Final

BARBADOS

SIXTH NATIONAL REPORT
2019

EXECUTIVE SUMMARY

The Government of Barbados has been a Party, by ratification, to the Convention on Biological Diversity (CBD) since March 10th, 1994 and is committed to ensuring that the country maintains compliance with its obligations under the Convention. To date, Barbados has submitted five national reports to the CBD. The focus of the reporting on biodiversity issues in the Sixth National Report (6NR) will be on the use of spatial data as a means for indicating success of implementation of biodiversity targets in country.

This report used the draft updated National Biodiversity Strategy and Action Plan (NBSAP) and its targets as the basis for presenting, where relevant and available, spatial data which can be used to monitor and evaluate the implementation of the NBSAP. During a national consultative process, stakeholders identified national priorities from the Aichi Biodiversity Targets and amended these targets to address current national issues and chart realist timelines for implementation.

The prioritised targets are:

1. By 2030, at the latest, Barbadians will be more knowledgeable about the values of biodiversity and the steps they can take to conserve and use it sustainably.
2. By 2030, at the latest, the Government of Barbados , businesses and stakeholders at all levels in Barbados, will 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.
3. By 2030, the rate of loss of all natural habitats including forests is decreased by 25%.
4. By 2030, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.
5. By 2030, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.
6. By 2030, invasive alien species and pathways are identified and prioritised, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.
7. By 2035, anthropogenic pressures on coral reefs (e.g. nutrient loads, anchor damage, overfishing) and other vulnerable ecosystems impacted by climate change or ocean acidification, are minimised, so as to maintain their integrity and functioning.
8. By 2030, at least 17 percent 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 designated within connected systems of protected areas and plans for effective area-based conservation measures are in development.
9. By 2030, pressures on known threatened species have been identified and mitigated, and conservation status has been improved.
10. By 2030, 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.

11. By 2030, document all traditional and scientific knowledge and technology relating to biodiversity so that it improved, widely shared, transferred and applied.
12. By 2030, at the latest, financial resources to conduct projects and research in the area of biodiversity should increase substantially.

The national biodiversity-related targets and, where applicable baseline spatial data, are presented in this 6NR and in the absence of available spatial data, recommendations are made as to the type of spatial data which will be relevant for reporting purposes.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

BNFN	Barbados Natural Fibres Network
BNOCL	Barbados National Oil Company Limited
BSTP	Barbados Sea Turtle Project
BWFA	Barbados Wildfowlers Association
CBD	Convention on Biological Diversity
CBOs	Community-Based Organisations
CERMES	Centre for Resource Management and Environmental Studies

CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CSOs	Civil Society Organisations
CZMU	Coastal Zone Management Unit
FAO	Food and Agriculture Organisation
GDP	Gross Domestic Product
IAS	Invasive alien species
IBAs	Important Bird Areas
IPPC	International Plant Protection Convention
IRDP	Integrated Rural Development Programme
IUCN	International Union for the Conservation of Nature
MEAs	Multilateral Environmental Agreements
MEB	Ministry of Environment and National Beautification
NBSAP	National Biodiversity Strategy and Action Plan
NCCAP/AP	National Climate Change Adaptation Policy and Abatement Plan
NGOs	Non-Governmental Organisation
NHS	Natural Heritage System
NPC	National Oil Company
SDG	Sustainable Development Goals
SPAW	Specially Protected Areas and Wildlife
UNCBD	United Nations Convention on Biological Diversity
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollars
UWI	University of the West Indies
WICSCBS	West Indies Central Sugar Cane Breeding Station

1 INTRODUCTION

The Government of Barbados has been a Party, by ratification, to the Convention on Biological Diversity (CBD) since March 10th, 1994 and is committed to ensuring that the country maintains compliance with its obligations under the Convention. To date, Barbados has submitted five national reports to the CBD. The focus of the reporting on biodiversity issues in the Sixth National Report (6NR) will be on the use of spatial data as a means for indicating success of implementation of biodiversity targets in country.

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The targets presented in the NBSAP have a set of indicators, which can be used to measure success of implementation. These targets, objectives and indicators will provide guidance for the type of spatial data, which must be collected to measure implementation success. The following sections present an overview of the status of national biodiversity ecosystems and value to national economic development. The NBSAP targets and, where applicable baseline spatial data, are presented and in the absence of available spatial data, recommendations are made as to the type of spatial data which will be relevant for reporting purposes.

2 UPDATED NATIONAL BIODIVERSITY PROFILE

Barbados' Fourth National Report to the Convention on Biological Diversity (2011) presented detailed information on the island's terrestrial and marine biodiversity, its status and trends. The Fifth National Report (2016) provided an update of that report, using information obtained since the Fourth National Report was prepared. This section presents an overview of the current situation based on the information contained in the Fourth and Fifth National Reports. This information was used in the preparation of an updated NBSAP since its original publication in 2002.

2.1 Terrestrial Biodiversity

2.1.1 Flora

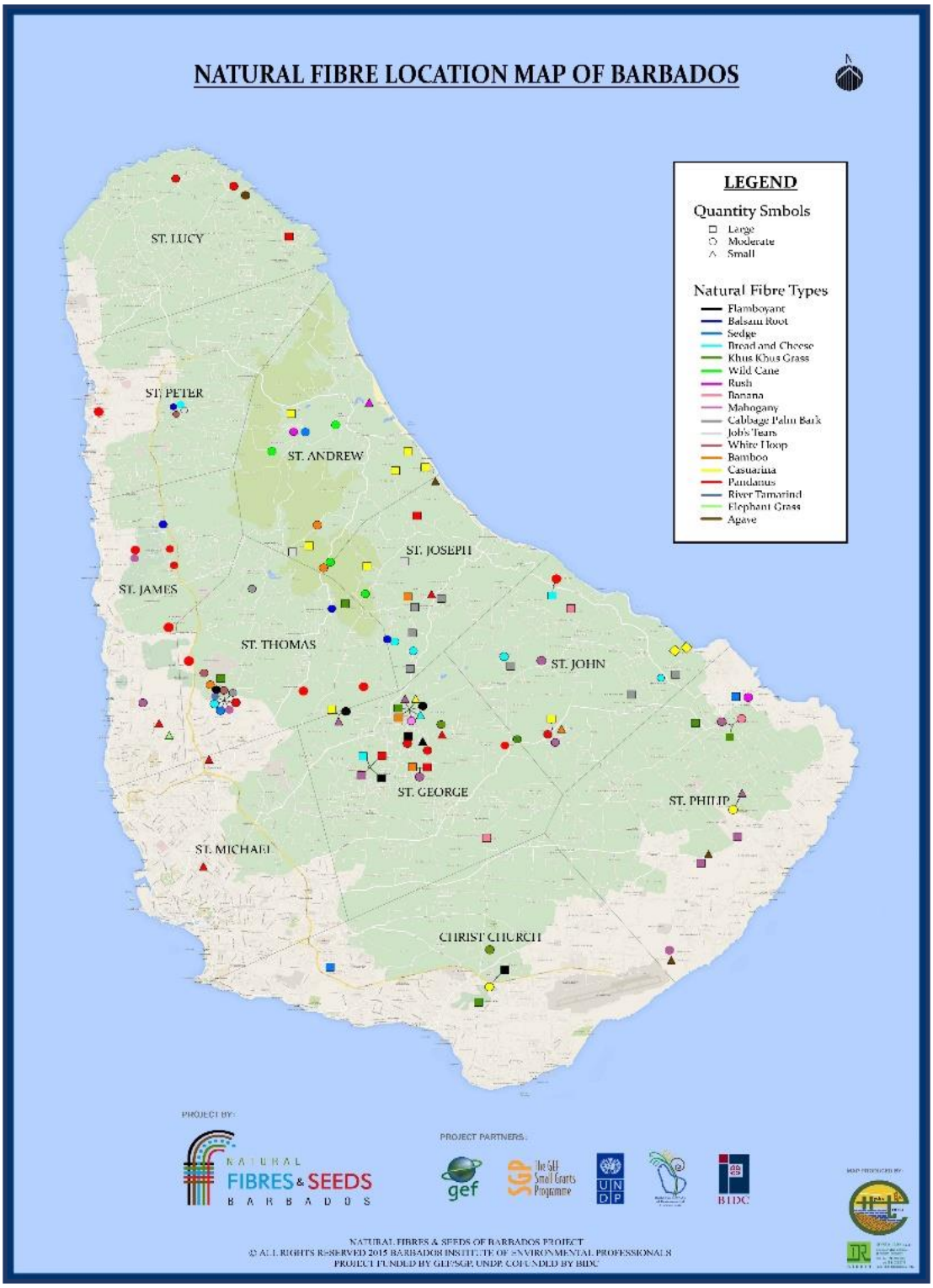
Approximately 700 species of native and naturalised flowering plants have been described for Barbados and approximately 100 of these are trees. Two (2) of these plant species are only found in wooded areas and are considered to be endemic1; 8 species as rare or endangered and 23 species have been identified as requiring protection in Barbados2. Fifteen (15) of these species are also known to be found at only one site. Furthermore, recent research has resulted in fifteen (15) flowering plants being identified for possible inclusion in the island's flora, and eight (8) of these species (*Philodendron lingulatum, Hymenocallis latifolia, Hymenocallis speciosa, Mimosa distachya, Macroptilium atropurpureum, Sapindus saponaria, Canella winterana* and *Psychotria microdon*) are new records for Barbados.

Research on lower plants remains limited; however, Carrington (1991) lists the fern ally (*Psilotum nudum*) and a tree fern (C*yathea arborea*) as rare or endangered. In addition, some of the *Bryophytes* and *Pteridophytes* in Barbados have been inventoried but the status of these species remains unclear.

Over the years, 28 sedge species and 79 grass species have been described. In addition, 222 algal species; 37 species of *Pteridophytes;* 9 macro fungi, 4 lichens, 22 species of mosses, 4 species of liverwort and 1 hornwort species have been documented on the island.

In 2015, the Barbados Natural Fibres project identified 38 species of natural fibres and 11 seeds as having economic value for the national crafts sector. The distribution of these species on the island is shown in Figure 1.

[1] Government of Barbados, 2002. National Biodiversity Strategy and Action Plan
[2] Government of Barbados, 2002. National Biodiversity Strategy and Action Plan



[3]

Figure 1: Natural Fibres of Barbados Location Map

[3] Barbados' 5th National Report to the CBD

2.1.2 Fauna

2.1.2.1 Birds

To date, two hundred and sixty-one (261) species of birds have been recorded in Barbados, representing an increase of about 150 over the 2002 NBSAP estimate. The current estimate comprises over 230 migratory species, five (5) of which are of global importance (Burke, 2007)[4]. There are 34 species of birds breeding on the island, including some exotics (Watson, 2009)[5]. Of these, 31 have been identified as native breeding, one of which, the Barbados Bullfinch (*Loxigilla barbadensis*), is endemic. There are 6 endemic subspecies of birds on the island. Approximately 16 bird species have been categorised as exotics (8 of these species occur naturally due to an expanded range and 8 species have been deliberately introduced). Lastly, nearly 31 native and migratory species of birds are protected under the *Wild Birds Protection Act, Cap 398.*

Barbados has six (6) Important Bird Areas (IBAs) covering approximately 185 hectares of land and includes marine areas. The IBAs are wetlands, which serve as a network of sites for native and migratory water birds. They have been identified based on 11 key bird species found on the island and which meet international IBA criteria[6] (see Figure 2[7]).

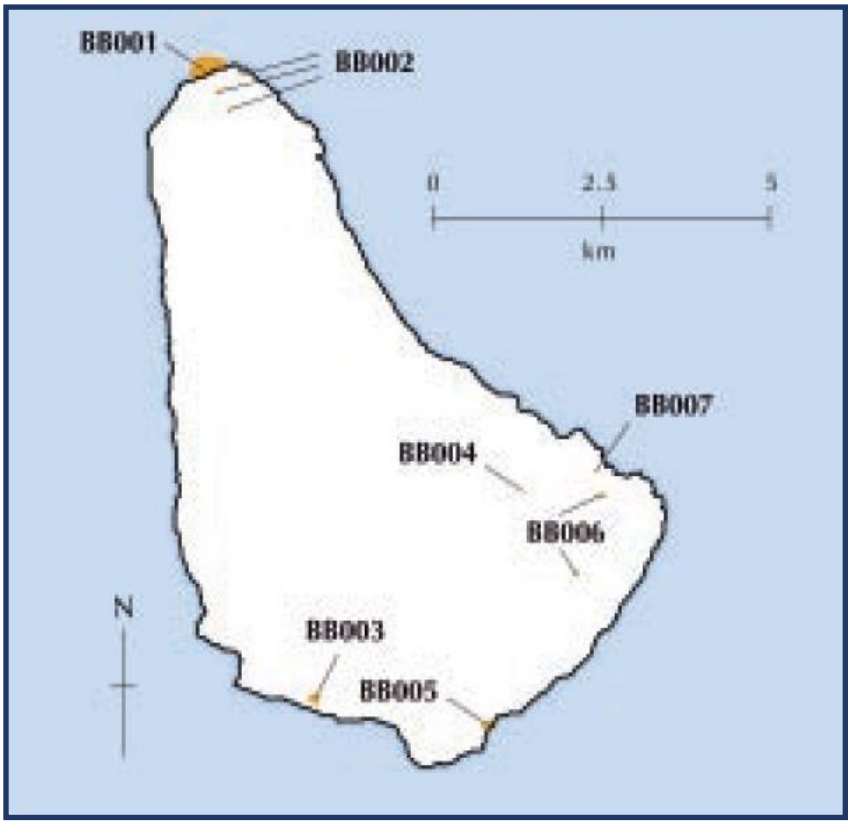


Figure 2: Location of Important Bird Areas of Barbados

[4] Burke, Wayne, 2007
[5] Watson, Karl, 2009
[6] Wayne Burke. Important Bird Areas of the Caribbean – Barbados. www.birdlife.org (29/05/2016)
[7] Wayne Burke. Important Bird Areas of the Caribbean – Barbados. www.birdlife.org

2.1.2.2 Mammals

The mammalian fauna of Barbados continues to be dominated by 6 species of bats (*Artibeus jamaicensis, Brachyphylla cavernum minor, Molussus molussus, Monophyllus plethodon plethodon, Myotis martiniquensis* and *Noctillo leporinus*), the African green monkey *(Chlorocebus aethiops sabaeus)*, Indian mongoose *(Herpescus javanicus)* and the European hare (*Lepus capensis*) which occupies a limited range. None of Barbados' mammals is endangered.

According to recent research, the hare population seems to be experiencing resurgence due to an increase in grass cover and less use of harmful pesticides. It also appears that the hare population may be differentiated from the ancestral European population and may have a reduced genetic diversity. Molecular DNA genetic diversity, morphological and physiological studies are currently being conducted in this regard.

2.1.2.3 Reptiles

The terrestrial reptile population of Barbados is comprised of snakes, lizards and tortoise species. Four snake species (*Leptotyphlops carlae, Ramphotyphlops braminus, Liophis perfuscus* and *Mastigodryas bruesi*) have been recorded for Barbados. Eight species of lizards have been recorded. The Barbados Leaf-Toed Gecko (*Phyllodactylus pulcher)* is one of the few remaining endemic vertebrate species on the island. Previously thought extinct, the gecko was rediscovered on Culpepper Island in 2011. In 2013, other colonies were found in rocky coastal areas in the parish of St Philip. Surveys undertaken in both these locations estimate that fewer than 250 mature individuals remain. Further surveys are underway to locate other colonies and to ascertain the size of the population. Based on data collected and analysed to date it is believed that the Barbados Leaf-toed Gecko qualifies as "Critically Endangered" on the IUCN (International Union for the Conservation of Nature) Red List of Threatened Species[8].

2.1.2.4 Amphibians

Two amphibian species, the cane toad (*Chaunus marinus linnaeus)* and the whistling frog, (*Eleutherodactylus johnstonei*) inhabit the island. These species are currently locally abundant wherever water is present.

2.1.2.5 Insects and Allied Arthropods

To date approximately 1320 species of insects and allied arthropods have been described. Among the insects, odonates, hemipterans, coleopterans and dipterans have been found to be the most common.

2.2 Freshwater Biodiversity

More than ninety (90) aquatic macro-invertebrate taxa have been identified for Barbados. Generally, the fauna population is sparse—due to the oceanic origin of Barbados and the disturbance of freshwater environments—and is dominated by snails, shrimps and insects. The overall status and trends related to the taxa are unknown; however, work continues in this area and it is estimated that more species will be discovered.

[8] Source: https://rainforests.mongabay.com/biodiversity/en/barbados/CR.html Accessed December 3, 2019

2.3 Marine Biodiversity

Three species of marine turtles nest in Barbados: the endangered Green turtle (*Chelonian mydas)*, the critically endangered Hawksbill (*Eretmochelys imbricate)* and the endangered Leatherback (*Dermochelys coriacea*). All three of these species are listed on Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), while the hawksbill and leatherback are also classified as critically endangered (IUCN, 2008).

Four species of seagrass, 10 species of soft coral and 31 species of hard coral have been recorded around the island. The seagrasses have been impacted by coastal and land-based sources of pollution while there has been little change in the coral populations.

2.4 Drivers of Biodiversity Loss

The major threats to biodiversity in Barbados are habitat loss and fragmentation, alien invasive species, over-harvesting of species, pollution, shooting of birds[9], resource extraction and natural disasters. Since the publication of the Fourth National Report, notable developments have occurred in the areas discussed below.

2.4.1 Habitat loss and fragmentation

Habitat loss and fragmentation have resulted from the gradual urbanisation and sub-urbanisation of the island. Generally, Barbados has been able to control haphazard development and urban sprawl through the implementation of a National Physical Development Plan (PDP) in 2003. There is a draft PDP-Amendment[10] and research for its revision (using aerial photography for 2015 produced from the Coastal Risk Assessment and Management Programme) has confirmed the growth in urban sprawl due to the continued subdivision of land for building development since 1998. At the same time, similar photography shows that within the boundaries of the Barbados National Park and along the natural gully systems, there has been a notable increase in vegetation cover. Studies are needed to assess the extent of habitat change due to both these factors, and the overall impact on local biodiversity.

2.4.2 Invasive Alien Species

Of the 48 invasive alien species reported for Barbados, only seven have been reported on the island since the year 2000. Those of more recent concern are the giant African snail (*Lissachatina fulica)* and the red lionfish (*Pterois volitans*) and as seen in Figures 3 and 4 respectively.

[9] Voluntary measures in the form of quotas and others, and now being used to control this sport in Barbados and to protect at-risk species

[10] Barbados Physical Development Plan Amendment: Toward a Green, Prosperous and Resilient Nation. Draft February 2017, Source: www.townplanning.gov.bb

Figure 3. Giant African Snail

Figure 4. Lion Fish

While the African green monkey (*Chlorocebus sabaeus*) has been on the island for approximately 350 years, today it is widely considered to be an agricultural pest. The specific size of the population appears to be unknown and such data is vital to its management and control. The giant African snail is also considered a pest and programmes for its eradication are continuing under the guidance of the Ministry with responsibility for Agriculture. The study on Invasive Alien Species (IAS) conducted for this NBSAP, notes that little is known about the ecological, economic and cultural impacts of the species reported for Barbados; the economic impacts, however, are considered to be significant. To date, none of the IAS has been eradicated.

2.4.3 Shooting of Birds

The long-established practice of hunting migratory birds in shooting swamps has undergone significant change in recent years. Through the collaborative efforts of the Barbados Wildfowlers Association (BWFA), Birdlife International, Canadian Wildlife Services and the United States Fish and Wildlife Service, an initiative to ensure the sustainable harvesting and management of shorebirds was activated in 2008. Subsequently, the BWFA has passed several resolutions to limit the harvesting of some species and to control hunting methods. Annual quotas have been established nationally and per shooting venue, as well as on species such as the lesser yellowlegs and the American golden plover. The system of data collection now in place should enable reliable monitoring of species visiting the wetlands and shooting swamps in Barbados. The Barbados model is being used in other jurisdictions.

2.5 The Value of Biodiversity and Ecosystem Services and Their Contribution to Human Well-being

Ecosystems are dynamic discontinuous systems, which interact and connect in a myriad of ways, largely influenced by economic, social and cultural factors. Ecosystems can be said to represent ecological processes, which are value-neutral and the resources they provide can be expressed in terms of goods and services that can have a value assigned to them.[11] Ecosystem services can therefore be defined in terms of the benefits people obtain from ecosystems. All ecosystem services therefore, have a direct

[11] Ecosystem Services. Source: http://jncc.defra.gov.uk/default.aspx?page=6382 . Accessed January 15, 2019.

relationship with human wellbeing. The Millennium Ecosystems Report, 2005[12] indicates that ecosystems provide several services to people in the following categories:

1. Provisioning Services – products obtained from ecosystems e.g. food, fuel, fibre, water and genetic resources.
2. Regulating services – benefits obtained from regulating ecosystem processes such as climate, air quality, erosion control, human disease.
3. Cultural services – non-material benefits e.g. spiritual, cognitive, recreation, aesthetics, tourism, experiences.
4. Supporting services – required for production of all ecosystem services e.g. oxygen, primary production, soil formation

The interrelationship among ecosystem services and human wellbeing is depicted in Figure 5 below.

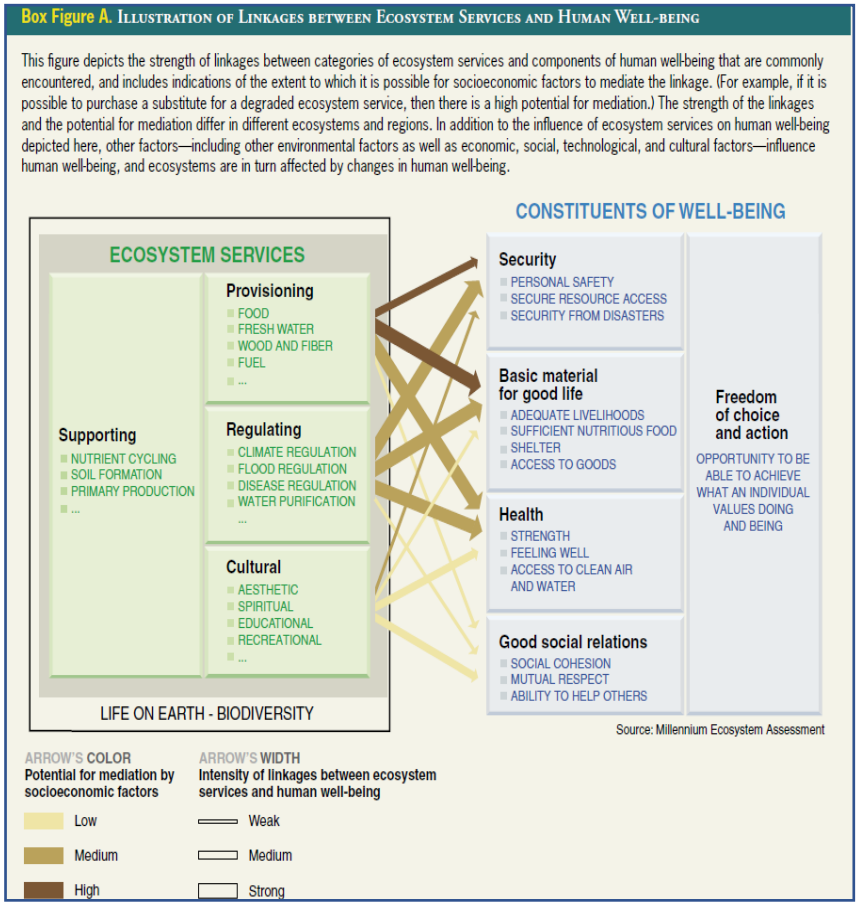


Figure 5 Illustration between ecosystem services and human wellbeing[13]

[12] Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-being: Synthesis. Island Press, Washington, DC. Source: https://www.millenniumassessment.org/documents/document.356.aspx.pdf Accessed: December 15, 2018

[13] Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-being: Synthesis. Island Press, Washington, DC. Source: https://www.millenniumassessment.org/documents/document.356.aspx.pdf Accessed: December 15, 2018

The economic, social and cultural viability of Barbados depends on the continued capacity of its marine and terrestrial ecosystems to support viable ecosystem services. For Barbados, critical ecosystem services fall within the four categories listed in the Millennium Ecosystem Assessment report of 2005. In Barbados' Green Scoping Study,[14] these services have been identified as:

> *"Ecosystem services [….] take many forms: provisioning from natural systems (seafood, wood and plants from gully ecosystems) and altered agro-ecosystems; seashore protection services of reefs and coastal vegetation; sand generation by reefs; non-extractive use services that support income generating activities such as snorkelling, SCUBA diving, hiking and sightseeing; and, finally, the creation of opportunities for recreation, a critical component of human wellbeing, that is afforded Barbadians through healthy terrestrial and marine ecosystems".*

2.5.1 The Value of Biodiversity and Ecosystem Services to Barbados

This following section will present information on the value of ecosystem services to Barbados under the categories listed above. In some cases, actual values are presented as environmental goods and services associated with these ecosystems are part of major economic activity in Barbados. In other cases, the value, while acknowledged as important, have not been quantified individually but may form part of aggregated statistics collected nationally and therefore no disaggregated data is available for them.

2.5.1.1 Provisioning Services

These services are inclusive of products that are obtained from ecosystems, such as: food, fibre, fuel, genetic resources, biochemicals, natural medicines, pharmaceuticals, water, and building materials.

Fisheries

Coastal ecosystems such as coral reefs, mangroves, beaches and seagrasses provide great value to numerous economic sectors including tourism, fisheries and shoreline protection.[15] These systems are under threat due to overfishing, pollution and climate change threats such as coral bleaching and ocean acidification. For Barbados, coastal ecosystems are of economic importance to the tourism, fisheries and recreational sectors.

The fisheries sector is of major economic and social importance to Barbados and the sector's value has been quantified in many different forms. In 2016, an estimated 1,652 tonnes of fish landed in Barbados at the two main fishing complexes; the Bridgetown and Berinda Cox complexes. The main species of importance and their relative values in terms of fish catch are provided in Figure 6[16].

[14] Moore, W., Alleyne ,F., Alleyne, Y., Blackman, K., Blenman, C., Carter, S., Cashman, A., Cumberbatch, J., Downes, A., Hoyte, H., Mahon, R., Mamingi, N., McConney, P., Pena, M., Roberts, S., Rogers, T., Sealy, S., Sinckler, T. and A. Singh. 2014. Barbados' Green Economy Scoping Study. Government of Barbados, University of West Indies - Cave Hill Campus, United Nations Environment Programme, 244p.

[15] Richard Waite; P.J.H.Van Beukering, L. Burke, L. Brander. Coastal Capital: ecosystem valuation for decision making in the Caribbean. Pecharcal Report 2014

[16] Barbados Economic and Social Report 2016

Year	2010	2011	2012	2013	2014	2015	2016P
Flying Fish	2,424.0	908.0	354.0	1,909.0	1,314.0	378.0	469.0
Dolphin	465.0	505.0	459.0	514.0	278.0	373.0	405.0
Kingfish	29.0	27.0	26.0	22.0	21.0	12.0	13.0
Billfish	27.0	44.0	46.0	46.0	55.0	83.0	76.0
Tuna	117.0	114.0	184.0	178.0	211.0	247.0	307.0
Snapper	28.0	10.0	19.0	14.0	11.0	21.0	31.0
Reef Fish (Carangids)	20.0	10.0	39.0	9.0	16.0	43.0	43.0
Shark	8.0	9.0	12.0	8.0	11.0	19.0	13.0
Swordfish	10.0	19.0	16.0	12.0	16.0	22.0	16.0
Any Other Variety	98.0	127.0	145.0	23.0	19.0	48.0	63.0
Total	**3,226.0**	**1,773.0**	**1,300.0**	**2,735.0**	**1,952.0**	**1,246.0**	**1,436.0**

SOURCE: Fisheries Division, Ministry of Agriculture
P - Provisional

Figure 6: Barbados Fish Landing by Species and Type (tonnes) (2010-2016)

In a paper presented at the 58th Gulf and Caribbean Fisheries Institute conference,[17] the value added of different fisheries was estimated to be US$19 Million and about 2.6 times the landed value of the fisheries (see Figure 7):

[17] Mahon, R. C. Parker, T. Sinckler, S. Willoughby and J. Johnson. 2007. The Value of Barbados' Fisheries: A Preliminary Assessment. 58th Gulf and Caribbean Fisheries Institute. Pp 88-92.

Fish Type	Ex-vessel value	Value added	(% of total)	Overall value
Flyingfish	1,794,249	13,324,338	(88)	15,118,587
Dolphinfish	2,502,692	3,001,173	(55)	5,503,865
Tuna	701,425	1,217,695	(63)	1,919,119
Billfishes	307,805	327,302	(52)	635,107
Swordfish	96,522	61,518	(390	158,040
Kingfish	133,459	92,141	(410	225,600
Subtotal - offshore	5,536,151	18,024,168	**(77)**	23,560,319
Snappers	82,150	122,964	(60)	205,115
Shark and barracuda	44,721	42,317	(49)	87,037
Lobster	3,934	3,888	(50)	7,821
Jacks	29,626	16,898	(36)	46,524
Bonito	4,885	4,684	(49)	9,570
Reef fishes	44,657	28,028	(39)	72,685
Sea eggs	1,387,500	0	(0)	1,387,500
All others	201,048	28,890	(13)	229,938
Subtotal - coastal	1,798,520	247,669	**(12)**	2,046,189
Total	7,334,672	18,271,837	(71)	25,606,508

Figure 7: Barbados Fish Landing by Species and Type (tonnes) (2010-2016)

Other fisheries activities include sea egg fishing which had a total value of BBD 500,000.00 in 2016 and lionfish catch of less than 1 tonne. These fisheries activities are generally supported by a varied fishing fleet as indicated below (Figure 8).

Year	2011	2012	2013	2014	2015	2016
Moses	587	615	622	588	607	672
Day-boats	249	235	237	230	230	234
Ice boats	187	191	191	175	179	193
Long-liners	39	42	40	41	43	47
Total	**1,062**	**1,083**	**1,090**	**1,034**	**1,059**	**1,146**

SOURCE: Fisheries Division, Ministry of Agriculture

Figure 8: Fishing Fleet by Type (2011-2016)

Agriculture

The agricultural sector derives its value from the contribution of activities in the sugar and non-sugar sub-sectors and fisheries (value of fisheries sector was discussed above). In terms of valuing the ecosystem services relevant to sustaining land-based agriculture, the main activities are reported in the categories of vegetable, root crops, cotton, livestock and diary production. The production volume of these commodities during the period 2009 – 2016 is provided below (Figure 9).

Commodities	2009	2010	2011	2012	2013	2014	2015	2016P	Change over 2015
Export Crops									
Sugar ('000 tonnes)	30.3	24.5	22.6	23.6	17.4	15.7	10.8	7.0	(34.7)
Cotton ('000 kgs)	3.9	n.a.	n.a.	34.2	25.7	12.0	17.7	13.7	(22.6)
Root Crop Production ('000 kgs)									
Cassava	690.5	399.5	308.4	184.9	1,037.6	552.9	379.1	490.5	29.4
Eddoes	23.5	228.3	19.5	65.3	173.3	74.6	156.6	250.3	59.8
Sweet Potatoes	888.1	1,176.4	506.5	1,211.1	1,218.1	1,231.9	1,334.6	2,897.5	117.1
Yams	824.3	806.6	243.1	346.8	751.8	567.1	578.1	378.4	(34.5)
Onions	626.0	497.9	392.5	550.1	503.8	315.3	757.8	428.7	(43.4)
Peanuts	50.4	15.5	4.6	18.5	87.3	4.6	7.9	11.2	40.8
Vegetable Production ('000 kgs)									
Beans (string)	170.3	222.1	270.0	226.4	112.3	109.2	149.9	137.0	(8.6)
Beets	52.0	30.5	48.5	28.9	31.5	23.7	43.4	83.6	92.5
Cabbage	254.3	60.4	261.7	311.2	181.6	322.7	360.6	337.5	(6.4)
Carrots	198.1	263.7	145.7	244.5	295.5	310.2	271.0	134.6	(50.3)
Cucumbers	1,119.7	1,148.1	1,144.8	813.9	823.9	994.3	810.9	250.3	(69.1)
Lettuce	572.1	339.1	499.0	170.7	213.3	312.7	459.9	439.7	(4.4)
Melon	243.1	240.8	156.3	194.6	381.6	318.9	401.2	197.6	(50.7)
Okra	244.6	302.8	311.8	263.6	215.5	263.6	290.0	261.0	(10.0)
Pepper (Hot)	178.1	76.1	82.8	64.8	48.2	92.8	88.5	37.5	(57.7)
Pepper (Sweet)	293.9	317.5	314.4	175.1	487.8	396.3	329.9	137.2	(58.4)
Pumpkins	191.2	179.7	166.4	188.0	528.9	508.2	308.2	249.3	(19.1)
Tomatoes	718.5	717.5	813.0	1,033.3	977.0	781.0	733.6	336.9	(54.1)

Figure 9 Production of Select Agricultural Commodities of Economic Importance (2009-2016)

Other values of biodiversity relate to the use of genetic resources for germplasm conservation and for use in breeding programmes. Additionally, the value as it relates to landscaping, soil and beach erosion mitigation as well as in the production of herbal, medicinal and spa products, must also be considered although the value of these activities is more difficult to quantify.

Water

Groundwater is the only source of potable water on the island and is found mainly in natural reservoirs within aquifers serviced by natural underground streams. It is estimated that the average water demand is about 89.4 Mm^3 of which public services provide 64.5Mm^3 the rest being serviced by private wells.[18]

Energy

Barbados extracts oil and gas to a limited extent. The Barbados National Oil Company Ltd. (BNOCL) reports that the total production available at the end of 2016, obtained from existing wells, is approximately 1.91 Million barrels of crude oil and 3,292,000 thousand cubic feet (mcf) of gas. Gas sales by the NPC in 2016 had a value of BBD 17,312,200.00. Royalties earned nationally through the sale of oil and gas by BNOCL in 2016 amounted to BBD 4 Million[19].

Genetic Resources of Economic Importance

Germplasm conservation is critical for ensuring sustainable food security; developing food crops and forestry species adapted to environmental and climate changes and pest and disease resistance or tolerance. While some of Barbados' genetic resources used in the agricultural sector were discussed previously, this section focuses on other benefits from local ecosystems.

Plant Breeding and Production of New Plant Varieties

Currently, the only intensive, coordinated and sustained breeding programme in Barbados is for sugarcane at the West Indies Central Sugar Cane Breeding Station Inc. (WICSCBS Inc.) which undertakes research and breeding to produce new sugarcane varieties. WICSCBS Inc. is internationally recognised as a leader in sugarcane breeding operations. It provides fuzz (true seed) or varieties to both regional and international clients.[20] Its bespoke breeding programme allows it to tailor breeding programmes to meet the special needs of its clientele.

In the past, other plant breeding programmes were focussed on commodities such as cotton, pigeon peas and cut flowers. Informal breeding programmes are still in practice by small-scaled farmers who grow, as examples, peanuts, Bajan cucumber, corn, guinea corn and okra. These breeding programmes rely on farmers collecting the best seeds of the current year for planting the next crop season and has greatly facilitated germplasm conservation and improvement in Barbados.

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[18] Moore, W., Alleyne ,F., Alleyne, Y., Blackman, K., Blenman, C., Carter, S., Cashman, A., Cumberbatch, J., Downes, A., Hoyte, H., Mahon, R., Mamingi, N., McConney, P., Pena, M., Roberts, S., Rogers, T., Sealy, S., Sinckler, T. and A. Singh. 2014. Barbados' Green Economy Scoping Study. Government of Barbados, University of West Indies - Cave Hill Campus, United Nations Environment Programme, 244p.

[19] Barbados Economic and Social Report. 2016

[20] Source: http://www.canebreedingstation.com/#

Animal Breeding

While there are no coordinated breeding programmes for livestock in Barbados such activity occurs at the small-scale level. Key species include: black belly sheep, goats, rabbits and pet fish.

Ornamental Services

Under this category are those ecosystems services, which provide raw materials to support varied subsectors, including the crafts sector. Of relevance are:

- Natural fibres for use in basket making, bags, placemats, paper and paper products;
- Fashion and accessories – relying on natural fibres and seeds for jewellery making and leather products from black belly sheep and cow leather;
- Interior design – natural fibres, flowers for floral arrangements;
- Exterior landscaping and beautification – ornamental plants such as royal and cabbage palms, sage, khus khus grass and other local varieties used in landscaping;
- Manufacturing – use of local timber such as mahogany for production of trophies and other crafts items.

Medicinal Plants

Local plant varieties are often used to treat minor illnesses. These treatments are based on traditional knowledge and are known as "old folk remedies". Such use of these indigenous traditional plant remedies is increasing and several products such as soaps and other spa products have incorporated some of these plants.

The Barbados green monkey is exported to be used in biomedical research to test IPV and OPV polio vaccines internationally. Additionally, they are used to test molecules and pharmaceuticals.

2.5.1.2 Regulating Services

Services under this category provide benefits through the regulation of ecosystem processes such as air quality, climate regulation, erosion control, waste treatment, pollination and regulating human disease.

Carbon Sequestration

About 18% or approximately 8,000 ha of Barbados is under forest cover, which translates to a million metric tonnes of carbon in living forests and biomass [UN FAO][21]. The value of vegetative carbon sequestration for Barbados is not known. Such figures would be beneficial to obtain as it could provide guidance as to potential management strategies to improve and preserve vegetable carbon sequestration especially in Barbados' national parks. Data obtained from the UN Biodiversity Lab[22] reveals the following (Figures 10 & 11)[23] in terms of carbon storage in the environment and the potential for carbon

[21] WWW.fao.org
[22] Source: https://www.unbiodiversitylab.org/index.html
[23] Source: http://www.nbsapforum.net/knowledge-base/resource/draft-biodiversity-status-maps-your-6nr-%E2%80%93-barbados

sequestration over a 20-year period. The data presented in the form of spatial maps is inadequate and further data sets will need to be collected to provide more detailed maps for analysis and decision-making.

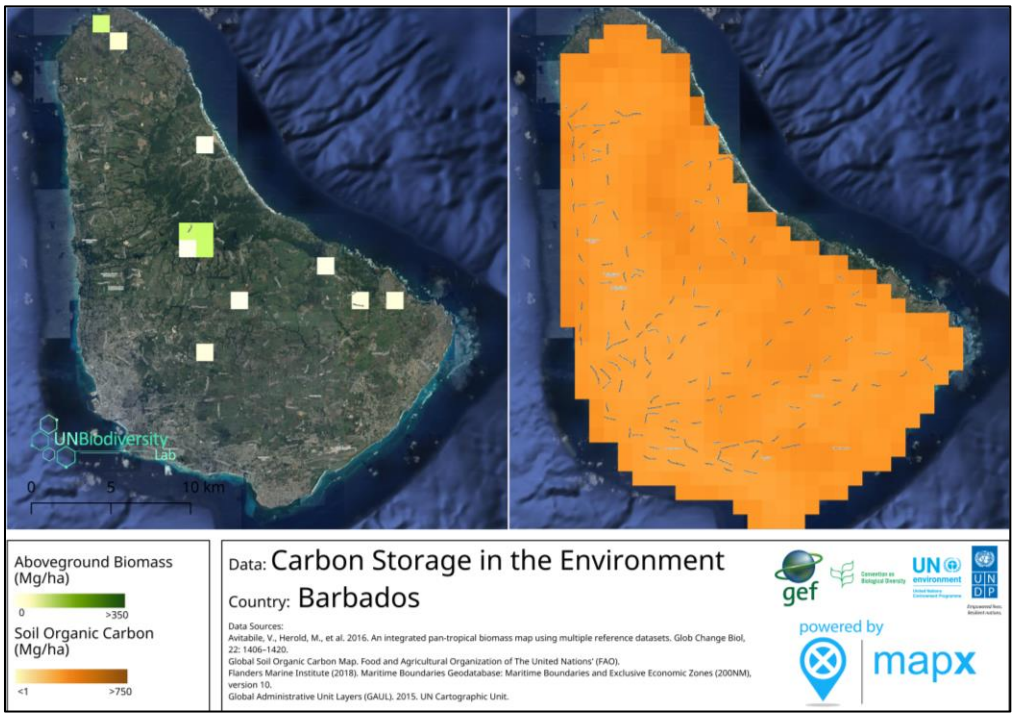

Figure 10 Carbon storage - Above Ground biomass and Soil Organic Carbon

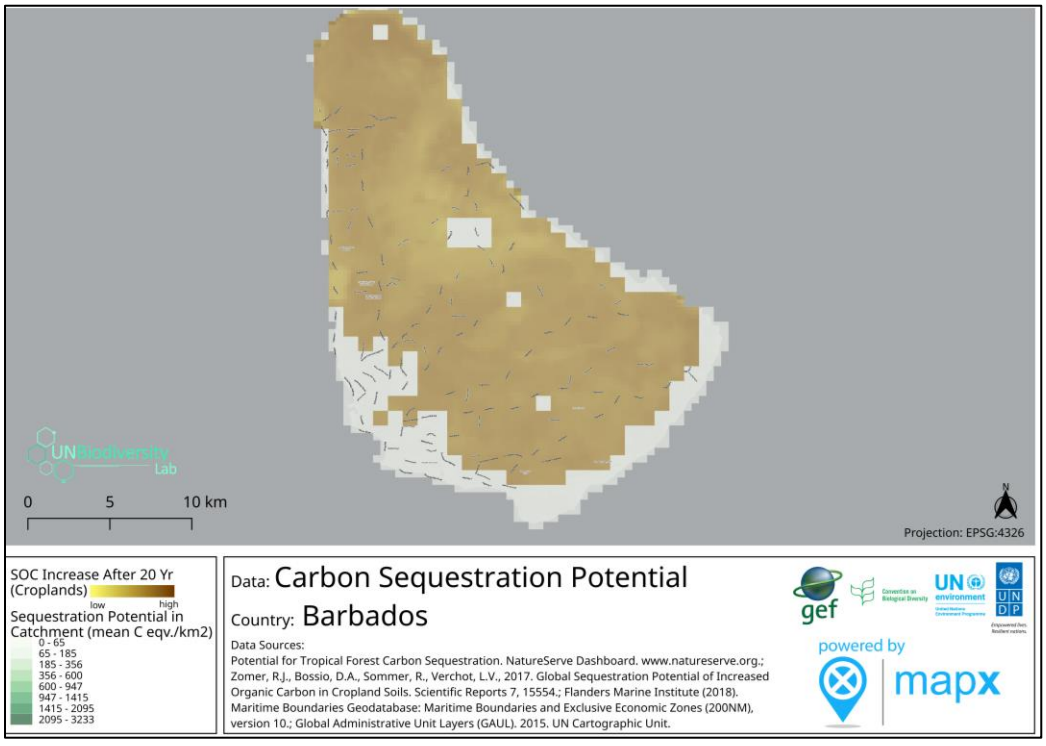

Figure 11 Carbon Sequestration Potential

2.5.1.3 Cultural Services

Non-physical benefits derived from ecosystems such as recreation, aesthetics and spiritual enhancement, education values, cultural heritage and tourism.

Tourism

The tourism sector, which relies heavily on Barbados' natural resources, supports approximately 14,000.00 jobs and accounts for 40% of employment opportunities, contributes 12% to GDP and more than 50% to foreign exchange. Seventy-five percent (75%) of tourists visiting Barbados do so for pleasure, participating in both land and marine-based activities closely linked to both ecosystems.

Visitors to Barbados spend an average of about 1,400 USD, of this total an estimated 869 USD are spent on coastal and marine recreation per person. These activities included: laying on the beach, swimming, snorkelling, sailing, glass bottom boating, power boating and diving[24]. An earlier study[25] also reveal that most visitors surveyed indicated their willingness to pay a nominal environmental fee of ≤ 5.00 USD to help fund the long-term protection of coastal and marine resources in Barbados. Figure 12 [26] shows the value of the tourism sector to Barbados' economy.

	Accommodation & Food Services			Arrivals		
Year	*Share in GDP (%)	Employment ('000 persons)	Stay-over Expenditure ($M)	Stay-over Visitors	Average Intended Length of Stay (days)	Cruise Passengers
2006	19.3	n.a.	1,418.6	562,541	n.a.	539,092
2007	21.9	n.a.	1,716.4	572,937	n.a.	616,354
2008	20.6	n.a.	1,712.2	567,667	n.a.	597,523
2009	19.2	n.a.	1,522.5	518,564	n.a.	635,212
2010	18.5	12.7	1,448.6	532,180	15.04	664,747
2011	16.5	13.2	1,314.1	567,724	12.18	609,844
2012	15.5	12.7	1,237.2	536,303	12.51	517,436
2013	17.5	13.3	1,406.2	508,520	11.82	570,263
2014	17.1	15.4	1,363.1	519,635	11.97	563,030
2015	21.4	15.8	1,719.5	591,872	11.19	586,615
2016P	18.3	16.4	1,443.4	631,513	11.01	729,645

SOURCE: Barbados Statistical Service, Caribbean Tourism Organisation
P – Provisional
* GDP at Basic Prices, Employment and Stay-over Expenditure relate to the industry of Accommodation and Food Services.

Figure 12 Value of Barbados' Tourism Sector (2006-2016)

[24] The Economic Importance of Coastal and Marine Resources to Tourism in Barbados. 2017. Peter Schuhmann, Ryan Stoute and Richard Waite.

[25] Peter W. Schuhmann. The Economic Value of Coastal Resources in Barbados: Vacation Tourists' Perceptions, Expenditures and Willingness to Pay. 2012. CERMES Technical Report No 50.

[26] Barbados Social and Economic Report 2016.

Recreation

Recreation values of Barbados' ecosystems include those provided via national parks and protected areas for walks and hikes. Typically, hikes through Barbados will involve trekking through cane fields, gullies, forested areas and coastal communities.[27] Hikes generally range in length from 6 to 12 miles and have become an integral part of recreational activities for both locals and visitors to the island.

2.5.1.4 Supporting Services

These services are those deemed essential for the production of all other ecosystem services and will have indirect impacts on human well-being, or may occur over a long period of time. Examples include: production of atmospheric oxygen (through photosynthesis), primary production, soil formation and retention, nutrient cycling, water cycling and provisioning of habitat.

Erosion Control

Plants with extensive fibrous root systems such as khus khus grass are used extensively to control soil erosion especially along the edge of plantation fields and sloping areas.

Germplasm Conservation

Through formal and informal breeding programmes of plants species and animal breeds of economic importance, Barbados has engaged in germplasm conservation. Such efforts need to be urgently augmented by a national programme for germplasm conservation of genetic resources of economic importance.

2.6 Framework for Biodiversity Management and Integration (Mainstreaming)

The underlying causes of biodiversity loss can be addressed by ensuring that biodiversity conservation is integrated into all national and sectoral development plans and across government and society, thereby reducing the direct pressures on biodiversity and promoting sustainable use. The United Nations Convention on Biological Diversity (UNCBD) promotes such an approach by calling for the mainstreaming of biodiversity across government and society. This is expressed in Strategic Goal A of the Aichi Biodiversity Targets. Mainstreaming may be simply defined as "the process of embedding biodiversity considerations into policies, strategies and practices of key public and private actors that impact or rely on biodiversity, so that it is conserved and sustainably used both locally and globally (Huntley and Redford, 2014, p. 7). The concept is further articulated in Aichi Targets 1 through 4.

2.6.1 Status of Biodiversity Mainstreaming

Barbados has already made considerable strides in mainstreaming, as biodiversity concerns are expressed in many of the key national and sectoral policies and plans. The Fourth National Report to the UNCBD

[27] Source: https://barbados.org/hike.htm

contains a comprehensive description of the policies, programmes and institutions that actively incorporate biodiversity conservation. These are summarised in Table 1 below.

Table 1: Sectoral and Cross-sectoral Integration/ Mainstreaming of Biodiversity Considerations

National & Sectoral Policies and Plans	Institutional Arrangements	Legislation	International Treaties/ Conventions
1. National Strategic Plan 2006-2025 2. National Biodiversity Strategy and Action Plan 2002 3. Barbados Sustainable Development Policy 2004 4. Physical Development Plan (Amended) 2003 5. The National Park Plan 6. Fisheries Sector Management and Development Policy 7. Medium Term Development Strategy 2010-2014 8. Green Paper: Sustainable Development of Tourism in Barbados: A Policy Framework 9. Barbados Tourism Master Plan 2014-2023.	10. Ministry of Environment and Drainage - Natural Heritage Department - National Conservation Commission - National Botanic Gardens - Coastal Zone Management Unit • Ministry of Agriculture - Fisheries Division, - Soil Conservation Unit, • Town and Country Development Planning Office	• Town and Country Planning Act (cap.240) • Land Acquisition Act Cap.228) • Barbados Constitution (Section 16) • The Soil Conservation (Scotland district) Act (cap.396) • The National Conservation Commission Act (cap.393) • The Trees Preservation Act (cap.397 • The Cultivation of Trees Act (cap.390) • The Barbados Agricultural Development and Marketing Corporation Act (12/19930 • The Barbados Territorial Waters Act 1997 • The Marine Boundaries and Jurisdiction Act (cap.387) • Fisheries Act 1995 (cap.391) • Fisheries Management Regulations (1998) • The Marine Pollution Control Act 1998 (cap.392). • Coastal Zone Management Act (1998-39) • International Trade in Endangered Species of Wold Fauna and Flora Act 2006-3 • National Conservation Commission Act (cap.393) • The Wild Birds Protection Act (cap.398)	11. United Nations (UN) Convention on Biological Diversity; Cartagena Protocol on Biosafety 12. Convention on International Trade in Endangered Species 13. UN Convention on the Law of the Sea 14. Convention to Combat Desertification 15. Convention for the Protection and development of the Marine Environment of the Wider Caribbean; the Protocol Concerning Cooperation in Combating Oil Spills in the Wider Caribbean 16. Vienna Convention for the Protection of the Ozone Layer; the Montreal Protocol on substances that Deplete the Ozone Layer 17. UN Fish Stocks Agreement 18. FAO Compliance Agreement 19. International Convention for the Conservation of Atlantic Tunas 20. The International Plant Protection Convention 21. Agreement on the Application of Sanitary and Phytosanitary Measures

National & Sectoral Policies and Plans	Institutional Arrangements	Legislation	International Treaties/ Conventions
		• The Protection of New Plant Varieties Act (2000-17) • Plant Protection Act (2007-53)	22. Millennium Development Goals

The Fifth National Report (2016) summarises additional policies and programmes not included in the 2011 report and these, along with subsequently developed policies and programmes that further advance the mainstreaming of biodiversity, are summarised in Table 2.

Table 2: Additional Integration Measures Not Included in the Fourth National Report

National & Sectoral Policies and Plans	Institutional Arrangements	Legislation	International Treaties/ Conventions*
• Barbados Growth and development Strategy 2013-2020 • The Draft Climate Change Adaptation Policy Framework • **The Physical Development Plan 2017 Revisions** • The 2012 Green Economy Scoping Study • Barbados Tourism Master Plan 2014-2023 • Fisheries Sector Management and Development Policy • New Fisheries Management Regulations (2014)	• Ministry of Finance and Economic Affairs • Ministry of Environment and National Beautification • Town and country Development Planning Office • Ministry of Finance • Ministry of Economic Affairs and Investment • Ministry of Tourism and International Transport • Ministry of Agriculture and Food, Security • Ministry of energy and Water Resources • Ministry of Maritime Affairs and the Blue Economy	• Town and Country Planning Act (cap 240) • Fisheries Act 1993 (cap391) • Fisheries Management Regulations (1998)	• The Convention on Wetlands of International Importance Especially as Waterfowl Habitats (Ramsar, 1971) • Convention Concerning the Protection of the World Cultural and Natural Heritage (1972). • FAO International Plant Protection Convention (IPPC), 1951 (amended 1979 & 1997). • Protocol on Specially Protected Areas and Wildlife

In addition to the foregoing information, it is important to note the following with regard to biodiversity mainstreaming in Barbados. First, despite the legislative disaggregation of responsibility for certain aspects of biodiversity, the overarching responsibility for coordinating biodiversity conservation and management lies with the Biodiversity and Conservation Programme of the Ministry of Environment and National Beautification. The Programme is the focal point for all matters emanating from, and related to, the UNCBD and it addresses issues related to the management and implementation of all biodiversity-related multilateral environmental agreements (MEAs).

Further, biodiversity management in Barbados of necessity involves a multidisciplinary approach by several agencies that include government Ministries, NGOs, CBOs, academia, the private sector, regional and international organisations. These agencies share responsibility for implementing policies, programmes and projects that directly or indirectly contribute to biodiversity conservation and management. To effectively coordinate the work of these wide-ranging stakeholders, the Biodiversity Programme convenes and manages a Cabinet-appointed Working Group on Biodiversity. In a decision taken on March 11, 2014, the Cabinet of the Government of Barbados assigned responsibility to the Working Group on Biodiversity not only for biodiversity-related matters including MEAs, but also for the future implementation of issues related to the United Nations Convention to Combat Desertification and Drought. The purpose is to ensure synergies are achieved in implementing all MEAs and to streamline the various committees that service the Ministry responsible for the environment. The Terms of Reference of the Working Group on Biodiversity includes the following:

a) To advise on national policy and recommend strategies for the conservation and management of marine and terrestrial biodiversity and sustainable land management;
b) To advise and provide necessary technical input for the development of projects in the areas of biodiversity and sustainable land management;
c) To oversee the management of projects developed by the Ministry related to biodiversity, serving as the Project Steering Committee to such projects;
d) To advise on the implementation of multilateral environmental agreements related to biodiversity to which the Government of Barbados is a Party, including the Convention on Biological Diversity, the Ramsar Convention on Wetlands, the Protocol Concerning Specially Protected Areas and Wildlife (SPAW) to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region, and the United Nations Convention to Combat Desertification and Drought; and
e) To review and monitor the status of marine and terrestrial biodiversity in Barbados.

2.7 New and Emerging Issues

2.7.1 Climate Variability and Climate Change

Since the first NBSAP was published in 2002 there have been substantial changes in the understanding and treatment of global climate change. These changes are reflected in the development and refinement of the international conventions and agreements that enable the global management of climate change as well as the evolution of both the regional and national frameworks and strategies for climate change adaptation planning. The international climate change regime which comprises the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol and the Paris Agreement, is the overarching framework for the global intergovernmental response to climate change. Small island developing states like Barbados, by becoming Parties to the Convention, have committed to implementing some measures, taking into account their specific national circumstances and objectives and provided the industrialised countries are forthcoming with their commitments to provide financial and technological support.

For Barbados, climate change is an island-wide concern, which has implications for all sectors and for all land and coastal areas, including natural habitats, ecosystems, biodiversity and associated natural resources. Consequently, it is essential that climate change be addressed in this updated NBSAP. Recent climate trends for Barbados have been reported[28] as:

- An increase in mean annual temperature by around 0.6°C since 1960, that is at an average rate of 0.14°C per decade;
- Increases in mean rainfall in the quarter, September to November by 12.9 mm per month (6.2%) per decade but this increase is not significant. The increase is off-set partially by a decrease of around 4.0 mm per month (2.1%) per decade in the quarter June to August
- The mean rate of sea-level rise for the past 60 years the in the Caribbean region has been similar to the global average of approximately 1.8 mm. per year (IPCC AR5, 2014).

Detailed climate modelling projections for Barbados predict an increase in average atmospheric temperature, reduced average annual rainfall, increased sea surface temperatures and the potential for an increase in the intensity of tropical storms.

Barbados has already been engaging in adaptation planning and management through a range of actions undertaken be several agencies that are also involved in biodiversity management, thereby achieving a level of integration of climate change and biodiversity management and planning. Some activities include:

- The Integrated Coastal Zone Management Plan, coral reef monitoring, beach revegetation and coastal infrastructure works,
- The Coastal Risk Assessment and Management Programme,
- The Flood Management Project under the Water Resource Management and Flood Resilience Climate Change Adaptation Programme and
- The Water and Sanitation System Upgrade Project, which aims to improve water resources management.

A Draft National Climate Change Adaptation Policy and Abatement Plan (NCCAP/AP) has been prepared and is being reviewed for submission to Cabinet, while the draft Revised PDP (2017) integrates climate change adaptation as well as biodiversity conservation in the national physical development planning process. The NCCAP/AP provides a clear and succinct analysis of the climate related vulnerabilities to which 17 strategically important socio-economic development sectors are susceptible and provided policy for adaptive risk reduction to identified climate related vulnerabilities in the priority national socio-economic sectors including coastal and marine resources, terrestrial biodiversity, water resources, agricultural resources and others.

[28] Simpson, M. et al (2012). CARIBSAVE Climate Change Risk Atlas (CCCRA) - Barbados. DFID, AusAID and The CARIBSAVE Partnership, Barbados, West Indies.

2.7.2 The United Nations 2030 Agenda for Sustainable Development

At the United Nations Sustainable Development Summit held on 25 September 2015, the world community adopted the United Nations 2030 Agenda for Sustainable Development. Billed as a "plan of action for people, planet and prosperity,"[29] the Agenda outlines 17 Sustainable Development Goals (SDG) and 169 targets which countries have committed to achieve between 2015 and 2030.

3 NATIONAL TARGETS

This chapter provides an overview of the national biodiversity targets being pursued as embodied in the National Biodiversity Strategy and Action Plan 2002.

3.1 Overview of the NBSAP (2002)

The National Biodiversity Strategy and Action Plan for Barbados was published in July 2002 and was guided by the following overarching goal:

> "…***to promote the conservation and sustainable utilisation of the island's terrestrial, marine and freshwater biodiversity."***

To achieve this goal a set of twelve (12) targets/objectives were articulated, each supported by specific strategies and accompanying activities to be implemented by designated agencies. These strategies and actions were applied to the components of biodiversity described in the Biodiversity Country Study Technical Reports (Environmental Management and Land Use Planning for Sustainable Development 1998), i.e. Natural Vegetation, Agriculture, Land Resources, Terrestrial Fauna, and Marine and Freshwater species.

The NBSAP also recognised that a four-point approach to implementation was needed that would involve actions at the level of (1) the political directorate and decision makers, (2) the technical level, (3) communities, CBOs, NGOs and private agencies, and (4) the individual level. That approach hinged on the development and implementation of education and public awareness programmes. The specific national targets are as follows:

1. To mobilise adequate financial resources for the management and conservation of Barbados' biodiversity.
2. To develop the required human resource and institutional capacity for biodiversity conservation and management.
3. To conduct essential research to inform the development and implementation of management practices for the sustainable use of biodiversity.
4. To use the results of the research programme to develop appropriate management techniques and mechanisms to ensure sustainable consumptive use and to preserve non-consumptive use values of biodiversity resources.
5. To revise, consolidate and formulate policy and legislation to achieve the conservation and sustainable use of biodiversity.

[29] Taken from the preamble of the 2030 Agenda for Sustainable Development.

6. To promote biodiversity conservation and sustainable use through incentives.
7. To incorporate conservation requirements into land use planning
8. To improve public awareness and education
9. To establish effective in situ and ex situ biodiversity conservation measures
10. To ensure equitable biodiversity and traditional knowledge access and benefit sharing
11. To establish biosafety regulations in order to safeguard biodiversity
12. To promote the conservation and sustainable use of biodiversity in various sectors (agriculture, health, fisheries, tourism).

4 IMPLEMENTATION MEASURES

This section sets out the objectives and strategies for biodiversity conservation and management at the national level. It details the specific actions that were taken to implement the strategies in order to meet the stated objectives/targets. In the Fourth National Report (2011) it was observed that much of the implementation of the NBSAP was in the area of research and conservation of some key species, but that this work was actually done by Government Agencies, academia and NGOs outside of the Ministry responsible for the environment. With respect to institutional capacity, there is additional staff of the biodiversity programme area of the MENB; however, the scientific capacity to manage biodiversity continues to be inadequate, and there remains no formal mechanism to continuously monitor species or to monitor implementation of the NBSAP and its targets. On policy and legislation, implementation of the Biosafety Framework has started, and draft biosafety legislation is being prepared.

The draft Revised Physical Development Plan also elevates biodiversity conservation through its provisions for a Natural Heritage System and improvements to the System of Parks and Open Spaces, which together create stronger policies for sites of special ecological interest such as National Forest Candidate Sites, Natural Heritage Conservation Areas and others. In addition, the Barbados Coastal Risk Assessment and Management Programme has been in its implementation phase since 2011. The various components of this national scale project, which includes infrastructure works, institutional strengthening, and risk assessment, monitoring and management, will collectively enhance the conservation of coastal biodiversity around the island. Notwithstanding this, there is one specific aspect that directly relates to biodiversity management – the Ecosystem-based Adaptation Pilot Project. This is a reef-generation and construction project that is being implemented as a non-engineering solution to shoreline erosion and will provide valuable information on potential replication elsewhere.

Table 3: Progress Made in Implementing National Biodiversity Targets

NBSAP (2002) and Fourth National Report (2011) Proposals		Actions Taken 2002-2011 (as in Fourth National Report)	Actions Taken 2011 to 2019 (for and beyond the Fifth National Report)	Obstacles Encountered and Lessons Learned
NATIONAL BIODIVERSITY TARGET/OBJECTIVE	**STRATEGIES**			
1. To mobilise adequate financial resources for the management and conservation of Barbados' biodiversity.	Develop mechanisms for funding the conservation and management of bio-diversity, ensuring that the costs of production are equitably shared.	1. Awareness of international funding opportunities was built among personnel responsible for biodiversity management 2. The Ministry of Tourism supported research on the valuation of sea turtles, coral reefs and the scuba industry. This will help support and justify calls for incentives and tools for biodiversity conservation 3. No user fees have so far been introduced	1. The Ministry of Agriculture in 2015 established the Green Agricultural Green Product and Green Energy Research Fund (AGPRF), geared toward funding with positive environmental impact. 2. In 2015, approval was granted and legislation enacted to introduce user fees at the Barbados Marine Reserve (BMR) at Folkestone. Cabinet has also approved fees for the agricultural sector.	The AGPRF has limited financing and is time-bound, and therefore is not expected to run for the long term (over a 5-year period)
2. To develop the human resource base and strengthen institutional capacity for biodiversity conservation and management	Strengthen the institutional and technical capacity of environmental government agencies to efficiently manage the components of biodiversity and promote their sustainable use	1. The Natural Heritage Department was established in 2005 to promote biodiversity conservation through management of the National Park Plan set out in the Physical Development Plan 2003. The responsibilities of the NHD were detailed in the 4th NR. Since its establishment, the NHD has continuously carried out education-al and training activities including collecting and storing biodiversity specimens.	1. The 2012 MED study on Sustain-able Land Management focused on developing a Strategic Plan & Institutional Strengthening of the Soil Conservation Unit (SCU). 2. By a decision of Cabinet on March 11, 2014, the Working Group on Biodiversity was reconvened. This multifaceted committing with representation form government, academia, NGOs and the private sector supports biodiversity management nationally through its mandate to advise on, and	There is limited availability of both human and financial resources to implement the Plan.

NBSAP (2002) and Fourth National Report (2011) Proposals		Actions Taken 2002-2011 (as in Fourth National Report)	Actions Taken 2011 to 2019 (for and beyond the Fifth National Report)	Obstacles Encountered and Lessons Learned
NATIONAL BIODIVERSITY TARGET/OBJECTIVE	STRATEGIES			
		2. Inter-sectoral committees with Government and private sector agencies, NGOs, and academia share information on managing biodiversity and are part of the policy making process	ensure synergies in the implementation of biodiversity-related projects and MEAs	
3. To conduct essential research to inform the development and implementation of management practices for the sustainable use of biodiversity	Establish a national research programme to document the status of, threats to and value of biodiversity	A national research programme has not been prepared; however, several important scientific studies have been conducted, as follows: a) 2005: the UWI and the Barbados Museum and Historical Society - establishment of a virtual herbarium, launched in 2009. The herbarium is active and is linked to a second web-based database: Plants of the Eastern Caribbean. It can be accessed at: http://ecflora.cavehill.uwi.edu/vhmain.php b) Surveys of plant nurseries and pet shops to monitor the types of species imported into the country. c) The UWI and other regional and international institutions studies on a variety of species - cattle egret, green monkey, bats, molluscs, beach vegetation, terrestrial plants, coral	1. The University of the West Indies: Research on new and emerging threats to biodiversity, e.g. Lionfish and Sargassum seaweed. 2. 2015-2016: Research on the extraction and use on non-traditional natural fibres – BIEP/GEF-SGP. 3. An ecosystem-based pilot project is being implemented by the CZMU as part of the Coastal Risk Assessment and Management Project (CRMP). The project will identify the location of healthy coral types, the water quality challenges at those locations, and develop a coral nursery by renovating the existing laboratory at the Bellairs research Institute of McGill University at Folkestone. The results will provide useful information on this non-	The MED needs to develop an environmental knowledge management system to document and make accessible the results of varied R&D efforts

NBSAP (2002) and Fourth National Report (2011) Proposals		Actions Taken 2002-2011 (as in Fourth National Report)	Actions Taken 2011 to 2019 (for and beyond the Fifth National Report)	Obstacles Encountered and Lessons Learned
NATIONAL BIODIVERSITY TARGET/OBJECTIVE	STRATEGIES			
		reefs, snakes, invertebrates and fisheries resources including a study of the sea egg fishery. d) A number of agencies (CERMES, CCA, NCC) collaborated on the GEF/SGP-funded coral reef monitoring programme (Reef Watchers) conducted within the BMR at Folkestone. This was a community-based programme that resulted in training volunteers form the local diving community and development of a database to assist long-term monitoring of the reefs. e) A biodiversity GIS was developed that includes data on indigenous, rare and endangered species. f) The Ministry of Agriculture: research on a variety of crops e.g. hot peppers, herbs, tomatoes, root crops, sweet peppers and others.	engineering solution to shoreline erosion, which contributes to loss of coastal biodiversity.	
4. To use the results of the research Programme to develop appropriate management techniques and	1. Develop management approaches for the sustainable consumptive use of flora and fauna. 2. Develop management approaches for conservation of species	A number of management plans were developed including: National Park Plan, Graeme Hall Management Plan, Draft Beach Management Plan, Integrated Gully Ecosystem Management Plan, Sea Turtle Recovery Action Plan, Fisheries	1. CERMES published an evaluation of the 2015 sea eggs season, including recommendations on the future management of the fishery. 2. Preparation of a National Plan of Action for the conservation and	

NBSAP (2002) and Fourth National Report (2011) Proposals		Actions Taken 2002-2011 (as in Fourth National Report)	Actions Taken 2011 to 2019 (for and beyond the Fifth National Report)	Obstacles Encountered and Lessons Learned
NATIONAL BIODIVERSITY TARGET/OBJECTIVE	STRATEGIES			
mechanisms to ensure sustainable consumptive use, and to preserve non-consumptive use values of biodiversity resources	and ecosystems that have significant non-consumptive use value, e.g. for tourism or ecological services.	Management Plan and specific plans for flying fish, large pelagic, sea eggs and conch. Taxon-specific management is covered in reference to general biodiversity management in overarching plans	management of sharks as required by CITES and being spearheaded by the FAO.	
5. To revise, consolidate and formulate policy and legislation to achieve the conservation and sustainable use of biodiversity	Implement existing national legislation and revise or develop new legislation to incorporate biodiversity management policies that are not currently adequately addressed	There are several policies, plans and pieces of legislation, which assist in biodiversity conservation. There is also a draft Environmental Management Bill which, when enacted, will consolidate many biodiversity and other environmental management issues. The Physical Development Plan (2003) was approved in Parliament in 2007 and is a legally-binding document.	1. The draft Environmental Management Bill is currently being reviewed and amended. 2. Proposed additions to the Draft Tourist Accommodation (Licensing and Classification) Regulations, 2016 – Regulation 37 to include measures to protect sea turtles and corals. 3. In January 2016, work was started on a revision of the PDP. A draft revised Plan will be completed by March 2017, and it will contain new policies that will strengthen biodiversity conservation	The time taken to draft and amend legislation continues to be an obstacle.
6. To promote biodiversity	Develop practical incentive measures so	No incentive packages have been developed to date.	Discussions have been underway between CZMU and other agencies	Most incentive programmes require making financial

NBSAP (2002) and Fourth National Report (2011) Proposals		Actions Taken 2002-2011 (as in Fourth National Report)	Actions Taken 2011 to 2019 (for and beyond the Fifth National Report)	Obstacles Encountered and Lessons Learned
NATIONAL BIODIVERSITY TARGET/OBJECTIVE	STRATEGIES			
conservation and sustainable use through incentives	that persons are encouraged to conserve biological diversity	The 2007 Intellectual Property Strategy for Barbados speaks to providing incentives to farmers who grow indigenous plant varieties.	to develop a certification scheme for boat operators who follow a Code of Conduct at *Swim with the Sea Turtles* sites.	records available. This poses a problem for some private sector entities.
7. To incorporate biodiversity conservation requirements into land use planning	Rationalise land use designation and encourage sectoral planning for environmentally friendly development	The PDP (2003) guides all physical development on the island and provides for environmental Impact Assessments to be conducted on all major developments, including impacts on biodiversity. The Green Deficit Management Programme (GDMP) introduced by the National Botanical Gardens as an initiative of the proposed National Silviculture Programme, was intended to rehabilitate green sites and create new ones.	The revision to the PDP is expected to contain policies that will significantly increase attention to biodiversity conservation. In addition, the Barbados National Park (BNP) as defined in the PDP 2003 was officially declared in June 2016.	
8. To improve public awareness and education	Develop public awareness through educational and training activities to ensure broad-based support and involvement in biodiversity conservation	The Ministry of the Environment has an ongoing programme in primary and secondary school as well as general public education and awareness activities. Environmental Studies is offered at key educational institutions including through the Caribbean Examinations Council Advanced Proficiency Level taught in several secondary schools,	1. The activities of 2002 to 2011 are continuing including the public awareness activities of the Biodiversity Section of the Ministry of the Environment, which launched its website in 2016 and funded a poster to improve awareness on handling stranded marine mammals. 2. The Barbados Sea Turtle Project (UWI) takes volunteers every	There is a need to for a well-articulated communication strategy for the MED. This strategy must include communication to all relevant stakeholders. Lessons learned: collaborating with the private sector to facilitate achieving this NBSAP objective is critical.

NBSAP (2002) and Fourth National Report (2011) Proposals		Actions Taken 2002-2011 (as in Fourth National Report)	Actions Taken 2011 to 2019 (for and beyond the Fifth National Report)	Obstacles Encountered and Lessons Learned
NATIONAL BIODIVERSITY TARGET/OBJECTIVE	STRATEGIES			
		and undergraduate and graduate degrees at all UWI campuses.	year and manages a Facebook page to improve awareness of sea turtles. 3. The private sector is also engaged in the national public awareness and education programmes e.g. Atlantis Submarine Barbados – educational tours and information; the Barbados Institute of Environmental Professionals (BIEP); the Barbados Natural Fibres Network (BNFN); 4. Grantees of various GEF SGP programme have been an avenue for public awareness, e.g. the Reef Watchers and the Natural Fibres networks.	
9. To establish effective in situ and ex situ biodiversity conservation measures	1. Establish an effective and sustainable system of protected areas 2. Establish effective and sustainable ex situ facilities for biodiversity conservation	The PDP 2003 contained the boundaries of, and policies for development control within, the BNP, and Natural Heritage Conservation Areas (NHCA). These are actively implemented through the Town and Country Development Planning Office.	1. A partnership of the Ministry of Agriculture, the BNFN, the BIEP, through funding from the GEF SGP, is in the initial stages of implementing the first national germplasm/seed bank. The seed bank will have a collection of natural fibres and seeds germplasm of economic importance, and later, will focus	Limited human resources with the knowledge to establish and maintain a national seed bank. Collaboration/networking with national and international partners is needed

NBSAP (2002) and Fourth National Report (2011) Proposals		Actions Taken 2002-2011 (as in Fourth National Report)	Actions Taken 2011 to 2019 (for and beyond the Fifth National Report)	Obstacles Encountered and Lessons Learned
NATIONAL BIODIVERSITY TARGET/OBJECTIVE	STRATEGIES			
			on conserving seeds of agronomic importance. 2. The NCC Botanical Gardens, and tis Tissue Culture Laboratory established in 2014, will both serve to advance the objective in in-situ biodiversity conservation.	
10. To ensure equitable biodiversity access and benefit sharing	Promote necessary actions to facilitate equitable biodiversity access and benefit sharing		1. The Intellectual Property Office has participated in regional efforts to Establish a Caribbean Framework for the Protection of Traditional Knowledge, Folklore/Traditional Cultural Expressions and Genetic Resources[30] 2. Barbados is participating in the regional GEF-funded project on Access and Benefit Sharing, which aims to help Caribbean island countries make the best possible use of their genetic resources, generate and share benefits derived from their use, and equitably return of the revenue generated from these activities to the protection of the resources within the region.	The challenge is the need to develop a system, which guides access to genetic resources and traditional knowledge and benefits to be, derives from such access, as no coherent mechanism exists.

[30] Source: http://www.wipo.int/meetings/en/details.jsp?meeting_id=15485

NBSAP (2002) and Fourth National Report (2011) Proposals		Actions Taken 2002-2011 (as in Fourth National Report)	Actions Taken 2011 to 2019 (for and beyond the Fifth National Report)	Obstacles Encountered and Lessons Learned
NATIONAL BIODIVERSITY TARGET/OBJECTIVE	STRATEGIES			
11. **To establish biosafety regulations in order to safeguard biodiversity**	Establish activities which will safeguard the environment from risks posed by genetically modified organisms and other forms of biotechnology	In 2005 the National Biosafety Frame-work for Barbados was prepared comprising policy, legislative and institutional structures for biosafety management. The Implementation Plan for the Framework was developed in 2007.	1. The MED is implementing the National Biosafety Framework: (1) a draft Biosafety Bill is undergoing national consultation; (2) several training workshops on biosafety were held; (3) a National roster of Experts has been created. 2. Barbados is also participating in the GEF-funded project for Implementing NBFs in the Caribbean, which seeks to (i) establish "a workable and transparent regime for biosafety and (ii) develop "implementing systems for handling notifications or requests for approvals, enforcement and monitoring, and public information and public participation.	Challenges: lengthy timeframe for the legislative drafting and Cabinet approval as well as for developing regulations. Also, the Biosafety Policy has not yet reached the point of drafting and there have been delays in approval for participating in the project.

4.1 Implementation Gaps

This section identifies gaps in implementing the NBSAP targets, represented by those activities that have not been done to date. The gaps further demonstrate that there is a notable implementation deficit that needs to be addressed in the future.

Table 4: Gaps in Implementing the NBSAP (2002)

NBSAP Objective	Activities not Implemented	Comment
Objective 1: To mobilise adequate financial resources for the management and conservation of Barbados' biodiversity	a) Establish user fees for biodiversity resource users	Only the AGPRF has been identified to date No user fees established
Objective 2: To develop the human resource base and strengthen institutional capacity for biodiversity conservation and management	a) Enhance the capacity of a selected institution to scientifically describe, classify and store collected specimens. b) Has the MED been strengthened? Has the SCU IS programme been implemented?	
Objective 3: To conduct essential research to inform the development and implementation of management practices for the sustainable use of biodiversity	a) Develop/support monitoring of impacts of exploitation, habitat loss, pollutants and alien species on the distribution and abundance of terrestrial, marine and freshwater biodiversity, alien, indigenous and rare species b) Adopt biodiversity indicators under the National Indicators programme and identify additional indicators to highlight biodiversity degradation c) Assess past, current and future patterns of consumption of biodiversity d) Assess the economic value of consumptive use of biodiversity e) Assess the non-consumptive value of biodiversity (e.g. biological control, prevention of soil loss, ecotourism) f) Assess the role of education in biodiversity conservation and management g) Assess the effects of climate change on biodiversity conservation and management. h) Convert the Herbarium at the University of the West Indies, Cave Hill Campus, to a National Herbarium i) Develop a National Clearing House Mechanism as a forum for national/ regional biodiversity researchers	

NBSAP Objective	Activities not Implemented	Comment
Objective 4. To use the results of the research Programme to develop appropriate management techniques and mechanisms to ensure sustainable consumptive use, and to preserve non-consumptive use values of biodiversity resources	a) Identify ecological factors affecting the population status of exploited species c) Identify biodiversity resources with high non-consumptive use value d) Develop taxon-specific management plans to protect species of significant non-consumptive use value of key biodiversity resources e) Incorporate appropriate elements into management plans to protect biodiversity of simultaneously high consumptive and non-consumptive use value f) Develop management approaches to control alien species, which studies have shown to have demonstrable negative impacts on indigenous biodiversity.	
Objective 5. To revise, consolidate and formulate policy and legislation to achieve the conservation and sustainable use of biodiversity	a) Endorse and encourage creation of the post of Environmental Legal Officer as recommended by the EMLUP. a) Develop regulations to fully implement the revised Environmental Legislation for Barbados. *What is the current status of this legislation?* b) Review present incentives and dis-incentives for biodiversity management and incorporate into national policy c) Develop regulations under the CZM Act to minimise impacts of coastal constructions on the beach and near-shore marine environment d) Strengthen the Marine Pollution Control Act to reduce the impact of land-based sources of marine pollution, and the CZM Act to e) Formulate national legislation to address biosafety and bio-technology concerns f) Facilitate community involvement in revising existing and/or developing new legislation g) Conduct biodiversity legislation and enforcement workshops for relevant user groups	
Objective 6. To promote biodiversity conservation and sustainable use through incentives	a) Develop innovative mechanisms for funding incentive package b) Adopt suitable economic valuation methods to value biodiversity so that it can be include in the national accounting system	

NBSAP Objective	Activities not Implemented	Comment
	Research in this area has been conducted only for sea turtles. b) Identify sustainable economic alternatives to activities that threaten biodiversity c) Promote participation of NGOs in funding	
Objective 9. To establish effective in situ and ex situ biodiversity conservation measures	a) Provide for adequate buffer zones and plan environmentally sound development in areas bordering protected areas b) Identify species of flora and fauna requiring ex situ conservation measures c) Establish or support captive breeding facilities, plant nurseries/ arboreta d) Manage the collection of biological resources from natural habitats for ex situ conservation.	
Objective 10. To ensure equitable biodiversity access and benefit sharing	a) Designate authority(ies) responsible for biodiversity and traditional knowledge access b) Develop a database of entities involved in granting access to biodiversity and traditional knowledge c) Define considerations for biodiversity access (e.g. expectations of, and impacts on stakeholders; resources and legal frameworks required etc. d) Define considerations for traditional knowledge access (e.g. definitions of traditional knowledge, regional harmonisation, international efforts etc. e) Create and inventory of local/ traditional innovations and technologies f) Create conditions to facilitate access to genetic resources for environmentally sound uses. g) Assess whether the Government is a sufficient beneficiary of bilateral agreements between local NGOs, companies etc. involved in the sale of biodiversity h) Create conditions and policies to facilitate equitable access and benefit sharing i) Establish equitable and environmentally friendly bilateral agreements between local institutions and international pharmaceutical companies	
Objective 12. To promote the conservation and sustainable use of	a) Develop an official mechanism for collaboration with the Ministry of Agriculture on the conservation and sustainable use of agro-biodiversity	

NBSAP Objective	Activities not Implemented	Comment
biodiversity in various sectors (agriculture, health, fisheries and tourism) ***Strategy 1:*** **(Agriculture): Encourage agricultural biodiversity conservation and sustainable use by revising approaches to agricultural management**	b) Promote knowledge in the farming sector of the economic value of appropriate farming practices e.g. improved yields, erosion control, biological pest control, organic fertilisers etc. c) Collect and disseminate indigenous knowledge and innovations on environmentally sound and biologically diverse farming practices d) Develop local organic farming practices and train persons to certify organic farms e) Establish an Organic Farm Management Programme f) Establish a pilot project that converts an abandoned cane field into an organic food forest g) Establish a National Integrated Pest Management Programme h) Establish an effective National Plant and Animal Quarantine Programme i) Educate farmers about the impacts of agro-chemicals on the environment and the benefits of organic fertilisers j) Promote cultivation of crops that require less water and agro-chemicals to produce good yields k) Encourage a secure market system for organic products l) Promote diverse organic house gardens m) Develop a national planting material programme that includes awareness, certification and standards for seed exchange n) Regulate and restrict use of herbicides and pesticides which result in biodiversity loss o) Establish a national programme to preserve germplasm for the Barbados black belly sheep	
Strategy 2: **(Health) Incorporate biodiversity conservation issues into disease control and waste management practices**	a) Review existing management strategies for mosquito and rodent control re impacts on non-target species and ecosystems (e.g. Graeme Hall Swamp) b) Ensure use of pesticides conforms to international standards c) Promote biological control of disease vectors	

NBSAP Objective	Activities not Implemented	Comment
	d) Support enforcement of existing legislation by the Sewage and Solid Waste Project Unit e) Implement national awareness programme on the value of natural habitats, to deter wide-scale de-bushing and to inform on the impacts of illegal dumping on the marine environment f) Ensure appropriate techniques and machinery are used in the clean-up of dumpsites g) Support recycling schemes through subsidies and incentives to reduce cost of landfill maintenance h) Ensure that solid waste and hazardous waste sites are adequately distanced and buffered from sensitive ecosystems and habits of endangered species	
Strategy 3: **(Fisheries) Encourage fisheries conservation and sustainable use by revising approaches to fisheries management**	a) Ensure important breeding grounds are protected within NHCAs b) Provide mechanisms for inter-agency and stakeholder consultations c) Ensure that regulatory systems maintain populations at levels that ensure ecosystem integrity and function d) Regulate fishing apparatus and methods to reduce adverse effects on marine biodiversity e) Reduce at-sea dumping of garbage f) Maintain catch statistics to monitor populations of target species and the impacts of exploitation a) Sensitise fisher folk on the importance of sustainable fishing practices and marine protected areas b) Train fisher-folk for self-enforcement of regulatory measures c) 3.9. Encourage alternative income generation for fisher folk and ensure secure markets for catch.	
Strategy 4: **(Tourism) Encourage measures to reduce threats to biodiversity resulting from improperly**	a) Improve monitoring and enforcement at sea by strengthening the capacity of the Coast Guard	

NBSAP Objective	Activities not Implemented	Comment
planned and managed tourism development	b) Implement a monitoring programme on the impacts of climate change on fish stocks a) Conduct research on the contribution of tourism facilities and activities to biodiversity loss b) Sensitise the tourism sector to the negative impacts of tourism on the environment c) Encourage sound environmental management techniques at tourism facilities d) Educate tourism personnel on the relationship between tourism and biodiversity conservation e) Promote regulatory measures to maintain the balance between tourist numbers and the carrying capacity of sensitive habitats f) Restrict development of large tourism centres and conduct CBAs to inform decision making g) Prevent high impact tourism in undeveloped areas of significant biodiversity importance h) Promote only small-scale, fully trained guided tourism in important biodiversity areas i) Consider the need for a head tax on all tourist arrivals	

5 THE AICHI BIODIVERSITY TARGETS 2020

5.1 Progress towards Implementing the Aichi Biodiversity Targets

The Fifth National Report describes the progress Barbados has made in contributing to achievement of the Aichi Biodiversity Targets since 2011. In summary, Barbados' activities have in different ways and in varying degrees contributed to the twenty global targets through national level actions on each target.

The following presents a synopsis of Barbados progress towards implementing the Aichi targets during the reporting period.

Table 5: Progress in Implementing the Aichi Targets

No.	Aichi Targets	Relevant indicators	Progress toward implementation during the reporting period
Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society			
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	• Trends in awareness and attitudes to biodiversity • Trends in public engagement with biodiversity • Trends in communication programmes and actions promoting social corporate responsibility	The MED continues to move forward with its awareness and education programmes on biodiversity conservation and management. The new NBSAP will contain a detailed communication strategy and action plan. Training workshops, conferences and seminars have been undertaken in a wide cross section of areas relevant to the environment and obligations under various MEAs. Participation in activities marking major environmental days observed globally. Outreach programmes to communities and schools to sensitise about environmental issues. There is a noticeable trend in the involvement of the private sector in conservation and biodiversity maintenance e.g. the conversion of quarry mines to ecologically balanced spaces.
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.	• 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	As part of the development of its new NBSAP Barbados is currently undertaking an assessment of biodiversity values. While specific studies have not been undertaken to access the value of biodiversity various studies undertaken by the Ministry of Agriculture – Fisheries Division and other stakeholders and statistical data can be used to assist in determining such values.

		• 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	The Green Economy Scoping Study[31] published in 2014 provides tangible linkages between agricultural biodiversity, and economic development. One of the challenges faced in determining ecosystem values, especially in non-traditional areas is the lack of statistical data and accessibility of the limited data that is captured by various government departments and within the private sector.
3	By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed to minimise 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, considering national socio-economic conditions.	• Trends in the number and value of incentives, including subsidies, harmful to biodiversity, removed, reformed or phased out. • Trends in identification, assessment an establishment and strengthening of incentives that reward positive contribution to biodiversity and ecosystem services and penalise adverse impacts.	Data not available to access progress
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.	• Trends in Ecological Footprint and/or related concepts • Trends in extent to which biodiversity and ecosystem service values are incorporated into organisational 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	Much work still needs to be undertaken at achieve this target. There is an increasing focus on sustainable utilisation of biodiversity of economic importance as evidenced by the species-specific management plans developed by the Fisheries division (e.g. sea egg); the focus on regenerating old quarries (e.g. Walker's reserve); the conversion of a bird shooting wetland to a conservation area.

[31] Moore, W., Alleyne ,F., Alleyne, Y., Blackman, K., Blenman, C., Carter, S., Cashman, A., Cumberbatch, J., Downes, A., Hoyte, H., Mahon, R., Mamingi, N., McConney, P., Pena, M., Roberts, S., Rogers, T., Sealy, S., Sinckler, T. and A. Singh. 2014. Barbados' Green Economy Scoping Study. Government of Barbados, University of West Indies - Cave Hill Campus, United Nations Environment Programme, 244p. (Revised January 2015)

		utilised species, including species in trade	
Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use			
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.	• 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	Loss of habitat in sensitive areas such as the Scotland District Area remains a concern due to land slippage. No assessment has been undertaken to determine the rate of loss of natural habitat. A 2015 study of the natural fibres and seeds of economic importance to the crafts sector has brought to light limited availability of some fibre and seed plants which were present in abundance in specific locales on the island. Grass and pasture fires remain a threat to biodiversity and there is need to undertake baseline studies and to monitor loss of habitat due to this threat. The challenge remains the availability of data to make the assessment.
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	• 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	Several management plans have been developed by the Fisheries Division of the Ministry of Agriculture including an overall fisheries management plan [323334] The Fisheries Management Plan contains 8 fishery-specific management plans for the follow: (i) Shallow-shelf reef fishes, e.g. parrotfish, surgeonfish, grunts; (ii) Deep slope fishes, e.g. snappers, groupers; (iii) Coastal pelagics, e.g. herrings, jacks, small tunas; (iv) Large

[32]P. McConney, R. Mahon and H. Oxenford. 2003. Barbados Case Study: The Fisheries Advisory Committee. Caribbean Coastal Co-Management Guidelines Project

[33] P. McConney, R. Mahon and C. Parker. 2003. Barbados Case Study: The Sea Egg Fishery. Caribbean Coastal Co-Management Guidelines Project

[34] Patrick McConney. Multi-objective Management of Inshore Fisheries in Barbados: A Biodiversity Perspective

	species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.	• Trends in population of target and bycatch aquatic species • Trends in proportion of utilised stocks outside safe biological limits	pelagics, e.g. dolphin, tunas, kingfish, swordfish, shark; (v) Flying fish; (vi) Sea urchins, i.e. sea egg; (vii) Turtles, e.g. loggerhead, hawksbill, leatherback; and (viii) Lobsters; e.g. spiny, spotted. Section 3(3)) of the 1993 Fisheries Act makes provision for the development of strategies s for the sustainable utilisation of fish stock. "*The objective of fisheries management and development shall be to ensure the optimum utilisation of the fisheries resources in the waters of Barbados for the benefit of the people of Barbados.*"
7	By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.	• 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	The Ministry of Agriculture has developed several polices for the sustainable development of the agricultural sector. Policies for the agricultural sector have been articulated within the framework of the National Policy, which in addition to other strategies refer to defining a green belt for agriculture.[35] Focus on implementing water storage facilities and rain harvesting facilities on farms; and implementation of water conservation technologies Data will need to be disaggregated to make a full assessment of progress towards the target
8	By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.	• 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	Data not available to access progress

[35] A Review of Agricultural Policies: Case Study of Barbados. 2005. The CARICOM Regional Transformation Programme for Agriculture

		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	
9	By 2020, invasive alien species and pathways are identified and prioritised, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.	• 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	Studies are being undertaken regarding the Lionfish and Giant African snail about management. More data is required to fully make an assessment on progress to this target.
10	By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimised, so as to maintain their integrity and functioning.	• 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	Several coral reef studies are being undertaken by the Centre for Resource Management and Environmental Studies (CERMES), Faculty of Science and Technology, The University of the West Indies, Cave Hill Campus, Barbados, including a recent study Mapping the return of acroporid corals on fringing reefs along the west coast of Barbados.[36] Further studies are required to generate data required to make a full assessment on progress towards this target

[36] R. Maclean and H.A. Oxenford. 2016. Mapping the return of acroporid corals on fringing reefs along the west coast of Barbados. CERMES Technical Report No 80. http://www.cavehill.uwi.edu/cermes

Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity			
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 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 landscapes and seascapes.	• 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 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	The national system of protect areas management remains under several different government ministries, sometime with limited coordination of activities. The National Park Development Plan was developed to guide the development of the Barbados National Park and Natural Heritage Conservation Areas in Barbados Barbados's system of Parks and Open Spaces is detailed in the Physical Development Plan and comprises 6 categories and specific land use policies for each of the categories. The categories: - OS 1 The Barbados National Park - OS 2 Natural Heritage Conservation Areas - OS 3 Coastal Landscape Zone - OS 4 Public Parks and Open Spaces - OS 5 National Attractions - OS 6 Barbados National Forest Candidate Sites The system of protected areas includes: - Carlisle Bay - a Marine Protected Area - Folkestone Marine Reserve - Barbados' first marine protected area
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.	• Trends in abundance of selected species • Trends in extinction risk of species • Trends in distribution of selected species	Technical workshop in 2013 to discuss the conservation of the Barbados Leaf-Toed Gecko; distribution studies. Ongoing work by the Fisheries Division of the Ministry of Agriculture on the abundance and distribution of fish stock of economic importance including invasive species such as the Lionfish.

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.	• 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	Mapping of natural fibres and seeds used by the crafts sector (2015) Ministry of Agriculture, collaborating with national Barbados Natural Fibres Network (an NGO) to establish a seed bank for natural fibres and seeds in the first instance and then for crops of agro-importance.
Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services			
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, considering the needs of women, indigenous and local communities, and the poor and vulnerable.	• 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	Several studies undertaken by both the private and public sectors on ecosystem services provided by biodiversity. Not enough data available to assess the progress towards this 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.	• 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	Trend towards greater private sector involvement in conservation and restoration with specific focus on restoration of quarry sites and conversion of bird shooting swamps to national reserves. The beautification of Historic Bridgetown focused on the upgrade of Constitution River with an aim toward flood mitigation intervention; landscaping using indigenous plants and the creation of a marine life habitat

		• Trends in proportion of land affected by desertification	
16	By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation is in force and operational, consistent with national legislation.	• Number of Parties to the CBD that have ratified the Protocol • Number of Parties to the Nagoya Protocol that have legislative, administrative or policy measures and institutional structures in place for implementing the Nagoya Protocol	
Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building			
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.	• Trends in implementation of National Biodiversity Strategies and Action Plans, including development, comprehensiveness, adoption and implementation	Work commenced towards developing new NBSAP targets
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.	• 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	June designated national cultural heritage month Extraction and documentation of traditional aspects of products and services which have a unique characteristic because of traditional know-how and practices as well as geographical location to be used as a tool for protection such products under an intellectual property regime
	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.	• Number of maintained species inventories being used to implement the Convention • Trends in coverage of comprehensive policy-relevant sub-global assessments	Greater collaboration with academic institutions such as the University of the West Indies, Barbados Community College, and Bellairs Institute and the private sector regarding biodiversity management issues MOA focus on R&D and innovation to enhance the

		including related capacity building and knowledge transfer, plus trends in uptake into policy	agricultural sector and train young persons to generate greater interest in agriculture Publication on the medicinal properties of native plant species
	By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilisation, should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.	In decision X/3 the Conference of the Parties adopted a set of 15 indicators to assess progress in the implementation of the financial resource mobilisation strategy and Target 20 of the Strategic Plan.	Traditional funding sources such as the GEF/SGP, CDB and Government financing continue to be significant contributors to supporting related projects An increase number of NGOs focusing on biodiversity conservation projects using indigenous plant species and animal breeds Private sector financing for major restoration and conservation projects

6 NATIONAL PRIORITISED AICHI BIODIVERSITY TARGETS 2020 AS PRESENTED IN THE REVISED NEW NBSAP

6.1 Nationally- Prioritised Aichi Biodiversity Targets

For the next period, Barbados has selected twelve (12) national priority targets from among the 20 global targets, and will focus resources on advancing these as a means of addressing national priorities while also contributing to global goals. The nationally prioritised Aichi Targets are listed in Table 8. As shown in the Table, the language of five of these targets—1, 3, 11, 12 and 13—has been adjusted to more closely align the targets with national circumstances. The prioritised targets have been integrated into the revised NBSAP 2019.

Table 6: Nationally Prioritised Aichi Targets

Aichi Target		National Target	
Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society			
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.	**1**	By 2030, at the latest, Barbadians will be more knowledgeable about the values of biodiversity and the steps they can take to conserve and use it sustainably.
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.	**2**	By 2030, at the latest, the Barbados Government and business and stakeholders at all levels in Barbados, will 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.
Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use			
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.	**3**	By 2030, the rate of loss of all natural habitats including forests is decreased by 25%.
7	By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.	**4**	By 2030 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.
8	By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.	**5**	By 2030, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.
9	By 2020, invasive alien species and pathways are identified and prioritised, priority species are controlled or eradicated, and measures are in place	**6**	By 2030, invasive alien species and pathways are identified and prioritised, priority species are controlled or eradicated, and measures are in

	to manage pathways to prevent their introduction and establishment.		place to manage pathways to prevent their introduction and establishment.
10	By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimised, so as to maintain their integrity and functioning.	7	By 2035, anthropogenic pressures on coral reefs (e.g. nutrient loads, anchor damage, overfishing) and other vulnerable ecosystems impacted by climate change or ocean acidification, are minimised, so as to maintain their integrity and functioning.
Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity			
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 landscapes and seascapes	**8**	By 2030, 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 designated within connected systems of protected areas and plans for effective area-based conservation measures are in development.
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.	**9**	By 2030, pressures on known threatened species have been identified and mitigated, and conservation status has been improved.
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.	**10**	By 2030, 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.
Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building			
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.	**11**	By 2030, document all traditional and scientific knowledge and technology relating to biodiversity so that it improved, widely shared, transferred and applied.
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.	**12**	By 2030, at the latest, Financial resources to conduct projects and research in the area of biodiversity should increase substantially
20	By 2020, at the latest, the mobilisation of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilisation		

	should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.		

7 THE DRAFT NBSAP AND THE USE OF SPATIAL DATA FOR REPORTING ON IDENTIFIED NATIONAL TARGETS

7.1 Introduction

This revised NBSAP draws on the assessment of implementation of the 2002 NBSAP, which included an analysis of gaps in implementation and identification of lessons learned, as set out in Section 3. These gaps and lessons have been integrated into the revised draft NBSAP. It also draws on the stakeholder review of the global Strategic Plan for Biodiversity and the Aichi Biodiversity Targets (2011-2020) which resulted in the selection of thirteen (13) prioritised national targets adapted to the Barbados case. Thirdly, it is developed around a stakeholder-articulated Vision for biodiversity management, which is consistent with broader national development goals. These three aspects of work have been woven together to articulate a NBSAP implementable over the period 2020 to 2030, a time frame that includes that of the National Strategic Plan for Barbados 2006-2025.

Available and accessible spatial data is presented in this section and can be considered baseline data, which can be used for future analysis of implementation of NBSAP.

7.2 Priority Targets, Objectives and Actions

The priority strategies for biodiversity conservation in Barbados to 2030 are aimed at improving the well-being of all Barbadians. The priority targets, objectives and actions that will be implemented to achieve this vision are as follows.

7.2.1 TARGET 1: By 2030, at the latest, Barbadians are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

Effective implementation of conservation actions depends on informed and motivated stakeholders who understand the value in biodiversity conservation and how to achieve it. For this, education at all levels is necessary, and can be achieved by carefully targeted communications strategies. While Barbados has conducted several educational and public awareness activities over the years, we believe that this is a continuous process that must be adaptable to changes biodiversity conditions. The following measures are recommended:

Strategic Objectives Target 1:

1. **To communicate to the public on matters related to biodiversity conservation and management.**
2. **To continuously integrate biodiversity concerns and conservation actions into national policies and programmes, including their implementation.**

Strategic Actions Target 1:

1. Raise awareness through the design and implementation of a communication strategy about the NBSAP and key issues related to biodiversity conservation and management at the national level among a wide but defined group of audiences and user groups

2. Increase the participation of stakeholders in relevant data collection and dissemination, the development of key indicators and in biodiversity conservation and develop a platform for access, storage, dissemination and use (data management) of knowledge and data created
3. Encourage collaboration among strategic partners to implement provisions of the NBSAP through information sharing
4. Designate personnel with responsibility for continuous intersectoral liaison and for monitoring sectoral and cross sectoral activities and programmes that are biodiversity related
5. Develop and implement a continuity programme for increasing awareness among public sector decision makers and technical personnel in targeted economic sectors and in the cross-cutting area of economic planning. This programme should be geared towards maintaining and expanding mainstreaming by continuously updating stakeholders on changing issues/ developments in biodiversity management and formulating appropriate response measures
6. Periodically revisit and upgrade the education and awareness programme to remain current and cutting edge
7. Implement education and awareness activities (e.g. seminars, public information events) in response to new developments and /or occurrences in biodiversity matters, e.g. new information of species, changes in policy etc.
8. Design public awareness and education programmes targeting primary and secondary schools through linking with their science and environmental programmes
9. Provide support for Barbados implement provisions of Principle 10 of the Rio Declaration related to Access to information and to give effect to the - *Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean*[37]

While this target does not specifically require spatial data to facilitate monitoring and evaluation of success of implementation, the sharing of spatial data collected and stored by different stakeholders is critical for knowledge sharing and decision-making.

7.2.2 TARGET 2: By 2030, at the latest, the Barbados Government, businesses and stakeholders at all levels will 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.

This target is directly related to the national goal of building a Green Economy and the objective of promoting the sustainable use of national renewable resources and the wise management of our non-renewable natural resources. Barbados already has in place several management plans for provisioning species such as in fisheries (sea urchin, flying fish), wildfowling, and black belly sheep. The 5th National Report and stakeholder consultations, however, have revealed that there remain exploited and exploitable species to be identified and managed sustainably in order to conserve them for future use.

[37] Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean. https://www.cepal.org/en/escazuagreement

Strategic Objective Target 2: To develop appropriate management approaches and practices for the sustainable consumption of biodiversity-based products

Strategic Actions Target 2:

1. Identify and document species of plants and animals used, and with the potential to be used, in commercial and subsistence provisioning services.
2. Identify human-induced and ecological factors that affect the population status of these species: extent of human exploitation; vulnerability to natural events; exposure to natural predators, diseases etc.
3. Develop indicators and prepare and implement a monitoring plan to track the status of these species.
4. Develop and implement national physical development plans which are pro-biodiversity conservation use and sustainable management
5. Develop species-specific management plans for the identified species to ensure their continued regeneration.
6. Develop management plans to control alien and other predatory species and, where possible, ecological factors, which negatively impact on the identified species.

Spatial Data

Spatial data relevant to this target would include:

- Data showing urban sprawl
- Land use maps showing both marine and terrestrial habitat shifts/loss as a result of changes to the use of land
- Town planning and Physical development maps
- Walker's Reserve – before sand dune rehabilitation and after

Figure 13 shows the planned national growth development taking into consideration urban and rural development and the maintenance of national park spaces in the Scotland District Area.[38] National park spaces encompasses areas in the parishes of St. Lucy, St. Andrew, St. Joseph, St. John, St. Philip and St. Thomas.

[38] Barbados Physical Development Plan Amendment: Toward a Green, Prosperous and Resilient Nation. Draft February 2017. Strategic Policies. Source: http://www.townplanning.gov.bb/pdp/downloads/

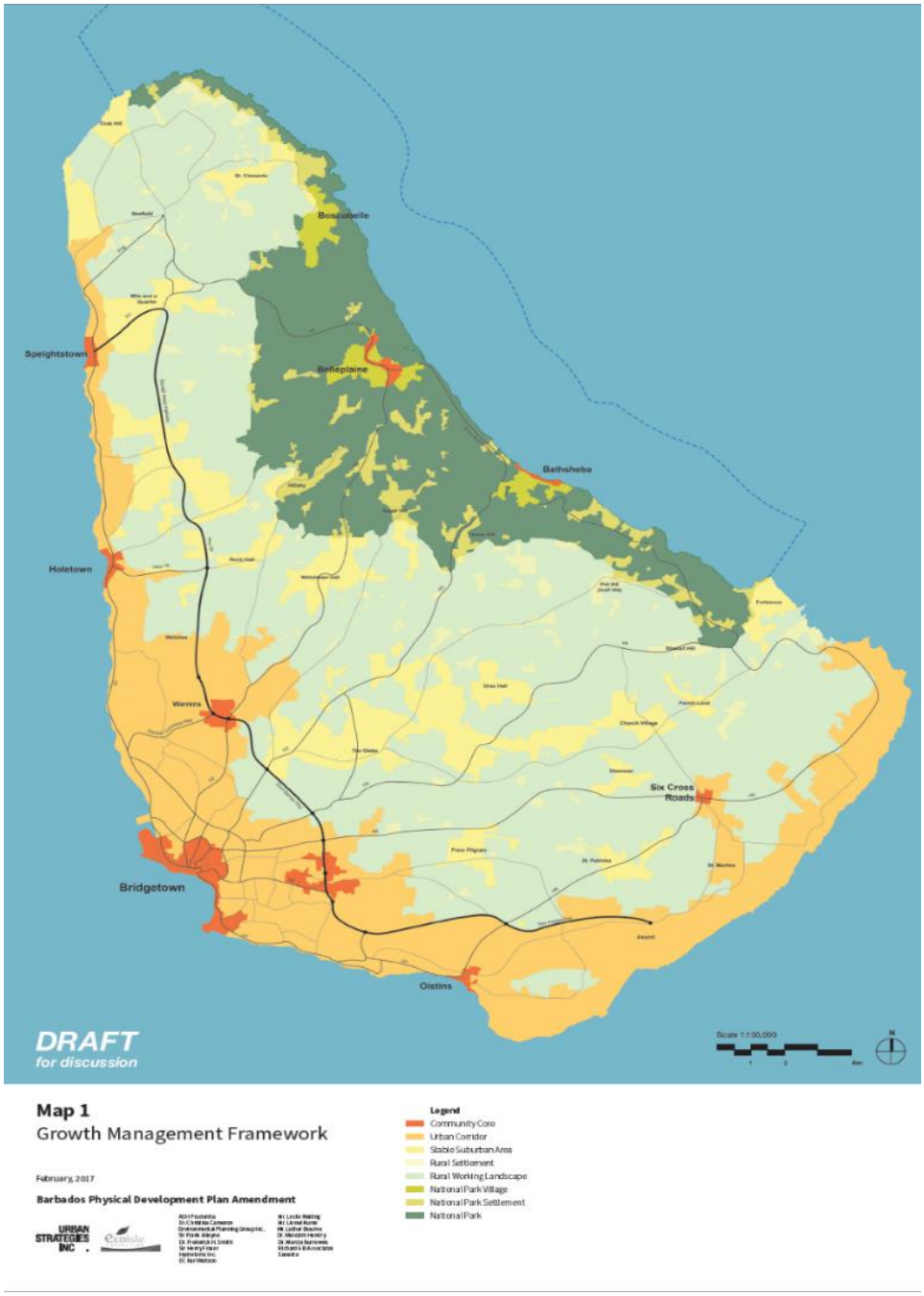

Figure 13 Barbados' planned growth strategy and land space allocation

The draft Physical Development Plan (2017)[39] outlines Barbados' growth strategy along key areas as depicted on the Growth Management Framework map.

[39] Barbados Physical Development Plan Amendment: Toward a Green, Prosperous and Resilient Nation. Draft February 2017

- **The Community Cores**: these allocated areas play a pivotal role as the heart of communities with the highest levels of service, offering daily amenities, heritage assets and infrastructure. As a result, reinvestment will be the focus in historic cores and re-urbanisation and infill in emerging cores.
- **The Urban Corridor:** As shown is based on 2016 settlement patterns. The national focus will be for new development and growth within these areas
- **Stable Suburban Areas**: will be the focus for infill or completion of existing neighbourhoods and approved development with an emphasis on introducing more locally based amenity and mobility options
- **The Rural Working Landscape**: spaces allocated for food, agriculture, natural resources and pockets of rural settlements
- **The Barbados National Park**: will continue to be conserved for its distinct characteristic of ecosystems, agriculture and rural settlements that exist within the protected landscape.

The information presented can be used as baseline and to monitor how well Barbados has maintained its natural spaces especially in relation to food and agriculture and national parks.

7.2.3 TARGET 3: By 2030, the rate of loss of all of Barbados' natural habitats, including forests, will be decreased.

Strategic Objective Target 3: To preserve the biodiversity of remaining indigenous vegetation cover, areas designated in the National Physical Development Plan (PDP) as Significant Natural Features (or similar designations in the revision that the PDP is currently undergoing), and other known significant species and habitats within and outside of the boundaries of the Barbados National Park.

Strategic Actions Target 3:

1. Create memoranda of understanding for the Planning, Policy and Research Unit, the Natural Heritage Department and other relevant agencies of the Ministry of the Environment to work closely with the Town and Country Development Planning Office to effectively implement the land use policies pertaining to natural heritage conservation in the 2003 Physical Development Plan, (and those of the Revised PDP (2017) when they come into force), in order to strengthen in situ conservation in specially designated areas.
2. Identify species of fauna and flora requiring *ex situ* conservation measures
3. Build the capacity of the National Botanical Gardens agency to actively implement *ex situ* conservation of significant species of flora
4. Establish a formal collaborative mechanism among identified government agencies, academic and research institutions, non-governmental organisation and private sector agencies to develop a national register of biological resources for ex situ conservation.

Spatial Data

To facilitate reporting and decision making for this target, supporting spatial data will include:

- Town Planning and Physical development maps
- Forest cover maps
- Maps showing marine and terrestrial areas designated as national parks and protected areas

- Worlds heritage sites/protected areas
- Areas of *in situ* conservation of economically important plants and animal species

The focus of this target is to maintain, and increase where relevant, Barbados' natural habitats while planning for a steady state of population growth. Relevant to this target as articulated in the Barbados Physical Development Plan Amendment,[40] are measures in place to the development of national parks and natural heritage spaces. Figures 14 and 15 provide spatial data information relevant to this target. In Figure 14, information is presented on the planned Natural Heritage System (NHS). The draft PDP-Amendment recognises the importance of a NHS for Barbados, as it will provide a framework for the protection and enhancement of the "quality of the natural environment through soil and groundwater conservation, protection of land and marine biodiversity, and the prevention of air, land and water pollution". Additionally, it provides a foundation for engaging the public to build awareness of the critical linkages between the environment, sustainable development, wealth creation and human wellbeing. Central to the NHS is the protection, maintenance and enhancement of natural heritage in urban and rural spaces while minimising adverse impacts to these areas as a result of human development and natural disasters.

[40] Barbados Physical Development Plan Amendment: Towards a Green, Prosperous and Resilient Nation. Draft February 2017. Source: http://www.townplanning.gov.bb/pdp/Downloads/ (accessed July 8, 02019).

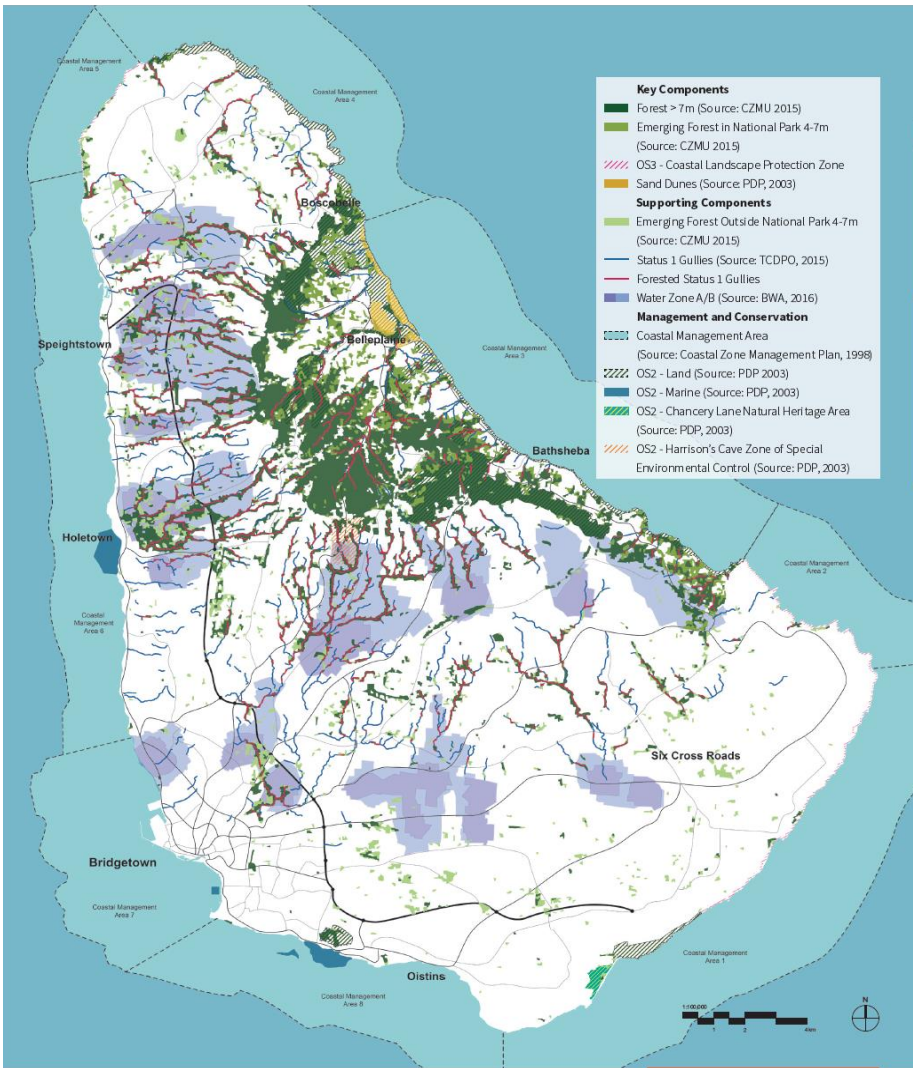

Figure 14 Proposed Natural Heritage Systems

Key component of the NHS as elucidated in the PDP-Amended are:

i) Forested and naturally vegetated gullies; ii) Forests (existing vegetation over 7m); iii) Emerging forests (existing vegetation 4-7m) in the National Park; iv) Coastal and inland wetlands; v) Coral reefs; vi) Key habitat areas; vii) Species at risk; viii) Sea cliffs and sea rocks; ix) Rivers; and x) Sand dunes and natural beaches.

Supporting components of the Natural Heritage include: i) Other gullies; ii) Regenerating forests (4-7 m) outside the National Park; and iii) Groundwater protection zones (water recharge and protection areas).

Within the NHS, natural disasters and hazards will be managed to minimise adverse impacts. The spatial distribution of natural hazard risks in Barbados "…….is determined by the interaction of local and regional hydro-meteorological, oceanographic and tectonic phenomena with the island's varying geological, topographic, bathometric, and biological features. The resulting interactions give rise to location-specific expressions of natural hazard risk that threaten human health and wellbeing, built infrastructure, sector-

specific economic activities, and natural heritage assets". The spatial data presented in the PDP-Amended (See Figure 13) provides essential information to assist in planning for mitigation of these hazards. Natural hazard areas identified in the map include i) soil slippage and erosion prone areas; ii) gullies and escarpments and iii) flood susceptible areas including rivers, streams, floodplains and coastal areas

Monitoring the situation will rely on hazard vulnerability and impact assessment modelling and mapping. Data collected by key agencies such as the Ministries with responsibility for Environment and for Agriculture, Coastal Zone Management Unit, the Soil Conservation Unit and the UWI (CERMES); and ongoing work by Civil Society Organisations (CSOs) will be critical for monitoring progress in achieving components of this target.

The information provided in the natural hazard map can be used by stakeholders for decision-making to address key issues such as land degradation, climate change impacts, planning decisions with regard to building permissions within proximity of these designated areas. Further, such data will be critical in the development of disaster management and emergency preparedness plans for communities within these areas.

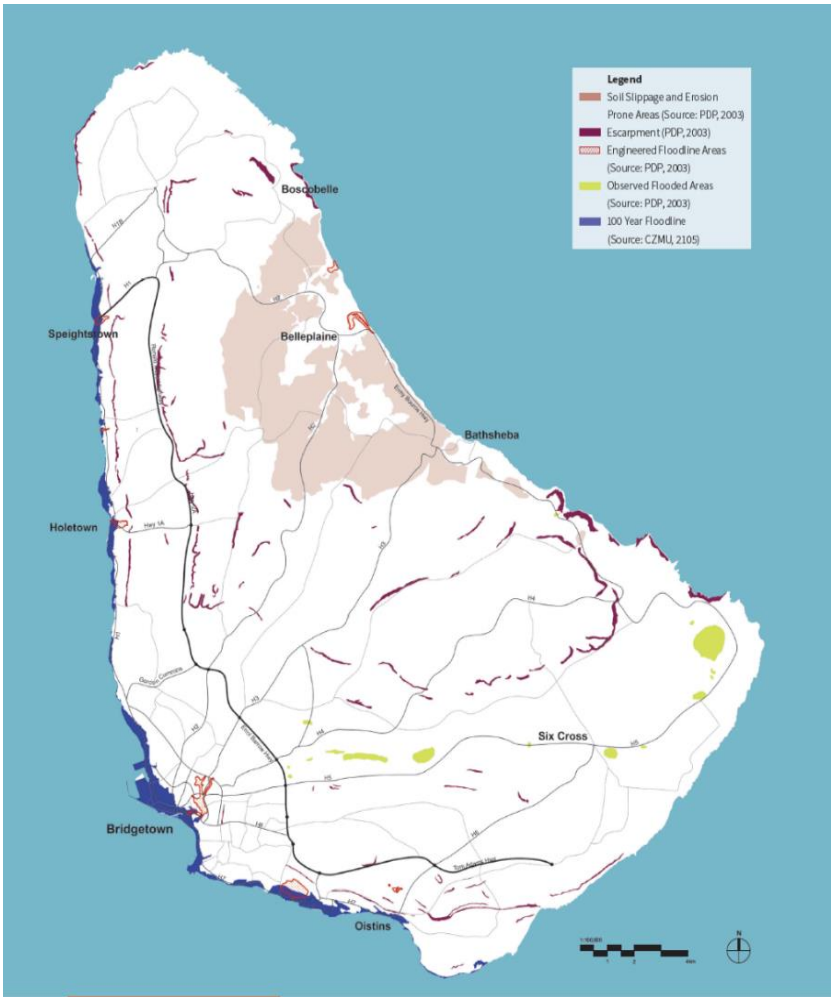

Figure 15 Natural Hazard Map

7.2.4 TARGET 4: By 2035, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

Strategic Objective Target 4: To conserve the biodiversity of areas under use in agriculture, aquaculture and forestry.

Strategic Actions Target 4

1. Develop and implement education and training programmes about sustainable practices to conserve biodiversity for active members of the agricultural, aqua-cultural and fibre sectors, including the benefits of such practices.
2. Develop and implement specific programmes to minimise the impacts of agriculture and aqua culture on biodiversity, for example:
    - National Integrated Pest Management Programme
    - National programme for Organic Farming, including training and certification.
3. Collect and disseminate indigenous knowledge and innovations on environmentally sound and biologically diverse farming practices.
4. Regulate and restrict the use of herbicides and pesticides that result in biodiversity loss.
5. Investigate the impacts of the use biomass and non-chemical fertilisers on crop yields.

Spatial Data

To facilitate reporting and decision making for this target, supporting spatial data will include:

- Town Planning and Physical development maps
- Agriculture land use maps
- Forest cover maps
- Areas of *in situ* conservation of economically important plants and animal species
- Data on environmental impact as a result of run off from agricultural and manufacturing activities

Barbados' food imports accounts for approximately 90% of all domestically consumed food, with a significant portion of this expense being attributed to primary agricultural goods. Achieving food security and sovereignty is therefore recognised as one of the island's highest priorities. The objective is to ensure that Barbados has an adequate supply of prime agricultural land to ensure national food security while expanding the base of young agricultural entrepreneurs. Figure 16 shows the four types of protections identified to support this objective of national food security: i) The Food and Agriculture land use designation; ii) The Soil Protection Overlay; iii) The Integrated Rural Development Programme (IRDP) policy areas; and iv) Food Production Zones. Figure 17 shows the classification of agricultural land in Barbados.

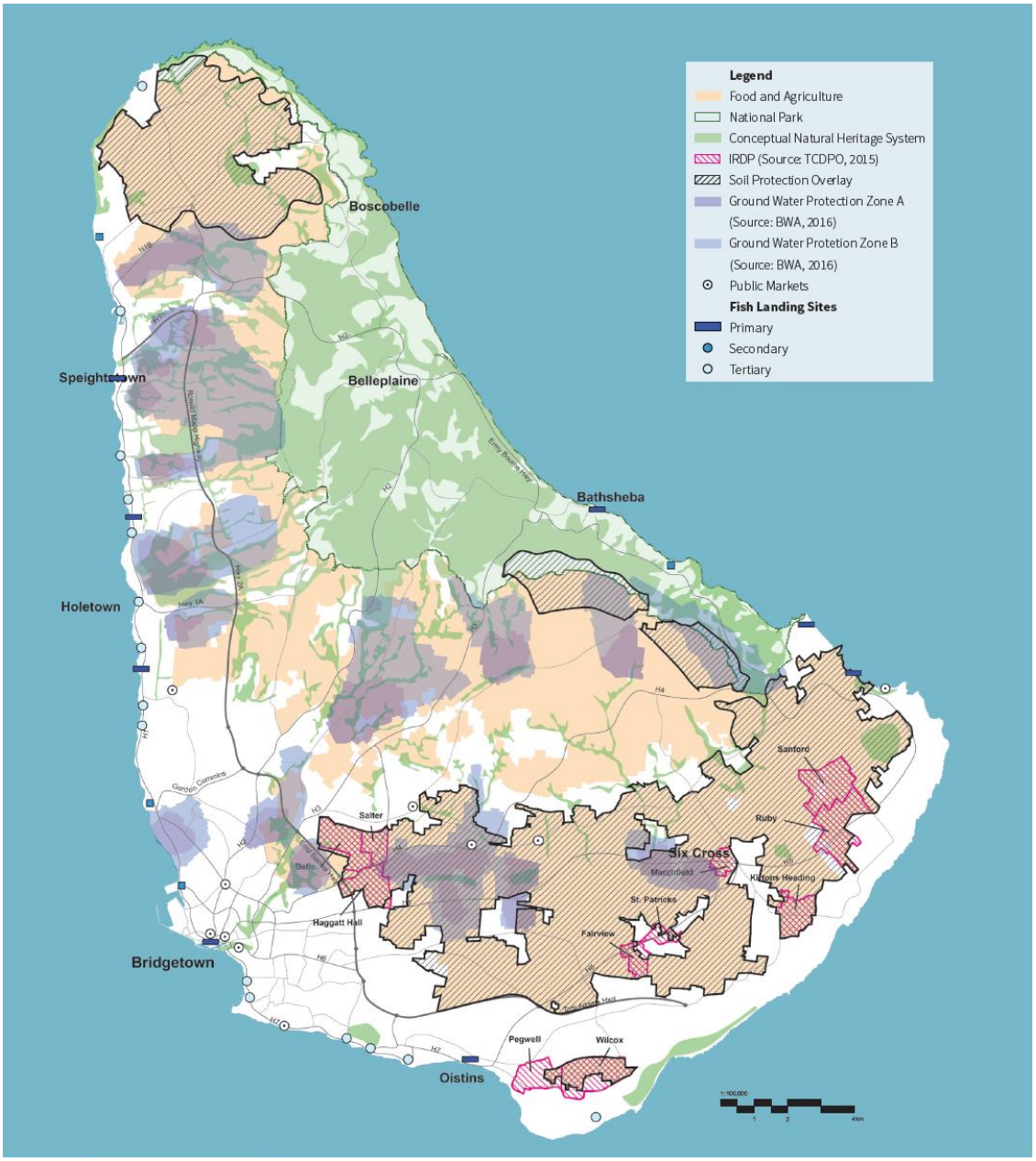

Figure 16 Food and Agriculture Map - Protection Layers

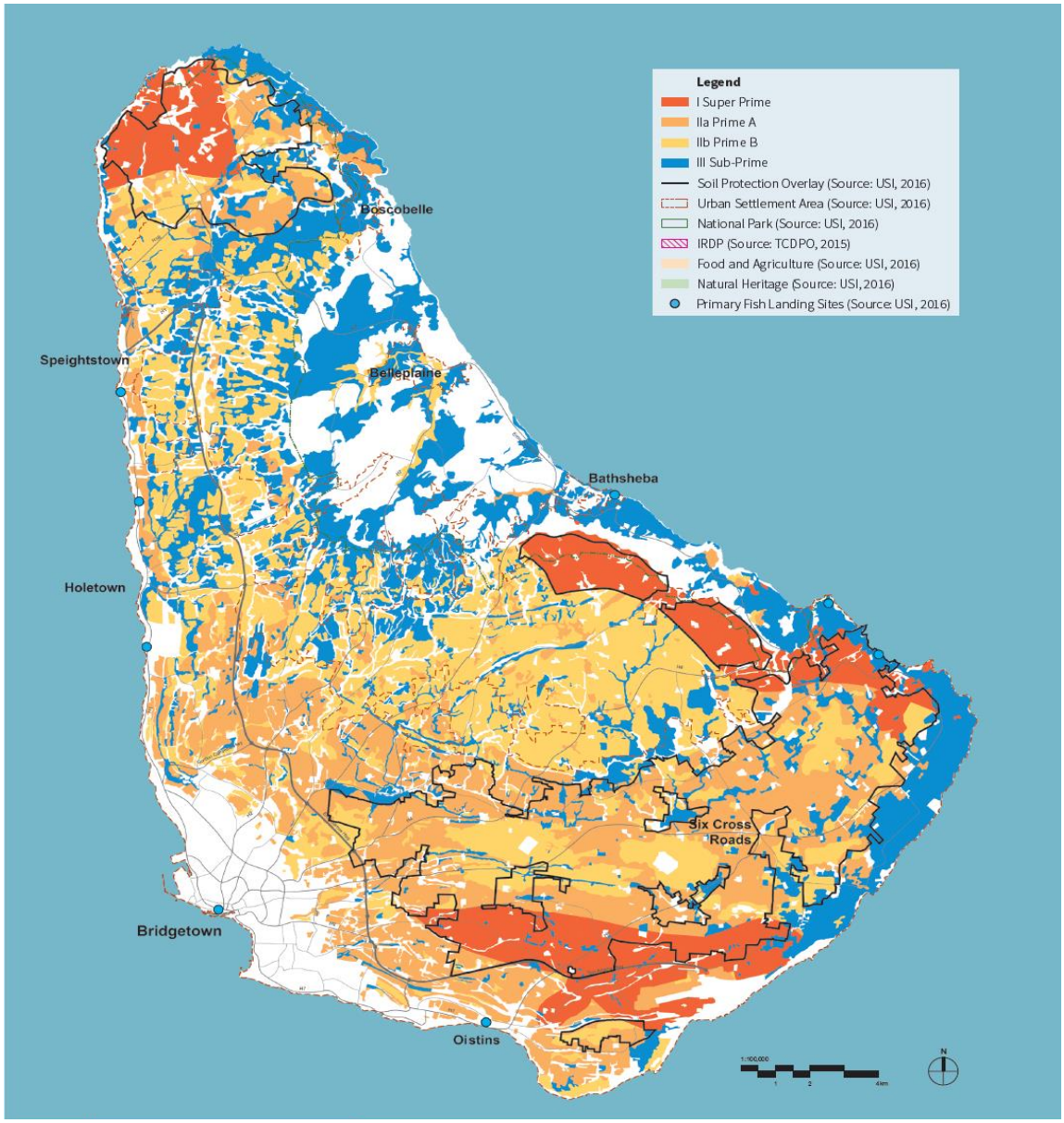

Figure 17 Agricultural Land Classification

Both Figures 17 and 18 can be used as baseline information to monitor the Barbados' performance as it relates to maintaining lands, and expansion of lands, in agricultural production. Additional information on the types of agricultural activities and the agrobiodiversity associated with those activities will give a good indication as to the conservation and use of biodiversity of agro-economic importance to Barbados. To achieve this objective and assist in reporting on this target it will be important to have a regular agricultural census conducted as well as planned periodic updates to the maps provided.

Of critical importance to national development is the maintenance of forest cover especially in areas designated as being susceptible to natural hazards as shown in Figure 16. The following provides information on national forest cover as of 2017 (see Figure 18).

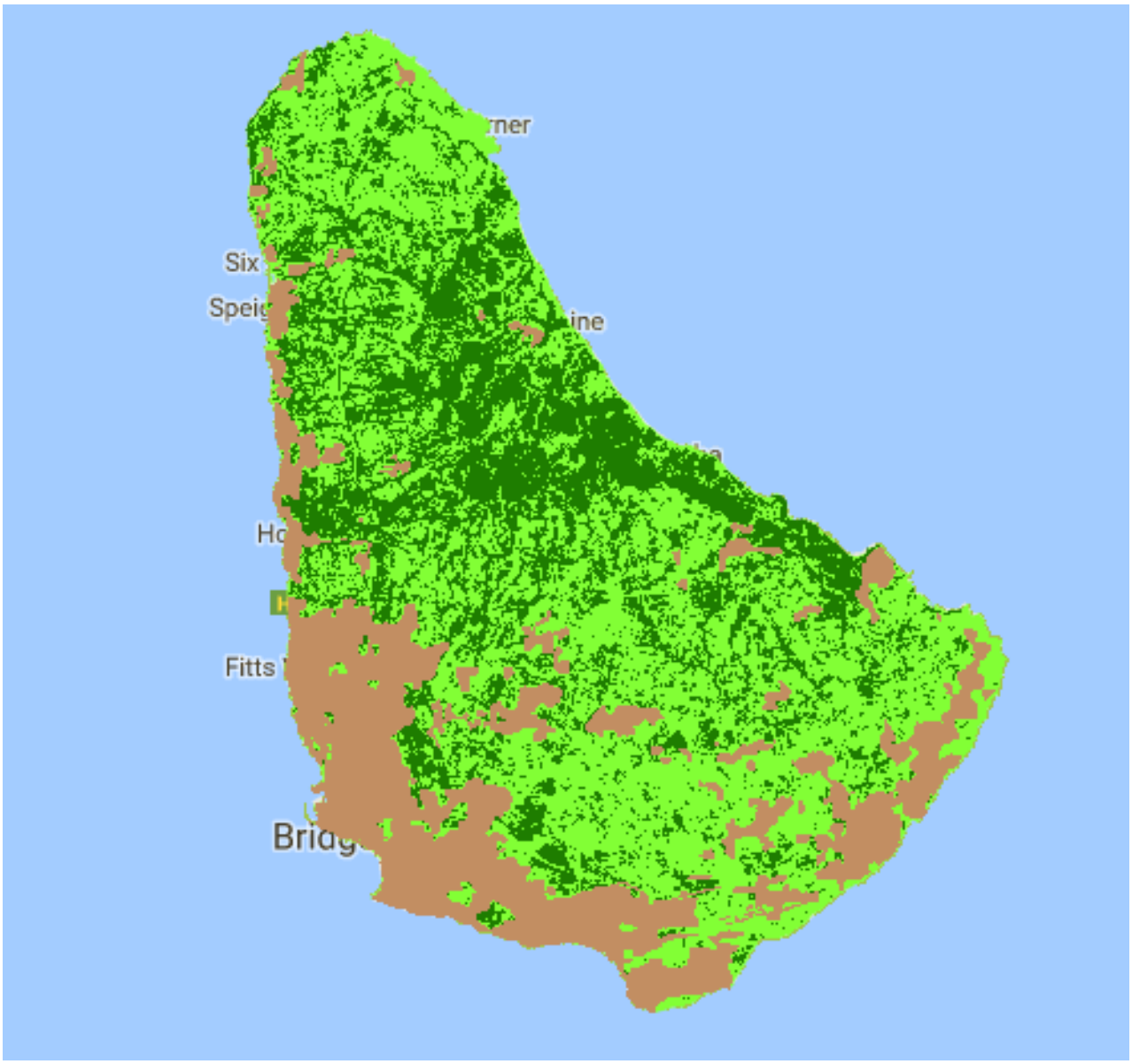

Figure 18 Map was created using Google Earth Engine, the total forest cover of Barbados in 2017 was calculated as 6 934.05

7.2.5 TARGET 5: By 2030, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

Strategic Objective Target 5: To minimise the level of pollution from human activities being released into the natural environment (terrestrial, marine and atmospheric) that can negatively impact biodiversity resources

Strategic Actions Target 5:

1. Establish a formal (reporting) mechanism for sharing information by agencies represented on the Biodiversity Working Group among the members of that group, and specifically with the lead agency(s) for biodiversity conservation, on sources and levels of pollution and recorded impacts on all aspects of biodiversity within their purview.
2. Establish an information system, managed by the agency responsible for biodiversity management, to record and monitor pollution levels (continuous and incidental) in ecosystems of national importance, as well the observed impacts on the ecosystems.
3. Provide support for the effective enforcement of the Marine Pollution Control Act, the Solid Waste Management Act particularly as it relates to illegal dumping and waste disposal, including the siting and management of hazardous waste facilities, and other legislation and management plans related to pollution.
4. Periodically examine the implementation of existing mosquito and rodent control activities, de-bushing and other clean-up activities to ensure that impacts on biodiversity are minimised or mitigated.
5. Ensure that the on-going Biodiversity Education and Public Awareness Programmes include education and awareness about the dangers of polluting (including risks to human health) and promotes practical measures to assist the general public in pollution reduction.

Spatial Data

To facilitate reporting and decision making for this target, supporting spatial data will include:

- Agriculture land use maps
- Data on environmental impact as a result of run off from agricultural and manufacturing activities
- Data showing impacts on coral reefs

7.2.6 TARGET 6: By 2030, invasive alien species and pathways are identified and prioritised; priority established species are managed and measures are in place to prevent the introduction and establishment of new invasive alien species.

Strategic Objectives Target 6:

1. **To minimise the impacts of invasive alien species of flora and fauna on local biodiversity**
2. **To reduce the pathways by which alien invasive species of flora and fauna can enter local ecosystems**

Strategic Activities Target 6:

1. Identify and update the list of invasive species to Barbados.

2. Compile existing information and conduct studies to determine the population size of the priority invasive species identified and their impact on biodiversity to date.
3. Establish species-specific strategies to eradicate or control population sizes of IAS to manageable levels. In cases where IAS impacts on native biodiversity cannot be controlled, bio-secure areas for the conservation of threatened native species will be identified and resources sought to implement them."
4. Establish monitoring programmes, in collaboration with key agencies, to track populations of priority invasive species and their impact on biodiversity.
5. Develop legislation or amend existing legislation and regulations for border controls at all seaports and the airport with respect to all imported species.

Spatial Data

To facilitate reporting and decision making for this target, supporting spatial data will include:

- Maps showing migration of alien invasive species and impacts

7.2.7 TARGET 7: By 2030, sources of endogenous anthropogenic pressures on coral reefs (e.g. excess nutrients, anchor damage, overfishing inter alia) are identified and effects minimised to maintain the integrity and functioning of coral reefs.

Strategic Objective Target 7: To protect coral reefs and other coastal ecosystems in Barbados against the impacts of global climate change and ocean acidification.

Strategic Actions Target 7:

1. Liaise with the Coastal Zone Management Unit in order to access information generated through the CZMU coral reef monitoring programme, on trends on the status of the reef ecosystems around the island.
2. Maintain an in-house database, or formalise a communication system with the CZMU, to generate periodic reports on the status of the reef ecosystems, the threats, and the impact of measures implemented to protect them.
3. Support the work of the CZMU being implemented through the Coastal Risk Assessment and Monitoring programme to protect coastal ecosystems.
4. Develop regulations as necessary and *s*upport effective enforcement of the Coastal Zone Management Act, the Marine Pollution Control Act, the Fisheries Management Act and other related legislation and regulations aimed at protecting coastal ecosystems.

Spatial Data

To facilitate reporting and decision making for this target, supporting spatial data will include:

- Time-scale data showing changes in coral reef health
- Time-scaled data on reef ecosystems and factors affecting these ecosystems

7.2.8 TARGET 8: By 2035, at least 17% of terrestrial and inland water, and 10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are designated within connected systems of protected areas, and plans for effective area-based conservation measures are being developed.

Strategic Objectives Target 8: To establish and develop management action plans for zones of protection for important biodiversity and ecosystem services.

Strategic Actions Target 8:

1. Quantify the acreage of biodiversity ecosystems protected by the Barbados National Park and System of Parks and Open Spaces under the Barbados Physical Development Plan 2003 and the Coastal Zone Management Plan. Include any additional acreage included in the Revised PDP 2017 (including proposed buffer zones) and proposals for marine protected areas, as projections pending legislation.
2. Develop specific action plans to effectively and equitably manage these areas, including strengthening the capacities of agencies with direct responsibility for managing these areas to implement the action plans.

Spatial Data

To facilitate reporting and decision making for this target, supporting spatial data will include:

- Town Planning and Physical development maps
- Forest cover maps
- Marine and terrestrial protected area maps
- Land use maps
- Fisher's use and management maps
- Areas of *in situ* conservation of economically important plants and animal species
- Data on species management and habitats

Key Protected Area Coverage

Figure 19 provides an indication of key biodiversity area protection for Barbados [41] showing approximately 10.7% of terrestrial land space as protected. Figure 20 shows Barbados' Protected and Connected index as 12-17% generally and along the south coast as 17-30%.

[41] Source: http://www.nbsapforum.net/knowledge-base/resource/draft-biodiversity-status-maps-your-6nr-%E2%80%93-barbados Accessed December 10, 2019

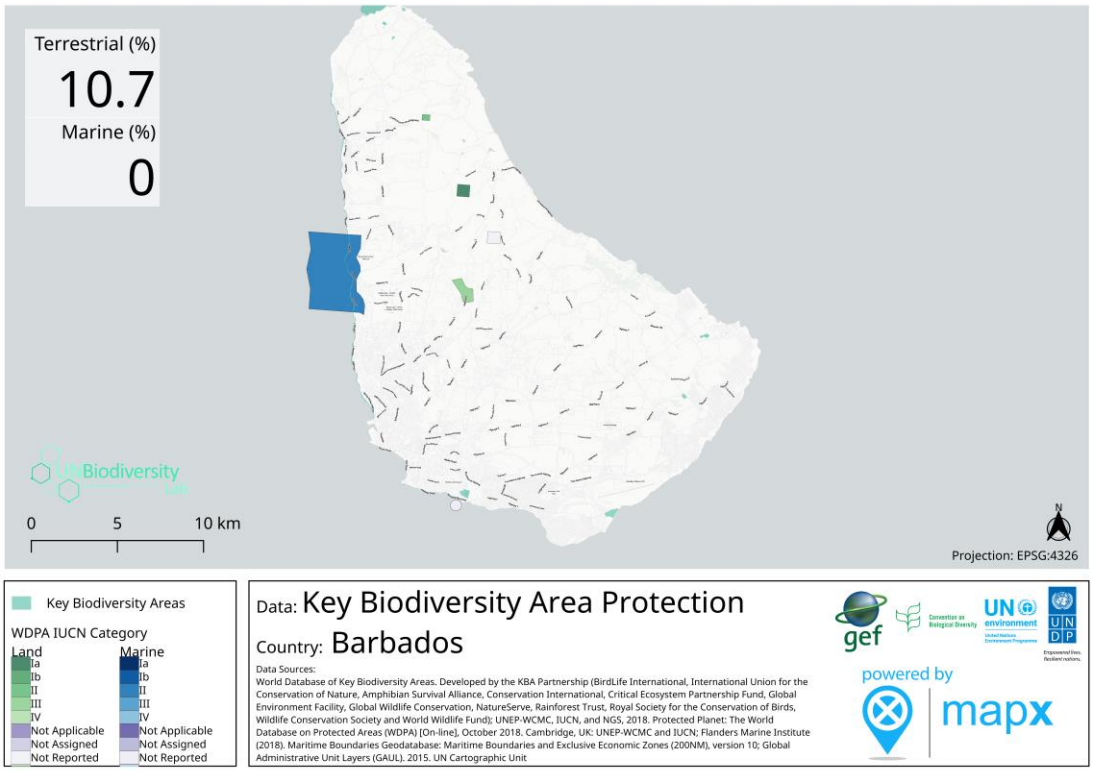

Figure 19 Key Biodiversity Protected area

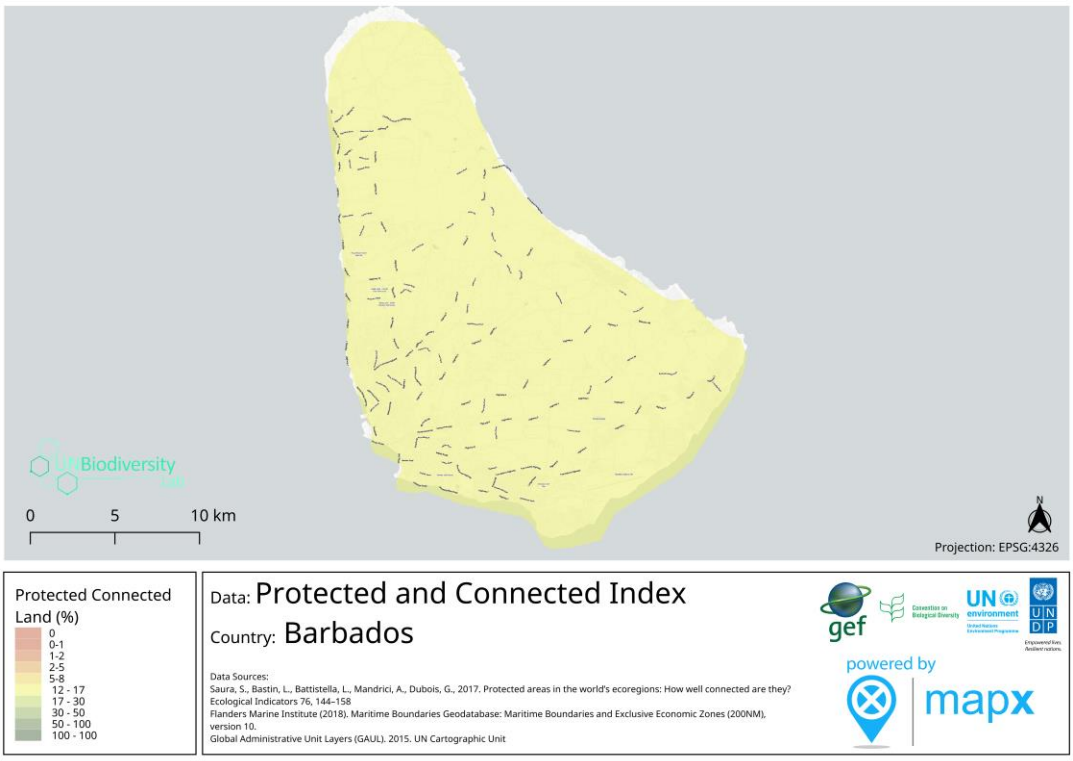

Figure 20 Protected and Connected Index

In terms of protected marine areas, the country the Folkestone Park and Marine Reserve was established in 1981 by the Designation of Restricted Areas Order 1981, and the Marine Areas (Preservation and Enhancement) (Barbados Marine Reserve) Regulation 1981. The National Conservation Commission (NCC), the government agency responsible for the management of marine protected areas in Barbados, manages the Folkestone Park and Marine Reserve. The Park and Reserve are located on the west coast of Barbados. The Reserve stretches a total distance of 2.2 km and extends a distance offshore of 950m at its widest point and 660m at its narrowest. The Reserve consists of four zones: (i) Scientific Zone Designated for marine research; (ii) Northern Designated Water Sports Zone for fast speed watercraft use; (iii) Southern Designated Water Sports Zone for fast speed watercraft use; and (iv) Recreational Zone Designated for recreation, including swimming, snorkelling and fishing. Figure 21 provides a map indicating the Marine protected spaces in Barbados.[42]

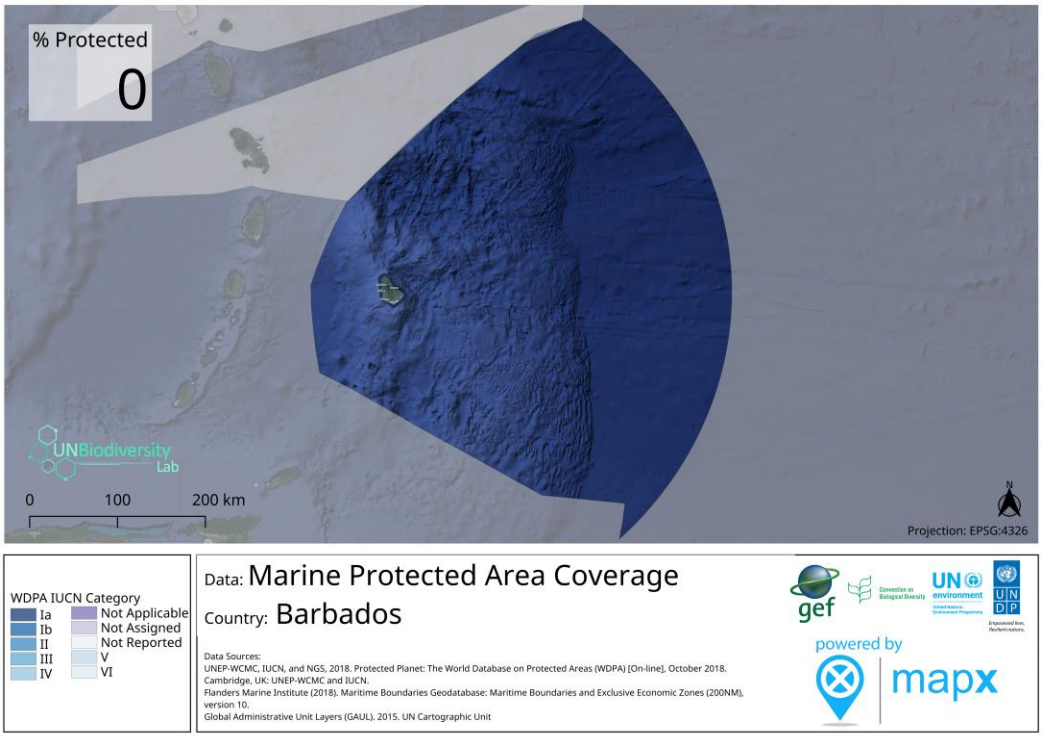

Figure 21: Marine Protected Area Coverage

These spatial data can be used to monitor the country's commitment to implementing measures to increase the marine protected areas for example the proposed Carlisle Bay Marine Park. This area is located on the southwestern coast of Barbados and is a calm, sheltered area where a variety of recreational activities occur on a daily basis. The bay is popular for diving, snorkelling, and the anchoring and sailing of yachts. The marine biodiversity in Carlisle Bay is extremely rich, with more than three hundred and fifty (350) species of tropical flora and fauna. Among these are organisms such as the frog fish (*Antennarius multiocellatus*), which is rare in Barbados, and the sea horse

[42] Source: http://www.coastal.gov.bb/content/carlisle-bay-marine-park Accessed December 10, 2019.

(*Hippocampus erectus*) which is rare worldwide. These, and other organisms, live on the scattered patch reefs and artificial reefs in the form of sunken ships which make up the primary ecosystems in the area. At present, there are five (5) major wrecks in the bay: the Berwyn, the Fox, the C-Trec, the Bajan Queen and the Eillon, which attract more than forty (40) dive boats and glass bottom boats on a weekly basis.[43]

7.2.9 TARGET 9: By 2030, pressures on known threatened species have been identified and mitigated, and conservation status has been improved.

Strategic Objective Target 9: To identify and protect threatened species of flora and fauna in Barbados.

Strategic Actions Target 9:

1. Support existing (e.g. UWI), and initiate new monitoring programmes as necessary, to assess threats to and status of native biodiversity.
2. Develop species-specific or, where appropriate ecosystem-based management plans to mitigate threats and monitor the implementation of these plans and the impact on the status of the species protected.
3. Develop appropriate indicators to be used in the management and monitoring plans.

Spatial Data

To facilitate reporting and decision making for this target, supporting spatial data will include:

- Town Planning and Physical development maps
- Forest cover maps
- Marine and terrestrial protected area maps
- Land use maps
- Data and maps on conservation areas
- Data on species habitats

The following series of maps presents spatial data from a project conducted on the Barbados' leeward west coast, which investigated turtle nesting habitat and the impact of coastal development, especially related to tourism development. One key objective of the project was to examine the spatio-temporal use of west coast beaches by hawksbill turtles using the long-time series of data on nesting distribution collected by the Barbados Sea Turtle Project (BSTP) since 1997.[44] Observations were made over a 15-year period to determine if changes in the coastal zone have affected where sea turtles emerge, and where they can or cannot successfully lay their eggs. The project revealed that several factors including beach width, vegetation, human activity and light/dark periods impacted successful turtle nesting. Figure 22 provides an indication of the beach with of areas investigated in the project. Figures 23 to 41 provide

[43] Ibid

[44] Horrocks, J.A. and J. Walcott. 2016. Nesting by hawksbill sea turtles on the west coast of Barbados in Relation to Beach Width: With recommendations for conservation of critical nesting habitat. Barbados Sea Turtle Project, University of the West Indies, Cave Hill Campus, Barbados 49 pp.

more detailed information on Hawksbill turtle nesting partner on the specific west coast beaches in Barbados.

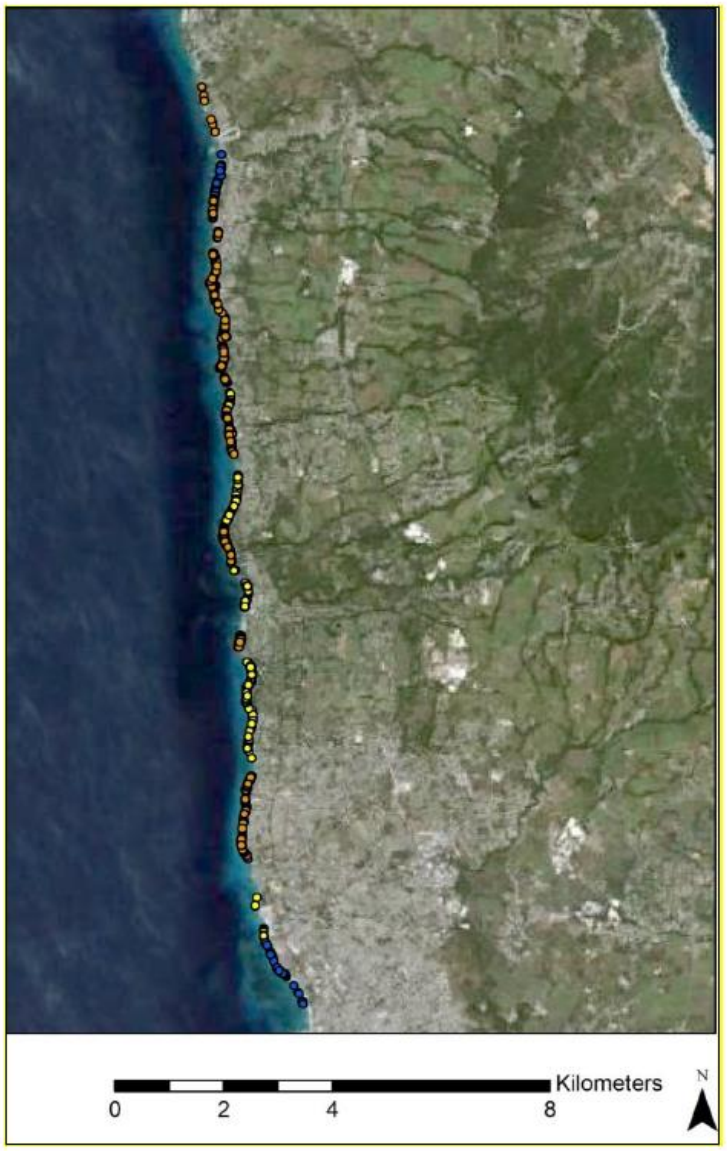

Figure 22. West Coast Sectors identified by average beach width (orange: 5-10 m, yellow: 10-20 m and blue: >20 m). Areas with no dots have dry beach widths of <5m.

Figure 22 West Coast sectors showing average beach width

Aerial photos show the positions of Nesting Activities, colour coded to show the average width of the Location where the Activities occurred; B. showing the % Nests, Attempts and False Crawls on stretches of different widths within the Sector. Place names are shown for orientation only.

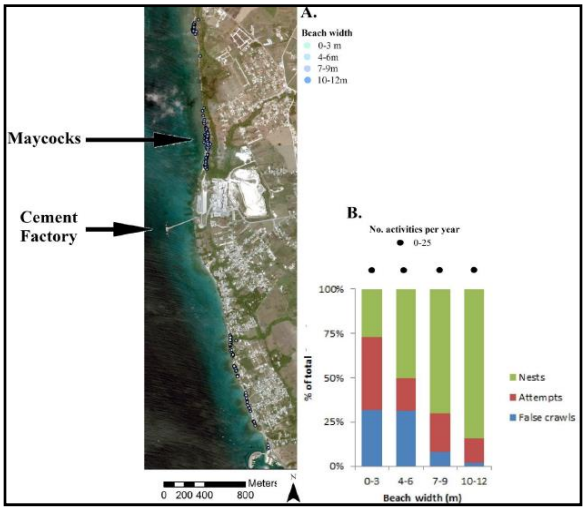

Figure 23: Sector 1 Northwest

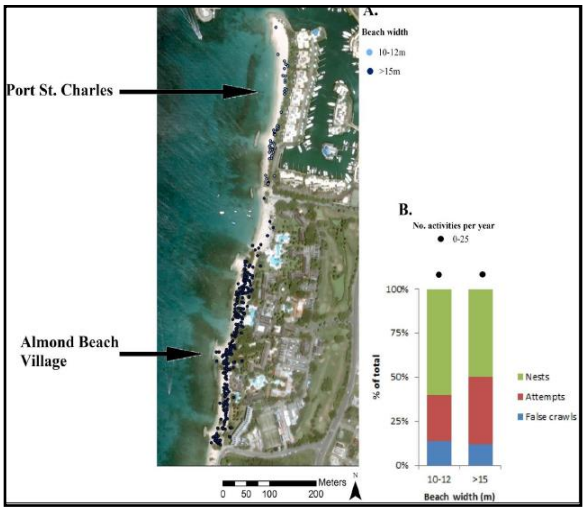

Figure 24: Sector 2 Heywoods

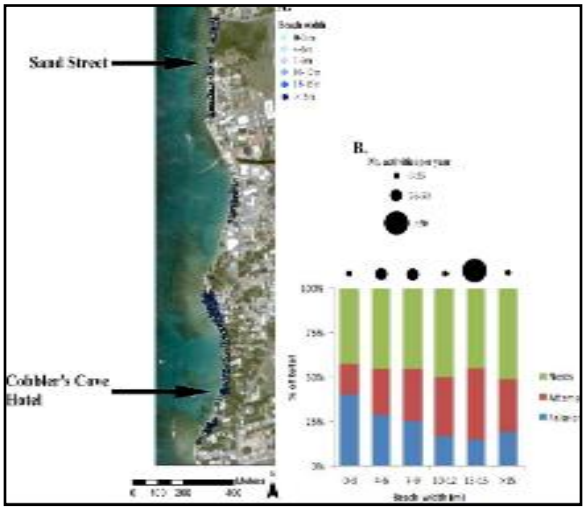

Figure 25: Sector 3 Speightstown

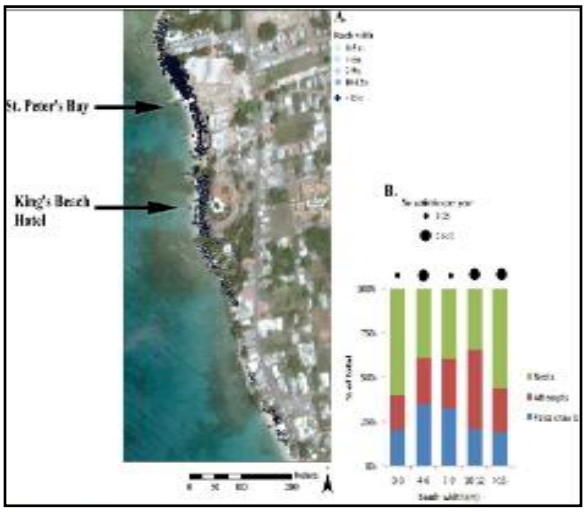

Figure 26: Sector 4 King's Beach

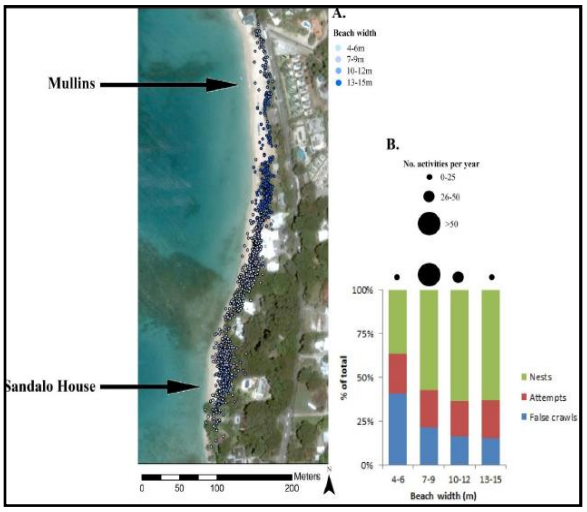

Figure 27: Sector 5 Gibbes Bay North

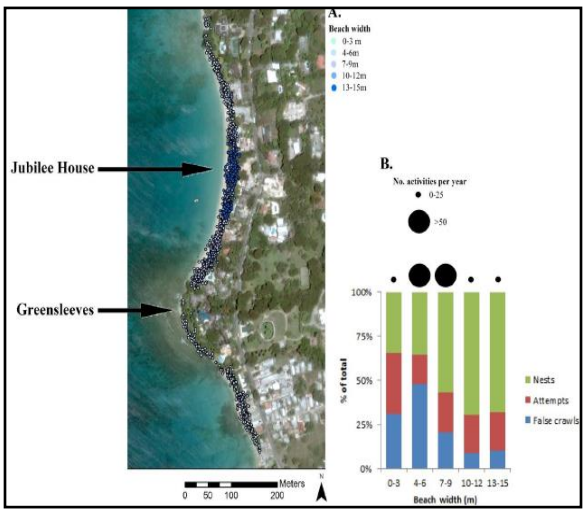

Figure 28: Sector 6 Gibbes Bay South

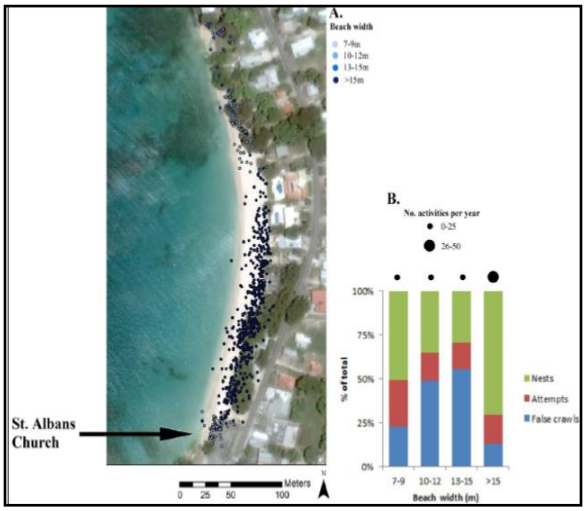

Figure 29: Sector 7 Reeds Bay North

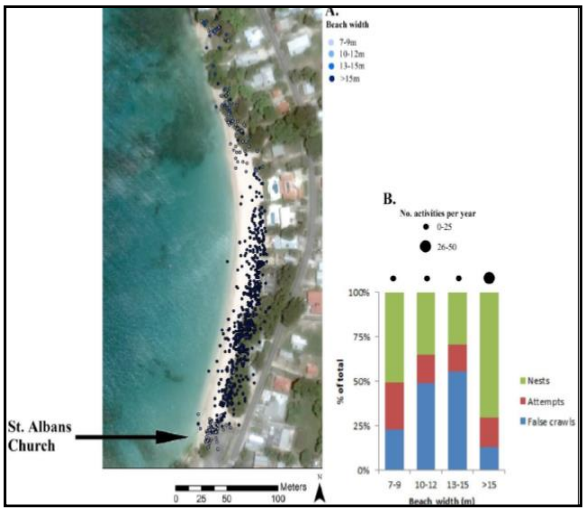

Figure 31: Sector 8 Reeds Bay South

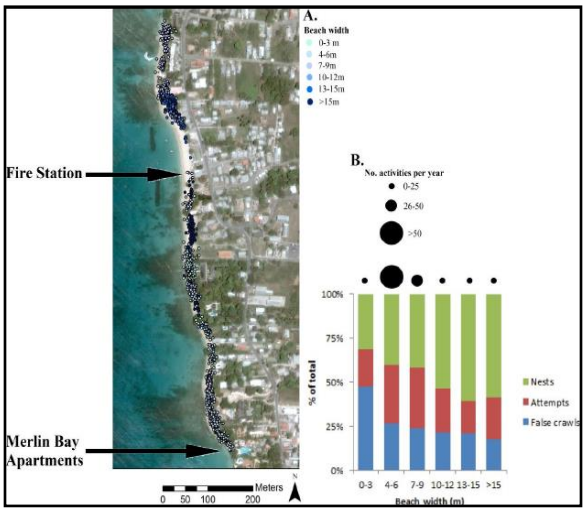

Figure 30: Sector 9 Alleyne's Bay

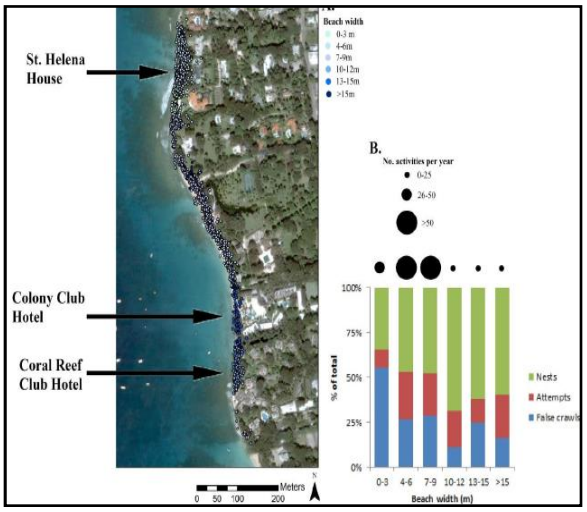

Figure 32: Sector 10 Heron Bay

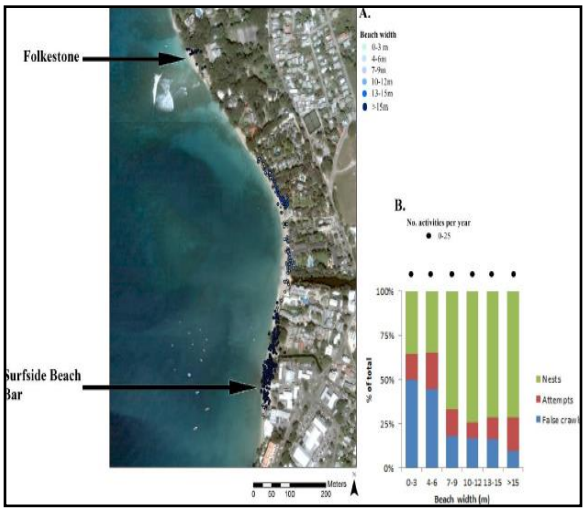

Figure 33: Sector 11 Holetown

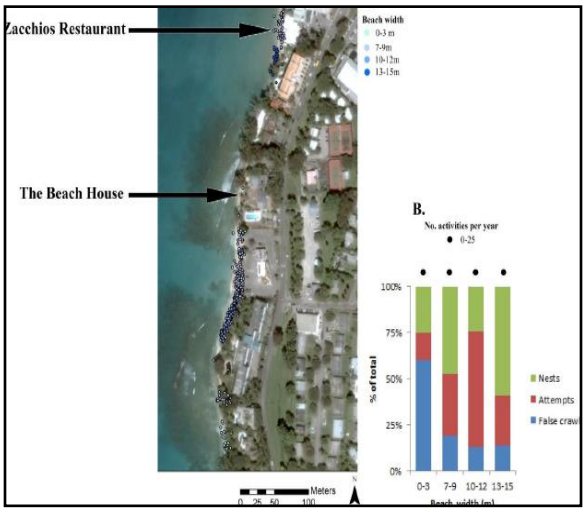

Figure 34: Sector 12 West Coast Boardwalk

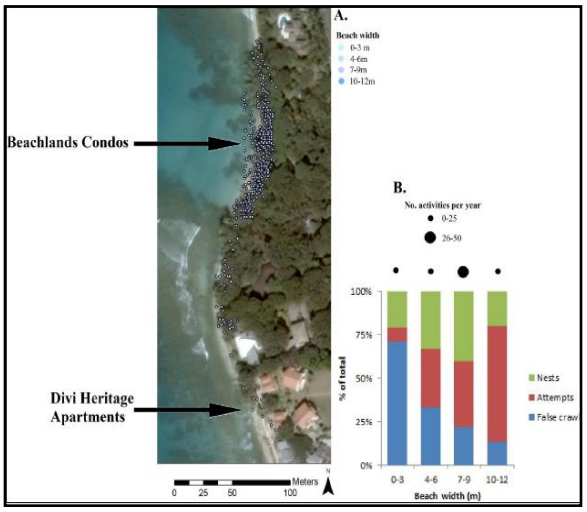

Figure 36: Sector 13 Holetown South

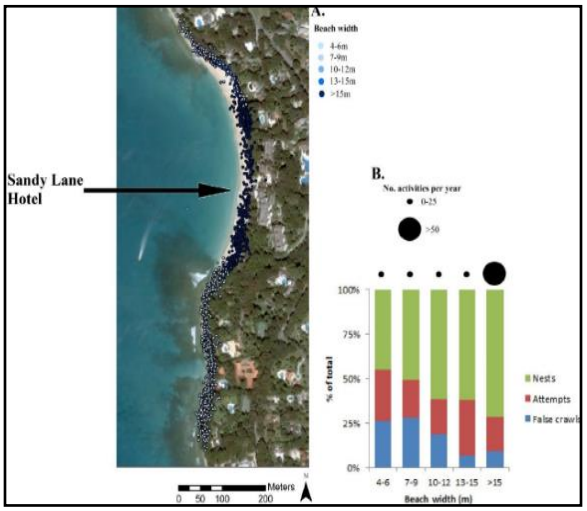

Figure 37: Sector 14 Sandy Lane

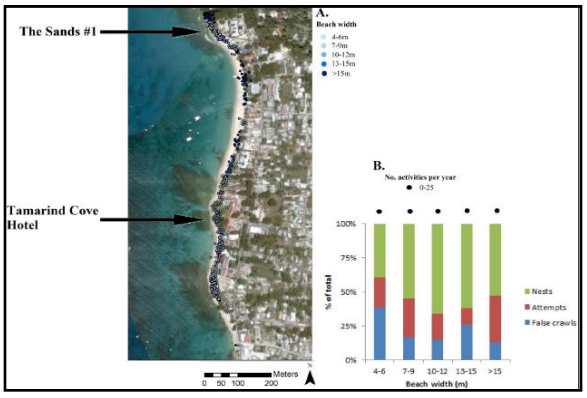

Figure 35: Sector 15 Paynes Bay

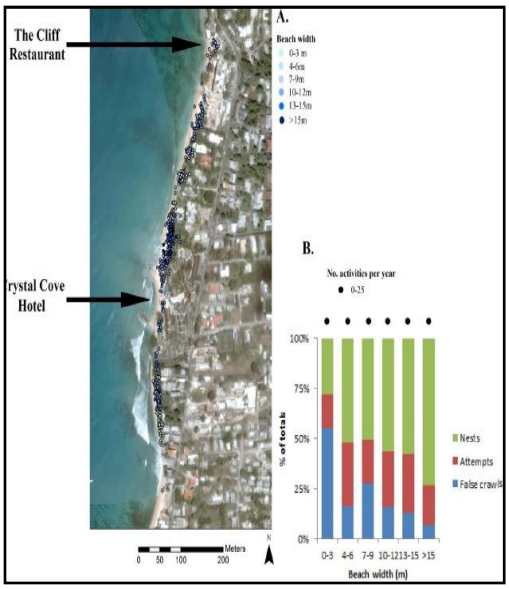

Figure 38: Sector 16 Crystal Cove

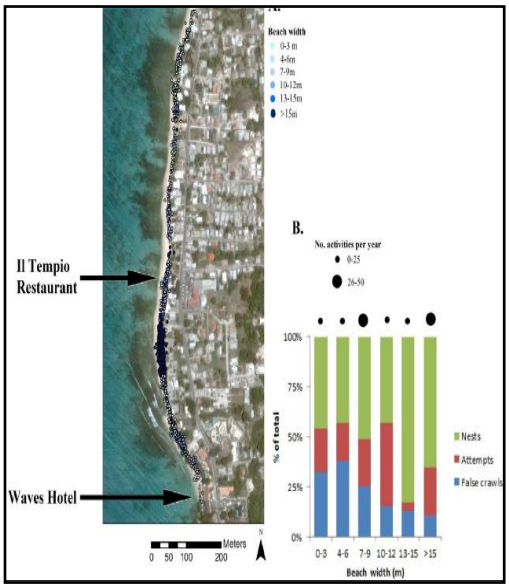

Figure 40: Sector 17 Fitts Village

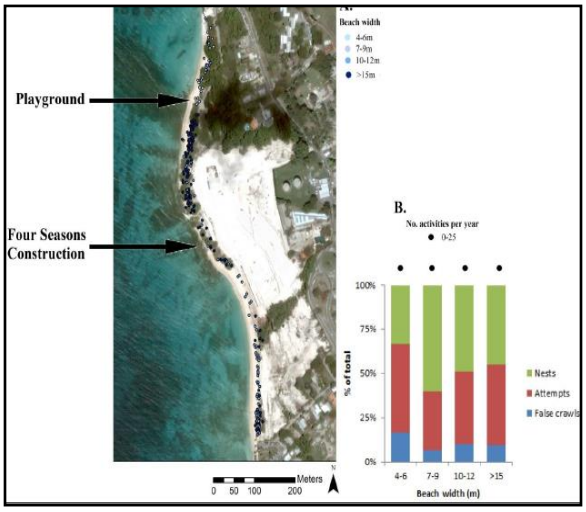

Figure 39: Sector 18 Batts Rock

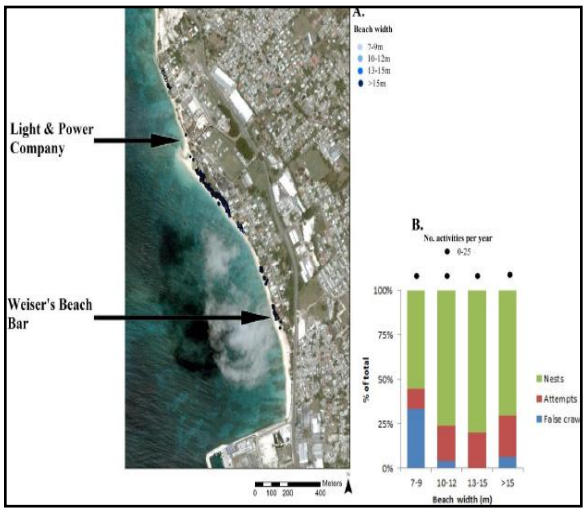

Figure 41: Sector 19 Brighton

This research data reveals conditions optimal for Hawksbill turtle successful nesting and can be used to influence decision making with regard to building permission granted for development or beautification along the west coast beaches of Barbados. It can also be used to lobby for establishments along the coast to adopt sustainable practices conducive to successful turtle nesting.

With regard to monitoring, subsequent studies at timed intervals, to build on data presented, will provide information for analysis with regard to changes in nesting patterns and identification of factors influencing these changes.

Species Rarity and Endangered Species

The IUCN Red list notes the following species as critically endangered in Barbados (See Figure 42)[45]. Some such as the Barbados Threadsnake and the Barbados Leaf-toed Gecko may also be considered rare species as they are considered uncommon, scarce and are infrequently encountered. Additionally, they have been sighted in limited geographical locations on the island. Biodiversity management practices for these endangered and rare species must address the issue of increasing species populations as well as designating their habitats as sensitive and protected areas. Factors to take into consideration will be tourist activities and building in these sensitive habitats.

[45] Source: https://rainforests.mongabay.com/biodiversity/en/barbados/CR.html Accessed December 29, 2019

This is a list of Critically Endangered species in Barbados according to the IUCN Red List.
This list was last updated 2019-09-14

This list contains only species that have been assessed for the IUCN Red List. It is therefore not representative of all the species in the country.

Species counts by country: Total | Amphibians | Birds | Fish | Mammals | Reptiles | Vascular Plants.

scientific_name	common_name	taxonid	category
Juniperus barbadensis var. barbadensis	Barbados Cedar	44164	CR
Atya brachyrhinus		197803	CR
Alinea lanceolata	Barbados Skink	44579133	CR
Tetracheilostoma carlae	Barbados Threadsnake	203637	CR
Phyllodactylus pulcher	Barbados Leaf-toed Gecko	48443321	CR

Figure 42: Critically Endangered Species

7.2.10 TARGET 10: By 2035, 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.

Strategic Objective Target 10: To safeguard the genetic diversity of socio-economically and culturally important species of cultivated plants and animals in Barbados, and their wild relatives.

Strategic Actions Target 10:

1. Establish a national programme to preserve germplasm for nationally important cultivated plants and farmed animals and any remaining wild relatives (e.g., Barbados black belly sheep...).
2. Establish and maintain a national register of genetically significant breeds.
3. Through collaborative arrangements among the agencies responsible, develop and implement management strategies, including monitoring and evaluation, to safeguard the genetic diversity of these socio-economically and culturally important species.

Spatial Data

To facilitate reporting and decision making for this target, supporting spatial data will include:

- Town Planning and Physical development maps
- Forest cover maps
- Marine and terrestrial protected area maps
- Land use maps
- Data and maps on conservation areas
- Data on species habitats

7.2.11 TARGET 11: By 2030, document all traditional and scientific knowledge and technology relating to biodiversity so that it is improved, widely shared, transferred and applied.

Strategic Objective Target 11: To document and share all traditional and scientific knowledge and technology relating to biodiversity in Barbados.

Strategic Actions Target 11:

1. Commission a desk and/or field study to gather collate and document traditional knowledge related to biodiversity.
2. Commission a project to gather and compile all available scientific studies on biodiversity, including research findings and research gaps and needs.
3. Prepare and annotated bibliography of scientific, peer-reviewed and other validated publications contributing to traditional and scientific knowledge of Barbados' biodiversity.
4. Establish a National Biodiversity Clearing House Mechanism as a means of sharing the information gathered in the foregoing activities.

7.2.12 TARGET 12: By 2030, at the latest, financial resources to conduct projects and research in the area of biodiversity should increase substantially.

Strategic Objective Target 12: To collaborate with key partners to coordinate financial resources to execute national projects and research

Strategic Actions Target 12:

1. Undertake an inventory of relevant biodiversity related projects being implemented nationally and develop a database of agencies related to the projects.
2. Undertake an annual project collaboration meeting with private and public sector agencies, CSOs and regional and international agencies to discuss how existing project can fit within the Ministry's biodiversity workplan.
3. Inclusion of biodiversity-specific activities for funding in annual budget
4. Work closely with the NGOs/CSOs/CBOs to collaborate to submit project proposals related to biodiversity and which has synergies with the Ministry's workplan.

8 THE STAKEHOLDER CONSULTATION PROCESS

In preparation of this 6NR several stakeholder meetings were conducted in various forms including face-to-face meetings, workshops and focus group meetings. During the reporting period six consultations were held with stakeholders from the following sectors Public, Private, Civil Society, Academia, International donor organisations and the media and Entertainment sectors. Consultations were conducted in September 2017, October 2017, March 2019, May 7-9, 2019, and August 2019. In terms of data collected on these meetings, an average of 30 stakeholders attended sessions with a gender breakdown as follows: 57% females and 43% males. Representation from the various sectors was Civil Society 28%, Public 28%, Academia 21%, Media/entertainment 10%, International Organisations 7% and Private 6%.

Consultations were held in the initial data collections phase to ascertain the types of biodiversity-related projects undertaken within the context of the National biodiversity targets and implementation of the NBSAP. Further meetings were held in workshop format to validate the findings presented in the draft report. The final 6NR reflects all relevant comments and recommendations received from stakeholders.