

# Analysis of Biodiversity Targets

## Aichi Target Framework

December, 2014

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Empowered lives.  
Resilient nations.

**Analysis of Biodiversity Targets - report submitted by the Forest Department, Ministry of Forestry,  
Fisheries and Sustainable Development, Belize**

We thank all those participants who took part in the review process, both in Government agencies, in regional workshops and focal group meetings across Belize.

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# 1. DEVELOPING NATIONAL TARGETS

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## INTRODUCTION

Natural resource planning in Belize has evolved since the development of the original National Biodiversity Strategy and Action Plan in 1998, with an increasing recognition of the need to use specific goals and targets to be able to track implementation success of Belize's management of its biodiversity. Several attempts have been made over the years to develop a biodiversity monitoring framework, but none have yet achieved a coordinated framework that meets Belize's monitoring needs.

Over the last five years, there has been a gradual increase in recognition of the importance of the environment in Belize's national development, in its adaptation mechanisms for climate change, and the need for cross sectoral integration of the environment into mainstream policies and planning. The National Biodiversity Strategy and Action Plan is soon to be revised under the National Biodiversity Enabling Activities, as part of the United National Development Programme "National Biodiversity Planning to Support the implementation of the CDB 2011 - 2020 Strategic Plan in Belize" project, and in recognition of its national commitments under the CBD.

This provides Belize with the opportunity to:

- strengthen the Plan through the incorporation of the new Aichi objectives, actions and targets, modified to the national context,
- integrate a framework for effective monitoring and evaluation of implementation,

### 1.1 THE GLOBAL FRAMEWORK

Belize is committed to the conservation and sustainable use of its natural resources, with the ratification of a number of legally binding multilateral environmental agreements, including the Convention on Biological Diversity, the Convention on World Heritage Sites, Convention on the International Trade in Endangered Species of Wild Fauna and Flora, the Convention on Wetlands of International Importance (Ramsar Convention), the United Nations Framework Convention on Climate Change, and the United Nations Convention to Combat Desertification (Land Degradation). Belize is also committed to meeting national targets set under the United Nations Millennium Development Goals.

Under the Convention of Biodiversity, Belize is committed to work towards the **2020 Biodiversity Target** of...

*".. a significant reduction in the current rate of biodiversity loss at the global, regional and national levels as a contribution to poverty alleviation and to the benefit of all life on earth".*

Under the Convention on Biological Diversity, there are five Strategic Goals, with 20 associated global targets:

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**Strategic Goal A:** *Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society*

- » **Target 1:** By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.
- » **Target 2:** By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.
- » **Target 3:** By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.
- » **Target 4:** By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.

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**Strategic Goal B:** *Reduce the direct pressures on biodiversity and promote sustainable use*

- » **Target 5:** By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.
- » **Target 6:** By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.
- » **Target 7:** By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

» **Target 8:** By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

» **Target 9:** By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.

» **Target 10:** By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.

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**Strategic Goal C:** *Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity*

» **Target 11:** By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascapes.

» **Target 12:** By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.

» **Target 13:** By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

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**Strategic Goal D:** *Enhance the benefits to all from biodiversity and ecosystem services.*

» **Target 14:** By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.

» **Target 15:** By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.

» **Target 16:** By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.

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**Strategic Goal E:** *Enhance implementation through participatory planning, knowledge management and capacity building*

» **Target 17:** By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.

» **Target 18:** By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.

» **Target 19:** By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.

» **Target 20:** By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan 2011- 2020 from all sources and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels. This target will be subject to changes contingent to resources needs assessments to be developed and reported by Parties.

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***To achieve these targets, member countries have been asked to develop national biodiversity monitoring systems, tied to National Targets, that can feed into the global indicators.***



## 1.2 DEVELOPING NATIONAL TARGETS

National Targets and indicator development is tied into the National Biodiversity Strategy and Action Plan, providing a measures of success framework based on the objectives of the NBSAP. It should also be linked to the Aichi Targets, providing information on Belize's contribution to these global CBD targets. To achieve a fully integrated set of National Targets, the following steps need to be taken:

**Step 1.** Revision of the objectives of the 1998 National Biodiversity Strategy and Action Plan, with widespread stakeholder participation - these revised objectives will provide the framework for the national targets and indicators

**Step 2.** Identification of Targets linked to the Objectives

- One or more targets should be developed for each objective. The objectives and targets should be driven by national priorities.
- National targets should be linked to specific global Aichi targets, but not driven by them. Not all global targets will be relevant in the national context

**Step 3.** Development of Indicators

- Once the objectives have been identified, indicators can be adopted or developed to provide information on Belize's success in meeting the targets, and to feed into Belize's reporting on its contribution towards the global targets.

***This output is a review of potential indicators for measuring Belize's contribution towards the Global Aichi Targets and provide information for discussions on potential national targets and indicators, supporting the revision of the National Biodiversity Strategy and Action Plan and the objectives and targets that are developed during the NBSAP revision process. It provides information on available indicators, with baselines where feasible, for adaptation once national NBSAP objectives and targets have been formulated, and that provide a measure of Belize's fulfilment of its commitment to the CBD.***

### 1.3 BELIZE'S NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN

The current National Biodiversity Strategy and Action Plan was developed in 1998, but has not been fully reviewed and revised since that date. It has goals and Objectives, but no clear targets or output indicators.

#### **NBSAP Goal**

*To promote the sustainable use of Belize's biological and cultural resources by educating society to properly conserve biological diversity in order to maintain and enhance the quality of life for all Belizeans. This will be achieved by ensuring local participation and equitable access to benefits, through adequate institutional and human capacity building and collaborative research and development.*

#### **Objectives**

1. Foster and enhance human and institutional capacity building to effectively plan and manage Belize's biodiversity resources.
2. Create an awareness of the importance of biodiversity resources to Belize's development and to the welfare of its people.
3. Promote community participation and decentralize the management and use of Belize's biodiversity resources.
4. Determine, document and monitor the status and value of Belize's biological resources.
5. Strengthen and consolidate in-situ conservation.
6. Promote ex-situ conservation of Belize's biological resources as a complement to in-situ conservation.
7. Promote the sustainable use, equitable access and distribution of benefits derived from Belize's biological resources.
8. Formulate policies on biosafety and intellectual property rights.
9. Amend legislation to ensure that Belize's biodiversity is developed and used sustainably.

**NBSAP, 1998**

Twelve **Strategic Areas** were used to structure the National Biodiversity Strategy and Action Plan, and linked to the Convention on Biological Diversity articles (Table 1). Each Strategic Area is then sub-divided into twelve cross cutting **Thematic Areas** – eight key, cross cutting Thematic Areas (Table 2), and a further four more specific areas with a total of 353 Strategic Actions.

Strategic Area	Number of Strategic Actions	CBD Article(s)
In situ and ex situ conservation	36	CBD: Article 8 and Article 9
Laws and policy	57	CBD: Article 6, Article 11, and Article 14
Human and institutional capacity for the conservation and sustainable use of biodiversity	57	CBD: Article 12, Article 13 and Article 18
Research, monitoring and sustainable use of biodiversity	81	CBD: Article 7, Article 10, Article 12, Article 14
Community participation	23	CBD: Article 10
Education and public awareness	28	CBD: Article 13
Institutional collaboration and coordination (national, regional, and international)	22	CBD: Article 17 and Article 18
Information management	21	CBD: Article 12, Article 17 and Article 16
Access to genetic resources	12	CBD: Article 15
Equity and benefit sharing	5	CBD: Article 8, 10, 15, 16, 20
Population and biodiversity	5	CBD: Article 10, Article 13
Biosafety	6	CBD: Article 19

**Table 1: Strategic Areas of the NBSAP, Number of Strategic Actions, and links to the CBD**

Key Cross-cutting Thematic Areas	Specific Thematic Areas
A. Environmental and Land Use Planning	I. Access to Genetic Resources
B. Fisheries, Coastal and Marine Resources,	J. Equity and Benefit Sharing
C. Forestry and Wildlife Management	K. Human Population
D. Agriculture	L. Biosafety
E. Tourism	
F. Medicinal Plants	
G. Legal and Policy Framework	
H. Information Management	

**Table 2: Strategic Areas of the NBSAP, Number of Strategic Actions, and links to the CBD**

**Structure of the Belize National Biodiversity Strategy and Action Plan, 1998**

The 1998 National Biodiversity Strategy Action Plan structure was focused on objectives and strategies, responsible agencies, timeframe and budgets (Table 3), but did not incorporate clear targets or indicators.

<b>In Situ and Ex Situ Conservation</b>				
<b>Objective: To maintain and enhance coastal and marine biodiversity through the establishment of Protected Areas, captive breeding and research</b>				
<b>Strategic Action</b>	<b>Responsible Agency</b>	<b>Timeframe</b>		<b>Approx. Budget (Bz\$)</b>
		<b>1 – 5 years</b>	<b>&gt; 5 years</b>	
a. Conduct biological and socio-economic assessments of critical, habitats in coastal and marine areas, inland water bodies and rivers, to determine their suitability for protective status.	CZMP/A, Fisheries and Forest Departments, SWA, FGGL, SPECTE			\$50,000/site

**Table 3: Example of NBSAP and Strategic Action Structure (NBSAP Action Plan, 1998)**

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## 1.4 NATIONAL BIODIVERSITY MONITORING FRAMEWORKS

Past and current national initiatives in Belize have included:

- National Biodiversity Monitoring Framework (2005, Draft)
- National Biodiversity Monitoring Program (2014, Draft)
- Millennium Development Goals
- Meso-American Barrier Reef System (MBRS) Synoptic Monitoring Program,
- Healthy Reefs Simplified Integrated Reef Health Index (SIRHI)
- Healthy Reefs Eco-Audit

### 1.4.1 National Biodiversity Monitoring Framework

A draft National Biodiversity Monitoring Framework was developed by the Biodiversity Monitoring Working Group in 2005 under the Forest Department. This was as part of Belize's regional commitment through its membership of the Central American Commission for Environment and Development (CCAD), which is committed to the pursuit of the goals set by the ALIDES agreement in 1994, towards a sustainable development model for the region. Through this agreement, a regional strategy was developed for monitoring and evaluating biodiversity, with the goal of harmonizing data gathering and management at the regional level, for feeding into international monitoring.

The framework was focused heavily on terrestrial biodiversity, and was linked to the National Biodiversity Strategy and Action Plan, but developed more to monitor the status and trends of biodiversity in Belize than implementation and outputs of the Plan itself. It was framed by a number of goals, linked to targets (Table 4).

#### Goals

- To maintain the integrity of priority ecosystems
- To ensure that protected areas are working
- To maintain trophic integrity
- To maintain priority species
- To use the natural resources sustainably
- To maintain good water quality
- To make maintenance of biodiversity sustainable
- To prevent the introduction and spread of exotic species

#### **Targets for Goal: To maintain the integrity of priority ecosystems**

- To ensure the viability of Belize's ecosystems
- To maintain areas large enough to maintain biodiversity, and corridors to maintain genetic diversity
- To achieve a goal of protecting at least 10% of each ecosystem type
- To maintain healthy, intact forest ecosystems
- To maintain healthy, intact marine ecosystems

**Table 4: Draft Biodiversity Monitoring Framework for Belize (2005)**

Focal Questions	Goals	Sub-sets	Aichi Target	MDG7
Are we maintaining the integrity of broad ecosystems?	To maintain enough of Belize's broad ecosystems	Coverage of broad ecosystems – current and past	5	7.1
		Inside the protected area system	5	7.1
		Outside the pa system	5, 10	7.1
		How are we doing in securing under-represented ecosystems	5, 10	
	To ensure our protected areas are effective	Are the protected areas managed effectively for biodiversity protection?	11	
	To maintain healthy, intact ecosystems with trophic integrity	Inside the protected area system	5, 11, 14	7.6
		Outside the pa system	5, 14	
	To maintain adequate connectivity	Size and distribution of large ecosystem nodes	5	
		Between ecosystem nodes	5	
		Between protected areas	5	
Are we maintaining priority species?	To maintain species of concern	Species of international concern	12	7.7
		Species of national concern	12	7.7
		Endemic species	12	
		Commercial species	6, 12	7.4
		Culturally important species	4, 12	
		Indicator species	12, 7, 6, 4	
Are we using our natural resources sustainably?	To ensure that terrestrial resource use is sustainable	Forestry – timber, non-timber forest products	7	
		Game species (including hicatee)	7	
		Freshwater fish species	6	
	To ensure that marine resource use is sustainable	Lobster, conch and fin fish	6	7.4
		Coral and other invertebrates	6	
	To ensure the sustainable use of water and soil resources	Extraction rates/flow	5, 14	7.5
		Desertification indicators? – soil degradation, sustainable agricultural techniques	14, 7, 4	
	Bioprospecting		16	

Draft Biodiversity Monitoring Framework for Belize (2005)				
Focal Questions	Goals	Sub-sets	Aichi Target	MDG7
Are we maintaining good water and air quality?	To maintain the quality of water	Freshwater quality and contaminants	8	
		Marine water quality and contaminants	8	
	To maintain the quality of air	Air quality and contamination – along roads, in towns, around industry	8	
Are we combating climate change?	To assist in global efforts to combat climate change	Carbon emissions	15	7.2
		Ozone depleting gases	15	7.3
Invasive exotic species	To prevent negative impacts on biodiversity from invasive exotic species	Terrestrial invasive exotic species	9	
		Freshwater invasive exotic species	9	
		Marine invasive exotic species	9	
Are we making maintenance / management of biodiversity sustainable?	To ensure financial sustainability mechanisms are in place for management of biodiversity in-situ and at national level	In-situ financial sustainability of protected areas: generated funds, source (non-grant/national funding/international grants)	20	
		Financial sustainability of the national protected areas system	20	
		Income vs expenditure	20	
Are we ensuring the implementation of legislation and policies for biodiversity protection?	To effectively implement legislation and policies for biodiversity protection	Land allocations within SDA. Forest Reserves	2, 3	
		Legal vs illegal natural resource use	4	
		Effectiveness of enforcement	4, 11	
Are we minimizing and/or mitigating negative impacts on biodiversity?	To minimize and/or mitigate negative impacts on biodiversity	Fire	5	
		Land-use change	5	
		Unsustainable use of natural resources	4, 6	
Are we ensuring that there is public awareness of biodiversity value?	To promote awareness of the value of biodiversity and natural resources	Public opinion of value and role of: protected areas, wildlife, water, soil, environmental services	1, 2	
		Support for biodiversity conservation	1, 2	
Are we monitoring land use change?	To have quantitative data on changes in land use and the resulting effects	Urbanization and Roads	5	
		Agriculture	5	
		Dereservation	11, 5	
		Soil degradation	14	

The National Biodiversity Monitoring Framework was not completed within the timeframe of the Forest Department project, and therefore not implemented. The Goals and targets, whilst providing a vague desired status, were not specific enough to be measurable. Since the development of that framework, biodiversity stakeholders have become much more skilled at developing “SMART” goals and targets – targets that are specific, measureable, achievable, realistic and time-framed.

#### 1.4.2 National Biodiversity Monitoring Program

More recently the Environmental Research Institute of the University of Belize (ERI-UB) has initiated development of a National Biodiversity Monitoring Program (NBMP), designed to standardise monitoring efforts across the country in both the terrestrial and marine environment. The very participatory process has included input from both protected areas and research stakeholders, and was based on the monitoring programmes and monitoring outputs currently ongoing in Belize. A goal and objectives were developed for the NBMP, and used to frame and prioritise the identified indicators. The indicators have been linked to Aichi Targets, Headline Indicators and Operational Indicators (Table 5).

<b>Aichi Target 5:</b> By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.				
<b>Headline Indicator:</b> Trends in extent, condition and vulnerability of ecosystems, biomes and habitats				
➤ <b>Operational Indicator:</b> Trends in extent of selected biomes, ecosystems and habitats				
<i>Specific Indicator</i>	<i>Source</i>	<i>Implementing Partner</i>	<i>Frequency</i>	
Forest cover ➤ Broadleaved ➤ Mangrove ➤ Littoral ➤ Savannah	Remote sensing (Landsat)	FD, ERI	Annually	

**Table 5: Example of NBMP Framework**

Whilst these indicators have been linked to the Aichi Targets, they can only become fully operational when linked to, and adapted for, the targets of the National Biodiversity Strategy and Action Plan, as until the NBSAP is revised, the objectives and targets for national biodiversity conservation have not yet been identified.



### 1.4.3 Millennium Development Goals

Belize also has national targets set under its *Millennium Development Goals*, and has recently submitted its report on progress towards these (GoB / UNDP, 2013). MDG7: Ensure Environmental Sustainability focuses on the integration of sustainable development into Belize’s policies and programmes. It “recognises that growth must be both inclusive and environmentally sound to reduce poverty and build shared prosperity for people, today and for future generations” (UNDP, 2013). Progress towards MDG7 is measured against four targets, using ten indicators (Table 6 to 8).

<b>MDG7 Target A: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental services</b>				
<b>MDG Indicators</b>	<b>Baseline (GoB/UNDP, 2013)</b>	<b>Status (GoB/UNDP, 2013)</b>	<b>Current Status</b>	<b>Comments</b>
7.1 Proportion of land area covered by forest  <i>Direct alignment between MDG and CBD Aichi Targets 5 and 11</i>	65.8% (2000)	62.8% (2010)	61.1% (CATHALAC 2013)	<b>On Target:</b> Belize has one of the lowest deforestation rates in the region, but this is increasing – approaching 1% for 2013 (Cherrington, 2014). 2/3 of the remaining forest lies within the NPAS, but forested areas outside the NPAS are being cleared for agriculture.
7.2 CO <sub>2</sub> emissions per capita and per \$1 GDP (PPP)  <i>Aichi Target 15 contributes towards achieving the national target</i>	NA	13,482.7769g (2000) 2.7 PPP	No data	<b>On Target:</b> Belize is a low emission nation, and incorporating CDM mechanisms into its national development to reduce CO <sub>2</sub> emissions. Maintenance of its forest cover, both inside and outside the N, is also contributing to achieving this goal.
7.3 Consumption of Ozone Depleting Substances (ODSs), Chlorofluorocarbons (CFCs), Hydro Chlorofluorocarbons (HCFCs) and Methyl bromide	NA	Complete phase-out of CFCs. HCFCs-54.78 Metric tons; Methyl bromide-0.08	Complete phase-out of CFCs. HCFCs-54.78 Metric tons; Methyl bromide-0.08 (UNDP, 2013)	<b>On Target:</b> Belize has successfully phased out CFC’s, The government of is pursuing the 2020 consumption reduction targets for HCFC’s set by Decision XIX/6 of the Meeting of the Parties of the Montreal Protocol.

**Table 6: Millennium Development Goal 7 Target A**

<b>MDG7 Target A: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental services</b>				
<b>MDG Indicators</b>	<b>Baseline (UNDP, 2013)</b>	<b>Status (UNDP, 2013)</b>	<b>Current Status</b>	<b>Comments</b>
7.4 Proportion of fish stock with safe biological limits  <b>Aichi Targets 4 and 7 contribute towards this MDG7 target</b>	2010 Lobster Tails: 500,651 lbs Cleaned Conch: 705,776 lbs Fish Fillet: 11,394 lbs Whole fish: 124,772 lbs King Crab Claws: 2,882 lbs Lobster Head Meat: 53,685 lbs Sea Cucumber: 17,950 lbs	2011 Lobster Tails: 611,160 lbs Cleaned Conch: 856,425 lbs Fish Fillet: 17,090 lbs Whole fish: 268,340 lbs King Crab Claws: 3,307 lbs Lobster Head Meat: 64,187 lbs Sea Cucumber: 49,833 lbs		Belize is pro-active in management of its fish stocks, and takes an ecosystem approach. It leads the region in % of marine no-take zones, and is piloting Managed Access. It has set gear restrictions and seasonal closures to protect key commercial species, protected spawning aggregation sites, and stopped fishing of grazers critical to coral reef health. It has banned bottom trawling for shrimp. The Fisheries Act of 1948 is currently revised and updated as the Fisheries Resource Management Bill, and awaiting endorsement. However, in 2012, the spiny lobster fishery, constricted by 30% of its 2011 values, despite a 6.85% increase in the number of licensed fishermen (an increase in fishing effort) (UNDP, 2013).
7.5 Proportion of total water resources used  <b>Aichi Target 14 contributes towards this MDG target</b>			<b>Not Reported for Belize:</b>	Belize has the highest volume of freshwater availability per capita for Latin America...however availability of water is considered to be decreasing based on a comparison of 1987 and 2009 figures. Current figures estimate internal renewable surface water resources at 15.258 km <sup>3</sup> /year and internal renewable groundwater resources at 7.51 km <sup>3</sup> /year (IGRAC, 2012). In 2000, total water withdrawal was estimated at 101.0 km <sup>3</sup> , of which 68.4 million m <sup>3</sup> (68%) for agricultural purposes, 21.2 million m <sup>3</sup> (21%) for industrial purposes and 11.4 million m <sup>3</sup> (11%) for municipal purposes (FAO/AQUASTAT, 2014). Belize has developed a National Integrated Water Resource Management Policy, endorsed by Government, to provide for management of water resources. This is the first initiative in Belize to put a cost on an environmental service for integration into the national economy. No comprehensive water-quality monitoring program exists in Belize.

**Table 6: Millennium Development Goal 7 Target A (continued)**

<b>Target B: Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss.</b>				
<b>MDG Indicators</b>	<b>Baseline (UNDP, 2013)</b>	<b>Status (UNDP, 2013)</b>	<b>Current Status</b>	<b>Comments</b>
<p>7.6 Proportion of terrestrial and marine areas protected</p> <p><b>Aichi Target 11 contributes towards this MDG target</b></p>	NA	76 Protected Areas Total (44 Terrestrial 24 Marine, 8 Private) (2010)	98 protected areas total; 72 of these established for ecosystem and species protection.	<p><b>On Target:</b> Belize currently has 36.6% of its terrestrial area protected, and 19.8% of marine areas under protection. In order to meet the targets within the CBD, the Belize Fisheries Department is focusing on incorporating 10% of all marine and coastal habitats in Belize's territorial waters within legally protected, non-extractive replenishment zones. However, in the marine environment, only 6.7% of the marine reserves are legislated replenishment zones (with full protection against fishing activities), and only 3.12% are functional (being managed as RZs). In the terrestrial environment, freshwater bodies and rivers are as being under-represented within the NPAS.</p> <p>Of the 68 natural ecosystems identified under the revised ecosystem mapping (Meerman, 2011), only 7 ecosystems do not meet the 10% target recommended by IUCN</p>
<p>7.7 Proportion of species threatened with extinction</p> <p><b>Aichi Target 11 and 12 contributes towards this MDG target</b></p>	NA	Belize hosts 137 species of plants and animals listed in the IUCN Red List (2009)	Belize has a total of 105 globally threatened species 11 critically endangered, 31 endangered and 63 Vulnerable. A further 55 are near threatened.	<p><b>On target:</b> Species conservation efforts are largely led by the NGO community, except in the case of commercially important species. Two of the Critically Endangered species listed for Belize are on the edge of national extinction – both sawfish. There has been no credible report of either species for more than 10 years, though reports are still occasionally received from artisanal fishermen in the northern communities. Other than these, all critically endangered species are not expected to become locally extinct in the next 5 years, and initiatives are in place to address identified threats. One new critically endangered species has been added to the national list (not covered by the IUCN list) as a result of a range extension.</p>

**Table 7: Millennium Development Goal 7 Target B**

**Table 8: Millennium Development Goal 7 Target C**

<b>Target C: Halve by 2015 the proportion of people without sustainable access to safe drinking water and basic sanitation</b>				
<b>Indicators</b>	<b>Baseline (UNDP, 2013)</b>	<b>Status (UNDP, 2013)</b>	<b>Current Status</b>	<b>Comments</b>
7.8 Proportion of population using an improved drinking water source	43.8% (1995)	93.4% (Census 2010)	97.7 (MICS 2011)	<b>On Target:</b> Near 100%
7.9 Proportion of population using an improved sanitation facility	41.0% (1995)	73.5% (SIB/LFS 2009)	96.9% (MICS 2011)	<b>Slightly Behind Target:</b> "Improved" pit latrines are the most common forms of sanitation infrastructure in rural areas, but there are significant issues when flooding occurs, and with lateral percolation through limestone bedrock, leading to contamination of wells. National sanitation is being addressed through the MDG Acceleration Framework: Water and Sanitation (2011). Initiatives are ongoing to improve sanitation in urban areas, with ongoing initiatives in Placencia, Belize City and San Pedro
<b>Target D: By 2020, to have achieved a significant improvement in the lives of slum dwellers</b>				
<b>Indicators</b>	<b>Baseline (UNDP, 2013)</b>	<b>Status (UNDP, 2013)</b>	<b>Current Status</b>	<b>Comments</b>
7.10 Proportion of urban population living in slums				<b>Not reported for Belize.</b>

**Marine conservation has a stronger history of target development and monitoring, first with the Meso-American Barrier Reef System (MBRS) Synoptic Monitoring Program, and continuing with the Healthy Reefs Initiative SIRHI and Eco-Audit monitoring programmes.**

#### 1.4.4 Healthy Reefs Simplified Index of Reef Health (SIRHI)

The Healthy Reefs for Healthy People Initiative (HRI) has developed a significant set of indicators for reef health and social well-being in the Mesoamerican reef region, integrating monitoring data from. Of the 58 indicators developed (HRI, 2007), four have been selected for ongoing regional monitoring efforts, to provide a rapid assessment of reef health as components of the Simplified Integrated Reef Health Index (SIRHI). Where feasible, these indicators are linked to targets (Table 9).



The Healthy Reefs initiative releases a biannual report card on the status of the reef (2008, 2010 and 2012), based on the SIRHI indicators:

Indicator		Target
S4	Coral Cover (%)	A 25 – 30% increase in coral cover from 2000 levels, over the next 10 years A 30-40% increase in coral cover from 2000 levels, over the next 25 years VERY GOOD: ≥40%
S5	Fleshy Macroalgae cover (%)	A coral: macroalgae ratio no less than 2 VERY GOOD: 0-0.9%
F11	Key herbivores (g/100m <sup>2</sup> )	To be developed. VERY GOOD: ≥3,480 g/100m <sup>2</sup>
S6	Key commercial fish species (snapper and grouper) (g/100m <sup>2</sup> )	Commercial species biomass of ~1300 g/100m <sup>2</sup> VERY GOOD: ≥1680 g/100m <sup>2</sup>

**Table 9: Healthy Reefs SIRHI Indicators**

#### 1.4.5 Healthy Reefs Eco-Audit

The **Healthy Reefs Eco-Audit** is a second, collaborative initiative between the HRI, the World Resource Institute and local partners. It is a “systematic multinational evaluation of the implementation of recommended reef management actions by governments, NGOs, and the private sector” over the Meso-American Reef region. The audit is intended to “help catalyse faster, more effective management responses to coral reef degradation and to increase the accountability of governments, the private sector, and non-governmental organizations (NGOs) with a stake in and responsibility for maintaining the MAR as a healthy, biologically vibrant and economically viable resource”. It includes 28 standardized indicators

across 7 themes, and produces a report on the status of Belize every two years (reports are available for 2011 and 2013).

- Theme 1: Marine Protected Areas
- Theme 2: Ecosystem-based Fisheries Management
- Theme 3: Coastal Zone Management
- Theme 4: Sanitation and Sewage Treatment
- Theme 5: Research, Education and Awareness
- Theme 6: Sustainability in the Private Sector
- Theme 7: Global Issues

Again, where feasible, targets are set for each of the indicators. For example, for the Indicator *Percent of a country's territorial sea included in gazetted MPAs*, the target is for At least 20% of the MAR marine area to be within MPAs.

### 1.5 KEY BASELINES

The ***National Protected Area Policy and System Plan*** (Meerman et al., 2005) provided a number of baselines, including an assessment of ecosystem coverage, a draft list of National Species of Concern, and an assessment of human footprint.

The Healthy Reefs Initiative ***Guide to indicators of Reef Health and Social Well-being*** provides baselines, where possible, for the 58 HRI indicators.

The ***Status of Protected Area report*** (Walker et al., 2010) provides the management effectiveness output for all protected areas within the NPAS, and provides a set of biodiversity indicators and baseline for tracking of biodiversity status within protected areas.

The ***Land Use Policy Mapping System*** (Meerman et al., 2011) includes data sets on agriculture, aquaculture, protected areas, biological corridors, key biodiversity areas, flood risk, and land degradation, as well as population, transportation infrastructure and other more social parameters.

The ***Lands Information Centre*** provides the spatial data sets for protected areas for Belize, linked directly to the Statutory Instruments that serve to legally define the protected areas.

The revised national ***Ecosystem Mapping*** (Meerman, 2011) provides a baseline of ecosystem distribution within Belize.

The ***Rationalization report and annexes*** (Walker et al., 2014) provides baseline data on the protected areas system, ecosystem representation biological corridors and climate change resilience features.

## 2. AICHI TARGETS

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### STRUCTURE OF AICHI TARGET SECTIONS

Each of the Aichi Targets have been assessed using the following criteria, to provide information to feed into the development of the National Indicators:

**1. *The Belize Context***

This section identifies where the target fits within the national planning context of Belize.

**2. *Current Status***

A summary of Belize's state of progress towards meeting the global Aichi Target.

**3. *Contribution to the Global Aichi Targets***

This section identifies the indicators that best feed into Belize's global reporting on progress towards the global Aichi targets.

The CBD-mandated Biodiversity Indicators Partnership (BIP) is the global initiative to promote and coordinate development and delivery of biodiversity indicators in support of the CBD, Multilateral Environmental Agreements (MEA), Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), national and regional governments and a range of other sectors. The Partnership brings together over forty organizations working internationally on indicator development to provide the most comprehensive information on biodiversity trends. It also identifies globally relevant indicators for each Aichi Target.

**4. *Information Availability***

Summarises the information sources available, or potentially available, in Belize, as highlighted in Section 1.

**5. *Potential National Target Concepts***

Whilst National Target development needs to be aligned with the objectives of the revised National Biodiversity Strategy and Action Plan, and vice versa, a number of concepts have been identified and listed for each target from outputs of stakeholder consultations that should assist in target development.

## 6. *Potential National Indicators*

A list of potential indicators have been developed that could be integrated into the finalized National Target. These are drawn from stakeholder meetings and workshops, current and developing national monitoring initiatives, and also take into account regional and global indicators. They provide a basis for discussion and a starting point from which indicators can be selected, adapted or rejected.

The potential national indicators are presented in a framework that identified the following:

- **Potential Indicator:** The Indicator name
- **Source:** Where the information for the indicator comes from
- **Frequency:** How often the indicator should be measured
- **Current Baseline / Trend Data:** The information currently available
- **Comments:** Additional information, including *Ease of Monitoring*, based on the rating scale of:
  - Very Easy
  - Easy
  - Moderate
  - Hard
  - Very Hard

The comments section also includes information on links to other indicators.



## *Strategic Goal A*

### *Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society*



**Target One:** By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.



**Target Two:** By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.



**Target Three:** By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.



**Target Four:** By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.



**Target 1:** By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

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### **1.1 The Belize context**

Public participation, education and access to socio-economic benefits are recognized within the National Protected Areas Policy and System Plan as important mechanisms to engender greater awareness, appreciation and support for the protected areas. Limited awareness is identified as a critical threat in the Status of Protected Areas report (2010) - *“Public and political awareness of the importance of the National Protected Areas System’s contribution to the national economy, in watershed protection, and water security, natural disaster mitigation, and climate change buffering, is considered inadequate, threatening the long-term security of Belize’s social and financial investments in its protected areas.”* This transcribes to an unwillingness to adequately defend the NPAS and the natural and cultural resources it protects, along with the environmental services provided, even though this is for the benefit of the nation.

There are very few coordinated, national, sustained campaigns promoting the value of biodiversity and environmental services – awareness programmes are generally through NGOs or NGO networks, and very specific (e.g. on legislation relevant to the Central American river turtle, targeting stakeholders of a particular protected area, or introducing Managed Access as a fisheries management tool).

### **1.2 Current Status**

#### **Current levels of biodiversity awareness**

Different groups in society have different levels of awareness of the value of biodiversity. Whilst these groupings and ratings are broad generalizations, they can help guide the focus and key messages of awareness activities.

During regional consultations (2014), awareness and understanding of biodiversity and environmental values across the general population in Belize was estimated at < 50%, and in some urban areas, was estimated to be closer to 20%. Belize is small country, with Government actions often driven by the demands of the electorate. The limited awareness of the importance of maintaining a balance between environment and development by the electorate (and within Government itself) is a major barrier to the achievement of Belize’s commitment to the CBD.

Those communities with a higher level of awareness and involvement in natural resource management tend to be those adjacent to protected areas, with active engagement by NGO co-management agencies. These agencies are generally site-focused, and not as active in the primary population centres of Belize

City and Belmopan, where over 25% of Belize’s population resides. People from urban centres have therefore been highlighted as having least opportunities to connect to the environment.

There is very limited central funding for sustained initiatives to increase environmental awareness. Environmental awareness at Government level is led by the Department of the Environment through a number of mechanisms – including social media, video and published newspaper advertisements. The National Protected Areas Secretariat (NPAS) office has recently launched an awareness campaign targeted at increasing awareness of the roles and values of Belize’s protected areas in everyday life...however this is time-limited by being project based. There have been a small number of recent, successful campaigns targeted at increasing awareness of specific issues. These have included the transboundary incursions in the Chiquibul area, focused on the gradual erosion of the national border, and the potential impacts of oil prospecting and extraction in the marine environment. Both were able to engage large scale, short term public interest. The Protected Areas Conservation Trust, too, has invested in large billboards to raise awareness of the importance of large predators in the maintenance of ecosystems.

Awareness has also increased at management level in the large-scale shrimp, citrus, banana and sugarcane farming industries. These have all achieved, or are working towards, international environmental certification, requiring mitigation of environmental impacts. Whilst the industry leaders may not all agree with the certification requirements, the certification processes has resulted in them becoming more aware. There is no similar certification system at the national level for small farmers, so even with awareness, there is little incentive for behavioural change based on this awareness, when many are only just making ends meet financially.

Group	Key Messages
<b>High Awareness</b>	
Conservation-focused NGOs Younger people (< 30) Tourism community	
<b>Medium Awareness</b>	
Teachers Social-focused NGOs Business community Large agrobusiness	<ul style="list-style-type: none"> <li>▪ Importance of ecosystem services in supporting society / human health</li> <li>▪ Importance of ecosystems in building resilience to climate change</li> <li>▪ Importance of watershed protection</li> <li>▪ Protection of threatened species</li> </ul>
<b>Low Awareness</b>	
Policy makers Urban communities Developers Mennonites	

**Table 10: Levels of biodiversity awareness across different sectors**

Concern was expressed during stakeholder consultations (2014), that the school curriculum at both primary and secondary level is not currently designed to fully engage students in valuing the environment and using natural resources sustainably. Education strategies in Horizon 2030 target this area, with a strategy of “*Educating to emphasize respect and appreciation for the natural environment*” by “*Integrating*

*environmental education within the school system and providing children with access to Belize’s natural wonders through field visits and hands-on experiences.”* General consensus among teachers interviewed, however, suggests that it is becoming harder for them to integrate access to the outdoors in their activities.

Engagement of the general public, and even of the NGOs, is considered to be weakened by inconsistent Government decisions that are contrary to national environmental policies and plans – particularly those associated with development and tourism in the highly sensitive marine environment. This leads to a reluctance to invest in protected areas, reflected by the focus of investment of the Sustainable Tourism Development Project in archaeological sites rather than the National Protected Areas System, as the archaeological sites have a stronger governance regime and a better track record of project implementation and achieved outputs, with less risk of inadequate political support or negative political intervention.

A significant challenge to increasing awareness is the high level of immigration, identified as one of the causes of poverty in Belize: *“The substantial influx of poor immigrants, Central American immigrants, who have no capital, are poorly educated, and lack skills, partly contribute to the increase in unemployment, under-employment, and poverty, especially in Cayo and Toledo.”* These immigrants have limited knowledge of environmental laws, or location and regulations of protected areas, and as a result are cited by protected area managers as an issue in terms of adequate enforcement.

### **1.3 Contribution to the Global Aichi Targets**

#### **1.3.1 Global Biodiversity Indicator Partnership (BIP) Indicators**

- % of respondents who have heard about biodiversity
- % of respondents who are able to correctly define biodiversity

**BIP Indicator Background:** The Union for Ethical BioTrade (UEBT) published the first Biodiversity Barometer in 2009, as a tool to gauge global consumer awareness and understanding of biodiversity. The biodiversity barometer is used to track the global Aichi biodiversity awareness targets set by the UN for 2020.

**Policy questions that the BIP indicator addresses:** What are the awareness levels of biodiversity amongst consumers worldwide? How many people have a good understanding of what biodiversity means – and can therefore take steps to conserve it? Are there differences between young and old, male and female, rich and poor, different levels of education?

### **1.3.2 CBD Suggested Potential Indicators**

- Trends in awareness and attitudes to biodiversity
- Trends in public engagement with biodiversity
- Trends in communication programmes and actions promoting social corporate responsibility

### **1.4 Information availability**

There are currently no national surveys of people's perceptions of the environment and environmental values. There are, however, a number of more targeted surveys of specific sectors or communities, linked to protected areas, generally conducted by NGO co-management agencies. Where socio-economic surveys are conducted, there is generally no standardization of socio-economic survey techniques among these agencies (standardization is best in the marine environment).

Individual NGOs gather data for informing on specific issues, some of which is available in grey literature reports. Information can also be gathered from protected area annual reports, though currently not all terrestrial protected area managers submit annual reports.

In the marine environment, the Healthy Reefs Eco-Audit presents data on the *availability of understandable information on reef condition and threats*, for general audiences (Indicator 5c).

The Environmental Research Institute (ERI) is including environmental perception / awareness operational indicators within its National Biodiversity Monitoring Program, designed to standardise monitoring efforts across the country. These include:

- Trends in awareness and attitudes to biodiversity,
- Trends in public engagement with biodiversity
- Trends in number of community based conservation initiatives,
- Trends in number and level of tourism activities

### **1.5 Potential National Target Concepts**

Based on outputs of stakeholder consultations, a National Target(s) should include one or more of the following concepts:

- Increased awareness of biodiversity in the general public by x% over the next 5 years (by 2020)
- An increase in public engagement by x% over the next 5 years (by 2020) – e.g. in the number of Belizean volunteers in conservation activities

## 1.6 Potential Indicators

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>School visitation to the Belize Zoo:</li> </ul>	Annual visitation statistics (Belize Zoo)	Annual	<b>2009-2010:</b> 211 groups, 13,211 students, teachers and parents <b>2010 – 2011:</b> 152 groups, 10,494 students, teachers and parents <b>2011-2012:</b> 199 groups, 12,408 students, teachers and parents <b>2012-2013:</b> 14,500	Long term data is available Assumes that visiting the Belize Zoo increases biodiversity awareness – would require pre- and post-awareness survey to validate. <b>Ease of Monitoring:</b> Very Easy <b>NBMP:</b> Trends in public engagement with biodiversity
<ul style="list-style-type: none"> <li>Belize National visitation to the Belize Zoo:</li> </ul>	Annual visitation statistics (Belize Zoo)	Annual	<b>2011:</b> Belizean Adults: 7,881 Belizean Children: 3,815. Combined: 11,696 <b>2013:</b> Belizean Adults / Children combined: 13,051	Assumes that visiting the Belize Zoo increases biodiversity awareness – would require pre- and post-awareness survey to validate. <b>Ease of Monitoring:</b> Very Easy <b>NBMP:</b> Trends in public engagement with biodiversity Trends in number and level of tourism activities
<ul style="list-style-type: none"> <li>Annual PA Belizean visitation statistics:                Guanacaste NP                Crooked Tree WS                Cockscomb Basin WS                St. Herman’s Blue Hole NP                Half Moon Caye NM                Laughing Bird Caye NP                Port Honduras MR                Hol Chan MR             </li> </ul>	Annual PA visitation statistics: Protected Area managers (BAS, SEA, TIDE, BFD). BTB has stats on BAS PAs and Hol Chan (2012 BTB Travel and Tourism Statistics Digest)	Annual	<b>Hol Chan MR:</b> 2010: 3,658 Belize visitors 2011: 3,213 2012: 4,543  <b>BAS PAs (including ATM)</b> 2010: 5,588 2011: 7,551 2012: 8,453	Protected areas selected are those with highest visitation and consistent records. Assumes that visiting a PA will increase biodiversity awareness – would require pre- and post-awareness survey to validate. Figures are available based on entrance fees and PA Visitor Books – should be presented in Annual Report* BTB figure available for Hol Chan MR and BAS PAs, but for BAS PA’s, are not broken down per PA for Belize visitation, and include ATM (which is now under IoA). Would need to go to source. <b>Ease of Monitoring:</b> Very Easy <b>NBMP:</b> Trends in public engagement with biodiversity Trends in number and level of tourism activities

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>Number of schools / colleges with active environmental groups</li> </ul>	Schools / colleges	Annual	No baseline	<p>Environmental clubs rise and fall, so trends would need to be monitored annually. It would be necessary to identify all the institutions being monitored, and contact them on an annual basis for the information.</p> <p><b>Ease of Monitoring:</b> Moderate</p> <p><b>NBMP:</b> Trends in public engagement with biodiversity Trends in awareness and attitudes to biodiversity</p>
<ul style="list-style-type: none"> <li>Number of (i) Belize Volunteers and (ii) volunteer days spent with conservation NGOs by Belize volunteers</li> </ul>	PA Managers, other NGOs	Annual	<p>Number Belize volunteers: No data</p> <p>Number of volunteer days: No data</p>	<p>Two indicators. Figures should be available from PA manager / NGO project reports, but would require commitment from PA managers to extract, and identification of relevant NGOs* Could be included in ME monitoring tool.</p> <p><b>Ease of Monitoring:</b> Moderate</p> <p><b>NBMP:</b> Trends in public engagement with biodiversity Trends in awareness and attitudes to biodiversity</p>
<ul style="list-style-type: none"> <li>Number of Belizeans involved in sustainable use / conservation activities and outreach</li> </ul>	PA Managers, other NGOs	Annual	No baseline	<p>Figures should be available for involvement from PA manager / NGO project reports, but would require greater commitment from PA managers to extract. Would require identification of other relevant NGOs*</p> <p><b>Ease of Monitoring:</b> Hard</p> <p><b>NBMP:</b> Trends in public engagement with biodiversity Trends in awareness and attitudes to biodiversity</p>

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>Number of fishermen (i) involved in and (ii) supportive of Managed Access</li> </ul>	Fisheries Department	Annually	Baseline for 2014 from Fisheries Department	<p>Two indicators. The Managed Access programme includes socio-economic surveys measuring level of awareness. Would need to better define “supportive”.</p> <p><b>Ease of Monitoring:</b> (i) Easy; (ii) Moderate</p> <p><b>NBMP:</b> Trends in public engagement with biodiversity</p> <p>Trends in awareness and attitudes to biodiversity</p>
<ul style="list-style-type: none"> <li>% of key businesses in Belize that mention biodiversity or ecosystem services in their corporate literature / on their website</li> </ul>	Websites / Key businesses	Every 5 years	No baseline	<p>Would need to identify key businesses...by income generation?</p> <p><b>Ease of Monitoring:</b> Moderate</p> <p><b>NBMP:</b> Trends in public engagement with biodiversity</p> <p>Trends in awareness and attitudes to biodiversity</p>
<ul style="list-style-type: none"> <li>Number of tour guides (i) using and (ii) supportive of protected areas</li> </ul>	PA Managers	Annually	No baseline Using PAs: Supportive:	<p>Figures may be available from PA managers* This may need to be linked to specific PA’s for comparability and trend development.</p> <p><b>Ease of Monitoring:</b> (i) Easy; (ii) Moderate</p> <p><b>NBMP:</b> Trends in public engagement with biodiversity</p> <p>Trends in awareness and attitudes to biodiversity</p>
<ul style="list-style-type: none"> <li>% of marine protected areas with private sector support</li> </ul>	Healthy Reefs Eco-Audit	Every 2 years	Eco-Audit 2014: POOR. Eco-Audit 2011: POOR.  Each MPA was ranked individually by its managing agency during the Belize Eco Audit national workshop (September 14); 72% of Belize’s MPAs receive low private sector support (This includes 28% moderate + 44% low + 0% high) and thus, ranks 2. This has not changed since last data collection (HRI, 2014).	<p><b>Eco-Audit:</b> 6e. Private Sector assistance to MPAs. Provides criteria for rating</p> <p><b>Means of Verification:</b> MPA original data collection to rate private sector support of MPAs as having high, moderate, low, or none.</p> <p><b>Ease of Monitoring:</b> Very Easy</p> <p><b>NBMP:</b> Trends in public engagement with biodiversity</p> <p>Trends in awareness and attitudes to biodiversity</p>



Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<b>Global Indicators</b>				
<ul style="list-style-type: none"> <li>Number of people who have heard about biodiversity</li> </ul>	General population survey	Every 5 years	No baseline	Global Indicators (BIP / UBET) <b>Ease of Monitoring:</b> Moderately Difficult <b>NBMP:</b> Trends in awareness and attitudes to biodiversity
<ul style="list-style-type: none"> <li>Number of people who are able to correctly define biodiversity</li> </ul>	General population survey	Every 5 years	No baseline	Global indicators (BIP / UBET) <b>Ease of Monitoring:</b> Moderately Difficult <b>NBMP:</b> Trends in awareness and attitudes to biodiversity
<ul style="list-style-type: none"> <li>Local recognition of protected area benefits</li> </ul>	State of Protected Areas	Every 5 years	SOPA 2010: 2.10 / 4.00 (52.5%)	State of Protected Areas indicator 3.14 <b>Ease of Monitoring:</b> Moderate <b>NBMP:</b> Trends in awareness and attitudes to biodiversity
<ul style="list-style-type: none"> <li>Understandable information on reef condition, threats and values, available to the general public and stakeholders</li> </ul>	HRI Eco-Audit	Every 2 years	HRI Eco-Audit 2014: VERY GOOD HRI Eco-Audit 2011: VERY GOOD	<b>Ease of Monitoring:</b> Moderate <b>Eco-Audit:</b> Indicator 5c. Provides ranking criteria. <b>NBMP:</b> Trends in awareness and attitudes to biodiversity
* PA data could be collected through an end-of-year review survey by NPAS / Forest and Fisheries Departments. Visitation statistics should also be presented in annual PA reporting.				



**Target 2:** *By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.*

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## **Mainstreaming at Government Level**

### **2.1 The Belize context**

National development planning is geared towards achieving the Millennium Development Goals and articulated through the National Poverty Eradication Strategy and Action Plan, 2009-2013 (NPESAP), and Medium-Term Development Strategy (MTDS: Building Resilience against Social, Economic and Physical Vulnerabilities; 2010-2013). It is guided by Horizon 2030, a long-term national development plan, endorsed by Government in 2013.

The Horizon 2030 Strategy provides a revised sustainable development context for the country, with a clear strategic focus on social and economic development. Environment is seen as the “bricks and mortar” on which development is founded. The Horizon 2030 framework and the key environmental sustainability initiatives linked to it are used to guide international investment - these include:

- National Protected Areas Policy and System Plan (Endorsed 2006)
- National Integrated Water Resources Management Policy (Endorsed 2009)
- National Land Use Policy and Integrated Planning Framework (Endorsed 2011)
- National Sustainable Tourism Master Plan of 2030 (Endorsed 2012)  
National Policy on Responsible Tourism (2010)
- Revision of the outdated Fisheries Act as the Fisheries Resource Bill (Draft - awaiting endorsement)
- Integrated Coastal Zone Management Plan (Draft - awaiting endorsement)
- Revision of the Forest Policy (Draft)
- Belize’s National Environmental Action Plan (Draft)

The National Poverty Elimination Strategy (2009 – 2013) addresses the need for environmental and biodiversity protection to meet MDG7 goals and for climate change adaptation. The National Land Use Policy and Integrated Framework for Land Resource Development (endorsed in 2011) provides the framework for management of Belize’s land resources in an equitable, sustainable, fully representative and accountable manner.

## 2.2 Current Status

The Government has approved a number of important environmental policies and plans, but many are not being implemented... these include the National Land Use Policy and Integrated Framework for Land Resource Development and the Integrated Coastal Management Plan. Challenges identified include limited resources (including human resources), limited political support / priority, and unclear designation of agencies responsible for implementation. Management of the natural resources is poorly represented in resource allocations, and has suffered significant cutbacks in central funding over the last five years... the institutions that are directly responsible for the management of Belize's environment and natural resources (Department of the Environment, Forest Department, Fisheries Department, Coastal Zone Management Authority and Institute) are under-funded, under-staffed and in many cases do not have the capacity to perform their basic functions.

The Central Bank of Belize, in its 2012 review of development in Belize since Independence, stated that *"the management of Belize's natural resources including its natural habitats, water ways, and archaeological sites is a key feature of sustainability and a societal responsibility with government charged as the steward."* It notes that by developing a national outlook that takes into account the needs of future generations, questions are raised concerning the exploitation of today's natural resources such as oil, the forests, and the reef to help raise the living standard of current generations vs. policies that support conservation aimed at positioning Belize's future generations for an improved standard of living. This has led to a position of conflict between the two stands, with conservation being seen as a barrier to development. Seemingly limited understanding at cabinet level of the critical importance of the interconnectivity between the environmental services that support Belize's economy and the health and wealth of its people, combined with political and personal interest agendas, have marginalised the environmental agenda, with little effort to truly integrate it into the national development agenda, even though the environment is present in policy statements.

Despite the statements on the importance of the environment in Horizon 2030, there is a critical need to strengthen the level of engagement of Government in actively making decisions that reflect the connection between the environment, and poverty alleviation, disaster risk management, climate change adaptation and the tourism industry. The second interim report for Horizon 2030 recognizes this, with the recommendation that the theme *"care for the natural environment" should be re-worked to give greater emphasis to climate change, the inextricable link between the economy and the environment and the primacy of protection/ conservation as a core principle of sustainable long term development."*

These policies and plans, however, are limited by fragmented implementation and inadequate investment in financial and human resources. Despite the national acceptance of the National Land Use Policy and Integrated Framework for Land Resource Development in 2011, and its strengths, the framework and policy is not yet being implemented, and is currently being revised to reflect the separation of the Forest Department from the Ministry of Natural Resources to a new Ministry – the Ministry of Forest, Fisheries and Sustainable Development.

Raising awareness of the importance of the protected areas and the environmental services they provide is being worked on through NPAS, with the identification of strategic alignments of the environmental agenda and areas where these can assist in meeting national development targets, to engage other ministries. However NPAS needs the full support of the NGO partners to ensure the message is widespread – this support is currently impacted by NGO distrust of Government.

There have been several non-Government initiatives to value ecosystem services, but these have not been integrated into national reporting, and ecosystem services, generally, are not fully taken into consideration when decisions are being made at national level. There is no integration of environmental values into national accounting - one identified challenge is the need to find a mechanism to effectively communicate the findings to policy makers.

The Department of the Environment, under the Ministry of Forestry, Fisheries and Sustainable Development, is the primary, frontline agency for ensuring development impacts on ecosystems and biodiversity are minimised or mitigated as far as possible, through the Environment Impact Assessment (EIA) process. This is the primary mechanism in Belize for ensuring development is sustainable. The objectives of the EIA process include:

- protection of biodiversity and ecosystem integrity;
- ensuring net community benefits from development projects that are implemented;
- exercising caution in dealing with environmental risk during and after development
- ensuring that decisions are made on a timely basis and on sound environmental advice;
- encouraging and providing opportunities for public participation in environmental aspects of proposals before decisions are taken;
- ensuring that developers take primary responsibility for the protection of the environment relating to their development proposals;
- facilitating the planning and implementation of environmentally sound proposals by minimizing adverse impacts and maximizing benefits to the environment; and
- providing a basis for ongoing environmental management through the use of compliance monitoring

The process has been strengthened significantly over the years, and includes integration of public participation, with mechanisms for feedback, as well as cross-sectoral input into EIA decisions by the National Environmental Appraisal Committee (NEAC). However it is at times challenged by over-ruling of the EIA process by Government, leading to frustration in DoE and NEAC, and loss of trust in the process by the general public.

The Integrated Water Resource Management Policy is the first instrument to address Payment for Environmental Services, but has not yet been fully implemented.

### **2.3. Contribution to the Global Aichi Targets**

#### **2.3.1 Global Biodiversity Indicator Partnership (BIP) Indicators**

There are currently no global indicators for this target.

#### **2.3.2 CBD Suggested Potential Indicators**

A number of possible national indicators are suggested, including:

- Trends in incorporating natural resource, biodiversity, and ecosystem service values into national accounting systems
- Trends in number of assessments of biodiversity values, in accordance with the Convention
- Trends in guidelines and applications of economic appraisal tools
- Trends in integration of biodiversity and ecosystem service values into sectoral and development policies
- Trends in policies considering biodiversity and ecosystem services in environmental impact assessment and strategic environmental assessment

### **2.4 Information availability**

National level valuations include “Coastal Capital: Belize - The Economic Contribution of Belize’s Coral Reefs” (WRI, 2009). This national-level initiative evaluated the average annual contribution of reef and mangrove associated tourism, fisheries, and shoreline protection services to the economy of Belize. Whilst this was a world-leading output, it had only limited national impact at Government level. Similar initiatives have focused on the Maya Mountains Massif (Hammond et al., 2011) and sport fishing (Fedler et al., 2008) – all of which provide valuations for ecosystem services, and all of which have had little impact in influencing policy decisions.

Relevant indicators from the Healthy Reefs Eco-Audit include:

- Theme 5: Research, Education and Awareness
  - 5b. Economic valuation of coral reefs

The Environmental Research Institute (ERI) is including mainstreaming operational indicators within its National Biodiversity Monitoring Program, designed to standardise monitoring efforts across the country. These include:

- Trends in integration of biodiversity and ecosystem service values into sectoral and development policies
- Trends in policies considering biodiversity and ecosystem service in environmental impact assessment and strategic environmental assessment

### **2.5 Potential National Target Concepts**

Based on outputs of stakeholder consultations, a National Target(s) should include one or more of the following concepts:

- Mainstreaming of biodiversity conservation across Ministries
- Integration of ecosystem services (or more specifically, water) into national accounting by 2020
- Increase in % allocation of national funds in the national budget to biodiversity management over the next 5 years (by 2020)

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## 2.6 Potential Indicators

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>Indication of total estimated value of natural resource economy in national budget</li> </ul>	National budget	Annual	2014: Not present in national accounting	Information from National Budget <b>Ease of Monitoring:</b> Very Easy <b>NBMP:</b> Trends in integration of biodiversity, ecosystem services and benefits sharing into planning, policy formulation and implementation and incentives
<ul style="list-style-type: none"> <li>Inclusion of biodiversity and ecosystem services within the national budget speech</li> </ul>	National budget speech	Annual	2014: Not present in national budget speech	Review of National Budget speech <b>Ease of Monitoring:</b> Very Easy <b>NBMP:</b> Trends in integration of biodiversity, ecosystem services and benefits sharing into planning, policy formulation and implementation and incentives
<ul style="list-style-type: none"> <li>Presence of 'payment for environmental services / natural capital accounting' in national accounting and reporting system</li> </ul>	National budget	Annual	2014: Not present in national accounting	Review of National Budget <b>Ease of Monitoring:</b> Very Easy <b>NBMP:</b> Trends in integration of biodiversity, ecosystem services and benefits sharing into planning, policy formulation and implementation and incentives
<ul style="list-style-type: none"> <li>Number of developments qualifying as Schedule I / Schedule II that are approved despite NEAC recommendations to the contrary and / or large scale public opposition</li> </ul>	DoE	Annual	2014: No data	Information from Department of the Environment <b>Ease of Monitoring:</b> Moderate <b>NBMP:</b> Trends in policies considering biodiversity and ecosystem service in environmental impact assessment and strategic environmental assessment
<ul style="list-style-type: none"> <li>Requirement for ecosystem evaluation integrated into EIA framework</li> </ul>	DoE – EIA manual and legislation	Annual	Not currently required	Review of EIA framework <b>Ease of Monitoring:</b> Very Easy <b>NBMP:</b> Trends in policies considering biodiversity and ecosystem service in environmental impact assessment and strategic environmental assessment
<ul style="list-style-type: none"> <li>Incorporation of ecosystem services and PES in NBSAP</li> </ul>	NBSAP	Every 5 years	NBSAP to be revised	Review of revised NBSAP <b>Ease of Monitoring:</b> Very Easy Trends in integration of biodiversity and ecosystem service values into sectoral and development policies.

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>▪ Incorporation of ecosystem services into future legislation</li> </ul>		Annual	No baseline	Review of new legislation / policies <b>Ease of Monitoring:</b> Easy <b>NBMP:</b> Trends in integration of biodiversity and ecosystem service values into sectoral and development policies. Trends in integration of biodiversity, ecosystem services and benefits sharing into planning, policy formulation and implementation and incentives

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**Target 3:** *By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.*

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### **3.1 The Belize context**

The Government prioritizes incentives to support private sector-led growth, with no national policy in place to ensure that Government incentives and subsidies are not harmful to biodiversity. The incentives that do exist are generally focused on increased agricultural productivity regardless of sustainability, and are linked to significant lobbying power for retention of these incentives.

The Belize Government has had a long-term dependency on international grant funding for management of its biodiversity conservation activities, including management of protected areas. There are few, if any, national incentives for public or private sector conservation and/or sustainable use initiatives. There are currently no legal mechanisms for integrating private protected areas within the National Protected Areas System, nor for conservation incentives for private landowners to do so, even in key conservation areas such as biological corridor routes. Lack of legal national recognition within the NPAS is an obstacle that restricts the ability of private landowners to raise funding for effective conservation management. Inclusion of conservation management as a “productive” land use under Government legislation, and passing of the Covenant Act, have therefore not received the same level of prioritization given to the agricultural and tourism development sectors. Sustainable agricultural production, where it exists, has therefore evolved in response to external market pressures, generally involving certification to international social and environmental standards.

Change to the incentive system currently in place would therefore require a paradigm shift in thinking by the Government.

### **3.2 Current Status**

With agriculture playing a key role in Belize’s development, the Government of Belize actively promotes large scale agricultural developments, with support for the largest agro-industries in Belize – citrus, bananas, sugar cane, shrimp farms and cattle. This is done through incentives in the form of fuel subsidies, free vaccinations, reduced duties on pesticides, and zero rated materials. These incentives are identified as one of the drivers for increased forest clearance for agricultural and unregulated pesticide use.

The reduced import duties on pesticides are flagged as a reason for reduced incentive for farmers to moderate use of pesticides – an issue that is currently being considered by the Pesticide Control Board.

However, realistically, the chances for changing this are slim due to the strong lobbying powers of the agriculture sector.

Whilst there are national agricultural policies promoting environmental sustainability, these are not linked to national incentives. However, there are private sector initiatives in the agriculture / aquaculture sector linked to global market demand towards reducing the environmental footprint of Belize's largest agricultural industries – primarily shrimp, bananas, citrus and cattle - and increasing their environmental sustainability.

Land tenure and land tax incentives favour development over conservation of biodiversity - one of the key disincentives for conservation is the productive vs. unimproved land tax – land has to be demonstrated to be developed in some way to be eligible for reduced land tax. The criteria for development do not include leaving the land natural for conservation management. For large tracts of land under private ownership, the tax burden has resulted in lands being subdivided, and forested land cleared but subsequently left unused, to avoid payment of the undeveloped land tax. There are currently no legal mechanisms in place (such as easements or covenants) or incentives for long term commitment of land to conservation

With much of the potential identified biological corridor areas under private ownership, this lack of incentive is detrimental to corridor formation or other biodiversity initiatives identified in the NPAPSP. Corridor functionality will only be feasible if incentives can be made available for private sector – or the “non-productive land tax” issue at least be resolved. This is an issue currently being addressed in both the Central and North East corridors. This is also an issue for national lands outside of the protected areas, available to Belizean nationals through a lease then purchase system. To apply for purchase, the prospective owner has to be able to demonstrate that he / she is actively developing the land. Again, this development is exclusive of conservation, and leads to increased land clearance.

There are few incentives to assist protected area co-management organizations in the work they have taken on towards national commitments. In the terrestrial environment, they are expected to raise their own funding for all activities, from surveillance and enforcement to outreach. The Government has established the Protected Areas Conservation Trust (PACT), an independent statutory body housed under the Ministry of Forestry, Fisheries and Sustainable Development, that currently has the mandate to receive a portion of the Conservation Tax paid by visitors on departure from Belize, as well as to source external funding, and to make disbursements to protected area managers through project grant-based mechanisms. The income from the Conservation Tax has, however, gradually been partially diverted away from protected areas, towards investment in urban infrastructure for support of the cruise ships industry, leaving less available for management of the natural resources.

In the fishing sector, the largest two fishing cooperatives are focused on short term profits, and have created incentives to continue fishing despite declining catches. These include direct subsidies for fishing supplies and low-interest loans, artificially changing the market risks, rewards, and costs of fishing, and encouraging more people to take up fishing as a livelihood. The Fisheries Department, however, has developed non-financial incentives through Managed Access – a rights based access system to regulate access to the fisheries resources, giving greater ownership to traditional fishermen.

The recent acceptance of Belize's REDD+ submission to the FCPF opens up further incentives and opportunities for implementation of REDD+ strategies linked with curbing deforestation. REDD+ is seen as a vehicle for achieving the goals and objectives of sustainable land use management and sustainable forest management, two tools towards sustainable development

### **3.3. Contribution to the Global Aichi Targets**

#### **3.3.1 Global Biodiversity Indicator Partnership (BIP) Indicators**

There are currently no global indicators for this target.

#### **3.3.2 CBD Suggested Potential Indicators**

A number of possible national indicators are suggested, including:

- Trends in the number and value of incentives, including subsidies, harmful to biodiversity, removed, reformed or phased out.
- Trends in identification, assessment and establishment and strengthening of incentives that reward positive contribution to biodiversity and ecosystem services and penalize adverse impacts.

### **3.4 Information availability**

Information on financial incentives should be available from the Ministry of Finance and Economic Development, and from those Ministries where the incentives are being implemented.

Under the Healthy Reef Initiative Eco-Audit, two indicators are focused on incentives:

Theme 6: Sustainability in the Private Sector

6d Government incentives for conservation and sustainable business

The Environmental Research Institute (ERI) is including incentives and subsidies within its National Biodiversity Monitoring Program, designed to standardise monitoring efforts across the country. These include:

- Trends in the number and value of incentives, including subsidies, harmful to biodiversity, removed, reformed or phased out

### **3.5 Potential National Target Concepts**

Based on outputs of stakeholder consultations, a National Target(s) should include one or more of the following concepts:

- Reduction in the number of subsidies resulting in harm to the environment or excessive resource use
- Reform of harmful subsidies highlighted repeatedly during national consultations
- Recognition of conservation / natural resource management as a productive use of land in key conservation areas
- Improved incentives for conservation management

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### 3.6 Potential Indicators

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>Number of positive Government incentives for conservation and sustainable business</li> </ul>	HRI Eco-audit	Every 2 years	Eco-Audit 2014: Very Poor Eco-Audit 2011: Very Poor No documented action that meets the criteria to achieve a higher score. No evidence for any of the listed tax incentives for Belize (HRI, 2014).	<p><b>Ease of Monitoring:</b> Easy</p> <p><b>Eco-Audit:</b> 6d Government incentives for conservation and sustainable business energy sources.</p> <p><b>NBMP:</b> Trends in the number and value of incentives, including subsidies, harmful to biodiversity, removed, reformed or phased out</p>
<ul style="list-style-type: none"> <li>Number of Government incentives negatively impacting biodiversity</li> </ul>		Every 5 years	No baseline	<p><b>Ease of Monitoring:</b> Moderate</p> <p><b>NBMP:</b> Trends in the number and value of incentives, including subsidies, harmful to biodiversity, removed, reformed or phased out</p>
<ul style="list-style-type: none"> <li>Annual volume of imported red and yellow-banded agro-chemicals, with duty exemption</li> </ul>	Pesticide Control Board Duty exemption records	Annual	No baseline	<p><b>Ease of Monitoring:</b> Moderate</p> <p><b>NBMP:</b> Trends in the number and value of incentives, including subsidies, harmful to biodiversity, removed, reformed or phased out</p>
<ul style="list-style-type: none"> <li>Ratio of duty exemptions awarded for importation of red + yellow-banded agrochemicals versus blue+green.</li> </ul>	Pesticide Control Board Duty exemption records	Annual	No baseline	<p><b>Ease of Monitoring:</b> Moderate</p> <p><b>NBMP:</b> Trends in the number and value of incentives, including subsidies, harmful to biodiversity, removed, reformed or phased out</p>
<ul style="list-style-type: none"> <li>Number of prioritized private conservation management areas qualified as being a “productive sector” for tax evaluation purposes</li> </ul>	BAPPA / Lands Department	Annual	No Baseline	<p><b>Ease of Monitoring:</b> Moderate</p> <p><b>Eco-Audit:</b> 6d Government incentives for conservation and sustainable business energy sources.</p>
<ul style="list-style-type: none"> <li>Number of prioritized private conservation management areas managed under Trust agreements with the GoB</li> </ul>	BAPPA	Annual	2 – Pfb and SCMA	<p><b>Ease of Monitoring:</b> Easy</p> <p><b>Eco-Audit:</b> 6d Government incentives for conservation and sustainable business energy sources.</p>



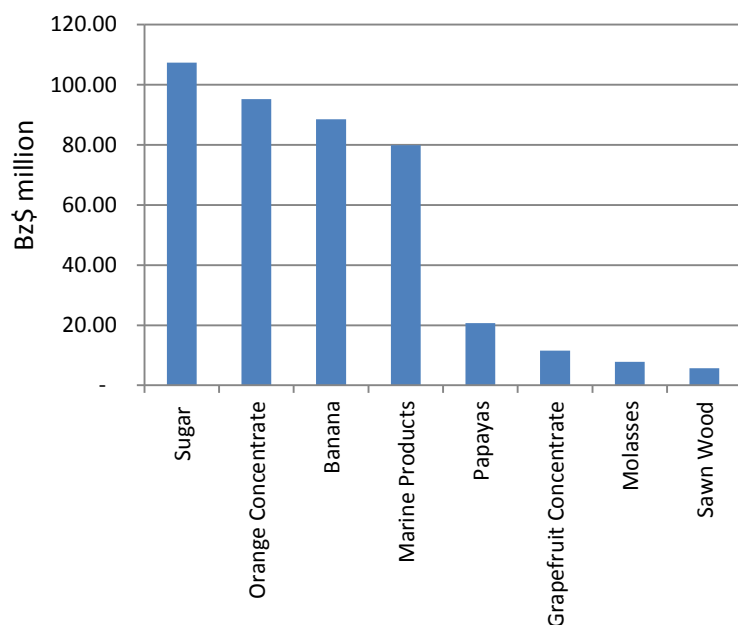
**Target 4:** By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.

#### 4.1 The Belize context

The Horizon 2030 Strategy provides a revised sustainable development context for the country, with a clear strategic focus on social and economic development. National agricultural policies promote environmental sustainability, but in practices, the move is towards expansion of large scale agricultural initiatives (such as cattle farming) and support of the banana, citrus and sugar cane industries. There is no move towards a national certification system recognizing sustainable production.

Belize is often cited as an example of a country reliant on its natural resources – its productive forests, soils and reef. The traditional logging industry, focused on selective logging of a few species including mahogany and cedar once provided the economic foundation for development in Belize. It has, however, been in decline, dropping from a value of Bz\$11.3million 6.8% of GDP in 1992 to Bz\$7.1 million (1.7%) in 2012. It has long been overtaken by the agricultural and fisheries sectors, which combined contributed Bz\$398.7 million (12.9%) to the GDP in 2012. The agricultural sector has been a major driver in the land use changes that have occurred over the last fifty years.

The agricultural sector, in particular, has traditionally been the largest contributor to GDP, characterized by three main sub-sectors: a) a fairly well organized, traditional export sector for sugar, banana, citrus, and marine products, b) a more traditional, small-scale farm sector, producing food primarily for local consumption, and c) a well-integrated large-scale commercial sector, represented primarily by the Mennonites (FAO, 2011). The traditional export crops citrus, sugar, and bananas - generated Bz\$290.97 million in external earnings in 2013. Large scale farming of kidney beans, black eye beans, animal feed and corn meal provides for both the internal and export markets. Marine products (principally shrimp, lobster and conch) are also important, contributing Bz\$79.84 million to export earnings.



**Graph 1: Agricultural, Aquacultural and Forestry contributions to**

The primary productivity sector has seen a decline of 4% in its contribution to the GDP - from 18% in 1992 to 14% in 2012 (SIB GDP statistics, 2014), yet is one of the main drivers of deforestation.

The Ministry of Forestry, Fisheries and Sustainable Development has, under its Sustainable Development section, the Department of the Environment (DoE). DoE is actively integrating sustainability into its everyday activities, and has recently drafted the 2014-2024 cross-sectoral National Environmental Action Plan.

As part of its remit to manage environmental impacts, DoE now requires that all shrimp farms install sediment ponds, in response to environmental impacts on water quality from shrimp farming effluent. This has been achieved, and has made a significant difference to the economics of shrimp farming, reducing water exchange by 75%. The settlement ponds remove the majority of the nitrogen and phosphorus, making a significant difference to the water quality of effluent.

The National Land Use Policy and Integrated Framework for Land Resource Development and (Meerman et al., 2011) provides the framework for management of Belize's land resources in an equitable, sustainable, fully representative and accountable manner. The Policy recognizes as part of its guiding principles that:

- the “management and protection of the integrity of natural resources and the natural environment in general is essential for the long-term, sustainable utilization of land”
- the “development of land should be undertaken on the basis of sustainability”
- “there are certain lands where the best use is conservation due to a variety of factors ranging from watershed protection, to landscape values, to ecosystem importance.”
- Conservation of biodiversity and natural resources as well as the associated retention of a variety of environmental services required is harmed by fragmentation and thus requires large blocks of land.
- Climate change adaptation and mitigation issues must be considered and mainstreamed into land use planning.

The policy has been endorsed but has not yet been implemented.

#### **4.2 Current Status**

Ensuring environmental sustainability is primarily through the Environmental Impact Assessment (EIA) Process, managed under the Department of the Environment (DoE). As part of its remit to manage environmental impacts, DoE requires that all large-scale (>500acres) agricultural and aquaculture initiatives develop an Environmental Impact Assessment before start-up, and provide an Environmental Compliance Plan to mitigate potential impacts on the environment.

DoE regulations now also requires shrimp farms to install sediment ponds, in response to environmental impacts on water quality from shrimp farming effluent, a move already taken by 95% of shrimp farms to reduce their environmental footprint. This has made a significant difference to the economics of shrimp

farming, reducing water exchange by 75%. The settlement ponds remove the majority of the nitrogen and phosphorus, making a significant difference to the water quality of effluent.

Whilst there are national agricultural policies promoting environmental sustainability, these are not linked to national incentives. However, there are private sector initiatives in the agricultural sector linked to global market demand towards reducing the environmental footprint of Belize's largest agricultural industries, and increasing their environmental sustainability. There has been a concerted effort to move towards social and environmental certification – shrimp farms, banana, citrus and sugar cane farms are all in the process of improving their environmental footprint, focusing on better management of agrochemicals, reduction of effluent and protection of riparian and mangrove buffers.

The shrimp farming industry has been a leader in the move to certification under the Aquaculture Stewardship Council – again through market-driven necessity. Belize will be first country where 90% of shrimp farms are certified, and the first in the world to achieve certification. With the more regulated use of shrimp feed required by certification, shrimp farms are finding that they are not only reducing the level of nutrient in their effluent, but also achieving a much better feed conversion rate, reducing expenditures. Whilst certification won't necessarily affect their current market, the farms are finalizing their certification requirements in preparation for the next 5 years, when the EU will tighten its importation to permit only certified shrimp. The US\$1.6 million required to achieve this has been located through investment from IDB, WWF, the EU / Complete Caribbean, with the support of the Government of Belize.

The banana industry has a rolling contract with Fyffes that requires them to meet certification standards. To maintain their current contracts and to compete on the international market, farmers have to commit to, and meet, social and environmental standards, including close monitoring of issues such as pesticide use and management of runoff into adjacent rivers. This is at a cost to the farmers, with little or no direct assistance from Government towards meeting these costs (BBGA, pers. com.). It should be noted however, that despite this, considerable quantities of nematicides and fungicides are applied by the banana industry, and there is also concern about the organo-phosphate pesticide applied to the bags protecting each bunch of bananas.

The citrus industry, too, is moving towards certification through the International Standards Organization ISO 14001 (Environmental Standards), linked to the requirements of its European market (CGA, pers. com.). The sugar cane industry, too, is certified under Fairtrade initiative, and there are efforts to replace the most toxic agro-chemicals with less damaging ones.

In the tourism sector, as in the agricultural and aquaculture sectors, certification for environmental sustainability is primarily market driven. For hotels, certification is generally through internationally recognised bodies – the only active certification system is Green Globe certification, which has certified seven hotels / resorts (Green Globe, 2014) – two of these within the coastal zone (HRI, 2014). The Belize Tourism Board is developing a set of standards for hotels, but this is not based on eco-certification – more on hospitality and health and safety standards.



In the marine environment, the Coral Reef Alliance (CORAL) has developed the "Voluntary Standards for Marine Recreation in the Mesoamerican Reef System". The Belize Tourism Board is in the process of making this a national, voluntary standard (HRI, 2014).

The Fisheries sector has been working towards greater sustainability through the implementation of Managed Access in marine protected areas. Two pilot sites have ongoing protocols in place, with plans to roll Managed Access out over all marine protected areas. Quotas are being set for species such as conch, based on pre-and post-season in-water surveys.

#### **4.3 Contribution to the Global Aichi Targets**

##### **4.3.1 Global Biodiversity Indicator Partnership (BIP) Indicators**

- Ecological Footprint
- Status of species in trade

##### **(i) Ecological Footprint**

**BIP Indicator Background:** The BIP Ecological Footprint indicator is developed by the Global Footprint Network, an "international think tank that provides Ecological Footprint accounting tools to drive informed policy decisions in a resource-constrained world. The Network works with local and national governments, investors, and opinion leaders to ensure all people live well, within the means of one planet". Belize is not yet one of the countries assessed.

The indicator is based on a ratio of ecological footprint to bio-capacity, measured in global hectares per capita, using the following parameters:

##### **Ecological Footprint**

- Cropland Footprint
- Grazing Land Footprint
- Forest Footprint
- Fishing Ground Footprint
- Carbon Footprint
- Built-up land

##### **Bio-capacity**

- Cropland
- Grazing Land
- Forest
- Fishing Ground
- Built Land

Data used to calculate the Ecological Footprint is based on international data sets published by the Food and Agriculture Organization of the United Nations, United Nations Commodity Trade Statistics Database and other data from the UN Statistics Division, the International Energy Agency, and the Intergovernmental Panel on Climate Change.



The Ecological Footprint tracks human demand on nature in terms of biologically productive areas a population uses for producing all the resources it consumes and absorbing all its waste. This demand is compared to the availability of nature, called bio-capacity, which represents the regenerative capacity of nature. When the Ecological Footprint exceeds bio-capacity, stocks are being depleted, and/or emissions are accumulating in the biosphere (such as CO<sub>2</sub> in the atmosphere and oceans). Thus a minimum condition for sustainable consumption is not being met and the use of natural resources is not within safe ecological limits.

The Ecological Footprint uses yields of primary products (from cropland, forest, grazing land and fisheries) to calculate the area necessary to support a given activity. Bio-capacity is measured by calculating the amount of biologically productive land and sea area available to provide the resources a population consumes and to absorb its wastes, given current technology and management practices. Countries differ in the productivity of their ecosystems, and this is reflected in the accounts.

A nation's consumption is calculated by adding imports to and subtracting exports from its national production. Results from this analysis shed light on a country's ecological impact. A country has an ecological reserve if its Footprint is smaller than its bio-capacity; otherwise it is operating with an ecological deficit. The former are often referred to as ecological creditors, and the latter ecological debtors.

***Policy questions that the BIP indicator addresses:*** Is Belize living within its ecological footprint – can its consumption be supported by its productive areas?

***(ii) Status of Species in Trade***

This global indicator tracks changes in the wild status of internationally traded species, and in particular species listed on CITES Appendix I and II. Global data are currently only available for birds

***BIP Indicator Background:*** The indicator reflects the impact of international trade on natural resources, in this case internationally traded species, and the effectiveness of measures to address this impact and keep the use of species in international trade well within safe ecological limits. This indicator may be very relevant for the marine and forestry sectors.

### **4.3.2 CBD Suggested Potential Indicators**

A number of possible national indicators are suggested, including:

- Trends in Ecological Footprint and/or related concepts
- Trends in extent to which biodiversity and ecosystem service values are incorporated into organizational accounting and reporting
- Trends in biodiversity of cities
- Ecological limits assessed in terms of sustainable production and consumption
- Trends in population and extinction risk of utilized species, including species in trade

### **4.4 Information availability**

Each of the certification protocols outlines the environmental standards to which agricultural sectors have to comply to meet their market criteria.

The Department of the Environment has copies of all Environmental Impact Assessments, minutes from NEAC meetings and Environmental Compliance Plans, detailing required environmental standards.

HRI Eco-Audit: Two Eco-audit indicators are relevant:

Theme 6: Sustainability in the Private Sector

- 6a Voluntary eco-standards program for marine recreation providers
- 6b Participation of coastal hotels in eco-certification schemes

The Environmental Research Institute (ERI) is including ecosystem services in its operational indicators, under the National Biodiversity Monitoring Program, designed to standardise monitoring efforts across the country. These include:

- Timber species extraction rate
- Hunting frequency & amount of harvest
- Trends in contribution of wild meat in diet
- Commercial species extraction rate (marine)

### **4.5 Potential National Target Concepts**

Based on outputs of stakeholder consultations, a National Target(s) should include one or more of the following concepts:

- Environmental sustainability of primary extractive and productive industries
- Environmental sustainability in the tourism industry
- Balance between resource availability and resource use

#### 4.6 Potential Indicators

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>▪ % of agricultural lands under sustainable management (as recognized by international eco-certification)</li> </ul>	Department of Agriculture Growers Associations	Annual	No baseline Note: BSCFA: Flo-Cert (Fairtrade) certification was suspended in July 2014 for 6 month, on 8 points of non-compliance.	Banana Growers' Association Citrus Growers Association Belize Sugar Cane Farmer's Association Papaya Growers Association <b>Ease of Monitoring:</b> Moderate
<ul style="list-style-type: none"> <li>▪ % of aquaculture initiatives under sustainable management (as recognized by international eco-certification)</li> </ul>	Ministry of Natural Resources Aquaculture Stewardship Council Belize Shrimp Growers Association	Annual	ASC 2014: 7 of Belize's 8 shrimp farms (>85% of shrimp producers) are being certified under ASC.	<b>Ease of Monitoring:</b> Very Easy <b>Eco-Audit:</b> Reduce upstream watershed pollution sources (agriculture, livestock, urban/tourism, industrial, rural, deforestation) through better management practices, action plans and regulations in each sector
<ul style="list-style-type: none"> <li>▪ Proportion of fish stock with safe biological limits</li> </ul>	Fisheries Dept.	Annual	Baseline from Fisheries Department	<b>Ease of Monitoring:</b> Moderate <b>MDG 7:</b> 7.4 Proportion of fish stock with safe biological limits <b>NBMP:</b> Trends in population and extinction risk of utilized species, including species in trade
<ul style="list-style-type: none"> <li>▪ Presence of Organic Farming certification and monitoring under Ministry of Agriculture</li> </ul>	BAHA Toledo Cacao Growers Association	Annual	BAHA 2014: No national certification for organic farming	<b>Ease of Monitoring:</b> Very Easy
<ul style="list-style-type: none"> <li>▪ Area (ha) of Belize under organic production</li> </ul>	Department of Agriculture	Annual	2013 TGCA: 1,537 acres certified as organic, and 92 acres pending certification – through Soil Association Ltd.	TCGA is certified by Soil Association Ltd. with accreditation to the Canadian Organic Regime (COR), which guarantees certification for North America National Organic Programme (NOP) <b>Ease of Monitoring:</b> Hard
<ul style="list-style-type: none"> <li>▪ % hotels / resorts recognised by national eco-certification</li> </ul>	Green Globe	Annual	Green Globe Certified: 7 hotels Eco-Audit: BTB planning on developing national eco-certification – no national certification in place yet	<b>Ease of Monitoring:</b> Easy <b>Eco-Audit:</b> Focuses on coastal resorts <b>NBMP Link(s):</b> Note: Certification is an expensive process, and therefore only the larger resorts may consider applying.
<ul style="list-style-type: none"> <li>▪ % of marine recreational guides following CORAL best practices</li> </ul>	BTB Tour Guide Associations	Annual	Eco-Audit 2014: 26 of the 238 registered marine recreational providers participating in 2009	<b>Ease of Monitoring:</b> Moderate <b>Eco-Audit:</b> 6a Voluntary eco-standards program for marine recreation providers

## Strategic Goal B

### Reduce the direct pressures on biodiversity and promote sustainable use



**Target 5:** By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.



**Target 6:** By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits



**Target 7:** By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.



**Target 8:** By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.



**Target 9:** By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.



**Target 10:** By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.



**Target 5:** By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.

### 5.1 The Belize context

Belize remains the only country in Central America with 61.1% forest cover (Cherrington, 2014). Approximately 40% of this forest is within the National Protected Areas System. However the current rate of deforestation (0.97% in 2013) is increasing, and predicted to continue along this trend into the future, with predictions that forest cover will fall to only 50% in approximately 29 years (Cherrington et al., 2012). Most deforestation is occurring outside protected areas, except in transboundary areas. In the Belize context, ensuring 50% of the land remains under forest cover in the long term is considered a viable national target during consultations (though 60% is considered preferable), in the acceptance that with an expanding population and the need for development, there will be continued deforestation, and at an increasing rate.

The NPAPSP Rationalization process (2013) identifies which areas need to be protected and why, and is being used by Forest and Fisheries Dept. and NGOs to guide decisions. A priority is establishment of biological corridors whilst forest cover still exists. The current political climate promotes land clearance for agriculture – through reduced land taxes, and subsidised fuel and pesticides. Most large scale clearance for agriculture is currently associated with the Mennonite commercial farms, the sugar cane farming industry, and clearance for cattle farming. The surge in sugar cane prices and the newly opened market for cattle are leading to increased forest clearance, leading to degraded soils.

### 5.2 Current Status

With 61.1% of its forest cover intact, and with one of the lowest deforestation rates in Central America, Belize has been acting as a stronghold for Central American wildlife. Species indicative of large tracts of intact forest such as jaguars, tapir, and white lipped peccary are still considered to have viable populations, and harpy

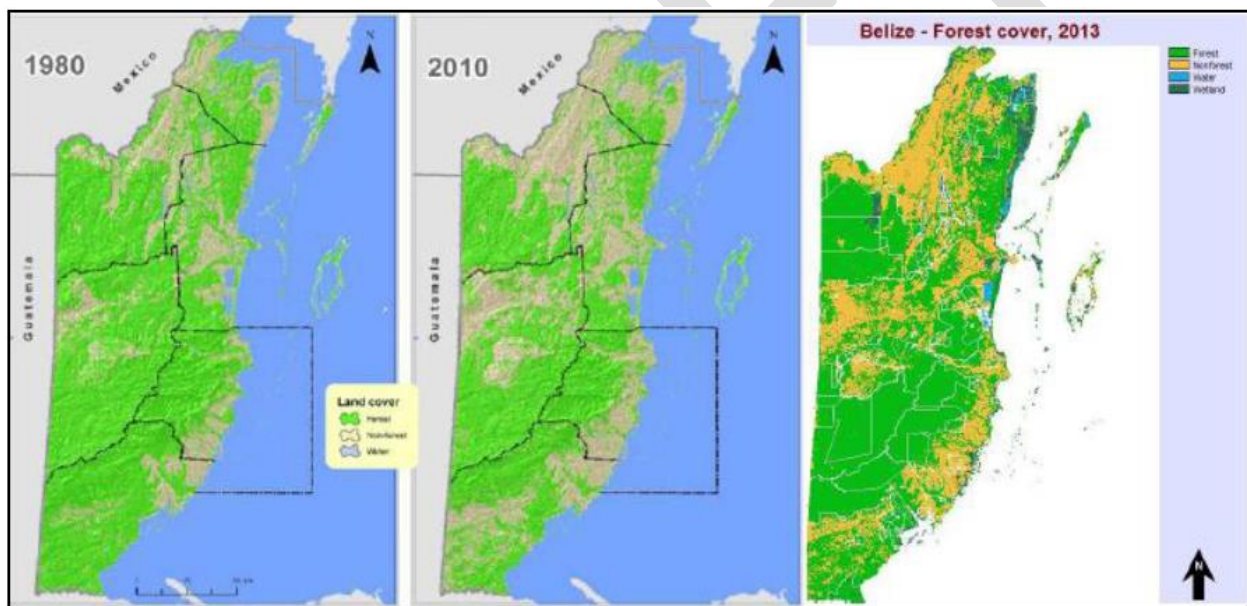
Year	Forest Cover (ha.)	Change/yr. (ha.)	% Change	% Forest Cover
1980	1,648,783	-	-	74.4%
1989	1,616,027	3,593	0.22%	72.9%
1994	1,536,025	18,823	1.17%	69.3%
2000	1,459,301	12,784	0.83%	65.8%
2004	1,416,530	11,033	0.76%	63.9%
2010	1,391,391	4,220	0.30%	62.8%
2012	1,366,300	11,231	0.81%	61.6%
2013	1,354,155	12,144	0.97%	61.1%

**Table 11: Forest Cover 1980 – 2013 (Cherrington, 2013)**

eagles have been recorded breeding, at the northern-most extent of their range. The deforestation rate has, however, been significant, with forest cover falling from 74.4% of Belize's land territory in 1980 to the current level of 61.1% (Table 11). The deforestation rate has increased over the last two years (2012

and 2013), approaching 1% for 2013. Initial data from the first half of 2014 suggests that this rate of clearance has accelerated further (Cherrington, 2014).

Of the 1.35 million hectares of forest cover that remains, approximately two thirds lies within the National Protected Areas System. It is agreed that in general, the protected areas are maintaining their forest cover and ecosystem functionality. However, there are some key areas where incursions are occurring inside the protected area boundaries, with an 8.4% decrease in forest cover since 2010 (Cherrington, 2014). Much of this is along the porous western border with Guatemala. However there has also been some erosion of Forest Reserves from within Belize. With the increasing human development footprint, the pressure to access the protected areas for agricultural land has increased. The majority of non-transboundary incursions into protected areas occur where there is a lack of effective management presence on the ground – Grant’s Work Forest Reserve, on the coastal plain, for example, has all but disappeared, having been eroded by increasing agricultural incursions, realignments of boundaries and eventual dereservation over the past ten years. Where long-term forest licensees or protected area co-management agencies maintain active, on-site management, non-transboundary incursions very seldom occur.



**Land use change across Belize, 1980 – 2013 (Belize R-PP, 2014 source: CATHALAC)**

Transboundary incursions, however, are becoming an increasing issue adjacent to the western border with Guatemala. Of the 2012-2013 recorded forest clearance within protected areas, the majority occurred in those protected areas that lie against the western border with Guatemala – Chiquibul National Park, Columbia River Forest Reserve, Caracol Archaeological Reserve and Vaca Forest Reserve. These correspond to agricultural incursions by farmers from Guatemala, driven by limited access to land and rising poverty along the Guatemalan side of border, a porous border, and limited resource on the Belize side for effective surveillance and enforcement.

Over the past five years, a number of the remaining large tracts of intact forest under private ownership - the Balam Jungle property in north east Belize and the Gallon Jug and Yalbac properties in the west - have been sub-divided, and portions sold, resulting in extensive clearance for agriculture – a direct result of the land tax issue for non-productive lands, a Government strategy to pressure large landholders to subdivide, increasing land availability for small landholders. The majority of the land, however, is being bought to extend Mennonite communities - the rate of land clearance for Mennonite farming has been increasing exponentially, with land being made available through various means – purchase of sub-divided large tracts within areas such as Balam Jungle, partnerships with local community farmers on leased land, and purchase of farmland outright.

There has been a concerted effort by GoB and NGOs to raise the level of ecosystem protection to 10%, in the marine environment, with the addition of Turneffe Marine Reserve to the National Protected Areas System. The importance of the ecosystem services provided by mangroves, is recognised in the Forest Act (SI 16 of 1965), and further strengthened by mangrove-specific legislation (SI 52 of 1989 – amended in 2010, but not yet approved). Removal requires a permit from the Forest Department – however this process is often circumvented, as enforcement capacity is limited, and fines are too small when compared with the financial incentives of coastal development. A recent InVEST risk assessment for mangroves suggests that whilst 30% of mangroves are at low risk from human stressors, 58% are at medium risk and 12% at high risk, with the highest incidence of impact on Ambergris Caye (CZMAI, 2013). Mangrove cover maps have been generated for 1980, 1989, 1994, 2000, 2004, and 2010, the last also included a national validation exercise of field visits, and estimated mangrove cover at 74,684 hectares.

### **5.3 Contribution to the Global Aichi Targets**

#### **5.3.1 Global Biodiversity Indicator Partnership (BIP) Indicators**

- Extent of forest and forest types
- Global wild bird index
- River fragmentation and flow regulation

##### **(i) Extent of forest and forest types**

**Background:** The “Extent of forest and forest types” is a key global indicator and tracked through information collected by the Food and Agriculture Organization of the United Nations. The extent of forests, measured as the proportion of land area under forests, tracks national and global progress towards the UN Millennium Development Goal 7. Global assessments of the world’s forests are currently carried out at 5 year intervals by the Food and Agriculture Organization of the United Nations (FAO), relying on information submitted by the national focal point. The next assessment will be in 2015.



**Policy questions that the indicator addresses:** The Extent of forests and forest types indicator measures trends in forest area over time, enabling the loss of forests to be monitored.

**Indicator relationship to main Aichi Biodiversity Target:** The indicator has a direct relation to the Aichi Biodiversity Target 5 since it indicates trend in forest area over time.

### **(ii) Global wild bird index**

Whilst several protected areas include bird monitoring within their monitoring programmes, Belize does not have a national bird monitoring programme, and would therefore be unable to contribute effectively towards this indicator.

### **(iii) River fragmentation and flow regulation**

**Background:** Freshwater ecosystems including rivers, lakes and wetlands are extremely rich in species, but unfortunately, are also amongst the most altered and threatened ecosystems in the world. The natural flow regime and the longitudinal and lateral connectivity of rivers, both essential characteristics that sustain the biophysical and ecological processes necessary for life in freshwaters, are disrupted when rivers are fragmented by dams and their reservoirs. This fragmentation and the consequent loss of ecosystem processes not only affect ecosystems and species, but humans as well.

River fragmentation disrupts the natural biophysical and ecological processes essential for maintaining life in freshwaters. Dams disconnect rivers from the surrounding floodplains, block migratory fish passage, and retain sediments and nutrients that nourish downstream ecosystems. Reservoirs turn running water habitats into lake-like systems, resulting in the disappearance of fish species adapted to riverine habitats and the proliferation of other, often exotic species adapted to still waters. In highly fragmented rivers the diversity of life is likely to have been reduced and the adaptive capacity of native species impacted. Therefore an increase in river fragmentation indicates a higher likelihood of biodiversity loss as well as a disruption in ecosystem service delivery. Sediment trapping behind dams, for instance, disrupts the delivery of essential nutrients and sediments to coastal ecosystems, affecting the services they provide, such as fisheries and beach replenishment.

**Policy questions that the indicator addresses:** The indicator provides a snapshot of the condition of riverine ecosystems around the world and identifies those rivers that remain free flowing and therefore worth conserving, as well as rivers where environmental flows, restoration and other interventions could improve the ecosystem functioning and address the loss of riverine species and habitats.

**Indicator relationship to main Aichi Biodiversity Target:** It is directly related to Target 5 on extent of habitats – it is one of the few indicators that looks at freshwater ecosystem condition.

*Belize Indicator Partnership*

### **5.3.2 CBD Suggested Potential Indicators**

A number of possible national indicators are suggested, including:

- Trends in proportion of degraded/threatened habitats
- Trends in extent of selected biomes, ecosystems and habitats
- Trends in condition and vulnerability of ecosystems
- Trends in fragmentation of natural habitats
- Population trends of habitat dependent species in each major habitat type

### **5.4 Information availability**

Belize has accurate historical and current information on forest cover, and has in-country capacity for generation of future information.

A National Biodiversity Monitoring Program is being developed, which will provide core information on extent of ecosystem cover:

- Broadleaf Forest
- Mangrove
- Littoral Forest
- Savanna
- Seagrass

Healthy Reefs Eco-audit:

Theme 3: Coastal Zone Management

3c Mangrove extent as an indicator of the effectiveness of the coastal zone management plan implementation

The Environmental Research Institute (ERI) is including extent and condition of ecosystems in its operational indicators, under the National Biodiversity Monitoring Program, designed to standardise monitoring efforts across the country. These include:

- Agricultural expansion rate
- Extent and distribution of developments
- Rate and extent of natural habitat conversion
- Frequency, distribution and extent of fires by land use

### ***5.5 Potential National Target Concepts***

Based on outputs of stakeholder consultations, a National Target(s) should include one or more of the following concepts:

- Maintaining or improving the extent of forests within the protected areas
- Effective ecosystem representation within the National Protected Areas System
- Maintenance of ecosystem functionality and connectivity (including rivers)
- Maintaining forest connectivity through the establishment of key biological corridors
- Maintaining and improving the extent of mangroves within protected areas

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## 5.6 Potential Indicators

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>Extent of forest cover</li> </ul>	Forest Department / ERI	Annual	Cherrington 2013: 2013: 61.1% (1,648,783 ha) 1980: 74.4% (1,354,155 ha)	<p><b>Ease of Monitoring:</b> Moderate. Whilst there is current tracking of forest cover, this is not established as a long-term programme.</p> <p><b>MDG 7:7.1</b> Proportion of land area covered by forest</p> <p><b>NBMP:</b> Trends in proportion of degraded/threatened habitats; Remote sensing</p>
<ul style="list-style-type: none"> <li>Extent of forest cover in protected areas</li> </ul>	Forest Department / ERI	Annual	Cherrington 2013: 8.4% decrease in forest cover since 2010.	<p>Approximately ⅓ of the forest cover in 2013 lies within the National Protected Areas System (Cherrington, 20414)</p> <p><b>Ease of Monitoring:</b> Moderate. Whilst there is current tracking of forest cover, this is not established as a long-term programme.</p> <p><b>NBMP:</b> Trends in proportion of degraded/threatened habitats; Remote sensing</p>
<ul style="list-style-type: none"> <li>Rate of forest cover change per annum</li> </ul>	Forest Department / ERI	Annual	Cherrington 2013: 2013: 0.97% decrease in forest cover	<p><b>Ease of Monitoring:</b> Moderate. Whilst there is current tracking of forest cover, this is not established as a long-term programme.</p> <p><b>NBMP:</b> Trends in proportion of degraded/threatened habitats; Remote sensing</p>
<ul style="list-style-type: none"> <li>Frequency, distribution and extent of anthropogenic fires</li> </ul>	Forest Department / Department of Agriculture	Annual	No recent baseline	<p><b>Ease of Monitoring:</b> Hard. There is no current national tracking of fire frequency and distribution. Would require significant work to develop the baseline. However, once developed, subsequent monitoring would be easier.</p> <p><b>NBMP:</b> Trends in proportion of degraded/threatened habitats; Remote sensing</p>
<ul style="list-style-type: none"> <li>Area of annual agricultural expansion</li> </ul>	ERI, Department of Agriculture, LIC	Annual		<p>An indicator of the expanding agricultural footprint – the biggest driver of deforestation in Belize</p> <p><b>Ease of Monitoring:</b> Moderate. Whilst there is current tracking of forest cover, this is not established as a long-term programme.</p> <p><b>NBMP:</b> Trends in proportion of degraded/threatened habitats; Remote sensing</p>

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
▪ Extent of mangrove cover	Forest Department / ERI	Annual	ERI 2010: 74,684 hectares	<b>Ease of Monitoring:</b> Moderate. Whilst there is current tracking of mangrove cover, this is not established as a long-term programme. <b>Eco-Audit:</b> 3c: Mangrove extent as an indicator of the effectiveness of the coastal zone management plan implementation. Uses Cherrington et al. report <b>NBMP:</b> Trends in proportion of degraded/ threatened habitats; Remote sensing
▪ Extent of mangrove cover in protected areas	Forest Department / ERI National Replenishment Zones Project	Annual	National Replenishment Zones Project, 2014: 16.8%	<b>Ease of Monitoring:</b> Moderate. Whilst there is current tracking of mangrove cover, this is not established as a long-term programme. <b>Eco-Audit:</b> 3c: Mangrove extent as an indicator of the effectiveness of the coastal zone management plan implementation. <b>NBMP:</b> Trends in proportion of degraded/ threatened habitats; Remote sensing
▪ Rate of mangrove cover change per annum	Forest Department / ERI	Annual	Cherrington et al.	<b>Ease of Monitoring:</b> Moderate. Whilst there is current tracking of mangrove cover, this is not established as a long-term programme. <b>Eco-Audit:</b> 3c: Mangrove extent as an indicator of the effectiveness of the coastal zone management plan implementation. <b>NBMP:</b> Trends in proportion of degraded/ threatened habitats; Remote sensing
▪ Extent of Littoral Forest cover	ERI, Forest Department National Replenishment Zones Project	Annual	Rationalization report, 2013: 14.4% Littoral Forest / coastal vegetation Within MPAs: 8.5%	There is no current tracking of Littoral Forest cover, though it is highlighted in system level plans as an indicator. <b>Ease of Monitoring:</b> Moderate. <b>NBMP:</b> Remote sensing
▪ Extent and distribution of coastal developments	ERI / LIC	Annual		<b>Ease of Monitoring:</b> Hard. There is no current national tracking of coastal development. Would require significant work to develop the baseline. However, once developed, subsequent monitoring would be easier. <b>NBMP:</b> Extent and distribution of developments”

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>Number / Total area of relevant protected areas with presence of white lipped peccary</li> </ul>	Status of Protected Areas report	Every 5 years	Status of Protected Areas 2010: Number of protected areas (of 31 - another 18 had no data) with reports of presence of white-lipped peccary: PAs WLP increasing: 0 (0%) PAs WLP stable: 10 (32.2%) PAs WLP decreasing: 13 (41.9%) PAs WLP disappeared: (25.8%) Total extent of protected areas reporting presence of white lipped peccary: To be calculated	An indicator of forest functionality, effective management against hunting pressure, and connectivity. <b>Ease of Monitoring:</b> Moderate. Is incorporated in the revised National Protected Areas Management Effectiveness Tool (Walker et al., 2010) <b>NBMP:</b> Trends in abundance, distribution and extinction risk of selected species
<ul style="list-style-type: none"> <li>Number of key identified biological corridors fully established (of 3)</li> </ul>	Forest Department	Every 2 years	2014: 0 of 3. Work is ongoing on sections of all three corridors, but none has yet been fully established	3 key corridors identified in NPAPSP, North East, Central and Southern. Rationalization report and Integrated Land Use Plan Mapping. <b>Ease of Monitoring:</b> Easy. Would require update from lead NGO agencies. Ya'axché Conservation Trust (southern), ERI (Central), CSFI / Wildtracks /PfB (North-North east)

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>Area of forest cover including and contiguous with the Maya Mountains Massif</li> </ul>	Forest Department / ERI	Every 2 years	<p>2004 baseline:  <b>VERY GOOD:</b> 1,133,054 ha (2,799,826 acres) or more.  Allowing for connectivity over gaps of less than 100m between forest blocks - this gives connectivity across the Western Highway. (NB. this includes Lowland broadleaved dry forest)  Needs updating.</p>	<p>Technical Assessment of the Maya Mountains Massif (Walker et al, 2004): Contiguous includes forest with &lt; 50m gap between forest areas.  Rating as follows:  <b>Very Good:</b> 1,133,054 ha (2,799,826 acres) or more. Allowing for connectivity over gaps of less than 100m between forest blocks - this gives connectivity across the Western Highway. (NB. this includes Lowland broadleaved dry forest)  <b>Good:</b> 687,017 ha – 1,133,054 ha.  687,017 ha is the area of contiguous forest running as far as the Western Highway, and connected by a gap of no more than 50m. The Hummingbird Highway is currently not considered as a barrier to connectivity for broadleaved forest, and rivers are also assumed to not affect connectivity. Forest areas within MPR are considered contiguous.  <b>Fair:</b> 438,593 ha – 687,017 ha  Broadleaf forest currently within the MMM - approx. 438,593 ha (439,321 ha minus the inundation area of Chalillo (728ha). 687,017 ha contiguous as far as the Western Highway, and connected by a gap of no more than 50m.  <b>Poor:</b> Less than 438,593 ha  The area of broadleaf forest currently within the MMM, with no connectivity beyond the MMM  The area of contiguous forest is calculated using mapping and satellite imagery, and is based on Meerman 2004 edition Belize Ecosystems map. All figures include broadleaf shrubland, as this is included in the broad 'broadleaf forest' categories.  <b>Ease of Monitoring:</b> Moderate  <b>NBMP:</b> Trends in coverage condition, representativeness and effectiveness of PA and other area-based approaches</p>

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>▪ % of watersheds impacted by dams</li> </ul>	BEL / Department of Agriculture	Every 5 years	Rivers with dam systems that impede connectivity: 3 Macal Rio Grande Blue Creek (for rice field inundation)	Indicator of freshwater fragmentation <b>Ease of Monitoring:</b> Moderate
<ul style="list-style-type: none"> <li>▪ % of watersheds impacted by flow diversion / regulation</li> </ul>	Department of Agriculture	Every 5 years	No baseline	Indicator of freshwater fragmentation <b>Ease of Monitoring:</b> Moderate <b>NBMP:</b>
<ul style="list-style-type: none"> <li>▪ % of actual renewable water resources withdrawn</li> </ul>	FAO Aquastat	Every 5 years	Total water withdrawal (surface and groundwater) was estimated at 101 million m <sup>3</sup> /yr in 2000 – 0.5% of actual renewable water resources	FAO Aquastat includes figures for agriculture, municipalities and industry, but these are out of date (2000) <b>Ease of Monitoring:</b> Hard <b>NBMP:</b>





**Target 6:** *By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.*

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### **6.1 The Belize context**

Belize's fishery is focused on the shallow waters between the coast and the barrier reef, and on the three offshore atolls. It is both socially and economically important to Belize, with more than 2,750 fishermen directly dependent on capture fisheries, over 12,500 Belizeans are direct beneficiaries (fishermen families and dependents) of the fishery, and a further 1,000 involved indirectly in processing and export (Fisheries Dept., 2014). The primary products in the marine sector are Caribbean spiny lobster, Queen conch and finfish (primarily snapper and grouper), with sea cucumber as a relatively new extractive industry, and a limited level of extraction of fish for the aquarium trade.

Fishing is non-industrial, with fishermen based from coastal communities fishing independently, using open boats, sail sloops, and canoes, and fishing by free-diving, use of lobster traps and shades, or by hook and line. The majority of the product is sold to two fishing cooperatives that export to the United States and Europe.

### **6.2 Current Status**

Belize is becoming a regional leader in marine resource management, with a series of complementary management strategies in place to address the above issues:

- ecosystem-based management through the establishment of a network of eight marine reserves in key locations, with general use, conservation and strict replenishment zones
- a further five marine protected areas have been established as full no-take reserves, under the Forest Department, strengthening replenishment zones in the marine sector
- establishment of the active GoB/NGO National Coral Monitoring Working Network
- protection of critical spawning aggregation sites and support of a national Government / NGO Spawning Aggregation Working Group
- strict legislation and regulations
- requirement for fishermen to have valid fishing licenses
- enforced seasonal closures and size limits (lobster, conch, Nassau grouper), quotas (conch), and gear restrictions, with realistic fines
- species specific protection (e.g. Nassau grouper, nurse shark)
- protection of grazers (parrotfish and surgeonfish), with requirement for skin patch to be left on finfish fillet for ease of identification
- full protection for sea turtles

- nationwide ban on trawling
- promotion of diversification into deep slope fishing and community based initiatives such as seaweed farming.

Up-to-date management plans exist for the majority of the marine protected areas, and system-level Conservation Action Plans strengthen system level management within the larger seascape, increasing communication and collaboration between marine protected area managers. Partnerships between the Belize Fisheries Department and NGOs also strengthen management, particularly in the areas of scientific monitoring and education and outreach. This management regime has allowed Belize to largely avoid the catastrophic collapse of fish stocks experienced by adjacent countries in the region. However, it is recognised that Belize has a ‘mature’ fishery – so cannot be expanded in its present form further without danger of collapse. Over the last fifteen years, marine resources have been declining and data from the 2010 – 2012 demonstrates that this decline is accelerating.

### **6.3 Contribution to the Global Aichi Targets**

#### **6.3.1 Global Biodiversity Indicator Partnership (BIP) Indicators**

- Marine Trophic Index
- Number of MSC certified fisheries
- Proportion of fish stocks within safe biological limits
- The Red List Index for seabirds

##### ***(i) Marine Trophic Index***

**Background:** Developed by the Sea Around Us Project to investigate the impacts of fisheries on the world’s marine ecosystems. The MTI can be used to “describe the complex interactions between fisheries and marine ecosystems and communicate a measure of species replacement indices by fisheries”. The MTI is calculated from catch composition data collected by the Food and Agricultural Organization of the United Nations (FAO), after being spatially allocated to EEZs, LMEs or other relevant spatial ecosystem components. A decrease in Marine Trophic Index represents a decline in the abundance and diversity of fish species high in the food chain. The data needs to also account for expansion of fishing effort.

##### ***(ii) Number of MSC certified fisheries***

Belize does not have an MSC certified fishery – the geographically closest certified fishery is the Sian Ka'an and Banco Chinchorro Biosphere Reserves, which are certified for spiny lobster, increasing their competitiveness on the international market.

##### ***(iii) Proportion of fish stocks within safe biological limits***

Primary fish stocks in Belize are spiny lobster and queen conch. Both are monitored closely.

#### ***(iv) The Red List Index for seabirds***

Belize has twenty species of seabirds (Birdlife, 2014), including gulls, terns and cormorants. None are considered threatened (Vulnerable, Endangered or Critically Endangered) – note, however, that the Birdlife list does not include the Red footed booby nor the magnificent frigatebird or brown pelican. Whilst these are coastal species, rather than ocean-going, they could still form a useful indicator for the health of the fishery.

#### ***6.3.2 CBD Suggested Potential National Indicators***

A number of possible national indicators are suggested, including:

- Trends in proportion of depleted target and bycatch species with recovery plans
- Trends in area, frequency, and/or intensity of destructive fishing practices
- Trends in catch per unit effort
- Trends in extinction risk of target and bycatch aquatic species
- Trends in fishing effort capacity
- Trends in population of target and bycatch aquatic species
- Trends in proportion of utilized stocks outside safe biological limits

#### ***6.4 Information availability***

Information is available from the Belize Fisheries Department on the number of fishermen active in the marine environment, and on delivery of conch and lobster to the fishing cooperatives. Pre- and post-season in-water surveys provide data on conch and lobster populations, and more detailed catch data is available from Managed Access areas.

Healthy Reefs Eco-audit:

Theme 1: Marine Protected Areas

1e Percentage of MPAs with good enforcement

Theme 2: Ecosystem-based Fisheries Management

2a Harmonizing fisheries regulations among countries

2b Special regulations for grouper / spawning sites

2d Transform all open-access fisheries to rights-based sustainable fisheries management systems

The Environmental Research Institute (ERI) is including monitoring of fisheries resources in its operational indicators, under the National Biodiversity Monitoring Program, designed to standardise monitoring efforts across the country. These include:

- Trends in population of target and bycatch aquatic species

- Trends in catch per unit effort
- Fishing Pressure

### ***6.5 Potential National Target Concepts***

Based on outputs of stakeholder consultations, a National Target(s) should include one or more of the following concepts:

- Improving sustainability of the lobster, conch and finfish fisheries
- Belize's Marine Reserves under Managed Access regime
- Maintaining and improving functionality of spawning aggregation sites
- Improved management of freshwater fish stocks

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## 6.6 Potential Indicators

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>▪ % of Marine Reserves under Managed Access</li> </ul>	Belize Fisheries Department (BFD)	Annual	BFD 2014: 22.2% (2 out of 9 MR) Total area of MR = 723,761 acres Total area under MA = 186,653ac Total % area of MR managed as MA = 25.8% HRI Eco-audit: POOR	Managed Access is currently implemented at GRMR and PHMR (2014) <b>Ease of Monitoring:</b> Very Easy <b>Eco-Audit:</b> 2d Transform all open-access fisheries to rights-based sustainable fisheries management systems <b>NBMP:</b> Trends in pressures from unsustainable agriculture, forestry, fisheries and aquaculture
<ul style="list-style-type: none"> <li>▪ % Belize's Territorial Sea under Managed Access</li> </ul>	Belize Fisheries Department (BFD)	Annual	BFD 2014: 0.04% Territorial Sea area (with cayes): 4,698,772 acres Area under managed access: 186.653 acres HRI Eco-audit: POOR	Territorial Sea area (with cayes): 4,698,772 acres Area under managed access: 186,653 acres <b>Ease of Monitoring:</b> Very Easy <b>Eco-Audit:</b> 2d Transform all open-access fisheries to rights-based sustainable fisheries management systems <b>NBMP:</b> Trends in pressures from unsustainable agriculture, forestry, fisheries and aquaculture
<ul style="list-style-type: none"> <li>▪ % of fishermen permitted for Managed Access areas</li> </ul>	Belize Fisheries Department (BFD)	Annual	Baseline from Fisheries Department	<b>Ease of Monitoring:</b> Very Easy <b>Eco-Audit:</b> 2d Transform all open-access fisheries to rights-based sustainable fisheries management systems <b>NBMP:</b> Trends in pressures from unsustainable agriculture, forestry, fisheries and aquaculture
<ul style="list-style-type: none"> <li>▪ % of Territorial Sea considered as functional Replenishment Zone</li> </ul>	National Replenishment Zones Project	Annual	20014: 6.7% legally established replenishment zone (with full protection against fishing activities) 3.12% is considered as functional – effectively managed as replenishment zones	<b>Ease of Monitoring:</b> Easy <b>Eco-Audit:</b> 2d Transform all open-access fisheries to rights-based sustainable fisheries management systems
<ul style="list-style-type: none"> <li>▪ Total catch (fish, crustaceans and molluscs)</li> </ul>	Fisheries Department UNEP GEO Data Portal, June 2014	Annual	UNEP 2011: 263,384 metric tons 2010: 385,374 metric tons 2009: 303,334 metric tons	<b>Ease of Monitoring:</b> Easy <b>NBMP:</b> Fishing pressure, Trends in catch per unit effort
<ul style="list-style-type: none"> <li>▪ Species Management Plan - lobster</li> </ul>	Belize Fisheries Department	Annual		Presence / Absence <b>Ease of Monitoring:</b> Very Easy

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
▪ Species Management Plan - conch	Belize Fisheries Department	Annual	Management programme tied to CITES	Presence / Absence <b>Ease of Monitoring:</b> Very Easy
▪ Species Management Plan – sea cucumber	Belize Fisheries Department	Annual		Presence / Absence <b>Ease of Monitoring:</b> Very Easy
▪ Species Management Plan - finfish	Belize Fisheries Department	Annual		Presence / Absence <b>Ease of Monitoring:</b> Very Easy
▪ Species Management Plan - sharks	Belize Fisheries Department	Annual	BFD: 2014. No Being drafted	Presence / Absence <b>Ease of Monitoring:</b> Very Easy
▪ % of designated SPAG sites with effective management and no fishing	Belize Fisheries Department (BFD)	Annual	HRI Eco-audit: GOOD One site (Gladden Spit) is not fully protected because it is issuing special licenses to traditional fishers for the snapper spawning season	11 protected spawning aggregation sites. <b>Ease of Monitoring:</b> <b>Eco-Audit:</b> 2b Special regulations for grouper / spawning sites. In Belize, 77% of known grouper SPAGS are legally fully protected, with 20% having moderate enforcement. One site (Gladden Spit) is not fully protected because it is issuing special licenses to traditional fishers for the snapper spawning season. None have adequate enforcement. The majority of SPAG sites (80%) are inadequately enforced, and the remaining 20% are moderately enforced
▪ % of river systems with patrols	Belize Fisheries Department (BFD)	Annual	No data. BFD are planning to start patrolling of rivers in 2015.	SMART data system will provide GPS tracks of river patrols <b>Ease of Monitoring:</b> Easy
▪ Number of reports of illegal fishing across all Marine Protected Areas	Belize Fisheries Department (BFD) Annual reports Co-management	Annual	Data available for Marine Reserves in Annual Reports Eco-Audit 2014: FAIR (At least 50% of MPAs have at least moderate enforcement	<b>Ease of Monitoring:</b> Easy <b>Eco-Audit:</b> 1e Percent of MPAs with good enforcement
▪ % of ships in the international fleet that have citations for poor practices	IMARBE	Annual	Baseline data available from High Seas Fisheries Unit	Belize has just been removed from the EU list of countries deemed non-cooperative in fighting illegal, unreported and unregulated (IUU) fishing <b>Ease of Monitoring:</b> Easy



**Target 7:** *By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.*

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### **7.1 The Belize context**

In the terrestrial environment, forestry is regulated under the Forest Act, which seeks to protect watersheds and steep slopes, whilst also providing a sustainable yield of timber and non-timber forest products. Timber resources are managed in Forest Reserves, considered a component of the National Protected Areas System, on national lands and in private reserves. The National Forest Policy, National Forest Programme and the Forest Act are currently being revised. The revisions address not only sustainability, but also a focus on added value products.

Whilst the current Agriculture Policy talks about sustainability, it is the private sector that is actually putting this into practice. The focus of the Agriculture Department is still on encouraging large scale agriculture, with limited focus on more intensive farming methods or organic farming.

### **7.2 Current Status**

In the forestry sector, Belize is moving towards improved sustainable harvesting practices, through Long-Term Forest Licences for the Forest Reserves, designed to promote sustainable forest management. The current revision of the National Forest Policy, National Forest Programme and the Forest Act will significantly strengthen Belize's management of its forest resources once completed and endorsed, as will the reduction and / or phasing out of Short-Term Forest Licences. The contractual agreements for Short Term Forest Licences include best management practices, but the limited human and financial resources for monitoring the concession areas, and few incentives to not take short cuts, leads to unsustainable logging practices. Illegal logging is also flagged as an active threat throughout Belize, as the increasing spread of agricultural clearance and roads provides easier access to intact forest areas.

The Long Term Forest Licenses (LTFL) are 20 to 40 year licenses that promote Sustainable Forest Management towards long term sustainability. The Forest Act and LTFLs include regulations to protect steep slopes and riparian belts from impacts, as well as addressing the need to protect the watershed and biodiversity.

Challenges include the limited national investment in management of the Forest Reserves and the illegal, large-scale, transboundary logging incursions from Guatemala, occurring along the porous border with Guatemala, with logging roads originating in Guatemala accessing Belize's forests in the Chiquibul and Columbia River forest areas – both protected areas with limited resources and political resolve to address the issues. As with illegal loggers from Belizean communities, these illegal loggers have no incentive to use sustainable forest management protocols.

There has been a concerted effort in the private agricultural sector to move towards social and environmental certification – shrimp farms, banana, citrus and sugar cane farms are all in the process of

improving their environmental footprint, focusing on better management of agrochemicals, reduction of effluent and protection of riparian and mangrove buffers.

The shrimp farming industry has been a leader in the move to certification under the Aquaculture Stewardship Council, through market-driven necessity. Belize will be first country where 90% of shrimp farms are certified, and was the first in the world to achieve certification. The US\$1.6 million required to achieve this has been located through investment from IDB, WWF, the EU / Complete Caribbean, with the support of the Government of Belize.

The banana industry has a rolling contract with Fyffes that requires it to meet certification standards. To maintain its current contracts and to compete on the international market, farmers have to commit to, and meet, social and environmental standards, including close monitoring of issues such as pesticide use and management of runoff into adjacent rivers. This is at a cost to the farmers, with little or no direct assistance from Government towards meeting these costs (BBGA, pers. com.).

The citrus industry, too, is moving towards certification through the International Standards Organization ISO 14001 (Environmental Standards), linked to the requirements of its European market (CGA, pers. com.). The sugar cane industry has been certified under Fairtrade certification and needs to maintain its environmental compliance to keep its market.

### ***7.3 Contribution to the Global Aichi Targets***

#### ***7.3.1 Global Biodiversity Indicator Partnership (BIP) Indicators***

- Area of forest under sustainable management: certification
- Wild Bird Index for farmland birds

#### ***7.3.2 CBD Suggested Potential National Indicators***

A number of possible national indicators are suggested, including:

- Trends in area of forest, agricultural and aquaculture ecosystems under sustainable management
- Trends in population of forest and agriculture dependent species in production systems
- Trends in production per input
- Trends in proportion of products derived from sustainable sources

### ***7.4 Information availability***

Information on sustainable forestry and Long Term Forest Licenses is available from the Forest Department.

Information is also available from the Department of Agriculture and the Associations associated with each agricultural sector – the Banana Growers Association, Citrus Growers Association, Belize Sugar Cane Farmer’s Association and the Belize Shrimp Growers Association.



### **7.5 Potential National Target Concepts**

Based on outputs of stakeholder consultations, a National Target(s) should include one or more of the following concepts:

- Sustainable forest management
- Improved use of agricultural land – more intensive, higher productivity, less dependent on large scale forest clearance, more sustainable
- Continued progress towards environmental certification of agriculture and aquaculture in Belize
- Increased focus on organic farming

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## 7.6 Potential Indicators

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
▪ % of forest cover managed under FSC certified regime	UN EP GEO Data Portal, July 2014 Forest Department	Annual	2011: 169,932 hectares 2010: 104,880 hectares	<b>Ease of Monitoring:</b> Very Easy
▪ % of forest cover under Sustainable Forest Management	Forest Department	Annual	2012: >900,000 acres Private: 345,000 acres Licensed National Lands: 132,000 Licensed Forest Reserves: 420,000 acres	<b>Ease of Monitoring:</b> Easy <b>NBMP:</b> Trends in pressures from unsustainable agriculture, forestry, fisheries and aquaculture
▪ % shrimp farms certified under ASC	Belize Shrimp Growers Association	Annual	BSGA 2014: 0% - but 88% of shrimp farms going through the certification process	<b>Ease of Monitoring:</b> Very Easy <b>Eco-Audit:</b> 6c. Adoption of seafood eco-labeling programs <b>NBMP:</b> Trends in pressures from unsustainable agriculture, forestry, fisheries and aquaculture
▪ % agricultural land certified for sustainable practices	Citrus Growers Association Banana Growers Association Belize Sugar Cane Farmer's Association	Annual	No baseline	<b>Ease of Monitoring:</b> Moderate <b>NBMP:</b> Trends in pressures from unsustainable agriculture, forestry, fisheries and aquaculture
▪ Area (ha) of Belize under organic production	Department of Agriculture	Annual	IICA 2007: Only about 1125 ha is under organic production with 90% being cacao bean and the other 10% a mixture of vegetables, peanuts and chia seeds.	<b>Ease of Monitoring:</b> Hard



**Target 8:** *By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.*

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### **8.1 The Belize context**

As a signatory to the Cartagena Convention, Belize has ratified the Land-Based Sources of Pollution Protocol as part of a concerted global effort to address the potential impacts of land-based sources of pollution on the marine environment. As part of its obligations, it produced the **National Program of Action for the Control of Land Based Sources of Pollution in Belize (NPA LBS)** in 2008, under the Department of the Environment. The plan addresses the issues of domestic sewage and waste water, reduction of bilge and sewage discharge into the marine environment, nutrient runoff, deforestation / land use change, and solid waste management.

Belize has few heavy industries, being primarily an importer rather than a producer, resulting in low heavy metal pollution levels. Air pollution is a growing issue, with increasing issues of respiratory disease, but the majority of concerns are focused primarily on contamination of water in watersheds, and impacts on the coral reef. Sediment, urban and agrochemical contamination from mainland watersheds have been highlighted as perhaps the greatest impacts on the Belize reef after climate change.

The Pesticides Control Board in Belize is the statutory body responsible for the implementation of the provisions of the Pesticides Control Act, and its enabling regulations. The Pesticide Control Board runs trainings for farmers, licensing them for pesticide use. It also requires that any person buying pesticides should be asked for their applicator's license; however, both the training and the request to see the license are frequently circumvented. The PCB is gearing up to enforce tighter controls in the areas of registration and post-registration surveillance, including new requirements for importers and handlers involved in the storage and distribution of pesticides in Belize.

The health issues linked to poor practices for chemical application aren't well known - sugar cane farmers aren't yet linking chemicals to high levels of neurological damage in the sugar cane communities, even though this has been shown in neighbouring countries. There is limited awareness of the concentrations to be used, and whilst Belize only permits the importation of pesticides registered by the PCB, restricted chemicals are brought in illegally from Mexico, Guatemala and Honduras, with little safety awareness.

The Department of the Environment (DoE) is mandated to ensure large developments and developments adjacent to sensitive areas (protected areas, coastal areas or coral reefs) manage the risks of potential pollution. Air pollution is regulated under the Pollution Regulations, with the DoE as the regulatory body. The DoE has the responsibility of maintaining good air quality, ensuring that the air is not being polluted to a point where it affects human health and ecological functions. It is illegal to emit or discharge pollutants either directly or indirectly into the air without a permit from the DoE.

The Belize Solid Waste Management Authority (BSWaMA) was established to ensure that solid waste generated in Belize is managed through an Integrated Sustainable Solid Waste Management process, and disposed of in an environmentally sound manner.

Belize has developed the legal framework for Belize to meet the standards of the Cartagena Convention in its effluent management, through the Environmental Protection - Effluent Limitation Amendment Regulation of 2009. The Water and Sewerage Act is designed to “prevent waste, contamination of water supply, and the pollution of any water whether surface or underground. The responsibility for implementation of sewage management was passed to the Belize Water Services Ltd. (BWS) in 2001 under an operating license issued by the Public Utilities Commission (PUC). Regulatory controls are through the PUC, the Water Industry Act (2001), and a “Codes of Practice” agreed by the Regulator and BWS in 2004.

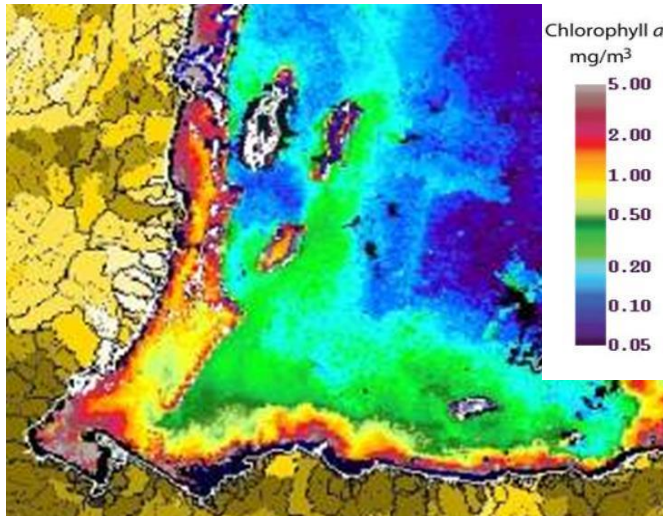
## **8.2 Current Status**

The primary sources of land-based pollution have been identified as being primarily agricultural (WRI, 2006), though poor sewage management in urban areas is also identified as an issue, as are mining activities – particularly mining for river sand, and illegal and uncontrolled mining for river gold in the Chiquibul.

Air pollution is thought to be an increasing issue. In 2014, the Department of the Environment established the Belize City Air Quality Monitoring Program to test the air quality in the city. Focusing on nitrogen oxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>) and ozone (O<sub>3</sub>), the monitoring provides a baseline for understanding the environmental and human health effects of air pollution from industrial, vehicular and other domestic emissions (DoE, 2014) - with an estimated 30,000 licensed vehicles operating in Belize City.

Smoke from extensive savannah and agricultural fires has also become a priority issue, particularly in Belmopan and Cayo, filling the air with smoke and resulting in an increase of respiratory health issues (DoE, pers. com., 2014). Air pollution in Belize also originates from other anthropogenic sources including vehicles, factories, indoor building materials, cleaning chemicals also contribute to air pollution levels.

In northern Belize, there are concerns about agrochemical runoff from the sugar cane, rice and cattle areas, as well as urban runoff. Two primary rivers drain the farmlands and pass major settlements – the Rio Hondo and the New River – flowing into Corozal Bay, one of the largest estuarine systems emptying onto the Mesoamerican reef. Chetumal, one of the largest settlements on the Mexican side of the estuary, has a population of over 150,000, but only limited sewage treatment, with much of its raw sewage also going into the estuary. The Commercial Free Zone on the Santa Elena border is considered one of the largest producer of industrial pollutants within northern Belize - whilst it has only a handful of manufacturing industries, it also has over 200 stores, with effluent emptying directly into the Rio Hondo (Fernandez, 2002), and from there into Corozal Bay Wildlife Sanctuary.

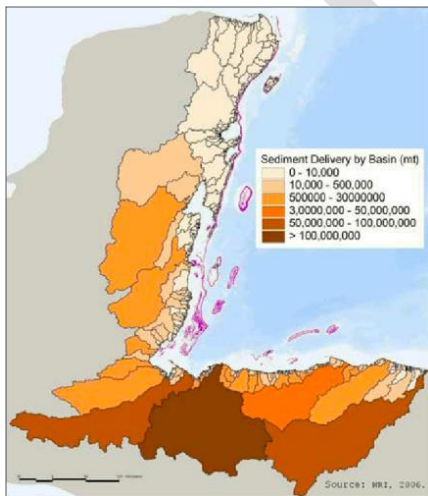


SeaWifs Chlorophyll  $\alpha$ . After Shank et. al. 2010/ Soto et. al. 2009

Light industries in Orange Walk also have the potential to introduce pollutants into the estuary, via the New River. The Tower Hill sugar processing plant has been responsible in the past for reduced water quality, resulting in fish kills, as has one of the sawmills, milling arsenic-treated lumber on the bank of the river. The estuary acts as a settling pond for many of the contaminants and sediments before the water flows out onto the reef. However, this leads to high levels of pollution and contamination in the estuary itself.

In Central Belize, agrochemicals are generally associated with the citrus and banana industries, and enter the rivers as a result of clearance of riverine vegetation in the farm areas. The level of agrochemical use will now be highly controlled by certification. Two citrus processing facilities in the Stann Creek District result in increased organic load to the North Stann Creek River, with DoE responsible for monitoring the effluent runoff from the processing. The shrimp farms on the central coastal plain have, in the past, been responsible for excessive nutrient run-off, causing algal blooms, particularly in Placencia Lagoon. This issue is now partially resolved through the installation of settling ponds and regulation of feed, as shrimp farms work to meet certification standards.

In the south, five major watersheds drain some of the principal banana growing areas. Following storm events, the increased sediment load of these rivers is also accompanied by an increased pesticide load, as rain washes agrochemicals from the watersheds into the rivers, and from there into the sea. This is overshadowed, however, by the watersheds emptying into the Gulf of Honduras, from Guatemala and Honduras (particularly the Uluá, Motagua, Patuca and Aguan) where land use change has removed much of the natural vegetation from the formerly forested slopes, and replaced it with agriculture (Burke et. al. 2006).



Sediment Delivery by Watershed Basin (Burke et. al. 2006)

Whilst there is recognition of the need for regulation of agrochemicals, particularly as climate change predictions suggest that the agricultural sector will be facing increased pests and diseases, the extra cost, the ease of smuggling cheaper, illegal agrochemicals across the borders, and the limited monitoring and enforcement capacity for regulation encourages farmers to continue poor practices. Regulation is a high priority of the Pesticide Control Board, but not of the farmers, but stakeholder feedback estimated that up to 40% of pesticides / herbicides may come into the country illegally (Stakeholder consultations, 2014).

Regulation is a high priority of the Pesticide Control Board, but not of the farmers, but stakeholder feedback estimated that up to 40% of pesticides / herbicides may come into the country illegally (Stakeholder consultations, 2014).

Clearance of river banks and mining of river sand is considered to be an issue in terms of increased sediment load. Mining operations are generally not monitored, and are focused on extracting maximum benefit rather than best practices (stakeholder consultations, Stann Creek). SeaWiFS ocean colour images highlighted the large pulse of river water that extends from Guatemalan and Honduran rivers, stretching as far north as Gladden Spit, and even out as far as Glover's Reef Atoll, during storm events (Soto et. al. 2009; WRI/ICRAN, 2006; Andrefouet et al. 2002). Connectivity was tracked using the proxy of weekly mean chlorophyll-a concentrations, derived from satellite imagery over a nine-year period. These studies indicated that Honduran river plumes, particularly that of the Ulu'a River, reached the southern part of the Belize Reef 61% of the time, providing further support for the outputs of WRI studies on the origins of impacting watershed run-off on the Mesoamerican Reef (WRI, 2006). Sediment core analysis of two sites within the Belize reef system (Turneffe Atoll and Sapodilla Cayes), indicate that watershed runoff onto the reef has increased relatively steadily over time, consistent with historical and current land use trends. Sediment supply to the reef is greater in the south, in the Sapodilla Reef area with greater urgency for action to reduce runoff impacts (Carilli et. al. 2009).

There is no national system for solid waste management, though Belize has now significantly improved its capacity to manage its solid waste through the construction and management of the Mile 24 Regional Sanitary Landfill, which receives municipal waste from transfer stations, one in Belize City, and the other in San Ignacio/Santa Elena – Benque Viejo. A number of industries have developed mechanisms for recycling – the banana industry, for example, compacts all its plastics and string into 40lb packs, and ships these to Costa Rica for recycling into further plastic sleeve production for protection of the banana bunches.

Belize has three sewage collection facilities in the country, serving Belmopan, Belize City and San Pedro, but none are of sufficient scale to be able to support the expansion of these areas since their construction. Despite Belize's commitments under the Cartagena Convention, monitoring of pollution from waste water and sewage is constrained by human resource and finance availability, and the lack of facilities for in-country assessment. A number of projects to address sewage issues are, however, ongoing – such as the Integrated Water and Sanitation Program for the Placencia Peninsula, a regional sewage collection, treatment and disposal system.

A national proposal is currently being developed by the Environmental Research of the Institute of the University of Belize, along with protected area management partners, to develop a national water quality monitoring programme, inclusive of contaminant monitoring.

### ***8.3 Contribution to the Global Aichi Targets***

#### ***8.3.1 Global Biodiversity Indicator Partnership (BIP) Indicators***

- Loss of reactive nitrogen to the environment

- Nitrogen deposition (International Nitrogen Initiative)

### **8.3.1 CBD Suggested Potential National Indicators**

A number of possible national indicators are suggested, including:

- Impact of pollution on extinction risk trends
- Trend in emission to the environment of pollutants relevant for biodiversity
- Trend in levels of contaminants in wildlife
- Trends in incidence of hypoxic zones and algal blooms
- Trends in nitrogen footprint of consumption activities
- Trends in ozone levels in natural ecosystems
- Trends in pollution deposition rate
- Trends in proportion of wastewater discharged after treatment
- Trends in sediment transfer rates
- Trends in water quality in aquatic ecosystems

### **8.4 Information availability**

Information is available from:

Healthy Reefs Initiative Eco-audit:

Theme 4: Sanitation and Sewage Treatment

4a Standards for wastewater management (in last 5 years)

4b New infrastructure for sewage treatment

It is anticipated that information will also be available through the National Biodiversity Monitoring Program (NBMP), once finalized and implemented, under the following operational indicators:

- Stream macro-invertebrate community composition and assemblage
- Trends in sediment transfer rates
- Trends in level of contaminants in wildlife

### **8.5 Potential National Target Concepts**

Based on outputs of stakeholder consultations, a National Target(s) should include one or more of the following concepts:

- Clean rivers - reduced contamination of water
- Reduced land-based pollution of the reef
- Strengthening of pesticide regulations and improved pesticide use / best practices
- Focus on environmentally sustainable farming practices
- Strengthening of solid waste and sewage management
- Garbage collection and removal systems in place in all communities, with recycling
- Incentives for reduction of pollution from anthropogenic activities

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## 8.6 Potential Indicators

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>Outputs of national water quality monitoring programme - contaminants</li> </ul>	ERI	Annual	Being developed under ERI / National Coral Reef Monitoring Network	<p><b>Ease of Monitoring:</b> Hard</p> <p><b>Eco-Audit:</b> 5c Reduce upstream watershed pollution sources (agriculture, livestock, urban/tourism, industrial, rural, deforestation) through better management practices, action plans and regulations in each sector</p> <p><b>National Coral Reef Monitoring Network</b></p>
<ul style="list-style-type: none"> <li>Stream macro-invertebrate community composition and assemblage</li> </ul>	ERI	Every 2 years	Included in the NBMP	<p><b>Ease of Monitoring:</b> Hard</p> <p><b>NBMP:</b> AQEM, Microhabitat approach</p>
<ul style="list-style-type: none"> <li>Contaminants in manatee tissue samples</li> </ul>	ECOSUR / Sea 2 Shore Alliance	Opportunistic	ECOSUR 2007: Mean PCB concentrations: 1.81µg/g lw OCP concentrations: 409 ng/g lw Heptachlor: 113 ng/g lw Dieldrin: 44.8 µg/g lw Mirex: 96.7ng/g lw	<p>Baseline: ECOSUR: Wetzel et al., 2008. Biopsy from 9 individual from Chetumal Bay, analysed at Mote Marine Laboratory. NB. lw = lipid weight</p> <p><b>Ease of Monitoring:</b> Moderate. Needs tissue samples from manatee necropsies. Contaminant analysis is relatively expensive, and has to be done outside of Belize.</p> <p><b>NBMP:</b> Trend in level of contaminants in wildlife</p>
<ul style="list-style-type: none"> <li>Bioaccumulation of mercury in sharks</li> </ul>	MAR Alliance			<p><b>Ease of Monitoring:</b> Hard</p> <p><b>NBMP:</b></p>
<ul style="list-style-type: none"> <li>% of population served by garbage collection programmes</li> </ul>	Belize Solid Waste Management Authority (BSWaMA)	Every 2 years	47% of population served by garbage collection programmes Total Population: 322,453 (2010) Number of communities with programmes: 11 of 206 communities (9 towns + Placencia, Independence) – population: 151,596 (2010)	<p>Data from the BSWaMA and Census 2010. Note:47% assumes that 100% of community is served by the collection service. In reality, the % of garbage collection service in each municipality varies from 90% to 55%.</p> <p><b>Ease of Monitoring:</b> Moderate</p> <p><b>NBMP:</b></p>

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>▪ % of communities that have approved dump sites</li> </ul>	Belize Solid Waste Management Authority (BSWaMA)	Every 2 years	7.2% of communities have approved dump sites 14 of 195 communities. In addition, Benque Viejo, Succotz, Bullet Tree, Santa Familia, Cristo Rey dispose their garbage at the transfer station. This takes the % up to 9.7%	<p>Excluding towns, Placencia and Independence.            Note: Benque Viejo, Succotz, Bullet Tree, Santa Familia, Cristo Rey dispose their garbage at the transfer station</p> <p><b>Ease of Monitoring:</b> Moderate  <b>Eco-Audit:</b> Standards for wastewater management / sewage treatment  <b>NBMP:</b></p>
<ul style="list-style-type: none"> <li>▪ Standards for wastewater management / sewage treatment</li> </ul>	Belize Solid Waste Management Authority (BSWaMA)	Every 2 years	Eco-audit 2014: GOOD	<p><b>Ease of Monitoring:</b> Easy  <b>Eco-Audit:</b> Belize has ratified the Cartagena Convention's Protocol Concerning Pollution from Land-based Sources and Activities, and has passed national effluent regulations. However, based on BWS water quality readings January and July 2011, discharge levels are below Class I standards (30 mg/L for BOD and suspended solids, requiring strengthened implementation.  <b>NBMP Link(s):</b></p>
<ul style="list-style-type: none"> <li>▪ New infrastructure for sewage treatment</li> </ul>	Belize Solid Waste Management Authority (BSWaMA)	Every 2 years	Eco-audit 2014: FAIR	<p><b>Ease of Monitoring:</b> Easy  <b>Eco-Audit:</b> 4b New infrastructure for sewage treatment</p>



**Target 9:** By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.

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### **9.1 The Belize context**

BAHA is mandated to regulate the importation of fruit, vegetables and vegetable material to Belize, to ensure that disease does not enter the country. BAHA also has the authority to prevent the transport of plant material and / or animals within Belize to prevent spread of infection. Challenges to control include the porous northern and western borders, and the constant flow of Mexican and Guatemalan fruit and vegetables, and cattle, crossing the border, making regulation difficult.

### **9.2 Current Status**

There is adequate (but by no means complete) information in Belize on invasive species, and for those species causing significant impacts to the economy, pathways have been identified and where feasible, management regimes have been put in place.

There aren't the human resources to address every invasive species, and a number have become well established. Where they are serious cause of concern to human health or agricultural production, however, measures have been put into place to control the impacts.

In the terrestrial environment, the greatest concern is for vectors of human illness, such as the African yellow fever mosquito (*Aedes aegypti*) (also a vector for dengue), and invasive pests of the primary agricultural industries. The Ministry of Health is responsible for control of mosquito-carried diseases, and conducts spraying in towns and villages when risks are highest.

Numerous infectious plant diseases have passed through Belize, one of the most dramatic being Lethal Yellowing – a disease that decimated coconut trees countrywide and effectively ended the rural industry of coconut oil extraction in the 1990's.

The Citrus Research and Education Institute (CREI) of the Citrus Growers Association established a monitoring programme in 2004, to conduct pro-active bi-annual surveys for exotic diseases known to be present in the region but not yet present in Belize. The citrus greening disease was identified in Belize in 2009, and is being addressed through emergency funding from OIRSA (the International Regional Organization for Agricultural Health). Diseased trees are destroyed, and new stock is grown in screened nurseries approved by BAHA, as legislated under SI No. 122 of 2009, and operated under the BCCP (Belize Citrus Certification Programme) nursery regulations and guidelines.

The pink hibiscus mealybug (*Maconellicoccus hirsutus*), from South East Asia, can affect many important horticultural and agricultural crops, and has been an issue in Belize in the past. It was detected in 1999, and an emergency plan was implemented, bringing it under control in a few months. Continued

monitoring has been ongoing since then, and in 2003, a regional laboratory was established in Belize for production of the parasitoid *Anagyrus kamali*, for control of PHMB in the region

The Medfly Eradication Programme was initiated in Belize in 1977, and has been able to control this invasive species, preventing its establishment as a crop pest. Belize was officially recognized by the USDA as a medfly free country on August 28th, 2001.

Several invasive snail species have been found in several of Belize's water sheds, and are possibly replacing local species (Meerman / MSBC News, 2010). Similarly, invasive crab species have been reported from South Water Caye Marine Reserve – neither of these has raised flags as currently they have no economic impacts.

Three non-native herptiles are found in Belize - the Asiatic house gecko arrived overland in the late 1980's, and has replaced the smaller dwarf gecko in urban areas and rural communities, the dwarf gecko now being marginalised to more natural forested environments. Asian Tokay geckos (*Gecko gecko*), originating from South East Asia, and common in the US pet trade, were first recorded on South Water Caye in 1994. A survey of the herptile populations of the cayes in 2002 indicated that the local gecko population was declining, and it is suspected that the introduction of this species may be the cause of local extinction of tuberculate leaf-toed gecko (*Phyllodactylus tuberculatus*) on that cayes (Meerman et al., 2002). There have not been any attempts made to eradicate either of these two species. For the Asiatic house gecko, the potential for eradication is extremely low, with this species now wide spread throughout the country, and in neighbouring countries. The most recent invasive lizard in Belize is the yellow-headed gecko, (*Gonatodes albobularis*) which is reported from Belize City, but has the potential to spread further afield.

Of significant concern is the likelihood of the North American red-eared slider (*Trachemys scripta*) becoming invasive, as there is limited public awareness of the origin and risks involved with this North American species. Imported illegally from Chetumal in relatively large numbers for the pet trade, it has a very high risk of hybridizing with the closely related native *Trachemys venusta*.

Some of the cayes have been impacted by invasive rats, introduced from boats - in the absence of natural predators these can be present in enormous numbers, and affect nesting birds and turtles, lizards and plants on the islands. Invasive coastal and cayes plants include the coastal *Casuarina* pine.

For the marine and freshwater invasive species, control has not been possible, with the high connectivity of the aquatic environment. Invasive lionfish (*Pterois volitans*) have had the most impact, first being recorded in Belize in 2008, and spreading rapidly throughout Belizean waters. This species is native to the West Pacific Ocean, and is a voracious feeder, eating both juvenile fish and crustaceans - a single lionfish on a small patch reef can reduce fish recruit biomass by 80% in five weeks (Albins et al., 2008). Whilst active fishing of this species is encouraged through tournaments and prizes, and an export market has been developed for fillet, it is now acknowledged that this species is in Belize waters to stay. Fishermen are therefore encouraged to fish for this species as an alternative, diversification from the regular finfish species, and as a means to have some control over



numbers. ECOMAR assisted in the development of The Belize Lionfish Management Plan: An Overview of the Invasion, Mitigation Activities and Recommendations, and the Belize Fisheries Department and NGOs are using organised lionfish fishing tournaments to help regulate this species.

Black tiger prawns (*Penaeus monodon*) occur in Belize as a result of an accidental release from a South Carolina research facility in 1988 (TISI), and first appeared in Belize in 2013. There is the potential threat that native crustaceans – shrimp, lobster, and crabs – that may be susceptible to diseases carried by this species. Strategies for control are similar to those for lionfish...targeted fishing and market creation. One shrimp farm in Belize is investigating the potential to breed this species, which would increase the risk of additional recruitment of this invasive exotic, through escapees or deliberate releases.

Shrimp farms utilise Whiteleg, or Pacific white Shrimp (*Litopenaeus vannamei*), and successive storm events have led to this species now being common in coastal waters in southern Belize, and utilized by local communities.

In the freshwater environment, Tilapia has largely replaced the native cichlids as the dominant species in rivers and freshwater bodies. This species originated from Tilapia farms both in Belize and in neighbouring Guatemala and Mexico, with fish stocks washing into the rivers during storm events, as a result of flooding. With the high connectivity of the river systems, removal of Tilapia is not considered realistic.

Armoured catfish were first reported in the Rio Bravo in 2012, and in the Rio Hondo in 2013. This species, from the exotic aquarium trade, is of concern as it roots through the substrate and may disrupt the food sources of native fishes and hamper their reproduction by destroying their eggs. It also destabilizes river beds and banks, removing riverine vegetation and increasing sedimentation, placing further strain on freshwater fish species already impacted by Tilapia. Efforts to remove this species from the waterways have not so far been successful.

Invasive plants include the pantropical water hyacinth, which can be found in extensive rafts in northern Belize rivers – particularly the New River. It appears though that floodwaters and flow surges maintain a balance – dislodging the water hyacinths and flushing them out to sea, where they rapidly perish in saline water. The Australian *Casuarina* pine is present along much of Belize's coastline, and can be locally common on sandy savannah soils. African oil palm is gradually invading the coastline of southern Belize – presumably from seeds flushed downriver from Honduran and Guatemalan oil palm plantations. Melaleuca is another invasive tree that has spread through savannah areas in central Belize. Cogon-grass is reported to be invading the savannahs throughout Belize, as well as traditional slash and burn farms.

### ***Contribution to the Global Aichi Targets***

#### ***9.3.1 Global Biodiversity Indicator Partnership (BIP) Indicators***

- Trends in invasive alien species

#### ***9.3.2 CBD Suggested Potential Indicators***

A number of possible national indicators are suggested, including:

- Trends in invasive alien species
- Trends in number of invasive alien species
- Trends in invasive alien species pathways management
- Trends in the impact of invasive alien species on extinction risk trends
- Trends in incidence of wildlife diseases caused by invasive alien species
- Trends in the economic impacts of selected invasive alien species
- Trends in policy responses, legislation and management plans to control and prevent spread of invasive alien species

#### **9.4 Information availability**

The Environmental Research Institute (ERI) is including monitoring of fisheries resources in its operational indicators, under the National Biodiversity Monitoring Program, designed to standardise monitoring efforts across the country. These include:

- Lionfish
- Tilapia
- Armoured catfish

Belize Agricultural Health Authority (BAHA) and the citrus and banana growers associations monitor invasive plant species.

#### **9.5 Potential National Target Concepts**

Based on outputs of stakeholder consultations, a National Target(s) should include one or more of the following concepts:

- Early detection and effective management of invasive species
- Control / eradication of invasive species where possible

## 9.6 Potential Indicators

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
▪ Average lionfish density across protected areas	ECOMAR / NCRMF	Annual	Baseline from NCRMF	National Coral Reef Monitoring Network <b>Ease of Monitoring:</b> Moderate <b>NBMP:</b> LFS Protocol; Trends in number and distribution of invasive alien species
▪ Watersheds with Tilapia	Fisheries Dept.	Annual	Nile tilapia ( <i>O. niloticus</i> ) was recorded in at least 9 of 29 drainage basins in 2008 (P. Esselman, 2009)	Presence / Absence – local consultations <b>Ease of Monitoring:</b> Easy <b>NBMP:</b> Trends in number and distribution of invasive alien species
▪ Watersheds with armoured catfish	Fisheries Department	Annual	2014: 1 (Rio Hondo)	Presence / Absence – local consultations Would also require site level sampling for this species <b>Ease of Monitoring:</b> Moderate <b>NBMP:</b> Trends in number and distribution of invasive alien species
▪ Number of species listed for Belize	BERDS BAHA Dept. of Agriculture Fisheries Dept.	Annual	No baseline	Baseline exists for Alien species, but doesn't identify invasives. Accuracy depends on data being submitted <b>Ease of Monitoring:</b> Hard <b>NBMP:</b> Trends in number and distribution of invasive alien species
▪ Updated invasive species list	BERDS BAHA Dept. of Agriculture Fisheries Dept.	Annual	No baseline	Presence / Absence of new list <b>Ease of Monitoring:</b> Easy <b>NBMP:</b> Trends in number and distribution of invasive alien species
▪ Trends in distribution and population density of invasive species		Every 4 years	No baseline - except	<b>Ease of Monitoring:</b> Hard <b>NBMP:</b> Trends in number and distribution of invasive alien species



**Target 10:** By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.

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### **10.1 The Belize context**

Belize has a world-renowned barrier reef - the largest in the western hemisphere, and recognized for its global importance by the declaration of seven of Belize's protected areas as a serial World Heritage Site. Reefs in Belize have historically been perceived to be at slightly lower risk than others in the region, due in part to the small human population and relatively low levels of coastal development. In recent years, however, coral health has generally been on a par with, or slightly below, the rest of the Caribbean, with impacts from a combination of coral bleaching, disturbance events (primarily hurricanes) and chronic stressors, leading to declining coral cover and increases in macroalgae (McField, et al., 2008 (ed. Wilkinson et al., 2008)). There is an effective network of marine protected areas with zones and regulations in place. The majority of marine protected areas are managed on ecosystem-based management principles under the Belize Fisheries Department, as a fisheries management tool. Bottom trawling has been banned, as has the use of nets on the reef, and fishing of grazers critical to reef health. Managed Access is being introduced as a management tool to reduce overall fishing pressure within the marine protected areas and increase sustainability.

Belize also has a number of other vulnerable ecosystems – including Elfin forest, a quasi-cloud forest of the Maya Mountains Massif, and the almost unique sphagnum bog of Sarstoon Temash National Park – one of two known lowland peat bogs in the region.

### **10.2 Current Status**

There has been extensive loss of key reef-building species (*Acropora cervicornis*, *Agaricia tenuifolia*, *Millepora complanata*, *Diploria spp.* and *Montastrea spp.*) and shift in species composition with subsequent replacement by *Agaricia tenuifolia* (CCRE, 2002), a faster growing species, but with lower value for provision of reef structure and functionality as a structural barrier to storm surges.

This, combined with increasing effects of global warming is of particular concern (Kramer & Kramer 2001), with an ecological shift towards algal dominance at many sites across Belize, and in the Caribbean generally. Global climate change (with increasing sea temperatures and ocean acidification) has been identified as the biggest contributing factor in reef health decline (Aronson et al., 2006). This overlies and adds to other stressors, including coral diseases, overfishing of herbivorous fish, the population crash of the herbivorous long-spined sea urchin *Diadema antillarum* and other environmental stressors, including land-based sedimentation and pollution (Liddell et al, 1986; Aronson et al, 1998).

Severe wave action from increasing tropical storm events has added to the pressures faced by the reefs, and major bleaching events have been recorded with increasing frequency, thought to be accentuated by increased acidification resulting from rising CO<sub>2</sub> levels (Anthony et al., 2008). 29% of Belize's reefs are



assessed as being in Critical health, 44% as Poor, 22% as Fair, and only 5% considered in Good health (Healthy Reefs, 2012). This is, however, an improvement from the 2010 rating.

The Belize Tourism Board regulates tourism impacts through the training and licensing of guides, and regulations for guide / visitor ratios. Whilst carrying capacities haven't been established for many protected areas, visitor management is generally considered part of the surveillance and enforcement duties of rangers.

There are policies and regulations in place, but these are not always practiced, and short term financial gain often outweighs long term sustainability, leading to mangrove clearance, clearance of riverine vegetation, and an increase of agricultural and aquaculture runoff. Whilst Belize is working to reduce its pressures on the reef, it also has to be recognized that the primary pollution impacts are from neighbouring countries, with far larger agricultural and urban sectors and is therefore outside the ability of Belize to make direct interventions (WRI, 2007). Regional initiatives and agreements are focused on reducing these anthropogenic impacts where possible.

Other vulnerable ecosystems include littoral forests, mangroves and herbaceous beach communities – all under heavy pressure from development as the coastal beaches and cayes of Belize increase in their popularity as tourism, investment and retirement destination. The sandy beaches are critical for nesting sea turtles and American crocodiles, and the littoral forest for the island leaf-toed gecko, a species with extremely disjointed distributions, as well as for numerous migratory bird species.

As climate change impacts increase, these beach communities will be affected by rising sea levels and increased tropical storm impacts. Mangrove and herbaceous beach communities play critical roles in stabilizing island structure, reducing coastal erosion, beach loss and sedimentation as well as providing nursery functionality for many marine species. Mangroves are protected under legislation, but limited human resources limits monitoring of development activities unless they are within or near marine protected areas. The Mangrove Protection Legislation has been under review for more than five years, awaiting endorsement.

Elfin forest is also considered particularly vulnerable to climate change, with predictions of cloud cover rising as air temperature rises, with associated changes in the cloud forest environment that will impact the amphibian, bird and plant species that inhabit the ecosystem.

The unique sphagnum bog of Sarstoon Temash National Park has recently been severely impacted by fire as a result of activities associated with oil exploration – oil exploration and extraction, particularly in the wetland and marine environments is of concern to many Belizeans, particularly as the nation has few resources to deal with serious oil spills.

### ***10.3 Contribution to the Global Aichi Targets***

#### ***10.3.1 Global Biodiversity Indicator Partnership (BIP) Indicators***

- Cumulative human impact on marine ecosystems
- Ocean Health Index

### **10.3.2 CBD Suggested Potential Indicators**

A number of possible national indicators are suggested, including:

- Extinction risk trends of coral and reef fish
- Trends in climate change impacts on extinction risk
- Trends in climatic impacts on community composition
- Trends in climatic impacts on population trends
- Trends in coral reef condition
- Trends in extent, and rate of shifts of boundaries, of vulnerable ecosystems

### **10.4 Information availability**

Healthy Reefs Initiative: Report Card Simplified Integrated Reef Health Index indicators

- Coral Cover (%)
- Fleshy Macroalgae cover (%)
- Key herbivores (g/100m<sup>2</sup>)
- Key commercial fish species (snapper and grouper) (g/100m<sup>2</sup>)

Healthy Reefs Initiative Eco-audit

Theme 1: Marine Protected Areas

- 1a Percent of Belize's territorial sea included in gazetted MPAs
- 1b Percent of Belize's territorial sea included in fully protected zones
- 1c Percentage of mapped coral reef area included in fully protected zones
- 1d Percent of MPAs with good management
- 1e Percentage of MPAs with good enforcement

Theme 7: Global Issues

- 7a Mapping of potentially resilient reefs to warming seas and coral bleaching

### **10.5 Potential National Target Concepts**

Based on outputs of stakeholder consultations, a National Target(s) should include one or more of the following concepts:

- Reduced anthropogenic pressures on vulnerable ecosystems, particularly the reef
- Improved protection of identified resilient reefs and other vulnerable ecosystems

## 10.6 Potential Indicators

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>Percent of Belize's territorial sea included in gazetted MPAs</li> </ul>	Fisheries Department Eco-Audit NPAS	Every 2 years	Eco-Audit 2013: VERY GOOD (5/5) 19.6% of Belize's territorial sea is inside MPAs. Belize has 18,768 km <sup>2</sup> of territorial sea, and 3,670.9 km <sup>2</sup> inside MPAs Eco-Audit 2011: FAIR (3/5)	Baseline established. Still some issues with overlapping boundaries that won't be resolved until SIs are revised <b>Ease of Monitoring:</b> Easy now baseline established. <b>Eco-Audit:</b> 1a Used national data on MPAs, exclusive of cayes <b>NBMP:</b> Trends in extent of marine PA, coverage of key biodiversity areas and management effectiveness
<ul style="list-style-type: none"> <li>Percent of Belize's territorial sea included in fully protected zones</li> </ul>	Fisheries Department Eco-Audit NPAS	Every 2 years	Eco-Audit 2014: FAIR (3/5) 2.7% of Belize's territorial sea is inside fully protected zones of MPAs (BZ1a.2 & BZ1a.3). Belize has 18,768 km <sup>2</sup> of territorial sea (BZ1a.2), and 399 km <sup>2</sup> inside fully-protected (no-fishing) zones of all MPAs Eco-Audit 2011: POOR (2/5)	Baseline established. Still some issues with overlapping boundaries that won't be resolved until SIs are revised. Note Corozal Bay Wildlife Sanctuary s considered as extractive, not non-extractive. <b>Ease of Monitoring:</b> Easy now baseline established. <b>Eco-Audit:</b> 1b Percent of Belize's territorial sea included in fully protected zones <b>NBMP:</b> Trends in extent of marine PA, coverage of key biodiversity areas and management effectiveness
<ul style="list-style-type: none"> <li>Percentage of mapped coral reef area included in fully protected zones</li> </ul>	National Replenishment Zones Project	Every 2 years	Eco-Audit 2013: VERY GOOD (5/5) Belize has 649 km <sup>2</sup> of coral reefs and 80.2 km <sup>2</sup> of coral reefs inside fully protected areas or zones. Thus 12.0% of reefs are under full protection. Eco-Audit 2011: FAIR (3/5)	Baseline established. Still some issues with overlapping boundaries that won't be resolved until SIs are revised <b>Ease of Monitoring:</b> Easy now baseline established. <b>Eco-Audit:</b> 1c Percentage of mapped coral reef area included in fully protected zones <b>NBMP:</b> Trends in representative coverage of PAs and other area based approaches, including sites of particular importance for biodiversity, and of terrestrial, marine and inland water systems

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
▪ % of identified resilient reefs within Conservation or Protection zones of MPAs	National Replenishment Zones Project	Every 2 years		<b>Ease of Monitoring:</b> Easy once a baseline established. <b>NBMP:</b> Trends in extent, condition and vulnerability of ecosystems, biomes and habitats
▪ % of littoral forest cover protected within PAs	ERI / Forest Department National Replenishment Zone Project	Every 2 years	NPAPSP Rationalization Report (2013): 14.4% Littoral Forest / coastal vegetation 8.5% in MPAs (NRZP)	<b>Ease of Monitoring:</b> Easy now baseline established. <b>Eco-Audit:</b> <b>NBMP:</b> Trends in extent, condition and vulnerability of ecosystems, biomes and habitats
▪ % of coastal and caye mangrove protected within PAs	ERI / CZMAI National Replenishment Zone Project	Every 2 years	16.8% 8.5% in MPAs (NRZP)	<b>Ease of Monitoring:</b> Easy once a baseline established. <b>NBMP:</b> Trends in extent, condition and vulnerability of ecosystems, biomes and habitats
▪ Percent of MPAs with good management effectiveness	Management effectiveness of marine protected areas 2009	Every 4 years	2009 Average %: 71.5% (GOOD)	Baseline established. Marine Protected Areas were not included in the first assessment (2006). Based on National Management Effectiveness Tool (Young et al., 2005; modified 2009, Walker et al.) <b>Ease of Monitoring:</b> Moderate. Funding needed to conduct a national assessments <b>Eco-Audit:</b> 1d Percent of MPAs with good management <b>Status of Protected Areas:</b> Management effectiveness of marine protected areas 2009 (sub-report of SOPA 2010). <b>NBMP:</b> Trends in .. effectiveness of PA and other area-based approaches
▪ Percent of PAs with good management effectiveness	Status of Protected Areas report 2010	Every 4 years	SOPA 2010 Average %: 61.1% (GOOD)	<b>Ease of Monitoring:</b> <b>Status of Protected Areas:</b> Based on National Management Effectiveness Tool (Young et al., 2005; modified 2009, Walker et al.). <b>NBMP:</b> Trends .. effectiveness of PA and other area-based approaches

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>▪ National average coral reef cover (%)</li> </ul>	Healthy Reefs Initiative (HRI): Report Card	Every 2 years	HRI 2012 average: 19% HRI 2010 average: 19% HRI 2008 average: 12%	<b>Ease of Monitoring:</b> <b>HRI:</b> 2012 Based on data from 37 sites (BAS 1, BFD 12, BV 9, TIDE 7, WWF 2) <b>NBMP:</b>
<ul style="list-style-type: none"> <li>▪ National average Fleшы Macroalgae cover (%)</li> </ul>	Healthy Reefs Initiative (HRI): Report Card	Every 2 years	HRI 2012 average: 16% HRI 2010 average: 17% HRI 2008 average: 9%	<b>Ease of Monitoring:</b> <b>HRI:</b> 2012 Based on data from 37 sites (BAS 1, BFD 12, BV 9, TIDE 7, WWF 2) <b>NBMP:</b>
<ul style="list-style-type: none"> <li>▪ National average Key herbivores (g/100m2)</li> </ul>	Healthy Reefs Initiative (HRI): Report Card	Every 2 years	HRI 2012 average: 1,870 g/100m2 HRI 2010 average: 19% HRI 2008 average: 12	<b>HRI:</b> 2012 Based on data from 37 sites (BAS 1, BFD 12, BV 9, TIDE 7, WWF 2) <b>NBMP:</b>
<ul style="list-style-type: none"> <li>▪ National average Key commercial fish species (snapper and grouper) (g/100m2)</li> </ul>	Healthy Reefs Initiative (HRI): Report Card	Every 2 years	2012 average: 495 g/100m2	<b>HRI:</b> 2012 Based on data from 37 sites (BAS 1, BFD 12, BV 9, TIDE 7, WWF 2) <b>NBMP:</b>
<ul style="list-style-type: none"> <li>▪ % of sites with VERY GOOD SIRHI</li> </ul>	Healthy Reefs Initiative (HRI): Report Card	Every 2 years	HRI 2012 SIRHI average: 0% HRI 2010 SIRHI average: HRI 2008 SIRHI average:	<b>HRI:</b> 2012 Based on data from 37 sites (BAS 1, BFD 12, BV 9, TIDE 7, WWF 2) <b>NBMP:</b>
<ul style="list-style-type: none"> <li>▪ % of sites surveyed nationally with GOOD SIRHI</li> </ul>	Healthy Reefs Initiative (HRI): Report Card	Every 2 years	HRI 2012 SIRHI average: 5% HRI 2010 SIRHI average: HRI 2008 SIRHI average:	<b>HRI:</b> 2012 Based on data from 37 sites (BAS 1, BFD 12, BV 9, TIDE 7, WWF 2) <b>NBMP:</b>
<ul style="list-style-type: none"> <li>▪ (i) Prevalence of Coral Bleaching</li> <li>▪ (ii) Frequency of coral bleaching</li> </ul>	National Coral Reef Monitoring Network	Annual	Baseline data	<b>NBMP:</b> Revised Coral Bleaching Monitoring Protocol: Monthly during bleaching season at minimum during peak bleaching month and February

## **Strategic Goal C**

### ***Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity***



**Target 11:** *By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascapes.*



**Target 12:** *By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.*



**Target 13:** *By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.*



**Target 11:** *By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascapes.*

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### **11.1 The Belize context**

The National Protected Areas System fulfils a number of critical roles, such as water catchment, watershed protection and erosion prevention and other environmental services. Increasing risk of impacts from hurricanes and post-hurricane anthropogenic fire requires the retention of larger areas of coverage of greater geographical spread, with replication, necessary to fulfil minimum dynamic area and threat mitigation requirements - insurance against potentially non-reversible impacts. Belize currently has 35.8% of its terrestrial area protected (Cherrington, 2014), meeting the CBD target. The national marine target is to have 10% of all marine and coastal habitats within Belize's territorial waters as functional and legally protected, non-extractive replenishment zones. Currently, 19.8% of territorial waters are under marine protective management, but only 6.7% of this is legally established as replenishment zones (with full protection against fishing activities), and only 3.12% is considered as functional – effectively managed as replenishment zones (TNC, 2014).

The identified highest priority biodiversity areas of global concern in Belize (Global Key Biodiversity Area 1) are adequately covered by the NPAS, occurring within the protected areas of the Maya Mountains Massif. With limited financial and human resource, it is important for Belize to be able to prioritize where investments are focused within the National Protected Areas System. A prioritization exercise was therefore conducted in 2013 based on a series of critical criteria – ecosystem services, biodiversity values, socio-economic values and climate change resilience. Each protected area was assessed based on these criteria, to provide a baseline to guide the decision making and financial investment processes (Walker et al., 2013). Protected area priorities for species protection have also been identified (Walker et al., 2012)

### **11.2 Current Status**

A number of gaps have been identified in national ecosystem representation. Rivers, used to define protected area borders, are often not included within the protected areas themselves. This impacts effective protection of species such as the critically endangered Central American river turtle. Two seasonally inundated ecosystems of the coastal plain - Eleocharis marsh and Tropical evergreen seasonal broad-leaved lowland swamp forest, tall variant have less than 10% coverage. Recommendations have been made to support protected area realignments to improve coverage of under-represented ecosystems within the NPAS (Walker et al., 2012).

Mangroves are not considered to be adequately protected within the National Protected Areas System, and there is only limited enforcement of existing mangrove legislations. Mangroves have shown a 10%

loss over the last 10 years (HRI). This relatively slow rate of loss is predicted to continue and accelerate (Cherrington, 2014). This ecosystem is flagged by DoE for further assessment focus in EIA reviews. The Integrated Coastal Zone Management Plan also identifies key areas of mangroves that have high protection values and therefore in zones of low development activity.

Of the 68 natural ecosystems identified under the revised ecosystem mapping (Meerman, 2011), only 7 ecosystems do not meet the 10% target recommended as the IUCN minimum, and are therefore considered under-represented within the National Protected Areas System. When using 30% as the minimum threshold for representation (Selva Maya), a further 21 ecosystems would be considered under-represented.

The most prominent gaps are in the marine environment, under the various categories of Caribbean Open Sea. Caribbean Open Sea – Abyssal lacks any representation within the national ecosystem coverage. One other deep water ecosystem (Caribbean Open Sea – Bathyal) has very poor coverage, at 0.3% for the MPA system as a whole. This decreases to 0.2% when only including legislated Replenishment Zones (non-extractive zones).

The recent declaration of the Turneffe Atoll Marine Reserve has increased representation of the Coastal Shelf and Mesopelagic waters to over 10% within MPAs, though only 7.8% and 2.9% respectively lie within Replenishment Zones (Table 12).

Whilst not an ecosystem in their own right, seamounts such as those between Turneffe and Lighthouse Atolls are also important systems that are currently not represented within the NPAS.

Also highlighted as under-represented within the system are mangrove forests, with only 9.3% of dwarf mangrove scrub within the NPAS. Coastal forests (littoral forests) and beach vegetation (Tropical coastal vegetation on very recent sediments, moderately drained) are also considered one of the most vulnerable ecosystems, lying in areas targeted for tourism development.

Of particular concern is the viability of the key nesting bird colonies, with species such as brown pelicans, magnificent frigatebirds, great egrets, reddish egrets, white ibis, and roseate spoonbills. Seven Bird Sanctuaries were established in 1977 under the Lands Act for the protection of key bird nesting and roosting sites. However, only one of these cayes, located within South Water Caye Marine Reserve, is fully integrated into the National Protected Areas System, and few have any significant management presence.

Marine Ecosystems	% of ME in MPA	% of ME in NTZ
Caribbean Open Sea - Abyssal	0.0	-
Caribbean Open Sea - Bathyal	0.3	0.2
Caribbean Open Sea - Mesopelagic	12.8	2.9
Coastal Shelf	33.0	7.8
Coral Reef	54.3	14.3
Deep Patch Reef and Seagrass	99.9	26.4
Deep Water Mud	22.0	2.9
Littoral Forest	8.5	2.7
Mangrove	16.8	3.2
Seagrass	23.7	1.9
Sparse Algae and Sea Grass	80.5	6.6

*This estimation covers MPAs and protected areas up to 2km inland from the coast*

**ME:** Marine Ecosystem

**NTZ:** No Take Zone

**Table 12: Marine Ecosystem Representation**



Protection of these sites is doubly difficult as at times the colonies shift cays, and some key colonies, particularly for wood storks were not included within the original listing.

Belize still retains large blocks of forest, but the increasing human footprint is gradually causing fragmentation, with impacts on those species requiring large, intact forested areas. Jaguars are considered to be representative of the state of forest connectivity, with population viability being linked to the establishment of forested biological corridors. It is therefore an actively monitored target for conservation initiatives through the regional Panthera initiative.

A number of tree species and non-timber forest products are managed under the Forest Department through the Forest Act and associated policies. However, limited human and financial resources, combined with hurricane and tropical storm damage to forests, and subsequent poor enforcement of salvage logging regulations have led to over-harvesting of several species, including rosewood, cedar and mahogany, though these are unlikely to become extinct in Belize.

Belize is famous for its barrier reef, stretching parallel to the shore, with its rich marine life – corals, invertebrates and fish – bringing critical tourism dollars, and supporting an important traditional, low-technology fishing industry. It also has three offshore Atolls that benefit from having very low human impacts. The health of the reef, however, has been declining since the 1970's / 1980's, with a phase shift from greater coral to greater macroalgal cover. Species such as the structurally important elkhorn corals (*Acropora palmata*) have declined rapidly over the past thirty years

Climate predictions for Belize suggest that the prognosis for reef health is not good – it lies on the threshold of coral temperature tolerance - a 1°C sea surface temperature rise will take many of the corals out of their tolerance range. Reef health within the Mesoamerican region has been monitored by the Healthy Reefs Initiative, using a Simplified Integrated Reef Health Index (SIRHI) to compare sites across Mexico, Belize, Guatemala and Honduras, using % coral and macroalgal covers, and herbivorous and commercial fish biomass. Between 2006 and 2012, 14 sites increased and 19 decreased in health, with 6 showing no change. In general, the mean % coral cover increased from 12% in 2008 to 19% in 2012, considered Fair, though over a similar time frame, the mean % macroalgae cover also increased from 9% to 16%. Belize reef conservation strategies include the successful “Fragments of Hope” initiative - growing on of resilient coral fragments in nurseries and planting out on impacted reef areas.

### **11.3 Contribution to the Global Aichi Targets**

#### **11.3.1 Global Biodiversity Indicator Partnership (BIP) Indicators**

- Coverage of Protected Areas
- Management effectiveness of protected areas
- Protected area overlays with biodiversity

#### **11.3.2 CBD Suggested Potential Indicators**

A number of possible national indicators are suggested, including:

- Trends in extent of marine protected areas, coverage of key biodiversity areas and management effectiveness
- Trends in protected area condition and/or management effectiveness including more equitable management
- Trends in representative coverage of protected areas and other area based approaches, including sites of particular importance for biodiversity, and of terrestrial, marine and inland water systems
- Trends in the connectivity of protected and other area based approaches integrated into land and seascapes
- Trends in the delivery of ecosystem services and equitable benefits from protected areas

#### **11.4 Information availability**

Status of Protected Areas report 2010: Provides management effectiveness outputs for all protected areas within the National Protected Areas System, based on the National Management Effectiveness Tool

The NPAS Rationalization report (Walker et al., 2014) provides baseline information on ecosystem representation within the protected areas system.

The Healthy Reefs Initiative Eco-audit report (HRI, 2014)

##### Theme 1: Marine Protected Areas

- 1a Percent of Belize's territorial sea included in gazetted MPAs
- 1b Percent of Belize's territorial sea included in fully protected zones
- 1d Percent of MPAs with good management
- 1e Percentage of MPAs with good enforcement

The Environmental Research Institute (ERI) is including protected area coverage in its operational indicators, under the National Biodiversity Monitoring Program, designed to standardise monitoring efforts across the country. These include:

- Trends in coverage of PAs
- Trends in extent of marine PAs, coverage of key biodiversity areas and management effectiveness
- Trends in PA condition/management effectiveness including more equitable management
- Trends in representative coverage of PAs and other area based approaches, including sites of particular importance for biodiversity, and of terrestrial, marine and inland water systems
- Trends in connectivity of PAs and other area based approaches integrated into landscape and seascapes

#### **11.5 Potential National Target Concepts**

Based on outputs of stakeholder consultations, a National Target(s) should include one or more of the following concepts:

- Well governed, functional and effectively managed national protected areas System providing ecosystem services and biodiversity protection
- Ecosystem representation and biological connectivity
- Traditional users and communities participating in management of protected areas, and benefitting from their ecosystem services

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### 11.6 Potential Indicators

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>Extent of national territory (terrestrial) under protected area status</li> </ul>	NPAS / Forest Dept.	Every 2 years	Belize currently has 35.8% of its terrestrial area protected	<p><b>Ease of Monitoring:</b> Moderately Easy (SI's need to be revised to correct area errors)</p> <p><b>MDG 7:</b> 7.6 Proportion of terrestrial and marine areas protected</p> <p><b>NBMP:</b> Trends in extent of marine PA, coverage of key biodiversity areas and management effectiveness</p>
<ul style="list-style-type: none"> <li>Extent of national territory (marine) under protected area status</li> </ul>	National Replenishment Zones Project	Every 2 years	19.8% of territorial waters are under marine protective management	<p><b>Ease of Monitoring:</b> Moderately Easy (SI's need to be revised to correct area errors)</p> <p><b>MDG 7:</b> 7.6 Proportion of terrestrial and marine areas protected</p> <p><b>Eco-Audit:</b> 1a Percent of a country's territorial sea included in gazetted MPAs</p> <p><b>NBMP:</b> Trends in extent of marine PA, coverage of key biodiversity areas and management effectiveness</p>
<ul style="list-style-type: none"> <li>Extent of national territory (marine) under protected area status – replenishment zone (non-extractive)</li> </ul>	National Replenishment Zones Project	Every 2 years	6.7% of territorial waters are legally established replenishment zones, only 3.1% is considered as functional –managed as replenishment zone	<p><b>Ease of Monitoring:</b> Moderately Easy (SI's need to be revised to correct area errors)</p> <p><b>Eco-Audit:</b> 1b Percent of a country's territorial sea included in fully protected zones</p> <p><b>NBMP:</b> Trends in extent of marine PA, coverage of key biodiversity areas and management effectiveness</p>
<ul style="list-style-type: none"> <li>Average management effectiveness across all protected areas (%)</li> </ul>	Status of Protected Areas report 2010	Every 4 years	SOPA 2010: Average % across all protected areas: 61.1%	<p><b>Ease of Monitoring:</b> Moderate</p> <p><b>Status of Protected Areas:</b> Based on National Management Effectiveness Tool (Young et al., 2005; modified 2009, Walker et al.).</p> <p><b>NBMP:</b> Trends in extent of marine PA, coverage of key biodiversity areas and management effectiveness</p>

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>▪ % of ecosystems not meeting 10% representation criteria</li> </ul>	Rationalization report 2013	Every 4 years	10.3% of ecosystems not meeting 10% representation criteria (7 out of 68)	<p><b>Ease of Monitoring:</b> Moderate</p> <p><b>Rationalization Report 2013:</b> Based on Meerman 2011 Ecosystem mapping</p> <p><b>NBMP:</b> Trends in representative coverage of PAs and other area based approaches, including sites of particular importance for biodiversity, and of terrestrial, marine and inland water systems</p>
<ul style="list-style-type: none"> <li>▪ Number of key identified biological corridors fully established (of 3)</li> </ul>	Forest Department	Every 2 years	2014: 0 of 3. Work is ongoing on sections of all three corridors, but none has yet been fully established	<p>3 key corridors identified in NPAPSP, North East, Central and Southern. Rationalization report and Land Use Plan mapping (Meerman et al., 2011).</p> <p><b>Ease of Monitoring:</b> Easy. Would require update from lead NGO agencies. Ya'axché Conservation Trust (southern), ERI (Central), CSFI / Wildtracks /PfB (North-North east)</p> <p><b>NBMP:</b> Trends in connectivity of Pas and other area based approaches integrated into landscape and seascapes</p>
<p>Averaged score of State of Protected Areas indicators for benefit impacts:</p> <p>3.11 Extent of local economic benefits</p> <p>3.12: Sustainable use for economic benefits</p> <p>3.13 Employment in activities related to the protected area</p> <p>3.14 Local recognition of protected area benefits</p>	State of Protected Areas reports (National Management Effectiveness Assessment outputs)	Every 4/5 years	SOPA 2006: 50.1%	<p><b>Ease of Monitoring:</b> Moderate</p> <p><b>Status of Protected Areas:</b> Based on National Management Effectiveness Tool (Young et al., 2005; modified 2009, Walker et al.).</p>



**Target 12:** *By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.*

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### **12.1 The Belize context**

While the Government of Belize focuses on forest, fishery and protected areas management, Government funding for threatened species is limited, and focused primarily on maintenance of commercial fish stocks and marine turtles. Government support for the Wildlife Programme, under the Forest Department, is very limited. Species conservation efforts are therefore led primarily by the NGO community, generally with GoB support. Many of Belize's globally threatened species are being addressed through NGO / Government partnerships – including the mandating of four NGO rehabilitation facilities (for parrots, primates, manatees and crocodiles), and specific species conservation programmes in both the terrestrial and marine environments.

The global and national threatened species lists, along with availability of data from protected area managers, formed the basis for selection of seventeen species of concern indicators for the terrestrial environment in the State of Protected Areas reporting (Walker et al., 2010),

A draft list of nationally threatened species was developed as part of the National Protected Areas System Plan, but still needs validation, as part of the update to the National Biodiversity Strategy and Action Plan.

### **12.2 Current Status**

Belize has a total of 105 globally threatened species (11 critically endangered, 31 endangered and 63 Vulnerable) and a further 55 near threatened. The overall viability of species of concern in the terrestrial protected areas system of Belize is considered to rate at the lower end of GOOD, this being that “populations are reduced, but should recover with limited human intervention” (Walker et al., 2010).

Belize is considered the last remaining stronghold in the region for the Central American river turtle, the yellow-headed parrot, and the Petén sub-species of the scarlet macaw. For other species, such as the Antillean manatee, and Yucatan black howler monkey, Belize has the most viable populations in the region.

The Critically Endangered Central American river turtle (*Dermatemys mawii*), locally known as the “hicatee”, is considered nationally as one of the most critical terrestrial species, with a rapidly declining population. A nationwide survey of hicatee populations in 2010 demonstrated that *Dermatemys* is heavily depleted in most of Belize, with hunting pressure removing it from many of the watersheds. In a few remote areas, however, especially in those areas with some level of protection, healthy populations still remain (Rainwater et al., 2010). The current level of extraction is unsustainable (Rainwater et al., 2010).

It is considered a cultural delicacy, and whilst there are regulations in place for its protection, including year-round possession limits, a brief closed (non-hunting) season, and a complete prohibition on selling and purchasing *Dermatemys*, these still allow for legal hunting when in season. The Forest Department, Fisheries Department and a number of NGOs form the National Hicatee Conservation and Monitoring Network, and have conducted a national awareness programme, with increased targeted awareness and enforcement at cultural events. A number of protected area co-management NGOs are involved in the network, and incorporate monitoring into their field activities and awareness into their education and outreach programmes.

Endangered Yellow headed parrots (*Amazona oratrix ssp. belizensis*) have also been flagged as a critical species, as increasing frequency of fires, competition for fruit with citrus farmers, and poaching of nestlings for the illegal pet trade have reduced the national population significantly with estimates of fewer than 1,500 individuals remaining in the wild (BBR, 2014). Their large size and ability to learn words makes this species particularly attractive for the illegal pet trade. A significant push to enforce legislation addressing the issue of the illegal pet trade in parrots was started in 2012, and strengthened in 2014, with a permit system being introduced for birds in long term captivity, and a no tolerance stance for new birds entering the trade through poaching.

Where yellow headed parrots occur within protected areas, there are initiatives in place to increase nesting sites artificially, manage fires, and increase enforcement against poaching of the nestlings. The Belize Bird Rescue Centre, one of four Government mandated rehabilitation centres, is working with the Forest Department and TIDE to rehabilitate as many pet parrots as possible, for return to the wild at Payne's Creek National Park.

This is also true for the isolated sub-population of scarlet macaw (*Ara macao*) in Belize, estimated at fewer than 200 (FCD, 2013), this bird is highly threatened by transboundary poaching of nestlings. A team of individuals, working with the co-management agency, Friends for Conservation and Development, provide active protection of the primary macaw nesting site during the nesting season each year, and in 2014, to increase nesting success through constant presence at the nesting sites, deterring poachers.

The white lipped peccary (*Tayassu pecari*) has been flagged as in acute decline as hunting, forest fragmentation and the increasing human footprint have impacted the once large populations. Large herds of 200 or more have now declined to herds of 30 to 50. This species is almost wiped out from the large Chiquibul Forest, with a population decline of 90% or more, primarily by transboundary poaching from Guatemala, linked to the large scale transboundary incursions in the area. Similar pressures exist in the southern Maya Mountains Massif, with illegal, transboundary xateros subsisting on game meat as they harvest xaté. Whilst there are no specific monitoring plans or conservation action plans in place for peccaries, most effectively managed protected areas maintain a record of sightings and group size.

Forest fragmentation and the increasing human footprint is also a threat for other forest species – in particular, the Endangered Geoffroy's spider monkey (*Ateles geoffroyi*), with populations becoming increasingly isolated in forest pockets – the Peccary Hills, Gallon Jug and eastern portions of the Maya Mountains Massif. Populations were affected in 2011 by extensive fires in the central Belize area,

following Hurricane Richard (2010), and are currently recovering. This trend of declining distribution and abundance is predicted to increase. Belize is also the stronghold for the endangered Yucatan black howler monkey (*Alouatta pigra*), a Yucatan endemic. Both these species face similar threats from the illegal pet trade.

The Forest Department works closely with the Belize's Primate Rehabilitation Centre, which focuses on rehabilitation of these two species, and reintroduction back into the wild, where feasible. 15% of intakes are injured monkeys / displaced monkeys from the wild, 85% are ex-pets confiscated by the Forest Department in its effective implementation of its zero-tolerance campaign against the wildlife trade in Belize.

Of particular concern is the viability of the key nesting bird colonies, with species such as brown pelicans, magnificent frigatebirds, great egrets, reddish egrets, white ibis, and roseate spoonbills. Seven Bird Sanctuaries were established in 1977 under the Lands Act for the protection of key bird nesting and roosting sites. Declines are being noted, but not formally monitored, in a number of bird species – including the snail kite that has been seen to decline in abundance markedly in the last two decades.

A number of tree species and non-timber forest products are managed under the Forest Department through the Forest Act and associated policies. However, limited human and financial resources, combined with hurricane and tropical storm damage to forests, and limited enforcement of salvage logging regulations have led to over-harvesting of several species, including rosewood, cedar and mahogany, though these are unlikely to become extinct in Belize.

Belize is famous for its barrier reef, stretching parallel to the shore, with its rich marine life – corals, invertebrates and fish – bringing critical tourism dollars, and supporting an important traditional, low-technology fishing industry. The health of the reef, however, has been declining since the 1970's / 1980's, with a phase shift from greater coral to greater macroalgal cover. Species such as the structurally important and critically endangered staghorn and elkhorn corals (*Acropora cervicornis* and *A. palmata*), both important reef-building corals, have declined rapidly over the past thirty years.

Climate predictions for Belize suggest that the prognosis for reef health is not good – it lies on the threshold of coral temperature tolerance - a 1°C sea surface temperature rise will take many of the corals out of their tolerance range. Reef health within the Mesoamerican region has been monitored by the Healthy Reefs Initiative, using a Simplified Integrated Reef Health Index (SIRHI) to compare sites across Mexico, Belize, Guatemala and Honduras, using % coral and macroalgal covers, and herbivorous and commercial fish biomass. Between 2006 and 2012, 14 sites increased and 19 decreased in health, with 6 showing no change. In general, the mean % coral cover increased from 12% in 2008 to 19% in 2012, considered Fair, though over a similar time frame, the mean % macroalgae cover also increased from 9% to 16%. Belize reef conservation strategies include a ban on the fishing of key herbivore species, and the successful "Fragments of Hope" initiative - growing on of resilient coral fragments in nurseries and planting out on impacted reef areas.

Belize has already seen the local ecological extinction of two species of Critically Endangered sawfish, with no validated reports in many (>10) years. These species inhabit shallow bays, lagoons and estuaries and



were a primary target when gill nets first arrived in Belize. Populations declined rapidly, and by 1985, the last few individuals were caught. However, unverified reports from northern Belize suggest that a remnant population of smalltooth sawfish (*Pristis pectinata*) may still be present in some of the northern the coastal lagoons, though efforts to validate its persistence have been unsuccessful to date.

Commercial fish have shown an ongoing decrease in mean biomass rating as Poor, particularly when compared to the regional average. Large specimens of the Endangered hogfish, for example, one of the most prized commercial species, have almost disappeared from the reef. The larger parrotfish populations, the primary grazers on the reef, decreased from 1788 g.100m<sup>2</sup> in 2008 to 1407 g.100m<sup>2</sup> in 2010. Regulations were passed and implemented in 2009 to protect reef grazers - parrotfish and surgeon fish.

Belize is considered a stronghold for the Antillean manatee (*Trichechus manatus*), an Endangered sub-species of the Vulnerable West Indian manatee. Manatees in Belize are facing increasing threats from tourism development in the coastal area, particularly linked to cruise ship tourism. With the projected development of two cruise ship disembarkation points on near-shore cayes, these pressures are projected to increase further. A species recovery plan for manatees was written in 1998, and guided the implementation of key strategies – the formation of the Manatee Working Group and the Belize Marine Mammal Stranding Network, declaration of three protected areas in key manatee areas, and the establishment of a Manatee Rehabilitation Centre. The Manatee Programme is active in Belize, but despite increased awareness and protective measures, mortality in the last two years has increased exponentially, as boat traffic increases in key manatee areas.

Belize has four sea turtle species – the Critically Endangered hawksbill (*Eretmochelys imbricata*) and leatherback (*Dermochelys coriacea*) turtles, and Endangered green (*Chelonia mydas*) and loggerhead (*Caretta caretta*) turtles. Sea turtle populations are fully protected, but remain highly threatened by loss or degradation of nesting habitat, particularly through coastal development, and from impacts from neighbouring countries. A Turtle Monitoring Network engages both Government and Non-Government agencies in monitoring of nesting beaches and in-water population surveys, as well as citizen scientists under the ECOMAR Turtle Watch programme.

The Critically Endangered goliath grouper (*Epinephelus itajara*) has shown significant decline over the last ten years in Belize, with the average fish length at landing decreasing, and many of those fish now reaching market being below reproductive age. Unlike the Endangered Nassau grouper (*Epinephelus striatus*), the goliath grouper is not protected under the Fisheries regulations. Many groupers spawn in aggregations in specific sites along the reef, which are monitored and protected. Three sites reported over 1,000 Nassau grouper for 2012, with the highest counts being from Northeast Point, Glovers Reef Atoll, averaging 1,725 individuals (SPAG Working Group, 2013).

Shark populations in Belize are considered overexploited and undermanaged for some species, with only the whale shark (*Rhincodon typus*) and nurse shark (*Ginglymostoma cirratum*) under any form of legal protection. The Endangered scalloped and great hammerheads (*Sphyna lewini* and *S. mokarran*), and Vulnerable oceanic whitetip and dusky sharks (*Charcharinus longimanus* and *C. obscurus*) are among

those species targeted by shark fishermen, primarily as transboundary incursions to provide fins for the shark fin trade. At one point, over 2,000lbs of shark meat was being exported illegally to Guatemala per week (R. Graham, pers. com.), a level that is in no way sustainable. The Fisheries Department is identifying strategies for better management of the shark populations in Belize, through the Shark Working Group.

American crocodile (*Crocodylus acutus*) populations are declining, with impacts on their nesting beaches from coastal development and increasing human conflicts on the cayes. This is being partially addressed by the Forest Department and the American Crocodile Education Sanctuary (ACES).

A total of two critically endangered amphibians (*Agalychnis moreletii* and *Craugastor coffeus*), four endangered (*Craugastor sabrinus*, *Craugastor sandersoni*, *Ecnomiohyla minera* and *Bromeliohyla bromeliacia*), and three vulnerable (*Craugastor psephosypharus*, *Craugastor alfredi* and *Eleutherodactylus leprus*) are known to occur in Belize. All but *E. minera* and *B. bromeliacia* have been shown to be persisting in Belize, despite the widespread occurrence of chytrid fungus. It is likely that the other two species, not observed since the 1990's also remain in viable populations. The physical habitat of all these species is protected by the 14 protected areas of the Maya Mountains Massif, though disturbingly, preliminary tests indicate high levels of agro-chemical pollution across the landscape – lifted from the coastal plain agriculture and deposited in orographic rainfall (Walker, pers. com.).

### **12.3 Contribution to the Global Aichi Targets**

#### **12.3.1 Global Biodiversity Indicator Partnership (BIP) Indicators**

- Living Planet Index
- Red List Index
- Wildlife Picture Index

#### **12.3.2 CBD Suggested Potential Indicators**

A number of possible national indicators are suggested, including:

- Trends in abundance of selected species
- Trends in extinction risk of species
- Trends in distribution of selected species

### **12.4 Information availability**

The **Status of Protected Areas 2010** report (Walker et al., 2010) provides a baseline for a number of indicator species within the National Protected Areas System, to assist in following trends at a national level:

- Yellow headed parrots
- White lipped peccary
- West Indian manatees

- Central American river turtle (hicatee)
- Great Curassow
- Scarlet Macaw
- Species of International Concern – viability score
- Average risk level for Species of International Concern

The **National Biodiversity Monitoring Program**, once implemented, will provide information on the following indicators

- Jaguar Abundance Index
- Sharks and rays
- Sea turtles
- *Acropora*
- Central American river turtle (hicatee)

The Environmental Research Institute (ERI) is including threatened species in its operational indicators, under the National Biodiversity Monitoring Program, designed to standardise monitoring efforts across the country. These include:

- Puma
- Freshwater fish (Tilapia, Armoured catfish)
- Sport fishing species (bonefish, permit, tarpon, snook)

### **12.5 Potential National Target Concepts**

Based on outputs of stakeholder consultations, a National Target(s) should include one or more of the following concepts:

- No further national species extinctions
- Increased viability of threatened species
- Improved knowledge of conservation status and requirements, management and monitoring of threatened species

## 12.6 Potential Indicators

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>Proportion of species threatened with extinction</li> </ul>	IUCN RedList	Annual	Belize has a total of 105 globally threatened species 11 critically endangered, 31 endangered and 63 Vulnerable. A further 55 are near threatened.	Based on globally threatened species (IUCN RedList). Includes 1 addition to the national list ( <i>Craugastor coffeus</i> ) based on range extensions not yet included in RedList for Belize. <b>Ease of Monitoring:</b> Easy <b>MDG 7:</b> 7.7 Proportion of species threatened with extinction <b>NBMP:</b> Trends in abundance, distribution and extinction risk of selected species
<ul style="list-style-type: none"> <li>Jaguar Abundance Index</li> </ul>	National Biodiversity Monitoring Program	Annual		<b>Ease of Monitoring:</b> <b>NBMP:</b> Trends in abundance, distribution and extinction risk of selected species
<ul style="list-style-type: none"> <li>Sharks and rays</li> </ul>	MAR Alliance	Annual		<b>Ease of Monitoring:</b> <b>NBMP:</b> Through MAR Alliance
<ul style="list-style-type: none"> <li>Sea turtles</li> </ul>	ECOMAR	Annual		<b>Ease of Monitoring:</b> <b>NBMP:</b> Through ECOMAR
<ul style="list-style-type: none"> <li><i>Acropora</i></li> </ul>	National Coral Reef Monitoring Program	Annual		<b>Ease of Monitoring:</b> <b>NBMP:</b> Through National Coral Reef Monitoring Program
<ul style="list-style-type: none"> <li>Central American river turtle (hicatee)</li> </ul>	State of Protected Areas 2010 National Biodiversity Monitoring Program	Every 4 years	SOPA 2010: FAIR	Included as an indicator in the revised National Management Effectiveness Tool (Young et al., 2005; Walker et al., 2010) <b>Ease of Monitoring:</b> Easy, if national assessment continues to be done every 4 years, otherwise moderate <b>SOPA:</b> Based on data from 29 protected areas considered to have sufficient, valid data on biodiversity, 2010 <b>NBMP:</b> Trends in abundance, distribution and extinction risk of selected species
<ul style="list-style-type: none"> <li>West Indian manatees</li> </ul>	National Biodiversity Monitoring Program	Every 4 years	Lighthawk 2014 survey: National baseline to be released	Regional Lighthawk survey conducted in 2014, including Belize. Water conditions in northern Belize very turbid <b>Ease of Monitoring:</b> Easy, if national assessment is done every 4 years, otherwise moderate

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>▪ Yellow headed parrots</li> </ul>	State of Protected Areas 2010	Every 4 years	SOPA 2010: FAIR	<p>Included as an indicator in the revised National Management Effectiveness Tool (Young et al., 2005; Walker et al., 2010)</p> <p><b>Ease of Monitoring:</b> Easy, if national assessment continues to be done every 4 years, otherwise moderate</p> <p><b>SOPA:</b> Based on data from 29 protected areas considered to have sufficient, valid data on biodiversity, 2010</p> <p><b>NBMP:</b> Trends in abundance, distribution and extinction risk of selected species</p>
<ul style="list-style-type: none"> <li>▪ White lipped peccary</li> </ul>	State of Protected Areas 2010	Every 4 years	SOPA 2010: FAIR	<p>Included as an indicator in the revised National Management Effectiveness Tool (Young et al., 2005; Walker et al., 2010)</p> <p><b>Ease of Monitoring:</b> Easy, if national assessment continues to be done every 4 years, otherwise moderate</p> <p><b>SOPA:</b> Based on data from 29 protected areas considered to have sufficient, valid data on biodiversity, 2010</p> <p><b>NBMP:</b> Trends in abundance, distribution and extinction risk of selected species</p>
<ul style="list-style-type: none"> <li>▪ Great Curassow</li> </ul>	State of Protected Areas 2010	Every 4 years	SOPA 2010: FAIR	<p>Included as an indicator in the revised National Management Effectiveness Tool (Young et al., 2005; Walker et al., 2010)</p> <p><b>Ease of Monitoring:</b> Easy, if national assessment continues to be done every 4 years, otherwise moderate</p> <p><b>SOPA:</b> Based on data from 29 protected areas considered to have sufficient, valid data on biodiversity, 2010</p>

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>Scarlet Macaw</li> </ul>	State of Protected Areas 2010	Every 4 years	SOPA 2010: FAIR	<p>Included as an indicator in the revised National Management Effectiveness Tool (Young et al., 2005; Walker et al., 2010)</p> <p><b>Ease of Monitoring:</b> Easy, if national assessment continues to be done every 4 years, otherwise moderate</p> <p><b>SOPA:</b> Based on data from 29 protected areas considered to have sufficient, valid data on biodiversity, 2010 <b>NBMP:</b> Trends in abundance, distribution and extinction risk of selected species</p>
<ul style="list-style-type: none"> <li>Terrestrial species of International Concern – viability score</li> </ul>	State of Protected Areas 2010	Every 4 years	SOPA 2010: Viability rating of 58.3% (at the lower end of GOOD)	<p>Included as an indicator in the revised National Management Effectiveness Tool (Young et al., 2005; Walker et al., 2010)</p> <p><b>Ease of Monitoring:</b> Easy, if national assessment continues to be done every 4 years, otherwise moderate</p> <p><b>SOPA:</b> Based on data from 29 protected areas considered to have sufficient, valid data on biodiversity, 2010</p>
<ul style="list-style-type: none"> <li>Average risk level for Terrestrial species of International Concern</li> </ul>	State of Protected Areas 2010	Every 4 years	SOPA 2010: Average is HIGH, with two species, the hicatee and the yellow-headed parrot, assessed as Very High.	<p><b>Ease of Monitoring:</b> Easy, if national assessment continues to be done every 4 years, otherwise moderate</p> <p><b>SOPA:</b> Based on data from 29 protected areas considered to have sufficient, valid data on biodiversity, 2010</p>
<ul style="list-style-type: none"> <li>Terrestrial species of National Concern – viability score</li> </ul>	State of Protected Areas 2010	Every 4 years	SOPA 2010: Average of GOOD (55.8%)	<p><b>Ease of Monitoring:</b> Easy, if national assessment continues to be done every 4 years, otherwise moderate. Relies on accurate feedback from protected area staff</p> <p><b>SOPA:</b> Based on data from 29 protected areas considered to have sufficient, valid data on biodiversity, 2010</p>

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
▪ Goliath grouper	State of Protected Areas 2010	Every 4 years	SOPA 2010: FAIR (37.5%)	<b>Ease of Monitoring:</b> Easy, if national assessment continues to be done every 4 years, otherwise moderate. Relies on accurate feedback from protected area staff <b>SOPA:</b> Based on data from 10 marine protected areas considered to have sufficient, valid data on biodiversity, 2010
▪ Hawksbill turtle	State of Protected Areas 2010	Every 4 years	SOPA 2010: FAIR (37.5%)	<b>Ease of Monitoring:</b> Easy, if national assessment continues to be done every 4 years, otherwise moderate. Relies on accurate feedback from protected area staff <b>SOPA:</b> Based on data from 10 marine protected areas considered to have sufficient, valid data on biodiversity, 2010
▪ Hogfish	State of Protected Areas 2010	Every 4 years	SOPA 2010: GOOD (55.5%)	<b>Ease of Monitoring:</b> Easy, if national assessment continues to be done every 4 years, otherwise moderate. Relies on accurate feedback from protected area staff <b>SOPA:</b> Based on data from 10 marine protected areas considered to have sufficient, valid data on biodiversity, 2010
▪ Marine Species of International Concern – viability score	State of Protected Areas 2010	Every 4 years	SOPA 2010: Average GOOD (55.5%)	<b>Ease of Monitoring:</b> Easy, if national assessment continues to be done every 4 years, otherwise moderate. Relies on accurate feedback from protected area staff <b>SOPA:</b> Based on data from 10 marine protected areas considered to have sufficient, valid data on biodiversity, 2010
▪ Average risk level for Marine species of International Concern	State of Protected Areas 2010	Every 4 years	SOPA 2010: HIGH (45.8%)	<b>Ease of Monitoring:</b> Easy, if national assessment continues to be done every 4 years, otherwise moderate. Relies on accurate feedback from protected area staff <b>SOPA:</b> Based on data from 10 marine protected areas considered to have sufficient, valid data on biodiversity, 2010

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>Marine species of National Concern – viability score</li> </ul>	State of Protected Areas 2010	Every 4 years	SOPA 2010: Viability rating of GOOD (64.2% - at the lower end of GOOD)	<p><b>Ease of Monitoring:</b> Easy, if national assessment continues to be done every 4 years, otherwise moderate. Relies on accurate feedback from protected area staff</p> <p><b>SOPA:</b> Based on data from 10 marine protected areas considered to have sufficient, valid data on biodiversity, 2010</p>

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**Target 13:** *By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.*

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### **13.1 The Belize context**

Belize has not identified its indigenous seed stock at national level, nor have policies and laws been put in place that protect these stocks - this is not considered a high priority target by the Agriculture Department in Belize.

### **13.2 Current Status**

There are international initiatives focused on maintaining genetic stock of wild cacao, and the Toledo Cacao Growers Association are working on identifying and maintaining local varieties of cacao that are tolerant to pests and diseases, for use in rehabilitation of old fields through grafting of high quality plants. Budwood from these and imported clonal stock are maintained in TCGA's clonal gardens.

Whilst some culturally important varieties of corn and beans exist, there is limited focus on local varieties of cultivated plants at the national level. In local indigenous communities there are attempts to maintain local varieties using collections / storage of seed stock and forested buffer zones, but there is no scientific backing for these efforts, and they are not coordinated.

### **13.3 Contribution to the Global Aichi Targets**

#### **13.3.1 Global Biodiversity Indicator Partnership (BIP) Indicators**

- Genetic diversity of terrestrial domesticated animals

#### **13.3.2 CBD Suggested Potential Indicators**

A number of possible national indicators are suggested, including:

- Trends in genetic diversity of cultivated plants, and farmed and domesticated animals and their wild relatives
- Trends in genetic diversity of selected species
- Trends in number of effective policy mechanisms implemented to reduce genetic erosion and safeguard genetic diversity related to plant and animal genetic resources

### **13.4 Information availability**

- Little information available – priority has been for maintenance and improvement of cacao stocks through use of wild stocks

### ***13.5 Potential National Target Concepts***

Whilst this is not seen as a national priority, based on outputs of stakeholder consultations, it is suggested that a National Target(s) should include one or more of the following concepts:

- Improved identification and protection of priority wild genetic stock
- Recognition of and support for maintenance of pure indigenous seed stock

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### 13.6 Potential Indicators

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>Recognition of and support for maintenance of pure indigenous seed stock by Department of Agriculture</li> </ul>	Dept. of Agriculture	Annual	No initiative targeting indigenous seed stock	Presence / absence of activities <b>Ease of Monitoring:</b> Easy <b>Eco-Audit:</b> <b>NBMP Link(s):</b>
<ul style="list-style-type: none"> <li>Number of communities maintaining local maize varieties</li> </ul>	Dept. of Agriculture	Every 2 years	No baseline	<b>Ease of Monitoring:</b> Hard...would need identification of farmers maintaining local varieties <b>Eco-Audit:</b> <b>NBMP Link(s):</b>
<ul style="list-style-type: none"> <li>Policy decision on GMO</li> </ul>	Dept. of Agriculture	Annual	No policy	Presence / absence <b>Ease of Monitoring:</b> <b>Eco-Audit:</b> <b>NBMP Link(s):</b>

## *Strategic Goal D*

### *Enhance the benefits to all from biodiversity and ecosystem services.*



**Target 14:** *By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.*



**Target 15:** *By 2020 ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.*



**Target 16:** *By 2020, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.*



**Target 14:** By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.

### 14.1 The Belize context

Belize is very dependent on the ecosystems services provided by its natural resources - essential for the health and well-being of its people. The current National Protected Areas System effectively protects the majority of the upper watersheds in Belize, safeguarding the water supplies to much of the country. The catchment functions of the intact forest canopy of protected areas of the Maya Mountains Massif and the private lands of the northern foothills are important in the role of watershed protection and water security for much of Belize, as well as a significant portion of the Petén, in Guatemala. Recent legislation – the Integrated Water Resources Act – provides additional mechanisms for safeguarding water catchment areas.

Environmental policies provide some protection for the 66' riparian and coastal vegetation, to address the issues of erosion and protection from storm events and filtration of agrochemicals from adjacent agricultural areas.

The lagoons of the flat northern and coastal plains provide important flood control functions, acting as sinks for excess water during storm events.

The extensive, intact forest canopy contributes towards global climate control, through carbon sequestration, assisting in the reduction of greenhouse gas emissions.

Many communities situated adjacent to protected areas (particularly in southern Belize) rely on natural resources for house construction materials, medicinal plants, craft materials and other activities. Pacaya and cabbage palm are harvested for food, whilst game species such as great curassow and paca are important in supplementing the basic diet in these rural communities.

#### Critical Ecosystem Functions of the Forests, Savannas and Wetlands of Belize

##### Ecosystem Services

- Air and water purification
- Climate maintenance
- Water security - drought and flood control
- Nutrient cycling
- Economic value – tourism
- Hydro-power generation
- Pollination
- Natural disaster mitigation

##### Direct Products

- Timber
- Food (Game species, fish)
- Medicines
- Traditional building materials
- Craft materials
- Xate

##### Inspirational and Cultural Attributes

- Cultural products (e.g. copal)
- Aesthetic landscapes
- Spiritually significant caves
- Relaxation
- Traditional folklore

The aesthetic landscapes of the national parks of Belize are an

### **Critical Ecosystem Functions of the Marine ecosystems and Resources of Belize**

#### **Ecosystem Services**

##### **Mangroves**

- *Nutrient cycling*
- *Protection of shorelines from storm surges*
- *Filtering of runoff for reduced sedimentation and water pollution*
- *Roots provide important nursery areas for commercial and non-commercial species Provide nesting structures for important bird colonies*

##### **Coral Reef**

- *Barrier reef protects coastline from storm surges*
- *Provides coral, a major component of beaches and cayes*
- *Source of spawn recruitment for much of the Caribbean*
- *Value as a tourism resource*

##### **Seagrass**

- *Nutrient cycling*
- *Stabilizing substrates and settling water turbidity*

##### **Direct Products**

##### **Lobster, conch and shrimp**

- *Fin fish*
- *Seaweed*
- *Sand*

##### **Inspirational and Cultural Attributes**

- *Aesthetic land/seascapes*
- *Relaxation*
- *Traditional vacation location*

tourism destination and as part of Belize's natural and national heritage. Scenic vistas, waterfalls and caves all provide inspiration and educational opportunities to both Belizean and international visitors.

The ecosystem services provided by the coral reefs and mangroves, too, cannot be over-stated. The reef is of economic importance to Belize, supporting the traditional lobster, conch and finfish fisheries and providing incomes for fishermen from coastal communities. The no-take zones within the marine protected areas ensure that there are viable populations of commercial species for subsistence and commercial fishing. The spawning aggregation sites, mangroves, seagrass and coastal lagoons provide critical habitats as spawning and nursery areas, and are vital in the maintenance of commercial species.

The barrier reef and coastal mangroves provide significant protection against the impacts of tropical storms and hurricanes, protecting property and infrastructure, as well as lives. Mangrove roots protect shorelines and cayes from erosion during storm event. The protection coastal mangroves provide to coastal communities throughout Belize from tropical storms and their support of the traditional fishing industries have been important in the development of Belize.

The dazzling arrays of coral and fish are of high touristic value, attracting snorkelers and divers from all over the world, benefitting Belize's growing number of tourism operations, based from both the cayes and the mainland. Access to pristine marine areas and marine life for educational activities builds awareness of Belize's natural resources, encouraging future good stewardship.

Climate change places these ecosystem services at risk.

#### **14.2 Current Status**

Protected areas across Belize were assessed under the NPAS Rationalization process for their importance in contributing towards ecosystem services, including:

- water catchment,
- wetland / flood sink function
- river bank / coastal protection
- steep slope protection
- marine replenishment areas
- filtration by mangrove and seagrass

Protected area realignments were recommended where these would improve priority ecosystem coverage (Walker et al., 2012)

The primary concern for water security is the loss of catchment functionality in the northern lowlands particularly with the increasing rate of clearance of some of the remaining large tracts of forest for agriculture in the Balam Jungle and Yalbac / Gallon Jug areas. With the large scale loss of forest cover in

these areas, the limestone bedrock and shallow aquifer may not be sufficiently protected to prevent desiccation and water shortages.

The increase in unseasonal, excessive rainfall is over-stretching the wetland flood-sink functions, with increased flooding events, despite the protection of ecosystem functionality in these areas. This is exacerbated by poorly planned causeway construction, restricting water flow.

Belize has extensive areas of degraded soils, damaged by unsustainable agricultural practices – though these have not yet been fully mapped. There are areas of degraded lands throughout Belize. In southern and north western Belize these are often characterized by the predominance of *Heliconia* species and invasive grasses and vines. In western Orange Walk and Corozal Districts, thorny scrub tends to predominate. These lands have significantly reduced value either to biodiversity or local communities and would benefit from restoration – either for more sustainable agriculture or to semi-natural ecosystems that would once again provide valuable ecosystem services to Belize.

Contrary to national policies, many areas of riparian vegetation, and forests on steep slopes, have been cleared for agricultural purposes. The impacts of such inappropriate development are starting to be understood – with the fatal and costly impacts of flooding during Tropical Storm Arthur in 2008 being directly attributable to such activities. There is need, scope and financial justification to restore natural vegetation in such areas.

In the north, the degradation of the large transboundary estuarine system of Corozal Bay by land-based sources of contamination (agricultural, industrial and urban) are reducing ecosystem viability in the area, impacting biodiversity (including the critically endangered goliath grouper and vulnerable West Indian manatee) and the livelihoods of traditional fishers.

In the marine environment, expansion of marine replenishment zones (non-extractive) is recognised as essential for ensuring Belize's marine protected areas system is effective in supporting a sustainable fishery – this is being addressed by the Belize National Replenishment Zones Project, through a Government/ NGO steering committee.

### ***14.3 Contribution to the Global Aichi Targets***

#### ***14.3.1 Global Biodiversity Indicator Partnership (BIP) Indicators***

- Biodiversity for food and medicine

#### ***14.3.2 CBD Suggested Potential Indicators***

A series of indicators are also suggested by the CBD for potential use at national level:

- Population trends and extinction risk trends of species that provide ecosystem services
- Trends in benefits that humans derive from selected ecosystem services



- Trends in proportion of the population using improved water services
- Trends in proportion of total freshwater resources used

#### **14.4 Information availability**

The Environmental Research Institute (ERI) is including ecosystem services in its operational indicators, under the Natural Resource Monitoring Program, with indicators being designed to standardise monitoring efforts across the country. These include:

- Trends in proportion of the population using improved water services
- Trends in benefits that humans derive from selected ecosystem services
- Trends in delivery of multiple ecosystem services
- Trends in economic and non-economic values of selected ecosystem services
- Trends in well-being of communities who depend directly on local ecosystems goods and services
- Trends in human and economic losses due to water or natural resources related disasters
- Bees

#### **14.5 Potential National Target Concepts**

Based on outputs of stakeholder consultations, a National Target(s) should include one or more of the following concepts:

- Recognition at all levels of society of the value of water and other ecosystem goods and services
- Improved incorporation of ecosystem service protection into decision making
- Restoration of key degraded ecosystems to improve ecosystem services

## 14.6 Potential Indicators

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>Proportion of total actual renewable freshwater resources used</li> </ul>	BSWaMA	Every 5 years	<p>FAO/AQUASTAT, 2014: 0.46% of total actual renewable freshwater resources withdrawn annually (2000 estimate). Estimate of internal renewable surface water resources at 15,258 million m<sup>3</sup> per annum, and internal renewable groundwater resources at 7,510 million m<sup>3</sup> per annum (IGRAC, 2012). In 2000, total water withdrawal was estimated at 101.0 million m<sup>3</sup>, of which 68.4 million m<sup>3</sup> (68%) for agricultural purposes, 21.2 million m<sup>3</sup> (21%) for industrial purposes and 11.4 million m<sup>3</sup> (11%) for municipal purposes</p>	<p>Belize has the highest volume of freshwater availability per capita for Latin America...however availability of water is considered to be decreasing based on a comparison of 1987 and 2009 figures. Needs updating</p> <p><b>Ease of Monitoring:</b> Moderately Difficult</p> <p><b>MDG 7:</b> 7.5 Proportion of total water resources used</p> <p><b>NBMP:</b> Trends in distribution, condition and sustainability of ecosystem services for equitable human well-being.</p>
<ul style="list-style-type: none"> <li>Extent of riparian vegetation restored for ecosystem services</li> </ul>		Every 4 years	No baseline	<p>Belize Ecosystem Map. However, riparian vegetation is hard to map.</p> <p><b>Ease of Monitoring:</b> Moderate / Hard</p> <p><b>NBMP:</b> Trends in distribution, condition and sustainability of ecosystem services for equitable human well-being.</p>
<ul style="list-style-type: none"> <li>Extent of forest cover on steep slopes restored for ecosystem services</li> </ul>		Every 4 years	No baseline	<p>Belize Ecosystem Map.</p> <p><b>Ease of Monitoring:</b> Moderate</p> <p><b>NBMP:</b> Trends in distribution, condition and sustainability of ecosystem services for equitable human well-being.</p>
<ul style="list-style-type: none"> <li>Extent of degraded farmlands rehabilitated for sustainable agriculture or as semi-natural vegetation for ecosystem services</li> </ul>	Department of Agriculture	Every 4 years	Baseline	<p><b>Ease of Monitoring:</b> Moderate</p> <p><b>NBMP:</b> Status and trends in extent and condition of habitats that provide carbon storage</p> <p>Trends in proportion of degraded/threatened habitats</p>

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>Value of damages following natural disasters, directly attributable to loss of natural vegetation</li> </ul>	Ministry of Finance	Annual	No baseline	<p>Value of damages after natural disasters are calculated at a national level</p> <p><b>Ease of Monitoring:</b> Easy</p> <p><b>NBMP:</b> Trends in human and economic losses due to water or natural resources related disasters</p>
<ul style="list-style-type: none"> <li>Bats – diversity and population</li> </ul>	ERI	Annual	Baseline may be available (Miller)	<p>This is an indicator under the NBMP framework, but is currently occurring in the south (TIDE, Ya'axché), but not of national focus</p> <p><b>Ease of Monitoring:</b> Moderate...would need to engage partners across Belize, with extensive training and equipment</p> <p><b>NBMP:</b> Population trends and extinction risk trends of species that provide ecosystem services. Acoustic reading stations, mist nets, harp traps</p>
<ul style="list-style-type: none"> <li>Bee population health</li> </ul>	ERI, Department of Agriculture Bee Keepers	Every 2 years	No baseline	<p>Being tracked by the Belize Honey Producers. Needs defined indicator</p> <p><b>Ease of Monitoring:</b> Moderate</p> <p><b>NBMP:</b> Population trends and extinction risk trends of species that provide ecosystem services.</p>



**Target 15:** *By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.*

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### **15.1 Belize Context**

The short-term impacts of natural disasters and the long-term effects of climate change are expected to undermine the resilience of the natural ecosystems and increase human vulnerability, increasing the urgency of tackling the challenge of ensuring Belize has adaptation strategies in place. Global modelling has predicted that Belize will be one of the country's most at risk from the adverse impacts of climate change (UNFCCC). It is expected to face more frequent heat waves and droughts, rainfalls with increased intensity, and rising sea levels. These impacts will be at their greatest in the north of Belize where annual rainfall has already decreased significantly over the last 30 years (local consultations), and is predicted to continue decreasing, with lengthened dry seasons and reduced predictability of rainfall. Average accumulated precipitation during July, August and September is predicted to drop from 180mm (the 2008 baseline) to 120mm in 2020 – a reduction of 60mm - over 33% (Anderson et al., 2008). The average July temperature is predicted to rise from 28°C in 2008 to 29°C in 2020...to 33°C in 2080 (Anderson et al., 2008), with associated risks to health, agriculture and fish stocks.

Over the last fifteen years, there has been an increasing frequency of tropical storms - Hurricane Mitch (1998), Hurricane Keith (2000), Tropical Storm Chantal (2001), Hurricane Iris (Category 5, 2001), Hurricane Dean (Category 5, 2007), Tropical Storm Arthur (2008), and Hurricane Richard (Category 1, 2010), as well as smaller tropical cyclones. These cause significant damage to forests, as well as to the banana, sugarcane, papaya, rice, corn and vegetable industries across the country, impacting both local and national economies. These tropical storm events have huge impacts on the rural infrastructure, with roads being destroyed and communities cut off by flood waters for weeks at a time, impacting and isolating communities and reducing access to fresh water, health care and schooling (Community consultations, 2014). They have also contributed towards the nation's large fiscal debt, reducing funding availability for investment in areas such as natural resource management.

Increasing sea level (a potential rise of 0.18 to 0.56 meters by 2090), and the generally low elevation of the coastal zone (less than 2m above sea level), is predicted to result in a drop in the availability of fresh water for household use and irrigation, with increased saltwater inundation, and eventual salination of the shallow aquifer, throughout the coastal zone.

In the terrestrial environment, the changing temperature and rainfall regimes anticipated lead to predictions of drier forests – of a shift from “tropical wet” to “tropical moist”, and “tropical moist” to “tropical dry.” These broad changes across the terrestrial landscape will be further shaped by the increased intensity of storms, and the associated storm impacts, and by the rising sea level.

In the coastal zone, the increased sea level (a potential rise of 0.18 to 0.56 meters by 2090) and the generally low elevation of the coastal zone (less than 2m above sea level), will result in huge ecosystem shifts, particularly with the salination of low lying aquifers of the coastal zone, with associated shifts to more salt-tolerant species. This is predicted to result in a drop in the availability of fresh water for household use and irrigation, with increased saltwater inundation, and eventual salination of the shallow aquifer, throughout the coastal zone.

The condition of the coral reef, the ecosystem on which much of Belize's marine resource utilization (both fishing and tourism) is based, has been declining at an alarming rate and corals are already at the upper limit of their temperature tolerance. Should the structural coral of the barrier reef and atolls not be able to maintain growth rates equal to sea level rise, there will be the increased risk to coastline and caye infrastructure, with increased mechanical damage to the barrier reef, reducing its ability to act as a protective barrier to the mainland during storm events. If and when Belize loses this protection against the force of the open sea waves, there will be greatly increased coastal erosion, with the loss of both minor and major cayes, and several of the coastal lagoons merging with the sea. This will also have huge impacts on coastal communities.

The medium and long term implications of climate change may well include the loss of tourism revenues (diving and snorkelling) as a result of the reduced aesthetic appeal of the reef and the loss of charismatic reef species (e.g. parrotfish, corals, colourful fish and sharks), through degradation of marine ecosystems, as well as the potential collapse of the fishing industry that currently supports 2,750 fishers and their families.

### **15.2 Current Status**

Belize is very aware of the urgency of ensuring is putting mechanisms into place to increase its resilience to climate change, with mainstreaming of climate change across all Ministries. As part of this, the NPAS Rationalization process assessed protected areas for their contribution towards Belize's climate change resilience Walker et al., 2013).

A number of broad adaptation measures have been identified to help increase ecosystem resilience and maintain species diversity:

- Maintaining large blocks of forest cover, with priority given to the primary forest nodes, to buffer against climate change impacts and continue providing water security
- Maintaining lateral connectivity to facilitate ecosystem migration southwards, with priority given to the three primary corridors
- Maintaining altitudinal connectivity to facilitate ecosystem migration up altitudinal gradients
- Maintaining forest cover where feasible in the lowlands of the southern coastal plain to provide conditions conducive for orographic rainfall
- Managing post-hurricane fire risk with effective planning and fire management
- Maintaining the integrity of coastal mangrove systems, to protect coastlines from erosion
- Reducing human impacts on the marine ecosystems

Climate change impacts are particularly hard in the shallow, coastal environment. The health of the marine environment is critical to the social and economic health of Belize – however the state of the reef has declined significantly over the last twenty years. Local threats to the marine environment are overshadowed by the impacts of climate change, already affecting the marine ecosystems of Belize.

Belize, with its limited emissions, is better situated to invest in conserving its carbon stocks, as opposed to restoration. The development and acceptance of Belize's REDD+ strategy supports the global REDD initiative, and provides a vehicle for reducing emissions from deforestation and forest degradation through achieving sustainable land use and improved forest management, towards Belize's sustainable development agenda - Horizon 2030. Acceptance of the REDD+ Readiness Preparation Proposal resulted in Belize entering the Forest Carbon Partnership Facility (FCPF), with allocation of funding to support Belize's proposal, subject to signing of the REDD Country Participation Agreement between Belize and the Trustee of the Readiness Fund

Under the Convention on Climate Change and Desertification (UNCCD), Belize is developing its National Action Plan, in collaboration with the Partnership initiative for Sustainable Land Management. There is currently only limited implementation under the commitments to UNCCD, with a need for capacity building, for development of targets, and for a monitoring system for desertification, land degradation and drought. The National Action Plan, once completed, will require further, significant international investment for effective implementation (Belize report to UNCCD, draft, 2014).

### ***15.3 Contribution to the Global Aichi Targets***

#### ***15.3.1 Global Biodiversity Indicator Partnership (BIP) Indicators***

There are currently no global indicators for this target.

#### ***15.3.2 CBD Suggested Potential Indicators***

A number of possible national indicators are suggested, including:

- Status and trends in extent and condition of habitats that provide carbon storage
- Population trends of forest-dependent species in forests under restoration
- Trends in area of degraded ecosystems restored or being restored
- Trends in proportion of degraded/threatened habitats
- Trends in primary productivity
- Trends in proportion of land affected by desertification

### ***15.4 Information availability***

Belize hosts the Caribbean Climate Change and has an active Climate Change Office that has the capacity to monitor climate change.

The Forest Department is establishing a REDD+ programme with in-built monitoring of forest / land cover, carbon stock assessments, and data from the National Forest Inventory and permanent sample plots.

### ***15.5 Potential National Target Concepts***

Based on outputs of stakeholder consultations, a National Target(s) should include one or more of the following concepts:

- Improved ecosystem resilience, through:
  - continued maintenance of the national protected areas system,
  - creation of biological corridors,
  - reduced anthropogenic pressures,
  - protection of resilient reefs
  - and other strategies identified in the NPAPSP Rationalization report
- Maintenance of ecosystems providing carbon storage functionality
- Operationalization of REDD+ strategies
- Restoration of vulnerable areas – riparian vegetation and steep slopes
- Manage land use to avoid degradation of habitats

## 15.6 Potential Indicators

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>Natural vegetation cover</li> </ul>	ERI, Forest Department	Annual	Ecosystem map (Meerman, 2011, revised 2014)	<p>Status and trends in extent and condition of habitats that provide carbon storage. Modified vs non modified.</p> <p><b>Ease of Monitoring:</b> Moderate. Whilst there is current tracking of forest cover, this is not established as a long-term programme.</p> <p><b>NBMP:</b> Trends in extent, condition and vulnerability of ecosystems, biomes and habitats. Remote sensing</p>
<ul style="list-style-type: none"> <li>Extent of forest cover</li> </ul>	Forest Department / ERI	Annual	Cherrington 2013: 2013: 61.1% (1,648,783 ha) 1980: 74.4% (1,354,155 ha)	<p><b>Ease of Monitoring:</b> Moderate. Whilst there is current tracking of forest cover, this is not established as a long-term programme.</p> <p><b>NBMP:</b> Trends in extent, condition and vulnerability of ecosystems, biomes and habitats. Remote sensing</p>
<ul style="list-style-type: none"> <li>% of forest cover under Sustainable Forest Management</li> </ul>	Forest Department	Annual	2012: >900,000 acres Private: 345,000 acres Licensed National Lands: 132,000 Licensed Forest Reserves: 420,000 acres	<p><b>Ease of Monitoring:</b> Easy</p> <p><b>NBMP:</b> Trends in extent, condition and vulnerability of ecosystems, biomes and habitats. Remote sensing</p>
<ul style="list-style-type: none"> <li>Deforestation rate</li> </ul>	Forest Department	Annual	March 2013: 2013: 0.97% 2012: 0.81% 2010: 0.30%	<p>REDD+ RPP, June 2014. Status and trends in extent and condition of habitats that provide carbon storage</p> <p><b>Ease of Monitoring:</b> Moderate. Whilst there is current tracking of forest cover, this is not established as a long-term programme.</p> <p><b>NBMP:</b> Trends in extent, condition and vulnerability of ecosystems, biomes and habitats. Remote sensing</p>
<ul style="list-style-type: none"> <li>Extent of steep slopes (<math>\geq 25^\circ</math>) that are degraded by anthropogenic impacts</li> </ul>	DoE	Every 4 years		<p><b>Ease of Monitoring:</b> Very hard.</p> <p><b>NBMP:</b> Trends in extent, condition and vulnerability of ecosystems, biomes and habitats. Remote sensing and ground truthing</p>



Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>▪ Extent of riparian vegetation that are degraded by anthropogenic impacts</li> </ul>	DoE	Every 4 years		<p><b>Ease of Monitoring:</b> Very hard.</p> <p><b>NBMP:</b> Trends in extent, condition and vulnerability of ecosystems, biomes and habitats. Remote sensing and ground truthing</p>
<ul style="list-style-type: none"> <li>▪ National greenhouse gas inventory</li> </ul>	Belize Climate Change Office		GHG Inventory 2011: 54,079,653.87 kg CO <sub>2e</sub> for 2011	<p>Baseline developed by the CCCC: Greenhouse Gas Inventory Development Report, 2012</p> <p><b>Ease of Monitoring:</b> Hard</p>
<ul style="list-style-type: none"> <li>▪ CO<sub>2</sub> emissions per capita and per \$1 GDP (PPP)</li> </ul>	Belize Climate Change Office		2000: 13,482.7769g /2.7 PPP	<p>Belize is a low emission nation, and incorporating CDM mechanisms into its national development to reduce CO<sub>2</sub> emissions. Maintenance of its forest cover, both inside and outside the National Protected Areas System, is also contributing to achieving this goal.</p> <p><b>Ease of Monitoring:</b> Hard</p> <p><b>MDG 7:</b> 7.2 CO<sub>2</sub> emissions per capita and per \$1 GDP (PPP)</p>
<ul style="list-style-type: none"> <li>▪ Consumption of Ozone Depleting Substances (ODSs), Chlorofluorocarbons (CFCs), Hydro Chlorofluorocarbons (HCFCs) and Methyl bromide</li> </ul>	Belize Climate Change Office		UNDP, 2013; Complete phase-out of CFCs. HCFCs-54.78 Metric tons Methyl bromide-0.08	<p>Belize has successfully phased out CFC's, The government of is pursuing the 2020 consumption reduction targets for HCFC's set by Decision XIX/6 of the Meeting of the Parties of the Montreal Protocol.</p> <p><b>Ease of Monitoring:</b> Hard</p> <p><b>MDG 7:</b>7.3 Consumption of Ozone Depleting Substances (ODSs), Chlorofluorocarbons (CFCs), Hydro Chlorofluorocarbons (HCFCs) and Methyl bromide</p>
<ul style="list-style-type: none"> <li>▪ Value of Belize national carbon stocks</li> </ul>	Forest Department		No data	<p>Baseline to be developed under the REDD+ initiative MRV</p> <p>Above and below ground carbon stocks</p> <p><b>Ease of Monitoring:</b> Hard</p>
<ul style="list-style-type: none"> <li>▪ % of domestic energy production coming from renewable resource</li> </ul>	Belize Climate Change Office	Every 4 years		<p><b>Ease of Monitoring:</b> Moderate</p>



**Target 16:** *By 2020, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.*

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### **16.1 The Belize context**

The Nagoya Protocol on ABS was adopted on 29 October 2010 in Nagoya, Japan and will enter into force 90 days after the fiftieth instrument of ratification. This Protocol is a supplementary agreement to the Convention on Biological Diversity, and provides a transparent legal framework for the effective implementation of one of the three objectives of the CBD: the fair and equitable sharing of benefits arising out of the utilization of genetic resources.

Belize will need to take certain measures to meet the core obligations in relation to access to genetic resources, benefit-sharing and compliance, if it takes the decision to sign on to the Nagoya Protocol.

### **16.2 Current Status**

The Forest Department is currently assessing whether Belize should or should not sign on to the Nagoya Protocol. It has an interest in the Protocol, particularly in its position as a provider of genetic resources, but does not currently have a domestic access and benefit-sharing or bio-discovery policy framework in place. There is legislation (e.g. the Wildlife Protection Act) that provides some control in some situations.

### **16.3. Contribution to the Global Aichi Targets**

#### **16.3.1 Global Biodiversity Indicator Partnership (BIP) Indicators**

- Ratification status of the Nagoya Protocol

#### **16.3.2 CBD Suggested Potential Indicators**

A number of possible national indicators are suggested, including:

- Ratification of the Protocol
- Supportive legislative, administrative or policy measures and institutional structures in place for implementing the Nagoya Protocol.

<b>National Obligations under the Nagoya Protocol</b>		
<b>Access obligations</b>	Domestic-level access measures are to:	<ul style="list-style-type: none"> <li>▪ Create legal certainty, clarity and transparency</li> <li>▪ Provide fair and non-arbitrary rules and procedures</li> <li>▪ Establish clear rules and procedures for prior informed consent and mutually agreed terms</li> <li>▪ Provide for issuance of a permit or equivalent when access is granted</li> <li>▪ Create conditions to promote and encourage research contributing to biodiversity conservation and sustainable use</li> <li>▪ Pay due regard to cases of present or imminent emergencies that threaten human, animal or plant health</li> <li>▪ Consider the importance of genetic resources for food and agriculture for food security</li> </ul>
<b>Benefit-sharing obligations</b>		<ul style="list-style-type: none"> <li>▪ Domestic-level benefit-sharing measures are to provide for the fair and equitable sharing of benefits arising from the utilization of genetic resources from Belize.</li> <li>▪ Utilization includes research and development on the genetic or biochemical composition of genetic resources, as well as subsequent applications and commercialization.</li> <li>▪ Sharing is subject to mutually agreed terms. Benefits may be monetary or non-monetary such as royalties and the sharing of research results</li> </ul>
<b>Compliance obligations</b>	Specific obligations to support compliance with the domestic legislation or regulatory requirements of the contracting party providing genetic resources, and contractual obligations reflected in mutually agreed terms, are a significant innovation of the Nagoya Protocol. Contracting Parties are to:	<ul style="list-style-type: none"> <li>▪ Take measures providing that genetic resources utilized within their jurisdiction have been accessed in accordance with prior informed consent, and that mutually agreed terms have been established, as required by another contracting party</li> <li>▪ Cooperate in cases of alleged violation of another contracting party's requirements</li> <li>▪ Encourage contractual provisions on dispute resolution in mutually agreed terms</li> <li>▪ Ensure an opportunity is available to seek recourse under their legal systems when disputes arise from mutually agreed terms</li> <li>▪ Take measures regarding access to justice</li> <li>▪ Take measures to monitor the utilization of genetic resources after they leave a country including by designating effective checkpoints at any stage of the value-chain: research, development, innovation, pre-commercialization or commercialization</li> </ul>

**Table 13: National Obligations under the Nagoya Protocol**

#### **16.4 Information availability**

The Forest Department is the focal point for the CBD, and has information on the status of Belize with respect to this protocol.

The Convention on Biological Diversity website: Has a list of countries that have ratified the Nagoya Protocol (Belize is currently not on this list).

#### **16.5 Potential National Target Concepts**

The Belize Forest Department is currently balancing whether or not to ratify the Nagoya Protocol.

## Strategic Goal E

### *Enhance implementation through participatory planning, knowledge management and capacity building*



**Target 17:** *By 2015, each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.*



**Target 18:** *By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels*



**Target 19:** *By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.*



**Target 20:** *By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan 2011-2020 from all sources and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels. This target will be subject to changes contingent to resources needs assessments to be developed and reported by Parties.*



**Target 17:** *By 2015, each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.*

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### **17.1 Belize Context**

The NBSAP, developed in 1998, has never been endorsed nationally, but has provided an informal framework for the guidance of biodiversity conservation in Belize, and been used by the Government, NGOs and CBOs in the justification and prioritisation of biodiversity conservation activities. Over the last five years, there has been increasing recognition of the importance of the environment in Belize's national development, in its adaptation mechanisms for climate change, and the need for cross sectoral integration of the environment into mainstream policies and planning.

The Terms of Reference for updating the NBSAP were circulated on the 9<sup>th</sup> September, 2014. Once a consulting team has been selected, a working group will be established and a workplan will be developed for updating the plan.

### **17.2 Current Status**

Belize recognizes the need for an updated, strengthened National Biodiversity Strategy and Action Plan, and has located funding under the National Biodiversity Enabling Activities, as part of the "National Biodiversity Planning to Support the implementation of the CDB 2011 - 2020 Strategic Plan in Belize" project. The revision of the NBSAP provides an opportunity to:

- strengthen the Plan through the incorporation of the new Aichi objectives, actions and targets, modified to the national context,
- integrate a framework for effective monitoring and evaluation of implementation,
- reinforce the importance of ecosystem services to national development
- address the issues of climate change impacts on ecosystems and biodiversity, and the need to build resilience

Belize will have an opportunity to use the process itself to improve mainstreaming of biodiversity across government and society, to strengthen Belize's commitment to maintaining its natural resources, ecosystem services and species diversity, and as a tool to ensure Belize moves forward with strategies that will assist in reducing poverty and increasing resilience and adaptation to climate change.

### **17.3 Contribution to the Global Aichi Targets**

#### **17.3.1 Global Biodiversity Indicator Partnership (BIP) Indicators**

- Status of NBSAP

### **17.3.2 CBD Suggested Potential Indicators**

A number of possible national indicators are suggested, including:

- Trends in implementation of National Biodiversity Strategies and Action Plans, including development, comprehensiveness, adoption and implementation

### **17.4 Information availability**

- Forest Department, as the CBD Focal Point

### **17.5 Potential National Target Concepts**

- An effective NBSAP, based on accurate information and developed with participatory input from stakeholders across Belize, that engages, informs and provides effective strategies for improved management of natural resources and biodiversity
- NBSAP mainstreamed across Government and civil society, with effective implementation

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### 17.6 Potential Indicators

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>Revised and approved National Biodiversity Strategy and Action Plan</li> </ul>	NPAS / Forest Department	Every 5 years	Current NBSAP is from 1998	Presence / Absence <b>Ease of Monitoring:</b> Easy
<ul style="list-style-type: none"> <li>Annual review of implementation</li> </ul>	NPAS / Forest Department	Annual	No revised NBSAP. Review of 1998 NBSAP implementation in 5 <sup>th</sup> Report to the CBD	Presence / Absence <b>Ease of Monitoring:</b> Easy
<ul style="list-style-type: none"> <li>% activities successfully implemented</li> </ul>	NPAS / Forest Department	Annual	No revised NBSAP.	Annual Review <b>Ease of Monitoring:</b> Moderate
<ul style="list-style-type: none"> <li>% outputs successfully achieved</li> </ul>	NPAS / Forest Department	Annual	No revised NBSAP.	Annual Review <b>Ease of Monitoring:</b> Moderate
<ul style="list-style-type: none"> <li>NBSAP strategies are integrated into cross-Ministerial annual workplans and budgets</li> </ul>	Ministry of Finance	Annual	No revised NBSAP.	Would need review of workplans and budgets of all relevant Ministries <b>Ease of Monitoring:</b> Hard



**Target 18:** *By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant level.*

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### **18.1 Belize Context**

Integration of traditional knowledge for protected area management planning is required under the National Protected Areas System policy, with management strategies being developed in collaboration with community stakeholders. Management planning requires that traditional knowledge through stakeholder consultation and participation be incorporated into the management planning process, and that managers identify ways of incorporating community customs and traditions into protected area management. The first management strategy to fully integrate traditional sustainable resource use was developed for Columbia River Forest Reserve, with multiple stakeholder consultations – however, this still needs to be implemented.

### **18.2 Current Status**

In the Maya Golden Landscape in southern Belize, Integrated Landscape Management has been rolled out across a matrix of community, national and private lands and 12 protected areas, bringing stakeholders together to share and implement plans for development built on sustainability of these plans and the natural resources on which they are based.

Traditional fishing on the coastal shelf is fully integrated and supported by Managed Access and Fisheries legislation. Managed Access provides a mechanism for direct and effective participation of traditional fishermen in management through Managed Access Advisory Committees. Traditional fishing of spawning aggregation sites has also been permitted in recognition of the historical background, despite the negative impacts on the fish populations. This is, however, being gradually phased out as it is incompatible with the maintenance and sustainability of fish stocks.

There is unwritten recognition of traditional community use of freshwater / marine resource within a number of Wildlife Sanctuaries (non-extractive designation), where traditional fishing precedes the establishment of the protected area, and has continued to this date, despite non-extractive regulations. This will be formalised through the future revision of the Protected Areas System Act, with the division of Wildlife Sanctuaries into two – Wildlife Sanctuary 1 (non-extractive: e.g. Cockscomb Basin Wildlife Sanctuary) and Wildlife Sanctuary 2 (sustainable traditional extraction: e.g. Crooked Tree and Corozal Bay Wildlife Sanctuaries). Sustainable use will only be permitted with an approved sustainable resource use management plan.

One major area of conflict is between traditional use and oil exploration – currently, the legislation framework for oil exploration supersedes that for protected areas, even when a protected area is



managed directly by local communities, and can impact the ecosystem services provided (e.g. Sarstoon-Temash National Park).

### **18.3 Contribution to the Global Aichi Targets**

#### **18.3.1 Global Biodiversity Indicator Partnership (BIP) Indicators**

- Index of Linguistic Diversity
- Status and trends of linguistic diversity and numbers of speakers of indigenous languages

#### **18.3.2 CBD Suggested Potential Indicators**

There are also a number of possible national indicators are suggested, including:

- Trends in degree to which traditional knowledge and practices are respected through: full integration, participation and safeguards in national implementation of the Strategic Plan
- Trends of linguistic diversity and numbers of speakers of indigenous languages
- Trends in land-use change and land tenure in the traditional territories of indigenous and local communities
- Trends in the practice of traditional occupations

### **18.4 Information availability**

The Environmental Research Institute (ERI) is including traditional knowledge in its operational indicators, under the National Biodiversity Monitoring Program, designed to standardise monitoring efforts across the country. These include:

- Trends in land use change and land tenure in the traditional territories of indigenous and local communities
- Trends in the practice of traditional occupations

### **18.5 Potential National Target Concepts**

- Where demonstrated to be sustainable and feasible, traditional use is recognised, respected and incorporated into management practices
- Community co-management of natural resources - including protected area management, Managed Access, sustainable use management areas - is strengthened

### 18.6 Potential Indicators

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>Number of protected areas co-managed by CBOs</li> </ul>	NPAS	Annual		Doesn't reflect management effectiveness / management capacity <b>Ease of Monitoring:</b> Easy
<ul style="list-style-type: none"> <li>% protected areas achieving a rating of 4 in National Management Effectiveness indicator 1.9 "Traditional Knowledge"</li> </ul>	NPAS	Every 4/5 years	2010: 47.8% State of Protected Areas 2010 Indicator 9 Traditional Knowledge – of 67 protected areas (+ 3 with no data) Score of 4: 8 (12.0%) Score of 3: 14 (20.9%) Score of 2: 13 (19.4%) Score of 1: 32 (47.8%)	Indicator 1.9 under the National Management effectiveness Tool (Young et al., 2005), <b>Ease of Monitoring:</b> Easy
<ul style="list-style-type: none"> <li>Number of traditional fishermen participating in Managed Access</li> </ul>	Fisheries Department	Annual	Data from Fisheries Department	<b>Ease of Monitoring:</b> Easy



**Target 19:** By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.

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### **19.1 Belize Context**

There is increasing information available on the ecosystems and biodiversity of Belize, its values, the ecosystem, especially with the requirement to integrate baseline information into protected area management plans. However, biodiversity monitoring is not consistent across the country, and for the protected areas system, is dependent on the capacity of the co-management agencies. A National Biodiversity Monitoring Program is currently being developed through ERI-UB, focusing on developing national biodiversity monitoring goals and targets, following a multi-stakeholder consultation process, to integrate existing monitoring data and provide standardised monitoring across the country.

A number of collaborative public / private sector Working Groups have been formed to monitor and plan for threatened species:

- National Hicatee Conservation and Monitoring Network
- Manatee Working Group
- Spawning Aggregation Working Group
- National Coral Reef Monitoring Network
- Belize Sea Turtle Conservation Network

### **19.2 Current Status**

Ongoing assessment of deforestation, land use, and fires is conducted via remote sensing under the Forest Department, and it is in the first stages of establishing a national Forest Inventory, with permanent sample plots located throughout Belize. The Department of Agriculture keeps records of agricultural land use and production. In the marine environment, there have been significant advances in standardising data collection, under both the Fisheries Department monitoring programmes (based on the MBRS Synoptic Monitoring Program), and the Healthy Reefs Initiative.

Information is being used to inform biodiversity management at both site and national level, with extraction regulation amendments based on scientific data (e.g. for parrotfish, Nassau grouper, rosewood). Whilst the Belize Government has established an on-line Central Clearing House Mechanism, it has not been able to maintain this facility, restricting information availability. However other initiatives, both Government and NGO, are making information more available:

- The Environmental Research Institute stores and makes available electronic documents
- The Lands Information Centre has the mandate for maintaining national GIS data

- The online Biodiversity and Environmental Resource Data System, maintained under BTFS, stores the biodiversity information for the country.
- The Statistical Institute of Belize manages socio-economic information for the Government of Belize. Much of this information is available on-line

### ***19.3 Contribution to the Global Aichi Targets***

Belize has improved its data collection and management, and provides information to regional datasets. However, there needs to be strengthening of ongoing monitoring of trends. This is being partially addressed through the Working Groups and NGO sector.

#### ***19.3.1 Global Biodiversity Indicator Partnership (BIP) Indicators***

There are currently no global indicators for this target.

#### ***19.3.2 CBD Suggested Potential Indicators***

A number of possible national indicators are suggested, including:

- Number of maintained species inventories being used to implement the Convention
- Trends in coverage of comprehensive policy-relevant sub-global assessments including related capacity building and knowledge transfer, plus trends in uptake into policy

### ***19.4 Information availability***

- NPAS website
- Belize Tropical Forest Studies
- Biodiversity Working Groups

### ***19.5 Potential National Target Concepts***

- Readily accessible, accurate and up-to-date information on biodiversity, ecosystem services and their values
- Accurate information on biodiversity available and being accessed to inform policy development and decisions
- Accessible information easily available on status of biodiversity

## 19.6 Potential Indicators

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>BERDS is fully functional and up to date</li> </ul>	BERDS / BTFS	Annual	Status from BTFS	<p>BERDS is the primary national species inventory database – requires greater national support and investment for maintenance</p> <p><b>Ease of Monitoring:</b> Easy</p>
<ul style="list-style-type: none"> <li>Estimated value of natural resource economy included in national budget</li> </ul>	National budget	Annual	2014: Not present in national accounting	<p>Information from National Budget</p> <p><b>Ease of Monitoring:</b> Easy</p> <p><b>NBMP:</b> Trends in economic and non-economic values of selected ecosystem services</p>
<ul style="list-style-type: none"> <li>Number of approved biodiversity and ecosystem valuations</li> </ul>	Forest and Fisheries Departments	Annual	No easy access	<p><b>Ease of Monitoring:</b></p> <p><b>Eco-Audit:</b></p> <p><b>NBMP Link(s):</b></p>
<ul style="list-style-type: none"> <li>Number of approved biodiversity and ecosystem valuations available on-line</li> </ul>	NPAS / BERDS	Annual	No easy access	<p><b>Ease of Monitoring:</b></p> <p><b>NBMP:</b> Trends in economic and non-economic values of selected ecosystem services</p>
<ul style="list-style-type: none"> <li>Integrated requirement for ecosystem evaluation into EIA framework</li> </ul>	DoE – EIA manual and legislation	Annual	Not currently required	<p>Presence / Absence. Review of EIA framework</p> <p><b>Ease of Monitoring:</b> Easy</p> <p><b>NBMP:</b> Trends in policies considering biodiversity and ecosystem service in environmental impact assessment and strategic environmental assessment</p>
<ul style="list-style-type: none"> <li>% NEAC / DoE decisions on EIAs that adequately reflect biodiversity valuations</li> </ul>	DoE	Annual		<p><b>Ease of Monitoring:</b> Hard</p>
<ul style="list-style-type: none"> <li>Incorporation of ecosystem services into future legislation</li> </ul>		Annual	2014: No data	<p>Review of new legislation / policies</p> <p><b>Ease of Monitoring:</b> Easy</p> <p><b>NBMP:</b> Trends in integration of biodiversity and ecosystem service values into sectoral and development policies.</p>
<ul style="list-style-type: none"> <li>Summary Status of Biodiversity report widely dispersed</li> </ul>	Management effectiveness assessment / Working Groups	Every 4 years	<p>2010 Status of Protected Areas report</p> <p>Healthy Reefs report card</p> <p>Healthy Reefs Eco-Audit</p>	<p><b>Ease of Monitoring:</b> Moderate</p>



**Target 20:** *By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan 2011- 2020 from all sources and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels. This target will be subject to changes contingent to resources needs assessments to be developed and reported by Parties.*

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### **20.1 Belize Context**

Belize does not have a revised Strategy for Resource Mobilization - the current strategy listed in CBD documents is linked to the 1998 National Biodiversity Strategy and Action Plan (CBD, 2013).

### **20.2 Current Status**

Despite the limitations of not having a comprehensive strategy to guide mobilization of financial resources, Belize currently has international funding to implement identified critical activities, in preparation for the revision and updating of the National Biodiversity Strategy and Action Plan, and for strengthening the environmental framework.

Belize is supported by a number of donor agencies, including:

- Food and Agriculture Organization, for implementation of their Country Programme Framework for Belize 2011 – 2015
- World Bank / Global Environment Facility (GEF) Management and Protection of Key Biodiversity Areas in Belize – strengthening environmental legislation, addressing threats to the KBAs, and improving biodiversity management
- IDB support for improved solid waste management, waste water and sanitation for the Placencia Peninsula, land management programmes, improving agricultural health systems, the support of green power through Belcogen, supporting cacao growers, disaster risk management
- UNDP support for improved water resource management, the development of the National Integrated Water Resource Management Act (2011)
- UNDP support for strengthening of disaster preparedness and emergency response capacity in Belize
- UNDP portfolio of climate change initiatives, developed within the GCCA framework, and implemented under the National Climate Change Office within the Ministry of Forestry, Fisheries and Sustainable Development, including:
  - Enhancing Belize’s Resilience to Adapt to the Effects of Climate Change,
  - Enabling Activities for the Preparation of Belize’s Third National Communication to the UNFCCC, including updating inventories of greenhouse gases and development of a comprehensive climate change adaptation strategy

### **20.3 Contribution to the Global Aichi Targets**

The global BIP indicator for this target is:

- Official development assistance in support of the CBD

This is one of fifteen possible global indicators suggested by the CBD, under COP10 Decision X/3, including:

(1) Aggregated financial flows, in the amount and where relevant percentage, of biodiversity-related funding, per annum, for achieving the Convention's three objectives, in a manner that avoids double counting, both in total and in, inter alia, the following categories:

- (a) Official Development Assistance (ODA);
- (b) Domestic budgets at all levels;
- (c) Private sector;
- (d) Non-governmental organizations, foundations, and academia;
- (e) International financial institutions;
- (f) United Nations organizations, funds and programmes;
- (g) Non-ODA public funding;
- (h) South-South cooperation initiatives;
- (i) Technical cooperation;

(2) Number of countries that have:

- (a) Assessed values of biodiversity, in accordance with the Convention;
- (b) Identified and reported funding needs, gaps and priorities;
- (c) Developed national financial plans for biodiversity;
- (d) Been provided with the necessary funding and capacity-building to undertake the above activities;

(3) Amount of domestic financial support, per annum, in respect of those domestic activities which are intended to achieve the objectives of this Convention;

(4) Amount of funding provided through the Global Environment Facility and allocated to biodiversity focal area;

(7) Number of Parties that integrate considerations on biological diversity and its associated ecosystem services in development plans, strategies and budgets;

(9) Amount and number of South-South and North-South technical cooperation and capacity-building initiatives that support biodiversity;

(11) Amount of financial resources from all sources from developed countries to developing countries to contribute to achieving the Convention's objectives;

(12) Amount of financial resources from all sources from developed countries to developing countries towards the implementation of the Strategic Plan for Biodiversity 2011-2020;

(15) Number of access and benefit-sharing initiatives and mechanisms, consistent with the Convention and, when in effect, with the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of the Benefits Arising out of Their Utilization, including awareness-raising, that enhance resource mobilization;

#### ***20.4 Information availability***

- National budget
- Conservation stakeholders
- International aid agencies / donors

#### ***20.5 Potential National Target Concepts***

- Realistic and effective national and international financial support for biodiversity conservation



## 20.6 Potential Indicators

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>▪ Belize Strategy for Resource Mobilization</li> </ul>	CBD / Forest Department	Every 5 years	CBD: 1998 – linked to the 1998 NBSAP	Presence / absence <b>Ease of Monitoring:</b> Very Easy
<ul style="list-style-type: none"> <li>▪ Official international development funding received per annum by Belize, linked to the CBD</li> </ul>	Ministry of Finance	Annual	No data	Would require information from the Ministry of Finance <b>Ease of Monitoring:</b> Moderate <b>Eco-Audit:</b>
<ul style="list-style-type: none"> <li>▪ International funding to co-management partners for support of protected areas</li> </ul>	Forest Department Co-management Partners NPAS	Every 5 years	No data	Whilst not in itself hard to collect, as each NGO will have the details of funds received for management plan implementation, most NGOs consider this information to some extent confidential <b>Ease of Monitoring:</b> Hard <b>Eco-Audit:</b>
<ul style="list-style-type: none"> <li>▪ Indication of total estimated value of natural resource economy in national budget</li> </ul>	National budget	Annual	2014: Not present in national accounting	Information from National Budget <b>Ease of Monitoring:</b> Easy <b>NBMP:</b>
<ul style="list-style-type: none"> <li>▪ Inclusion of biodiversity and ecosystem services within the budget speech</li> </ul>	National budget speech	Annual	2014: Not present in national budget speech	Review of National Budget speech <b>Ease of Monitoring:</b> <b>NBMP:</b> Trends in integration of biodiversity and ecosystem service values into sectoral and development policies
<ul style="list-style-type: none"> <li>▪ Presence of 'payment for environmental services / natural capital accounting' in national accounting and reporting system</li> </ul>	National budget	Annual	2014: Not present in national accounting	Review of National Budget <b>Ease of Monitoring:</b> <b>NBMP:</b> Trends in integration of biodiversity and ecosystem service values into sectoral and development policies
<ul style="list-style-type: none"> <li>▪ % of national budget allocated to protected area management</li> </ul>	National budget	Annual	No baseline or monitoring protocol	Review of National Budget. Budget lines would need to be identified <b>Ease of Monitoring:</b> Easy once established
<ul style="list-style-type: none"> <li>▪ % of national budget allocated to natural resource management</li> </ul>	National budget	Annual	No baseline or monitoring protocol	Review of National Budget. Budget lines would need to be identified <b>Ease of Monitoring:</b> Easy once established

Potential Indicators	Source	Frequency	Current Baseline / Trend data	Comments
<ul style="list-style-type: none"> <li>Value of private sector investment in biodiversity conservation</li> </ul>	Conservation stakeholders	Every 4 years	No baseline or monitoring protocol	Partially included in co-management accounting. Would need definition of what counts as investment. <i>Ease of Monitoring:</i> Hard

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### 3. Relevance of the Aichi Targets to the Belize Context

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#### ***3.1 How Relevant are the global targets to the Belize Context?***

During the stakeholder consultations, stakeholders were asked to rate each of the Aichi Targets for their relevance to the Belize context, based on a simple scale of:

High:	3
Medium:	2
Low:	1

The following table (Table x) summarizes the outputs:

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How relevant are the global targets to the Belize scenario?	Cayo	Stann Creek	Toledo	Orange Walk Corozal	Belize City	Prioritization Score
<b>Target 1:</b> By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably	H	H	H	H	H	3
<b>Target 2:</b> By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.	H	H	H	H	H	3
<b>Target 3:</b> By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.	H	H	H	H	H	3
<b>Target 6:</b> By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits	H	H	H	H	H	3
<b>Target 7:</b> By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.	H	H	H	H	H	3
<b>Target 12:</b> By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.	H	H	H	H	H	3
<b>Target 14:</b> By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.	H	H	H	H	H	3
<b>Target 17:</b> By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.	H	H	H	H	H	3
<b>Note: The Prioritization Score is the Average of the Regional Scores from stakeholder consultations, based on: High: 3; Medium: 2; Low: 1</b>						

How relevant are the global targets to the Belize scenario?	Cayo	Stann Creek	Toledo	Orange Walk Corozal	Belize City	Prioritization Score
<b>Target 18:</b> By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.	H	H	H	H	H	3
<b>Target 19:</b> By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.	H	H	H	H	H	3
<b>Target 20:</b> By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan 2011-2020 from all sources and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels. This target will be subject to changes contingent to resources needs assessments to be developed and reported by Parties.	H	H	H	H	H	3
<b>Target 4:</b> By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.	H	H	M	H	H	2.8
<b>Target 5:</b> By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced	H	M	H	H	H	2.8
<b>Target 9:</b> By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.	H	H	M	H	H	2.8
<b>Target 11:</b> By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascapes.	M	H	H	H	H	2.8
<b>Target 8:</b> By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.	H	H	L	H	H	2.6
<b>Note: The Prioritization Score is the Average of the Regional Scores from stakeholder consultations, based on: High: 3; Medium: 2; Low: 1</b>						

How relevant are the global targets to the Belize scenario?	Cayo	Stann Creek	Toledo	Orange Walk Corozal	Belize	Prioritization Score
<b>Target 10:</b> By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.	H	M	M	H	H	2.6
<b>Target 15:</b> By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.	L	H	M	M	H/M	2.1
<b>Target 13:</b> By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.	M	L	M	M	M	1.8
<b>Target 16:</b> By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.	M	L	H	M	n/a	1.6
<b>Note: The Prioritization Score is the Average of the Regional Scores from stakeholder consultations, based on: High: 3; Medium: 2; Low: 1</b>						

### 3.2 Belize's Contribution to achieving the Aichi Targets

Belize was assessed on its progress in contributing towards the goal of each global Aichi target through broad cross-sectoral stakeholder consultation. Progress was rated as follows:

Summary of Ratings Per Aichi Target	Level of National Contribution			
	Low	Medium	High	Not Applicable
<i>Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society</i>	 	 		
<i>Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use</i>		    		
<i>Strategic Goal C: Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity</i>		 		
<i>Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services.</i>		 		
<i>Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building</i>		  		
<b>Number of Aichi Targets</b>	<b>5</b>	<b>14</b>	<b>0</b>	<b>1</b>

Reference list to be incorporated into final draft

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