

MINISTRY OF PLANNING AND DEVELOPMENT

IWEco.TT
Integrating Water, Land and Ecosystems Management in Caribbean Small Island Developing States
#CaringForOurFuture

gef

UN environment

Component of a 10-year Management Plan

North-East Tobago
Man and the Biosphere Area

unesco
Man and the Biosphere Programme

FOCUS: POLLUTION

AUGUST 2022

Component of a 10-year Management Plan

FOCUS: POLLUTION

for the

North-East Tobago Man and the Biosphere Area

Draft

CREDITS

COORDINATION

Linford Beckles, Director, Department of the Environment,
Tobago House of Assembly
Environmental Research Institute Charlotteville

TECHNICAL WRITING TEAM LEADER

Aljoscha Wothke, CEO, Environmental Research Institute
Charlotteville (ERIC), Tobago.

ERIC CONTRIBUTORS

Lanya Fanovich, Jacob Bock, Janina Ewals,
Trainees: Jhunean Giraud, Sherneil Dick

PHOTOGRAPHIC CREDITS

Environmental Research Institute Charlotteville, Max Smith,
Dr Ryan S. Mohammed, Tobago Heritage Conservation Society,
Jacob Bock, and Janina Ewals

SUMMARY REVIEW

Jheuel Carter-Guy, Ministry of Tourism, Culture and the Arts
Dianne Rampadarath, Ministry of Agriculture, Land and Fisheries
Ruqayyah Thompson, Institute of Marine Affairs
Rosemary Lall, Programme Officer, UNDP Country Office, Trinidad and Tobago
Javed Lakhan, Ministry of Planning and Development
Dr Cindy Chandool, Project Manager of the Environmental Policy
and Planning Division of the Ministry of Planning and Development

Draft



Table of Contents

1 Executive Summary 5

2 The Way Forward 9

3 Introductory Remarks 10

4 Methods 12

5 Limitations 12

6 Vision 13

7 Mission 13

8 Key Objectives 14

9 What is the UNESCO MAB Programme? 16

9.1 Administration 19

9.2 Designation of NE Tobago 21

10 Management Plan Components 26

10.1 Addressing Barriers to Sustainable Management 27

11 Pollution 32

Draft

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

Draft

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

1. Background
2. Literature Review
3. Addressing Barriers to Sustainable Management
4. Governance
5. Financing and Donor Data Base
6. Alien Invasive Species
7. Sustainable Agriculture and Sustainable Land Management Practises
8. Sustainable Tourism
9. Pollution
10. Research
11. Education
12. Networking

IWEco

13. Principles
14. Vision
15. Mission

Draft

16. Key Objectives
17. Site Description
    - 17.1. Biogeographic Location
    - 17.2. Biophysical Characteristics
    - 17.3. Ecosystem Descriptions
    - 17.4. Conservation Status
    - 17.5. Human Systems
    - 17.6. Land Tenure
    - 17.7. Zoning
    - 17.8. Existing And Proposed NNH Sites
18. Cultural and Socioeconomic Background
19. Historical Background
20. Cultural Background
21. Folk Tales
22. Socio-economic Background
    - 22.1. SWOT
    - 22.2. PESTLE
23. Relevant Legislations and Policies
24. Relevant International Conventions
25. Conservation
26. Climate Change Resilience Strategies
27. Development
    - 27.1. Green Economy
    - 27.2. Blue Economy
    - 27.3. Purple Economy

SGP

Draft

28. Marine Zoning Guidelines
29. Sustainable Fisheries
30. Sustainable Cultural Entrepreneurship
31. Arts
32. Historical Sites
33. Income Sharing
34. Disaster Mitigation and Prevention
35. Branding
36. Marketing
37. Aesthetics
38. Safety
39. Twinning
40. Implementation Schedule
41. M&E and BR Review
42. Budget
43. Conflict Resolution

Annexes

44. Non-exhaustive list of relevant networks
45. Non-exhaustive list of relevant donors
46. Revised Stakeholder Register and Engagement Plan
47. Revised Communications Plan
48. List of Conservation Relevant Species
49. Intelligible Online Knowledge Management Platform

Draft

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.**

Draft

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

Draft

- 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.

Draft

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)



Draft

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.

Draft

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)



Draft

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.

Draft

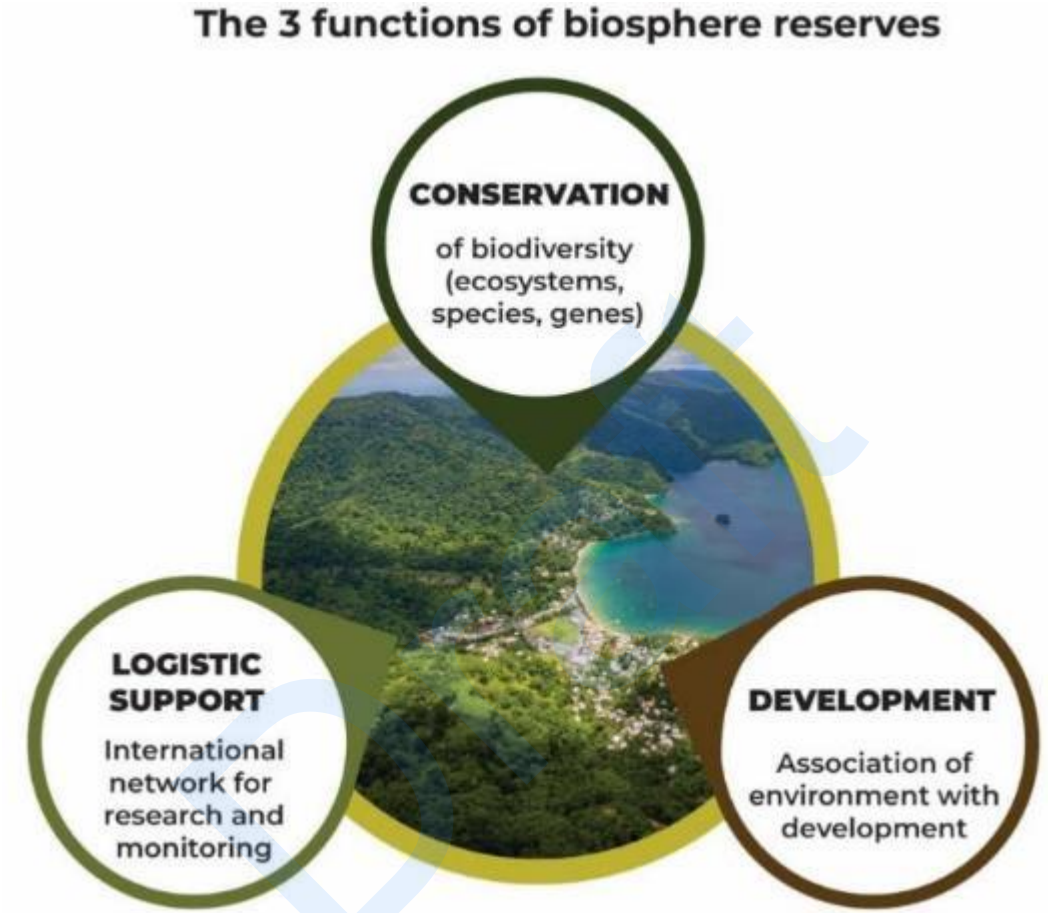


Figure 4. Schematic overview of 3 functions of biosphere reserves.

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.

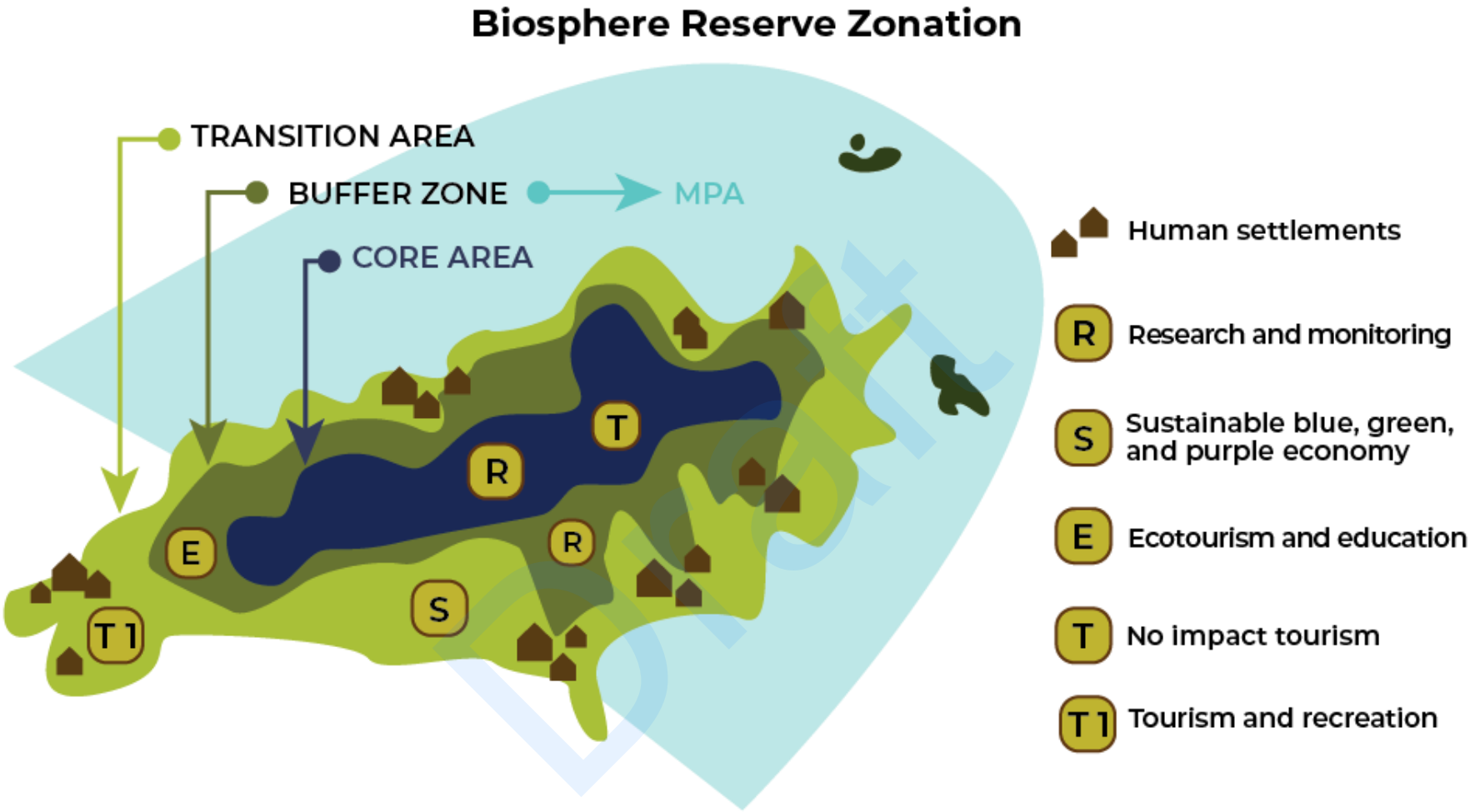


Figure 5. Schematic overview of NE Tobago Biosphere Reserve zonation (ERIC 2021).

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.

Draft

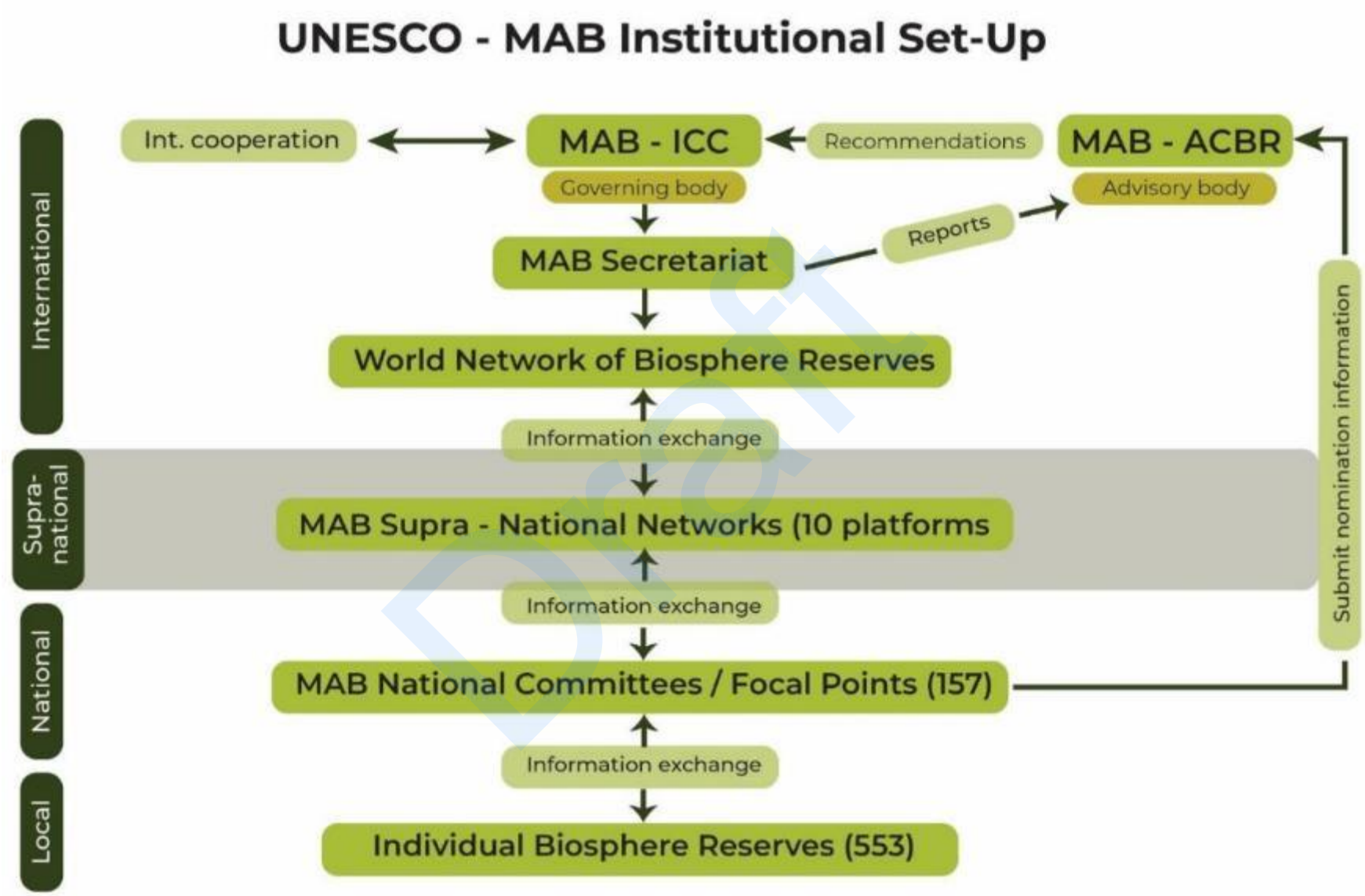


Figure 6. Diagram of the MAB institutional structure adapted from Schliep (24).

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.

Draft

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**	✓

Draft

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.

Draft

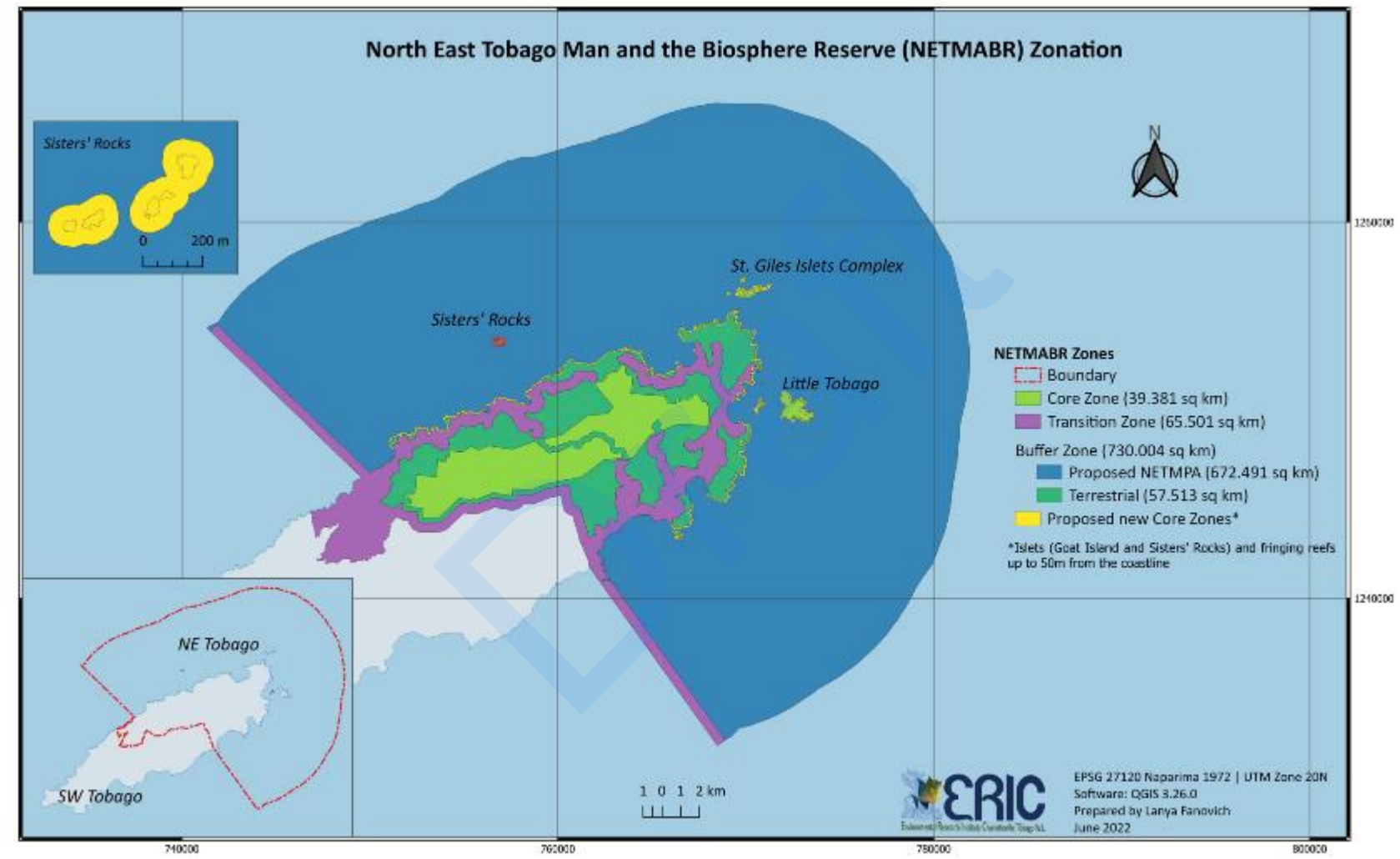


Figure 7. Zonation of the NE Tobago MAB Reserve (ERIC 2022)

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.

Draft

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.

Draft

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:

Draft

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.

Draft

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)



Draft

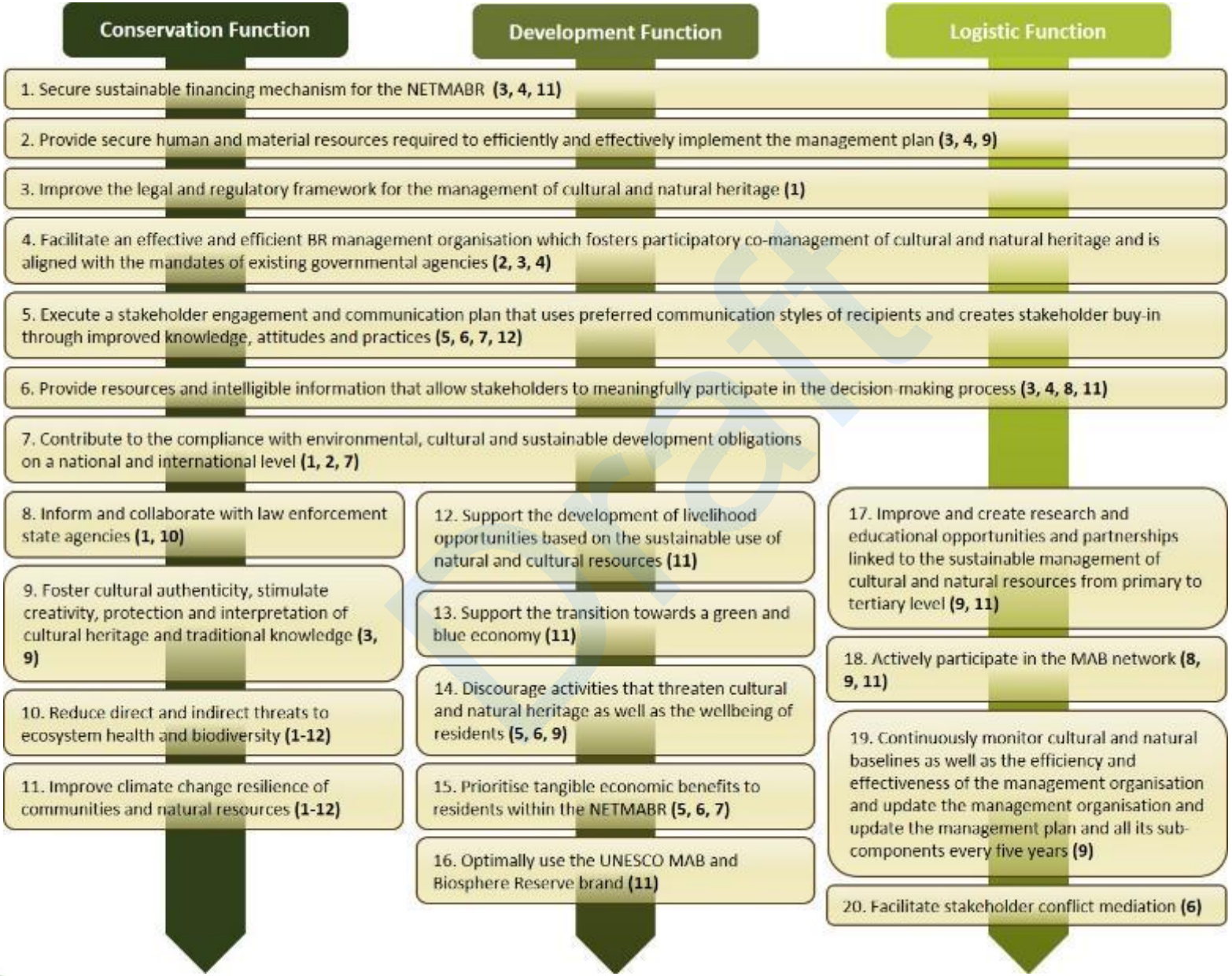


Figure 9. Proposed Main Strategies for the BR Management Plan, Addressed Key-Barriers in (brackets)

11 POLLUTION

SUMMARY SITUATIONAL ANALYSIS

In the last decades, pollution has become an increasing stress factor to NE Tobago's ecosystem health and negatively impacted the livelihood of residents and ecosystem health. All types of terrestrial and marine pollution (solid-, liquid-, air-, noise-, and light pollution) are present in the area.

A recent study conducted by the World Bank Group suggest that especially the amount of solid waste will increase in the coming decades in Trinidad and Tobago. Based on the 2010 published 'Solid Waste Characterisation Study for Tobago', the solid waste collected in North-East Tobago is estimated to be around 3.000 to 4.000 metric tonnes per year. Nevertheless, these numbers only represent collected solid waste and not waste otherwise introduced into the environment. Within the collected solid waste were approximately 30% paper and paper board waste, 26% organic waste, 22% plastic waste, but only 0,1% (3-4 metric tonnes) reported construction and demolition waste. The low amount of reported construction waste greatly shows the dilemma that North-East Tobago currently faces. Much of the construction waste is not disposed properly but fly tipped on road sides, left behind close to the construction site or not registered properly.

However, Trinidad and Tobago has a strong legal framework on environmental protection and pollution. The Environmental Management Act, Environmental Clearance Rules, Environmentally Sensitive Species Rules, Environmentally Sensitive Areas Rules, Noise Pollution Control Rules, Air Pollution Rules, Water Pollution Rules, Waste Management Rules, and many more have been passed as far back as two decades ago.

Most recently the Waste Management Rules (2021) and Waste Management Regulations (2021) have been updated in a manner that supports Trinidad and Tobago's National Development Strategy, Vision 2030, which focuses on the 'environment being at the centre of social and economic development', while aiming to fulfil T&T's commitment to the global Sustainable Development Goals (SDGs), in particular SDG 12: "Ensure sustainable consumption and production patterns". Trinidad and Tobago has furthermore entered into the following multilateral agreements and treaties that govern management of waste: Basel Convention on the Control of

Draft

Transboundary Movement of Hazardous Wastes and Disposal, Stockholm Convention, Rotterdam Convention, Protocol Concerning Pollution from Land-Based Sources and Activities, and International Convention for the Prevention of Pollution from Ships (MARPOL).

Under the current legislation, many activities causing pollution are already restricted or regulated, nevertheless, the executive enforcement of such legalisation requires significant improvement. Currently, the training of police officers is more geared towards violent and monetary crime, and enforcing environmental legislation is often not seen as a priority.

All collected solid waste from the entire island is brought to the Studley Park landfill site. While the Studley Park landfill site is not within the NETMABR, there is still a social and environmental responsibility to ensure adequate disposal of solid waste produced in North-East Tobago. The NETMABR under its Conservation and Logistics Functions should be a driving factor in exploring, initiating, and facilitating new waste management processes and recycling opportunities for the islands' waste.

As discussed, solid waste is one of the mayor pollution drivers in NE Tobago. Nevertheless, other forms of pollution also have a negative impact on the BR.

Solid waste pollution

Fly tipping is a common practice along roadsides and over bridges especially between Charlotteville and Speyside. Fly tipping is often started by contractors and thereafter private waste is dumped at the same side. Unfortunately, this practise is often started by government contractors. This also applies to the practise of dumping sargassum, cleaned from beaches, at roadsides and rivers causing an excessive amount of salt leaching into soil and rivers. The sheer amount of illegal dumping at some locations isn't just aesthetically unpleasing, it also leads to heavy metal pollution, hazardous waste pollution and soil contamination effecting large areas as pollutants leach into the soil, rivers and groundwater.

Draft



Figure 10. Construction waste dumped at a roadside (Jacob Bock)

Another major solid waste problem is bin spillage. Many bins are open and not properly secured, and garbage is dispersed by stray animals or rain floods. While there are an adequate number of bins in household areas, easily accessible bins are lacking in public areas causing existing bins to frequently overflow. The open type bins and garbage spillage are a health hazard as sharp objects such as glass are often found near bins. Additionally, the bin spillage and open type bins provide food and will grow rodent populations, which are a health risk.

Littering is another widespread solid waste problem in North-East Tobago. A significant proportion of littered items are one-way plastic packaging, plastic bags, Styrofoam packaging, snack packaging, plastic bottles, and box drink packaging. Even where bins are available on public places, littering still takes place in close proximity. While some members of the public are actively avoiding to littler, others don't seem to be yet aware of, or don't care about the negative impacts that littering behaviour has on the environment. Littering and bin spillage are two different issues leading to a similar result. Not only is garbage aesthetically unpleasing, but the littered material

also washes into the rivers and drains, clogging up drainage channels or ending up in the ocean. Most flooding events within communities are caused by clogged drains.
Fishing gear and fish offal are also commonly littered or disposed inadequately. Fish offal will give off an unpleasant odour, attract rodents, and increase the risk of infectious disease. Fishing gear such as lines and hooks pose a serious health hazard for residents and visitors alike. Especially fishing lines and nets are a major threat to marine life. Ghost nets have been a regular sight around NE Tobago. Even though abandoned, these nets keep on catching fish, mammals, and reptiles and cause damage to corals.

Just like fishing nets and lines, the majority of problematic littered and bin spilled pollutants are plastics. As these are often washed into the ocean, plastic solid waste is one of the major pollutants for the marine area around North-East Tobago. Marine life often mistakes large plastic items as food. These items can also cause entanglement of marine life, often resulting in the animal's death. In most cases plastics aren't biodegradable and only decay into smaller microplastics. While health effects of microplastics on the human body isn't conclusively studied yet, it is a fact that microplastics increasingly enter the food chain. Fish accidentally feed on microplastics, which similarly to heavy metals can't be digested and deposit in the fish's tissue. As fish is a major food source for North-



Figure 10. Plastic and Styrofoam pollution at the Belmont beach (Janina Ewals)

East Tobago, microplastics and heavy metals are ingested by residents, accumulate in the human tissue, and pose a potential health risk to the population.

Lastly there is solid waste pollution through glass fibre particles on beaches or boat repair spots. Often boat repairs are done at the beachfront and waste from glass fibre work is not disposed after the work is done. This leads to small glass fibre particles being dispersed through the sand and blown into the air. These fibres are damaging to the environment and a health risk when inhaled, swallowed, or stepped on.



Figure 11. Sargassum influx (Jacob Bock)

Within the past years Sargassum seaweed has become a frequent seasonal pollutant for local beaches. There are no practical measures to reduce the amount of seaweed reaching Tobago's coast. In the past, seaweed has been collected and fly tipped onto roadside areas causing more contamination. The Sargassum seaweed also releases a bad odour (esp. hydrogensulfide) while decaying.
Some attempts have been made to reduce solid waste through recycling programmes or educational activities at school. One example of recycling efforts is the new island wide recycling programme TTRI (Tobago Recycling Resource Initiative). TTRI was established in late 2020 and is a waste management and recycling project through a public-private partnership venture of the Tobago House of Assembly (THA) - Division of Infrastructure, Quarries and the Environment (DIQE), Division of Health, Wellness and Family Development (DHWFD) and Recycling Waste and Logistics Limited (RWL).

Additionally, public areas are cleaned on a daily basis through government programs such as URP, but this is only an attempt to treat the symptoms and doesn't address the root problem of solid waste pollution. More awareness of the public and enforcement of rules and regulations urgently needed to reduce solid waste pollution in North-East Tobago.



Figure 12. Construction waste dumped by the river (Jacob Bock)

Water pollution

Construction waste pollution is not only through solid waste but also through liquid waste. Hazardous material run off from construction site is common. Paint, solvents, heavy oils, unmixed cement, and other liquid pollutants are washed from construction sites into the soil, rivers, groundwater and ocean. These liquid pollutants, even in small amounts, can severely damage flora and fauna and are potentially ingested by humans through contaminated groundwater or agricultural produce. Thus, strong chemicals from construction site run off is a threat to human health and the environment alike.

Another water pollution source is excessive use of fertilizers and pesticides in agricultural practices. These chemicals also leach into the soil and water systems where they can cause damage. Eutrophication of rivers is a common sight in North-East Tobago as agricultural land is often located right next to rivers. The fertilizers cause a significant algae bloom in the rivers depleting the dissolved oxygen in the water. This leads to inhospitable environmental conditions for river flora and fauna. Furthermore, high chemical contamination of groundwater poses a health threat especially to children and can lead to serious illnesses. Nevertheless, this type of pollution is currently only present in Bloody Bay River.

Further chemical contamination is introduced to the environment through household cleaning utensils such as solvents, strong soaps, and bleach. The household grey water is running mostly unfiltered into the communal drainage systems which lead to rivers or the ocean. This releases household chemicals unfiltered into the environment. The blackwater is stored in septic tanks. Nevertheless, these septic tanks are often damaged or overflowing leading to wastewater leaching into the soil, surface and groundwater. This is another great health risk to the North-East Tobago. Recent water quality analysis confirm that a lot of beaches and other near shore areas are contaminated with faecal coliforms, which are bacteria found in human and animal faeces. Wastewater also damages the river and coral reef ecosystems where drainages discharge into these water bodies.

Additionally, Charlotteville, which is a port of entry, (pre-COVID-19 average 15 yachts per day) and Castara (average 5 yachts per day) are yacht tourism ports. The villages lack infrastructure for yachties to adequately dispose of their waste. Unfortunately, it has been frequently observed that boat owners dispose their wastewater into near shore areas causing pollution and potentially increasing health risk of residents.

Draft

Air pollution

Air pollution is often less tangible compared to water and solid waste pollution. Many of the air pollution causes are on a larger regional or global scale. Nevertheless, there some air pollution aspects that are particular to North-East Tobago.

As previously mentioned, Sargassum seaweed releases a strong odour while decaying. The hydrogen sulphite gas causing this odour is strong enough to discolour silverware and can potentially be dangerous to human health. The air pollution caused by Sargassum has further socioeconomic impacts, as it greatly decreased tourist visits in past years.

Sahara dust particles are another air pollutant found in North-East Tobago. The dust carries respirable dust with a particle size of 10 micrometres or less, allergens and even pesticides namely DDT, which all are dangerous to the human respiratory system. The Sahara dust further limits visibility and can cause navigation difficulties for fishermen.

Burning of household rubbish and larger fires such as wildfires causes dangerous gases and small particulate matter to be released into the air. When inhaled, chemicals like carbon monoxide, carbon dioxide, aromatic hydrocarbons and others can lead to serious respiratory illnesses. Small particulate matter with a size of 10 or less micrometres is also associated with an increased risk of cancer and respiratory conditions such as asthma, chronic obstructive pulmonary disease (COPD), bronchitis, and pneumonia.

Burning fossil fuels not only contributes to the global air pollution with greenhouse gases but also contains small particulate matter that deposits into human lungs. As described before, this particulate matter is linked to cancer and respiratory conditions. While air pollution caused by burning fossil fuels is present in gasoline run engines, the health risks are more severe with diesel engines.

Noise pollution

Noise pollution is mainly through loud music from bars and dedicated sound systems in vehicles. The noise from bars is often not only inadequately loud, but also played until early morning hours. As discussed, there are noise pollution rules and regulations in place, but they are often not enforced. Vehicles with dedicated sound systems are mainly playing loud sounds at beaches our along roads in the transition zone. Nevertheless, it is probable that these vehicles are causing noise pollution in other areas of the biosphere reserve. Underwater noise pollution from fishing vessels or other boats has not been assessed yet.

Draft

Light pollution

While light pollution is a minor pollution issue in North-East Tobago, it is still significant to the endangered local sea turtle populations. Hatching turtles orient themselves by the light from the stars and moon. Strong artificial light can cause hatching turtles to lose orientation, don't find the ocean, and as a result die. As a result, it is important to not pollute the local beaches with light during the night-time. Additional unnecessary light pollution stems from flood lights on public sport ground sometimes operation even in the absence of users.

Overall, the primary pollution processes in NE Tobago are construction waste, littering, fly tipping, bin spillage, grey and black water, and overflowing or damaged septic tanks. Often it is not the lack of legislation allowing these types of pollution, but the lack of active enforcement of set acts, rules, and regulations.

HIGH LEVEL GOAL

Pollution is not a threat to ecosystem- and human health in NE Tobago.

PRIORITIES

- Improve the knowledge, attitudes and practices (KAP) of residents, visitors and other stakeholders towards various forms of pollution.
- Improve the enforcement of relevant pollution laws, regulations and policies.

STRATEGIES

- Development and implementation of public awareness and educational programmes on impacts, health standards, laws and best practices towards decreasing pollution.
- Build the capacity and the dedication of the police force to enforce environmental laws.
- Development (or improvement) and implementation of pollution monitoring.
- Implementation of improved of waste management, specifically the reduction of waste in general.

Draft

PROPOSED ACTIVITIES

Facilitate:

- design and implement pollution-related KAP analyses to design future programmes, outreach and activities (to be repeated every five years);
- targeted public outreach campaigns that improve awareness of economic, health and environmental pollution risks, designed specifically for:
    - general public;
    - farmers;
    - fishermen;
    - general contractors;
    - hospitality sector;
    - automotive sector.
- collaborate with community-based organisations to develop and implement creative programmes to improve the aesthetics of NETMABR communities and to foster community pride among residents, e.g., best clean village and best clean school competitions.
- a commitment from construction contractors and employees to undergo a SLM anti- pollution certification programme that commits them to dispose of construction wastes appropriately and to demonstrably apply actions.
- lobbying for strengthening of legal frameworks to support the use of monitoring methods such as camera trapping, to persecute law-breakers.
- lobbying for use of reporting mechanisms such as CrimeStoppers, to report any major pollution crimes, to actively discourage major dumping and fly-tipping.
- capacity building of police on environmental and waste management legal framework against pollution, environmental and waste management standards, monitoring and correct enforcement procedures.

Draft

- coordination of roles and responsibilities of law enforcement agents, to ensure effective administration of legal frameworks governing pollution and waste management.
- improved or new monitoring strategies against pollution infringements, including:
- camera trapping near known dumping sites;
- water, air quality monitoring near point and non-point source pollution sites; and
- solid waste monitoring near point and non-point source pollution sites.
- a feasibility assessment of a latrine replacement drive;
- Application of lessons learnt from the CReW+ project, *"An integrated approach to water and wastewater management in the Wider Caribbean Region using innovative solutions and sustainable financing mechanism",* undertaken in Charlotteville.



Figure 13. NEST beach clean-up at Hermitage