



Department
for Environment
Food & Rural Affairs



Darwin Initiative Main Project Annual Report

Important note: *To be completed with reference to the Reporting Guidance Notes for Project Leaders:*

it is expected that this report will be no more than 10 pages in length, excluding annexes

Submission Deadline: 30 April

Darwin Project Information

Project Reference	22-014
Project Title	Maximizing Benefits of Marine Reserves and Fisheries Management in Belize
Host Country/ies	Belize
Contract Holder Institution	Wildlife Conservation Society (WCS)
Partner institutions	Belize Fisheries Department, Environmental Defense Fund, The Nature Conservancy, University of Miami
Darwin Grant Value	£273,150
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Start/end dates of project	1 April 2015 - 31 March 2018
Reporting period (e.g., Apr 2015 – Mar 2016) and number (e.g., Annual Report 1, 2, 3)	April 2015 - March 2016, Annual Report 1
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Report author(s) and date	Nicole Auil Gomez, April 29, 2016

1. Project Rationale

The Belize Barrier Reef System supports an array of coastal, avian, and marine life within important habitat systems. Anthropogenic activities, however, have put increased pressure on the system, particularly overfishing. Although Belize is well known for its network of marine reserves, only 3.15% of its marine territory is legally protected from fishing (designated as “no-take”). This area is too small to ensure replenishment of resources, protection of biodiversity, and resilience to climate change. Outside of these no-take zones, fisheries such as lobster and conch, which provide food and income for local communities, are threatened by increasing numbers of fishers and illegal fishing. The former open-access system has led to overfishing of species that are functionally critical to the health of coral reef ecosystems (such as parrotfish, an important grazer) and has threatened the sustainability of local livelihoods. As a result, both the conservation and fishing communities have expressed interest in developing a rights-based management approach that ensures the sustainable use of marine resources.

Belize is located on the Caribbean coast of northern Central America at 17°15' north of the equator and 88°45' west of the Prime Meridian on the Yucatán Peninsula. The two focal sites of this project are the Glover's Reef Marine Reserve (GRMR) and the South Water Caye Marine Reserve (SWCMR). These two marine protected areas are off the southern half of Belize's coast, with the former being an atoll outside of the barrier reef (45 kilometers east of the mainland at UTM coordinates 415257 East, 1859219 North), and the latter being within the reef lagoon at UTM 337800 East, 1851500 North (Fig. 1).

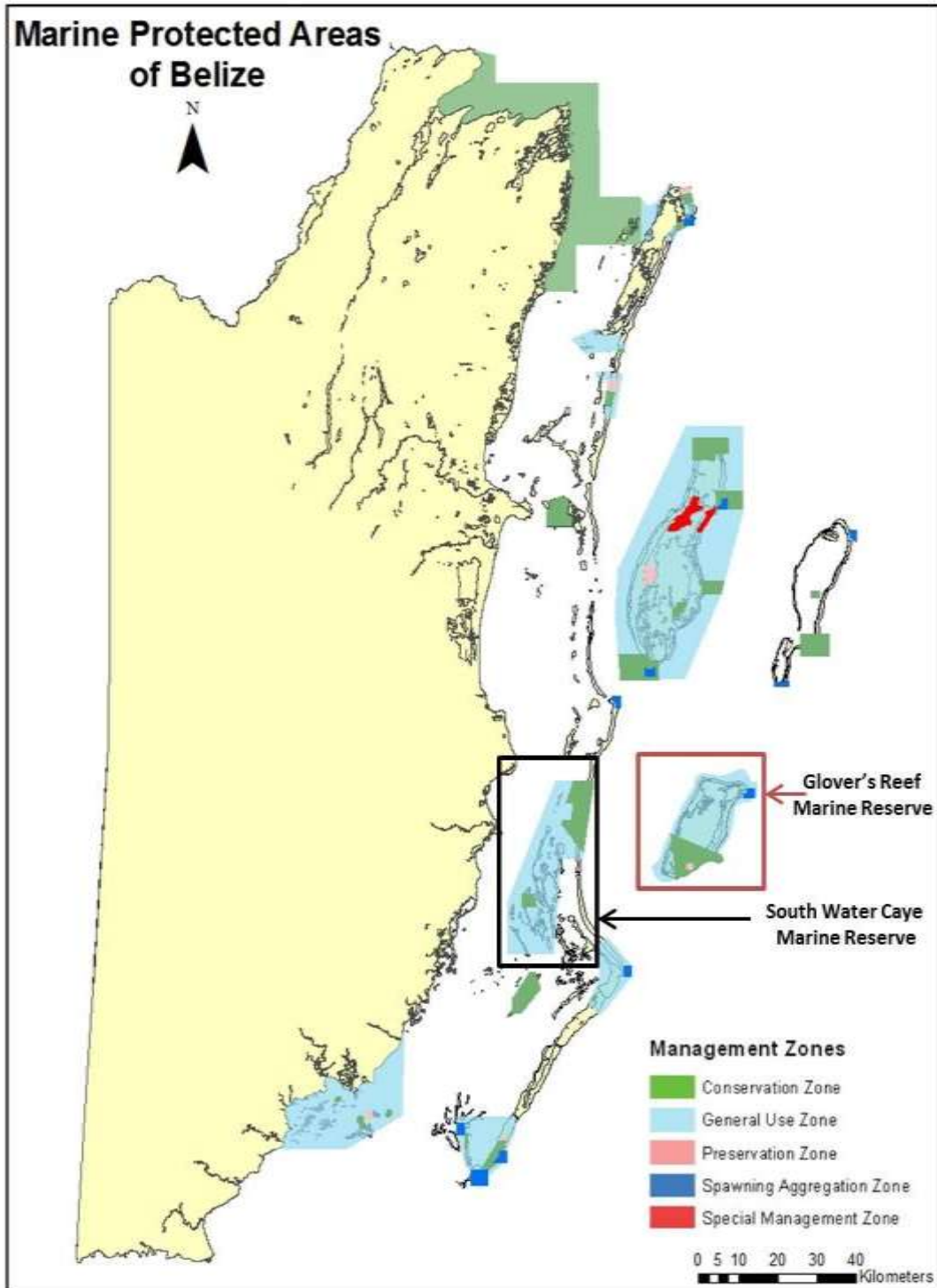


Figure 1. Map of Belize and focal project sites.

2. Project Partnerships

Our primary partner for this project has been the Belize Fisheries Department. A majority of the outputs are aimed at supporting and strengthening the fisheries framework; therefore, the initiatives have required not only the support, but also the operationalization of the programs in conjunction with the Department. Additionally, the international and local non-governmental organizations' (NGO) team members have collaborated with WCS by bringing their expertise in mapping, modeling, protected areas management, data collection, conservation compliance, and community engagement. The international and local NGOs have come together under two working groups, the Managed Access Working Group (MAWG) and the National Replenishment Zone Expansion Steering Committee (NRZESC). The result has been a truly industry led, participatory process of decision making – primarily through strong working groups. The Managed Access Working Group has expanded from a technical committee of five to a broader membership of 10 including protected areas co-managing NGOs. Nine meetings have been held to collectively set out the Managed Access framework. In June 2015, the Cabinet of Belize approved the national rollout of the Managed Access Framework (MAF) to all fishing waters in Belize. This rollout was set to begin in January 2016 with full implementation in June 2016. The results have included engagement with the former and current Minister of Fisheries and respective Chief Executive Officer for the Ministry, and formal rollout of licensing in January 2016. Additionally, the National Replenishment Zone Steering Committee tackled the issues of replenishment zone expansion using theoretical Marxan modeling, two rounds of fisherfolk consultations, and strategic external communications – the latter led by WCS. The Glover's Reef Atoll and South Water Caye Advisory Committees met regularly, each quarter, with all meetings having attained quorum with stakeholder representation.

The key NGO project partners include the Environmental Defense Fund and The Nature Conservancy. We have also engaged the services of Dr. Elizabeth Babcock, of the University of Miami, who will be finalizing the depletion model of lobster and conch for the SWCMR.

3. Project Progress

3.1 Progress in carrying out project activities

Output 1: For GRMR and SWCMR, sustainable fishing regulations are implemented through no-take zones and license-based MA programs that employ total allowable catch (TAC) quotas.

Activity 1.1 Assist authorities with data collection and analysis for development of TAC for conch and lobster for SWCMR.

The fishers' catch logbook data and sample catch data were collected at GRMR by the WCS team. Our fisheries scientist consultant, Dr. Babcock, has analyzed the data for the conch seasons 2011-2012, 2012-2013, and 2013-2014 (Babcock 2015). Based on the results, which showed that fishing mortality is likely higher than the rate needed to maintain sustainable take, the recommendation made to the Fisheries Department was to reduce the national quota for subsequent conch seasons. The quota for conch was reduced to 800,000-pounds (lbs) for 2015-2016, from 850,000-pounds for the 2014-2015 season.

To date, fishing quotas for lobster or finfish have not been established yet. The Belize Fisheries Department, Environmental Defense Fund, WCS, and University of Santa Barbara California are finalizing an adaptive management framework for the conch, lobster, and finfish, which will seek to set harvest control measures for the fisheries.

Activity 1.2 Monitor trends in number of MA licenses issued annually at GRMR and SWCMR to understand how licensing criteria impact the number of fishers in each reserve.

The official implementation of managed access licensing began in January 2016, and the electronic system is fully functional and allows for real-time assessment of legal use per zone, and fishing infractions. The Managed Access Committee (MAC) for GRMR received 170 applications for rights to fish at GRMR and accepted roughly 76%; this is in line with the total anticipated. As for SWCMR, 703 applications were submitted and the respective Committee

accepted 100%. We expect the number of approved licenses to begin to decrease in 2017 for SWCMR.

Activity 1.3 *Assist the Fisheries Department with entering catch data from fishers and monitor total catch per reserve, evaluating against established TACs.*

Catch data from fishers' catch logbooks were entered into the Fisheries database. WCS' sustainable catch level of lobster at GRMR of 22,810 lbs - 26,358 lbs was maintained at 25,813 lbs. Catch Log data for conch for the 2015-2016 season reached 50,000 lbs as of January 2016 for GRMR. Beginning in early 2016, we expect to also monitor the catch data using fisher logbooks from SWCMR.

Activity 1.4 *Collect independent sample of catch data monthly in both reserves to serve as benchmark for quality control, allowing for the evaluation of the accuracy of fisher logbook data.*

Fisheries-dependent data have been collected monthly at both GRMR and SWCMR for the 2015-2016 season. We have been sampling monthly (3 days) catch at both GRMR and SWCMR since June 2015, from the start of the most recent fishing season, until present. The catch per unit effort (CPUE) data collected at GRMR has resulted in 1189 conch samples from 24 fishers (5 sailboats total); 802 lobster samples from 76 fishers (8 sail boats); and 123 fish samples from 13 fishers (4 sailboats and 3 skiffs). Snappers are the most abundant finfish caught, followed by groupers. At SWCMR, 2519 conch samples have been assessed from 34 fishers (1 sailboat and 9 skiffs); 1251 lobster samples from 65 fishers (three sailboats and 12 skiffs); and 307 finfish samples taken from 24 fishers (2 sailboats and 6 skiffs.) We have shared the data with the Fisheries Department; statistics will be completed at the end of the fishing season, in July.

Activity 1.5 *Conduct regular meetings of the MA Committees and Annual Fisher Forums to ensure that fishers are kept up-to-date on program progress and have an opportunity to discuss their concerns.*

In December of 2015, the eight Managed Access Committees (one per management region) met for the first time and were trained on their roles and responsibilities as the overseers of licensing for their respective area. Each committee is made up of commercial fishers who are elected to represent traditional fishers in their respective area. The prime responsibility is to vet each license application. They also provide intelligence to conservation compliance staff and WCS on illegal fishing activities.

Output 2: Spatial Monitoring and Reporting Tool (SMART) is implemented in order to improve targeted enforcement efforts aimed at reducing illegal, unreported, and unregulated fishing.

Activity 2.1 *Train Fisheries Department and NGO personnel who help co-manage marine reserves in the use of SMART software and procedures, including use of the new applet for tablet use, in order to record and track enforcement effort and illegal activities.*

WCS has trained conservation compliance staff at all marine protected area in the use of SMART.

Activity 2.2 *Collaborate with reserve enforcement staff in developing SMART reports to determine infraction rates.*

WCS is in the process of collecting all data from the reserves, which we will use to train managers to interpret the data using SMART software. Strategic intelligence gathering from fishers and enforcement staff has resulted in five arrests with 100% convictions at GRMR for 2015.

Activity 2.3 *Use SMART results to identify types and hotspots of illegal activity in order to design more effective and efficient patrols that reduce distance travel and fuel used.*

This activity will begin in Year 2.

Activity 2.4 Use SMART to map fishing activity throughout the reserves in order to better understand fishing patterns.

We have yet to map current data. Fisher encounter data will be mapped with enforcement data in 2016.

Activity 2.5 Convene workshop to review implementation of national SMART rollout and conduct training in analysis of data.

This activity will begin in Year 2.

Output 3: Benefits of no-take zones and MA programs on coral reef ecosystems and resource-based livelihoods are better understood, strengthening adaptive management and community support.

Activity 3.1 Analyze both logbook and independent sample datasets for conch and lobster, including mean size, population structure, and CPUE, and use results to update TAC models each season.

Catch reports have been finalized for the 2014-2015 lobster and conch seasons for GRMR and SWCMR (Tewfik 2016). Also, preliminary analysis has been conducted for the 2014-2015 conch logbook dataset, supplemented by information from WCS individual fisher catch data for GRMR (Tewfik 2015 and Conch morphology study ongoing), which Dr. Babcock has also been updating for conch fishery models. WCS has made public presentations on the benefits of GRMR's no-take areas, including for the Coastal Zone Management Authority & Institute's Seminar Series, and the 37th Association of Marine Laboratories of the Caribbean (AMLC) meeting. A manuscript is in preparation for Glover's Reef Marine Reserve: "Trends in fisheries targets reveal benefits of conservation strategies at a Caribbean Atoll" based on initial analysis (Tewfik 2015) and follow-up collaborations with Dr. Babcock. We anticipate the manuscript to be submitted by the end of August.

Activity 3.2 Using well-established protocols, monitor and report on a suite of coral reef ecosystem health indicators (including several focusing on critical herbivores like parrotfish).

Independent data collection efforts for conch, lobster, *Diadema* sea urchins, and finfish including parrotfish were completed for GRMR in June-July 2015, with analyses to be completed this summer. Preliminary analysis of benthic cover on patch reefs, *Diadema* urchin densities across patch reefs and forereefs are available. No such data existed for SWCMR, which was last sampled in August 2014 but will be conducted in May 2016.

Activity 3.3 Conduct annual socioeconomic surveys of MA licensed fishers in collaboration with the Fisheries Department.

The socioeconomic surveys conducted for fishers at GRMR between 2012 and 2015 have been analyzed and internal report produced (Maaz 2015). Between 146 and 67 fishers were interviewed per year, and in total 388 surveys were administered. The data show that there are 382 dependents of fishers from GRMR, with an average household number of five persons. It is clear that the managed access licensed fishers have a long tradition of fishing at GRMR, and fishing is the primary source of income for the families. The fishers are in general middle-income, with most owning their own homes and have full furnishings, and 50% in 2015 have motor vehicles and up to 30% owning a computer.

Activity 3.4 Monitor perceptions among fishers of the necessity and effectiveness of enforcement program.

Our Community Fisheries Coordinator prepared a report on the socioeconomic assessment of the managed access fishers from GRMR (Maaz 2015). One question was specific on the

perception of enforcement and one on the perception of illegal fishing was included. For GRMR, there is indication that the enforcement needs improving.

Activity 3.5 *In collaboration with partners, prepare and disseminate information on results with participating fishers in order to foster dialogue and continued support.*

The results of the work will be presented during a fisher forum that will be held in 2016.

Output 4: New and expanded no-take zones in Belize's network of marine reserves are designated through statutory instruments and approved by relevant stakeholders.

Activity 4.1 *Conduct national survey to evaluate level of understanding and support for no-take areas and their benefits.*

All consultations have been conducted for Phase 1 of the National Replenishment Zones Expansion (NRZE) project, which is looking at expanding protected areas in Belize's open sea or deep sea. These consultations were held with deep-sea commercial fishers and sport fishers from across key sites (i.e., Lighthouse Reef Natural Monument and Bacalar Chico, Turneffe Atoll, Gladden Spit and Silk Cayes, Glover's Reef, Caye Caulker, and Sapodilla Cayes marine reserves). Currently, deep sea habitats are the most underrepresented in Belize's marine protected areas system, with abyssal (2,000-4,000 m), bathyal (700-1,000 m), mesopelagic (200-700 m), and coastal shelf (less than 200 m) habitats representing only 0.0%, 0.2%, 2.9%, and 7.8% coverage, respectively, of existing replenishment zones. However, based on consultations held with fishers, they have committed to support the expansion of deep sea replenishment zones, increasing the area of protection to more than 10% in all four marine zones (abyssal, 10.1%; bathyal, 14.3%; mesopelagic, 12.0%; and coastal shelf habitats, 10.1%) (Appendix, Figure 1). These projections align well with the initial Marxan-generated results, which also meet or exceeded the 10% conservation goal. We have developed a consultation report detailing the results of the consultations held.

Activity 4.2 *Facilitate regular bi-monthly meetings of the Steering Committee for the National Replenishment Zones Expansion program, and its associated Technical and Communications Sub Committees.*

In the later part of April, partners and WCS will meet with the Belize Coast Guard and Ministry of National Security (members of the National Security Council) to discuss enforcement measures for the proposed deep-sea expansion. Furthermore, the Marine Conservation and Climate Adaptation Project (MCCAP), a government-led initiative, utilized the proposed expansion developed through the NRZE project as the basis for the re-zoning of its three target sites, Corozal Bay Wildlife Sanctuary, Turneffe Atoll Marine Reserve, and South Water Caye Marine Reserve. Through MCCAP, consultations with fishers, NGOs, and government departments were held to review the proposed design; the validated maps should be completed by May. The results will then be analyzed to determine its alignment with the NRZE initial proposed design for the areas.

Activity 4.3 *Conduct quarterly meetings of the Reserve Advisory Committees and discuss potential new expanded zones (proposed by WCS and TNC) with stakeholders at these forums.*

There have been the regular quarterly meetings of the Glover's Reef and the South Water Caye Advisory Committees. Consultation meetings have been held specifically with deep-sea fishers, and a Consultation Report is provided.

WCS, The Nature Conservancy, and the Fisheries Department are approaching the National Security Council and the Belize Coast Guard to discuss enforcement measures for the proposed deep-sea expansion. This intervention is expected to expand the support base for the initiative, and should make it easier to then pass a legislation to declare the proposed deep-sea area as no take. The plan is for a one-mile replenishment zone along the seaward boundary of our territorial sea that would assist in defending Belize's national maritime security.

Activity 4.4 Develop outreach material in coordination with TNC and the Fisheries Department to inform stakeholders of the biodiversity and fisheries benefits of no-take areas that incorporate results from GRMR analyses.

The Punta Fuego radio education-drama has been the primary source of outreach on the no-take/replenishment zone initiative.

In year two of the project, WCS is developing a communications strategy that will outline additional materials to supplement the initiative.

3.2 Progress towards project outputs

Output 1:	For GRMR and SWCMR, sustainable fishing regulations are implemented through no-take zones and license-based MA programs that employ total allowable catch (TAC) quotas.			Comments (if necessary)
	<i>Baseline</i>	<i>Change recorded by 2016</i>	<i>Source of evidence</i>	
Indicator 1.1	Record of licenses issued at GRMR	170 licenses have been requested and 129 issued to date, since the January rollout	Records from the Fisheries Department MA database	
Indicator 1.2	Logbook catch database and analysis reports	Managed Access "soft" rollout began in January 2016, endorsed by Cabinet for full rollout commencing June 2016. To date 1727 licenses have been issued for the country	Cabinet paper (Managed Access for Sustainable Fishing and Fisher Livelihoods)	WCS does not have access to the final Cabinet Paper as it is not a public document.
Indicator 1.3	Record of licenses issued at SWCMR	703 issued to date, since the January rollout	Records from the Fisheries Department MA database	
Indicator 1.4	Logbook analysis reports; scientific publications and technical reports detailing development of TACs	Logbook data for GRMR has been inputted in the database; preliminary report on conch data indicates that the fishery captures relatively small, immature conch in the Conservation Zone	Babcock et al. 2015	
Indicator 1.5	Minutes of meetings of National MA Working Group (MAWG) and MA	There have been 6 meetings of the MAWG over the last year. The inception meetings	Meeting minutes: (MAWG - February 10 2015,	It was decided that the Forum would be done before the lobster season

	Committees (MAC); reports of Annual Fishers Forums including list of participants and presentations	for the MAC's were held in January. Fishers forums not held but a series of consultations were held with fishers from GRMR and SWCMR to develop the MAF	April 15 2015, May 25 2015, August 05 2015, December 15 2015, April 7 2016)	opens in 2016. Due to the numerous meetings with fisheries, it was decided that we had reached meeting fatigue
Output 2	Spatial Monitoring and Reporting Tool (SMART) is implemented in order to improve targeted enforcement efforts aimed at reducing Illegal, unreported, and unregulated fishing			
Indicator 2.1	Surveillance and enforcement (SMART) reports describing patrol activities and results	Data to be consolidated in mid-2016		Report pending – project year 2
Indicator 2.2	GRMR annual reports	Data from project year one to be analyzed		
Indicator 2.3	SWCMR annual reports	Not reporting period		
Indicator 2.4	Reports which include maps produced	No mapping conducted in year one.		Report pending – project year 2
Output 3	Benefits of no-take zones and MA programs on coral reef ecosystems and resource-based livelihoods are better understood, strengthening adaptive management and community support.			
Indicator 3.1	Annual reports on CPUE and fisher income	CPUE available for conch and lobster at both GRMR and SWCMR		
Indicator 3.2	Reports on catch data and independent data analysis	Analysis for GRMR is ongoing with preliminary results for patch reef benthic cover and <i>Diadema</i> urchin densities		
Indicator 3.3	Scientific article manuscripts	Report finalized indicating socio-economic survey results for 2011-2015. Report on the benefits of no-take areas at Glover's Reef.	Report, Maaz 2015 Report, Tewfik, 2015a	Data not prepared for scientific publication; additional data will be included in 2017 for a peer-reviewed publication, to include statistics from Dr. Babcock

Output 4	With the widespread support of fishing communities and the general public, new or expanded no-take zones are established in Belize's network of marine reserves.			
Indicator 4.1	National survey results	Results from an impact survey conducted following the radio drama indicates that fishers who listened to <i>Punta Fuego</i> were significantly more likely to exhibit correct knowledge, possess positive attitudes, report interpersonal communication, and perform positive fishing behaviours compared to non-listeners. Analysis for the degree of exposure found that the more an audience member listened to and engaged with the drama, the more likely they were to exhibit positive knowledge (a 12% change in knowledge) and attitudinal shifts (a 19.5% change in attitudes).	Robbins et al. 2015	
Indicator 4.2	Minutes of meetings of the Steering Committee	5 NRZE Steering Committee meetings were held from 2015 to date	Meeting Minutes	
Indicator 4.3	Government gazette with statutory instruments	The validation process for phase 1 has been completed. These have been shared with the Fisheries Department. Through MCCAP the department is targeting three of the NRZE proposed areas to be legally re-zoned.	Consultation Report (WCS,TNC, Fisheries Department 2016)	

3.3 Progress towards the project Outcome

Outcome:	Sustainable fisheries management increases catch-per-unit-effort and income, strengthens ecosystem health, and provides a model for expansion of no-take zones and managed access programs in marine reserves across Belize.			Comments (if necessary)
	<i>Baseline</i>	<i>Change by 2016</i>	<i>Source of evidence</i>	
Indicator 0.1	By 2018, fishery-dependent data from GRMR indicates an increase in CPUE to at least 7.5 conch/hour and 1.5 lobsters/hour, compared to a current baseline of 6.5 conch/hour and 1.3 lobsters/hour.	CPUE for conch and lobster relatively stable at GRMR and SWCMR up to mid-2015 – see catch data reports. Data collection ongoing for 2015-2016	Catch data reports GRMR & SWCMR (Tewfik 2016a, 2016b)	Future research will focus on improving the quality of the logbook data, and life history studies including studies of maturity and growth curves, as well as studies of the source of recruitment for conch in Belize (as per Babcock).
Indicator 0.2	By 2018, fishery-independent surveys at GRMR of conch, lobster, selected species of finfish including parrotfish, <i>Diadema</i> , as well as coral cover, show improvement against established baselines	Last independent data collection at GRMR was 2015 using expanded protocol - e.g. broader fish community and more extensive habitats (forereef, seagrass) - ongoing analysis. GRMR benefits manuscript based on LAMP past work (2007 - 2013). Last independent data at SWCMR was 2014 – report available.	Publication Tewfik 2015b	Next survey work at SWCMR will be this May and GRMR will have a down-sized data collection with Healthy Reef Initiative in summer 2016. These reports do include information on <i>Diadema</i> .
Indicator 0.3	By 2018, annual socioeconomic surveys of 135 fisher families around GRMR show a 3% increase in average fishing-related income from £3,234 to £3,534/fisher/year.	Fishers who use GRMR have been surveyed between 2013-2015. Results show strong long-term use by the core fishers at GRMR, and in 2015 85% have seen an improvement in resources with the MAF. However,	Socio-economic Assessment of Managed Access Fishers at GRMR For Period 2013-2015 Report (Maaz 2015)	

		logbook data indicate a decrease in income from conch, with lower catch – this reduced conch numbers was seen nationally in 2015.		
Indicator 0.4	By 2018, the WCS-facilitated NRZE Steering Committee has successfully increased the designation of no-take areas from 3% to 7% of the territorial sea of Belize, achieving significant progress towards the national goal of 10% by the end of 2018.	The NRZE Steering Committee developed a two-phased approach for replenishment zones expansion, which was endorsed by the former Minister of Forestry, Fisheries, and Sustainable Development. Phase 1 looks at expanding replenishment zones in the deep sea or open area and phase 2 looks at expanding replenishment zones in the inshore area. All consultations have been held for phase 1 and a consultation report was developed and submitted to the Belize Fisheries Department for them to review.	Meeting Minutes 2015 (30th April, 25th June, 27th August, 29th October, 11th February) NRZE Project, Phase 1 Consultation Report (TNC, WCS, Fisheries Department 2016)	Members of the NRZE Steering Committee along with the Belize Coast Guard and National Security discussed plans to enforce the proposed deep-sea area later in April.
Indicator 0.5	By the end of the project, the SWCMR MA program will be in year 3 of licensing with 80% of fishers submitting their catch data logbooks.	100% of request for licenses in SWCMR was approved by the relevant MAC and issued by Fisheries Department.	Fisheries Department's licensing database.	MAF only three months into implementation – we expect additional licensing in June.

3.4 Monitoring of assumptions

Assumption 1	<p><i>The political will to establish additional replenishment zones exists.</i> WCS is actively involved at the community level and the political level, and there is indication that Belizeans support further development and expansion of the activities currently piloted at GRMR and to be developed at SWCMR.</p> <p>The Belize Fisheries Department established a National Replenishment Zone Expansion Steering Committee, indicating their interest in the initiative to increase replenishment zones across Belize's territorial seas. The Steering Committee designed a two-phased approach for expansion that was supported by the former Minister of Fisheries. The phased approach looks at expanding replenishment zones in the deep-sea area first (i.e. depths greater than 200-ft). The Fisheries Department has integrated the government-led project (Marine Climate Change Adaptation</p>
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	<p>Project / MCCAP) focused on expanding replenishment zones for three marine protected areas in the NRZE initiative. The results of the NRZE Marxan analysis and consultations have formed the template for the rezoning at the three target sites. WCS and its partners have been involved in the MCCAP consultations.</p>
<p>Assumption 2</p>	<p><i>The Fisheries Department continues to support the rights-based, or MA, program.</i> WCS works in close collaboration with the Fisheries Department, which has supported the development of MA programs and plans to expand this approach as a national strategy for marine resource management.</p> <p>The Ministry of Fisheries and the Fisheries Department have fully endorsed the Managed Access fishery system. The Cabinet approved full rollout of the program for June 2016; “soft” rollout began in January 2016.</p>
<p>Assumption 3</p>	<p><i>The fishers are willing to participate in the MA program and support the no-take expansion.</i> Fishing communities have expressed their desire for programs that reduce overfishing that has caused a decline in key marine species and has led to reduced income.</p> <p>Fishers nationwide have supported the Managed Access Framework and, in December 2015, eight MA Committees, made up of fishers, were formalized. These Committees approve fishing license applications for each respective MA zone. As it relates to no-take expansion, with presentation of the Marxan analysis and validation discussion with deep-sea fishers from six communities, the resulting input was not significantly variable (see draft report attached).</p>
<p>Assumption 4</p>	<p><i>The export prices for lobster and conch remain at a stable level.</i> The revenue from these two major fisheries is based to a large extent on exports by the fishing co-operatives, mainly to the US market. These prices will influence how much fisher income will change during the lifetime of the project.</p> <p>The price per pound of lobster and conch paid to fishers remained stable between 2014 and 2016. The prices for lobster is BZD\$21/pound and for conch BZD\$8/pound.</p>
<p>Assumption 5</p>	<p><i>There are no natural disasters, such as hurricanes and el Niños, during the project period that will affect the coral reefs and near-shore fisheries.</i> Even in light of a major storm event, WCS is committed to working on managed access and no-take expansion in these geographies and Belize in the short- and long-term.</p> <p>For year one, there have been no natural disasters that have affected the work.</p>

3.5 Impact: achievement of positive impact on biodiversity and poverty alleviation

Production has remained fairly stable in GRMR, which allows fishers to continue to provide for their families’ basic needs. We have not had any displacement that would have result in fishers losing income. We do expect to see increased economic benefit in the future, as we have been working with the National Fishermen Producers Cooperative Society Ltd. and Hopkins and

Dangriga fishermen associations, to move towards a more sustainable and value added lobster production, focusing on whole lobster versus the traditional lobster tails.

The enforcement efforts of the Conservation Zone at GRMR and SWCMR have allowed for sustained lobster and conch catch levels at both parks. The finfish reports from independent catch data collection by WCS show a shift in target species from hogfish to less desired consumable reef fish such as barracuda (at GRMR) or schoolmaster snappers (at SWCMR). Given the overall low recordings of finfish data and broad species distribution it appears to be opportunistically driven.

4. Contribution to SDGs

The project has focused on the following Sustainable Development Goals for Year 1:

Goal 1: End poverty in all its forms everywhere

The new rights-based fisheries management system, which is now implemented in Belize (i.e. Managed Access / MA) in large part due to the efforts of this project, allows for all small-scale fishers to have rights and access to their traditional fishing grounds. The system ensures approval by peers for access to natural resources, strengthening entitlements and obligations of the men and women from the economically disadvantaged coastal communities. The system also allows for fishers exiting the industry to pass on their licenses to their kinfolks. The MA system, as well as our efforts to improve the ecological health of the fisheries resources, reduces vulnerability of small-scale fishers to stochastic or economic shocks.

Goal 14: Conserve and sustainably use the oceans, seas and marine resources

Small-scale fishers in Belize now are part of a fishery management system that will be better regulated and monitored with fishers, to reduce over exploitation of the natural marine resources. WCS data for both SWCMR and GRMR for June 2014 - February 2015 show lobster CPUE similar to the previous season, while conch CPUE was higher. Finfish data were varied at both sites, and these are likely caught opportunistically (see Catch Data Report Glover's Reef Marine Reserve and South Water Caye Marine Reserve). WCS has also been striving, in partnership with other organizations, to conserve 10% Belize's of deep-sea waters. After successfully completing two rounds of validation meetings with fishers, WCS and partners have presented recommendations to the Ministry of Fisheries. By integrating the MCCAP with the NRZE initiative the group is working towards legal rezoning three target sites.

5. Project support to the Conventions, Treaties or Agreements

This project is poised to assist Belize in meeting its commitments under the Convention on Biological Diversity (CBD):

- Aichi Targets 11 and 14: The National Replenishment Zone Expansion Steering Committee has worked at finalizing a Marxan model for expansion of the deep-sea no take area. The fishers who use this area have participated in workshops to finalize the areas that are to be vetted by the Fisheries Department then endorsed by the Minister of Fisheries. This is expected to be completed in Year 2 of the project and will lead to the designation 10% of deep-sea territory under full protection, and includes areas of special interests such as spawning aggregation sites, turtle nesting sites, and resilient areas.
- Aichi Targets 1, 4, and 6: Fishers from the length and breadth of the country have been consulted in various fora, individual and groups, to discuss and agree on the process of Managed Access, a new fisheries management system for Belize. The now established national system, commenced in January 2016, is expected to be a sustainable fisheries management with fishers having a better awareness and understanding of the importance of biodiversity conservation to securing livelihoods.

- Aichi Target 10: Based on WCS reports, lobster catch at both GRMR and SCWMR are stable, and conch catch was slightly higher than the previous season (Tewfik 2016a; Tewfik 2016b). The conch, however, were shown to be still extracted in immature state, as determined by lip thickness (Babcock 2015), which indicates that the size regulation needs to change. Reviewing external data, Belize has slightly improved scoring in an independent Eco-Audit from 64% effectiveness at reef management in 2014 to 68% in 2016 (HRI Eco Audit 2016).
- Aichi Target 14: While livelihood improvement is an indicator that is slow to show change, the new state of fisheries management, through the rights-based system overseen by fishers, is very likely to produce positive results, as indicated by the GRMR pilot site surveys (Maaz 2015). However, enforcement is key in ensuring that fisheries resources do not decline in the wild.

6. Project support to poverty alleviation

By the end of the first year, the project has yet to show signs of poverty alleviation in a manner consistent with projected benefits. Specifically, there are tangible achievements in setting the stage for a proper fisheries management system that is stakeholder inclusive, through the official Cabinet endorsement. Economic benefit is expected by the completion of the project, with beneficiaries being small-scale fishers and their families and communities. WCS has not done an economic assessment of the fisher households at GRMR or SCWMR for Year 1.

7. Project support to Gender equity issues

In an effort to recognize the hardworking men and women in Belize's fishing industry, in 2015 WCS held the first Punta Fuego Outstanding Fisher of the Year Award contest in Belize. The national competition was designed to recognize an outstanding Belizean whose primary income source is fishing, is a respected leader in the fishing community, and has contributed to conservation and the sustainable use of Belize's fisheries resources. Through a rigorous selection process, Mrs. Ana Ramirez was recognized as the 2015 Punta Fuego Outstanding Fisher. Mrs. Ramirez began fishing at the age of seven and, along with her husband, supported their 12 children from their fishing-based income, many of whom are now avid fishermen and women. Mrs. Ramirez is also a strong advocate for finfish size limits and was instrumental in the establishment of Port Honduras Marine Reserve. WCS will be conducting a 2016 Punta Fuego Outstanding Fisher of the Year Award contest.

All of WCS community engagement meetings are geared not only to fishers, but also to their spouses and families.

8. Monitoring and evaluation

The combination of fisheries dependent and independent data collection and analysis set-up a solid validation of the results. However, the trends are ongoing and may not appear within the timeframe of the first year of the project. In addition, as variable and unforeseen community dynamics appear and shifts in management assets and approaches occur, delays in improvements will be expected. Examples include (a) slower herbivore recovery despite a ban due to interactions with improving predator densities, and (b) lack of recovery as enforcement assets lack fuel or personnel to conduct patrols resulting in poor recovery of some target species (i.e. Nassau grouper at Spawning Aggregations).

9. Lessons learnt

The rigorous consultation process utilized for engaging fishers regarding the replenishment zones expansion project and the targeted communications strategy built tremendous community support for expanding replenishment zones in the deep sea or open sea area. However, better engagement was needed for targeting higher-level decision makers. We were

able to obtain the government authorization for the implementation of the Managed Access Program as a result of rigorous community engagement.

As it relates to fisheries-independent data, a switch from a narrow species focus for Long-Term Atoll Monitoring Protocol (LAMP) to a broader and more holistic approach (LAMP II), including larger fish community, benthic habitat data, and expansion into previously unsurveyed areas (i.e. forereef and deep seagrass) has resulted in some difficulties. Lobster broodstock are not seen on the reef crest during the day with these animals occupying shelter on the deeper wall – i.e. they are not accessible during monitoring activities. Our ability to monitor *Diadema* as part of the larger mobile invertebrate community is also hampered by its nocturnal and cryptic nature given the many other activities we conduct on any single dive. However, the results from broader community data and habitat breadth do outweigh the particular negatives. More detailed investigation of finfish catch and availability to local communities is recommended. The lack of any species-specific data on size at maturity and lack of size regulations (exception – Nassau grouper) in Belize makes negative impacts more likely and sustainable planning difficult.

- [If you had to do it again, what would you do differently?](#)

With regards to designing our communications strategy for national replenishment zones expansion, WCS would strategically target the engagement of higher-level decision makers to motivate them to make positive changes regarding conservation measures.

- [What recommendations would you make to others doing similar projects?](#)

Similarly, as mentioned above, WCS would recommend that a comprehensive communications strategy is developed that targets stakeholders from the community level to higher level decision makers, ensuring that support garnered from the community regarding conservation measures would result in concrete action by decision makers.

- [How are you going to build this learning into the project and future plans?](#)

WCS targeted communications strategy for Season 2 of *Punta Fuego* includes fostering political support for the expansion and designation of replenishment zones and marine conservation more generally. Beyond this, WCS will contract a consultant to develop a political strategy aimed at garnering support from higher level decision makers for a broad range of conservation measures.

10. Actions taken in response to previous reviews (if applicable)

Not Applicable.

11. Other comments on progress not covered elsewhere

The former Minister of Fisheries was engaged in the process for the last two years but, in November 2015, Belize underwent national elections and a new Minister and Chief Executive Officer (CEO) were assigned to the Ministry of Fisheries. Familiarization between the new leaders and the NGO community is still underway. WCS will be moving proactively over the next few months to gain higher-level support for this initiative. Furthermore, the integration of the government-led MCCAP initiative with the NRZE would assist with fast tracking the legal rezoning of three target areas.

We have made significant refinements and improvements to data collection for fisheries dependent and fisheries-independent assessments: (a) improved equipment (longer calipers, finer scales) and additions of indicators of maturity for conch (as well as data on shell length and lip) and lobster will allow great improvements to understanding population dynamics and appropriate sizes at harvest. The fisheries independent LAMP II protocols, as discussed earlier, will allow a much more holistic approach to management and conservation specifically in recognizing the importance of healthy habitats that support fisheries as well as including previously ignored habitats important to the life histories of ecologically and commercially important conch, lobster, and finfish.

12. Sustainability and legacy

The legacy expectation of this project is primarily to leave long-lasting ecological, social, and economic benefits for the users of GRMR and hopefully to those of SWCMR. We have just entered into the formal national Managed Access Framework, but we see already expected results of stable number of fishers with access to GRMR. Fishers have reported in the socioeconomic surveys that they understand the need to collect and report catch data. Now we will start monitoring for SWCMR. Conch and lobster data were stable or increasing in both reserves.

13. Darwin Identity

To date, there have been no final peer reviewed publication; therefore public acknowledgment or use of the Darwin identity has not yet taken place. Acknowledgements are indicated in the internal reports, listed in Annex 4.

14. Project Expenditure

Table 1 Project expenditure during the reporting period (1 April 2015 – 31 March 2016)

Project spend (indicative) since last annual report	2015/16 Grant (£)	2015/16 Total Darwin Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs (see below)			-1%	
Consultancy costs			0%	
Overhead Costs			0%	
Travel and subsistence			5%	
Operating Costs			2%	
Capital items (see below)	-	-	-	
Others (see below)			0%	
TOTAL				

Annex 1: Report of progress and achievements against Logical Framework for Financial Year 2015-2016

Project summary		Measurable Indicators	Progress and Achievements April 2015 - March 2016	Actions required/planned for next period
Output 1				
For GRMR and SWCMR, sustainable fishing regulations are implemented through no-take zones and license-based MA programs that employ total allowable catch (TAC) quotas.		By 2018, fishery-dependent data from GRMR indicates an increase in CPUE to at least 7.5 conch/hour and 1.5 lobsters/hour, compared, compared to a current baseline of 6.5 conch/hour and 1.3 lobsters/hour.		
Activity 1.1	Assist authorities with data collection and analysis for development of TAC for conch and lobster for SWCMR.		Conch and lobster data from fishers logbooks and from WCS fisheries-dependent surveys that are being used to finalize a TAC for both GRMR and SWCMR	The 2015-2016 fisheries dependent data will be analyzed and report produced. Dr. Babcock will have a TAC for SWCMR by the end of year two.
Activity 1.2	Monitor trends in number of MA licenses issued annually at GRMR and SWCMR to understand how licensing criteria impact the number of fishers in each reserve.		Managed Access "soft" rollout began in January 2016. To date 1756 licenses have been issued for the country.	WCS will be continuing to do quality control checks of the licensing data. In the field, conservation compliance personnel will verify licenses. Infractions will be included in the database and WCS will be training the enforcers on data output analysis.
Activity 1.3	Assist the Fisheries Department with entering catch data from fishers and monitor total catch per reserve, evaluating against established TACs.		WCS has entered fishers logbook data, updated to February 2016 at both GRMR and SWCMR.	TAC's for SWCMR is expected to be produced with this season's data a next season's data on both fisheries.
Activity 1.4	Collect independent sample of catch data monthly in both reserves to serve as benchmark for quality control, allowing for the evaluation of the accuracy of fisher logbook data.		WCS has data to February 2016 for the lobster and conch fisheries at GRMR and SWCMR.	
Activity 1.5	Conduct regular meetings of the MA Committees and Annual Fisher Forums to ensure that fishers are kept up-to-date on program progress and have an opportunity to discuss their concerns.		There have been several meetings of the MAWG and NRZEC over the last year. Fisher consultations have been held for both initiatives.	Celebration of Fisher month will be held in June, to honor fishers throughout the country. Additionally, a Fisher Forum will be held before the end of 2016, with the new cohort of licensed fishers under the MAF.

Output 2			
Spatial Monitoring and Reporting Tool (SMART) is implemented in order to improve targeted enforcement efforts aimed at reducing illegal, unreported, and unregulated fishing.		By 2018, fishery-independent surveys at GRMR of conch, lobster, selected species of finfish including parrotfish, <i>Diadema</i>, as well as coral cover, show improvement against established baselines:	
Activity 2.1	Train Fisheries Department and NGO personnel who help co-manage marine reserves in the use of SMART software and procedures, including use of the new applet for tablet use, in order to record and track enforcement effort and illegal activities.	All protected areas have trained staff on the use of SMART.	In the fall 2016, training will be convened to analyze the output of the SMART system, in light of the MAF.
Activity 2.2	Collaborate with reserve enforcement staff in developing SMART reports to determine infraction rates.	The GRMR data is available for WCS to analyze.	
Activity 2.3	Use SMART results to identify types and hotspots of illegal activity in order to design more effective and efficient patrols that reduce distance travel and fuel used.	Not reporting period.	In the coming year, the data generated from the SMART system will be analyzed to produce year-one results, following the implementation of the MAF.
Activity 2.4	Use SMART to map fishing activity throughout the reserves in order to better understand fishing patterns.	There have been no mapping with the current data.	Fisher encounter data will be mapped with enforcement data in 2016.
Activity 2.5	Convene workshop to review implementation of national SMART rollout and conduct training in analysis of data.	Not reporting period	Planned for second half of 2016.
Output 3			
Benefits of no-take zones and MA programs on coral reef ecosystems and resource-based livelihoods are better understood, strengthening adaptive management and community support.		By 2018, annual socioeconomic surveys of 135 fisher families around GRMR show a 3% increase in average fishing-related income from £3,234 to £3,534/fisher/year.	
Activity 3.1	Analyze both logbook and independent sample datasets for conch and lobster, including mean size, population structure, and CPUE, and use results to update TAC models each season.		
Activity 3.2	Using well-established protocols, monitor and report on a suite of coral reef ecosystem health indicators (including several focusing on critical herbivores like parrotfish).		

Activity 3.3	Conduct annual socioeconomic surveys of MA licensed fishers in collaboration with the Fisheries Department.	Our Community Fisheries Coordinator prepared a report on the socioeconomic assessment of the managed access fishers from GRMR (Maaz 2015)	The next socioeconomic survey will be conducted with fishers registering at the start of the lobster season (June 2016) and again at the start of 2017, when the MAF will have been in operation for a year.
Activity 3.4	Monitor perceptions among fishers of the necessity and effectiveness of enforcement program.	Our Community Fisheries Coordinator prepared a report on the socioeconomic assessment of the managed access fishers from GRMR (Maaz 2015). One question specific on the perception of enforcement and one on the perception of illegal fishing were included. For GRMR, there is indication that the enforcement needs improving.	
Activity 3.5	In collaboration with partners, prepare and disseminate information on results with participating fishers in order to foster dialogue and continued support.		During the fisher forum to be held in 2016, the results of the work will be presented.
Output 4			
With the widespread support of fishing communities and the general public, new or expanded no-take zones are established in Belize's network of marine reserves.		By 2018, the WCS-facilitated NRZE Steering Committee has successfully increased the designation of no-take areas from 3% to 7% of the territorial sea of Belize, achieving significant progress towards the national goal of 10% by the end of 2018.	
Activity 4.1	Conduct national survey to evaluate level of understanding and support for no-take areas and their benefits.	The impact report of the NRZE education-drama shows positive response to messaging for fishers. Positive knowledge of fishing behavior showed a 12% change in knowledge and attitudinal shifts had a 19.5% change in attitudes.	WCS is commencing preparation for Season 2 of Punta Fuego. A follow-up impact assessment will be conducted following this, at the end of 2016.
Activity 4.2	Facilitate regular bi-monthly meetings of the Steering Committee for the National Replenishment Zones Expansion program, and its associated Technical and Communications Sub Committees.	Five steering committee meetings in the last year. WCS is the Secretary for the Committee and a new Communications Sub-Committee was formed, of which WCS is a part.	Continued meetings are expected with the NRZE Steering Committee, to meet the objective of getting a minimum of 10% marine area declared no-take

Activity 4.3	Conduct quarterly meetings of the Reserve Advisory Committees and discuss potential new expanded zones (proposed by WCS and TNC) with stakeholders at these forums.	There have been the regular quarterly meetings of the Glover's Reef and the South Water Caye Advisory Committees. Consultation meetings have been held specifically with deep-sea fishers, and a Consultation Report is provided.	WCS, TNC and the Fisheries Department are approaching the National Security Council and the Belize Coast Guard to discuss enforcement measures for the proposed deep-sea expansion
Activity 4.4	Develop outreach material in coordination with TNC and the Fisheries Department to inform stakeholders of the biodiversity and fisheries benefits of no-take areas that incorporate results from GRMR analyses.	The <i>Punta Fuego</i> radio education-drama has been the primary source of outreach on the no-take / replenishment zone initiative.	In year two of the project, WCS is developing a communications strategy that will outline additional materials to supplement the initiative.

Annex 2 Project's full current logframe as presented in the application form (unless changes have been agreed)

Measure Outcomes - Indicators		Verifying Outcomes		Assumptions		Outputs	
Indicator 1	By 2018, fishery-dependent data from GRMR indicates an increase in CPUE to at least 7.5 conch/hour and 1.5 lobsters/hour, compared, compared to a current baseline of 6.5 conch/hour and 1.3 lobsters/hour.	Indicator 1	Reports on number of MA licenses issued, total lobster and conch catches in relation to total TAC, reports on CPUE and total catch and total value.	Assumption 1	The political will to establish additional replenishment zones exists. WCS is actively involved at the community level and the political level, and there is indication that Belizeans support further development and expansion of the activities currently piloted at GRMR and to be developed at SWCMR.	Output 1	For GRMR and SWCMR, sustainable fishing regulations are implemented through no-take zones and license-based MA programs that employ total allowable catch (TAC) quotas.
Indicator 2	By 2018, fishery-independent surveys at GRMR of conch, lobster, selected species of finfish including parrotfish, <i>Diadema</i> , as well as coral cover, show improvement against established baselines: a. Mean conch density of 70 conch/ha against a baseline of 60 conch/ha. b. Mean lobster density of 32 lobster/ha against a baseline of 28 lobster/ha. c. Mean biomass of parrotfish of 12kg/ha against a baseline of 10kg/ha. d. Mean <i>Diadema</i> density of 0.08 urchins/m2 against a baseline of 0.06 urchins/m2.	Indicator 2	WCS survey reports on densities of conch, lobster, selected species of finfish including parrotfish, <i>Diadema</i> , and percentage cover of coral and algae.	Assumption 2	The Fisheries Department continues to support the rights-based, or MA, program. WCS works in close collaboration with the Fisheries Department, which has supported the development of MA programs and plans to expand this approach as a national strategy for marine resource management.	Output 2	The combination of increased stewardship among fishers and improved enforcement efforts have led to reduced illegal, unreported and unregulated fishing over the life of the project, as documented through the use of the Spatial Monitoring and Reporting Tool (SMART).

<p>Indicator 3</p>	<p>By 2018, annual socioeconomic surveys of 135 fisher families around GRMR show a 3% increase in average fishing-related income from £3,234 to £3,534/fisher/year.</p>	<p>Indicator 3</p> <p>Annual socioeconomic survey reports tracking trends in quality of life of fishers.</p>	<p>Assumption 3</p> <p>The fishers are willing to participate in the MA program and support the no-take expansion. Fishing communities have expressed their desire for programs that reduce overfishing that has caused a decline in key marine species and has led to reduced income.</p>		<p>Output 3</p> <p>Benefits of no-take zones and MA programs on coral reef ecosystems and resource-based livelihoods are better understood, strengthening adaptive management and community support.</p>
<p>Indicator 4</p>	<p>By 2018, the WCS-facilitated NRZE Steering Committee has successfully increased the designation of no-take areas from 3% to 7% of the territorial sea of Belize, achieving significant progress towards the national goal of 10% by the end of 2018.</p>	<p>Indicator 4</p> <p>National working group minutes, reports and communiqués.</p>	<p>Assumption 4</p> <p>The export prices for lobster and conch remain at a stable level. The revenue from these two major fisheries is based to a large extent on exports by the fishing co-operatives, mainly to the US market. These prices will influence how much fisher income will change during the lifetime of the project.</p>		<p>Output 4</p> <p>With the widespread support of fishing communities and the general public, new or expanded no-take zones are established in Belize's network of marine reserves.</p>
<p>Indicator 5</p>	<p>By the end of the project, the SWCMR MA program will be in year 3 of licensing with 80% of fishers submitting their catch data logbooks.</p>	<p>Indicator 5</p> <p>Reports on number of MA licenses issued, logbook data.</p>	<p>Assumption 5</p> <p>There are no natural disasters, such as hurricanes and el Niños, during the project period that will affect the coral reefs and near-shore fisheries. Even in light of a major storm event, WCS is committed to working on managed access and no-take expansion in these geographies and Belize in the short- and long-term.</p>		

Annex 3 Standard Measures

Table 1 Project Standard Output Measures

Code No.	Description	Gender of people (if relevant)	Nationality of people (if relevant)	Year 1 Total	Year 2 Total	Year 3 Total	Total to date	Total planned during the project
6A	SMART Training	Male & female	Belizean	20			20	

In Table 2, provide full details of all publications and material produced over the last year that can be publicly accessed, e.g. title, name of publisher, contact details, cost. Mark (*) all publications and other material that you have included with this report.

Table 2 Publications

Title	Type (e.g. journals, manual, CDs)	Detail (authors, year)	Gender of Lead Author	Nationality of Lead Author	Publishers (name, city)	Available from (e.g. weblink or publisher if not available online)