000
		3.3. Project information dissemination	75,000
		3.4. Inter-community learning forum	190,000
<b>Sub-total Component 3:</b>			<b>560,000</b>
6. Project/Programme Execution cost			0.52million
7. Total Project/Programme Cost			5.53 million
8. Project/programme Cycle Management Fee charged by the Implementing Entity			0.47million
<b>Amount of Financing Requested</b>			<b>6 million</b>

## ■ PROJECTED CALENDAR:

MILESTONES	EXPECTED DATES
Start of Project/Programme Implementation	December 15, 2014
Mid-term Review (if planned)	May 1, 2017
Project/Programme Closing	December 31, 2019
Terminal Evaluation	March 31, 2020

## ■ PART II: PROJECT / PROGRAMME JUSTIFICATION

*Describe the project / programme components, particularly focusing on the concrete adaptation activities of the project, and how these activities contribute to climate resilience. For the case of a programme, show how the combination of individual projects will contribute to the overall increase in resilience.*

**Component 1 – Improving the Protection Regime of Marine and Coastal Ecosystems (AF resources: \$2 million; in-kind contribution by the Government of Belize and NGOs: \$0.415 million)**

24. This component is aimed at programmatically mainstreaming specific climate change adaptation measures in the on-going efforts of the Government of Belize for the conservation of marine and coastal ecosystems. This would be achieved through: a) expanding and securing the marine protected areas (MPAs) and replenishment (no-take) zones in strategically selected locations to build climate resilience, and b) strengthening the legal framework for management of the MPAs and coastal zones.

25. The activities would include (a) realignment and expansion of MPAs and replenishment zones, (b) enhancement of the enforcement and monitoring of selected MPAs and no-take zones,

(c) re-population of coral reefs, (d) implementation of an Integrated Coastal Zone Management (ICZM) Plan, (e) implementation of the legal and institutional reforms for the MPA network, and (f) providing necessary training to implement these activities. These are aligned with the key components of successful MPA management repeated in various MPA effectiveness studies (e.g., Alder et al., 1994; Neis, 1995; Sumaila et al., 2000; Christie et al., 2009). These efforts are crucial to reduction in key local stressors to the reef, which is important for enhancing the ecosystem's functionality, resilience and capacity to adapt to climate induced changes. Such stressors include: (a) overfishing and harmful fishing practices (e.g., gill nets, spear gun fishing, unregulated fish traps); (b) unplanned coastal development and marine dredging which cause nutrient, sediment and other pollution, and also lead to loss of critical nursery habitats (especially mangroves and seagrass); and, (c) uncontrolled tourism expansion (e.g., cruise-ship industry, hotel construction) and associated unsustainable practices, pollution and pressures on the reef.

The major undertaking is expanding and securing Marine Protected Areas (MPA) from 13% to 20.2% (indicative) of the marine ecosystem habitats and Marine Replenishment No-Take Zones from approximately 2% to 3.1% (indicative)<sup>19</sup> as identified in the NPASP. The specific emphasis would be on the area surrounding Turneffe Atoll, Southwater Caye Marine Reserve, Corozal Bay Wildlife Sanctuary and Estuary Lagoon Systems. (See Map 1 and more in Annex 1.) The selection of the three MPAs to be targeted by the project is based on the Government's on-going protected areas (PA) rationalization exercise, which aims to provide recommendations for "building on the current network of protected areas, improving functionality, connectivity and socio-economic benefit as Belize moves into a future with increasing anthropogenic pressures, overshadowed by the need to adapt to current and predicted climate change impacts."<sup>20</sup> These three MPAs are critical in terms of the integrity and connectivity of marine ecosystem and climate impacts. Relative shoreline stability is high in areas with mangroves and coral reefs close to the shore and in areas well protected by multiple lines of defense, such as in Turneffe Atoll and South Water Caye. By preserving the reefs in these areas would contribute to the stability of at least 200km of the mainland coastline. And the reefs in these areas are estimated to contribute to 24 – 40% of the shoreline stability. Mangroves are also vitally important to the stability of the shoreline of mainland and cayes throughout Belize. Figure 2 indicates that the coastline of Corozal Bay is highly stabilized by the presence of mangroves (24 – 40%).<sup>21</sup> Warmer waters and more frequent thermal anomalies have been observed especially in areas of slow flow, as in the South Water Caye area, and in shallow and sheltered regions on the internal side of Corozal Bay and Turneffe lagoons. Also, the Turneffe Atoll area serves as a major source of coral larvae. Transport of coral larvae is driven by the general pattern of currents in the area, with most of the connections between pairs of reefs running parallel to the coastline. The west to southwest area of Turneffe towards Southwater Caye represents the highest number of connections. (P. Mumby et al, 2009). In addition, the benefits of storm protection and damages avoided by safeguarding these areas are substantial. The target areas, especially Turneffe, harbor significant mangroves, littoral forests, and lagoon systems which are underrepresented in the current system. Based on a

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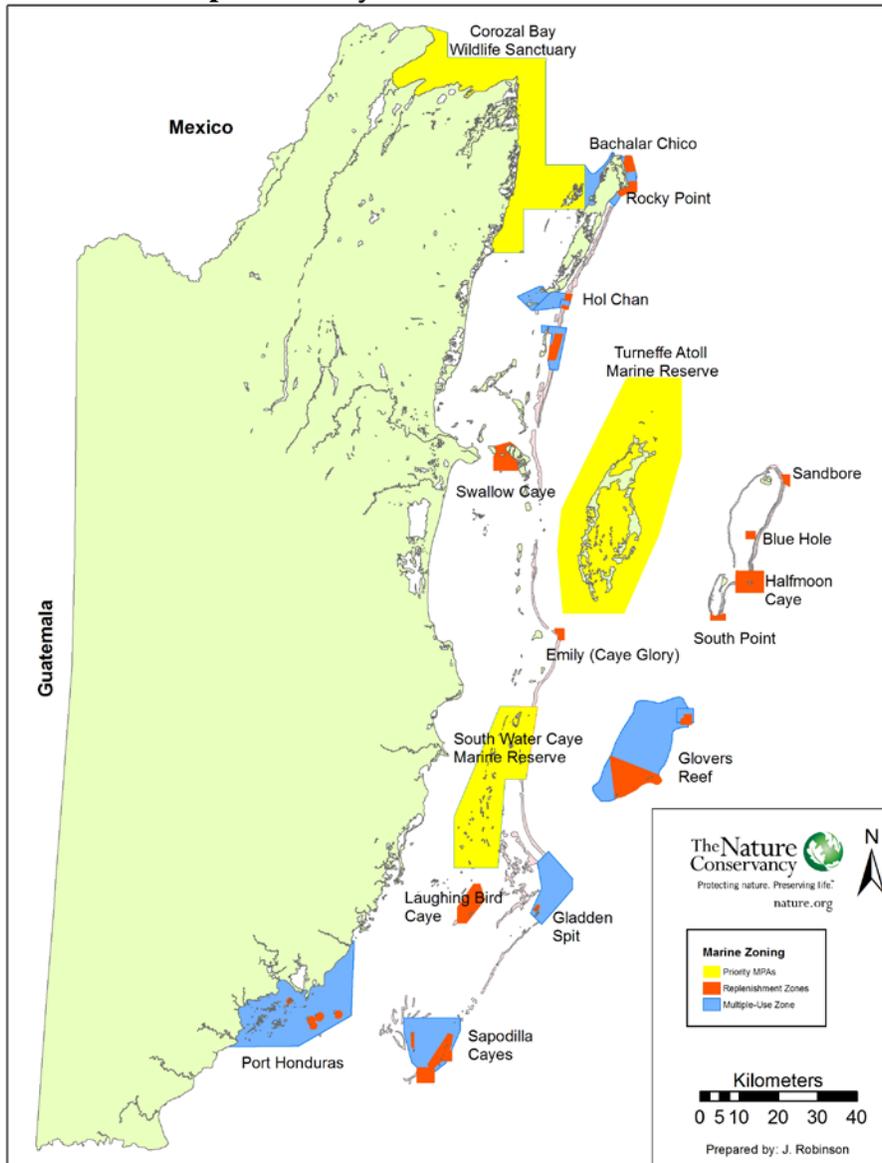
<sup>19</sup>The percentage represents the proposed areas surrounding Turneffe based on discussions with the local stakeholders. See Map 2.

<sup>20</sup>Source: Rationalization Exercise of the Belize National Protected Areas System (Draft) (Wildtracks, August 2012)

<sup>21</sup>Cooper E, Burke L, and Bood N. (2009) "Coastal Capital: Belize. The economic contribution of Belize's coral reefs and mangroves." WRI working Paper. World Resources Institute, Washington, DC. 53p .

25 year major storm event, the annualized value of storm protection and damages avoided by Turneffe Atoll is US\$38 million (A. Fedler, 2011). Furthermore, by including the identified fish spawning sites, resilient coral reef sites and climate refugia, climate-resilient stocks are secured within these sites. The Turneffe area includes at least 3 identified spawning aggregations which would be buffered by the marine reserve and significant reef flats which are key habitats for the valued catch and release species – bone fish, tarpon and permit. These sites would thus ensure the reef’s capacity to recover from extreme climate events by providing a sufficiently large and resilient seed stock of critical biodiversity (such as fish and coral) to restock the reef and sustain productivity in the long-term.

**Map 1. Priority Marine Protected Areas**



**Outcome A: MPAs and replenishment zones expanded and secured in strategically selected locations.**

26. The proposed activities include:

**1.1. Realignment and expansion of management areas and replenishment zones within selected MPAs - Turneffe Atoll Marine Reserve, Corozal Bay Wildlife Sanctuary, and the South Water Caye Marine Reserve).** Turneffe Atoll was legally declared a marine reserve (November 2012) during the preparation of this Project. By its designation, Belize's MPA system has been expanded to about 20% of Belize's territorial sea. The Project will refine and demarcate the newly designated boundary. The Project will also support an expansion of the Corozal Bay Wildlife Sanctuary (CBWS) and realignment of fully-protected (non-extractive) zones for Turneffe Atoll Marine Reserve, South Water Caye Marine Reserve and Corozal Bay Wildlife Sanctuary to obtain a national increase of fully protected replenishment zones from an existing 2% to 3.1% of Belize's territorial sea. The project will achieve these through:

- a. Spatially mapping and analysing target MPAs for realignment and/or expansion: Geographic Information Systems (GIS) and remote sensing tools will be sourced and used to spatially map and analysed the targeted MPAs boundaries' expansion and realignment. Corozal Bay Wildlife Sanctuary (CBWS), in particular, will be re-mapped as recommended in the National Protected Areas Rationalization report to include part of the northern coastal lagoon system and saline savannah. The overall expansion or refinement process for the targeted MPAs will take into strong consideration the inclusion of such ecosystems as rapidly disappearing littoral forest and beach vegetation, some national cayes (particularly national cayes and inundated mangroves on Turneffe) that through research and monitoring have been found to exhibit crucial structural components that allow for quick recovery or resilience to climate disturbances (e.g., increased sea surface temperatures), and refugia-areas that experience less change than others. Protection of functional groups, keystone species, and representative habitats (e.g., coral reefs across depth gradient, mangroves, seagrass beds, lagoon systems, and fish spawning aggregation sites) will be prioritized. Major features will be highlighted that could promote the replenishment of fisheries and restoration of ecosystem balance.
- b. Verifying the spatial mapping via ground-truthing: Once drafted, the newly proposed expansion or realignment maps for the targeted MPAs will be ground-truthed to gather field data to test the accuracy of the maps. The ground-truth will aid verification of the image data (maps and remote sensing data) to real features on the ground.
- c. Preparation of revised zoning scheme maps for targeted MPAs based on ground-truth data: The collection of the ground-truth data for the targeted MPAs will be used to interpret, analyse and calibrate the newly proposed zoning maps for the respective MPAs. These maps will be used during consultations with communities and stakeholders to obtain their feedback.

d. Carrying out close consultations with communities and stakeholders to obtain feedback on the revised zoning: The project will carry out meetings and focus group discussions with communities and stakeholders (in particular fishermen) to share the new zoning scheme for the targeted MPAs and to resolve existing and potential conflicts with respect to the proposed management schemes. The approach will be strategic, inclusive (e.g., stakeholder involvement in decision-making processes), creative, and flexible to allow for addressing traditional uses of the areas, existing threats (inside and outside MPAs), and climate change stresses. In the case of Corozal Bay Wildlife Sanctuary (CBWS) which currently lacks a zoning scheme and has traditionally allowed fishing activities, consultations will be carried out to discuss a review of the CBWS classification to address zoning for extractive and non-extractive activities.

e. Compiling and incorporating feedback from consultations and baseline data into finalization of zoning maps for targeted MPAs: Information collected through consultations will be compiled and verified through literature review and independent investigations where possible, and utilized to aid finalization of the zoning maps.

f. Incorporating finalized zoning maps within management plans for target MPAs: The new maps reflecting the expansion or realignment for each of the targeted MPAs will be incorporated into existing management plans for the MPAs and the respective management plans will be adjusted textually to reflect the new zoning scheme. The legislation (Statutory Instruments) for each of the target MPAs will also be revised to adequately reflect the new boundaries.

g. Demarcation of target MPAs as per the new boundaries: The three target MPAs will be appropriately demarcated with buoys and signs to conspicuously depict the new boundaries. Achieving adherence to the new zoning will not happen unless stakeholders can understand the benefits of them and are made part of the process in delineating the expanded or realigned MPA boundaries. The process to involve affected stakeholders will be further addressed in Component 2 and 3 of the project.

**1.2. Supporting the management of the selected MPAs – Turneffe Atoll Marine Reserve, South Water Caye Marine Reserve and Corozal Bay Wildlife Sanctuary—including replenishment zones.** The project will support management of the targeted MPAs particularly in the following areas:

a. Enhancing the enforcement and monitoring at the three MPAs, including within replenishment zones: The project will build and strengthen co-management partnerships for effective management of the target MPAs and ensure that they are adequately equipped with the skilled staff, resources and tools necessary for effective management. The project will support strengthening enforcement and surveillance, and biological monitoring, including construction of a ranger station, new pier, and watchtower/base station at SWCMR, procurement of field equipment such as boats for patrolling, equipment and supplies for biological and socioeconomic field monitoring, and data analysis (e.g., laptop computers to store and analyze data, patrol register system, among others). Enforcement is a crucial component of the MPA's management system and as such clearly defined enforcement guidelines and procedures (as guided

by MPA management and operational plans) will be developed and implemented in order to: 1) help improve monitoring, surveillance and enforcement of the MPA thus benefiting the MPA management; 2) allow enforcement staff to act professionally; and 3) reduce the possibility of legal action against the MPA management by rule breakers. The project will support a revision of existing enforcement guidelines and procedures for the three MPAs to ensure that they are implemented in a fair and equitable manner, and provide training for enforcement staff where needed.

b. Biological and water quality monitoring as per MPA management plans: Monitoring and enforcement information for the three targeted MPAs will be routinely collected, compiled, verified and stored within an appropriate database system for regular analysis. A comprehensive operational and monitoring plan for each of the MPAs will be developed and implemented to guide systematic collection of management information and data (e.g., climate, biophysical, socioeconomic, and governance). Routine and robust biological and water quality monitoring of strategic and control sites (representing coral reefs, coral restoration sites, mangroves, and seagrass beds) within MPAs will be conducted to determine how each target ecosystem is being affected and how to improve the management strategy to maintain their ecological health and climate resilience. Monitoring of commercial fishing resources will also be carried out to evaluate the impact of the implementation of sustainable management practices (such as managed access) at the MPAs. Data collection and field work will be coordinated with the CZMAI in relation to the implementation of the ICZM Plan (see Outcome B 1.4e below).

c. Carrying out formal management effectiveness assessments to track management success: An independent management effectiveness assessment, focusing on analysis of biophysical, socioeconomic and governance indicators, will be carried out bi-annually (in year 2 and year 4) with scores recorded within a management effectiveness tracking tool. Findings will be fed back to the MPAs' management procedures to make improvements and adjustments where needed so that conservation goals can be met.

**1.3. Repopulation of Coral Reefs.** Pilot investments will be made into repopulating reefs within replenishment zones of targeted MPAs with temperature resilient coral varieties. This will be achieved through:

a. Ground-truthing to identify reefs suitable for coral nurseries set-up and outplanting: Two of the three target MPAs -- Turneffe Atoll Marine Reserve (TAMR) and South Water Caye Marine Reserve (SWCMR) will be thoroughly groundtruthed in order to identify suitable areas for construction of coral nursery tables for propagating corals for outplanting. Potential areas for outplanting within target MPAs replenishment zones will also be identified and recorded. An external consultant will be hired as the Principal Investigator to help lead this effort with active participation by MPA staff.

b. Establishment of coral nurseries: At least six coral nursery tables will be constructed per MPA and in accordance to findings from the ground-truthing efforts. At least four fishermen will be hired and trained to support construction and installation of

nursery tables in the sea. MPA staff biologists and rangers will be trained to enable their routine monitoring of corals within nurseries.

c. Out-planting in selected reefs: Coral colonies propagated within nurseries will be outplanted to locales identified in the ground-truthing. The process will be led by a Principal Investigator (external consultant) and 20-30 fishermen will be hired to participate in the outplanting efforts. Fishermen will be trained in coral outplanting techniques prior to their participation in the outplanting efforts. MPA biologist and rangers will be trained in monitoring techniques to track the health and status of outplanted corals as well as progress towards the building of reef resilience. The monitoring of coral reef resiliency will also be linked to climate stations that are being established by the CCCCC at TAMR and SWCMR.

## **Outcome B: Coastal zones effectively managed**

27. To achieve this outcome, the Project would increase protection of coastal mangroves, seagrass and tidal marsh areas through supporting the implementation of an Integrated Coastal Zone Management (ICZM) Plan. The Coastal Zone Management Act, which took effect on May 8, 1998, mandated the creation of the Coastal Zone Management Authority and Institute (CZMAI) to coordinate all the different sectors active in the coastal zone, and the various interests using and managing the valuable coastal marine zones of Belize. The Authority's main purpose is to ensure effective inter-sectoral coordination and facilitate mainstreaming of biodiversity conservation issues into productive sector activities and policy development. The CZMAI also carry out scientific research and monitoring programs of marine resources, which informs CZMAI's assessments related to potential benefits or impacts to the coastal zone from investments and economic activities, design of programmes and projects to mitigate negative environmental impacts to the coastal zone, and the integration of conservation principles into sectoral planning activity. The proposed activities include:

**1.1. Strengthening the legal framework for the MPA network and the management of the coastal zone.** The Coastal Zone Management Authority and Institute (CZMAI) is in the process of finalizing the national integrated coastal zone management (ICZM) Plan for Belize. The draft ICZM Plan was completed in December 2012 and is currently undergoing an internal review by the CZMAI Advisory Council and Board. The final draft will be tabled to Cabinet in March 2013 for endorsement and approval. CZMAI projects that the Government of Belize will approve the ICZM Plan by June 2013. The plan takes into strong consideration inputs from nine established Coastal Advisory Committees (CACs) and feedback received through broader public consultations. The ICZM Plan lays out proactive and adaptive strategies to facilitate the improved management of coastal and marine resources within a specified timeframe across sectors. The Plan contains prescriptive, area-specific guidance and recommended zoning schemes guided by the strategies. The implementation of the ICZM Plan supported under the proposed Project will promote the coordination and integration of existing legislation, policies and management efforts of all organizations with mandates directly or indirectly related to the coastal and marine environment. Specific proposed activities to achieve this outcome include:

- a. Rolling out of the over-arching protected area legislation: The MCCAP will strengthen the MPA legal framework by supporting the sensitization process of the legal framework for protected areas (co-financing), and the revision of the CZM Act.
- b. Initial support to the protected areas administration structure: The MCCAP will strengthen the MPA institutional framework by supporting the establishment of a national institutional framework for protected areas (co-financing).
- c. Revision of mangrove regulations: The project will support efforts to finalize the draft revised mangrove regulations to enable added protection for mangroves. Efforts toward this were carried out in 2009 but the process was not completed. The activity includes key consultations (meetings and focus group discussions), data gathering and literature review toward revising and finalizing the mangrove regulations. This will be done under the mandate of the Forest Department and in close collaboration with the CZMAI, Department of Environment, NGOs and independent research entities to obtain the information and guidance to carry out the necessary revision and finalization of the mangrove regulations.
- d. Revision of the CZM Act: The Project will support the revision of the CZM Act to set out the geographical (e.g., the nine planning regions), legal and policy framework within which the ICZM Plan will be implemented. A CZM Act was adopted in 1998 to aid the smooth implementation of an ICZM Strategy. However, this Act is now considered outdated and in need of a comprehensive revision to be able to add legal strength for the implementation of the ICZM Plan. Under this activity, the project will support the hiring of two highly qualified consultants to lead the revision process and production of the revised CZM Act. The project will also support the cost of consultations to obtain feedback to guide revision efforts.

**1.2. Implementation of an Integrated Coastal Zone Management Plan.** The ICZM Plan presents critical recommendations for the long-term development of all coastal areas, including development of small, climate vulnerable cays and of cays found inside marine reserves. The project will support equipping the CZMAI with the necessary personnel (in-house staff as well as from among Coastal Advisory Committees) and tools to enable monitoring of adherence to recommendations in the ICZM Plan, water quality monitoring and field data collection, compilation and analysis to track health of the coastal systems, and the strengthening of coastal outreach. This will include the procurement of water quality testing and enforcement equipment and supplies, including support to the CACs which play an integral role in the implementation of the ICZM Plan. The CACs are responsible for monitoring the state of the natural environment and wildlife of the coastal zone in each region and activities that may impact them. The CACs will also oversee the drafting and implementation of development guidelines for their particular region. The CACs are intended as partnerships between stakeholders and the CZMAI in the coastal management process. The CACs will facilitate a participatory form of coastal monitoring and resource management planning that aims to reflect the needs and concerns of both local and national interests.

**a. Coastal non-point pollution management.** Under the National Environmental Appraisal Committee (NEAC) umbrella, CZMAI will work proactively with the varied permitting management agencies within Belize to ensure that development plans that could affect the health of the coastal ecosystem through pollution run-off, dredging and mining and aquaculture initiatives meet the standards set within the ICZM Plan. CZMAI is a member of the NEAC which reviews, advise and provide clearance for development projects within country (including mangrove clearance, dredging and mining, hotel resorts and aquaculture developments, etc.). CZMAI is strategically positioned within the Ministry of Forest, Fisheries and Sustainable Development (MFFSD), which enhances alliance with the MFFSD and the NEAC to strengthen existing coastal developing licensing and permitting procedures to ensure that they are streamlined and in sync with the recommendations of the ICZM Plan. The active participation of the Coastal Advisory Committees (CACs) within the varied planning regions will lend support to this process through proactive evaluation of project impacts on the ground, and the adherence to the ICZM plan's guidelines. Support will be given to relevant governmental departments in charge of licensing and permits, and to the CACs to ensure efficient licensing procedures, cross-referencing and monitoring of pertinent license and permit. Alliances will be built with research entities and local NGOs to ensure that biological and socio-economic datasets are appropriately gathered and used to help guide permitting and mitigation actions on the ground. A steering group will be formulated to help spearhead this effort.

**b. Management of the Coastal Zone Development.** A wider dissemination of the development guidelines of the ICZM Plan will be carried out. A user friendly and condense version (i.e. booklet and video) of the development guidelines of the ICZM Plan will be developed, published and disseminated within the key coastal planning regions and relevant governmental agencies. The booklet will provide quick and easy access to potential coastal developers on main requirements for carrying out development, including licensing and permitting requirements along Belize's coasts. They will also be made available to various media, including the CZMAI websites and social media sites (e.g. Facebook). CZMAI will also carry out training for CACs personnel to ensure that they are fully verse with ICZM Plan and their role in its implementation, monitoring and evaluation, as well as developers and local business owners.

28. This complements Belize's current effort to upgrade legal, financial and institutional framework for the protected area system including MPAs to ensure sustainability of the existing national protected areas system through a GEF-funded project entitled "Strengthening National Capacities for the Operationalization, Consolidation, and Sustainability of Belize's Protected Areas System (the SNC project). A draft comprehensive legislation for Belize's protected areas system is expected to be prepared by December 2013, as well as a proposed administrative structure for the protected areas system, for rolling out in 2014. The SNC project is being coordinated by the National Protected Areas Secretariat within the MFFSD. (See Part II Section F)

**Component 2 – Promotion of viable and sustainable alternative livelihoods for affected users of the reef (AF resources: 2.45 million; in-kind contributions from GOB and NGOs: \$0.368 million)**

29. This component aims to support economically viable and sustainable alternative livelihoods for local populations whose economic activities are directly impacted by the adverse effects of climate change on marine and coastal areas described under Component 1. Promotion of sustainable alternative livelihoods would also contribute to reducing the anthropogenic stressors on the marine resources which in turn increases the health of reefs and associated marine and coastal ecosystems and their resilience to climate impacts. The primary targets are the twelve (12) coastal communities that utilize the marine and coastal resources of Corozal Bay Wildlife Sanctuary, Turneffe Atoll Marine Reserve, and South Water Caye Marine Reserve as a principal source of income. The Government of Belize (GOB) has placed very high priority on directly supporting measures for those communities that are heavily reliant on reef areas that would be targeted for enhanced protection. The number of those directly affected includes at least 2,500 fishers, processors, and those who engage in tourism, and indirectly many of the 105,000 people living in the target coastal areas of Belize. Many of these communities depend almost entirely on fishing for their livelihood. Other communities which used to engage in agriculture production have increasingly turned to fishing due to economic downturn in the agricultural sector. Also a majority of these fishermen is not well organized to collectively cope with the declining fish population and competitions from increasing number of poor fishermen. If this situation continues, damage on the marine resources and ecosystems from increasing and unorganized fishing activities will be irreversible and too severe to build resilience of the marine ecosystem to climate change impacts.

30. The fishing industry in Belize is small scale, commercially artisanal, organized by fishermen cooperatives and associations. Since 2004, there has been a steady increase in the number of fishers who were issued with fishing licenses. In 2011, there were 2,582 licensed fishermen with approximately 1,377 registered fishing vessels involved in the fishing industry. The project is expected to benefit approximately 1,600 fishers who depend on the resources from the three target areas. Fishing also contributes to the local economy by impacting indirectly on the commodity/supply chain. Additionally, fishing contributes to food security through consumption of the household's catch. Even though fishing is a significant sector in Belize's economy, 45% of fishing households are poor or are vulnerable to poverty. Poor households in Belize are on average made up of 6.7 members. The poor households in the target communities do not have enough earnings to reach the US\$ 1,500 per year to cover the necessities of each household member. With such high dependence on marine resources, poverty, poor social services, poor infrastructure and weak institutions governing fishing communities, the negative effects of climate changes on their livelihoods and income are likely to be severe. The losses are likely to be felt at the household level loss of income, loss of food security, increase in poverty and at the community level, a diminished local economy. This could lead to migration to cities and urban centres further exacerbating existing problems in the urban areas.

31. Some of the target fishing communities are nowhere near to setting up alternative livelihood ventures. This situation is compounded by the fact that the fishermen from these communities are not organized into a cooperative or an association. Chunox Village, for example, whose economy agriculture-based (primarily sugar cane), has been experiencing a significant

downturn. Cane farmers have consequently been resorting to fishing as an alternative livelihood, thereby significantly adding to the number of fishermen that originate from this community. The fishermen from the other villages (with the exception of Hopkins and Placencia) depend almost entirely on fishing for their livelihood. There is great potential to set up fisheries-based ventures as well as viable tourism ventures and other alternative livelihoods in these communities, but this requires significant initial capital investments that are not currently available to these communities.

32. Recent evidence suggests that fisheries and the fishing industry have been in decline since the mid 1990s. A study estimates lobster sales in Turneffe Atoll to cooperatives declined by about 70% from 2004 to 2009, while conch sales declined 56.7% over the same period. (Fedler, 2011) Finfish production was consistently equal to 500,000 pounds until 1992, but since 2003 it has declined to less than 10,000 pounds per year. Therefore, declines in fishing incomes are assumed if no effective measures to be taken. (See more analysis in Section C. Cost Effectiveness.) With decline in fisheries stocks largely due to decline of coral cover induced by higher sea-surface temperatures and more severe and more frequent coral bleaching, it appears inevitable that coastal communities heavily engaged in “catch fishing” will continue to face key livelihood challenges. Nonetheless, the emergence of new technologies for both traditional fisheries and aquaculture indicate the sector will continue to be an important contributor to local and national production and employment for a long time. There is, however, a need for eco-friendly strategies to help the sector through its transformation to ensure its sustainability.

33. This component would specifically support: a) community mobilization for the participatory identification and planning of viable and sustainable business ventures for alternative livelihoods and employment opportunities, b) development and implementation of business plans in support of identified sustainable business ventures, c) provision of sub-grants to support initial capital investments in viable options for affected users, and d) training and development of marketable skills essential for the transition to alternative livelihoods. This component will be implemented in direct partnership with co-managers of marine protected areas, local conservation NGOs, and fishing cooperatives and associations. The Government of Belize, private sector, micro-lending institutions, and multi-lateral and bilateral donors will also collaborate on the project. Affected users from the following communities eligible to participate in this component are: a) Corozal Town, b) Belize City, c) Dangriga, d) Consejo, e) Copper Bank, f) Chunox, g) Sarteneja, h) Hopkins, i) Sittee River, j) Riversdale, k) Seine Bight, and l) Placencia. Other coastal communities that do not currently appear as affected communities in current MPA management plans are also eligible to participate if it is established during project implementation that they are indeed affected by the MPA and replenishment zones expansion and enforcement activities of Component 1. To participate, they would need to be acknowledged and certified as long standing artisanal users by the marine reserve managers and duly confirmed by the Fisheries Department and the Project Steering Committee. Community members in this category will approach the Project Implementation Unit with a request to participate after which the PIU will refer such request to the relevant co-manager for consideration.

#### **Outcome C: Livelihoods of affected users of the reef diversified.**

34. The Project will support the development of community-based business ventures that can leverage the opportunity cost of fishing. The process of developing these ventures and alternative

livelihood strategies will be participatory and will be underlined by equity and community driven decision-making. The business ventures will be developed through a guided process as each venture will have a business plan to support the development of products and services all the way through to distribution and service delivery. To this end, the project will support the following activities:

**2.1. Community Mobilization.** Community members will be supported to mobilize themselves in order to identify viable livelihoods activities in a participatory manner. The approach will help to ensure that there is equity in the process and that all affected users including vulnerable groups, such as women and indigenous peoples, have the opportunity to become involved in and benefit from alternative livelihoods activities funded by the Project. Taking this approach will acknowledge culturally appropriate decision-making patterns while supporting small fishing communities to develop their capacity to assess their own needs, and design community level actions and solutions in the future. This process will be facilitated by a community development expert. The Project will assist community members to mobilize themselves through:

a. Community Needs Assessments: Initial meetings will be held to create an awareness of the goals of the project in terms of climate change adaptation and to discuss the opportunities for the development of alternative livelihoods for affected users. This will be followed by needs assessment workshops to facilitate the direct engagement of community members, including women, in devising and developing ideas for potential alternative livelihoods activities. This process will assist community members to map out their own resources and assets, identify and diagnose constraints to local social and economic development from household to community level, and identify required management and technical skills. The main outputs of this process will be the: a) establishment of a common vision on how to pursue alternative livelihood strategies, b) active engagement of community members to ensure buy-in for the sub-projects, c) gender empowerment by ensuring a process that seeks the input of both men and women and d) the identification of potential business ventures and investment opportunities. These will then be prioritized based on viability and other collectively established criteria.

b. Participatory Subproject Planning Workshops: The second step in the participatory planning process will be the further development of the prioritized subproject ideas and potential opportunities and the completion and submission of the sub-project proposal. This process will establish subproject goals and objectives, identify the main activities and inputs, identify the target beneficiaries and develop a budget. In-kind contribution will be required from sub-project beneficiaries to ensure commitment. The sub-project application will then be submitted to the Project Implementation Unit for consideration and approval through an established process.

**2.2. Development of Business Plans.** This involves technical assistance to subproject proponents to develop business plan in order to get their alternative livelihoods ventures off the ground. Included in this process will be information on resources and raw materials to be used as inputs, organizational plan, operating plan, financial plan, and marketing plan. The business plan is essential in various aspects: a) to commercialize the production; b) to

rationalize the management structure; c) to develop an efficient operation; d) to understand the risks and have a plan to deal with them; e) to identify their niche and explore new markets; and f) to inform investors and attract investment into the production. Market opportunities that directly encourages sustainably managed fishery through eco-labeling and certification will be actively sought and developed as this is now a viable business reality in the industry both locally and globally. Locally, this will be tied to the tourism industry and collaboration will be pursued with the Belize Tourism Board on their certification initiatives under their Quality Assurance Programme.

The project will place an emphasis on assistance in marketing for each approved business plan. The marketing expert will assist in the identification and development of the potential niche markets, development of marketing materials, advising on packing and product and service quality, and identification of potential business partners and distributors where possible. Alternative livelihoods activities will be undertaken at scale in order to ensure maximum returns and benefits for the communities and the environment. The marketing expert will also ensure that each business venture is registered with the Small Business Development Center at the Belize Trade and Investment Development Service (BELTRAIDE)<sup>22</sup> in order to ensure continuous business support over the long term.

**2.3. Skill straining to facilitate the coastal communities' transition to alternative livelihoods.** The project will provide training necessary to build the skills of the coastal communities to transition to alternative livelihoods, based on training needs identified during the community mobilization phase. This will be done by focusing on skill sets that supports small business development and individual marketable skills.

a. Training in business development: A comprehensive training program will be established for beneficiaries under this component of the project. This is to ensure that beneficiaries develop the skills necessary to sustain and maintain the transition to alternative livelihoods. This includes training in financial literacy, business management, production, marketing, quality control and financial management. Beneficiaries whose subprojects are already under implementation or have an approved sub-project are eligible to participate. These trainings will be coordinated by the PIU and attendance will be by invitation.

b. Training in marketable skills: Training support for the attainment of marketable and employable skills for individuals will also be done in order to support those who wish to transition to full time employment in other sectors or self-employment. Training in marketable individual skills sets will be mainly in the areas of: a) mari-culture; b) eco-tourism, d) agriculture and c) vocational education. These four areas were selected based on the current social, human and physical assets of the local communities. Many are already engaged in livelihood strategies in these areas as they attempt to diversify their own livelihoods and as such the project will be building on existing knowledge and experience and will not necessarily have to recreate existing social capital that supports longstanding fishing activities. A diagnostic study of fishing communities in CARICOM

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<sup>22</sup><http://belizeinvest.net/about/>

concluded that in Belize almost of half of the income of fishing families are derived from activities other than fishing<sup>23</sup>. Additionally, the areas selected are all tied to the largest and fastest growing sector of the Belizean economy -tourism. The training under this section is aimed at supporting: a) independently-operated profitable enterprises, and b) employment or self-employment for individuals. For training in mari-culture, the project will collaborate directly with the Fisheries Department. Some of the training under eco-tourism in areas such as tour guiding, will be carried out in collaboration with the Belize Tourism Board's Training Unit. The Institute for Technical and Vocational Education (ITVET) will assist in providing training for vocational activities and will assist in job placements for trainees.

**2.4. Sub-grants mechanism for community-based business ventures.** The Project will provide funding support for viable and sustainable community-based business ventures that have approved business plans. The sub-grants mechanism will be developed to provide financial resources as initial capital investment to support the start-up of business ventures identified by the affected community members. Regular monitoring field visits will be carried out for all approved subprojects under the sub-grants mechanism.

Eligible Applicants: Groups of affected users of the reef and selected MPAs from the target communities, through their representative organizations such as fishing associations or cooperatives, will be eligible to submit subproject proposals for financing. Non-governmental organizations (NGOs) and community-based organizations (CBOs) currently co-managing the selected MPAs are also eligible to apply on behalf of affected users. The NGOs and CBOs will also be involved in assisting the communities in the targeted areas to plan and carry out alternative livelihoods and diversification activities. This engagement would provide an efficient, multi-sectoral delivery mechanism for community-based interventions in the conservation of the reef. The legal status of the project proponents would also help to ensure accountability and transparency in the management of the sub-grants.

Grant size: Size of each sub-project would vary depending on the type of investment proposed. The allocation per community is estimated at about US\$150,000 – 170,000. Two types of grants will be provided under the project. The first type is **small grants** up to US\$25,000. The second type is **regular grants**, which will range from over US\$25,000 to US\$100,000. Because the grants are focused on developing alternative livelihoods they will be considered initial investments to support business ventures. Grants up to US\$25,000 will be required to be completed within a 12-month period. Regular grants will be required to be completed within a period between 18 to 36 months. Follow up phases of sub-projects are allowed but require technical appraisal and approval of the PSC.

Eligible Activities: Potential businesses activities that will be considered for funding by the project include:a) fisheries diversification initiatives that capitalize on eco-friendly fishing activities such as sport fishing; b) value-adding to final fishery products through processing,

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<sup>23</sup>Diagnostic Study to Determine Poverty Levels in CARICOM Fishing Communities, Caribbean Regional Fisheries Mechanism (CRFM), 2012.

introduction of standards, eco-labeling, utilizing fish parts that are currently discarded as waste; c) poly-culture of marine products; and d) community-based sustainable aquaculture, agriculture and tourism-related activities. Sub-projects with activities having to do with fishery must demonstrate environmental sustainability, social responsibility and economic viability. All projects regardless of type must fall under eligible activity categories which include:

- a. Fisheries diversification initiatives that capitalize on eco-friendly fishing activities such as sport fishing;
- b. Value-adding to final fishery products through processing, introduction of standards, eco-labeling, utilizing fish parts that are currently discarded as waste;
- c. Poly-culture of marine products; and
- d. Community-based sustainable aquaculture, agriculture and tourism-related activities. (Sub-projects with activities having to do with fishery must demonstrate environmental sustainability, social responsibility and economic viability.)

Approval Process: The sub-grants mechanism will be managed by the Project Implementation Unit (PIU). The applications will initially be screened by the staff of the PIU for eligibility. The Project Steering Committee will approve all sub-project applications and will then recommend the development of a business plan for the approved sub-project. A review sub-committee made up of members of the PSC and technical and business experts will then review all business plans and make recommendations to the PSC for final approval. Procurement for goods and services for the sub-projects will follow the World Bank guidelines and to be defined in the Project Operational Manual. All recipients of sub-grants must be legally established entities. The process is expected to flow as follows:

- b. Submission of Concept Paper – A completed concept paper will be submitted by project proponents on alternative livelihoods for affected users of the reef and targeted MPAs.
- c. Screening – The concept paper will be screened by the PIU based on the eligibility criteria established.
- d. Community Mobilization and Planning - Once the project concept is cleared and considered eligible. Participatory consultations and planning will be held and will be overseen by project technical staff.
- e. Technical Evaluation – Once full proposal has been received, a technical review committee which includes business experts will review the application and recommend the development of business plans, required for all regular grants of US\$50,000. Business plans for small grants will be at the discretion of the technical review committee.
- f. Development of Business Plan – A business plan will be developed for regular sub-projects and will act as a sort of feasibility study aside from being an investment plan. Development of a business plan does not guarantee approval by the Project Steering Committee.
- g. Approval – The completed application and business plan will then be forwarded to the Project Steering Committee for approval. The PSC may approve, reject or request for more information from sub-project proponents. The decision of the PSC is final.

- h. Notification of Decision – Applicants will be officially notified by the PIU on the decision of the PSC. Successful applicants will then be advanced to the implementation stage.
- i. Implementation – The sub-project will be implemented directly by proponents under the direction of the PIU. A built-in feature of the project is marketing support from the PIU. This may be from technical project staff. External consultants may be hired to provide specialised marketing support. Procurement will be according to established PACT guidelines.  
Monitoring and Reporting – PIU staff will conduct field visits to sub-project sites and proponents will be required to submit periodic reports and a final report on their project.

This component of the project will also work in tandem with the ongoing *Sustainable Natural Resource-based Livelihoods Project* funded by the Japanese Social Development Fund and the *Small Island Developing States Community-based Adaptation Program* funded by AusAid to ensure synergy in economic diversification and climate change adaptation of livelihood activities for local communities.

35. Consultations with local fishers and NGOs involved in sustainable natural resources management have yielded a list of potential alternative livelihoods opportunities that can be pursued commercially. These include, supporting economically viable and sustainable wild harvesting of the Florida Stone Crab (*Menippe mercenaria*) using locally available and environmental friendly materials. Only the large claw of the crab would be removed and the crab would be released to the ocean to allow for natural regeneration. Another alternative activity highlighted is the cultivation and processing of seaweed (*Gracilariaria* spp.). Large scale production could be done in the shallow coastal areas which provide adequate environmental and marine conditions for extensive farming systems. Seaweed cultivation and processing is already being undertaken on a pilot basis by the Placencia Fishermen’s Cooperative Society Limited in the southern region and it has shown very positive results. Another viable alternative activity is community-based farming of the Red Hybrid Tilapia (*Oreochromis* spp.), ‘River Lobster’ or Malaysian Prawn (*Macrobrachium* spp.), Sea Cucumber (*Holothuria* spp.) and the Australian Freshwater Lobster (*Cherax quadricarinatus*). Tilapia farms would be located on the mainland in plastic tanks and vegetable greenhouses can use the waste water for irrigation. These aquaculture initiatives would decrease the vulnerability of small-scale fishers by providing additional income to fishers and their families. The farming of tilapia is currently being done on a small scale by the Sarteneja Tilapia Growers and Development Association in northern Belize. Also, marine tourism-based activities such as tour-guide training, whale shark tourism, dive master, sailing, would be selectively supported by the project based on their economic viability and sustainability.

36. Specific emphasis will be placed upon gender equity, the participation of indigenous peoples and civil-society organizations through the design and implementation of the alternative livelihood activities. During the preparation of the Project, local communities were consulted to determine specific activities and target communities to be supported. Women were found to play an integral role in harvesting marine resources both through their direct productive involvement and social reproductive roles. Women are involved in extraction as well as in the marketing of fish products. They are also involved in a supporting role where they prepare materials and supplies for fishing expeditions and manage household income from fishing. Consequently, the

project will ensure that women have an opportunity to participate and express their aspirations during the identification and development of subprojects for funding. Gender related issues that affect the wellbeing of fishing families and inhibit the participation of women will be looked at. Further recognizing the role of women, the project will encourage spouses and youth from fishing families to develop sub-projects and submit for financing. Women will also be given the opportunity to participate in all training activities carried out under the project. Beyond being gender sensitive, the project will ensure that women have a role in decision-making in order to benefit directly from the resources the Project and strengthen the position of women structurally.

37. Affected indigenous Garifuna communities will also be fully engaged in promoting their involvement in managing marine resources and in the development of alternative livelihoods that are culturally appropriate. Sub-projects that promote or preserve Garifuna culture will be considered for funding as long as the viability of the actions can be established. Some examples include manufacturing and marketing of Garifuna drums, traditional dress, or the creation of cultural entertainment groups that support the strengthening of cultural tourism.

38. The role and engagement of civil society organizations including fishers associations and natural resource management NGOs will be a key feature of this project especially in the promotion and development of alternative livelihoods strategies. Local conservation organizations, cooperatives and fishing associations have continuously engaged the targeted communities therefore the project will build on those existing relationships and will avoid creating any new organizational structures within the communities.

### **Component 3 – Raising awareness, building local capacity, and disseminating information** (AF resources: \$0.56 million)

39. This component aims to: a) increase the understanding by local stakeholders about impacts of climate change and the value of marine conservation to build support for the National Protected Areas Policy and System Plan (NPAPSP) as a strategy to ensure the long term sustainability of natural resources, b) build local capacity to develop and explore climate resilience strategies, and c) provide regular and accessible public information on climate change effects in the marine ecosystems and coastal zone to promote behavior change designed to minimize climate risks in MPAs and replenishment zones (for example, through respecting the relevant laws, reduction of overfishing and reporting of infractions, etc.).

**Outcome D: The value of marine conservation and impacts of climate change are understood by local people.**

40. The activities under this component involve:

**3.1. Conducting a climate change knowledge, attitude and behavioral practice (KAP) survey** to identify needs and understand gaps in the knowledge, attitudes and behavioral practices of Belizeans (especially in coastal communities), with respect to climate change. The results of the KAP survey will be used in the design of targeted protected areas and climate change knowledge and awareness raising programs. KAP survey results will also be used in the design of a communications strategy to improve the knowledge, attitudes, and

practices of targeted coastal communities, thereby increasing capacity for climate change resilient communities, ecosystems and relevant economic sectors. The target audiences are: a) fishermen, b) eco-tourism operators, c) coastal communities, d) private sector, and e) youth and students. The project will ensure that women and indigenous groups (i.e., the Garifuna) are given special attention. The KAP surveys will follow a six-step process: i) define the survey objectives, ii) develop the survey protocol, iii) design the survey questionnaire, iv) implement the KAP survey, v) analyze the data, and vi) use the data (which includes translating the survey findings into action and disseminating the survey findings). Data from the initial KAP survey will be used to orient resource allocation for behaviour change communication campaigns, and to establish a baseline for comparison with subsequent KAP surveys.

**3.2. Dissemination of information about project investments** to promote learning and cooperation between the project and the marine conservation and climate adaptation community. Specifically, the project would disseminate periodically: a) updates of project activities (via quarterly electronic and print newsletters), b) comments and blogs from project participants on a web-based platform designed for the project, and c) lessons learnt and best practices developed from project activities, among project participants. The latter will be shared via a best practices forum in Year 2 and Year 4 of the project. Project beneficiaries and other project stakeholders will gather for one-day symposium that will include exhibits and poster presentations, seminars, and workshops. The symposium will allow the PIU to share project-related information in an atmosphere of learning and information exchange. One of the forums will be convened in the northern region and the second forum in the southern region.

**3.3. Designing and conducting a coordinated behavior change communication (BCC) strategy** to change public attitudes and behaviour. The strategy will provide a framework for delivering targeted key messages on climate change issues to the following target audiences: a) fishermen, b) eco-tourism operators, c) coastal communities, d) private sector, and e) youth and school students. The project will ensure that women and indigenous groups (i.e., the Garifuna) are given special attention. The strategy will recommend actions to raise awareness of climate change and its impacts, and the appropriate medium and method for communicating said actions. The strategy will focus on the adaptation element, which is concerned with impacts of a changing climate on society, the economy and the environment, and promotes activities to reduce vulnerability of marine and coastal ecosystems (and livelihoods) to extreme weather events and other longer term changes in our climate. The communication strategy will aim to: a) raise the awareness level of coastal communities on the opportunities and threats brought about by climate change, and the roles they can play in adapting to its impacts; and b) provide guidance and best practice tools on how to communicate adaptation to climate change. The goal will be to create a community that is well informed about climate change and thus make local to global responsible choices.

**3.4. Inter-community learning forum.** While the individual fishermen associations would be able to design and implement subprojects on their own, they would not be able to effectively participate in and contribute to climate change initiatives at national level and advocate for improvements in their livelihoods in isolation from each other. The project will therefore support inter-community dialogues and learning events among the participating

fishing communities who face similar challenges to adapt to climate impacts. The communities will learn from each other's climate adaptation subprojects. Leadership development training sessions will focus on inclusive climate resilience through collaboration among different communities and dialogue and mediation skills, mentoring of community leaders, as well as training in advocacy at the institutional level. The trainees will play a key role in supporting the implementation of the BCC strategy and action plan in year 2 and year 4. Institutional strengthening will include the development of a medium-term strategic plan for inclusive climate resilience for the resulting network of fishermen/women, which would be integrated into the strategic plans of the various fishermen/women associations. A committee comprised of leaders of the various fishermen/women groups will serve as the planning team.

***B. Describe how the project / programme provides economic, social and environmental benefits, with particular reference to the most vulnerable communities, and groups within communities, including gender considerations.***

41. The following paragraphs describe the economic, environmental, and social benefits from the key sectors in Belize which are relevant to the project. More detailed benefits specific to the project are described in the next section on cost-effectiveness analysis.

42. **The value of ecosystem services generated by the coral reefs and mangroves contributes between 15 and 22 percent of GDP in Belize.** The World Resources Institute (WRI) conducted a valuation study of the coastal capital in Belize (2008) to assess the economic contribution of three services provided by reef and mangrove ecosystems: (i) fishing, (ii) tourism, and (iii) shoreline protection. The value of coastal tourism was calculated by estimating gross tourism expenditures in coastal areas (marine recreation, accommodation and food, and other spending). The shoreline protection services total between US\$231 and US\$347 million, or 9 to 13.5 percent of GDP, in avoided damages per year by buffering against storm surge and reducing erosion.<sup>24</sup> Of this amount, mangroves contribute US\$111–167 million and coral reefs contribute a further US\$120–180 million. Economic benefits (described in more detail below) from fishing add another US\$14–16 million. In total, the value of the coastal ecosystem—coral reefs and mangroves—was in the range of US\$395–559 million per year, or 15 to 22 percent of Belize's 2007 GDP.

### **Environmental benefits**

43. The proposed Project would generate positive impacts on the rich flora and fauna of Belize by improving the management of marine ecosystems and habitats of the Belize Barrier Reef System, from oceanic atolls outside the Barrier Reef, to extensive lagoonal and estuarine systems in the near-shore area. The expansion of MPAs and no-take replenishment zones would promote the reproduction of commercially important overexploited marine species such as the Nassau Grouper (*Epinephelus striatus*), the Red Snapper (*Lutjanus campechanus*), the Silk

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<sup>24</sup>This is an upper bound on the damage estimates that would be incurred in coastal areas in the absence of mangroves and coral reefs, and further analysis of scenarios of gradual degradation of reef and mangrove ecosystems are needed to provide the lower- and mid-range estimates of the value of shoreline protection services.

Snapper (*Lutjanus synagris*), the Caribbean spiny lobster (*Panulirus argus*), the Queen Conch (*Strombus gigas*), and other species. Also, many endemic species like the West Indian Manatee (*Trichechus manatus*) and the American Saltwater Crocodile (*Crocodylus acutus*) would benefit from the habitat conservation measures under the project.

44. In addition, the proposed coral adaptation activities would promote repopulation of Elkhorn coral (*Acropora palmata*) and Staghorn coral (*Acropora cervicornis*) and other species to increase the resilience of reef systems and contribute to long-term sustainability of the coral biome. The named two species are listed as critically endangered by the IUCN Red List, the first reef building corals on the planet to be formally recognized as such. Until recently, *Acropora* corals dominated reefs and were the most abundant coral species on most Caribbean reefs. Because these species are the only large, open-branched corals in the Caribbean, they provide critical habitat for fish and other species like lobsters. Besides *Acropora*, other rare species such as Finger coral *Porites*, Pillar coral (*Dendrogyra cylindricus*), and Star corals (*Montastrea annularis* and *M. faveolata*) would also be targeted.

45. This ambitious Project would also allow Belize to meet its commitments under the Convention on Biological Diversity and the goals set under the Belize National Protected Areas System Plan. This means meeting protection targets for all marine ecosystems within the Belize Barrier Reef and providing stewardship for approximately 13% of highly valued coral reef ecosystems. It also provides an opportunity to expand this representation by a targeted 20.2% of marine ecosystem thus significantly increasing the protection and management of this crucial ecosystem.<sup>25</sup>

### **Social Benefits**

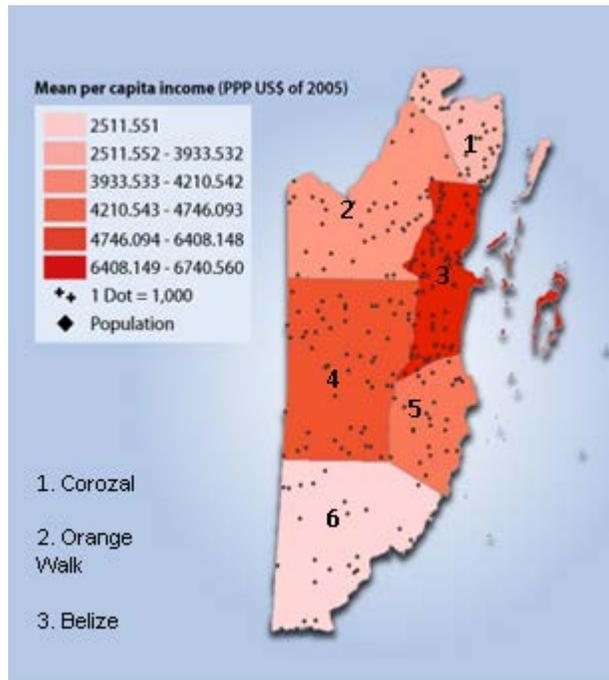
46. The proposed adaptation, conservation, and restoration activities of the Belize Barrier Reef System are of immense socio-economic significance, providing an opportunity for maintaining and potentially increasing the income level, food security and marine resources available for an estimated 203,000 people living in the coastal areas of Belize. Many of the 105,000 people living in the target coastal communities will indirectly benefit from the project intervention. Most of these communities are poor fishing communities. According to the National Poverty Assessment of 2010, about 41.3 percent of the population (approximately 114,000 people) remains below the poverty line. Of the total poor population, 55.3 percent live in rural areas.<sup>26</sup> The poor populations are concentrated in the Toledo and Corozal districts (see Figure 5).

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<sup>25</sup>The national MPA network currently covers approximately 386,612.80 hectares, or 20.2% of territorial waters. This initiative targets a potential expansion to up to 588,311 hectares or up to 30% representation of each coastal marine ecosystem as defined in the NPASP.

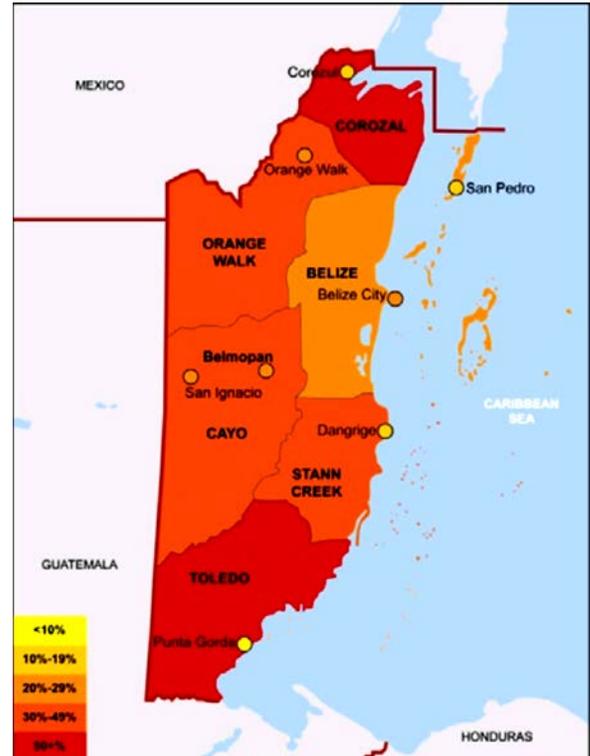
<sup>26</sup>Belize Country Poverty Assessment Report, 2010

**Figure 5. Per Capita Income and Population in Belize**



Source: Reshaping Economic Geography in Latin America and the Caribbean, World Bank, 2009.

**Figure 6: Poor Households in Belize**



Source: Belize Country Poverty Assessment Report, 2010

47. Belize is a multi-racial society with its mixture of various ethnic groups each with its own unique history and culture. The largest ethnic groups include the Mestizo, Kriol, Maya, Garifuna and Mennonite. The Mestizos are the largest group making up approximately 50% of the entire population. The Creole make up approximately 21% while indigenous groups namely the Maya and Garifuna make up 10% and 4.6% respectively. The Garifuna are historically fishermen and farmers and many still practice the age-old seafaring tradition today. Their culture which remains vibrant today is inherently tied to the sea and the use of marine resources.

48. Fishing has traditionally been a means of subsistence in coastal communities and has been the main source of protein. However, it has been transformed into a commercial activity over the years and, as a result, has affected the availability of fish for local consumption as an inexpensive source of protein. Many of the fishers in a number of coastal and rural communities, especially in the poorer districts of Corozal and Toledo, only received basic school education and are often illiterate.<sup>27</sup> Poorly managed marine resources could result in significant negative impacts on the welfare of these communities in terms of employment, income and source of food. For many, fishing has become a sort of a safety net and due to their limited levels of education, it

<sup>27</sup>Belize National Conch Report, 2005.

would be difficult for them to transition to other industries and livelihood activities without direct support.

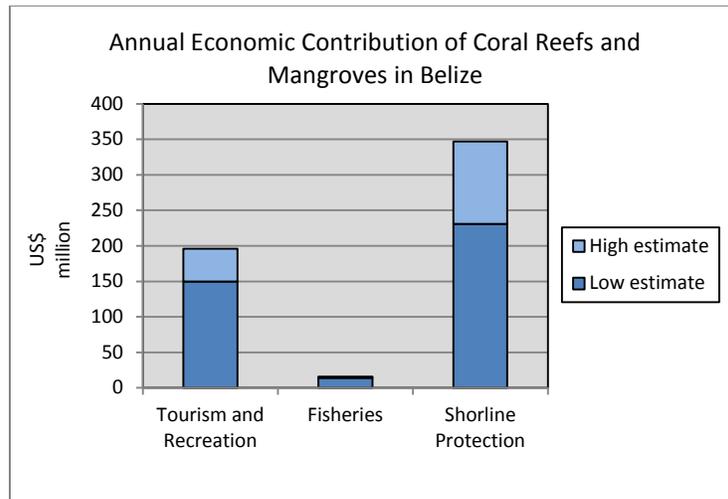
49. Belizeans originating mainly from coastal communities are not the only users of the fishery resources. Over the years, there have been encroachments by illegal fishers from Guatemala and Honduras that carry out indiscriminate fishing for undersized and out of season fishery products even within conservation zones in the MPAs. These illegal fishing activities would undoubtedly pose a heightened risk to the sustainability of the fishery resources. Hence, the proposed activities to improve the reef's protection regime and to provide alternative livelihoods to the local fishers are critical to maintaining and improving the welfare of poor rural households over the long term.

50. Since fishing is generally considered a male dominated activity most of the support given to fishers have been directly to male fishermen with the assumption that such support translates into direct benefits to the household. During consultations with women they shared that they have generally been excluded from participating in decision-making and in sharing in the benefits of community development activities related to fishing. The project will support the direct participation of women in decision making but also in participating in planned alternative livelihood activities where they are able to gain tangible benefits directly through training and support for economic activities. Women often manage the household finances and therefore often have to deal with the lack of adequate funds to maintain their household as they generally don't have an independent source of income. The project would empower their position in the household which can have a positive effect on the welfare of their families. The Belize Country Poverty Assessment of 2010 states that poverty rates of households where women are employed are generally lower than those with working men only. The report further suggests that poverty rates would be reduced if more women in poor households were able to work. The project will ensure that where women's economic participation is increased that their social reproductive roles in their households are considered so as to minimize any negative social effects especially on their children.

### **Economic Benefits**

51. Considering the high importance of tourism to Belize's foreign exchange receipts and the significance of fisheries to the coastal populations, the health of the marine ecosystems is critical to economic stability. The project would contribute to maintaining and potentially increasing the economic value of the reefs' environmental services in the fisheries and tourism sectors. Also the income level and marine resources available to the local population would potentially be increased through the proposed sustainable management and resiliency of marine resources, and the promotion of alternative livelihoods.

**Figure 7: Annual Economic Contribution of Coral Reefs and Mangroves in Belize**

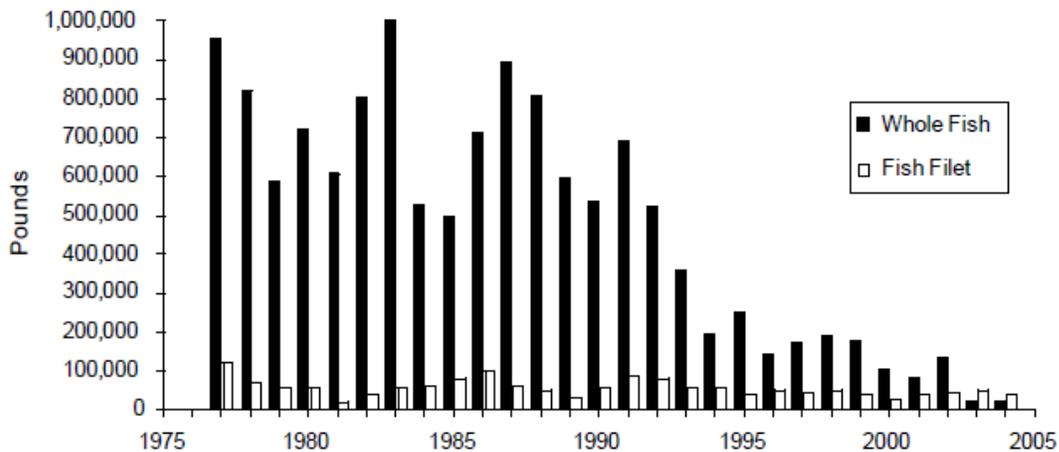


Source: Cooper *et al.*, Coastal Capital: Belize, WRI, 2008

52. **Fisheries.** Belize's fisheries are threatened by overfishing and a reduction of coral cover. By expanding no-take replenishment zones and promoting complementary fisheries management and adaptation measures, the project would provide a significant economic benefit in terms of the replenishment and stabilization of valuable marine species. Fishing is an important cultural tradition, as well as a safety net and livelihood for many coastal Belizeans. Belize's fishing industry is ranked 5th in the national economy. Total fishery export earnings (capture fishery sector only) increased by 20% from US\$10.8 million in 2010 to almost US\$13 million in 2011. Fishing contributed 2.2% of GDP in 2010.

53. Spawning aggregations of reef fish in Belize have been heavily depleted from historical levels. Nassau grouper, the most well-studied species has been depleted to the point that localized extinction is possible. In spite of intensive efforts to conserve the species in Belize, including new legislation offering both a nearly complete closure of fishing at the species' aggregation sites and a closed season, stocks have reached dangerously low levels. Following national landings statistics, historical exports of finfish from Belize exceeded 500,000 pounds per annum between 1976-1992, peaking at a million pounds in 1983 (Figure 8). A rapid drop in exports started in the mid 1990s and has not rebuilt. Nassau grouper roe was sold largely in-country but was still being exported during the mid 1990s, reaching a peak of 1,000 pounds in 1996. This practice was halted by 1999 but the damage had already been done.

Figure 8. Export of finfish from Belize from 1975 to 2005. The majority of that reported is grouper and snapper. Data are from the exports of National and Northern Cooperatives and summarized by the Belize Fisheries Department.



Source: Heyman, W.D. and B. Wade. 2007. Status of reef fish spawning aggregations in Belize. Proceedings for the Gulf and Caribbean Fisheries Institute 58: 301-306.

54. Nationally, lobster and conch rank as number one and two marine exports with a contribution in 2010 of US\$7.14 million and US\$3.31 million, respectively (Ministry of Agriculture and Fisheries 2010). However, these precious resources are under tremendous pressure and saw a 70% and 50% decline respectively from 2004 to 2009 country-wide (Fisheries Department 2009). Turneffe alone accounted for a reduced 6.2% of lobster and 2% of conch sold nationally and to cooperatives, down from an approximate 20% and 6.2% respectively of national supply (Turneffe Atoll Trust (TAT), 2011). If the Project is able to restore the fisheries to the 2004 level, the value from lobster and conch in Turneffe alone amounts to approximately US\$1.62 million.

55. Coastal communities such as Sarteneja, Chunox, Copper Bank, Caye Caulker, Dangriga, Hopkins, Seine Bight, Placencia, Mango Creek, Monkey River and Punta Gorda are highly dependent on fishing. It is estimated that the project would directly benefit approximately 1,600 fishers and their households. Fishery records show that 90-95% of total lobster and conch landings are exported mainly to the United States of America, earning roughly US\$13 million in gross revenue. The fishing industry in Belize provides direct employment for about 2,582 licensed fishers (Capture Fisheries Unit Annual Report 2011. Fisheries Department). More than 50% of these fishers are between the ages of 15 and 35 years and most of these fishers originate from impoverished rural and coastal communities. In addition, the fishing cooperatives employ 110 fulltime employees and the aquaculture farms employ 730 employees who are responsible

for processing, packaging and administering the daily activities. In recent years, some ‘full-time’ fishers who have benefitted from various training opportunities have sought employment in the tourism industry as tour guides. Under the project, viable alternative livelihoods would be supported to promote the exit of additional fishers. Fisheries diversification activities would also be supported to optimize the economic value of marine products. These project interventions will help to reduce fishing effort/pressure from the coral reef systems.

56. **Tourism.** The Project would provide economic benefits to coral reef- and mangrove-associated tourism which in 2007 contributed an estimated US\$150 million to \$196 million to the national economy (12 to 15 percent of GDP). Tourists spent between US\$30–\$37 million on sport fishing and diving alone (not counting accommodation, etc.). Additional indirect economic impacts, including locally manufactured materials that support the industry, contribute another US\$26–\$69 million a year. Combined, these result in a total economic contribution of US\$175–\$262 million from coral reef- and mangrove-associated tourism in 2007. For Turneffe alone, tourism generates an estimated gross US\$ 23.5 million annually from attractions such as snorkeling, diving, and sport fishing (TAT, 2011). These are “high value” industries that are especially sensitive to reef condition, and thus particularly vulnerable to degradation of the environment which they, themselves, are contributing to<sup>28</sup>. The Healthy Reefs Report Card for the Mesoamerican Reefs 2010 reports 65% of Belize’s reefs being in poor to critical condition and of the five Turneffe sites two are in fair, two in critical and one in poor condition.

57. **Protection.** Reefs and mangroves also protect coastal properties from erosion and wave-induced damage, providing an estimated US\$231 to US\$347 million in avoided damages per year. By comparison, Belize’s GDP in 2007 was US\$1.3 billion.<sup>29</sup> Turneffe is one of the three bio-physical barriers protecting Belize City, Belize’s largest urban settlement. From east to west these include Lighthouse Reef, Turneffe Atoll and the Belize Barrier Reef. Underwater, these barriers play an important role in preventing storm surge during extreme weather events. Turneffe Atoll acts as the first line of defense against storms as history has shown that many storms reduce in sustained wind speeds and overall effects as they pass over Turneffe Atoll before approaching the mainland (Wildtracks, 2011)<sup>30</sup>. The annual value of shoreline protection services provided by coral reefs and mangroves of Turneffe is estimated at US\$38 million (TAT, 2011).

**C. Describe or provide an analysis of the cost-effectiveness of the proposed project / programme.**

58. The economic analysis focuses on Components 1 and 2 given the difficulty in quantifying the effects of increased awareness. For Component 1, attention is given on the benefits and costs of creating the new MPA at Turneffe and improving management effectiveness at SWCMR and CBWS. Quantifying the effects of efforts to improve the management effectiveness of MPAs

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<sup>28</sup>Cooper E, Burke L, and Bood N. (2009) “Coastal Capital: Belize. The economic contribution of Belize’s coral reefs and mangroves.” WRI working Paper. World Resources Institute, Washington, DC. 53p .

<sup>29</sup>These estimates capture only three of the many services provided by coral reefs and mangroves, and should not be considered the “total” value of these resources. These numbers should be regarded as a lower bound estimate.

<sup>30</sup> The Saffir-Simpson Hurricane Wind Scale is a 1 to 5 rating, in order of increasing intensity, based on a hurricane’s sustained wind speed.

across Belize is difficult, hence the analysis conservatively assumes that the only benefits afforded by the project are in the three aforementioned areas.

59. In sum, the selected benefits exceed costs for different discount rates applied (4%, 10% and 20%). In terms of benefit break-even, if the only benefits realized by Component 1 are those associated with coral reefs on Turneffe, benefits will cover the costs of Component 1. Also, it is concluded that preserving reefs and mangroves is cost effective even if they offer only 1/20th of the shoreline protection offered by levees. Also Component 2 is worth undertaking even if the benefits are slightly lower than the conservative estimates. This is true even in the strictest case of the shorter time horizon and the highest discount rate, where long-run recovery of the fishery has not had much time to take place and fewer fishers and processors have transitioned into higher-valued occupations.

### **Component 1 Analysis**

60. Existing efforts to estimate the benefits of MPAs and the coral reefs and mangroves they contain have focused on three of the use benefits: (i) tourism/recreation, (ii) fisheries, and (iii) shoreline protection (e.g., Alban et al. 2006, Cesar et al. 2003, Conservation International 2008, Cooper et al. 2009, Das and Vincent 2009, Vergara et al. 2009, Fedler 2011, Pascal 2011). These three benefits are arguably among the most important benefits in quantitative terms for the ecosystems being valued in this analysis, but they are not the only benefits that are likely to be quantitatively important. Thus, the benefits estimates derived here should be viewed as lower bounds.

61. **Economic Valuation of Coral Reefs and Mangroves.** A recent study by Fedler (2011), estimates the annual value of the tourism, fisheries and shoreline protection benefits provided by coral reefs and mangroves on Turneffe. The tourism (and fisheries) estimates are based on data collected specifically for his study. The estimates for shoreline protection are derived from the Belize-wide study conducted by the World Resources Institute (Cooper et al. 2009). The Turneffe estimates are obtained by taking the Belize-wide estimates, expressing them in per-acre terms, and then multiplying by the number of acres of mangrove and coral reef, respectively, on Turneffe. More recent data on mangrove and coral acreage was used to re-derive the estimates of shoreline protection benefits provided by Turneffe's mangroves and reefs.

62. For SWCMR and CBWS there is little or no data on tourism. Accordingly, per-acre benefits for coral reefs and mangroves derived from Cooper et al.'s Belize-wide study are applied to data on coral reef and mangrove acreage for each of the two areas. The per-acre benefits were derived from Cooper et al, and the per-acre (revised) benefits for Turneffe. These per-acre benefits are the key values used in our analysis of benefits with and without the project. Table 3 shows the total benefits for each of the three areas, derived using the per-acre values and the acreage data. These estimates are referred as the base annual benefits.

**Table 3 Base Annual Benefits (USD)**

Category	Corozal Bay Wildlife Sanctuary	South Water Caye Marine Reserve	Turneffe Atoll
Tourism			
Coral Reef	\$16,800	\$5,271,000	\$25,597,846
Mangrove	\$1,545,462	\$640,202	\$11,376,820
Shoreline Protection			
Coral Reef	\$18,360	\$5,760,450	\$16,820,820
Mangrove	\$4,265,475	\$1,766,958	\$17,743,367

Note: Based on per-acre estimates in Table 6 and acreage data

63. **Estimated Benefits and Costs of Component 1.** Table 4 presents estimates of the present value of the costs of Component 1 and the benefits quantified assuming a 10-year time horizon (2013-2022) and three different discount rates. Coral reef benefits are largest for Turneffe because of its large reef acreage and the larger difference between with- and without project coral cover due to the creation of a new protected area, as opposed to increased management effectiveness of an existing protected area. Mangrove benefits are largest for SWCMR because it has the highest without-project acreage loss rate and a large area of mangrove cover. Note that the costs cannot be separated by ecosystem type (coral reef versus mangrove), nor can they be separated by area because the implementation costs of Component 1 are joint.

64. The last row of Table 4 indicates the selected benefits exceed costs for all three discount rates. In terms of benefit break-even, if the only benefits realized by Component 1 are those associated with coral reefs on Turneffe, benefits will cover the costs of Component 1. This is true even at the highest, 12%, discount rate. Recall that the Turneffe coral benefits are based on the very conservative assumption that the project results in a reduction in annual coral cover loss on the order of 1 percentage point compared to the without-project scenario. To put this number in context, recall that over the past three years, available data indicates that annual coral cover loss on Turneffe has been on the order of 10%.

65. Analogous estimate assuming a 20-year time horizon (2013-2032) markedly increases the desirability of Component 1. This is a result, in large part, of the growing divergence between with- and without-project coral cover over time. The estimated benefits now exceed costs by a wide margin for all three discount rates. In terms of benefit break-even, if the only benefits realized by Component 1 are 55% of those estimated for coral reefs on Turneffe, benefits will cover the costs of Component 1: at the 12% discount rate, 55% of estimated Turneffe coral benefits equal \$9,373,808, while costs are \$9,317,656.

**Table 4 Present Value of Costs, Selected Benefits, Net Selected Benefits (USD)—10-year horizon**

Selected Benefits	Discount Rate		
	10%	12%	4%
Corozal Bay			
Coral Reef	\$3,804	\$3,367	\$5,620
Mangrove	\$46,527	\$41,168	\$68,861
South Water Caye			
Coral Reef	\$1,193,404	\$1,056,512	\$1,763,325
Mangrove	\$307,067	\$271,767	\$454,103
Turneffe Atoll			
Coral Reef	\$9,052,239	\$8,015,749	\$13,365,837
Mangrove	\$46,527	\$37,519	\$62,761
Combined			
Coral Reef	\$10,249,447	\$9,075,629	\$15,134,782
Mangrove	\$395,998	\$350,453	\$585,726
<b>Total Selected Benefits</b>	<b>\$10,645,445</b>	<b>\$9,426,082</b>	<b>\$15,720,508</b>
<b>Total Costs</b>	<b>\$8,203,097</b>	<b>\$7,660,983</b>	<b>\$10,310,531</b>
<b>Net Selected Benefits</b>	<b>\$2,442,348</b>	<b>\$1,765,099</b>	<b>\$5,409,977</b>

66. For the cost-effectiveness analysis, it is considered an alternative to protecting coral reef and mangrove ecosystems. Given limited data availability, focus is on the shoreline protection services provided by the Turneffe Atoll to Belize City. The atoll's location directly east of Belize City results in the atoll being especially important to moderating storm damages (Fedler 2011).

67. A recent study prepared for UNDP (Simpson et al. 2010) provides estimates of the cost of protecting Belize City given projected sea level rise of one to two meters in the 21st century. Approximately 40 km of shoreline are estimated to be in need of protection. The costs of two types of protection are estimated: levees, which would cost \$197.4 million (USD) to construct, and a sea wall, which would cost \$684.3 million to construct. Annual maintenance costs are estimated to be 10% of construction costs for levees and 2.5% for sea walls.

68. Sea walls offer considerably greater protection than levees (Heberger et al. 2009). The analysis assumes that levees are the alternative likely to render shoreline protection comparable to that offered by preserving and restoring Turneffe's reefs and mangroves. The assumption is that the levees last for 100 years. To render costs comparable to those incurred by Component 1 over our 10-year and 20-year time horizons, the analysis annualizes the levee construction cost

of \$197.4 million over 100 years and then compute the present value of 10-year and 20-year streams of this annuity. The present values of these streams are added to the present value of the annual maintenance costs, yielding the present value of construction plus maintenance costs. These present values are presented in Table 5 for different discount rates, and for the two time horizons.

**Table 5 . Present Value of Levee Construction and Maintenance Costs**

Project Horizon	Discount Rate		
	10%	12%	4%
10-Year	\$242,596,312	\$245,379,488	\$225,446,397
20-Year	\$336,127,692	\$324,385,116	\$377,749,905

69. These costs are an order of magnitude larger than the total Component 1 costs in Table 4. It is difficult to quantitatively compare the shoreline protection provided by levees and the shoreline protection provided by preserving and restoring reefs and mangroves. However, **a comparison of the costs in Table 5 and the total costs in Table 4 reveals that preserving reefs and mangroves is cost effective even if they offer only 1/20th of the shoreline protection offered by levees.**

### Component 2 Analysis

70. The economic viability of Component 2 is evaluated by comparing the present value of benefits with the project and the present value of Component 2 costs. Table 6 presents the 10-year time horizon. The top part of the table presents the without-project scenario, which assumes there is no re-employment of fishers and processors in alternative occupations, and that the fishery continues to decline according to assumptions. The lower part of the table presents the with-project scenario, which assumes that fisheries recover and re-employment occurs. The benefits reported in the lower part of each table represents the difference between the present value of all incomes with the project (fisher/processor incomes plus alternative livelihoods income) and the present value of all incomes without the project (fisher/processor incomes only).

71. The estimate in the table implies that Component 2 is worth pursuing at each discount rate, and for both short and long time horizons, as the net benefits are positive in every case. The longer time horizon affords the highest net benefits, as there is more time for re-employment of fishers and processors into tourism and seaweed farming to take place, and more time for fish stocks to recover through more effective management of existing protected areas and the designation of new no-take zones. Referring to the estimates in the table, the benefits with the project are about 1-4% higher than the benefit break-even point that renders net benefits equal to zero. **This implies that Component 2 is worth undertaking even if the benefits are slightly lower than our conservative estimates presented in the “Total Benefits” row of the table. This is true even in the strictest case of the shorter time horizon and the highest discount rate, where long-run recovery of the fishery has not had much time to take place and fewer fishers and processors have transitioned into higher-valued occupations.**

**Table 6 Present Value of Incomes, Benefits, Costs and Net Benefits (USD)—10-year horizon**

	Discount Rate		
	10%	12%	4%
<b>Without Project</b>			
Fisher/Processor Income	\$287,309,296	\$264,939,069	\$375,830,730
<b>With Project</b>			
Fisher/Processor Income	\$212,568,157	\$196,416,199	\$276,236,529
Alternative Livelihoods Income	\$79,109,627	\$70,766,683	\$113,488,444
<b>Total Benefits</b>	\$4,368,488	\$2,243,813	\$13,894,244
<b>Total Costs</b>	\$1,936,963	\$1,854,650	\$2,221,799
<b>Net Benefits</b>	\$2,431,525	\$389,163	\$11,672,444

Notes: Alternative livelihoods income is from tourism and seaweed farming. Benefits with project are equal to sum of fisher/ processor and alternative livelihoods income with project minus fisher/processor income without project.

*D. Describe how the project / programme is consistent with national or sub-national sustainable development strategies, including, where appropriate, national or sub-national development plans, poverty reduction strategies, sector strategies, national communications, or national adaptation programs of action, or other relevant instruments, where they exist.*

72. The Project is aligned with the strategic thrusts in **the National Poverty Elimination Strategy and Action Plan 2009-13 (NPESAP)**, specifically on a) effective mitigation against effects of climate change and natural disaster, and b) reduction in citizens’ vulnerabilities to catastrophic disasters, and with **the Medium Term Development Strategy**, “Building Resilience against Social, Economic and Physical Vulnerabilities” (MTDS, 2010-2013), which is closely linked to the NPESAP. A long-term development plan, **Horizon 2030**, describes the main Government priorities and challenges including: a) strengthen macroeconomic and fiscal management, and b) sustainable Environment and Natural Resource Management.

73. **The First National Communication to the UNFCCC** (July 2002) states that Belize has been identified as one of those countries most vulnerable to the adverse impacts of climate change. It is therefore imperative that adaptation measures be identified for the country’s most vulnerable sectors and that steps be undertaken for the implementation of the more viable options. The proposed Project would address many of the adaptation measures identified in the First National Communications, for example:

- Enforce the laws regulating conservation and use of biological resources in the marine and terrestrial ecosystems;

- Establish and maintain protected areas;
- Include biodiversity conservation into adaptation strategies of other sectors;
- Discourage construction of new townships in coastal areas;
- Discourage construction of new residences within inland coastal plains;
- Create alternative livelihoods away from coastal areas.

74. The **Second National Communication to the UNFCCC** (August 2011) reiterates that Belize is among those countries that will be severely impacted by climate change. The serious adverse effects of climate change will impact the coral reefs and forests, and the increased intensity and frequency of severe weather events will affect human lives. These impacts will pose major impediments to Belize's efforts to promote sustainable economic and social development, and to reduce poverty, which are the country's primary and overriding priorities. The report states that Belize needs to focus on those actions that will reduce direct impact and help to build resilience within the natural environment. The proposed Project would support the following goal identified in the Second National Communication – building a society and economy that is resilient to the impacts of climate change. Specifically, the Project would address many of the adaptation measures identified in the Second National Communication, such as:

- Develop an incentive programme that encourages the private sector to actively participate in adaptation to climate change;
- Revise and streamline the current legislations and policies that relate to the management of the coastal zone to eliminate overlaps and close existing gaps;
- Develop strategies to increase compliance particularly with regard to coastal development;
- Promote/support mangrove conservation programmes, policies and legislation;
- Consolidate and strengthen the MPA system by establishing Fisheries Reserve or expand no-take zone in Marine Protected Areas;
- Conduct research to aid and support sustainable fisheries management goals;
- Develop and implement a sustained public information programme targeting fishermen especially and the public in general;
- Develop and implement a sustained public information programme on impacts of climate change and alternative livelihood programmes; and
- Encourage engagement in non-fisheries related economic activities and encourage diversification in targeted fish species targeted.

75. The project is consistent with **the National Protected Areas System Plan (NPASP)**, as it would target the completion of a comprehensive marine protected areas system in accordance with recommendations from this Plan, and fulfilling Belize's commitments to the Convention on Biological Diversity Program of Work on Protected Areas. The Project would also mainstream climate change considerations into the NPASP especially in areas where critical gaps exist.

76. The proposed Project is also aligned with the current World Bank's **Country Partnership Strategy (CPS)** for Belize (2011-15) which is aimed at supporting the country's efforts to achieve **Inclusive and Sustainable Natural Resource-Based Growth and Enhanced Climate Resilience**. The proposed Project will contribute directly to the CPS by improving the

protection regime of the Belize Barrier Reef System, supporting the poor who tend to depend on the reef resources, and raising awareness and strengthening the local capacities of the agencies involved in natural resource management in Belize.

77. The CARICOM Heads of State, of which Belize is a member, participating in the First Congress for the Environmental Charter and Climatic Change (held at Ávila Mountain, Caracas, 11-13 October 2007) requested that the Caribbean Community Climate Change Centre (CCCCC) prepare a Regional Framework document that would lay the ground for achievement of the vision of a “Caribbean society and economy that is resilient to a changing climate.” This strategic vision is reflected in the *‘Regional Framework for Achieving Development Resilient to a Changing Climate (2009-2015)’* that was approved by the CARICOM Heads of Government in July 2009. The Regional Framework provides a roadmap for action by member states and regional organizations over the period 2009-2015, while building on the groundwork laid by the CCCCC and its precursor programs and projects in climate change adaptation<sup>31</sup>. It also emphatically notes that (a) CARICOM countries such as Belize have an opportunity to attract climate change finance to support their initiatives to build the resilience of their economies, and (b) developing innovative financing mechanisms to support national climate action is crucial. This Project is directly responding and contributing to these objectives.

78. The Project complements **the Caribbean Pilot Program for Climate Resilience (PPCR)** financed under the Climate Investment Fund (CIF) which finances climate resilience measures in 6 CARICOM countries (Jamaica, Haiti, Grenada, Saint Vincent and the Grenadines, St. Lucia, Dominica) and region-wide activities addressing climate risks and vulnerabilities common to all Caribbean countries. While Belize does not benefit directly from on-the-ground PPCR investments, it would be able to benefit from regional technical assistance activities (implemented through regional organizations such as CCCCC) including strengthening climate change modeling and monitoring capacity of regional organizations and strengthening monitoring capacity by increasing the number of monitoring climate change (e.g., sea level and sea surface temperature) stations in the Caribbean especially in those countries with limited resources.

***E. Describe how the project / programme meets relevant national technical standards, where applicable.***

79. The MCAP project will be focused on securing expansion of MPAs and replenishment zones, and exploring livelihood diversification for impacted stakeholders. While securing MPA expansion is likely to result in mainly positive environmental impact, some of the livelihoods diversification initiatives proposed under the MCCAP (Component 2) have the potential likelihood of resulting in some environmental impacts. As such, an Environmental Management Framework (EMF) is being prepared that conforms to national standards (e.g., the Environmental Protection Act and regulations, the Fisheries Act, and MPA rules and regulations, and others – see Table 7).

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<sup>31</sup>Including the National Enabling Activities (NEAs), the First National Communications Projects, the Caribbean Planning for Adaptation to Climate Change (CPACC) project (1998-2001), the Adaptation to Climate Change in the Caribbean (ACCC) project (2001-2004), the Mainstreaming Adaptation to Climate Change (MACC) project (2003-2009), and the pilot projects being undertaken under the Special Pilot Adaptation to Climate Change (SPACC).

**Table 7: Relevant National Laws**

<b>1. Protection, Conservation or Reservation of Natural Resources</b>		
Chapter 215 Substantive Laws of Belize, R.E. 2003	National Parks System Act	To establish National Parks, Natural Monuments, Wildlife Sanctuaries and Nature Reserves
Chapter 210, Section 14, Substantive Laws of Belize, R.E. 2003	Fisheries Act	To establish Marine Protected Areas
Chapter 213, Section 3, Substantive Laws of Belize, R.E., 2003	Forest Act	To establish Forest Reserves
Chapter 330, Substantive Laws of Belize, R.E., 2003	Ancient Monuments and Antiquities Act	To establish archeological reserves
Chapter 191, Substantive Laws of Belize, R.E., 2003	National Lands Act	To set buffer zones along bodies of water, rivers, etc.
Chapter 220, Substantive Laws of Belize, R.E. 2003	Wildlife Protection Act	To conserve, restore and develop wildlife
<b>2. Pollution, Health and the Environment</b>		
Chapter 30, Substantive Laws of Belize, R.E., 2003	Public Health Act	To control pollution in air, water and on land if it affects the quality of human life
Chapter 328, Substantive Laws of Belize, R.E., 2003	Environmental Protection Act	To establish the Department of the Environment for the preservation, protection and improvement of the environment, wise use of the natural resources, the prevention and control of pollution, investigation and inspection to ensure enforcement of the Law, monitor environmental health, advise, educate and promote environmental policies
<b>3. Land Use and Planning</b>		
Chapter 191, Substantive Laws of Belize, R.E., 2003	National Lands Act	To manage and distribute national lands, except those reserved as forest lands under the Forest Act
Chapter 188, Substantive Laws of Belize, 2003	Land Utilization Act	To govern the use and development of land, to allow for the conservation of land and watersheds and to allow for the establishment of Special Development Areas (SDAs)
Chapter 329, Substantive Laws of Belize, R.E., 2003	Coastal Zone Management Act	To establish the Coastal Zone Management Authority and Institute which is to coordinate and monitor activities in the coastal zone

80. The EMF will adopt the World Bank Environmental and Social Safeguards Policies in order to assure the social and environmental sustainability of the projects that the institution promotes and assumes compliance responsibility (see Table 8). The EMF will include identification of potential environmental impacts and associated mitigation measures to safeguard against potential impacts.

**Table 8: World Bank Safeguard Policies**

<p><b><u>Environmental Policies:</u></b></p> <p>OP4.01: Environmental Assessment, 1999  OP 4.04: Natural Habitats, 2001  OP 4.09: Pest Management, 1998  OP 4.36: Forests, 2002</p>	<p><b><u>Social Policies:</u></b></p> <p>OP4.10: Indigenous Peoples, July 2005  OP 4.12: Involuntary Resettlement, 2001  PO/BP 7.60: Projects in Disputed Areas</p>
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81. The overall purpose of the Environmental Management Framework (EMF) is to present, on the basis of an environmental diagnosis and methodologies, instruments, procedures and responsibilities for environmental management to be applied during project implementation, in order to comply with the national environmental laws and the World Bank’s Environment Safeguard Policies. The key specific objectives of the EMF are to present: 1) a basic environmental characterization of the Marine Conservation and Climate Adaptation Project (MCCAP) intervention areas; 2) a diagnosis of the legal framework related to the environment theme in the different sectors that the MCCAP will support, and the institutional framework that will be involved during the project cycle; 3) an Environmental Due Diligence Process that outlines the key methodologies, instruments, procedures and responsibilities for environmental management within the context of the Project; and 4) an Environmental Strengthening Plan that would assure an adequate level of capacity for the management of the environmental aspects during project implementation.

82. Livelihoods projects that are to be funded by the MCCAP, will be required to go through the necessary environmental review process as required by Belize’s law such as the Environmental Protection Act and Environmental Impact review process. The Environmental Protection Act (EPA) is the most comprehensive piece of environmental legislation in Belize. The law demonstrates, as stated in the preamble, the commitment of the Government of Belize to the protection and preservation of Belize’s natural heritage to ensure that exploitation of the resources is consistent with maintaining ecological balance. Part V of the EPA is devoted entirely to Environmental Impact Assessments (EIA) process. The EPA stipulates that any person intending to undertake any project or activity which may significantly affect the environment shall cause an EIA to be carried out by a suitably qualified person and submitted to the Department of Environment (DoE) for evaluation and recommendation. The EPA lists the areas that the EIA should evaluate, including effects on humans, flora and fauna, water, soil, air, ecological balance, among others. The EIA is required to include measures that should be undertaken to mitigate any adverse environmental effects, and statement of reasonable alternatives and justification for their rejection. The EPA also mandates the involvement of the public in the EIA process. EIA Regulations were adopted in 1995 as subsidiary to the EPA. These Regulations outline criteria for environmental impact, define significant environmental issues, and stipulate the minimum content of an EIA. Of major significance in the EIA Regulations are two schedules: one which categorizes projects for which an EIA is mandatory, and the other that stipulates those projects that must undergo a screening process to determine whether an EIA is necessary. Also stipulated are those projects for which an EIA is not required. Some of the other national laws of relevance to the project are included in Table 7.

83. Not only does the project meet relevant national laws in Belize, it also supports the Government of Belize in the revision of key laws that are currently in draft form and would have an immediate impact on reducing harmful practices and activities in the coastal marine zone. These include:

- Revision of the Fisheries Act. The Living Aquatic Resources Bill would repeal and replace the current Fisheries Act. The Living Aquatic Resources Act, when enacted, would be a modern and robust piece of legislation that incorporates international principles and approaches that are required for responsible and sustainable fisheries management. The draft Bill is being vetted for onward submission to Cabinet and for onward submission to the National Assembly for passage into law.
- Revision of the Coastal Zone Management Act. A revised/improved Act would legislate the ICZM Plan and improve reefs legislative policy and regulatory protection regime. When legislated and executed, the ICZM Plan could hold other government entities liable to enforce relevant sections of the Plan.
- Promotion of mangrove conservation and management practices and enforcement of the laws which have to be improved to guarantee the appropriate level of conservation.
- Protection of fish spawning aggregations through the complete closure of fishing which is still being allowed in some of these areas and two known sites remain open to fishing.
- Promotion of the banishment of harmful techniques such as gill nets, spear gun fishing, fish traps, mangrove clearing and dredging operations within the boundaries of MPAs.
- Development of comprehensive guidelines to inform offshore oil and gas exploration and production in the offshore and near shore marine environment bearing in mind the potential impacts to the Barrier Reef and its protected areas.

F. Describe if there is duplication of project / programme with other funding sources, if any.

84. The project is fully aligned with and aimed at complementing and scaling up the ongoing efforts by the Government of Belize. These efforts include: i) strengthening the legal framework for Marine Protected Areas, ii) implementing an Integrated Coastal Zone Management Plan for the coastal zone (which includes the entire Belize reef), and iii) setting up the legal instrument for co-management of National Protected Areas with NGOs and community based organizations.

85. Through a GEF-funded project being implemented by the National Protected Areas Secretariat of the MFFSD entitled “**Strengthening National Capacities for the Operationalization, Consolidation, and Sustainability of Belize’s Protected Areas System (the SNC project)**” (see Table 9), UNDP Belize is supporting the Government of Belize’s efforts in effectively developing legal, financial and institutional capacities to ensure sustainability of the existing national protected area system. This project will provide the training of staff in management and business plan development, administration and financial planning related to protect areas, and protected areas management and monitoring techniques. The project will also design selected instruments/mechanisms (e.g., increased government budget

appropriations, tourism concessions, tourism gate fees, etc.) to increase protected area revenues. As a part of this, the SNC Project is supporting the development of a comprehensive protected areas legislation that will link all protected areas that are currently established and managed under the three principal existing acts – the Forests Act, the Fisheries Act, and the National Parks System Act. The process of developing this parent legislation will include a rationalization exercise to verify the elements of the existing protected area network, with key focus on ecosystem representation and categorization of protected areas within the system. A legislative review, along with the findings of the rationalization process, will serve as the basis for development of this over-arching protected area legislation. It is expected that this parent PA legislation will be tabled for approval by Cabinet by the end of 2013. The SCN Project will also support a legal review process to harmonize existing PA legislation and enabling regulations with the new parent protected area legislation.

86. Support for alternative livelihoods of impoverished communities is one of the priority issues for the Government of Belize. Through a Japan Social Development Fund (JSDF)-funded project entitled “**Promoting Sustainable Natural Resource-based Livelihoods in Belize**” (see Table 9), the World Bank is supporting their efforts in exploring potential sustainable natural resource-based livelihoods in forest and coastal communities (e.g., the sustainable extraction of “*popta*” seeds from the palmetto palm; cultivation of bay leaf palm (*Sabal muritiformis*) for thatching, xaté palms (*Chamaedorea sp.*) for ornamental use, palmetto palm (*Acoelorrhaphe wrightii*) for construction of fish and lobster traps, pepper for hot sauce, and *Noni* fruit; beekeeping and honey production; and nuts and fruits processing products (oil, wine, juice, etc.). The proposed Adaptation Fund project would benefit from the on-going efforts and complement them by directly financing the coastal communities vulnerable to climate change and affected by the expansion of MPAs with job creation, skills training, and provision of initial capital for alternative livelihoods.

87. The proposed repopulation of coral reefs is a natural continuation of the technical assistance from the World Bank to Belize. Adaptation measures to identify and propagate thermally resilient varieties of corals to survive in the increasing sea surface temperature have been piloted in Belize with the cooperation of international and local coral experts in 2009. Additionally, Japanese and U.S. researchers have provided scientific expertise in the genetic analysis of the thermally resilient corals. The project will continue to test the lessons learnt from these pilots by establishing some coral restoration sites within replenishment zones of the targeted MPAs. Important information for scaling up was collected from the pilot including the techniques for scoping and extraction of thermally resilient mother corals and the correlation between the location of nursery sites and the survival rate of second generation corals. Also, the preliminary DNA analysis provided critical information on the sample varieties from the pilot nurseries at the clade level, which will be the basis for further scientific analysis at sub-clade level in the project. The local marine biologists together with the officials from the Fisheries Department involved in the pilot will lead the repopulation efforts with the participation of the local communities in out planting of nursery-grown corals and educational activities.

88. The GOB is also implementing projects with support from the Inter-American Development Bank (IADB) including: i) increased access to wastewater treatment through the development of a new sewerage collection and treatment system in the Placencia Peninsula, and ii) flood mitigation infrastructure program for Belize City through canal improvements, Street

improvements, and institutional strengthening. The project would potentially build upon their experience in order to address some of the development-related local stresses to the reef.

89. A European Union (EU) funded Global Climate Change Alliance (GCCA) grant (€2.9 million) for Belize was disbursed in July 2012 (see Table 9). The grant is being implemented by UNDP to “enhance adaptive capacity and resilience to climate change in national policies and demonstrate action in support of effective governance of climate change and climate change related impacts in the water sector” in Belize. According to the GCCA project document, 66% of the funds will finance investments in the water sector. The remaining funds will be dedicated to enhancing national capacities to plan for and to coordinate a national response to the threats of climate change. A national climate change strategy currently does not exist. The GCCA project is addressing this gap; UNDP is currently supporting local counterparts in developing a climate change policy and strategy. Key progress to date is the staffing of the National Integrated Water Resources Authority (NIWRA), the staffing of the Climate Change Office (with a Principal Climate Change Officer and Climate Change Officer), information dissemination on a community adaptation programme, and commencing the assessment of an appropriate structure for the NIWRA based on the provisions of the Integrated Water Resources Management Act.<sup>32</sup>

90. The Caribbean Community Climate Change Center (CCCCC) is currently implementing a project called the Global Climate Change Alliance Caribbean Support Project (under the 10<sup>th</sup> EDF Intra-ACP financial framework in the Caribbean). Under this project, one Coral Reef Early Warning Station will be installed within the South Water Caye Marine Reserve in the vicinity of the Smithsonian Institute. Another such station is being financed by the CCCCC with support from AusAid, and is expected to be installed off Calabash Caye within the Turneffe Atoll Marine Reserve, under the responsibility of the University of Belize.<sup>33</sup>

91. Other relevant projects are listed in Table 9.

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<sup>32</sup> Source: GCCA Belize project document: “Enhancing Belize’s resilience to adapt to the effects of climate change” (March 2012)

<sup>33</sup> Source: CCCCC

**Table 9: Relevant Projects**

Projects	Objectives & Outcomes	Synergies
<p>GEF/UNDP</p> <p><u>Project name:</u> <b>Strengthening National Capacities for the Operationalization, Consolidation, and Sustainability of Belize’s Protected Areas System</b></p> <p><u>Status:</u> Ongoing</p>	<p><u>Objective:</u> To develop legal, financial and institutional capacities to ensure sustainability of the existing national protected areas system.</p> <p><u>Relevant Outcomes:</u></p> <ul style="list-style-type: none"> <li>• The national protected area system is supported by legal and institutional reforms furthering efforts in attaining sustainability of the system.</li> </ul>	<p>The MCCAP will strengthen the MPA legal and institutional frameworks by supporting the rolling out of the legal framework for protected areas, the establishment of a national institutional framework for protected areas, and the revision of the CZM Act.</p>
<p>European Union (EU)/UNDP</p> <p><u>Project name:</u> <b>Enhancing Belize’s Resilience to Adapt to the Effects of Climate Change (GCCA)</b></p> <p><u>Status:</u> Approved</p>	<p><u>Objective:</u> To enhance adaptive capacity and resilience to climate change in national policies and demonstrate actions in support of effective governance of climate change and climate change related impacts in the water sector.</p> <p><u>Outcomes:</u></p> <ul style="list-style-type: none"> <li>• Increased climate change resilience in the water sector of Belize as demonstrated by the existence of an improved framework for planning and coordination;</li> <li>• Belize’s adaptation portfolio reflects recommendations and lessons gained from the implementation of adaptation pilots;</li> <li>• Enhanced national capacities to plan for and to coordinate a national response to the threats of climate change.</li> </ul>	<p>The MCCAP would complement this project by focusing on investing in measures that protect and improve the ecological health of the natural ecosystems (such as the Belize Barrier Reef) as the best way to anticipate climate change while enhancing resilience to climate change impacts.</p>
<p>Japan Social Development Fund (JSDF)/The World Bank</p> <p><u>Project name:</u> <b>Promoting Sustainable Natural Resource-based Livelihoods in Belize</b></p>	<p><u>Objective:</u> To promote viable and sustainable natural resource-based livelihoods for poor communities in Belize, and thereby reducing anthropogenic pressures on the key natural resources.</p>	<p>The support given to two coastal areas to be targeted for mariculture activities – Sarteneja and Placencia – would complement the alternative livelihoods initiatives that would be supported under the MCCAP</p>

<p><u>Status:</u> Approved</p>	<p><u>Outcomes include:</u></p> <ul style="list-style-type: none"> <li>• Social mobilization, facilitation, and community co-management supported;</li> <li>• Innovative models of green livelihoods of fishing communities through mariculture development;</li> <li>• Community-led natural resources vigilance and knowledge dissemination</li> </ul>	<p>Project (Component 2).</p>
<p>GEF/The World Bank</p> <p><b>Project name: Management and Protection of Key Biodiversity Areas in Belize</b></p> <p><u>Status:</u> Project Preparation Phase</p>	<p><u>Objective:</u> To strengthen natural resource management and biodiversity conservation through the mitigation of threats to Key Biodiversity Areas (KBAs) in Belize.</p> <p><u>Outcomes include:</u></p> <ul style="list-style-type: none"> <li>• Strengthened legal and administrative framework for Protected Areas (PAs);</li> <li>• Protected Areas (PAs) in the KBAs managed more effectively (as measured by GEF Tracking Tools)</li> </ul>	<p>The two outcomes shown are aligned with two outcomes under Component 1 of the MCCAP, namely: 1) strengthening the legal framework of MPAs and the coastal zone, and 2) enhancement of the monitoring of three MPAs, as well as of replenishment zones, and marine managed areas. The KBA project will focus on the national system of protected areas (marine and terrestrial), while the MCCAP project will focus on the MPAs and the coastal zone. The projects therefore complement each other.</p>
<p>Australian Government (AusAid)/UNDP</p> <p><b>Project name: Community-Based Adaptation Country Programme Strategy (CCPS) for Belize</b></p> <p><u>Status:</u> Approved</p>	<p><u>Objectives:</u></p> <ul style="list-style-type: none"> <li>• To promote climate change related science based on communities cultures, knowledge and values, technology, innovations and applied R&amp;D at a local level.</li> <li>• To support community level interventions and innovations to adapt to climate change impacts and climate variability within the broader sustainable development context.</li> <li>• To enhance local capacities for adaptation to climate change impacts.</li> </ul> <p><u>Outcomes include:</u></p> <ul style="list-style-type: none"> <li>• Capacity strengthening among NGOs and CBOs for</li> </ul>	<p>The CCPS and the MCCAP are complementary in the following adaptation activities:</p> <ul style="list-style-type: none"> <li>• Awareness raising and capacity building on climate change adaptation;</li> <li>• Documentation and dissemination of lessons learned and best practices on community-based and cost effective climate change adaptation measures;</li> <li>• Community based monitoring and management of the resource base;</li> <li>• Integrated climate change risk reduction measures into coastal zone management practices ;</li> <li>• Support to livelihood</li> </ul>

	<p>designing and implementing community based adaptation measures undertaken;</p> <ul style="list-style-type: none"> <li>• Realization and mainstreaming of adaptation;</li> <li>• Lessons and practices from SIDS CBA initiatives included in relevant national and subnational policies and development programmes;</li> <li>• Up scaling practices and sharing knowledge for increased up take of community based adaptation experiences from SIDS CBA documented for replication purposes.</li> </ul>	<p>diversification/resilience. While the MCCAP focuses primarily on coastal fishing communities in the Corozal, Belize and Stann Creek Districts, the CCPS has a national and broader focus.</p>
<p>Bertarelli Foundation</p> <p><b>Project name: Management of the Turneffe Atoll Marine Reserve</b></p> <p>Status: Approved</p>	<p><u>Objective:</u> To declare and support the management of the Turneffe Atoll Marine Reserve (TAMR).</p> <p><u>Outcomes:</u></p> <ul style="list-style-type: none"> <li>• To be determined by the Ministry of Forestry, Fisheries and Sustainable Development (MFFSD).</li> </ul>	<p>The TAMR is one of the priority MPAs targeted under the MCCAP. While the MFFSD has not determined the specific use of the £3 million donation from the Bertarelli Foundation, the Ministry has agreed that the funding will complement the support provided by the MCCAP. The MCCAP would therefore focus on securing replenishment zones and management areas within the Turneffe Atoll Marine Reserve and the other two priority MPAs, as well as enhancing the monitoring of the three MPAs, as well as of replenishment zones, and marine managed areas.</p>

92. The proposed Project would draw lessons from the GEF-funded Conservation and Sustainable Use of the Barrier Reef Complex project managed by UNDP (1999-2004). The project purpose was to provide decision-makers and relevant stakeholders with analytical, management and technical capacities, decision making and planning tools, and financial mechanisms and economic instruments for long-term conservation of coastal and marine biodiversity. While the project contributed to the adoption of the National Integrated Coastal Zone Management (ICZM) Strategy in 2003, the worsening economic conditions facing Belize have clearly constrained the Government’s ability to focus on and continue to implement this program at levels necessary to achieve project outcomes over the long-term. The ICZM Plan has been developed during the past year involving key stakeholders through extensive consultations with local residents, scientific experts, and various government agencies. Development of the

proposed Project spurred the approval process of the Plan, which includes submission to the Coastal Zone Management Authority and Institute (CZMAI) Board in March 2013 and onward submission to the Cabinet for approval. The project would support the Government of Belize to implement the ICZM Plan as a crucial management tool that would provide a coastal zoning plan for Belize. The ICZM Plan would reflect an analysis of vulnerabilities of coastal habitation, existing tourism infrastructure, and planned development to climate impacts such as storm surge, siltation, and coastal effluents. An approach to implement the Plan is to promote the support from and engagement of stakeholders by providing information, guidelines, and tools that facilitate good planning and use of coastal zones. For example, a GIS tool can run models of scenarios to explore what are the possible consequences of the proposed development in certain lands within the coastal zones. The approach would keep momentum of the public awareness which has grown considerably through the consultations of the Plan.

93. The proposed Project would build upon the achievements of the Mesoamerican Barrier Reef System (MBRS) project (2001-2007). The first MBRS project facilitated the cooperation among Belize, Guatemala, Honduras, and Mexico through the adoption of a common policy framework for transboundary sustainable management of resources in the areas of fisheries, tourism, and Marine Protected Areas (MPAs).

**G. If applicable, describe the learning and knowledge management component to capture and disseminate lessons learned.**

94. **Awareness raising campaign:** One of the key activities of the project is that of climate change education and raising awareness as it relates the coastal and marine ecosystems. Addressing this area of need across the various priority sectors (tourism, fisheries) will be one of the activities under the project. Information on the value of coral conservation and impacts of climate change is disseminated to the local people through consultations, behavior change campaigns, and direct involvement in the coral repopulation efforts. Also the sustainable alternative livelihoods activities will be carefully selected and consulted with the local communities to promote support to/participation in the activities. The target audiences are: 1) fishers, 2) eco-tourism operators, 3) coastal communities, 4) private sector, 5) women, and 6) youth and particularly students in target areas. These activities are quite important for Belize where the general population, including fishers and those who reside in the coastal areas, feel that they do not have enough information and knowledge about climate change and its implications to their lives. There is especially little understanding of the linkage between the anthropogenic stressors and the health of marine and coastal ecosystems, and the environmental/social/economic adaptation benefits that healthy ecosystems would bring in the face of intensifying impacts of climate change. Indeed consultations held earlier during project preparation with a wide cross section of stakeholders confirmed that there is a need for greater public awareness and education as to the current and likely impacts of climate change and appropriate adaptation strategies. In order to ensure that the proposed climate change education and awareness raising component of the project is based on a proper understanding of the current level of knowledge, attitudes and practices of the target population, a climate change knowledge, attitude and behavioral practice (KAP) survey would be conducted to identify needs and understand gaps in the knowledge, attitudes and behavioral practices of Belizeans (especially in coastal communities), with respect to climate change. The KAP survey will utilize a combination of survey design methodologies, such as stratified random sampling, purposive sampling and

cluster sampling. The KAP survey will be conducted throughout all the targeted coastal communities of Belize, with appropriate representation of the private sector, the public sector, media houses, the general public/residents, women, men, and children in rural and urban settings, across occupations, income groups and various age categories.

95. The results of the KAP survey will be used in the design of a targeted climate change behavior change communication (BCC) strategy to improve and change the knowledge, attitudes, and practices of targeted coastal communities, thereby increasing capacity for climate change resilient communities and economy. The strategy will provide a framework for delivering targeted key messages on climate change issues to the following target audiences: i) fishermen, ii) eco-tourism operators, iii) coastal communities, iv) private sector, and v) youth and school students. The project will ensure that women and indigenous groups (i.e., the Garifuna) are given special attention. The strategy will recommend actions to raise awareness of climate change and its impacts, and the appropriate medium and method for communicating said actions. The strategy will focus on the adaptation element, which is concerned with impacts of a changing climate on society, the economy and the environment, and promotes activities to reduce vulnerability of marine and coastal ecosystems (and livelihoods) to extreme weather events and other longer term changes in our climate. The BCC strategy will aim to: i) raise the awareness level of coastal communities on the opportunities and threats brought about by climate change, and the roles they can play in adapting to its impacts; and ii) provide guidance and best practice tools on how to communicate adaptation to climate change. The goal will be to create a community that is well informed about climate change and thus make local to global responsible choices.

**H.** Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation, with particular reference to vulnerable groups, including gender considerations.

#### Project Concept Stage

96. All major Government and non-governmental stakeholders were consulted during the development of the original concept document from February to November 2011. The first set of consultations with key stakeholders held between February 21-24, 2011, arrived at the main conclusion that Belize must manage its natural resources in a more sustainable manner and strengthen resilience to climate shocks in order to achieve its medium- and long-term development goals.

97. To this end, the Marine Conservation and Climate Adaptation Project was jointly conceived by the Government and non-governmental partners. The concept and its design was well received by high level Government officials, and resulted in a request to the World Bank for further assistance in materializing this project. Further consultations on the content and scope of the concept document were held with high level Government officials on April 15th, 2011, between May 9th and 13th, 2011, and between November 14th and 18th, 2011. Consensus was developed with regard to the main objective and expected outcomes of the project, as well as the approximate budget amounts for the three components. The concept document was approved by the Adaptation Fund Board in March 23, 2012.

## Project Development Stage

98. A plan for stakeholder consultation, including consultation with the relevant communities and agencies was drafted. Based on the plan, several meetings and site visits were held between July 9 and December 14, 2012. A list of stakeholders consulted during this period can be found in Annex 5. All the key stakeholders had an opportunity to comment on and provide feedback on the three components of the project. The communities especially provided inputs regarding the potential alternative livelihoods that they have been successfully piloting and more opportunities that they would like to pursue under Component 2. Community consultations and focus group sessions, and one-on-one meetings were conducted. The consultation process involved:

- Inception meeting with the Fisheries Department, Protected Areas Conservation Trust, and The Nature Conservancy.
- Field visits to Chunox, Sarteneja, Belize City, Belmopan, Dangriga, and Hopkins to consult with the major project beneficiaries and obtain feedback on the three components and expected outcomes of the project;
- Field visits to Monkey River, Placencia, Sarteneja, Bermudian Landing, Caye Caulker, and Belize City to (i) identify the social impacts of current terrestrial and marine conservation efforts on the livelihoods of the community members, (ii) identify the measures currently in place or being considered to mitigate the adverse impacts identified and (iii) to discuss alternative sustainable livelihood projects that the communities are interested in exploring.
- One-on-one meetings with all key Governmental and non-governmental stakeholders to obtain feedback on the three components and expected outcomes of the project, including:
- Liaising with the Protected Areas Conservation Trust to discuss fiduciary management arrangements; and
- Meeting with the Minister of Forestry, Fisheries and Sustainable Development; the CEO of the Ministry of Forestry, Fisheries and Sustainable Development; and the Fisheries Administrator to discuss implementation arrangements and project components.
- Review meeting with key Governmental stakeholders for concurrence with the draft project proposal. These stakeholders were given a draft of the main project proposal sections (e.g., narrative of the three project Components, Results Framework, Budget, Implementation Arrangements) so that comments could be collected and addressed in the final draft of the project proposal.
- Comments on final draft of the project proposal. The consultations held confirmed the project components and helped to further define the specific activities to be undertaken. The importance of improving the management of marine resources was also validated. Fishing communities expressed their willingness to engage in alternative livelihood activities and expect that the project will provide resources to support their transition. It

also became clear that a mobilization aspect to the project was necessary to ensure a strong uptake of project resources given the fact that fishers have a low level of education and without support would not be able to navigate formal requirements.

99. Both men and women were involved in the consultations at the community level. Women were specifically targeted in Sarteneja, the largest fishing village, and in Dangriga and Hopkins, both being indigenous communities. During the consultations the project components and proposed activities were outlined and feedback on suitability and relevance to needs was solicited. Communities were also asked to indicate whether the project conflicted with or complemented other projects currently being done or which had been recently completed. Concerns of the community were documented even if they did not relate directly to the project subject areas. As a result of consultations, key feedback was received that formed the basis for the elaboration of the project activities.

100. Consultations will continue throughout the life of the project and will involve the key Government authorities, as well as the key non-governmental organizations, and fishermen associations and cooperatives such as the Sarteneja Alliance for Conservation and Development, the Turneffe Atoll co-management agency, Sarteneja Fishermen Association, Dangriga Fishermen Association, Northern Fishermen Producers Society Limited, National Fishermen Producers Society Limited, Placencia Fishermen Producers Society Limited, and the Belize Fishermen Federation. The future consultation efforts will build on the methodologies used in the project development phase and extend to include: on-going evaluation of interventions, periodic meetings with stakeholder groups (e.g. local fishermen's cooperatives, and associations), and feedback mechanisms established via the Project Steering Committee and the Project Implementation Unit. These types of consultations are considered critical to the process of adaptive management and ownership building necessary for successful project implementation.

I. Provide justification for funding requested, focusing on the full cost of adaptation reasoning.

Component 1: Improving the protection regime of marine and coastal ecosystems.

101. **Baseline:** While the on-going marine conservation measures have been crucial in protecting the critical marine and coastal ecosystems, they have been lacking in programmatically mainstreaming specific climate adaptation into their activities. Under the business-as-usual scenario and as identified in the NPASP, the Marine Protected Areas' (MPA) (including no-take replenishment zones) comprise 13% of marine ecosystem habitats, and Marine No-Take Replenishment Zones constitute approximately 2% of marine ecosystem habitats. While these figures are not small in terms of conservation, they would not be enough to increase the resilience of corals to face the impacts of climate change and the increasing anthropogenic stressors. In this scenario, lobster and conch production continues to decline (by 70% and 50%, respectively, since 2004). The current level of budget for managing these three MPAs through the Government budget allocation (approximately US\$161,104) is not sufficient to effectively manage the existing MPAs. The shortfall is estimated at US\$1.5 million annually.

102. A significant reduction of coral cover would expose the coastal areas to storm surges and coastal erosion. In addition, the local economies which rely on fisheries and tourism which in turn depend on the coral reefs and associated ecosystems would be severely affected. Once the corals are gone, there is no easy way to revive the reefs. In fact, there are no systematic actions to restore the critical reef-building corals which have been massively severed by frequent bleaching events in recent years.

103. Spawning aggregations of reef fish in Belize have been heavily depleted from historical levels. Nassau grouper, the most well-studied species has been depleted to the point that localized extinction is possible. In spite of intensive efforts to conserve the species in Belize, including new legislation offering both a nearly complete closure of fishing at the species' aggregation sites and a closed season, stocks have reached dangerously low levels. Following national landings statistics, historical exports of finfish from Belize exceeded 500,000 pounds per annum between 1976-1992, peaking at a million pounds in 1983 (Figure 8). A rapid drop in exports started in the mid 1990s and has not rebuilt. Nassau grouper roe was sold largely in-country but was still being exported during the mid 1990s, reaching a peak of 1,000 pounds in 1996. This practice was halted by 1999 but the damage had already been done.

104. Nationally, lobster and conch rank as number one and two marine exports with a contribution in 2010 of US\$7.14 million and US\$3.31 million, respectively (Ministry of Agriculture and Fisheries 2010). However, these precious resources are under tremendous pressure and saw a 70% and 50% decline respectively from 2004 to 2009 country-wide (Fisheries Department 2009). Turneffe alone accounted for a reduced 6.2% of lobster and 2% of conch sold nationally and to cooperatives, down from an approximate 20% and 6.2% respectively of national supply (Turneffe Atoll Trust (TAT), 2011). Presently, tourism contributes 18% of Belize Gross Domestic Product<sup>34</sup>. For Turneffe alone, tourism generates an estimated gross US\$ 23.5 million annually from attractions such as snorkeling, diving, and sport fishing (TAT, 2011). However the Healthy Reefs Report Card for the Mesoamerican Reefs 2010 reports 65% of Belize's reefs being in poor to critical condition and of the five Turneffe sites two are in fair, two in critical and one in poor condition.

105. Under the business-as-usual scenario, the pilot repopulation of corals is supported by a few local researchers without having long-term financing. Although the pilot results have attracted the interests of the Government and the international coral conservation communities, maintaining and scaling-up of the pilot nurseries is not likely to happen. In the meantime, bleaching events and an elevation of sea surface temperature are likely to occur more frequently and intensely, resulting in irreversible damages to the remaining corals in the area. Consequently, the coastal areas will be exposed to storm surges and coastal erosion. In addition, the local people who heavily depend on the coral reefs and associated ecosystems would be severely affected.

106. Climate change is anticipated to result in an increase in natural disasters including floods and droughts. Sea-level rise will also be associated with saline intrusion into coastal aquifers,

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<sup>34</sup> Key Note Belize City - 15 May, 2008 - Biltmore Plaza Hotel - Address by Prime Minister, Hon. Dean Barrow to the 10th Annual Industry Presentation.

affecting the availability of freshwater. Clean water is essential for recovery of corals from a bleaching event. A €2.9 million project funded by the European Union (which started in July 2012) will enhance adaptive capacity and resilience to climate change in the water sector in Belize. Wastewater and lack of proper sewage system not only pose a threat to the country's water resources, but also threaten the growth of corals. In response, the Government of Belize is currently implementing a US\$10 million project with support from the Inter-American Development Bank (IADB) aimed at increased access to wastewater treatment through the development of a new sewerage collection and treatment system in the Placencia Peninsula.

107. ***Adaptation Alternative:*** The project would specifically mainstream climate change adaptation into the on-going efforts by the Government of Belize mentioned under the baseline scenario by increasing the financial resources (approximately US\$2 million) in addition to Government investment, rather than replacing Government investment. The proposed activities would address many of the adaptation measures identified in the First National Communication to the UNFCCC. The project would expand MPAs (up to 20.2%) and no-take replenishment zones (up to 3.1%) and strengthen their enforcement. These are significant and ambitious targets that far exceed what other countries around the world have set aside. Selection of the new sites would take into account the elements to increase climate resilience such as fish spawning sites, resilient coral reef sites, and climate refugia. The project would also support: (i) strengthening of co-management partnerships for effective management of Marine Protected Areas, (ii) implementation of a comprehensive monitoring protocol, (iii) implementation of an Integrated Coastal Zone Management Plan for improved management of the entire Belize reef and coastal zone. If the Project is able to restore the fisheries to the 2004 level, the value from lobster and conch in Turneffe alone amounts to approximately US\$1.62 million. Additionally, reefs and mangroves protect coastal properties from erosion and wave-induced damage, providing an estimated US\$231 to US\$347 million in avoided damages per year. Turneffe is one of the three bio-physical barriers protecting Belize City, Belize's largest urban settlement. From east to west these include Lighthouse Reef, Turneffe Atoll and the Belize Barrier Reef. Underwater, these barriers play an important role in preventing storm surge during extreme weather events. Turneffe Atoll acts as the first line of defense against storms as history has shown that many storms reduce in sustained wind speeds and overall effects as they pass over Turneffe Atoll before approaching the mainland (Wildtracks, 2011)<sup>35</sup>. The annual value of shoreline protection services provided by coral reefs and mangroves of Turneffe is estimated at US\$38 million (TAT, 2011).

108. In addition, the project would accelerate natural recovery from and adaptation of reef coral populations to the increasing sea surface temperature, frequent bleaching events, and intensified extreme weather events through repopulation of coral reefs with resilient native varieties grown in the coral nurseries. The project would: (i) establish coral nurseries within the Belize barrier reef system and on at least one of the three atolls, (ii) repopulate coral reefs with resilient varieties grown in the coral nurseries, and (iii) provide training for the local people to participate in the repopulation efforts. The activity would establish nine or more coral nurseries

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<sup>35</sup> The Saffir-Simpson Hurricane Wind Scale is a 1 to 5 rating, in order of increasing intensity, based on a hurricane's sustained wind speed.

within the Belize barrier reef system and on at least one of the three atolls to be out-planted into selected areas to increase natural sexual reproduction and restoration of the reef structure.

109. The cost of these activities is estimated at US\$2 million for the five years of implementation.

Component 2: Support for viable and sustainable alternative livelihoods for affected users of the reef in the areas impacted by project activities.

110. **Baseline:** Of the targeted coastal fishing communities that would be affected by the expansion and securing of the MPAs and no-take replenishment zones, only Sarteneja and Placencia have been engaging in alternative livelihood projects. The Sarteneja Fishermen's Association have set up a pig farming business and have been able to secure funding from the GEF Small Grants Program/COMPACT project for the expansion of this business venture. The Placencia Fishermen Cooperative Society Limited have been engaging in seaweed cultivation and recently installed a seaweed processing facility with funding from the COMPACT project. Additionally, with support from USAID-MAREA, the Placencia cooperative recently secured the services of a consultant to strengthen the management of their seaweed business venture. These two communities are notable exceptions.

111. The other target fishing communities are nowhere near to setting up alternative livelihood ventures. This situation is compounded by the fact that the fishermen from these communities have not organized themselves into a cooperative or an association the way that Placencia and Sarteneja, respectively, have done. Chunox is a case in point. The economy of this community, which is agriculture-based (primarily sugar cane), has been experiencing a significant downturn. Cane farmers have consequently been resorting to fishing as an alternative livelihood, thereby significantly adding to the number of fishermen that originate from this community. The fishermen from the other villages (with the exception of Hopkins and Placencia) depend almost entirely on fishing for their livelihood. There is great potential to set up fisheries-based ventures as well as viable tourism ventures and other alternative livelihoods in these communities, but this requires significant initial capital investments that are not currently available to these communities.

112. Even though there have been various efforts to improve the livelihoods of fishers, the investments have been at insufficient scale to create meaningful impact or have not focused on capacity building and monitoring and evaluation to ensure successful outcome over the medium to long-term, even at Sarteneja and Placencia. Consequently, the socio-economic benefits accruing to communities have been minimal and unsustainable. In this scenario, the number of licensed fishermen and fishing effort would continue to increase, resulting in increasing pressures on the reef and coastal and marine resources. Some of the communities participating in the project continue to be among the poorest in the country despite the potential for income generation from natural resource-based livelihoods.

113. **Adaptation Alternative:** The financing from the Adaptation Fund would be used to support economically viable and sustainable alternative livelihood activities for local populations whose economic activities are directly impacted by the adverse effects of climate change as well as by the expansion and enhanced enforcement of MPAs and replenishment zones. The estimated

cost is US\$2.45 million. By addressing their livelihoods, the activity would contribute to reducing the anthropogenic stressors on the marine resources which in turn would increase the health of reefs and associated marine and coastal ecosystems and their resilience to climate impacts. This activity would specifically support: a) development of community-based viable business ventures for fisheries diversification, alternative livelihoods and employment opportunities, b) capacity building and training to facilitate fisheries diversification initiatives and transition to alternative livelihoods, and c) establishment of a sub-grant scheme to finance initial capital investments in viable options for affected users. Business ventures would include activities related to improving livelihoods, such as building the climate resilience of aquaculture, agriculture, and tourism; empowering local communities by building their capacity to assess their own needs; training for tour guides and scuba diving; seaweed farming and processing, etc. This component will be implemented in partnership with local fishing communities, indigenous communities, private sector (including fishing cooperatives), micro-lending institutions, NGOs, Government of Belize, and multi-lateral and bilateral donors. Affected users from the following communities eligible to participate in this component are: a) Corozal Town, b) Belize City, c) Dangriga, d) Consejo, e) Copper Bank, f) Chunox, g) Sarteneja, h) Hopkins, i) Sittee River, j) Riversdale, k) Seine Bight, and l) Placencia.

Component 3: Raising awareness, building local capacity, and disseminating information.

114. **Baseline:** In 2005, the Caribbean Community Climate Change Centre (CCCCC) commissioned a climate change KAP survey to obtain baseline data to help the CCCCC to make “optimal decisions with respect to climate change issues, adaptation, public awareness and education”. This survey experienced a number of problems, e.g.: 1) a proper survey instrument was not initially designed, 2) the timeframe for the execution of the survey was inadequate, and 3) the sampling scheme was not adequate.<sup>36</sup> The CCCCC KAP survey therefore did not provide reliable information on the extent (in 2005) of community awareness about climate change and its associated impacts. Furthermore, since that KAP survey was not designed to specifically target coastal fishing communities, information about fishers’ awareness and perception about climate change impacts on the reef and coastal-marine resources was not provided.

115. The subject of climate change has been introduced in the public discourse since the preparation and the publication of Belize’s First National Communication to the UNFCCC. Many organizations and institutions have become involved in education and public awareness on the theme of climate change. These range from the government’s Ministry of Education and the Ministry of Natural Resources, to agencies such as World Wildlife Fund Belize among others<sup>37</sup>. However, there is no documented information about coastal communities’ knowledge and perception of climate change and its impacts on the reef and coastal-marine resources and, by extension, on community livelihoods.

116. The fishermen’s cooperatives (which focus on the processing part of the fishing industry) and associations (which focus on the productive part) have not sufficiently built up their

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<sup>36</sup>Source: Belize Climate Change Survey: Understanding People’s Knowledge, Attitude and Behavior (CCCCC, 2005)

<sup>37</sup>Source: Belize’s Second National Communication to the Conference of the Parties of the UNFCCC, July 2009 (edited August 2011)

organizational structures, or defined their institutional strategic direction centered on the fishermen that they represent and the fisheries that they depend on. This situation will likely remain unchanged if funding for institutional strengthening is not made available. In this scenario, the fishermen would not be well represented in the cooperatives or associations and would therefore have little confidence in the information that is shared through these organizations.

117. **Adaptation Alternative:** The proposed awareness raising and capacity building component aims to: a) increase the understanding by local stakeholders about the value of marine conservation and climate change to build support for the National Protected Areas Policy and System Plan (NPAPSP) as a strategy to ensure the long term sustainability of natural resources, b) build local capacity to develop and explore climate resilience strategies, and c) provide regular and accessible public information on climate change effects in the marine ecosystems and coastal zone to promote behavior change designed to minimize climate risks in MPAs and replenishment zones. This will be done via: a) conducting a climate change knowledge, attitude and behavioral practice (KAP) survey to identify needs and understand gaps in the knowledge, attitudes and behavioral practices of Belizeans (especially in coastal communities), with respect to climate change; b) designing and conducting a coordinated behavior change communication (BCC) strategy to change public attitudes and behaviour; and c) supporting the strengthening of fishermen representation at the national level. Well managed and effectively led fishermen associations and cooperatives would be in a better position to support the promotion of marine conservation and climate adaptation measures (such as the enforcement and monitoring of MPAs and replenishment zones) among their members; and to work toward improved competitiveness and access to more lucrative markets. Additionally, these strengthened fishermen organizations would provide an effective platform to share knowledge about climate change among the hundreds of fishermen that they represent, as well as to change attitudes and behaviors as part of a climate resilience development strategy. This would enable climate change awareness communications strategies to effectively reach out to the fishermen via their organizations. The cost of these activities is estimated at US\$0.56 million.

118. The total funding requested from the Adaptation Fund is US\$6 million, including the project execution cost (US\$0.52) and the Implementing Entity fee (US\$0.47 million).

**J. Describe how the sustainability of the project/programme outcomes has been taken into account when designing the project.**

119. The project intends to mainstream climate change concerns to ensure the health and resilience of the marine and coastal ecosystems into the existing management and institutional framework of the Marine Protected Areas, thus adaptation measures would be sustained over the long-term. The proposed AF project forms a part of the GOB-WB partnership on sustainable natural resource management and climate resilience. While the AF project focuses on the climate adaptation in MPAs and coastal zones, other projects complement it by building sustainability in various areas. The GEF Strengthening National Capacities (SNC) Project aims to build legal, financial and institutional capacities for effective management of PAs. A major expected outcome of the SNC project is for the National Protected Areas System to be supported by

modernized and diversified financing thereby increasing the sustainability of the PA system. This will be accomplished in part by developing a Protected Areas Fee Policy and an accompanying Implementation Framework (to be operationalized in 2014) so as to increase the efficiency and effectiveness with which fees are collected, administered and reinvested. The GEF Management of Key Biodiversity Areas Project would strengthen the regulatory framework of the PA system. The Japan Social Development Trust Fund Project would support the diversification of livelihoods in forest and coastal communities. The Belize Climate Resilient Infrastructure Project financed by the WB would improve the resilience of critical infrastructure such as primary and secondary road networks, critical bridges, and drainage systems.

120. The Protected Areas Conservation Trust (PACT) will continue to play an important role in protected areas financing in Belize. The bulk of PACT's income is derived from a conservation fee and cruise passenger head tax. An important strategic goal for PACT is to strengthen and diversify its funding base through active fundraising and investment for conservation. While PACT's current level of financing has not been sufficient to meet its mandate and demands placed on it, the Trust Fund is well positioned to grow its funding base over the next five years by capitalizing on several innovative fund raising opportunities (such as conservation bequests). PACT is currently negotiating with a private donor to secure a US\$10 million conservation bequest that would establish a new endowment fund managed by PACT, finance conservation projects (including MPA management), and leverage additional funding for PA management. As a founding member of the Mesoamerican Reef Fund (MAR Fund), PACT is also well positioned to secure additional protected areas funding for Belize. For example, through a KfW Phase II initiative (German funding), the MAR Fund has secured a funding assignment for two projects in Belize totaling \$624,000 for the South Water Caye Marine Reserve and \$550,000 for the Corozal Bay Wildlife Sanctuary. PACT administers MAR Fund grants in Belize.

121. Also the project intends to strengthen co-management partnerships with the fisher communities and enhance their ability to effectively participate in the conservation of marine resources once productivity and managed use of resources are secured. Co-management partnership is a form of agreement between the Government of Belize and local, private, NGO, and national level organizations for the management of protected areas, which has increased in number since the 1990s. By partnering with locally active stakeholders and decentralizing responsibilities, a more effective park management regime has been created in many protected areas where the government resources were limited. Co-management partners have the authority to manage funds for the operations, including the identification and securing of grant funding, and the diversification of financing mechanisms. Also fundraising effort can include entrance fees, user fees and concession fees. The project aims to specifically promote the long-term partnership for the target MPAs with Sarteneja Alliance for Sustainable Development (SACD), Turneffe Atoll Sustainability Association, and other key fishermen cooperatives. Also, alternative livelihoods activities to be supported under Component 2 would specifically be chosen to be economically viable and climate resilient, thus providing strong incentive for local populations to engage continuously in those alternatives. The combination of self-regulation and economic viability of local livelihoods is a key aspect of sustainability. Strong interest and support from local stakeholders in climate issues is vital for securing financial and political backing for the sustainability of adaptation measures proposed under the project. Thus, the

project would promote awareness raising, targeted training, and dissemination of information to local stakeholders.

122. Recognizing that the world's oceans are under severe threats, the World Bank is committed to enhancing the sustainable development of the oceans and, together with many other partners, embarked on the Global Partnership for Oceans (GPO) launched in February 2012. The objective of the GPO is to sustainably enhance the economic, social and ecological performance of the oceans' ecosystems and living resources, with improved benefits captured by coastal and island developing countries. The proposed project is fully aligned with the GPO in that the project would support practical climate resilient measures that sustainably enhance the natural capital along the Belizean coast, on which many of the vulnerable groups in Belize depend. Belize intends leverage funding from the GPO which would target the Caribbean as one of the priority pilot regions, focusing on overfishing, water pollution, and habitat loss. The GPO is a growing alliance of more than 100 governments, international organizations, civil society groups, and private sector interests committed to addressing the threats to the health, productivity and resilience of the world's oceans. The GPO is intended to be a long-term partnership that facilitates financing, governance, and knowledge and best practices sharing aimed at enhancing sustainability of the marine ecosystems such as those in Belize. The pilot investment mechanism is expected to be available in the near future.

123. The Caribbean Challenge, a region-wide campaign led by The Nature Conservancy, to protect the health of the Caribbean's lands and waters is extending the invitation to Belize to participate. The participating Caribbean nations have come together to develop sustainable financing for protected areas through the establishment of the Caribbean Biodiversity fund, which currently has funding commitments of over USD \$40 million.

124. The Government of Belize has been contemplating a potential debt for adaptation transaction aimed at capitalizing a trust fund that would sustain the marine conservation and climate adaptation activities over the long term (Marine Conservation and Climate Adaptation Initiative). The GOB is currently in the process of restructuring superbond. The development of the Initiative will be resumed as soon as the new superbond structure is signed.

125. While the three target PAs are all in the marine environments; they differ greatly in their management regimes. Of the three, two are marine reserves (SWCMR and TAMR) which fall under the jurisdiction of the Fisheries Department and the Fisheries Act. The other, CBWS, is a wildlife sanctuary and falls under the jurisdiction of the Forest Department and the National Parks System Act. The SWCMR is under the management of the Fisheries Department while the CBWS is under some basic management structure via co-management agreement with the Sarteneja Alliance for Sustainable Development (SACD), and TAMR is soon to be placed under active management. Currently, small government financial allotments in combination with user fee collection are the constant source of financial support for MPA management. These are often times supplemented by grants and project funding from local and international donors. Fees collected by MPAs are submitted to the GOB general revenue and is then proportioned out and re-distributed to the MPAs. Of the three targeted MPAs, only SWCMR currently collects user fees (US\$10).

126. The major objectives of marine protected areas in Belize are for the conservation of ecosystem and species diversity, protection of commercially valuable species and the management of tourism and recreational activities. Key principles adopted in the designation and management of MPAs are the habitat approach where activities are managed based on impacts to associated habitats; the land–sea interface which recognizes the importance of managing adjacent terrestrial areas; participatory process to include the views, inputs and encourage support of stakeholders; and collaborative management between government, NGOs and local communities. Marine Protected Areas are established following a comprehensive system of planning based on scientific data, mapping of critical habitats and uses, assessments of the area, public consultation, etc. Stakeholder participation in the management of MPAs is accomplished through the establishment of advisory committees, which provide advice on critical areas for management. Based on the particular objectives, MPAs are designated ranging from no-take MPAs (which do not allow any type of extraction) to multiple use MPAs (which allow a range of activities including fishing, recreation, tourism, research). Marine Protected Areas in Belize are established based on classification according to the IUCN system for protected areas, under two pieces of legislation. Marine Reserves are established through amendments to the Fisheries Act (Regulations of 1983 and 1988) under the Fisheries Department. National Parks, Wildlife Sanctuaries, Natural Monuments and Nature Reserves are established through the National Parks Systems Act under the Forest Department.

127. The overall goal of Integrated Coastal Zone Management (ICZM) in Belize is to support the allocation, sustainable use and planned development of Belize’s coastal resources through increased knowledge and building of alliances, for the benefit of all Belizeans and the global community. There are three major objectives of ICZM which include: increasing knowledge and sustainable coastal resource use; supporting planned development; and building alliances to benefit Belizeans. The formulation of an ICZM Plan for Belize was based on the following principles: a balance between conservation and development; cross-sectoral and interdisciplinary decision making; high quality research and data management; application of environmental best practices in the coastal zone; application of the precautionary principle; decisions that incorporate the knowledge, aspirations and requirements of local communities; recognition of all national, regional and international activities and initiatives for management of natural resources, and factors in climate change impacts and adaptation initiative. The ICZM Plan utilizes the approach of multi-sectoral coordination in ensuring that cross-sectoral decisions reflect an integrated coastal resource management. The implementation of the ICZM Plan will be regulated through a primary piece of legislation, the Coastal Zone Management Act of 1998, which under this project will be revised to reflect the current needs of ICZM. This will aid Belize Barrier Reef and associated coastal-marine ecosystems to become more resilient to climate change effects.

128. The alternative livelihoods to be supported by the project will be derived with the full participation of direct beneficiaries to ensure that there is buy-in from the outset. The participatory approach to be undertaken will also ensure that there is collective responsibility for the development and eventual success of the subprojects by ensuring that there are sufficient and adequate organizational structures. The business plans will ensure that activities undertaken are feasible and viable and can be carried out in a systematic way. In addition, subprojects will have a strong marketing component to ensure that the activities follow the full business cycle with the support of a marketing professional. The direct support and active mentoring to beneficiaries as

they commercialize their activities is critical to the sustainability of the business ventures as fishers have limited business training and skills.

129. The design of the project followed an inclusive and participatory process. This approach will continue during implementation to ensure social sustainability. Special attention is given to the indigenous and women to ensure that they are able to participate and benefit from the project activities. The traditional relationship of indigenous people to the resources and the role of women in fishing communities will be given due consideration during the development and implementation of subprojects as they were during the design of the project. The benefits to be gained by community members from the project are expected to be culturally appropriate.

## PART III: IMPLEMENTATION ARRANGEMENTS

a. Describe the arrangements for project / programme implementation.

130. **Government of Belize (GOB):** The Financial Secretary, Ministry of Finance (MoF) is the designated authority which is charged to endorse the proposed Adaptation Fund Project.

131. **Implementation Agency:** The Protected Areas Conservation Trust (PACT) is accredited as the National Implementing Agency (NIE) for Belize by the Adaptation Fund Board. PACT will therefore execute the project on behalf of the Government of Belize (GOB) and will be responsible for the overall implementation of the project, including environmental and social safeguards, financial management and procurement. For sub-projects under Component 2, PACT will be the administrator of grant funds on behalf of communities as opposed to a microfinance lender, thus Financial Intermediary (OP 8.30) will not be triggered. PACT is a statutory body and Belize's national environmental trust fund. PACT was established to serve as Belize's long term financing mechanism for conservation and protected areas management. PACT's core competencies include:

- **Grant Management:** PACT's grants program was established in 1997 and currently the portfolio of grants include small grants ranging from US\$5,000 to large grants of US\$200,000. To date the PACT has invested over US\$10 million in grants throughout Belize to support the management of Belize's protected areas. PACT also manages the grants program of PACT Foundation (a private foundation established under the Tropical Forest Conservation Agreement with the United States Government. PACT is also a founding member of the Meso-American Reef (MAR) Fund—a regional non-government environmental fund for which PACT manages the grants awarded by the MAR Fund in Belize.
- **Resource Mobilization:** As Belize's national environmental trust fund, PACT serves a brokering role for funding by assisting the government and non-government organizations to prepare project application to various international agencies including the Global Environment Facility (GEF), Conservation International, The Nature Conservancy and the Oak Foundation among others. PACT has been able to leverage over US\$5 million dollars in co-financing and serve as the major local financier of

national projects supported by the Global Environment Facility for implementation of Belize's program of Work on Protected Areas.

- **Fiduciary Management:** PACT serves as the fiduciary for the National Protected Areas Secretariat — the government unit that coordinates the implementation of the National Protected Areas Policy and Systems Plan. Grants awarded to the Government of Belize for the work of the Secretariat and the system plan is managed by PACT. To date, PACT has managed grants from GEF, TNC, Oak Foundation and the United Nations Office for Project Services (UNOPS) on behalf of the Government. The PACT has sufficient financial management and institutional capacity to have been recently accredited by the Adaption Fund as the National Implementing Entity for Belize.

132. PACT will bear full responsibility for the overall management of the MCCAP project, and will bear all financial, monitoring, and reporting responsibilities to the World Bank, on behalf of the Government of Belize. As the accredited NIE for Belize, PACT has the following responsibility to the Adaptation Fund Board<sup>38</sup>: 1) provide semi-annual reports on Adaptation Fund projects. PACT has instituted the following systems as required by the AFB for accredited NIEs: 1) a formal internal control statement signed by its Executive Director and the PACT Board, along with financial statements; 2) a Finance and Audit Committee; and 3) a public anti-fraud policy that demonstrates a zero tolerance attitude.

133. **Project Implementation Unit:** PACT, in close collaboration with the Fisheries Department under the MFFSD, will establish a dedicated Project Implementation Unit (PIU) that is responsible for the day-to-day operations of the project and reporting to the PSC. The PIU will consist of a project coordinator, key technical staff, financial management and procurement staff. The PIU will assume key administrative and operational functions, including: a) development of annual work plans; b) management and supervision of sub-projects for alternative livelihoods; c) procurement, disbursement, and financial management; d) monitoring and evaluation (e.g., preparation of financial reports and annual implementation reports); and e) ensuring compliance with World Bank Fiduciary and Safeguards Provisions for governance and program implementation. The PACT is responsible for project monitoring and reporting requirements of the Adaptation Fund and the World Bank. The PIU will be housed at the CZMAI building and office complex in Belize City.

134. The **Project Coordinator (PC)** oversees the implementation of MCCAP and is responsible for the development and implementation of the project work plan and budget and also in managing project resources and support staff. He/she implements the policies, regulations, and procedures approved by the PSC for the project and outlined in the Operational Manual. He/she also liaises with the PACT Executive Director for financial and fiduciary management matters, and with the Fisheries Administrator (MFFSD) for technical matters, as well as with other MCCAP implementation partners. The PC reports to and provides regular reports to the PSC on all aspects of project activities.

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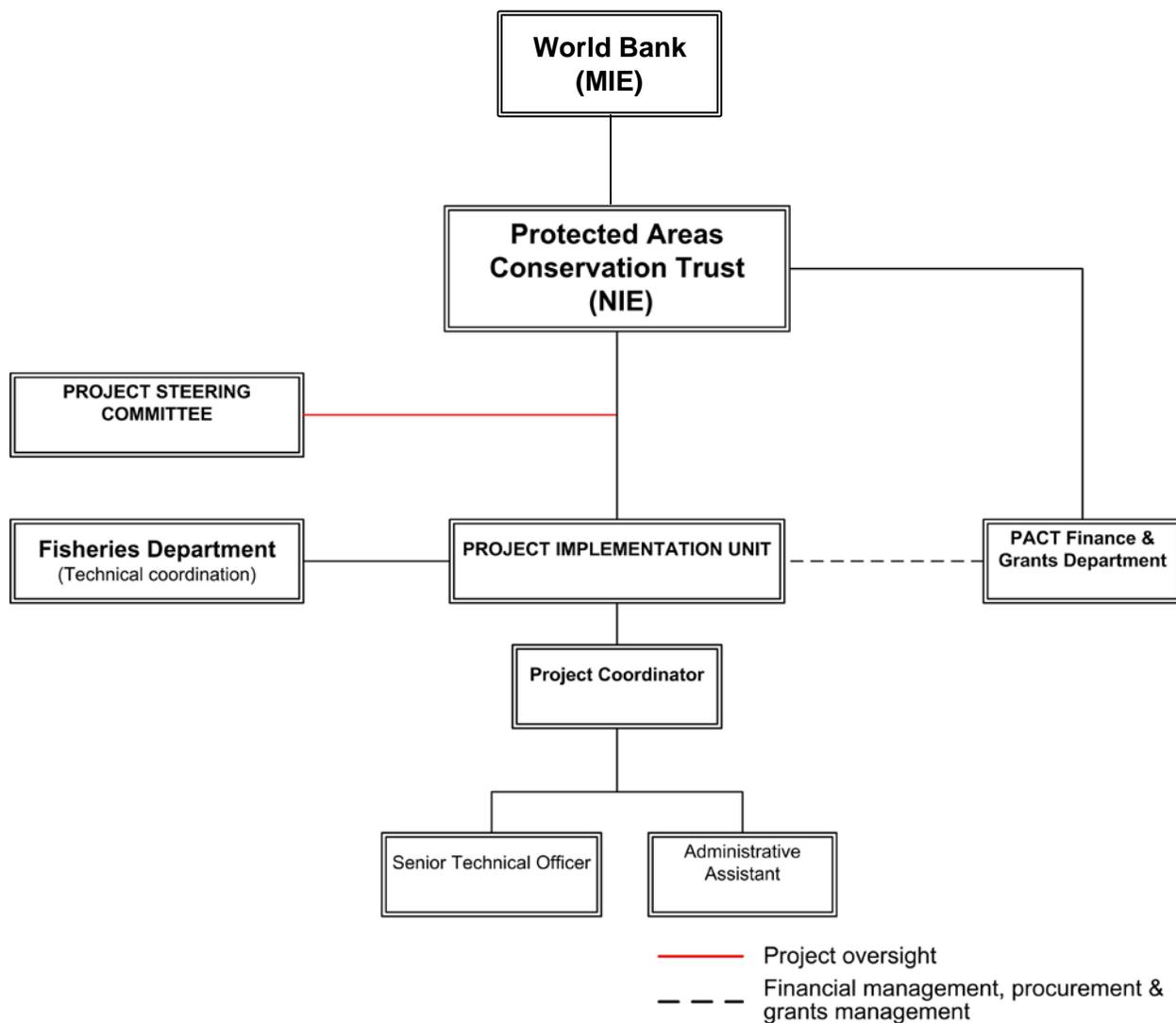
<sup>38</sup>For the MCCAP project, PACT (the NIE) will submit reports to the World Bank (the MIE), which will in turn report to the Adaptation Fund Board.

135. A **Senior Technical Officer (STO)** will be responsible for providing technical guidance to approved projects and grants. The STO will monitor and provide technical guidance to approved projects that support viable and sustainable alternative livelihoods for affected users of the reef in the areas impacted by project activities. This will include overseeing and providing technical guidance to the grants application and approval process for alternative livelihood projects, with the assistance of the PACT Grants Program Staff, which comprises the following personnel: Grants Director, Senior Grants Officer, two Grants Officers, and a Grants Program Clerk.

136. An Administrative Assistant (AA) will provide administrative and office support to the project staff. The AA will also create and operate a database of information generated through the project. The organizational structure of the Project Implementation Unit is shown at Figure 9.

137. PACT will be responsible for the accounting and financial management of the MCCAP and will ensure that General WB Financial Management and Policy Guidelines are fully complied with. PACT will also be responsible for managing all aspects of procurement and contracting under the project ensuring that General WB Procurement Guidelines are fully complied with. If it is deemed necessary, additional staff would be hired to supplement PACT's current staff skills.

**Figure 9: Project Implementation Unit Organizational Chart**



138. **Project Steering Committee:** A Project Steering Committee (PSC) drawn from a cross section of stakeholders in the marine and coastal resources management field with particular reference to the priority areas identified will be established by the MFFSD to oversee the project via the PIU. The PSC will comprise the key stakeholders including the relevant ministries (Ministry of Finance and Economic Development, MFFSD, etc.). The PSC will review the annual work plans and annual implementation reports, and will provide guidance to the PIU. The PSC will be chaired by the Chief Executive Officer of the MFFSD. The Executive Director of the PACT shall serve as the Secretary of the SC, while the Fisheries Administrator of the MFFSD shall serve as the Vice Chairperson. The MFFSD will establish a PSC to provide oversight and technical guidance for the implementation of the MCCAP. The PSC will be chaired by the Chief Executive Officer of the MFFSD. Members of the PSC will be nominated by their respective ministries and/or organizations and appointed by the MFFSD. Members are

appointed for the entire duration of the MCCAP. The PSC comprises the following members: Chairperson – CEO, MFFSD; Vice-Chairperson – Fisheries Administrator, MFFSD; Secretary – Executive Director, PACT; CEO, Coastal Zone Management Authority & Institute; Senior Advisor, Ministry of Finance; Economist, Policy & Planning Unit, Ministry of Economic Development; Coordinator, National Protected Areas Secretariat; Executive Director, SACD; Representative, Turneffe Atoll Marine Reserve management agency; Representative, South Water Caye Marine Reserve; Representative, Belize Fishermen’s Federation; and Representative, Belize Fishermen’s Cooperative Association. All PSC meetings will have their proceedings recorded in minutes describing the topics discussed and decisions adopted. Preparation of minutes is the responsibility of the PACT Executive Director, in his/her role as PSC Secretary, who appoints a Recording Secretary to take notes of the proceedings at all PSC meetings. Minutes must be prepared and issued by the Secretary within a period not exceeding five working days after the meeting, upon clearance by all PSC members present at the meeting. All PSC members attending a meeting have the right to demand the incorporation of his/her individual opinion in the meeting minutes.

139. **Multilateral Implementing Entity:** The World Bank has been requested by the GOB to act as the multilateral implementing entity and submit the proposal to the Adaptation Fund Board. The World Bank will bear the full responsibility for the overall fiduciary management of the Project financed by the Adaptation Fund, and will bear all financial, monitoring, and reporting responsibilities to the Adaptation Fund Board. The World Bank will also provide required technical assistance and capacity building for PACT to act as the executing agency for the project.

140. **Key Implementation Partners:** a) Turneffe Atoll Sustainability Association; b) Sarteneja Alliance for Conservation and Development; c) Belize Fishermen’s Federation; d) Belize Fishermen’s Cooperative Association; e) Southern Environmental Association; f) Dangriga Fishermen’s Association.

141. Further specification of responsibilities, staffing and reporting is provided in the Project Operational Manual.

**b. Describe the measures for financial and project / programme risk management.**

142. The following table summarises the risks and issues of the proposed Project:

**Table 10: Risk Matrix**

<b>Risk Category</b>	<b>Risk Rating</b>	<b>Risk Description</b>	<b>Proposed Mitigation Measures</b>
<b>1. Project Stakeholder Risks</b>			
1.1 Stakeholder	Low	Stakeholders (local fishermen, tourism business owners, and NGOs) do not support the proposed scheme.	An intensive awareness raising campaign would be carried out to increase the understanding and following buy-in of the local communities. The Operational Manual of the Project will mandate that it will support only activities that comply with sound environmental and social safeguard policies. A program of alternative livelihoods is envisioned under the proposed Climate adaptation measures.
<b>2. Operating Environment Risks</b>			
2.1 Country	Low	Future Governments may not support the goals, targets and commitments of the Project.	The proposed Project has been developed as part of the Bank's Country Partnership Strategy (FY12-15) supported by the Government of Belize.
2.2 Institutional (sector & multi-sector level)	Low	The Government does not meet certain policy and regulatory commitments (e.g. restrictions on ability to de-reserve, additionality commitment, etc.) in accordance to mutually agreed targets (UE, UNDP-GEF, WB-GEF) as in the past projects (e.g., GEF project)	The Government's commitment has been confirmed at the Ministerial level through on-going efforts to improve regulatory and institutional framework of MPAs and coastal zones.
<b>3. Executing Entity Risks (including FM &amp; PR Risks)</b>			
3.1 Capacity	Medium-Low	The Executing Entity selected for the Adaptation Fund Project is not equipped with enough capacity to manage the financial transactions and to implement the climate adaptation measures in the future.	The Protected Areas Conservation Trust (PACT) has been selected as the EE for its capacity and experience in managing many donor funded projects. PACT has recently been accredited by the Adaptation Fund as the NIE for Belize and is therefore equipped with the requisite personnel and experience to oversee the execution of the project.
3.2 Governance	Low	The governance structure, operational guidelines and other institutional policies of the PACT are altered over time and do not conform to the adequate standards.	PACT is a Statutory Body established by the Protected Areas Conservation Trust Act, No. 15 of 1995 and governed by a ten member Board of Directors. Its jurisdiction is expressly set out in the Act, therefore, makes switching, sharing or evasion of responsibility more difficult.
3.3 Fraud & Corruption	Low	Fraud and corruption occur after the proposed Project is completed.	The PACT Act empowers the Minister of Finance, currently the Prime Minister of Belize, to commission audits of the PACT. Also the governance structure of the PACT, prescribed by the Act, ensures that there is

			adequate representation from both the government and non-government constituents. The non-government representation constitutes the Board majority and includes large non-government organizations and community representation as well as an independent finance expert. Despite being a public Trust, the Governance arrangements are in line with best practices in place within the Latin American and Caribbean Network of Environmental Funds (REDLAC). Additionally, the PACT Board has strengthened its anti-corruption policies, which was a requirement for PACT's NIE accreditation by the Adaptation Fund Board.
<b>4. Project Risks</b>			
4.1 Design	Low	Program of climate adaptation measures is too ambitious.	The activities build upon or scale up on-going efforts in the country and are complemented by the programs under the Bank's Country Partnership Strategy.
4.2 Social & Environmental	Medium-Low	Downstream conservation and climate adaptation activities will create social and environmental concerns.	The operational manual of the Project will mandate that all activities supported by the Project comply with safeguard policies of the World Bank.
4.3 Program & Donor	Low	Other donor's program overlaps with the proposed activities.	Donor coordination will be led by MFFSD and PACT.
4.4 Delivery Quality	Medium-Low	Alternative livelihoods activities may not be implemented or may be poorly implemented.	Alternative livelihoods are strongly supported by MED and MFFSD. The Bank together with MFFSD will maintain close supervision and technical assistance as necessary to ensure the quality of implementation.

**c. Describe the monitoring and evaluation arrangements and provide a budgeted M&E plan. Include break-down of how Implementing Entity's fees will be utilized in the supervision of the monitoring and evaluation function.**

143. On-the-ground monitoring and evaluation (M&E) of the project activities will be the responsibility of the PACT. Compiling the information gathered, the PIU through PACT will report regularly to the Bank which will in turn report to the Adaptation Fund Board. The format of reporting and detailed steps is defined in the Project Operational Manual. The M&E system is based on the Results Framework presented in the next section. The PIU would carefully review the progress of the project activities during regular field missions and, if necessary, suggest any appropriate adjustments in the results framework for the project, including milestones, targets and indicators. Such adjustments would require a written consent by the Bank.

144. In addition to the regular monitoring, PACT will carry out a Mid-Term Evaluation at the end of the second year of implementation. At the end of the final year of the Project, the GOB will carry out a Final Evaluation which will be the basis of the GOB's Completion Report. Both evaluations will integrate findings from the existing M&E system and will also conduct overall assessments of project implementation to determine if the intended project outcomes and results are being achieved.

145. The indicative budget for monitoring and evaluation, which will be financed out of the project MIE cost, is shown in Table 11.

**Table 11: Monitoring and Evaluation Costs**

<b>M&amp;E Activity</b>	<b>Frequency</b>	<b>Responsible</b>	<b>Cost</b>
Project Inception Workshop	At start of project	PIU	2,000
Project Progress Report	Quarterly	Project Coordinator	Nil
Field Visits	Quarterly; As necessary	PIU/NIE	50,000
Consultant Reports	Per Activity	Consultants	Nil
Mid-Term Evaluation	At project mid-point	Consultants	25,000
Final Project Evaluation	At end of Year 5	Consultants	30,000
		<b>TOTAL</b>	<b>107,000</b>

d. Include a results framework for the project proposal, including milestones, targets and indicators and sex-disaggregate targets and indicators, as appropriate.

146. See Table 12 and 13 below.

**Table 12. Alignment of Project Objectives/Outcomes with Adaptation Fund Results Framework**

<b>Project Objective(s)<sup>39</sup></b>	<b>Project Objective Indicator(s)</b>	<b>Fund Outcome</b>	<b>Fund Outcome Indicator</b>	<b>Grant Amount (USD)</b>
Improving the protection regime of marine ecosystems	Marine protected areas (MPA) coverage increased to 20.2% and areas declared as marine replenishment zones (RZ) increased to at least 3.1% of the Belize’s territorial sea as identified in the NPASP, by the third year of the project	<i>Outcome 5:</i> Increased ecosystem resilience in response to climate change and variability induced stress	5. Ecosystem services and natural assets maintained or improved under climate change and variability-induced stress	1,115,550
Improving the protection regime of coastal ecosystems	Coastal zone managed effectively through implementation of Coastal Zone Management Plan, measured by coastline under protection and no net loss of mangroves	<i>Outcome 7:</i> Improved policies and regulations that promote and enforce resilience measures	7. Climate change priorities are integrated into national development strategy	884,450
Support for viable and sustainable alternative livelihoods for affected users of the reef	Project beneficiaries who have adopted alternative livelihoods and reduced dependency on traditional fishing for household income (at least 2,500 people) , of which 30% are women	<i>Outcome 6:</i> Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas	6.2. Percentage of targeted population with sustained climate-resilient livelihoods	2,450,000
Raising awareness, building local capacity, and disseminating information.	Awareness raising campaigns and dissemination of project information and project supported investments reach 100% and change attitude of 75% of intended beneficiaries	<i>Outcome 3:</i> Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	3.1. Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses 3.2. Modification in behavior of targeted population	560,000
<b>Project Outcome(s)</b>	<b>Project Outcome Indicator(s)</b>	<b>Fund Output</b>	<b>Fund Output Indicator</b>	<b>Grant Amount (USD)</b>
MPAs and replenishment zones expanded and secured in strategically selected locations	The target MPAs are effectively managed as recorded by the Management Effectiveness Tracking Tool	<i>Output 5:</i> Vulnerable physical, natural, and social assets strengthened in response to climate change impacts, including variability	5.1. No. and type of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type of assets)	350,550
	Infractions of rules and regulations in the target MPAs and RZs reduced by 75%			365,000
	At least 3 restored coral sites, with resilient varieties grown in coral nurseries, within TAMR and SWCMR by the end of the project (with each site measuring 300 m2)			400,000

<sup>39</sup> The AF utilized OECD/DAC terminology for its results framework. Project proponents may use different terminology but the overall principle should still apply

Coastal zones effectively managed	75% of coastal developments adhering to the development guidelines set by the ICZM Plan	<i>Output 7:</i> Improved integration of climate-resilience strategies into country development plans	7.2. No. or targeted development strategies with incorporated climate change priorities enforced	784,450
	Mangrove clearance infractions reduced by 100% (that is, infractions of the revised mangrove regulations)			100,000
Livelihoods of affected users of the reef diversified	Alternative livelihoods subprojects elaborated and financed, with 30% of beneficiaries being women	<i>Output 6:</i> Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	6.1.2. Type of income sources for households generated under climate change scenario	2,040,000
	Persons participating in training based on training needs assessment (30% of trainees are women)			410,000
The value of marine conservation and impacts of climate change are understood by local people	Behavior change communication (BCC) campaigns conducted at all the target fishing communities (Chunox, Copper Bank, Sarteneja, Belize City, Dangriga, Hopkins, Placencia, Sittee River, Riversdale and Seine Bight) and reach 100% of fishers	<i>Output 3:</i> Targeted population groups participating in adaptation and risk reduction awareness activities	3.1.2 No. of news outlets in the local press and media that have covered the topic	370,000
	Strategic planning workshops with fishers associations and three fisher cooperatives			190,000

**Table 13: Results Framework**

<b>Project Objective: Implement the priority ecosystem-based marine conservation and climate adaptation measures to strengthen the climate resilience of the Belize Barrier Reef System</b>										
Results Indicators	Unit of measure	Baseline	Cumulative Target Values					Frequency	Data sources/ methodology	Responsibility for data collection
			YR 1	YR 2	YR 3	YR 4	YR 5			
Marine protected areas (MPA) coverage increased to 20.2% of the Belize's territorial sea as identified in the NPASP, by the third year of the project; <b>(Component 1)</b>	%	MPAs share 13% of marine ecosystem habitats as identified in the NPASP.	13	13	20.2	20.2	20.2	Annually	Project reports; Fisheries Department reports; Statutory Instruments	PIU; Fisheries Department
Areas declared as marine replenishment zones (RZ) increased to at least 3.1% of Belize's territorial sea by the third year of the project; <b>(Component 1)</b>	%	Marine RZs share approximately 2% of marine ecosystem habitats as identified in the NPASP.	2%	2.5%	3%	3%	3%	Annually	Project reports; Fisheries Department reports; Statutory Instruments	PIU; Fisheries Department
Coastal zone managed effectively through implementation of Coastal Zone Management Plan, measured by coastline under protection and no net loss of mangroves; <b>(Component 1)</b>	Km	ICZM Plan available for implementation in Dec 2012 allowing for the 386 km of Belize's coastline under better management.	386	386	386	386	386	Mid and end of project	CZMAI monitoring reports; National Mangrove Assessment	PIU; CZMAI; Forest Department
	Hectares	National mangrove status in 2012 is 74,480 hectares	74,480	74,480	74,480	74,480	74,480			
Project beneficiaries who have adopted alternative livelihoods and reduced dependency on traditional fishing for household income (at least 2,500 people) , of which 30% are women; <b>(Component 2)</b>	% fishers	To be confirmed at start of project	29	35	40	45	45	Annually	Project reports; Independent evaluations	PIU
	% women		0	30	30	30	30			
Awareness raising campaigns and dissemination of project information and project supported investments reach 100% and change attitude of 75% of intended beneficiaries <b>(Component 3)</b>	% people with enhanced understanding	The value of marine conservation and impacts of climate change are not understood	0	100	100	100	100	End of project	KAP survey; BCC survey; Project reports	PIU
	% people		0	0	25	50	75			

	with changed attitude	well among local people.									
<b>Intermediate Outcome: MPAs and no-take zones expanded and secured</b>											
1.1. The target MPAs are effectively managed as recorded by the Management Effectiveness Tracking Tool;	Management effectiveness score as recorded by Management Effectiveness Tracking Tool (Note: 1 to 4 – lowest to highest score)	SWCMR – 2009 score of 2.65 of 4;  CBWS – 2009 score 2.16 of 4;  TAMR - nil	2.65	3	3.5	3.5	3.5		Annually	Project reports; Fisheries Department reports; Co-manager reports	PIU; Fisheries Department
1.2. Infractions of rules and regulations in the target MPAs and RZs reduced by 75%	% reduction in infractions of MPA/RZ rules and regulations	NOTE: based on arrests made at the MPAs in 2011-2012  Turneffe Atoll SPAG MRs- 13 arrest (2011) SWCMR: 26 arrests (2011)  Turneffe SPAG MRs - 2 arrest (2012) SWCMR - 23 arrests (up to Sept 2012)	10	50	75	75	75		Annually	Fisheries Department reports; MPA reports; Project reports	PIU
1.3. At least 3 restored coral sites, with resilient varieties grown in coral nurseries, within TAMR and SWCMR by the end of the project (with each site measuring 300 m <sup>2</sup> );	# coral sites	0 restored sites	0	3	3	6	6		Annually	Progress reports; Project reports	PIU; Fisheries Department
<b>Intermediate Outcome: Coastal zones effectively managed</b>											
1.4. 75% of coastal developments adhering to the development guidelines set by the ICZM Plan	% development adhering to ICZM Plan	No available quantitative data (baseline to be collected 1 <sup>st</sup> year of	0	10	50	50	75		Mid and end of project	Project reports; CZMAF's monitoring reports; Development projects EIAs and	PIU

		project)								compliance Plans	
1.5. Mangrove clearance infractions reduced by 100% (that is, infractions of the revised mangrove regulations)	% reduction in mangrove clearance infractions	No available quantitative data (baseline to be collected 1st year of project)	0	50	75	100	100	Annually	Project reports; Forest Department reports; CZMAI reports	PIU	
<b>Intermediate Outcome: Livelihoods of affected users of the reef diversified</b>											
1.6. Alternative livelihoods subprojects elaborated and financed with 30% of beneficiaries being women;	number of business plans financed;  % of female beneficiaries	0  0	3  30	10  30	17  30	19  30	20  30	Per subproject	Project reports; Consultant reports	PIU	
1.7. Persons participating in training based on training needs assessment (30% of trainees are women);	number of persons  % of female trainees	0  0	200  30	1000  30	1500  30	1800  30	2000  30	Per training event	Project reports; Consultant reports	PIU; Consultants	
<b>Intermediate Outcome: The value of marine conservation and impacts of climate change are understood by local people</b>											
1.8. Behavior change communication (BCC) campaigns conducted at all the target fishing communities (Chunox, Copper Bank, Sarteneja, Belize City, Dangriga, Hopkins, Placencia, Sittee River, Riversdale and Seine Bight) and reach 100% of fishers	Number of target communities  Number of fishermen	This project would mark the first time that fishermen have been targeted by BCC campaigns or KAP surveys	0  0	5  TBD	--  TBD	12  TBD	--  TBD	Annually	KAP survey reports; Project reports; Independent evaluations	PIU	
1.9. Strategic planning workshops with fishers associations and three fisher cooperatives	Number of planning workshops (3 per association &	Fishermen associations and cooperatives do not have strategic plans	9  3	21  7	24  8	24  8	24  8	Semi-annually	Project reports; Consultant reports	PIU; Consultants	

	cooperative) Number of strategic plans									
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- e. Include a detailed budget with budget notes, a budget on the Implementing Entity management fee use, and an explanation and a breakdown of the execution costs.

147. The project budget and timeline is outlined in Table 14.

**Table 14: Project Budget and Timeline**

Investment category	Activities	Year 1	Year 2	Year 3	Year 4	Year 5	Total (US\$)
<b>Component 1:</b> Improving the protection regime of marine and coastal ecosystems	<b>Realignment and expansion of replenishment zones and management areas within selected MPAs (TAMR, SWCMR and CBWS)</b>						
	1. Spatially map and analyse target MPAs for realignment or expansion	50,000					50,000
	2. Verify spatial mapping via ground-truthing	50,000					50,000
	3. Map of proposed revised zoning scheme prepared for feedback						Co-financing
	4. Consultations carried out with communities and stakeholders to obtain feedback on the revised zoning		30,000				30,000
	5. Consultations feedback and baseline data compiled and incorporated into zoning map		15,000				15,000
	6. Final revised map incorporated into the existing management plan for target MPAs and management plans textually adjusted to reflect zoning adjustments		45,000				45,000
	7. Target MPAs demarcated with buoys and signage as per the new boundaries		130,000	25,000	10,000	10,000	175,000
	<b>Supporting the management of the selected MPAs</b>						
8. Enhancement of enforcement and monitoring of selected MPAs, including replenishment zones		110,000	50,000	50,000	50,000	260,000	

	9. Biological and water quality monitoring of strategic and control sites (representing coral reefs, coral restoration sites, mangroves, and seagrass beds) within selected MPAs		17,500	12,500	12,500	12,500	55,000
	10. Management effectiveness assessments using tracking tool		17,775		17,775		35,550
	<b>Re-population of coral reefs</b>						
	11. Ground-truthing to identify reefs suitable for nurseries set-up	40,000					40,000
	12. Establishment of coral nurseries	50,000	10,000				60,000
	13. Out-planting in selected reefs		75,000	75,000	75,000	75,000	300,000
	<b>Strengthening the legal framework for the MPA network and the management of the coastal zone</b>						
	14. Rolling out of the over-arching PA legislation						Co-financing
	15. Initial support to the PA administration structure						Co-financing
	16. Revision of mangrove regulations	30,000					30,000
	17. Revision of the CZM Act	35,000	35,000				70,000
	18. Implementation of an Integrated Coastal Zone Management Plan	186,700	76,950	213,000	153,900	153,900	784,450
<b>Total: Component 1</b>							<b>2,000,000</b>
<b>Component 2:</b> Support for viable and sustainable alternative livelihoods for affected users of the reef in the areas impacted by project activities	<b>Community Mobilization for Alternative Livelihoods</b>						
	1. Community needs assessment workshops	23,000	19,000	19,000	9,000		70,000
	2. Participatory sub-project planning workshops	24,000	22,000	22,000	12,000		80,000
	<b>Business planning for economic alternatives and diversification sub-projects</b>						
	3. Development of business plans	14,000	33,000	21,000	14,000	14,000	96,000
	4. Marketing support for business ventures	15,000	36,000	23,000	15,000	15,000	104,000
	<b>Skills training to facilitate the coastal communities' transition to alternative livelihoods</b>						
	5. Training in business development		10,000	10,000	10,000		30,000
	6. Training in marketable skills		10,000	10,000	10,000		30,000
<b>Sub-grants mechanism for community-based business ventures</b>							

	7. Sub-grants for initial capital investment to support the startup of business ventures	300,000	500,000	440,000	400,000	400,000	2,040,000
<b>Total: Component 2</b>							<b>2,450,000</b>
<b>Component 3:</b> Raising awareness, building local capacity, and disseminating information	<b>A climate change knowledge, attitude and behavioral practice (KAP) survey</b>						
	1. Development and implementation of KAP survey (including instrument, field data collection, analysis, presentation of findings)	30,000		30,000		30,000	90,000
	<b>A behavior change communication (BCC) campaign to develop climate resilience strategy among local communities</b>						
	2. Development of a BCC Strategy and Action Plan		25,000				25,000
	3. Implementation of a BCC Strategy and Action Plan		45,000	45,000	45,000	45,000	180,000
	<b>Project information dissemination</b>						
	4. Updates of project activities (via quarterly electronic and print newsletters)	6,800	6,800	6,800	6,800	6,800	34,000
	5. Web-based platform		4,500		1,500		6,000
	6. Best practices forum		17,500		17,500		35,000
	<b>Inter-community learning forum</b>						
7. Learning events, leadership development, training	50,000	25,000	50,000	25,000		150,000	
8. Strategic planning for the network		40,000				40,000	
<b>Total: Component 3</b>							<b>560,000</b>
<b>Total: Components 1, 2 &amp; 3</b>		<b>881,500</b>	<b>1,268,025</b>	<b>1,049,300</b>	<b>987,975</b>	<b>823,200</b>	<b>5,010,000</b>
<b>Project Execution Cost (PIU/NIE) (see Table 22)</b>		110,005	107,705	105,540	98,517	98,233	<b>520,000</b>
<b>MIE Management Fee (see Table 23)</b>		91,000	90,000	99,000	90,000	100,000	<b>470,000</b>
<b>Total Budget</b>		<b>1,082,505</b>	<b>1,465,730</b>	<b>1,253,840</b>	<b>1,176,492</b>	<b>1,021,433</b>	<b>6,000,000</b>

142. A detailed budget with budget notes is shown in Tables 15-20.

### Component 1 – Improving the protection regime of marine and coastal ecosystems

**Table 15: Realignment and expansion of replenishment zones and management areas within selected MPAs (TAMR, SWCMR and CBWS)**

	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Amount Year 5 (USD)	Total (USD)	See Budget Note:
Consultants		45,000				45,000	C1A
Local transportation	25,000	20,000	10,000	5,000	5,000	65,000	C1B
Workshops		15,000				15,000	C1C
Services, Supplies & equipment	75,000	140,000	15,000	5,000	5,000	240,000	C1D
<b>Total Sub-Component</b>	<b>100,000</b>	<b>220,000</b>	<b>25,000</b>	<b>10,000</b>	<b>10,000</b>	<b>365,000</b>	

Budget notes:

C1A: Two national consultants will provide 160 person-days at an average rate of \$250 per day for management planning for MPAs. Additionally, one short-term national consultant will provide 20 person-days at a rate of \$250 for workshop facilitation during zoning consultations.

C1B: Costs associated with land, sea and air transport for ground-truthing, attending consultation workshops, and MPA demarcation.

C1C: 10 workshop sessions at \$1,500, inclusive of venue, meals and refreshments.

C1D: This allocation covers costs of equipment and supplies for spatial mapping, ground-truthing, and MPA demarcation. The bulk (\$150,000) will go towards MPA demarcation buoys and signs installation, and maintenance and operations costs. Another \$75,000 will go towards supplies and equipment such as desktop computer (with high data manipulation and storage ability), scanner and printer (large paper size), back-up data storage system, GIS software tools, digitizing table, and remote sensing imageries, GPS (handheld and for mounting on boat), digital camera, pelican case, depth sounder, potable CB radios, rebars, flagging tape, maps, notebooks, slates, and pencils. The rest of the allocation (\$15,000) covers the cost of printing and dissemination of management plans (Year 2), as well as data collection support.

**Table 16: Supporting the management of the selected MPAs**

	<b>Amount Year 1 (USD)</b>	<b>Amount Year 2 (USD)</b>	<b>Amount Year 3 (USD)</b>	<b>Amount Year 4 (USD)</b>	<b>Amount Year 5 (USD)</b>	<b>Total (USD)</b>	<b>See Budget Note:</b>
Consultants		15,000		15,000		30,000	C2A
Local transportation		20,000	15,000	15,000	15,000	65,000	C2B
Workshops		11,525		1,525		13,050	C2C
Service, Supplies & equipment		23,750	22,500	48,750	47,500	142,500	C2D
Infrastructure		75,000	25,000			100,000	C2E
<b>Total Sub-Component</b>		<b>145,275</b>	<b>62,500</b>	<b>80,275</b>	<b>62,500</b>	<b>350,550</b>	

Budget notes:

C2A: Two national consultants will provide 120 person-days at an average rate of \$250.00 per day for conducting bi-annual MPA effectiveness assessments.

C2B: Costs associated with land and sea transport for monitoring and field data collection, patrolling, attendance of workshops.

C2C: Two workshop sessions totaling \$3,050 for consultation workshops pertaining to the management effectiveness assessments, inclusive of venue, meals and refreshments. The rest (\$10,000) will cover the cost of enforcement training workshops for MPA personnel.

C2D: This allocation covers costs of equipment and supplies for field monitoring, and data collection and patrolling, including two small boats, laptop computers to store and analyze data, patrol register system, printing and dissemination of management effectiveness studies, as well as communications equipment (two-way radios and internet-ready laptops). Additionally, \$30,000 is allocated to cover the costs of database development and maintenance services provided by the Environmental Research Institute at the University of Belize.

C2E: This allocation covers the construction of a ranger station, a new pier, and a small base of operations with watchtower within the SWMR.

**Table 17: Re-population of coral reefs**

	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Amount Year 5 (USD)	Total (USD)	See Budget Note:
Consultants	45,000	65,000	55,000	55,000	55,000	275,000	C4A
Local transportation	20,000	20,000	15,000	15,000	10,000	80,000	C4B
Workshops	5,000					5,000	C4C
Supplies & equipment	18,000	2,000	10,000	5,000	5,000	40,000	C4D
<b>Total Sub- Component</b>	<b>88,000</b>	<b>87,000</b>	<b>80,000</b>	<b>75,000</b>	<b>70,000</b>	<b>400,000</b>	

Budget notes:

C4A: This allocation covers a short-term national consultant as well as 30 field workers from among fishermen.

C4B: Costs associated with land and sea transport for ground-truthing, attendance of workshop, nurseries installation and out-planting initiatives.

C4C: 2 workshop sessions at a \$2,500 each, inclusive of venue, meals and refreshments.

C4D: This allocation covers the costs of equipment and supplies for construction of nurseries and out-planting of corals.

**Table 18: Strengthening the legal framework for management of the coastal zone**

	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Amount Year 5 (USD)	Total (USD)	See Budget Note:
Consultants	60,150	40,150	20,300	20,300	20,300	161,200	C3A
Local transportation	8,025	3,025	6,050	6,050	6,050	29,200	C3B
Workshops	12,100	7,100	4,200	4,200	4,200	31,800	C3C
Services, Supplies & equipment	171,425	61,675	182,450	123,350	123,350	662,250	C3D
<b>Total Sub- Component</b>	<b>251,700</b>	<b>111,950</b>	<b>213,000</b>	<b>153,900</b>	<b>153,900</b>	<b>884,450</b>	

Budget notes:

C3A: One national consultant will provide 48 person-months at an average rate of \$834 per month for coordinating water quality monitoring and field data collection, data compilation and management and coastal outreach. Another national consultant will provide 100 person-days at rate of \$200 and 1 international consultant will provide 100 person-days at a rate of \$400 for CZM Act revision during Year 1 and 2. Additionally, two short-term national consultants will provide 80 person-days at a rate of \$250 for mangrove data, policy instrument development, and revision of mangrove regulation during Year 1.

C3B: Costs associated with land, air and sea transport for monitoring and field data collection, and attendance of workshops.

C3C: Workshop sessions at \$10,000 for Year 1 and \$5,000 for Year 2, inclusive of venue, meals and refreshments – related to CZM Act revision (Year 1 and 2) and mangrove regulations revision (Year 1). The rest (\$16,800) are for meetings and training related to the Coastal Advisory Committees.

C3D: This allocation covers the costs of two boats, four outboard engines, two boat trailers, communications equipment, desk-top and laptop computer for data inputs, storage and analysis, printer, scanner and other materials, water quality testing and enforcement equipment and supplies related to implementation of the ICZM Plan.

## Component 2

**Table 19: Support for viable and sustainable alternative livelihoods for affected users of the reef in the areas impacted by project activities**

	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Amount Year 5 (USD)	Total (USD)	See Budget Note:
Consultants	25,000	77,000	60,000	40,000	20,000	222,000	C5A
Local transportation	5,000	12,000	10,000	5,000	4,000	36,000	C5B
Vehicle	30,000					30,000	C5C
Workshops	10,000	28,000	24,000	14,000	5,000	81,000	C5D
Services, Supplies & equipment	6,000	3,000	1,000	1,000		11,000	C5E
Training courses		10,000	10,000	10,000		30,000	C5F
Sub-grants	300,000	500,000	440,000	400,000	400,000	2,040,000	C5G
<b>Total Component 2</b>	<b>376,000</b>	<b>630,000</b>	<b>545,000</b>	<b>470,000</b>	<b>429,000</b>	<b>2,450,000</b>	

Budget notes:

C5A: This allocation covers 504 person-days @ US\$250 per day of consultancy work related to undertaking community needs assessments, sub-project development and business plan development. It also covers 48 months at US\$2,000 per month for a marketing specialist to be hired after the start of the implementation of sub-projects.

C5B: This allocation covers costs associated with staff travel to communities and sub-project sites both for preparatory, implementation (including marketing) and monitoring activities in regards to sub-projects.

C5C: This allocation covers the cost of all-weather road pick-up truck for the purposes of field work including site visits and monitoring of sub-projects in coastal communities.

C5D: This allocation covers costs associated with 180 community mobilization and business planning workshops @ US\$300 per workshop and also covers 3 national level 2 day-workshops in support of business development @ US\$9,000 per workshop.

C5E: This allocation covers the associated costs of audio-visual equipment, supplies, and informational materials to facilitate community mobilization and planning activities.

C5F: Existing training facilities such as the ITVET and BTB Tourism Training Unit will be contracted to provide training in relevant individual marketable skills. Average cost per person is approximately US\$500 per module for 60 persons in total. Each module provided is self-contained and the cost includes support with job placement at ITVET.

C5G: This is a lump sum allocation specifically earmarked as initial capital investments for approved subprojects. Subprojects may be approved from US\$25,000 to US\$50,000. Follow up phases are allowed subject to approval.

### Component 3

**Table 20: Raising awareness and disseminating information**

	<b>Amount Year 1 (USD)</b>	<b>Amount Year 2 (USD)</b>	<b>Amount Year 3 (USD)</b>	<b>Amount Year 4 (USD)</b>	<b>Amount Year 5 (USD)</b>	<b>Total (USD)</b>	<b>See Budget Note:</b>
Consultants	27,500	43,000	27,500	1,000	27,500	126,500	C6A
Local transportation	5,000	20,000	10,000	15,000	5,000	55,000	C6B
Workshops	32,500	55,500	40,500	35,500	10,500	174,500	C6C
Vehicle	30,000					30,000	C6D
Services, Supplies & equipment	9,300	42,800	41,300	41,800	38,800	174,000	C6E
<b>Total Component 3</b>	<b>104,300</b>	<b>161,300</b>	<b>119,300</b>	<b>93,300</b>	<b>81,800</b>	<b>560,000</b>	

**Budget notes:**

C6A: Two national consultants will provide a total of 110 person-days at a daily rate of \$250.00 per day for development of KAP Survey in Year 1, 3 and 5. Additionally, two national consultants will provide a total of 80 person-days at a daily rate of \$250.00 per day for development of BCC strategy and action plan in Year 2. A web designer will provide 10 days at a daily rate of \$250 per day develop the web-based platform in Year 2, and will provide an additional 6 days at \$250 per day to upgrade the website in Year 4. Two national consultants will provide a total of 40 person-days each at a daily rate of \$250 per day to coordinate and facilitate the strategic planning process for the network of fishermen/women.

C6B: Costs associated with land, sea and air transport to attend workshops and participate in the best practices forum.

C6C: Costs associated with a series of learning events and personal development workshop sessions focusing on leadership development, dialogue and mediation, and mentoring. This includes costs for the services of expert trainers in mentoring, dialogue & mediation, among other areas of leadership development. Two best practices forums at \$12,500 each, inclusive of venue and meals and refreshments also included. The allocation also covers three regional workshops at \$2,500 each for KAP survey development, inclusive of venue and meals and refreshments; and two regional workshops at \$2,500 each for BCC strategy and action planning, inclusive of venue and meals and refreshments. The costs for three strategic planning workshops (inclusive of venue and meals and refreshments) also included, as are 16 BCC workshops at \$2,000 each (inclusive of venue and meals and refreshments) related to the implementation of the BCC strategy and action plan.

C6D: This allocation covers the cost of an all-weather road pick-up truck for the purposes of field work related to awareness raising and information dissemination. The vehicle will be assigned to the PIU.

C6E: The bulk of this cost (\$128,000) will go towards covering the costs of mass media advertising, and materials and supplies related to the implementation of the Behavior Change Communication action plan and workshops, as well as a vehicle that will be used to support awareness building and information dissemination work, as well as other project activities from Year 2 to Year 5. The rest (\$56,000) will cover the costs of a desk-top computer, laptop computer, printer and other materials and supplies related to producing newsletters, a computer that will house the web-based platform, materials and supplies related to training workshops, printing of materials associated with project information dissemination (e.g., newsletters), and boarding and lodging in Year 2 for the strategic planning participants.

**f. Include a disbursement schedule with time-bound milestones.**

148. The disbursement schedule is shown in Table 21.

**Table 21: Disbursement schedule**

	Upon agreement signature	One Year after Project Start	Year 2	Year 3	Year 4	Total (US\$)
Scheduled date						
Project funds	914,800	1,795,800	1,283,800	678,800	336,800	<b>\$5,010,000</b>
Execution costs	110,005	107,705	105,540	98,517	98,233	<b>\$520,000</b>
Multilateral implementing entity fee	91,000	90,000	99,000	90,000	100,000	<b>\$470,000</b>
	1,115,805	1,993,505	1,488,340	867,317	535,033	<b>6,000,000</b>

149. The budget for the execution costs (PIU/NIE) is indicated below.

**Table 22: Execution costs**

Expenditure	Upon agreement signature	One Year after Project Start	Year 2	Year 3	Year 4	Total
<b>Coordination and management</b>						
Project Manager	30,000	31,500	33,075	34,729	36,465	165,769
Senior Technical Officer	24,000	25,200	26,460	27,783	29,172	132,615
Administrative Assistant*	---	---	---	---	---	---
Social Security	835	835	835	835	835	4,175
<b>Sub-total</b>	<b>54,835</b>	<b>57,535</b>	<b>60,370</b>	<b>63,347</b>	<b>66,472</b>	<b>302,559</b>
<b>Overheads and administration</b>						
Administrative support (including, office equipment, materials and services)	25,170	20,170	15,170	15,170	15,170	90,850
<b>Fiduciary management**</b>						
Fiduciary management fee	30,000	30,000	30,000	20,000	16,591	126,591
<b>Total (US\$)</b>	<b>\$110,005</b>	<b>\$107,705</b>	<b>\$105,540</b>	<b>\$98,517</b>	<b>\$98,233</b>	<b>\$520,000</b>

Note:

\* Administrative Assistant – to be fully seconded by the Fisheries Department to the PIU (person is currently employed as a First Class Clerk and is about to complete a B.Sc. in Environmental Science & Sustainable Development)

\*\* Includes financial management and procurement functions, financial audit, and oversight of project implementation

150. The budget for the Implementing Entity fee (World Bank) is indicated below.

**Table 23: Budget breakdown of the Implementing Entity Fee**

<b>Stage</b>	<b>WB services</b>	<b>Total Staff Weeks</b>	<b>Total WB fee including variable cost</b>
<b>Preparation through Effectiveness</b>	• Appraisal mission and negotiations of the Project	5 sw	35,000
	• Preparation and submission to the WB Board for approval	10 sw	51,000
	• Fiduciary support	(4 sw)*	5,000
<b>Supervision</b>	• Technical and operational support	28 sw (10 sw)*	149,000
	• Supervision mission and field visits	20 sw	145,000
	• Regular reporting (Implementation Status Report, Project Performance Report, Monthly Operational Summary, etc.)	3 sw	15,000
	• Mid Term Review	4 sw	35,000
<b>Completion</b>	• Terminal evaluation and Implementation Completion and Results Report (ICR)	4 sw	35,000
<b>Fee</b>			470,000

\*Staff time is covered by the World Bank budget.

**PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY**

**A. RECORD OF ENDORSEMENT ON BEHALF OF THE GOVERNMENT** *Provide the name and position of the government official and indicate date of endorsement. If this is a regional project/programme, list the endorsing officials all the participating countries. The endorsement letter(s) should be attached as an annex to the project/programme proposal. Please attach the endorsement letter(s) with this template; add as many participating governments if a regional project/programme:*

Mr. Joseph Waight, Financial Secretary Ministry of Finance Government of Belize, Belmopan City, Belize Email: Josephwaight@mof.gov.bz Phone: 501-822-2362	Date: July 30, 2014
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**B. IMPLEMENTING ENTITY CERTIFICATION** *Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number and email address*

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans (the National Poverty Elimination Strategy and Action Plan 2009-13, the Medium Term Development Strategy, Horizon 2030, and the First National Communication to UNFCCC ) and subject to the approval by the Adaptation Fund Board, understands that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.	
	
<hr/> Karin Shepardson Program Manager, GCCIA World Bank	
Date: July 31, 2014	Tel. and email: (202) 458-1398, Kshepardson@worldbank.org
Project Contact Person: Enos E. Esikuri, Sr. Environmental Specialist, LCSSEN	
Tel. and Email: (202) 458-7225, Eesikuri@worldbank.org	

**Annex 1. Endorsement Letter from Mr. Joseph Waight, Financial Secretary, Ministry of Finance**



**GOVERNMENT OF BELIZE**  
*Ministry of Finance*  
*Belmopan, Belize*

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C/IOR/3/16/1/14(9) VOL II

July 30, 2014

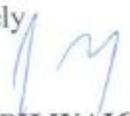
To: The Adaptation Fund Board  
c/o Adaptation Fund Board Secretariat  
Email: Secretariat@Adaptation-Fund.org  
Fax: 202 522 3240/5

**Subject: Endorsement for Belize Marine Conservation and Climate Adaptation Project**

In my capacity as designated authority for the Adaptation Fund in Belize, I confirm that the above national project/programme proposal is in accordance with the government's national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in the Belize.

Accordingly, I am pleased to endorse the above project/programme proposal with support from the Adaptation Fund. If approved, the project/programme will be implemented by the World Bank and executed by the Protected Areas Conservation Trust (PACT).

Sincerely

  
**(JOSEPH WAIGHT)**  
**Financial Secretary**  
**Ministry of Finance**



- c. Chief Executive Officer, Ministry of Economic Development  
Chief Executive Officer, Ministry of Forestry, Fisheries and Sustainable Development

## **Annex2: Priority Marine Protected Areas**

1. The project will place specific emphasis on the Turneffe Atoll Marine Reserve (TAMR), South Water Caye Marine Reserve (SWCMR), Corozal Bay Wildlife Sanctuary and Estuary Lagoon Systems (CBWS) (see Annex 1). The selection of the three MPAs to be targeted by the project is based on the Government's on-going protected areas (PA) rationalization exercise, which aims to provide recommendations for "building on the current network of protected areas, improving functionality, connectivity and socio-economic benefit as Belize moves into a future with increasing anthropogenic pressures, overshadowed by the need to adapt to current and predicted climate change impacts"<sup>40</sup>. These three MPAs are critical in terms of the integrity and connectivity of marine ecosystem and climate impacts. Warmer waters and more frequent thermal anomalies have been observed especially in areas of slow flow, as in the South Water Caye area, and in shallow and sheltered regions on the internal side of Corozal Bay and Turneffe lagoons.

2. The amount of sea under full protection will be representative of each habitat or ecosystem type, including coral reefs, seagrass beds, mangroves, sand flats, etc., with areas prioritized based on the level of protection provided to fish aggregations, nursery areas, keystone species, unique endemic species, and critical functional groups. Spawning aggregation sites will be integrated into the protected areas as special management zones. The project will also focus efforts on strengthening the critical role played by mangroves as nursery areas for commercial fish species – particularly in South Water Caye Marine Reserve, reducing the potential for mangrove removal through caye development. Climate refugia-areas such as reef sites that exhibit strong currents, upwelling or other oceanographic features that makes them less prone to thermal fluxes will also be prioritized for protection<sup>41</sup>. This will also include reef sites which have been found through research and monitoring to exhibit coral genotypes with temperature resistant or resilient characteristics. Coral nursery initiatives will be used to further enhance resilience potential of replenishment zones<sup>42</sup> within the two MPAs.

3. Improving the protection regime of these three MPAs would thus ensure the reef's capacity to recover from extreme climate events by providing a sufficiently large and resilient seed stock of critical biodiversity (such as fish and coral) to restock the reef and sustain productivity in the long-term.

### **The Corozal Bay Wildlife Sanctuary (CBWS)**

4. The Corozal Bay Wildlife Sanctuary (CBWS) encompasses approximately 72,000 hectares of the Belize portion of the estuary system, and much of the northern shelf lagoon behind Ambergris Caye. The CBWS has vast seagrass beds which provide resilience to high temperatures and high turbidity. The coastal lagoons and saline mudflats are inhabited by dwarf

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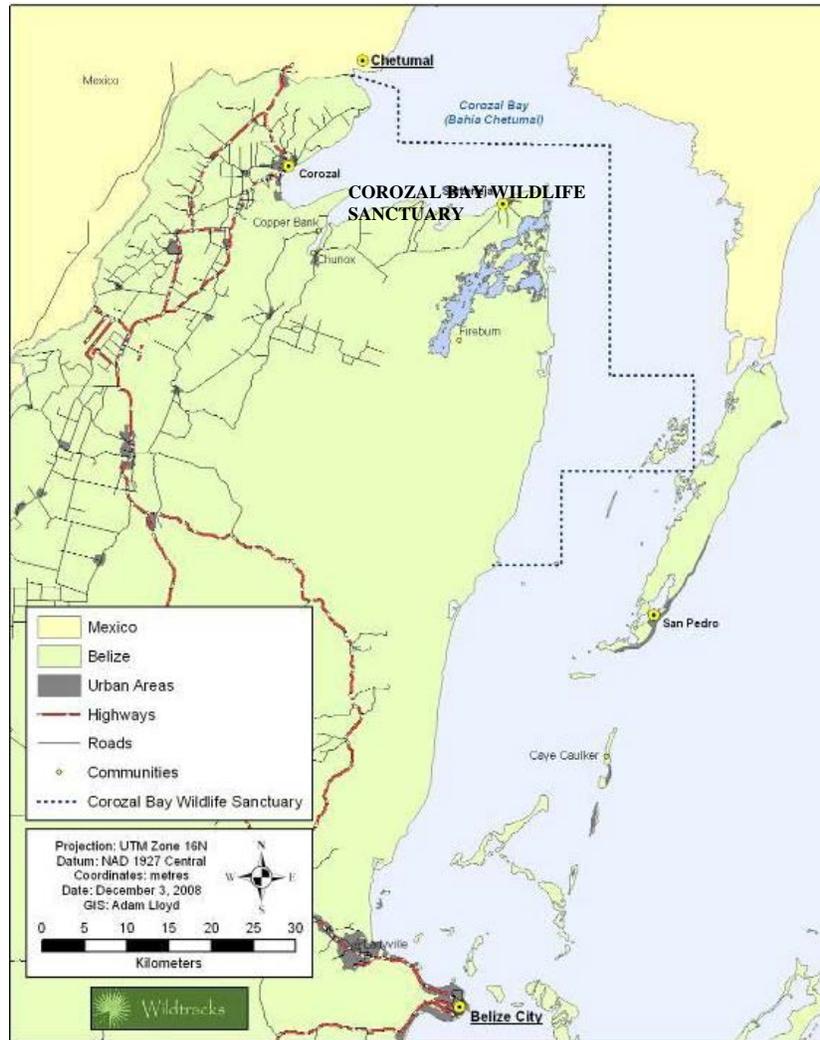
<sup>40</sup>Source: Rationalization Exercise of the Belize National Protected Areas System (Draft) (Wildtracks, August 2012)

<sup>41</sup>Hansen L.J., J.L. Biringer and J.R. Hoffman 2003. Buying Time: A user's manual for building resistance and resilience to climate change in natural systems. WWF.

<sup>42</sup>Bowden-Kerby A. and L. Carne 2011. Strengthening coral reef resilience to climate change impacts. Results and recommendations. Technical report to World Bank, Caribbean Community Climate Change Center and World Wildlife Fund.

mangrove, and are highly vulnerable ecosystems; frequently inundated and likely to become permanently so with climate change. They also have very low development potential. Including their representation within the CBWS would allow for an increased protection of Belize’s marine salt marsh and critical fish nursery areas. The area supports a local traditional fishing industry, and contains important habitat for the Goliath Grouper (*Epinephelus itajara*).

**Map 2: Corozal Bay Wildlife Sanctuary**

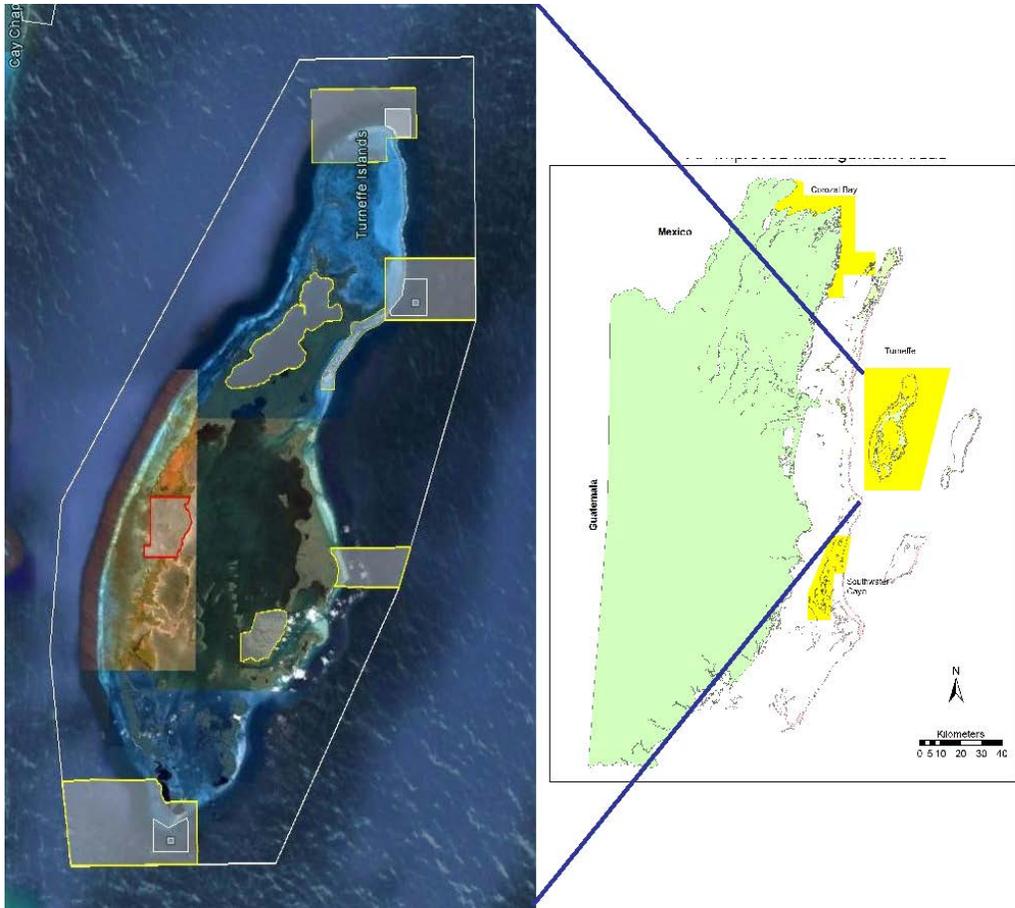


**Turneffe Atoll Marine Reserve and Replenishment Zones**

5. Turneffe Atoll, the largest of three offshore Atolls lying to the east of the coastal shelf of Belize, is considered to be an integral part of Belize’s reef system, and one of the best developed Atolls of the Mesoamerican Reef (MAR) region, as well as a global ecological hotspot for marine biodiversity. Turneffe is also well known for its three fish spawning aggregation sites that received marine protected areas designation in 2002. The entire Atoll, however, has not been designated as a Marine Reserve until November 2012. It still lacks a management structure or

presence in place. The marine protected area includes the entire Atoll (~131,690 hectares) as well as an area of the surrounding open sea, making it the largest marine protected area in Belize. The Turneffe Atoll area serves as a major source of coral larvae. Transport of coral larvae is driven by the general pattern of currents in the area, with most of the connections between pairs of reefs running parallel to the coastline. The Turneffe area includes at least three identified spawning aggregations which would be buffered by the marine reserve and significant reef flats which are key habitats for the valued catch and release species – bone fish, tarpon and permit.

**Map 3: Turneffe Atoll Marine Reserve and Replenishment Zones<sup>43</sup>**



Note: The outer white line represents the approximate boundary of Turneffe Atoll Marine Reserve. The yellow line represents the no-take areas.

6. The west to southwest area of Turneffe towards South Water Caye represents the highest number of connections (P. Mumby *et al*, 2009). In addition, the benefits of storm protection and damages avoided by safeguarding these areas are substantial. The target areas, especially

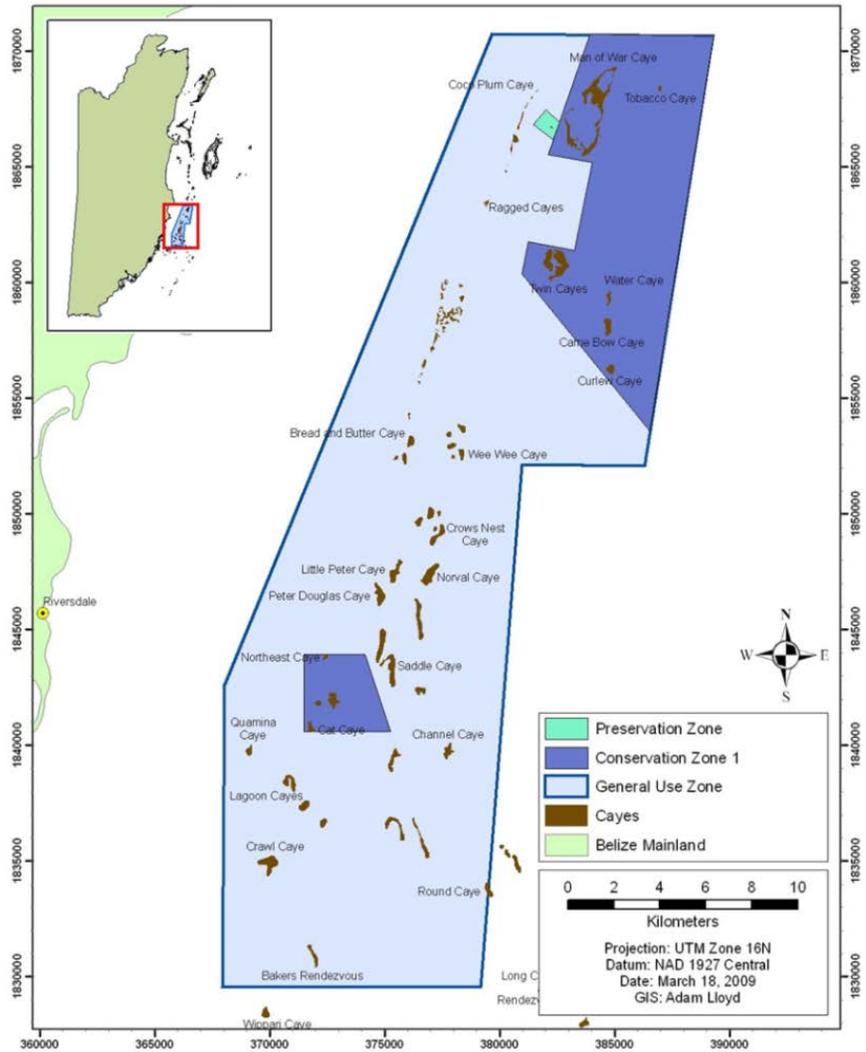
<sup>43</sup>This is a preliminary map outlining the boundaries of the MPA and no-take zones in Turneffe Atoll. The Project would support the demarcation process to define the official boundary of the Marine Reserve (multiple use). The outer white line (polygon) represents the outer limits of the Marine Reserve, estimated at 131,690 hectares. The yellow polygons represent what could become the no-take areas estimated at 19,218 hectares.

Turneffe, harbor significant mangroves, littoral forests, and lagoon systems which are underrepresented in the current system. Based on a 25 year major storm event, the annualized value of storm protection and damages avoided by Turneffe Atoll is US\$38 million (A. Fedler, 2011). Furthermore, by including the identified fish spawning sites, resilient coral reef sites and climate refugia, climate-resilient stocks are secured within the three MPAs.

### South Water Caye Marine Reserve (SWCMR)

The South Water Caye Marine Reserve (SWCMR), which is designated as a part of Belize’s World Heritage Site, is considered one of the most highly developed examples of barrier reef structure in the region, with extensive spur and groove formation. The channels through the reef barrier with strong flow and water exchange are key resilience features of the SWCMR. Other resilience features include deep water channels within reef lagoon that bring cooler water, and the reef relief and environmental gradient – fore reef, reef crest, back reef and lagoon with reef patches – which increase coral tolerance to different temperature regimes<sup>44</sup>. The marine reserve (47,700 hectares) encompasses 32 named cayes and supports an important oceanic mangrove system and extensive seagrass meadows, which provide valuable habitats for

**Map 4: South Water Caye Marine Reserve**



commercial and non-commercial species – including queen conch (*Strombus gigas*) and lobster (*Panulirus argus*), the foundations of the traditional fishing industry on which a number of coastal communities in Belize are dependent. The sheltered waters and mangrove systems of the Pelican cayes in the southern area of the Marine Reserve have been identified as one of the most

<sup>44</sup>Source: South Water Caye Management Plan 2010-2015 (Wildtracks, 2009)

biologically diverse marine systems within the western hemisphere, supporting a number of endemic species, and species new to science. The mangrove areas of the marine reserve are considered particularly important for the sustainability of commercially important species for the entire Belize Barrier Reef system.

### Annex 3: Repopulation of Coral Reefs (Component 1)

7. In addition, the Project would support the diversification of the economic activities of the coastal communities by providing jobs and training for **the repopulation of coral reefs with thermally resilient native varieties grown in coral nurseries**. It would accelerate natural recovery from and adaptation of reef coral populations to the increasing sea surface temperature, frequent bleaching events, and intensified extreme weather events through repopulation of coral reefs with resilient native varieties grown in the coral nurseries. This would be achieved through: (i) establishment of coral nurseries throughout the Belize barrier reef system and on each of the three atolls with resilient native varieties, and (ii) outplanting of these resilient varieties in selected reefs which are critical for restoration of the reef structure. Multiple nurseries need to be established in each section of the reef to represent the ‘ecotypes’ there and for greater probability of survival against bleaching events, storms or disease outbreaks. Selection of mother corals for propagation would be based on past bleaching history and mapping work (Carne 2010). The focus of the efforts would be on the *Acroporids* due to their fast growth rate, importance for reef structure and critically endangered status (IUCN Red List). Nurseries would also include stony coral species like *Agaricia tenuifolia*, *Dendrogyra cylindrus*, *Montastrea spp.* and brain corals. Heat resilient corals grown in the nurseries would be out-planted into selected areas to increase natural sexual reproduction and restoration of the reef structure. Material used for repopulation would be representative, to the extent possible of original population diversity based on Baums’ work at Gladden (2007) that revealed relatively high diversity for *Acroporapalmata* and densities. Most of the repopulation effort would be undertaken on reefs that can provide an upstream source of larvae, and/or have significant tourism and fisheries value and whenever possible, are located in protected areas. This component would be led by the local marine biologists and NGOs who have pioneered the coral pilot in Belize and supported by the local people who have been trained on the repopulation techniques.

8. *Scientific Basis of Selection for Thermal Resilience as a Key Strategy for Climate Adaptation in Coral Restoration Programs*: Much applied research in coral reef conservation these days is focused on understanding thermal resilience. It has been proposed that deliberate selection, bioengineering, and biomanipulation be seriously considered as a means of enhancing the capacity of reef-building corals to survive the several decades that will be required to slow the pace of global climate change by greatly reducing anthropogenic CO<sub>2</sub> emissions. The basic idea is that by increasing the proportion of corals on the reef that are resistant and/or resilient in the face of frequent bleaching events, tropical hard bottoms will have a better chance of remaining coral reefs and delivering the desired services, instead of metamorphosing into seaweed meadows or bare rock of lower value to society, and greater recalcitrance to restoration efforts.

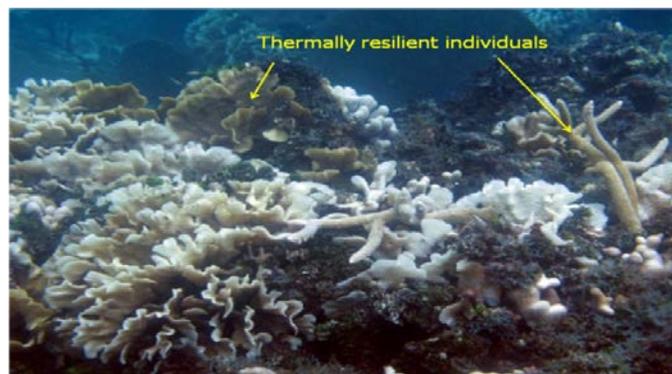
9. When corals are suffering from so many stressors at once, dealing with only one of these does not make a difference. The reason that thermal resilience is so important is that if this is not also addressed, the insurance on ecosystem services gained from other local interventions will be greatly reduced. Thermal resilience is the card that has to be played, on a local level, against climate change, a problem of global proportions and import. Elevating mean thermal resilience in reef-building corals at a restoration site ensures that mortality from anything but the most severe bleaching events will be minimized, giving natural recovery of coral colonies and

populations its best shot. All the best local conservation efforts may in some places be for naught, without this extra edge against global climate impacts.

10. There is little that local efforts can hope to accomplish specifically against the most severe bleaching events, in which coral mortality approaches 100%. Such an event hit the nearly pristine coral reefs of the Phoenix Islands, central Pacific Ocean (Kiribati) during 2002-2003, and the damage was astounding. The real challenge, however, lies in the ability of coral reef communities to withstand multiple, frequent events of moderate or mild severity.

11. What can work, at a minimum, is to promote identifying resistant corals, propagating these strains and species, and restoring them in critical areas on a small scale, to maintain some of the values of a normal, healthy coral reef in places where it matters most. Such efforts, combined with an all-out reduction of local human impacts to make the environment maximally favorable to natural regenerative processes, constitutes a prudent and conservative approach to coral reef restoration on a local scale, in an age of extreme climate events. In the Phoenix Islands, where local impacts are nearly nil, a few oddly resistant and resilient corals survived the most severe bleaching event yet observed, and rose from the reef's ashes like the islands' namesake to bring large tracts of reef back to health in a mere 7 years. The combination of thermally resilient corals and all-out local efforts, are a winning combination.

**Figure 9: Bleaching in Belize, October 2008**



Source: A. W. Bowden-Kerby and L. Carne

**Figure 10: Pilot Nursery in Laughing Bird Caye National Park, March 2009**



Source: A. W. Bowden-Kerby and L. Carne

## Annex 4: Examples of Potential Alternative Livelihood Activities (Component 2)

1. This annex presents some of the potential alternative livelihoods that has been tested in Belize and elsewhere.
2. Local fishers have piloted in developing seaweed (*Gracilaria* spp.) cultivation and processing. The coastal fishing communities in Placencia, Punta Gorda and Sarteneja have some basic building facilities to house seaweed storage and processing. Large scale production could be done in the shallow coastal areas (reef lagoon) in northern Belize, which provides adequate environmental and marine conditions for extensive farming systems. These areas near the coast are not currently used for tourism activity and would not interfere with shipping lanes. Also, seaweed farming will utilize CO<sub>2</sub> from the sea and help to reduce acidification, which causes bleaching of corals. It is also environmentally friendly because no chemicals would be introduced into the marine environment. In addition, it is not labor intensive and requires little supervision until harvesting time.
3. Backyard farming of Red hybrid tilapia (*Oreochromis* spp.) and Blue eye catfish (*Ictalurus furcatus*) for household consumption and export market. The tilapia is not native to Belize but is found throughout the country and the catfish is endemic species found in the rivers and lagoons. This activity could help decrease the vulnerability of small-scale fishers by providing additional income to fishers and their families.
4. Some agricultural activity such as vegetable growing in family plots and strengthening of pig rearing (already being done by some fishermen in northern Belize) as an alternative income generating activity have been developed in small scale in different locations.
5. Marine tourism-based activities such as tour-guide training, whale shark tourism, dive master, sailing, have been considered to have a great potential for income generation. These would be selectively supported by the Project based on their economic viability and sustainability.
6. *Why seaweed?* Seaweed is a fairly versatile product that has been traditionally used in the production of beverages in Belize and has become quite popular over the last decade. The proposed seaweed production is intended to cover large coastal areas involving a significant number (at least 100) of fishermen. Typical seaweeds harvested on the Belizean coast are *Eucheuma isiforme* and *Gracilaria* spp, which offer numerous commercial uses including local consumption as food and drink, production of *carrageenan* for food ingredients, dietary supplement, fertilizer, bioplastics, dyes and colorants, pharmaceuticals, and potentially biofuel. With the rise in the tourism industry, the demand for seaweed for therapeutic purposes, as part of spa treatment regimens, has boosted its use significantly. There are some resorts that import their seaweed since the local supply is largely inconsistent. It is this void that the seaweed production through this Project seeks to fill. Internationally, there are several industrial uses for seaweed. It is used in the manufacture of fertilizers, soil conditioners, animal feed and fish feed. It is also used as biomass for fuel, in integrated aquaculture and wastewater treatment. So there is a market locally and internationally. During the preparation of this Project proposal, consultations undertaken with local communities, Government of Belize, NGOs, and marine experts, have

confirmed that seaweed cultivation is a viable and high priority alternative livelihood option that needs support.

7. Seaweed farming has generally been a lucrative form of livelihood for coastal communities in other countries but is yet to be in Belize. For example, it is currently the largest and most productive form of livelihood for the coastal population of the Philippines. Information from the Seaweed Industry Association of the Philippines for 2004 indicated that more than 116,000 families consisting of more than one million individuals were farming more than 58,000 hectares of seaweed. In 2000-2004, the average annual production of dried seaweed in the Philippines was nearly 125,000 tons, with a value averaging about US\$ 139 million. World demand for seaweed and seaweed products is projected to remain at ten (10 %) percent annual growth rate. This implies that if implemented at scale and successfully in Belize, the targeted communities and the country as a whole stand to benefit significantly in terms of job creation (e.g., seaweed cultivation and harvesting for fishermen; seaweed drying and processing for women in the communities) and economic empowerment. Furthermore, seaweed systems are known to reduce carbon dioxide (CO<sub>2</sub>) in the atmosphere by fixing CO<sub>2</sub> for their growth. Some seaweed can absorb five times more CO<sub>2</sub> than plants on land. Seaweeds also help to reduce water pollution from farm waste and agriculture run-off and wastewater by absorbing nutrients. Such pollution control and alternative livelihoods are critical in improving the overall health of coral reefs, in turn, increasing resilience of coral reefs to the impacts of climate change (increased sea surface temperature, intensification of hurricanes, and ocean acidification).

8. Other potential marine-based activities for Project support include:

- **Harvesting crab claws:** Wild harvest of Blue land crab (*Cardiso maguanhumi*) which is distributed in throughout Belize would be considered. There is a market in the US and high demand for whole crabs in Yucatan, Mexico for use as bait in the octopus fishery. This activity would provide immediate economic benefits to the local fishermen and other Belizeans. The initial investment is simple; participants would be provided with 40-50 traps each. The harvesting of crabs would begin one week after the traps have been deployed on land areas. The natural capacity of the crab population to quickly rebound makes this livelihood environmentally friendly, sustainable, and economically viable within a short period of time (2-3 weeks).
- **Crab farming:** Channel Clinging Crab known as Caribbean King Crab (*Mithrax spinosissimus*) or Emerald crab (*Mithrax sculptus*) have a potential for commercialization based on the knowledge and experiences in the Caribbean (Grenada). Caribbean King Crab is sold to local restaurant and Emerald crab for aquarium owners. The farming scheme consists of (i) one onshore hatchery-nursery allowing a control of the rearing parameters, (ii) various large grow-out facilities such as floating cages or pens. During that phase the animals are only fed with algae which would be sourced from the seaweed farms.
- **Tourism:** It is also envisaged that marine tourism-based activities such as tour-guide training, whale shark tourism, dive master, sailing, would be selectively supported by the Project based on their economic viability and sustainability. In 2004 the GEF Small Grants Programme funded the Belize Tourism Industry Association to implement a project promoting marine tour guide training in communities that impact the Belize

Barrier Reef Reserve System – World Heritage Site. The main objective of the project was to provide fisher folks and tour guides with the knowledge, skills and attitudes that would assist them to become efficient tour guides. This goal to provide improved training for existing tour guides, as well as provide guide training to fishers who have traditionally used the Belize Barrier Reef Reserve System (BBRRS) to earn their income. This project achieved its main objectives of providing users of the marine resources of the BBRRS-WHS with the basic requirements necessary to obtain a tour guide license, and developing and executing a specialized Advance Marine Tour Guide Training Program for tour guides of coastal communities that utilize the BBRRS-WHS, through the completion of its targeted activities.

## **Annex 5. Local Consultations List of Participants**

### **Consultations between February 21st and 24th, 2011**

#### **Non-state Stakeholders:**

1. Albert Reimer, BAS Group
2. Alex Martinez, The Nature Conservancy
3. Amanda Burgos Acosta, Belize Audubon Society
4. Dareece Chuc, Belize Audubon Society
5. Dudley Heredia, Belize Audubon Society
6. Andre Cho, Geology and Petroleum Department (GPD)
7. Audrey Matura-Shepherd, Oceana
8. Colin Gillett, Coastal Zone Management Institute (CZMAI)
9. E. Irving, Galen University
10. Ernest N. Raymond, Social Investment Fund (SIF), Belize Municipal Development Project
11. Imani Fairweather Morrison, Oak Foundation
12. Jose Alpuche, Belize Agro-Productive Sector Group
13. Joseph Hendrilex, UNICEF
14. Kerry Beliste, Protected Area Conservation Trust (PACT)
15. Sharon Ramclam, PACT
16. Leandra Cho-Ricketts, University of Belize
17. Vincent Palacio, University of Belize
18. Marilyn Gentle-Garvin, Belize Family Life Association
19. Melanie McField, Healthy Reefs/Smithsonian
20. Mike Heusner, National Environmental Appraisal Committee (NTIA NEAC)
21. Nadia D. Bood, WWF Central America
22. Nellie Catzim, Southern Environmental Association (SEA)
23. Olivia Rhaburn, National Association of Village Councils of Belize (NAVCO)
24. Orlando Dawson, NAVCO
25. Seleni Matus, Belize Tourism Board
26. Tracey Hutchinson, Belize Social Security Board
27. Yvette Alonzo, Association of Protected Areas Management Organizations (APAMO)
28. Evita Quiroz, APAMO
29. Caroline Clarke, Representative, Belize Country Office, Inter-American Development Bank
30. Harold Arzu, Operations Advisor, Belize Country Office, IADB

#### **Government of Belize:**

1. Mary Vasquez, RESTORE Belize, Office of the Prime Minister
2. Yvonne Hyde, Chief Executive Officer, Ministry of Economic Development
3. Emily Waight-Aldana, Economist, Ministry of Economic Development
4. Yvette Alvarez, Senior Advisor, Ministry of Finance
5. Martin Alegria, Chief Environmental Officer, Department of Environment, Ministry of Natural Resources
6. Colin Young, National Protected Areas Secretariat (NPAS) Director, Ministry of Natural Resources

7. Arlene Maheiaa, NPAS, Ministry of Natural Resources
8. Paul Flowers, Strategic Planning and Policy Advisor, Ministry of Natural Resources
9. Tanya Marsden, Policy Unit (PCPU), Ministry of Natural Resources
10. Marlen Westby, PCPU, Ministry of Natural Resources
11. Marcelo Windsor, Forestry Department, Ministry of Natural Resources
12. Safira Vasquez, Strategic Approach to International Chemicals Management (SAICM), Department of Environment, Ministry of Natural Resources
13. Edgar Ek, Agriculture Dep. Chief Environmental Officer, Ministry of Natural Resources
14. Jeavon Hulse, Department of Environment, Ministry of Natural Resources
15. Gilroy Lewis, Solid Waste Management Authority (SWAMA), Ministry of Natural Resources
16. Lumen Cayetano, SWAMA, Ministry of Natural Resources
17. Beverly Wade, Fisheries Department, Ministry of Agriculture and Fisheries
18. Eugene Waight, Chief Agriculture Officer, Department of Agriculture, Ministry of Agriculture and Fisheries
19. George Myvett, Sr. Fisheries Officer, Fisheries Department, Ministry of Agriculture and Fisheries
20. David Leacock, Chief Executive Officer for the Ministry of Education and Youth
21. Christopher Aird, Chief Education Officer, Ministry of Education and Youth
22. Ellajeon Gillett, Ministry of Education and Youth
23. John Bodden, Ministry of Health
24. Judith Alpuche, Chief Executive Officer for the Ministry of Human Development and Social Transformation
25. John Flowers, Ministry of Human Development and Social Transformation
26. Lawrence Sylvester, Chief Executive Officer for the Ministry of Housing and Urban Development
27. Nigel Vasquez, Ministry of Tourism, Civil Aviation & Culture
28. Nonatis Canta, Pesticides Control Board (PCB)

### **Consultations between May 9th and 13th, 2011**

1. Hon. Dean Barrow, Prime Minister of Belize
2. Mr. Joseph Waight, Financial Secretary, Ministry of Finance, Belize
3. Ms. Yvette Alvarez, Senior Advisor, Ministry of Finance
4. Ms. Yvonne Hyde, Chief Executive Officer, Ministry of Economic Development
5. Ms. Emily Waight-Aldana, Economist, Ministry of Economic Development
6. Ms. Beverly Castillo, Chief Executive Officer, Ministry of Natural Resources and Environment, Belize
7. Mr. Martin Alegria, Chief Environmental Officer, Department of Environment, Ministry of Natural Resources and Environment, Belize
8. Dr. Colin Young, National Protected Areas Secretariat (NPAS) Director, Ministry of Natural Resources and Environment, Belize
9. Dr. Paul Flowers, Strategic Planning and Policy Advisor, Ministry of Natural Resources and Environment, Belize
10. Mr. George Myvett, Sr. Fisheries Officer, Fisheries Department, Ministry of Agriculture and Fisheries

11. Mr. James Azueta, Fisheries Officer, Fisheries Department, Ministry of Agriculture and Fisheries
12. Ms. Lisa Carne, Marine Biologist, Placencia, Stann Creek District
13. Ms. Nadia D. Bood, WWF Central America
14. Mr. Brian Young, Tour Guide and Co-Chairman of Friends of Laughing Bird Caye, Stann Creek District
15. Dr. Kenrick Leslie, Executive Director, Caribbean Community Climate Change Centre
16. Dr. Ulric Trotz, Science Adviser, Caribbean Community Climate Change Centre
17. Mr. Mark Bynoe, Environmental/Resource Economist, Caribbean Community Climate Change Centre
18. Mr. Winston Bennett, Project Manager, Caribbean Community Climate Change Centre

### **Consultations between November 14th and 18th, 2011**

1. Yvonne Hyde, Chief Executive Officer, Ministry of Economic Development
2. Beverly Castillo, Chief Executive Officer, Ministry of Natural Resources and the Environment (MNRE)
3. Colin Young, Program Director, Ministry of Natural Resources and the Environment (MNRE)
4. Paul Flowers, Strategic Planning and Policy Advisor, Ministry of Natural Resources and the Environment (MNRE)
5. Wilbur Sabido, Chief Forest Officer, Ministry of Natural Resources and the Environment (MNRE)
6. Arlene Maheia, Program Assistant, Ministry of Natural Resources and the Environment (MNRE)
7. Tanya Marsden, Public Sector Liaison Officer, Ministry of Natural Resources and the Environment (MNRE)
8. Ramon Carcamo, Assistant Fisheries Officer, Ministry of Agriculture and Fisheries
9. Dennis N. Jones, Managing Director, Belize Enterprise for Sustainable Technology (BEST)
10. Elvis Requena, Project Coordinator, Belize Enterprise for Sustainable Technology (BEST)
11. Shunsuke Nakamura, Resident Representative, Japan International Cooperation Agency (JICA)- Belize Office
12. Alex Martinez, Program Director, The Nature Conservancy
13. Imani Fairweather Morrison, Programme Officer, Oak Foundation

#### Placencia Community

14. Nellie Catzim, SEA/Executive Director, Southern Environmental Association (SEA)
15. Lisa Carne, SEA Consultant, Southern Environmental Association (SEA)
16. Sydney Lopez, Jr., Member, Placencia Fishermen's Co-operative
17. Leon Small, Member, Placencia Fishermen's Co-operative
18. LoullYodfrey, Member, Placencia Fishermen's Co-operative

#### Punta Gorda Community

19. Celia Mahung, Executive Director, Toledo Institute for Development and Environment (TIDE)
20. Virginia Fuhs, Member, Toledo Institute for Development and Environment (TIDE)
21. Seleem Chan, Member, Toledo Institute for Development and Environment (TIDE)
22. Joe Villafranco, Member, Toledo Institute for Development and Environment (TIDE)

23. Mario Muschamp, Member, Toledo Institute for Development and Environment (TIDE)
24. Lana Cannon, Member, TIDE/Brandeis University
25. Martin Reyes, Member, Toledo Fisherman Co-operative
26. Armando Ramirez, Member, Rio Grande Fisherman Co-operative

Bermuda Landing Community

27. Dana Rhamdas, Program Coordinator, Community Baboon Sanctuary (CBS)
28. Conway Young, Administrator, Community Baboon Sanctuary (CBS)
29. Shannon White, Peace Corps Volunteer, Community Baboon Sanctuary (CBS)
30. Dorla Rhaburn, Board member (Flowers Bank), Community Baboon Sanctuary (CBS)
31. Sharon Robinson, Board member (Flowers Bank), Community Baboon Sanctuary (CBS)
32. Faye Thompson, Board member (St. Paul's Bank), Community Baboon Sanctuary (CBS)
33. Denise Fermin, Board member (St. Paul's Bank), Community Baboon Sanctuary (CBS)
34. Loretta Bevans, Board member (Isabella Bank), Community Baboon Sanctuary (CBS)
35. Mildred Ortiz, Board member (Scotland Half-Moon), Community Baboon Sanctuary (CBS)
36. Jessie Young, Board member (Bermudian Landing), Community Baboon Sanctuary (CBS)
37. Joyola Joseph, Board member (Bermudian Landing) , Community Baboon Sanctuary (CBS)
38. Carolyn August, Board member (Willows Bank), Community Baboon Sanctuary (CBS)
39. Rosean Myvette, Board member (Double Head), Community Baboon Sanctuary (CBS)
40. Raymond Renue, Board member, Rancho Dolores Environment and Development Group
41. Rosamond Perez, Board member, Rancho Dolores Environment and Development Group
42. Carol Sutherland, Board member, Rancho Dolores Environment and Development Group
43. Edlene Smith, Board member, Rancho Dolores Environment and Development Group
44. Violet Jeffordsd, Board member, Rancho Dolores Environment and Development Group
45. Grace Pook, Board member, Rancho Dolores Environment and Development Group

**Consultations between July 9-13, 2012**

1. Dr. Wendel Parham, CEO, MFFSD
2. Ms. Beverly Wade, Chief Fisheries Officer, MFFSD
3. Mr. Mauro Gongora, Director of Commerce, Fisheries Department, MFFSD
4. Ms. Arlene Maheia, Acting Director - NPAS , MFFSD
5. Michelle Lindo-Longsworth, BEST - Deputy Manager and Project Coordinator
6. Dennis Jones, BEST- Managing Director
7. Nayari Diaz, PACT-Grants Coordinator
8. Lorena Ramirez, PACT – Project Officer

Monkey River Community

9. Michael William, Monkey River fisher
10. Daniela Castellanos, Toledo Institute for Development and Environment (TIDE)
11. Daniel Castellanos, Monkey River fisher

Placencia Community

12. Ian Chrnull, Placencia Fishermen Cooperative Society
13. Thurman Turner, Placencia Co-op
14. Sydney Lopez Jr., Placencia Co-op
15. Lorall Godfrey, Placencia Co-op

16. Kurt Godfrey, Placencia Co-op
- Sarteneja Community
17. Abel Verde, Sarteneja Fishermen's Association
  18. Benedicto Perez, Sarteneja Fishermen's Association
  19. Anastacio Gongora, Sarteneja Fishermen's Association
  20. Justino Quintinilla, Sarteneja Fishermen's Association
  21. Eduardo Munoz, Sarteneja Fishermen's Association
  22. Justino Mendez, Sarteneja Environmental Association
  23. Joel Verde, Coordinator - Sarteneja Association for Environment and Development

Bermudian Landing Community

24. Dana Rhamdas, Community Baboon Sanctuary
25. Jessie Young, Community Baboon Sanctuary
26. Dorla Rhaburn, Community Baboon Sanctuary
27. Dian Baldwin, Community Baboon Sanctuary
28. David Wade, Community Baboon Sanctuary
29. Loretta Bevans, Community Baboon Sanctuary
30. Jonathan Lyon, Community Baboon Sanctuary (Consultant)
31. Shannon White, Community Baboon Sanctuary (Consultant)
32. Colleen Joseph, Rancho Dolores Village
33. Rosalind Joseph, Rancho Dolores Village

Caye Caulker Community

34. Earl Smith, Caye Caulker Fisher men Association
35. Bonifacio Allen, Caye Caulker Fisher men Association
36. Carlos Chan, Caye Caulker Fisher men Association
37. Robert Blease, Caye Caulker Fisher men Association
38. Ali Cansino, Fisheries Officer - Fisheries Department
39. San Jose Succotz
40. Rafael Manzanero, Executive Director - Friends of Conservation and Development
41. Arnoldo Melendez, Extension Technician - Friends of Conservation and Development
42. Amparito Itza, Administrative Assistant - Friends of Conservation and Development

Belize City Community

43. Robert Usher, Executive Director -Northern Fishermen Cooperative Limited
44. Isaac Lambey, Director -Northern Fishermen Cooperative Limited
45. Ovel Leonardo, Chairman -Northern Fishermen Cooperative Limited
46. Barbara Bradley, Manager - National Fishermen Cooperative Limited
47. Elijio Tzul, Director - National Fishermen Cooperative Limited
48. Elmer Rodriguez, Chairman - National Fishermen Cooperative Limited
49. Fidel Castro, Director - National Fishermen Cooperative Limited
50. Daniel Dawson, Treasurer - National Fishermen Cooperative Limited

November 2012

1. Belize Audubon Society consultation – 15 November 2012;
2. Turneffe Atoll Sustainability Alliance consultation – 15 November 2012; and
3. Fisheries Department working session – 15 November 2012.
4. Belize Fishermen's Federation;
5. Dangriga fishers – 22 November 2012;

6. Hopkins fishers – 22 November 2012;
7. Placencia fishers and stakeholders – 22 November 2012;
8. Hopkins women – 23 November 2012
9. Dangriga women – 23 November 2012.

## Annex 6: Abbreviations and Acronyms

AOSIS	Alliance of Small Island States
AusAid	Australian Aid
BCC	Behaviour Change Communication
BFCA	Belize Fishermen Cooperative Association Limited
CACs	Coastal Advisory Committees
CARICOM	Caribbean Community
CBOs	Community-based Organizations
CBWS	Corozal Bay Wildlife Sanctuary
CCAD	Central American Commission on Environment and Development
CCCCC	Caribbean Community Climate Change Centre
CCPS	Community-Based Adaptation Country Programme Strategy
CDM	Clean Development Mechanism
CIF	Climate Investment Fund
COMPACT	Community Management of Protected Areas for Conservation
CPS	Country Partnership Strategy
CZM	Coastal Zone Management
CZMAI	Coastal Zone Management Authority and Institute
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
ENSO	El Niño Southern Oscillation
EIA	Environmental Impact Assessment
EPA	Environmental Protection Act
EU	European Union
GCCA	Global Climate Change Alliance
GEF	Global Environmental Fund
GDP	Gross Domestic Product
GOB	Government of Belize
GPO	Global Partnership for Oceans
IADB	Inter-American Development Bank
ICM	Integrated Coastal Management
ICZM	Integrated Coastal Zone Management
IPCC	Intergovernmental panel on Climate Change
IUCN	International Union for the Conservation of Nature
JSDF	Japan Social Development Fund
KAP	Knowledge, Attitude and Behavioral Practice
KBA <sub>s</sub>	Key Biodiversity Areas
MAR	Meso-American Reef
MCCAI	Marine Conservation and Climate Adaptation Initiative
MCCAP	Marine Conservation and Climate Adaptation Project
MFFSD	Ministry of Forestry, Fisheries and Sustainable Development
MOF	Ministry of Finance
MPA	Marine Protected Areas
NGOs	Non-governmental organizations
NIWRA	National Integrated Water Resources Authority
NPAPSP	National Protected Areas Policy and System Plan

NPASP	National Protected Areas System Plan
NPESAP	National Poverty Elimination Strategy and Action Plan
PA	Protected Areas
PACT	Protected Areas Conservation Trust
PIU	Project Implementation Unit
PPCR	Caribbean Pilot Program for Climate Resilience
PSC	Project Steering Committee
SACD	Sarteneja Alliance for Conservation and Development
SWCMR	South Water Caye Marine Reserve
TAMR	Turneffe Atoll Marine Reserve
TAT	Turneffe Atoll Trust
TNC	The Nature Conservancy
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNESCO	United Nations Educational, Scientific, and Cultural Organization
USAID-MAREA	Marine Aquatic Resources and Economic Alternatives
WB	World Bank
WRI	World Resources Institute



**GOVERNMENT OF BELIZE**  
*Ministry of Finance*  
*Belmopan, Belize*

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C/IOR/3/16/1/14(9) VOL II

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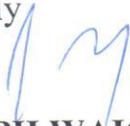
To: The Adaptation Fund Board  
c/o Adaptation Fund Board Secretariat  
Email: Secretariat@Adaptation-Fund.org  
Fax: 202 522 3240/5

**Subject: Endorsement for Belize Marine Conservation and Climate Adaptation Project**

In my capacity as designated authority for the Adaptation Fund in Belize, I confirm that the above national project/programme proposal is in accordance with the government's national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in the Belize.

Accordingly, I am pleased to endorse the above project/programme proposal with support from the Adaptation Fund. If approved, the project/programme will be implemented by the World Bank and executed by the Protected Areas Conservation Trust (PACT).

Sincerely

  
**(JOSEPH WAIGHT)**  
**Financial Secretary**  
**Ministry of Finance**



- c. Chief Executive Officer, Ministry of Economic Development  
Chief Executive Officer, Ministry of Forestry, Fisheries and Sustainable Development