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Component of a 10-year Management Plan

North-East Tobago
Man and the Biosphere Area

unesco
Man and the Biosphere Programme

FOCUS: CONSERVATION

AUGUST 2022

Component of a 10-year Management Plan

FOCUS: CONSERVATION

for the

North-East Tobago Man and the Biosphere Area

Draft

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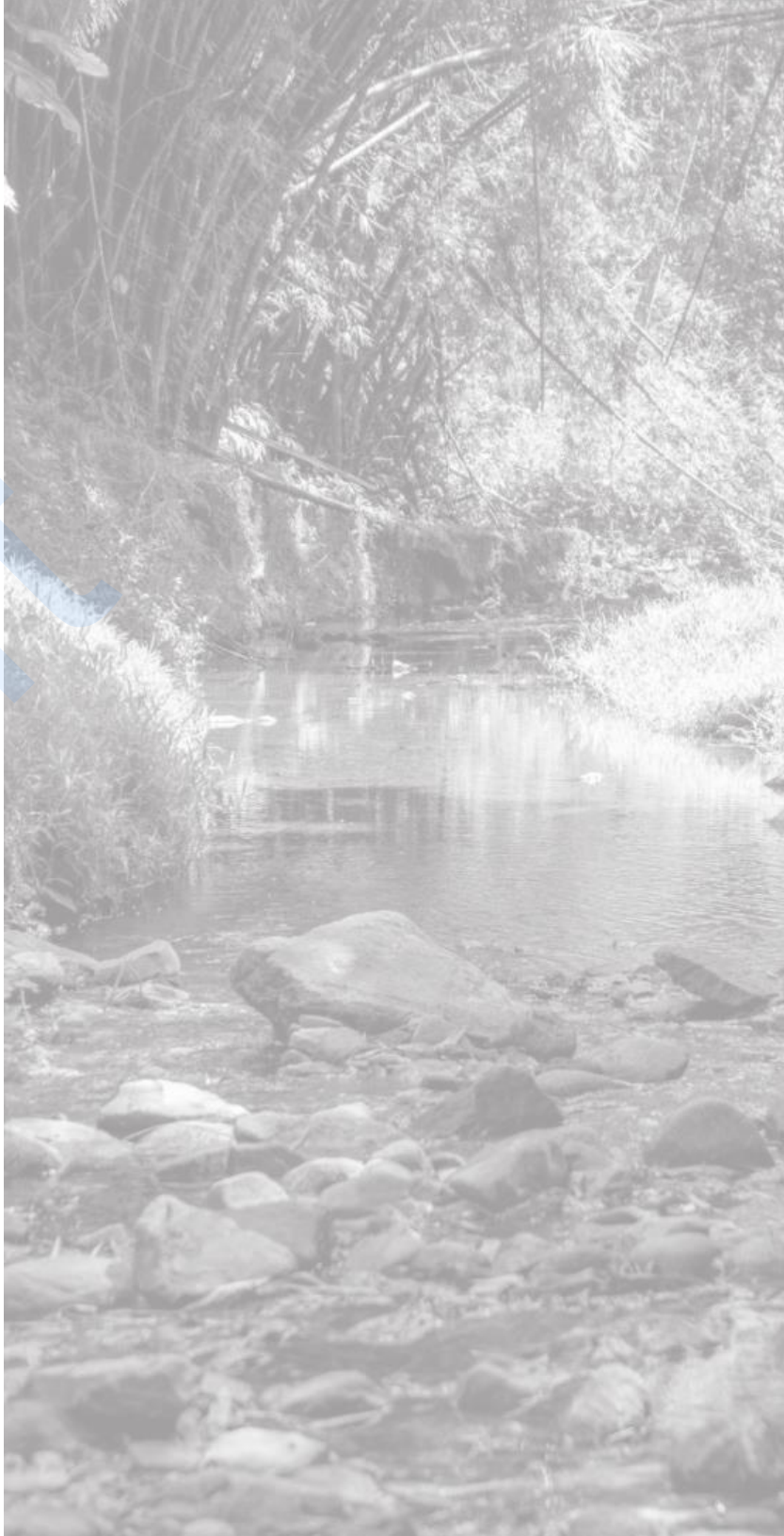




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1 EXECUTIVE SUMMARY

This document was developed as part of a project titled: *"Caribbean Small Island Developing States Trinidad Sub-Project Rehabilitation of Quarries"* (IWEco TT) with funding from the Global Environmental Facility, under approval of the United Nations Development Programme and via a contract with the Environmental Management Authority of Trinidad and Tobago. It is meant to be a guideline for the future management authority and staff of the North-East Tobago UNESCO Man and the Biosphere Reserve (NETMABR). While it will be open to all stakeholders, it is not meant to be an instrument for outreach activities; an outreach-friendly, intelligible version of the management plan will be developed in late-2022. The document represents the second component of the overall 10-year Management Plan for the NETMABR. The first, complementary component was finalised in December 2021 and a third and final one will be finalised under other interventions and consolidated in November 2022.

This draft plan was developed via review and analysis of primary and secondary literature as well as formal and informal stakeholder consultations between 2018 and 2022; major limitations were based on COVID-19 restrictions and significant primary data deficiencies. The draft plan at hand will be discussed with stakeholders between June and November 2022, revised and finalised accordingly.

This, second component of the Plan includes:

- Revision of previous Stakeholder and Communication Plans,
- Participatory Development of Vision, Mission, Objectives and Principles,
- Site Description,
- SWOT and PESTLE,
- Alignment with existing Legal and Regulatory Framework, Policies and International Conventions.

Furthermore, it includes situational analyses, high level goals, priorities, strategies and proposed actions for three management topics / components:

- Conservation Strategies, Programmes and Priority Projects
- Climate Change Resilience Strategies, Programmes and Proposed Actions
- Community-based, Green, Blue, Purple Economic Strategies, Programmes and Proposed Actions

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Next steps and two key recommendations are provided in the chapter below.

The ERIC team would like to thank the EMA Office, Trinidad and Tobago, specifically Alicia Aquing, GEF IWEco National Project Coordinator, and Mr Linford Beckles, Director, Department of the Environment, Tobago House of Assembly for facilitating this intervention and put trust in our technical capabilities.

North-East Tobago Man and the Biosphere Reserve Management Plan Components

SLM

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7. Sustainable Agriculture and Sustainable Land Management Practises
8. Sustainable Tourism
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2 THE WAY FORWARD

The ERIC has successfully applied to the UNDP Small Grants Programme, Trinidad and Tobago, to fund the final components of the Management Plan and create a knowledge sharing platform for the Plan via a project titled: "*Drafting the Final Components of the Management Plan for the North-East Tobago UNESCO Man and the Biosphere Reserve and Intelligible Knowledge Management*". The proposal was endorsed by the Department of the Environment, Tobago House of Assembly, which is the Focal Point for the UNESCO MAB Programme in Trinidad and Tobago and by Division of Ecological and Earth Sciences, UNESCO, Paris, France. This final component was approved in May 2022.

This timing aligns perfectly with a contract between the Inter-American Development Bank and Syntegra Change Architects Limited (Trinidad) with the following key objectives:

1. to structure the corporate governance framework of the NETPAMPT under a research-driven and participatory approach;
2. to structure the institutional framework of the NETPAMT, using components of an environmental and social management systems and including the foundations for a fund-raising strategy; and
3. to provide training and dissemination of i) the corporate governance framework; and ii) E&S institutional framework to key stakeholders.

Having started in February 2022, this intervention, of which the NETPAMT, and by extension the Tobago House of Assembly, is the direct beneficiary, will allow the NETPAMT, as future management organisation of the UNESCO Man and the Biosphere Reserve in North-East Tobago, to revise, refine, and apply the finalised management plan.

Based on these interventions, **the key recommendations** for advancing the sustainable development goals under the UNRESCO MAB Programme for NE Tobago are to:

1. **engage the Government of Trinidad and Tobago and the Tobago House of Assembly to provide the necessary budget allocations (2022-2024) for the operations of the NETPAMT until initial Green Fund funding and subsequent, self-financing is secured, and**
2. **facilitate stakeholder awareness and tangible benefits for communities in the NETMABR.**

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3 INTRODUCTORY REMARKS

This document was developed as part of a project titled: *"Caribbean Small Island Developing States Trinidad Sub-Project Rehabilitation of Quarries*" (IWEco TT) with funding from the Global Environmental Facility. It is meant to be a guideline for the future management authority and staff of the North-East Tobago UNESCO Man and the Biosphere Reserve (NETMABR).
The document represents a component of the overall 10-year Management Plan for the NETMABR. The additional, complementary components will be finalised under another intervention, and both consolidated in June 2022.
Amongst other guidelines, the Technical Guidelines for Biosphere Reserves (TGBR, UNESCO 2021) were taken into consideration for preparing this document.

The TGBR provides an indicative list of several main items a UNESCO Biosphere Reserve Management Plan should contain:

a. a recommendation for an organisational/governance structure responsible for implementation of the plan,
b. a situational analysis,
c. a vision,
d. medium-term goals,
e. management priorities,
f. proposed priority projects, and
g. monitoring indicators,

The document at hand covers, for the components under the contract with the EMA, items **b, c, d, e, and f**. Item **a** was covered under a previous assignment, item **g** will be covered under the above-mentioned complementary SGP project.
The components (topics) of the NETMABR Management Plan covered under this assignment included:

- Revision of previous Stakeholder and Communication Plans
- Participatory Development of Vision, Mission, Objectives and Principles
- Site Description, SWAT and PESTLE
- Alignment with existing Legal and Regulatory Framework, Policies and International Conventions
- Conservation Strategies, Programmes and Priority Projects
- Climate Change Resilience Strategies, Programmes and Proposed Actions

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- Community-based, Green, Blue, Purple Economic Strategies, Programmes and Proposed Actions
- Stakeholder Consultations, Local Capacity Building and Media Outreach

As discussed with the funding agency, stakeholder consultations were quite limited due to time- and COVID-19 restrictions. Furthermore, stakeholder consultations will be most efficient and effective when the full draft of the Management Plan will be available in 2022 and a more concise and intelligible version can be produced to meaningfully engage at all stakeholder levels. Once all documents will have been consolidated, the final layout will be polished using an advanced desktop publishing and page layout designing software application. Once funding permits, an intelligible and interactive website will be created to facilitate ease of access to and navigation through the Management Plan.



Figure 1. Fishermen in Castara Bay

4 METHODS

This draft document was developed via review and analysis of primary and secondary literature (see Annex 1) as well as formal and informal stakeholder consultations between 2018 and 2022. These consultations were conducted in relation to the drafting of the UNESCO Man and the Biosphere Nomination Form for NE Tobago, the drafting of the Dossiers for the Designation of NE Tobago's Main Ridge Forest Reserve, Islets and Reefs as Natural National Heritage Sites of Trinidad and Tobago and the drafting of a proposal to the Inter-American Development Bank titled: "Organisational Governance and Operational Strengthening of the North East Tobago Protected Area Management Trust (NETPAMT)".

It should be noted that this document applies the common writing style of UNESCO MAB Reserve Management Plans and, as such, does not claim to be or follow the writing style of a scientific research paper.

5 LIMITATIONS

The bulk of the document was prepared between November 2021 and June 2022 when restrictions regarding the COVID-19 pandemic prohibited workshops, group consultations and broader community involvement. Additionally, the extremely tight timeline for delivery of the draft and final document did not allow for the desired stakeholder participation. However, these limitations can be addressed in mid-2022, when the complementary components of the management plan will be finalised and a more intelligible version of the management plan can be developed, which will be more directed towards stakeholder engagement than programme management guidance (as it is the case for this document).

An additional, major limitation is the ubiquitous data deficiency for NE Tobago regarding all components of the management plan. Therefore, many statements in the situational analyses are based on recent, oral stakeholder reports and personal observations of the resident expert team. Hence the reason that baseline surveys, monitoring and evaluation interventions are essential to inform the future implementation organisation.

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6 VISION

MAB Vision: A world where people are conscious of their common future and their interactions with the planet, and act collectively and responsibly to build thriving societies in harmony within the biosphere.
To be based on stakeholder consultations.

7 MISSION

The MAB Mission 2015–2025 is to

- develop and strengthen models of sustainable development through the WNBR;
- communicate experiences and lessons learned, and facilitate the global diffusion and application of these models;
- support evaluation and high-quality management of biosphere reserves, strategies and policies for sustainable development and planning, and accountable and resilient institutions;
- help Member States and stakeholders to achieve the Sustainable Development Goals by sharing experiences and lessons learned related to exploring and testing policies, technologies, and innovations for the sustainable management of biodiversity and natural resources and mitigation and adaptation to climate change.

To be adapted on stakeholder consultations.

Figure 2. Children planting trees in Parlatuvier Bay (Janina Ewals)



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8 KEY OBJECTIVES

In order to address NE Tobago conservation and sustainable development challenges through strengthening the functions of a BR, the technical team proposes the following **Main Objective** for the management of the NETMABR:

To successfully consolidate and co-manage interventions related to sustainable and regenerative development, research, capacity building, education and networking on landscape, human- and eco-system levels for the benefit of NE Tobago's cultural and natural heritage, communities, and people.

Note: To be adapted based on stakeholder consultations

This key objective is designed to address the 12 key barriers that were identified by previous management plans for NE Tobago and IFPAM documents further as follows:

1. outdated legal and regulatory framework for establishing and managing natural and cultural resources,
2. unclear, fragmented roles responsibilities of stakeholders, especially managing authorities,
3. disempowered and under-resourced management authorities,
4. inadequate funding,
5. willingness to participate if interventions seem to be too restrictive,
6. stakeholder conflicts,
7. lack of broad, bipartisan political will,
8. lack of technical capacity to identify and address issues,
9. minimal capacity on the ground with respect to practical approaches to effective natural and cultural heritage management,
10. inadequate law enforcement,
11. minimal experience with income-generating opportunities, and last but by no means least,
12. a lack of transparency, accountability and compliance with regulation and legislation by the Tobago House of Assembly.

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While IFPAM and other programmes and projects were able to partially address these barriers, and while it can be stated that conservation status and efforts in NE Tobago have never been better, it remains a fact that all of the above barriers are still valid and need attention.
The Management Plan at hand is based on the methodical approach that most of the above-mentioned barriers can be addressed by implementing strategies aligned with the three MAB functions.

These, below-described key strategies, are mainly based on the results of the recent Improved Forest and Protected Area Management Project (IFPAM, 2015-2020) which applied a participatory approach in identifying objectives and potential solutions to overcome conservation barriers; additionally, the ongoing interaction between the technical team and key stakeholders was used to refine recommendations included into the Management Plan.
These strategies are reoccurring and supported by proposed activities in the various components of the Management Plan at hand.
It should be noted that, while IFPAM continuously considered socio-cultural aspects of NE Tobago as essential to successful management of natural resources, there was, unfortunately, not a matching project to similarly address the management of NE Tobago's cultural heritage.

Figure 3. Iguana Bay (Janina Ewals)



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9 WHAT IS THE UNESCO MAB PROGRAMME?

In 1971, United Nations Educational, Scientific and Cultural Organisation (UNESCO) launched the intergovernmental Man and the Biosphere programme (MAB) that aims to establish a basis for the improvement of relationships between people and their environments. It predicts the consequences of today's actions on tomorrow's world and thereby increases people's ability to efficiently manage natural resources for the well-being of both human populations and the environment (30).

The working unit of MAB is the Biosphere Reserve (BR), an international description of recognition from UNESCO for an area in the world, which is deemed to demonstrate a "balanced relationship between humans and the biosphere".

Biosphere Reserves are internationally recognised areas comprising terrestrial, marine and coastal ecosystems. Each reserve promotes solutions reconciling the conservation of biodiversity with its sustainable use by local communities. BRs are nominated by national governments and remain under the sovereign jurisdiction of the states where they are located.

BRs are intended to be model regions for demonstrating successful approaches to protection and sustainable development at a regional level. MAB sites are established with the goal to:

- harmonise conservation of biological and cultural diversity with economic and social development, and
- make a tangible contribution to the transition to green societies and support national governments' efforts to attain the Sustainable Development Goals (SDGs).

Biosphere Reserves have **three inter–connected functions**:

- **Conservation**: protecting cultural diversity and biodiversity, including genetic variation, species, ecosystems, landscapes, and securing services provided by such diversity.
- **Development**: fostering economic and human development that is environmentally and socially sustainable and culturally appropriate; and
- **Logistic Support**: facilitating demonstration projects, environmental education and sustainable development education and training, research and monitoring.

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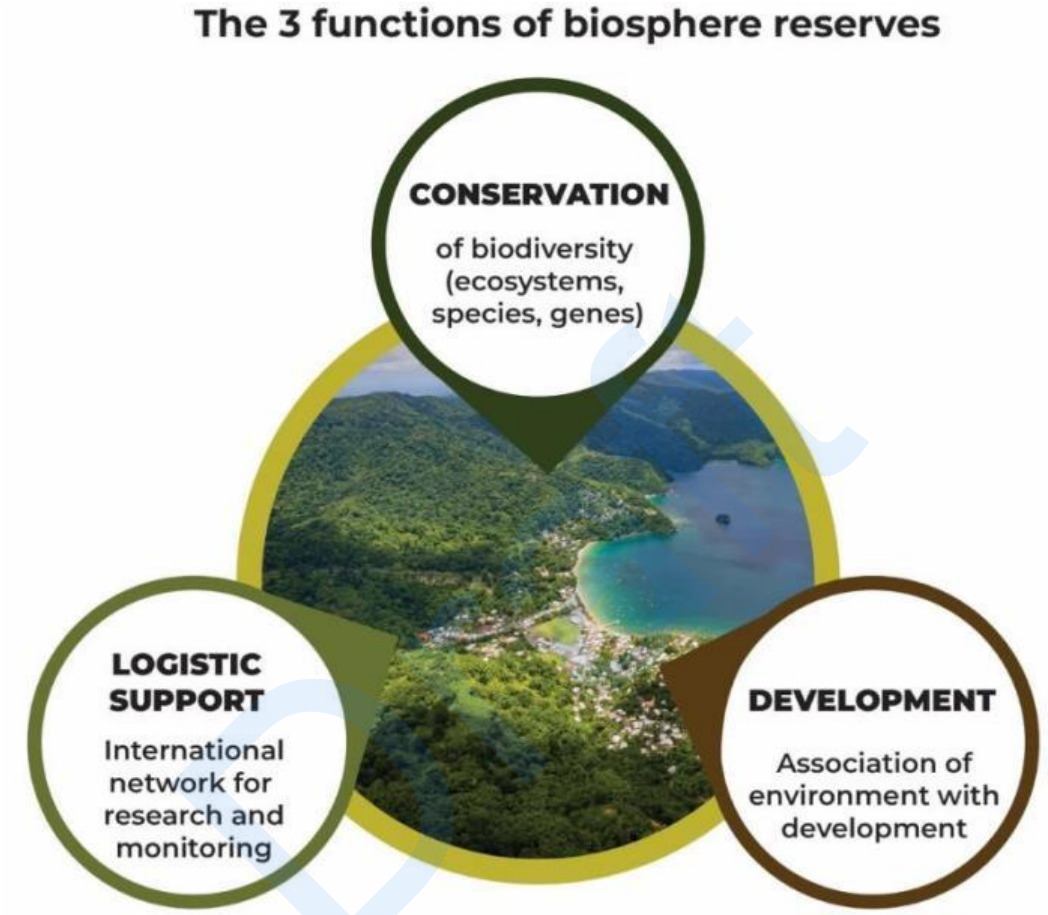


Figure 4. Schematic overview of 3 functions of biosphere reserves.

A BR consists of **three areas or zones – The core, buffer, and transition zones**.

The core zone is usually a legally protected area in which human activity is strictly limited and where monitoring of conservation priorities take place.

The buffer zone allows for appropriate activities such as research and scientific study, ecotourism, education and training.

The transition zone contains human settlements, agricultural and other commercial activities synonymous with human settlement.

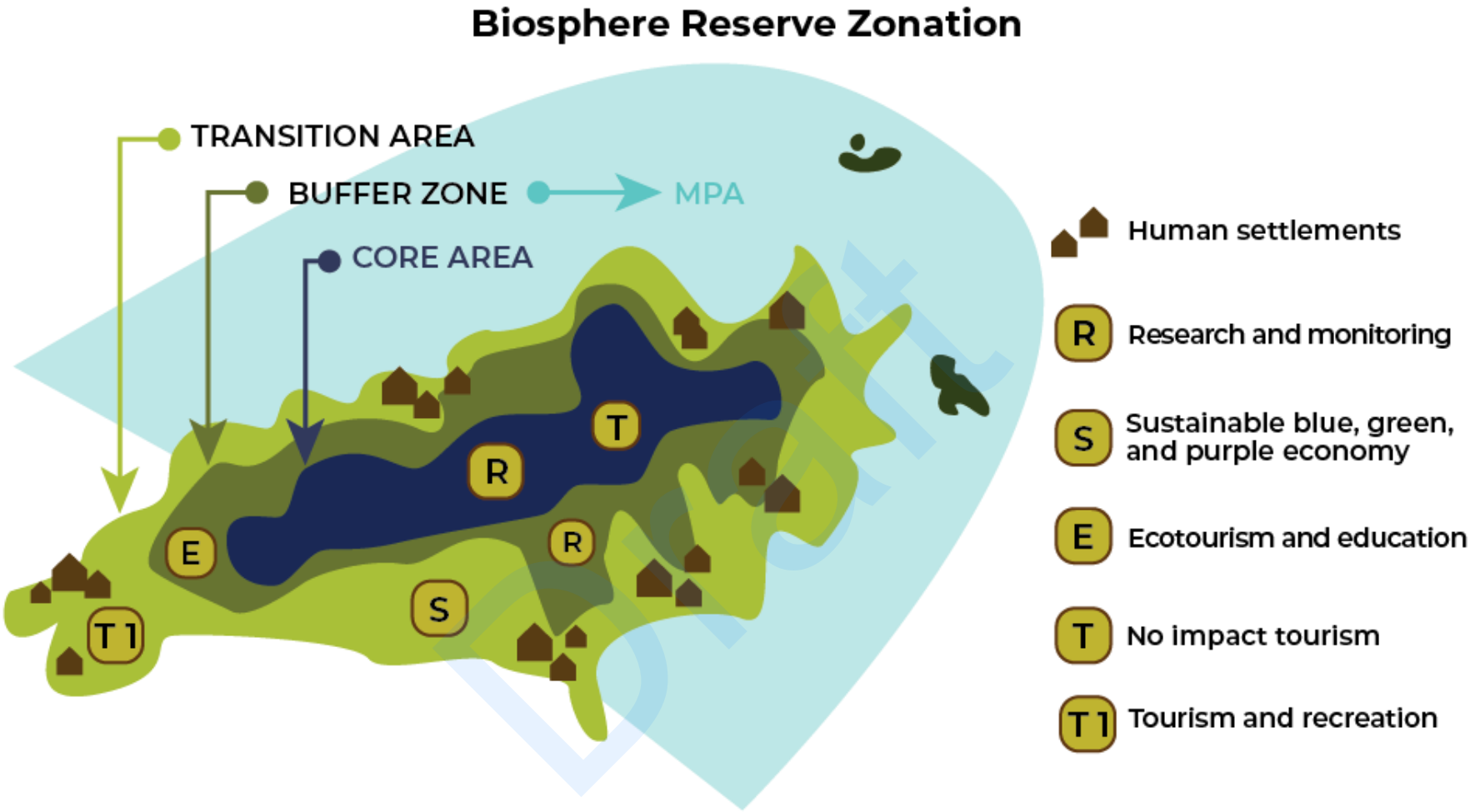


Figure 5. Schematic overview of NE Tobago Biosphere Reserve zonation (ERIC 2021).

The MAB Programme has a significant World Network of Biosphere Reserves (WNBR) which serves as a management tool for various municipal regions to improve strategies for sustainable development. As the pressures upon ecosystems increase with growing populations and climate change, the need for upgraded relationships between people and their natural surroundings only increases.

The **MAB Programme Mission** for the period 2015-2025 (31) is to:

- develop and strengthen models for sustainable development in the WNBR;
- communicate the experiences and lessons learned, facilitating the global diffusion and application of these models;
- support evaluation and high-quality management, strategies and policies for sustainable development and planning, as well as accountable and resilient institutions; and
- help member states and stakeholders to urgently meet the Sustainable Development Goals through experiences from the WNBR, particularly through exploring and testing policies, technologies and innovations for the sustainable management of biodiversity and natural resources and mitigation and adaptation to climate change. (MAB Strategy 2015-2025 & Lima Action Plan)

9.1 Administration

The international MAB Programme

The MAB programme is organised under an international agreement through UNESCO; state parties undertake actions within the MAB programme voluntarily and sites remain under national jurisdiction. At the global level, the MAB Programme is governed by its International Coordinating Council (ICC), under the overall authority of the UNESCO General Conference and its Executive Board.

The next level of governance is represented by regional and thematic networks. Governance at the national level is ideally through MAB National Committees.

The MAB institutional structure is outlined in Figure 6.

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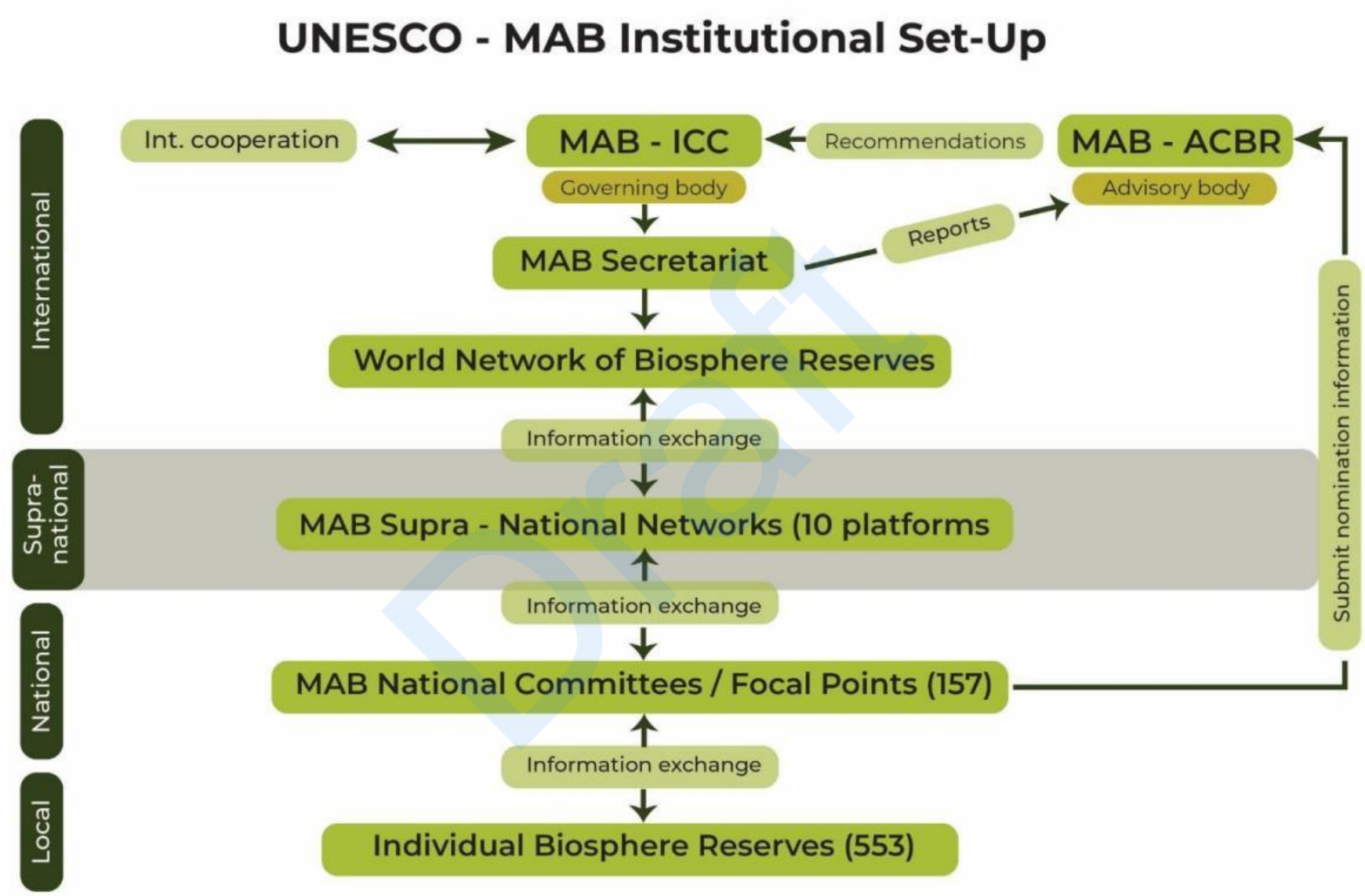


Figure 6. Diagram of the MAB institutional structure adapted from Schliep (24).

The MAB International Coordinating Council (ICC) is the governing body that meets biannually and consists of 34 Member States elected by UNESCO's General Conference. The ICC elects a chair and five vice-chairpersons from each of UNESCO's geopolitical regions that constitute the MAB Bureau which undertakes the responsibilities of the ICC between its biannual meetings. The MAB International Advisory Committee for Biosphere Reserves is the primary scientific and technical Committee body advising the ICC. The MAB Secretariat is the administrative centre for MAB based at UNESCO's Division of Ecological and Earth Sciences in Paris, the Secretariat work closely with the different field offices and Supranational Networks (e.g., IberoMAB – Iberian Peninsula and Latin America/ Caribbean region) around the world to coordinate the work of the MAB programme at the regional, national and individual Biosphere Reserve levels.

MAB is funded through the regular budget of UNESCO and mobilises funds-in-trust granted by Member States, bilateral and multilateral sources and extra-budgetary funds provided by countries, the private sector and private institutions.

UNESCO's intergovernmental structure provides MAB with a framework to help national governments support the planning and implementation of research and training programmes with technical assistance and scientific advice.

MAB-related activities are nationally financed however the programme can grant seed funding to assist countries in developing projects and/or to secure appropriate partnership contributions.

MAB offers fellowship opportunities co-sponsored by a number member states to assist the technical development of individuals seeking to build a profession within the field of the UNESCO programme priorities. These opportunities would be available to local staff to apply for.

Importantly, designation as a MAB Reserve does not necessarily require the formation of new laws.

9.2 Designation of NE Tobago

In September 2019, the Government of Trinidad and Tobago successfully submitted a Nomination Form to UNESCO with the request to consider NE Tobago as a Man and the Biosphere Reserve.

The eligibility criteria taken from the Biosphere Reserve Nomination Form are shown in Table 1.

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Table 1. The eligibility criteria taken from the Biosphere Reserve Nomination Form (2018).

	MAB Eligibility Criteria	NE Tobago
1	**Encompass a mosaic of ecological systems representative of major biogeographic region(s), including a gradation of human interventions**	✓
2	**Be of significance for biological diversity conservation**	✓
3	**Provide an opportunity to explore and demonstrate approaches to sustainable development on a regional scale**	✓
4	**Have an appropriate size to serve the three functions of biosphere reserves**	✓
5	**A legally constituted core area/s devoted to long term protection of sufficient size to meet long term conservation objectives**.	✓
6	**Buffer zone/s clearly identified & surrounding or contiguous to the core area/s, where only activities compatible with the conservation objectives can take place**".	✓
7	**Outer transition area where sustainable resource management practices are promoted and developed**	✓
8	**Organisational arrangements should be provided for the involvement and participation of a suitable range of inter alia public authorities, local communities and private interests in the design and the carrying out of the functions of a biosphere reserve**".	Ongoing
9	**Able to describe arrangements in place or foreseen**	✓
10	**Mechanisms to manage human use and activities in the buffer zone or zones**	✓
11	**Management policy or plan for the area as a biosphere reserve**	Currently developed
12	**Designated authority or mechanism to implement this policy or plan**	Department of the Environment, NETMAPT
13	**Programmes for research, monitoring, education and training**	✓

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In the Nomination Form, NE Tobago' values were described as follows:

"Covering over 835km^2, the proposed area encompasses three protected areas, one of which is the oldest protected tropical forest reserve in the world, a large planned Marine Protected Area (MPA) and 15 communities which are home to approximately 10,000 residents with a rich historical and cultural heritage. The area's rare and largely intact Caribbean Island Ridge-to-Ocean eco- and human-systems are well equipped to fulfil the three functions of a UNESCO Biosphere Reserve (BR): its biodiversity, range of ecosystems, and special-interest species are important on a regional and global scale (Conservation); the cultural heritage is a living example for the region's deeply rooted, historical, socio-economic and spiritual relationship between communities and natural resources (Development); and decades of regionally outstanding educational, research and networking activities (Logistic Support).

The close linkage between ecosystem services and natural resource use, active community groups, successful sustainable development projects, governmental initiatives and its closeness to Trinidad's resources provide the area with the prerequisites to successfully implement a BR and share lessons learnt with its Caribbean neighbours while serving as a regional role model. Being a hotspot for conservation related research for decades and having a track record of environmental education, capacity building and monitoring are well established cornerstones for providing and further increasing logistical support.

The legal, policy and institutional framework to manage a MAB area exist; current projects and programmes as well as those in the national and local development pipeline, and improved collaboration between government, civil society and private sector are demonstrably supportive of this BR nomination initiative. On varying levels, NE Tobago is already close to meeting the key conservation objectives of a successful BR as mentioned in the Seville MAB Strategy.

Coordinating future sustainable development efforts under a MAB umbrella and the inclusion of all relevant sectors of the society will significantly improve conservation and livelihoods through responsible use of our natural and cultural heritage which is the central goal of Tobago's guideline policy document, the Comprehensive Economic Development Plan."

On 28 October 2020, NE Tobago was officially declared a UNESCO MAB Reserve.

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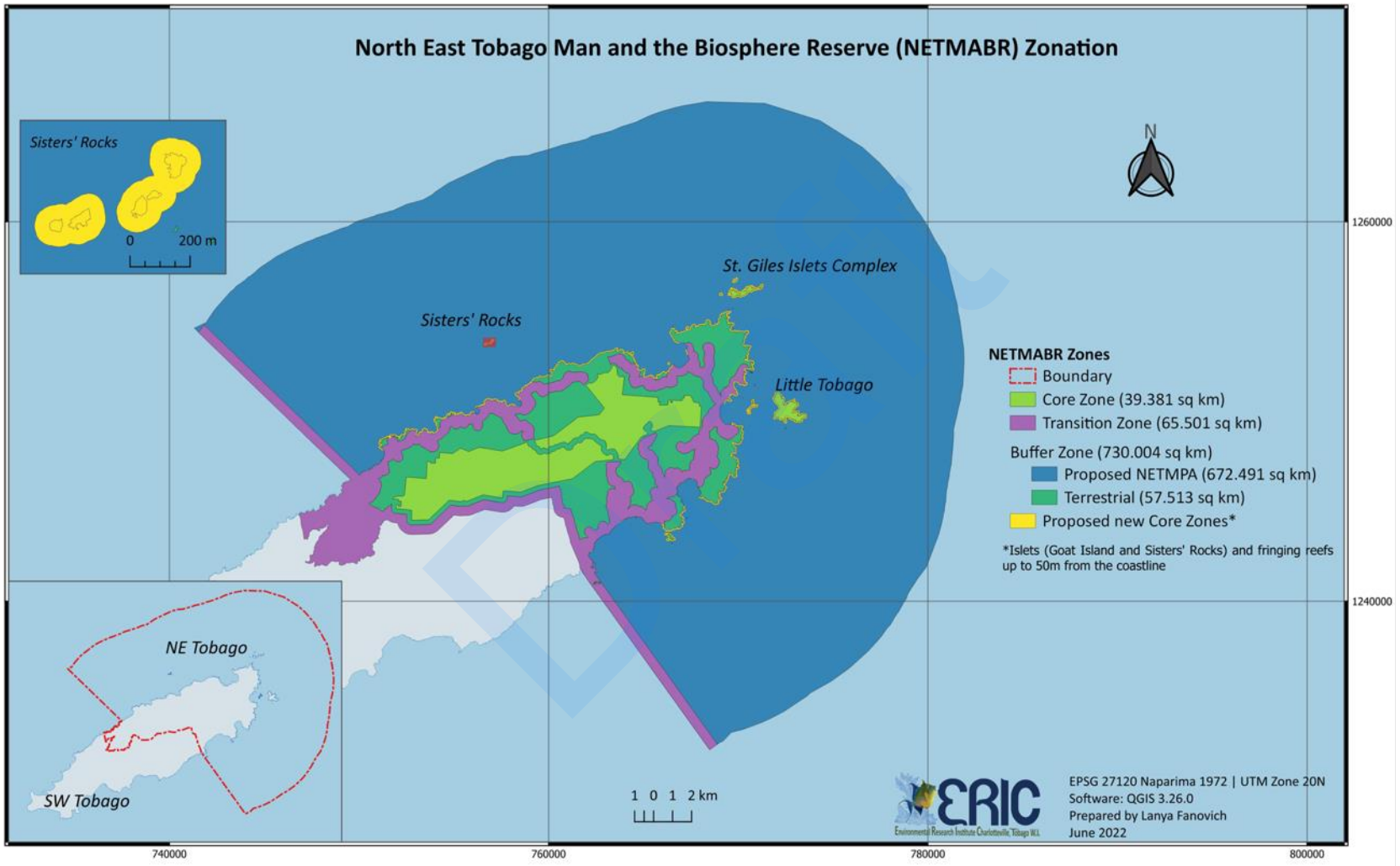


Figure 7. Zonation of the NE Tobago MAB Reserve (ERIC 2022)

The **Core Zone** of the NETMABR consists of three legally protected areas: the MRFR, Little Tobago and the St Giles Islet Complex, all of which are terrestrial.

It should be noted that, at the moment, the Core Zone does not include any marine areas, due to lack of protective legislation and regulations; however, work has started to designate high conservation value, coastal fringe reefs as Natural National Heritage Sites (which is the fastest way of to achieve legal protection) in 2021, and the National Protected Area Systems Plan was approved by Cabinet, which hopefully will result in the designation of the overall NE Tobago Marine Protected Area with some special, IUCN 1a category areas. Once these marine areas receive legal protection, they can, later on, switch from Buffer to Core Zone status within the BR.

The **Buffer Zone** for NETMABR was defined as:

- all lands between the Transition Zone and the MRFR Core Zone,
- a 125m belt on both sides of roads within the Core Zone (combining to a width of 250m)
- a 250m belt along the boundary between the Core Zone and the south-western area outside of the NETMABR,
- coastal areas between the boundaries of the NETMPA and the Transition Zone, and
- the entire marine realm of the proposed NETMPA.

As mentioned in the section above, some marine Buffer Zones might change to Core Zone as soon as legal protection can be provided. Therefore, the terrestrial, coastal Buffer Zones are crucial to protect sensitive marine ecosystems.

The **Transition Zone** was defined as all lands that are located within a 250m belt on both sides of all roads within the overall boundaries of the NETMABR; this includes all communities, and economic activities in the NETMABR (except for some micro-scale subsistence farming and hunting in the Buffer Zone). The result of this definition is a Transition Zone band, sandwiched between the terrestrial and marine Buffer Zones on which it has significant influence.

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10 MANAGEMENT PLAN COMPONENTS

The following chapters are subdivided into situational analysis, goals, strategies, and proposed activities. It is important to understand that the chapters are at different results framework levels therefore the subheadings are not necessarily on similar logic levels as well. This is the result of the High-Level Goal of each Component starting on a different logic level.

Table 2. Management plan component levels

Component level	Definition
Summary Situational Analysis	The current state of the BR respectively to the chapter subject, descriptively identifying strengths, weaknesses, opportunities and threats
High-Level Goal	The desired status achieved by the management plan
Priorities	Interventions that either significantly contribute to achieving the goal, or significantly reduce existing threats to the goal
Strategies	Long-term plans of action designed to achieve the goal
Proposed Activities	Programmes, projects, and other interventions that are aligned to the strategies and should be revised once the situational analysis significantly changes.

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10.1 Addressing Barriers to Sustainable Management

The NETMABR is subject to a series of interconnected, indirect threats to successful implementation of the MAB programme. Local residents and stakeholders are not commonly inspired to undertake conservation-relevant practices. This is partly because intelligible, adequate and continuous environmental education still requires improvement. While knowledge often exists, it is not successfully translated into a positive attitude and actual practise. This in turn is partially due to perceived and actual lack of ownership and empowerment on the part of residents in NE Tobago. On the other hand, and in certain cases, the sense of ownership is very well developed and strongly articulated; however, ownership rarely translates into stewardship.

Similarly, residents facing environmental challenges are often not informed enough to take appropriate actions against those perpetrating the violations (e.g., seek assistance from the Environmental Police and/or the Environmental Commission of Trinidad and Tobago).

Additionally, the lack of coherent and consistent conservation co-management and co-operation often undermines good efforts in some areas by neglect in others. For example, efforts of CSOs to protect nesting sea turtles are undermined by a lack of law-enforcement regarding the use of turtle nets and turtle meat consumption.

The principal barrier to addressing direct threats to the ecosystems of NE Tobago is fragmented management and use. The National Protected Areas Policy, the National Protected Area Systems Plan (7), the IFPAM Project (6) and ERIC's stakeholder assessments have all identified and prioritised this barrier for NE Tobago. Regulations and roles are unclear and consequently there is limited "enforcement / implementation of regulations concerning natural resource use" as stated in the NE Tobago Management Plan (2003). Fragmented, formal and informal, public and private, land management and use create an environment where it is nearly impossible for a single stakeholder to meaningfully influence the direct threats that are degrading NE Tobago's ecosystems.

This barrier has two components.

Government Sector

The ***government component*** involves the formal management of public lands and waters. This barrier includes outdated legislation and policy, a labyrinthine institutional structure and limited government capacity and resources. Repeated government initiatives since the 1970's have failed to address this issue; a case in point is the National Protected Areas Policy (2011) that called for a wide range of actions to be undertaken by 2016. These include the "*revision, development and declaration of supporting legal instruments [to] enact an enabling legislative framework*", the establishment of a centralised authority "*to administer the coordination and*

implementation of the National Protected Areas Policy for Trinidad and Tobago", and the establishment of protected areas under the new policy. Unfortunately, all efforts to declare the North East Tobago Marine Protected Area have failed since over half a decade.

Non-Government Sector

Fragmented management and use of land and waters also occurs in ***non-government sectors***. The absence of a national land use planning framework combined with outdated regulations and limited enforcement means that private land management and use is largely unrestricted. There is a concomitant lack of mechanisms and incentives for private land owners to engage in or benefit from conservation. The current, forested state of most private land in NE Tobago is therefore not a result of public policies or priorities, but an artefact of the priorities and preferences of individual owners. Although this speaks to the conservation commitment of some land owners, it is a highly vulnerable state for long-term conservation. Land owners may choose to develop their land with infrastructure or unsustainable agriculture that compromises the NETMABR.

Informal management and use of the land- and sea-scape, including public and private areas, is likewise unrestricted. As explained in the THA Comprehensive Economic Development Plan 2.0 (20), Tobago hosts "*longstanding insecure land tenure arrangements with as much as 83 percent of the lands of Tobago allegedly in informal tenure (the majority being family lands)*". Informal but long-standing family lands, squatting, small agricultural plots, unregulated dumping, hunting, harvesting of timber and other forest products, and harvesting of fish from the marine environment all represent often legitimate uses of public and private lands that can none the less contribute to fragmentation and degradation of ecosystems.

The implementation of the UNESCO MAB programme, including the operationalisation of the NE Tobago Protected Area Management Trust, offers a significant opportunity to de-fragment and consolidate the management of natural and cultural resources under one, overarching programme.

Although fragmented management is the principal barrier to conservation in NE Tobago, another critical barrier is a lack of monitoring and communication. This issue captures two hindrances to biodiversity conservation regionally as identified by the Caribbean Islands Biodiversity Hotspot assessment: limited technical and scientific knowledge and poor availability of information needed for effective decision-making, and lack of awareness of importance of biodiversity and ecosystem services. This similarly applies to the socio-cultural and economic development aspects of the NETMABR. Limited information and communication mean that it is difficult to:

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quantify threats, foster informed discussions, prioritise management actions, measure the success of interventions, and inspire stakeholders to take action. This barrier will be specifically targeted by strengthening the logistic function of the NETMABR.

In order to address the described challenges through strengthening the functions of a BR, the technical team proposes the following **Main Objective** for the management of the NETMABR:

To successfully consolidate and co-manage interventions related to sustainable and regenerative development, research, capacity building, education and networking on landscape, human- and eco-system levels for the benefit of NE Tobago's cultural and natural heritage and people.

In order to go into more depth, previous management plans for NE Tobago and IFPAM documents further detailed 12 key barriers to successful natural resource management in NE Tobago as follows:

1. outdated legal and regulatory framework for establishing and managing natural and cultural resources,
2. unclear, fragmented roles responsibilities of stakeholders, especially managing authorities,
3. disempowered and under-resourced management authorities,
4. inadequate funding,
5. willingness to participate if interventions seem to be too restrictive,
6. stakeholder conflicts,
7. lack of broad, bipartisan political will,
8. lack of technical capacity to identify and address issues,
9. minimal capacity on the ground with respect to practical approaches to effective natural and cultural heritage management,
10. inadequate law enforcement,
11. minimal experience with income-generating opportunities, and last but by no means least,
12. a lack of transparency, accountability and compliance with regulation and legislation by the Tobago House of Assembly.

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While IFPAM and other programmes and projects were able to partially address these barriers, and while it can be stated that conservation status and efforts in NE Tobago have never been better, it remains a fact that all of the above barriers are still valid and need attention.
The Management Plan at hand is based on the methodical approach that most of those barriers can be addressed by implementing strategies aligned with the three MAB functions.

These, below-described key strategies, are mainly based on the results of the recent Improved Forest and Protected Area Management Project (IFPAM, 2015-2020) which applied a participatory approach in identifying objectives and potential solutions to overcome conservation barriers; additionally, the ongoing interaction between the technical team and key stakeholders was used to refine recommendations included into the Management Plan.
These strategies are reoccurring and supported by proposed activities in the various components of the Management Plan at hand.

It should be noted that, while IFPAM continuously considered socio-cultural aspects of NE Tobago as essential to successful management of natural resources, there was, unfortunately, not a matching project to similarly address the management of NE Tobago's cultural heritage.

Figure 8. View from Speyside onto Little Tobago and Goat Island (Janina Ewals)



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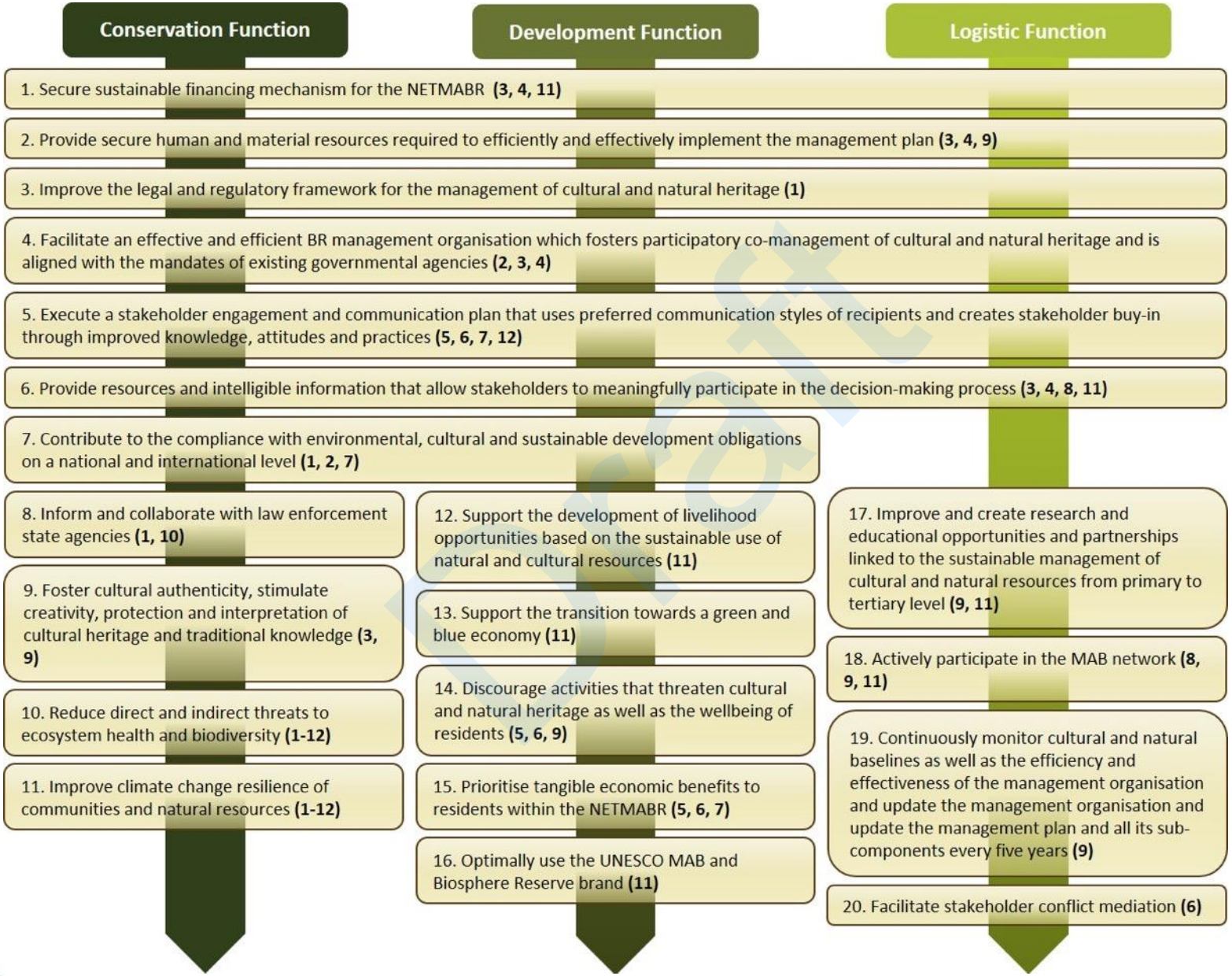


Figure 9. Proposed Main Strategies for the BR Management Plan, Addressed Key-Barriers in (brackets)

11 CONSERVATION

Conservation Status

Conservation Zones within the NETMABR

Currently, only the MRFR, Little Tobago (Wildlife Sanctuary) and St Giles (Prohibited Area) are protected areas under the Conservation of Wildlife Act (Chap. 67:01), the Forest Act (Chap. 66:01), the National Forest Policy (2011) and the Forest (Prohibited Areas) Order. The management of these three PAs is also supported by the State Lands Act (Chap. 57:01). This chapter addresses conservation within the entire NETMABR.

For more in-depth information, the following documents contain specific information regarding areas of high conservation value:

- FAO (2019) Management Plan for the NE Tobago Marine Protected Area (requires updating and revision)
- FAO (2019) Management Plan for the Main Ridge Forest Reserve (MRFR) Protected Area (requires updating and revision)
- ERIC, THA, (2021) Technical Dossier – Islets of the North-East Tobago UNESCO Man and the Biosphere Reserve as a Natural National Heritage Site
- ERIC, THA, (2021) Technical Dossier – Reefs of the North-East Tobago UNESCO Man and the Biosphere Reserve as a Natural National Heritage Site
- ERIC, THA, (2018) Technical Dossier – Tobago's Main Ridge Forest Reserve as a Natural National Heritage Site

The National Protected Area Systems Plan (NPASP, also requiring updating and revision), prepared by the FAO implemented IFPAM project and adopted by Cabinet (2019), proposes the establishment of additional protected areas in NE Tobago which would result in the following list:

Table 3. Conservation status of existing and proposed protected areas in NE Tobago (NPASP).

Type	Name	IUCN Equivalent	BR Zone
Terrestrial Scientific Reserve	Southern MRFR	Ia Strict Nature Reserve	NETMABR Core Zone
Terrestrial Special Conservation Reserve	Goldsborough Watershed	Ib Wilderness Area	Adjacent to Core and Buffer Zone
Terrestrial National Park	Northern MRFR	II National Park	NETMABR Core Zone
Terrestrial Natural Landmark / Monument	Flagstaff Hill	III Natural Monument or Feature	NETMABR Buffer Zone

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Type	Name	IUCN Equivalent	BR Zone
Terrestrial Natural Habitat or Species Management Reserve	L'Anse Fourmi Habitat Management Reserve	IV Habitat or Species Management Area	NETMABR Transition and Buffer Zone
	Merchiston Habitat Management Reserve	IV Habitat or Species Management Area	NETMABR Transition and Buffer Zone
	Starwood Habitat Management Reserve	IV Habitat or Species Management Area	NETMABR Transition and Buffer Zone
	Louis D'or Conservation Area	IV Habitat or Species Management Area	NETMABR Transition and Buffer Zone
	Hillsborough Dam Watershed	IV Habitat or Species Management Area	Adjacent to Core and Buffer Zone
Coastal and Marine National Parks (Marine Protected Areas)	Englishman's Bay	II National Park	Buffer Zone
	Charlotteville MPA	II National Park	Buffer Zone
Coastal and Marine Habitat or Species Management Reserves	Little Tobago and Goat Island	IV Habitat or Species Management Area	Core and Buffer Zone
	Lucy Vale	IV Habitat or Species Management Area	Buffer Zone
	Queens Island	IV Habitat or Species Management Area	Buffer Zone
	Richmond Island	IV Habitat or Species Management Area	Buffer Zone
	Sisters Rocks	IV Habitat or Species Management Area	Buffer Zone
	St Giles Islet Complex	IV Habitat or Species Management Area	Core Zone
	L'Anse Fourmi Bay	IV Habitat or Species Management Area	Buffer Zone
	Hermitage Bay	IV Habitat or Species Management Area	Buffer Zone
Coastal and Marine Seascapes	NETMPA	V Protected Seascape	Buffer Zone

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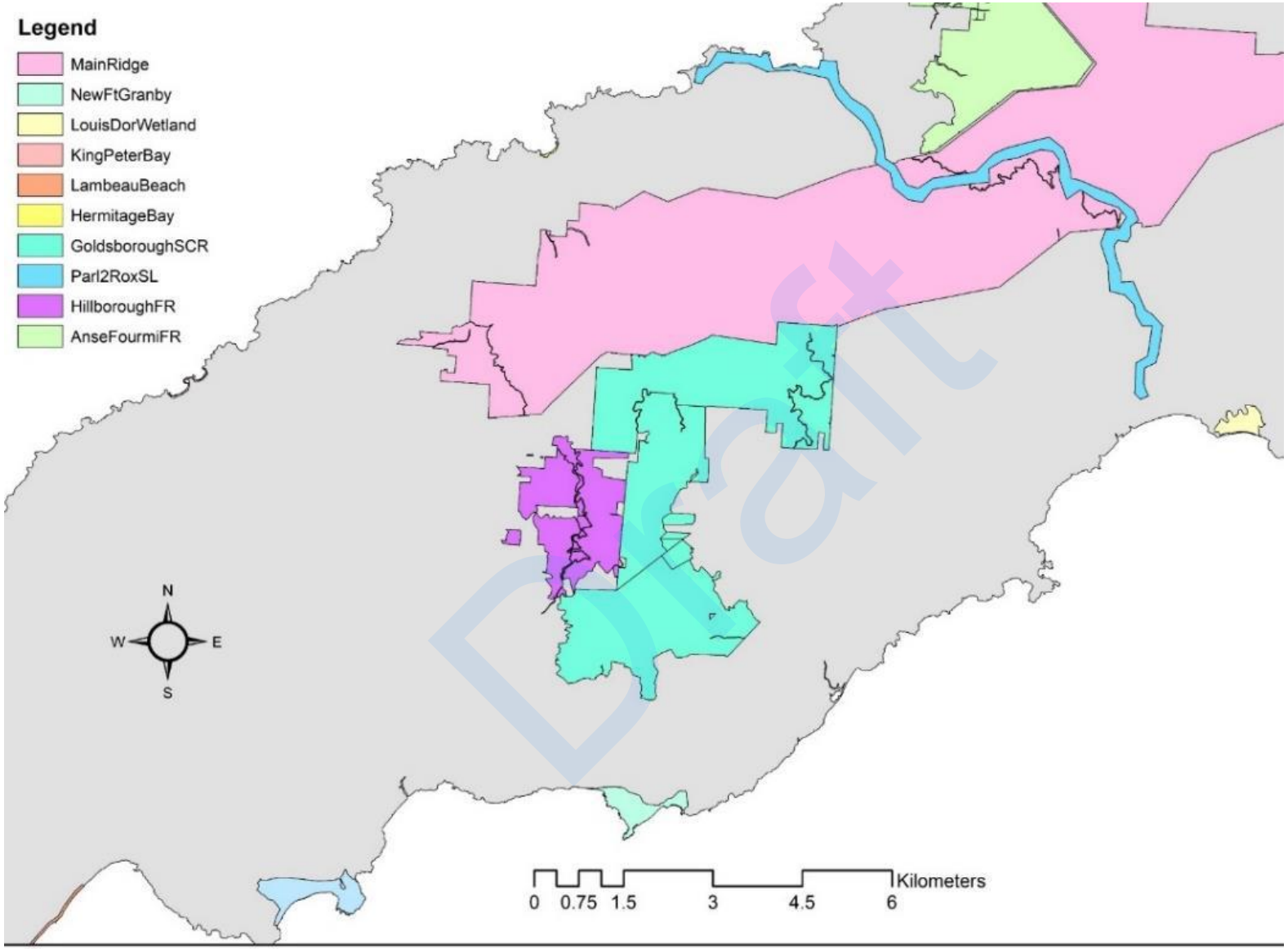


Figure 10. Proposed PNAs in central Tobago (NPASP, 2018)

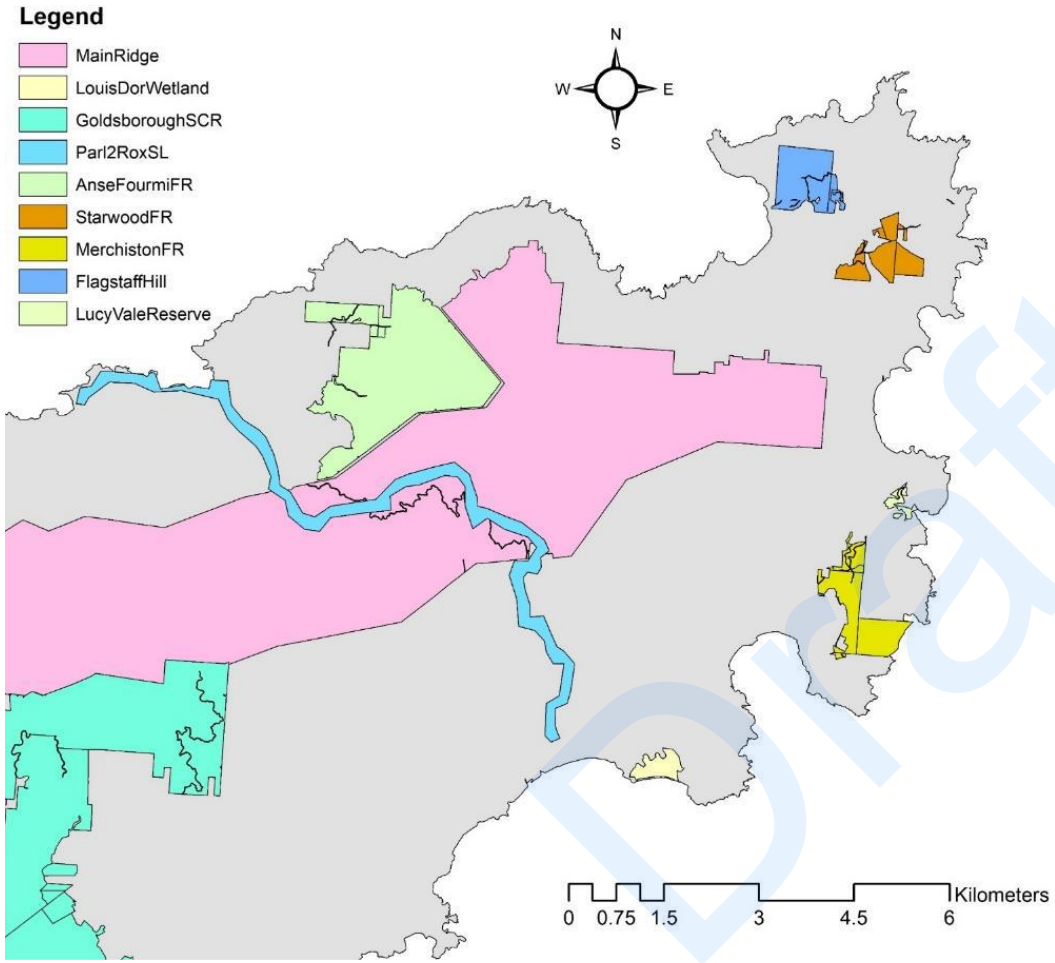


Figure 11. Proposed PNAs in northern Tobago (NPASP, 2018).

The above maps are directly taken from the NPASP (2018); please note that they contain some errors e.g., the map for central Tobago indicates Hermitage Bay in the legend; however, this bay is not on the map and is also not colour-coded in the map for northern Tobago. Furthermore, there are some areas that are proposed as PNAs but privately owned and the owners have not granted permission to do so e.g., the Flagstaff and Merchiston areas.

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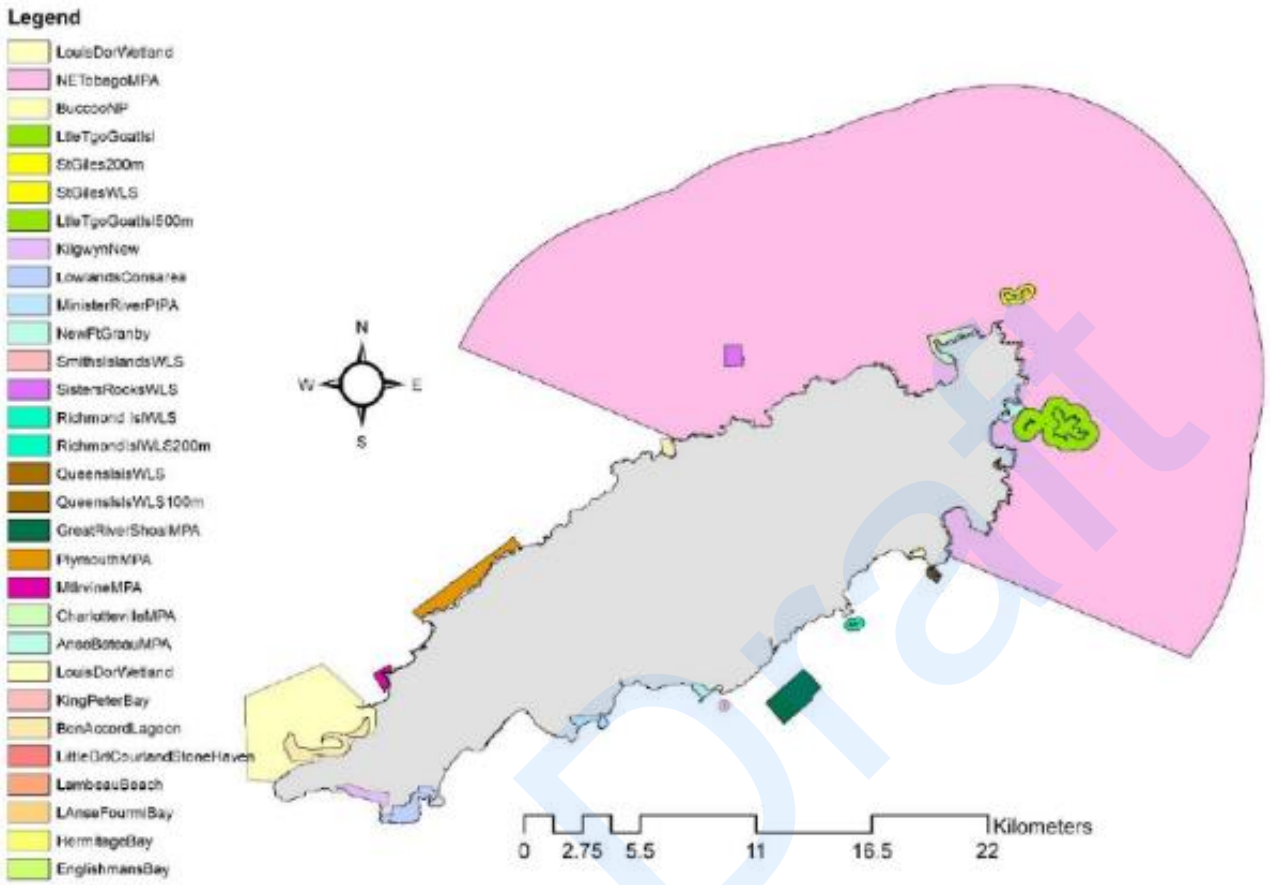


Figure 12. Outdated map of marine PNAs in Tobago (NPASP, 2018)

The map for the proposed marine PNAs in Tobago (Figure 12) is outdated since it was designed before the Tobago IFPAM committee decided to extend the MPA boundaries to Castara and Belle Garden; additionally, the listing of islets and coastal reefs as Natural National Heritage Sites was not foreseen at this point.

The current (2022) map of the NETMABR provides a more up-to-date delineation of the actual and proposed marine PNAs of NE Tobago.

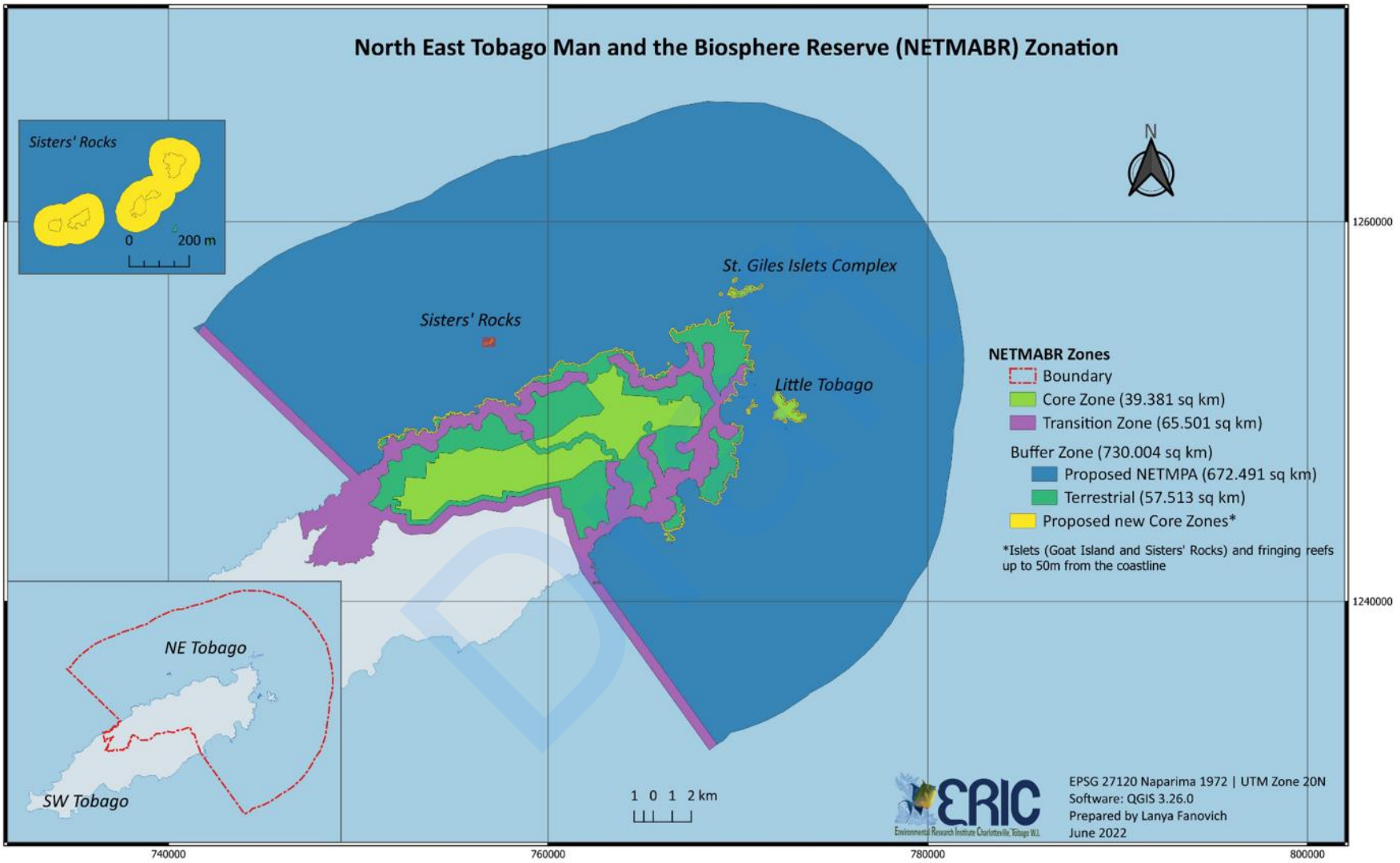


Figure 13. Updated map of the NETMABR, indicating proposed NNH Sites (reefs and islets), which are potential new BR Core Zones

It is important to note that once the areas identified in the NPASP and nominated as Natural National Heritage Sites and are legally protected they could and should be shifted from the Buffer Zone to the Core Zone of the Biosphere Reserve.

Ecosystem Services

The MEA uses four ecosystem service categories of: provisioning (e.g., artisanal fishery, small-scale agriculture, hunting), regulating (e.g., erosion control, coastal protection, water purification), cultural (e.g. aesthetic beauty that supports eco-tourism) and supporting (e.g., nutrient cycling). Ecosystem value is assessed here in these terms.

The diagram below illustrates the various ecosystem services of the five broader ecological areas:

For descriptive purposes, ecosystem service value is expressed in terms of five broader ecological areas that together constitute the landscape of NE Tobago: Ridges, Rivers, Reefs, Islands, Ocean. Each area includes one or more related ecosystems.

Ecosystems are often valued for the services they provide to people.



Figure 14. View from the ridge onto St Gilles islets

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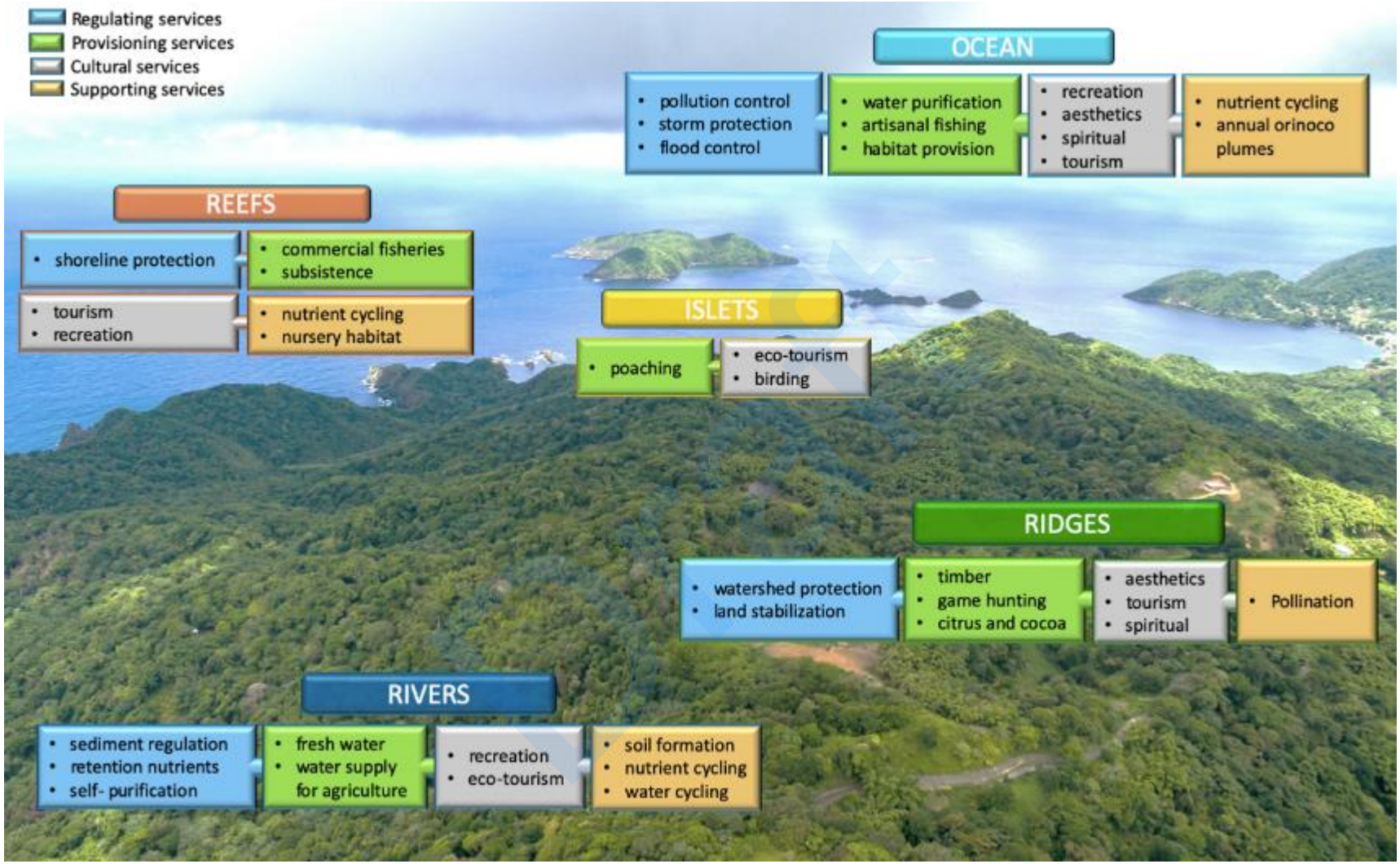


Figure 15. NETMABR Ecosystem Services

The list below only refers to ecosystem services that are related to specific species or groups of species. Ecosystem services that are mainly a product of abiotic factors are omitted.
The list is to be understood as representative and not exhaustive.

Table 4. Ecosystems, services and associated key species.

Ecosystems	Services	Example	Associated Key Species
Tropical Forests	Provisioning	timber extraction	e.g. Cedar (*Ocotea lucoxylon*), Cypre (*Cordia alliodora*), Crapo (*Carapa guianinsis*), Mahogany (*Swietenia spp*)
		hunting	e.g., Agouti (*Dasyprocta leporina*), Iguana (Iguana iguana), Armadillo (*Dasypus novemcinctus*)
		medicinal plants	e.g., Naked Boy Tree (*Bursera simaruba*), Bois Canot (*Cecropio peltata*), Zebapique (*Neurolaena lobate)*
	Regulating	carbon sequestration	all plants
		pollination	bees (e.g., *Apis mellifera*), bats (e.g., *Glossophaga longirostris*), butterflies/moths (e.g., *Caligo tucer*)
		moderation of extreme events, erosion control	trees (various species), bamboo (*Babusa vulgaris*)
	Cultural	tourism - birdwatching	e.g., White-tailed Sabrewing (*Campylopterus ensipennis*), Collared Trogon (*Trogon collaris*), Stripe-breasted Spinetail (*Synallaxis cinnamomea*)
		spiritual rituals	e.g., Silk Cotton Tree (*Ceiba pentandra*)
Fresh & Brackish Water (riparian, riverine, estuary and mangrove)	Provisioning	trapping	e.g., Blue Crab (*Callinectes sapidus*), Crayfish (*Macrobrachium carcinus*)
	Regulating	Waste-water treatment	e.g., mangroves (*Rhicophorus mangle*), reeds (various species)
	Cultural	tourism - birdwatching	e.g., Black Crowned Night Heron (*Nycticorax nycticorax*), Belted Kingfisher (*Megaceryle alcyon*)
		inspiration for art	plants associated with rivers and estuaries
	Supporting	provision of habitat	e.g., mangroves (*Rhicophorus mangle*), reeds (various species)
Coastal Marine (coastal beaches, coral reefs, seagrass beds)	Provisioning	fishing	e.g., Conch (*Lobatus gigas*), Lobster (*Panuliarus argus*), Snappers (*Lutjanus spp*), Grouper (*Epinephalsus spp*), Parrotfishes (*Sparisoma*)

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Ecosystems	Services	Example	Associated Key Species
	Regulating	erosion control	e.g., Sea Grape (*Coccoloba uvifera*), Sea Almond (*Terminalia cattapa*), Coconut (*Cocos nucifera*), corals (*Scleractinians*)
	Cultural	tourism - snorkelling, diving	corals (*Scleractinians*), other sea creatures
		inspiration for art	plants and animals associated with the ecosystems
	Supporting	provision of habitat	e.g., Sea Grape (*Coccoloba ubifera*), Sea Almond (*Terminalia cattapa*), Coconut (*Cocos nucifera*), corals (*Scleractinians*)
Offshore Islands	Provisioning	poaching	e.g., Magnificent Frigate Bird (*Fregata magnificens*), Red Footed Booby (*Sula sula*)
	Cultural	tourism - bird watching	e.g., Red-billed Tropic Bird (*Phaethon aethereus*), Briddeled Tern (*Onychoprion anaethetus)*
Marine Pelagic	Provisioning	fishing	Mahi Mahi (*Coryphaena hippurus*), Tuna (*Thunnus spp*), Mackerels (*Scomberomorus spp*)
	Cultural	tourism - sport fishing	e.g., Tuna (*Thunnus spp*), Marlin (*Makaira nigricans*)

Biodiversity

NE Tobago harbours globally valuable biodiversity in terms of 'at-risk' species, endemic species, migratory species, iconic species and commercial species. The value of NE Tobago's biodiversity derives from the diversity of the area's ecosystems and their relative intactness. The NETMABR includes open ocean species such as manta rays and hawksbill sea turtles, minute, florescent marine molluscs on the coral reef, iridescent hummingbirds, glass frogs, and extraordinary plant diversity in the Tropical Moist Broad Leaf Forests and regionally rare Tropical Dry Broad Leaf Forests.

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Most outstanding is the presence of critically endangered (CR) Hawksbill Sea Turtles (*Eretmochelys imbricate*), Staghorn and Elkhorn Corals (*Acropora*), endangered (EN) Leatherback Sea Turtles (*Dermochelys coriacea*), Green Sea Turtles (*Chelonia mydas*), Loggerhead Sea Turtles (*Caretta caretta*), hammerhead sharks (*Sphyrna*), star corals (*Montastraea*), vulnerable (VU) Olive Ridley Sea Turtles (*Lepidochelys olivacea),* snappers (*Heteropriacanthus*), Manta Rays (*Manta birostris*), Bloody Bay Poison Frogs (*Mannophryne olmonae*), Eastern Glass Frogs (*Hyalinobatrachium orientale tobagoense*), and Bloody Bay Litter Frogs (*Pristimantis*). The latter three species are endemic. Near threatened (NT) species include the Rainbow Parrotfish (*Scarus guacamaia*), Blacktip Shark (*Carcharhinus limbatus*), Caribbean Reef Shark (*Carcharhinus perezii)*, Bull Shark (*Carcharhinus leucas*), Lemon Shark (*Negaprion brevirostris*) and the White-Tailed Sabrewing (*Campylopterus ensipennis*). The conservation status of eight endemic species remains unknown; these include the Tobago Greenlet (*Hylophilus insularis*), Attenborough's Myotis (bat) (*Myotis attenboroughi*), Charlotteville Robber Frog (*Pristimantis charlottevillensis*), Hailey's Parrot Snake (*Leptophis coeruleodorsus*), Tobago False Coral Snake (*Erythrolamprus ocellatus*), Tobago Coral Brotula (*Ogilbichthys tobagoensis*), Tawny Blenny (*Starksia rava*) and the Darksaddle Blenny (*Starksia sella*).



Figure 16. Critically endangered hawksbill sea turtle in NE Tobago (ERIC)

Biodiversity experts expect that further research will likely yield more endemic species, especially of plants, reptiles and amphibians. The Environmental Management Act of Trinidad and Tobago provides special protection to Environmentally Sensitive Species (ESS) and Environmentally Sensitive Areas (ESA). There are currently no Environmentally Sensitive Areas listed in NE Tobago.

The Environmentally Sensitive Species (ESS) Rules apply to seven species recorded in NE Tobago.



Figure 17. Nurse shark in NE Tobago (ERIC)

Table 5. The seven ESS species as defined by the ESS Rules, 2001.

Scientific name species	Common name species
Campylopterus ensipennis	White-tailed Sabrewing
Eudocimus ruber	Scarlet Ibis
Dermochelys coriacea	Leatherback Sea Turtle
Caretta caretta	Loggerhead Sea Turtle
Chelonia mydas	Green Sea Turtle
Eretmochelys imbricata	Hawksbill Sea Turtle
Lepidochelys olivacea	Olive Ridley's Sea Turtle

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Table 6. Summary of IUCN at-risk, endemic, EDGE, CMS, CITES, SPAWRAC species occurring in the planned NETMABR (March 2022).

Category		Number	
IUCN RED LIST species	Critically Endangered	16	**114**
	Endangered	27	
	Vulnerable	46	
	Near Threatened	25	
ENDEMIC species			**40**
EDGE species			**19**
CMS species			**57**
CITES species			**140**
SPAWRAC species			**115**

A full list with species names documented in Annex IV.

In 2019, the first complete list of all documented, macroscopic species was compiled by the ERIC as a by-product of the MAB application and indicates NE Tobago's species richness as follows:

Table 7. NE Tobago species richness.

Species Group	Number of Species
Freshwater Invertebrates	26
Marine Invertebrates	252
Terrestrial Invertebrates	207
Marine Fish	204
Freshwater Fish	13
Amphibians	15
Reptiles	45
Birds	160
Marine Mammals	19
Terrestrial Mammals	39
Vascular Plants	800
Non-Vascular Plants	16
Total	**1796**

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Please note, this is work in progress and additional species are expected especially regarding terrestrial and marine invertebrates. Please also note that the total species count is 1,774. In some instances, species in Table 11 were counted twice if they are found in marine and terrestrial habitats.

Migratory Species

Trinidad and Tobago became a signatory to the Convention of Migratory Species (CMS) on 1 December 2018. It is considered a Range State for many migratory species including sharks. NE Tobago hosts 18 species, marine and avian, that are listed in the Convention. These notably include the Broad-winged Hawk (*Buteo platypterus*), Great Black Hawk (*Buteogallus urubitinga*), Roseate Tern (*Sterna dougallii*), the Hawksbill Turtle (*Eretmochelys imbricata*) and Leatherback Turtles (*Dermochelys coriacea*), all which nest in the area. The Giant Manta Ray (*Manta birostris*) is also a migrant species that frequents NE Tobago's waters.

Iconic Species

Many species are globally valuable for the recognition they receive in either public or scholarly spheres.

The Speyside Brain Coral (Colpophyllia natans)

One of the most notable natural icons is the Speyside Brain Coral colony. This colony is the largest reported in the Western hemisphere and one of the larger brain coral colonies in the world, measuring 3m high by 5.3m wide. The colony is estimated at 2,000 years old. The Speyside Brain Coral is a living monument to both the enduring power of living systems, such as coral reefs, and their fragility in modern times. Despite its extreme robustness and age, the colony suffered from both bleaching and subsequent disease during the 2010 coral reef bleaching event in Tobago, a reminder that in face of global climate change, even the most enduring natural icons are at risk.



Figure 18. Speyside brain coral (UNESCO/Jacob Bock)

The Hawksbill Sea Turtle (*Eretmochelys imbricata*)

The Hawksbill sea turtle is an iconic, critically endangered species that is a living embodiment of the interdependence of terrestrial and marine environments that the small island system represents. Like coral reefs, sea turtles represent an ancient evolutionary strategy that is at imminent risk from both global and local threats. Hawksbill sea turtles depend on a healthy ocean, safe coastal waters, and viable beaches for their lifecycle. Although Trinidad and Tobago are recognised internationally for Leatherback sea turtle (critically endangered) nesting, recent evidence suggests that NE Tobago's small, isolated beaches host a regionally significant rookery for this globally critically endangered species. Limited monitoring, combined with a local tradition of consumption, local abundance and the publicity given nationally to Leatherbacks have led to the iconic value of NE Tobago's Hawksbill's being dramatically undervalued. There is significant scope to expand the profile of this iconic species in the conservation area.



Figure 19. Hawksbill sea turtle (ERIC)

Iconic Birds and Marine Life

The NETMABR attracts international dive tourism for manta rays, and formerly for shark species, which may recover if fishing pressure is reduced. NE Tobago also includes three of Trinidad and Tobago's seven Important Bird and Biodiversity Areas (IBA) which attract international tourists. Notable is the hummingbird diversity, the largest magnificent frigate bird (*Fregata magnificens*) colony

in the Caribbean on St. Giles Island; and the extraordinary variety of seabirds on Little Tobago documented by Sir David Attenborough.



Figure 20. Manta ray (Andy and Allison Sallmon)


Figure 21. Magnificent frigate bird

Conservation Threats

Infrastructure Development

Construction of private and public infrastructure driven by population growth and economics, are a major concern to at-risk species. Poor adherence to good environmental practises and mitigation of erosion of construction material and disturbed soil, cause considerable damage to habitats. Heavy sediment loading blocks river mouths, preventing movement of the American eel (*Anguilla rostrata)* between the river and the sea. More impactful is sedimentation on reefs, affecting critical coral species and their associated communities. Infrastructure development is an active sector of the economy governed by inadequate legislation and limited enforcement.

Over-Exploitation

Unsustainable resource use including hunting, logging, and overfishing, threatens NE Tobago ecosystems. Despite a two (2) year national hunting ban from 2014 to 2015, hunting remains a threat and a socially accepted activity. Sea turtle slaughter and egg poaching are still practised, despite 2012 legislation rendering it illegal. Many of the long-term efforts by local conservation groups were beginning to show positive effects and sea turtle consumption became increasingly unpopular; however, the increased

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unemployment during the COVID-19 pandemic resulted in significant increase in poaching of turtles and other species as well as indiscriminate spearfishing. Illegal logging happens mostly on abandoned estates. The damage caused by heavy equipment access just to extract several trees is extensive. Such logging activities are not commercial but instead are mostly small scale and could be considered praedial larceny. Sustainable or even regenerative fishing is not practised and fisheries catch not monitored in a way to deliver reliable data. Highly valuable species are clearly overexploited, the fishing effort increases, and fish size decreases. This over-exploitation of NE Tobago's fish stocks is attributed to illegal, unreported, and unregulated fishing by foreign fishing boats (including long-liners targeting tuna and sharks) as well as unsustainable local fishing practises.

Pollution

Pollution by solid waste, liquid waste and agricultural run-off is a significant issue in NE Tobago. Liquid waste, including grey and black water, and solid waste enters the rivers and ocean via communal drainage. Septic tanks are often not maintained or pumped leading to high levels of faecal coliform in waters adjacent to urban areas. These impact water quality in reefs and exposes hard corals, gorgonians and fish to disease-inducing bacteria. Enriching the water to support algal growth applies additional pressure on at-risk hard corals, competing for space. Plastic packaging material is the main solid waste found alongside roads and in waterways associated with limited solid waste pickup schedules which has become a major issue for NE Tobago's marine wildlife such as sea turtles and seabirds, who consume plastics mistakenly. Littering and illegal fly tipping, especially between Speyside and L'Anse Fourmi are a constant issue and apparently difficult to remedy. The issue of microplastic in locally caught fish has not even been researched as yet! Recent studies by the ERIC and the Predator Ecology and Conservation Lab Department of Biological Sciences, Florida International University (USA) indicate a heightened level of mercury and recommend "*meat and fin products from large hammerhead species, Sphyrna mokarran, S. zygaena and S. lewini, need to be avoided by consumers and not sold by retailers due high mercury levels*".



Figure 22. Sargassum drifting towards the shoreline (Jacob Bock)



Climate Change

The effects of climate change, manifest through changing and unpredictable weather patterns, are a significant threat to NE Tobago's species of interest in every habitat. Related consequences include wildfires, landslides, coastal erosion and disrupted animal and plant life cycles. The dissolution of distinct wet and dry seasons over the past half century poses a major challenge for organisms to adapt their life, and especially reproductive, cycles. A good example is when increased rainfall in traditionally 'dry' seasons destroys the flowers of flowering plants that flower during dry conditions. This in turn affects nectar-seeking pollinators and consequently fruit seeking animals some months later.

Long dry seasons increase the vulnerability of the various forest ecosystems to wildfires which are sometimes accidental, sometimes set on purpose for soil fertilisation or land clearing. Wildfires can in turn lead to colonisation of the area by invasive bamboo and other secondary bush. Subsequent landslides in the rainy season are often a result of wildfires which destroy the plant cover that was previously stabilising the soil. Rising sea surface temperatures, especially during the months from August to October, increases the likelihood of bleaching events of reefs, which if prolonged, can result in significant coral mortality and have downstream effects on several natural processes. With coral reef loss, supported fauna is also lost, including endemic fish species.

The increasing occurrence of Sargassum seaweed, mostly beaching on the Atlantic coast of the NETMABR, is linked to an increased atmospheric CO_2 level, higher temperatures and nutrient inflow from the Kongo, Amazon, and Orinoco due to deforestation and soil erosion. The environmental impacts of Sargassum are significant, including obstructing nesting and hatching turtles, restricting sunlight penetration, changing beach ecology, increased health issues due to corrosive gases (e.g., H_2S), and hindering boat traffic; these negative impacts are increased by beach destruction and salt leaching into freshwater ecosystems resulting from clean-up activities. The usage of Sargassum as fertilisers, for consumption by humans or livestock, or other uses that include direct contact is still questionable based on the bioaccumulation of heavy metals (i.e., Arsenic) in Sargassum.

Local Disempowerment

Unfortunately, residents and stakeholders are rarely inspired to undertake conservation-relevant practices. This is partly because intelligible, adequate, and continuous environmental education is still in its infancy. While knowledge often exists, it is not successfully translated into a positive attitude and practise. This in turn is partially due to perceived and actual lack of ownership and empowerment on the part of residents in NE Tobago. Similarly, residents facing environmental challenges, such as developers violating laws by dumping waste illegally, are often not informed enough to take appropriate actions against those perpetrating the violations. Additionally, the lack of coherent and consistent conservation co-management often undermines good efforts in some areas by neglect in others. For example, efforts of CSOs to protect nesting sea turtles are undermined by a lack of law-enforcement regarding the use of turtle nets and turtle meat consumption.



Ecosystem Fragmentation

Road development, uncontrolled construction activities, partition of larger estates, and land clearing for small-scale agriculture driven by population growth, the economy and the need for increased and improved development and services, increasingly contribute to the fragmentation of forest, riverine and riparian ecosystems and their associated ecological processes.

Invasive Species

Alien invasive species currently pose a significant threat to NE Tobago ecosystems. As global ecosystem connectivity increases, this issue is likely to be a more frequent challenge in the future. Lionfish are the most obvious invasive species in NE Tobago and are posing a significant threat to resident fish species including the endemic species, due to their high fertility rate and enormous appetite. Local predators have not yet adapted to take advantage of this easily huntable fish. A less noticeable alien invasive species is the amphibian chytrid fungus, which poses a significant risk to the endemic amphibians of NE Tobago. A third category of invasive alien species that have a significant impact on local ecosystems are feral cats, roaming dogs, and unrestrained livestock and unrestrained yard fowl, which compete with native for resources, kill opportunistically or disrupt natural behaviours, such as sea turtle nesting. For more detailed information see also chapter 3.4 in part 1 of the Management Plan on Alien Invasive Species.

Conservation Efforts

There are several pieces of legislation which contain regulations and associates schedule listings that protect at-risk species from the various pressures directly impacting individuals or their environment. Breach of these regulations is punishable either through fines or imprisonment. However, severely neglected, or under-represented in these protection regimes are marine species, except for the sea turtles which are currently considered ESS. Ongoing amendment of the national Fisheries Act will attempt to rectify this.
THA Departments (e.g., DNFR, DMRF, DoE) are implementing ongoing environmental awareness and education programmes over the past decades. Unfortunately, these data are not easily and publicly available.
The most prominent NGOs active in conservation within the NETMABR are:

- The Environmental Research Institute Charlotteville (https://eric-tobago.org)
- The Tobago Alliance for Resilient Communities (https://tobagoarc.org)
- Environment Tobago (https://www.environmenttobago.net)
- The Speyside Eco-Marine Park Rangers (https://www.facebook.com/speyside.rangers.7)
- The Castara Tourism Development Association (https://www.facebook.com/Castara-Tourism-Development-Association-Information-Page-384349068668060/)
- The Belle Garden Police Youth Club (https://www.facebook.com/BelleGardenPYC)

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- The Moriah Police Youth Club (https://www.facebook.com/groups/751886878275014)
- The Roxborough Police Youth Club, (https://roxboroughyouthclub.weebly.com/)
- North East Sea Turtles (NEST) (https://www.facebook.com/search/top?q=north%20east%20sea%20turtles)

Monitoring

Monitoring surveys are conducted by state agencies including the EMA, IMA, and various departments under the THA including the DoE, DNRF, and DMRF. They are responsible for monitoring the ecosystem health under their mandate. Indicators and measures will include indicator species abundance, beach profiling, reef health, fisheries catch landings, and environmental quality testing. The ERIC also conducts surveys of various species groups as part of their monitoring programmes (e.g., Reef Check, Forest Check, Shark and Ray Sighting Database).

Biodiversity and conservation monitoring protocols as well as baseline surveys were conducted by the UWI and the IMA in 2018/2019. Based on these findings and consultations with stakeholders, development of monitoring protocols to support draft management plans for the MRFR and the NETMPA need to be revitalised with a special focus on practicability, financial resources, applicability, and community involvement rather than purely academic knowledge gain.

High Level Goal

Conservation activities in the North-East Tobago UNESCO Man and the Biosphere Reserve are implemented and socially accepted by a broad section of stakeholders, regenerate biodiversity, ecosystem services and health while supporting livelihoods in our communities.

(to be confirmed by stakeholders)

Sub-goals should be participatorily developed for the legally protected areas (Core Zone) and according to their level of protection and guided by IUCN objectives for various PA categories (https://www.iucn.org/theme/protected-areas/about/protected-area-categories), Buffer Zone and Transition Zone within the next years.

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Priorities

The conservation priorities should address several layers of concern:

1. All stakeholders are aware of the economic, social, and cultural benefits of improved ecosystem services and the consequences of continued degradation.
2. The level of protection for threatened species, ecosystems, and habitats is sufficient to maintain or even increase biodiversity and ecosystem health.
3. Existing conservation threats are reduced and anticipated threats avoided.
4. Knowledge about the conservation value of the NETMABR is created, exchanged, and intelligibly communicated.

Strategies

1. Implementation of an ongoing conservation communication and education campaign tailored to the preferred communication channels of various stakeholders.
2. Strengthening of legislation in the medium-term and improvement of law enforcement in the short-term.
3. Implementing replicable activities for threat reduction, mitigation, and avoidance as well as application of the precautionary principle.
4. Establishing an ongoing research and ecosystem health monitoring programme in collaboration with resident, national, and international stakeholders that focuses on applicable results that improve conservation and ideally contribute to livelihoods.
   Please note: Climate change mitigation and resilience are addressed in a specific chapter.

Programmes and Projects

<u>Re. Strategy 1: Implementation of an ongoing conservation communication and education campaign tailored to the preferred communication channels of various stakeholders.</u>

Facilitate:

- using the results of the 2017 and 2019 environmental Knowledge, Attitude and Practice assessments to design and implement a medium-term communication plan informing residents and visitors about the vital linkages between eco- and human-system health, ecosystem services, climate change, national, regional and global importance of natural and cultural heritage, as well as the legal and regulatory framework; this will include messaging about the BR as a brand and indication of place value;

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- ongoing capacity building of stakeholders (especially the private sector) regarding environmental management and threat reduction;
- consolidate the CSO and governmental educational efforts regarding cultural and natural heritage for children and adults.

Re. Strategy 2: Strengthening of legislation in the medium-term and improvement of law enforcement in the short-term.
Facilitate:

- enacting of the NPASP;
- designating of additional NNH Sites in NE Tobago to improve legal protected status;
- enacting additional, meaningful, and applicable NE Tobago specific, conservation regulations via the THA Act; specifically, regarding zoning and natural resource use regulations (e.g., seasons, sizes, catch limits, harvesting methods, etc.);
- clarifying the legal status of state land in NETMABR (boundaries, THA or the Commissioner of State Lands as final governmental authority, what areas are forests etc.);
- clarifying the legal and management roles and responsibilities of stakeholders (documented in NETPAMT governance and institutional structure);
- declaring of RAMSAR sites in NE Tobago (https://www.ramsar.org/);
- continuing the training of all law enforcement officers regarding environmental legislation which was started under IFPAM;
- implementing a Joint Law Enforcement Programme between CSOs, private sector, THA Departments, and law enforcement;
- appointing of litter wardens, game wardens, and honorary game wardens, both terrestrial and marine;
- applying the polluter pays principle for environmental violations;
- strengthening the capacity of THA officers with legal mandates e.g., DoE, DNRF, DMRF, and DoH; and
- increasing camera surveillance.

Re. Strategy 3: Implementing (replicable) policies, programmes, and projects for threat reduction, mitigation, and avoidance as well as application of the precautionary principle.
Facilitate:

- technical capacity building and availability of required resources (aka empowerment) for conservation activities of governmental and non-governmental conservation actors;
- collaboratively designing usage zonation for the NETMABR;

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- tailoring and implementing the national Integrated Coastal Zone Management Plan for NE Tobago;
- tailoring and implementing the specific Sustainable Shark and Ray Fisheries Management Plan (2019) for the NETMABR;
- supporting transitions from conventional to sustainable livelihoods through green and blue economic approaches;
- maintaining the ecological connectivity (especially through water courses and wildlife corridors) throughout the NETMABR;
- the operation of a wildlife rehabilitation centre (possibly through Corbin Local Wildlife, https://www.tobagowildlife.org);
- the development of sustainable and regenerative livelihoods that depend on intact ecosystem services;
- cross-sectoral collaboration regarding liquid and solid waste reduction starting with reducing and followed by reusing and recycling;
- coordinated conservation collaboration between stakeholders, especially including the private sector;
- determination of and adhering to carrying capacity at recreational sites (e.g., Little Tobago);
- collaborating with the oil and gas sector as well as the Ministry of Energy and Energy Industries regarding the management of actual and potential environmental impacts of exploration and extraction;
- evaluating and implementing best practises to fend off and reduce alien invasive species;
- developing and implementing a practicable sargassum response plan;
- restoring disturbed areas and threatened ecosystems e.g.; corals, seagrass beds, tropical dry forests, rivers, wetlands, beaches, and landslides;
- applying the precautionary principle for all (especially state-driven) development and business activities;
- designing and implementing specific conservation programmes for locally and internationally threatened species e.g., sea turtles, lobster, conch, snappers, groupers, sharks, Manta rays, White-tailed Sabrewing, amphibians, etc., see list in Annex IV; specifically, revitalise the abandoned, community-based turtle patrol programme;
- establishing a species and ecosystem disaster response plan;
- adopting the Fire Prevention, Detection, Suppression and Awareness Programme (See Fire Project H: 488 of DNRF);
- adopting the Multi-Hazard Early Warning System in collaboration with the Tobago Emergency Management Authority (TEMA); and
- developing and implementing an Integrated Pest Management (IPM) and Disease Management (DM) Programme.

Re. Strategy 4: Establishing an ongoing research and monitoring programme in collaboration with resident, national, and international stakeholders that focuses on applicable results that improve conservation and ideally contribute to livelihoods.

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Facilitate:

- establishing a research agenda developed by academia, governmental, private sector, and civil society stakeholders;
- establishing a natural resource use register, including metrics and specific threats, for regular monitoring purposes (including microplastic in seafood);
- establishing a publicly, easily, and freely accessible research and date repository for the NETMABR;
- reviewing, fusion, finalisation and implementation of the UWI, IMA, THA, and ERIC conservation monitoring protocols;
- engaging community members, especially resource users, in monitoring of environmental health and as well as participating in shared positive experiences regarding our cultural and natural heritage;
- continuing the CREWS marine monitoring programme through IMA;
- using (BR) networks to exchange experiences with similar sites on best practices to reduce pressures.

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