PROTECTED AREA NETWORK EXPANSION STRATEGY

2017 - 2026

Ministry of Agro Industry and Food Security
Government of Mauritius

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Protected Area Network Expansion Strategy

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Vision and Mission Statement for the Protected Area Network Expansion Strategy

Vision

Protect, conserve and restore native biodiversity, natural landscapes and ecosystem services in Mauritius to benefit present and future generations.

Mission Statement

1. Create a Protected Area Network that sustains and protects the natural, social, economic and cultural values of Mauritius.
2. Implement a broad-scale programme of ecological rehabilitation and restoration for the persistence of the native species of Mauritius and the resilience of its ecosystems.
3. Provide opportunities for people to discover, enjoy and appreciate the country's unique nature and to derive benefits from its protection.
4. Ensure the maintenance and provision of ecosystem services and critical ecological functions to enable Mauritius to withstand environmental pressures such as drought, severe storms and climate change in the face of a growing and urbanising population.
5. Engender a love of nature and a deeper understanding of the importance of our critical ecosystems and biodiversity.
6. Set an outstanding example in Mauritius that advances global sustainability initiatives and contributes to a habitable Planet.

Message of the Honourable Mahen Kumar Seeruttun, Minister of Agro Industry and Food Security

Mauritius is endowed with rich biological diversity comprised of a great diversity of plants, animals and habitats which make our country unique. There is worldwide consensus that we are in a period that is marked by increasing development pressures, dwindling natural resources and a decreased resilience to global changes in the environment, including climate change. Achieving environmental sustainability, which is so closely linked to social stability and economic survival, has been described as a race against time particularly for Small Island Developing States (SIDS) such as Mauritius.

As Government, we have always taken our responsibilities to our people seriously, as well as our obligations to the international community. Some of the most prominent obligations we have is to ensure that all Mauritians have access to a safe and healthy environment and that the uniqueness of our precious country is protected for posterity. These are non-negotiable rights of our people, and the Government will ensure that those rights are protected to their full extent.

In short, we need to do all in our power to ensure that our small Island can withstand the increasing rigours of global climate change and other threats that undermine the biophysical world in which we live, and on which we depend for our very survival. The uniqueness of our biodiversity and value of our ecosystems is indisputable, and Government embraces the responsibility to be the custodian of those irreplaceable assets, together with everyone who lives in this country.

Mauritius is known as a country that adheres to its international obligations. We are signatories to all the relevant international conventions and treaties that make up the collective global initiative to safeguard our Planet, and steer development on a more sustainable trajectory. To bring home the full effects of these international instruments, we are required to put in place national action plans and other tools for their prompt and sustained implementation at a country level.

Continuing the proud tradition of serving the nation while meeting our international obligations at the same time, I present to you the Protected Area Network Expansion Strategy (PANES) 2017-2026 with great pleasure. The PANES will not only help us meet our obligations in terms of treaties such as the Convention on Biological Diversity (CBD), but will ensure that we establish and maintain a Protected Area Network that will benefit our people, and strengthen our Island's capacity to be a home for our people far into the future.

Implementation of the PANES will help Mauritius to win the race against time, in its search for a sustainable future.

Mahen Kumar Seeruttun
Minister of Agro Industry and Food Security

Acknowledgements

An all-inclusive stakeholder approach was used for the formulation of the Protected Area Network Expansion Strategy (PANES) 2017-2026. The Ministry of Agro Industry and Food Security wishes to thank the following organisations for their valuable inputs and information provided during the preparation of the PANES 2017-2026:

- Ministry of Housing and Lands
- Ministry of Social Security, National Solidarity, and Environment Sustainable Development
- Ministry of Agro-Industry and Food Security:
    - National Park Conservation Services, Ministry of Agro-Industry and Food Security
    - Forestry Services, Ministry of Agro-Industry and Food Security
    - Vallée d'Osterlog Endemic Garden Foundation
    - The Mauritius Herbarium
- Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping
- Ministry of Finance and Economic Development;
- The University of Mauritius
- The Attorney General's Office
- Ministry of Tourism
- Mauritian Wildlife Foundation
- Water Resources Unit
- The Mauritius Meat Producers Association
- Ebony Forest
- Vallée de Ferney

The Ministry also acknowledges the technical and financial supports of the United Nation Development Programme (UNDP) Country Office and the Global Environment Facility (GEF) in the preparation and submission of the PANES 2017-2026.

Overview of the Protected Area Network Expansion Strategy (PANES)

The race against time

Development pressures on the natural environment are mounting and the reliance on natural resources is ever increasing throughout the world. Safeguarding biodiversity has been described as a race against time, and this is especially true in the case of Mauritius. It is now fully accepted that, in order to stem the tide of degradation, there has to be a strong, well-coordinated, consolidated and sustained effort that carries the support of all levels of society. The Protected Area Network Expansion Strategy (PANES) is the appropriate response from the people of Mauritius.

Mauritius is a small, fast developing country[1] with considerable development pressures on its land surfaces, be it for human settlement, industry, resorts or agriculture. When spatial data from the 2009 Environmentally Sensitive Area (ESA) analysis and current protected area data is superimposed on the latest satellite imagery of the country (Figure 1), the picture that emerges is that of a country where soon all available land outside the national parks, reserves and forest lands may be developed. The National Development Strategy endorses the protection of the natural areas for their national and global significance; this is an imperative that has to be operationalised urgently.

Status quo

Conservation in our country has a long history that dates back to colonial times. In recent years, much work has been done to preserve biological diversity with efforts expanding over the past few decades in particular. This is reflected in the existing Protected Areas and associated legal and institutional frameworks. Globally there has been a growing emphasis on adequate and comprehensive protection that is representative of the Earth's ecosystems. Mauritius has shown a strong commitment to safeguarding the planet's biodiversity, and is a signatory to a number of international biodiversity related conventions. On the home front however, it is generally accepted that the current Protected Area Network (PAN) comprising of National Parks, Nature Reserves and Ramsar Sites, neither represents all habitat types in Mauritius, nor adequately protects all critical ecosystems and native species required to maintain the ecological integrity and infrastructure of Mauritius.

Government's response

In response, the Government of Mauritius (GoM) with the assistance of the United Nations Development Programme (UNDP) and with funding from the Global Environment Facility (GEF), are implementing the "Expanding Coverage and Strengthening Management Effectiveness of the Protected Area Network (PAN)" project. Its overall objective is to expand the Protected Area Network to cover an adequate portion of our country's essential ecological areas, and to strengthen the management effectiveness of the Protected Areas. The project seeks to restore critical areas of ecological importance and to put in place measures to maintain and improve ecosystem functions. The Ministry of Agro Industry and Food Security (MoAIFS) spearheads the project with its lead organisations, the National Parks and Conservation Service (NPCS) and the Forestry Service (FS) centrally positioned in the initiative.

[1] Mauritius has the 3rd highest UNDP human development ranking in Africa. See: https://undp-aap.org/countries/mauritius

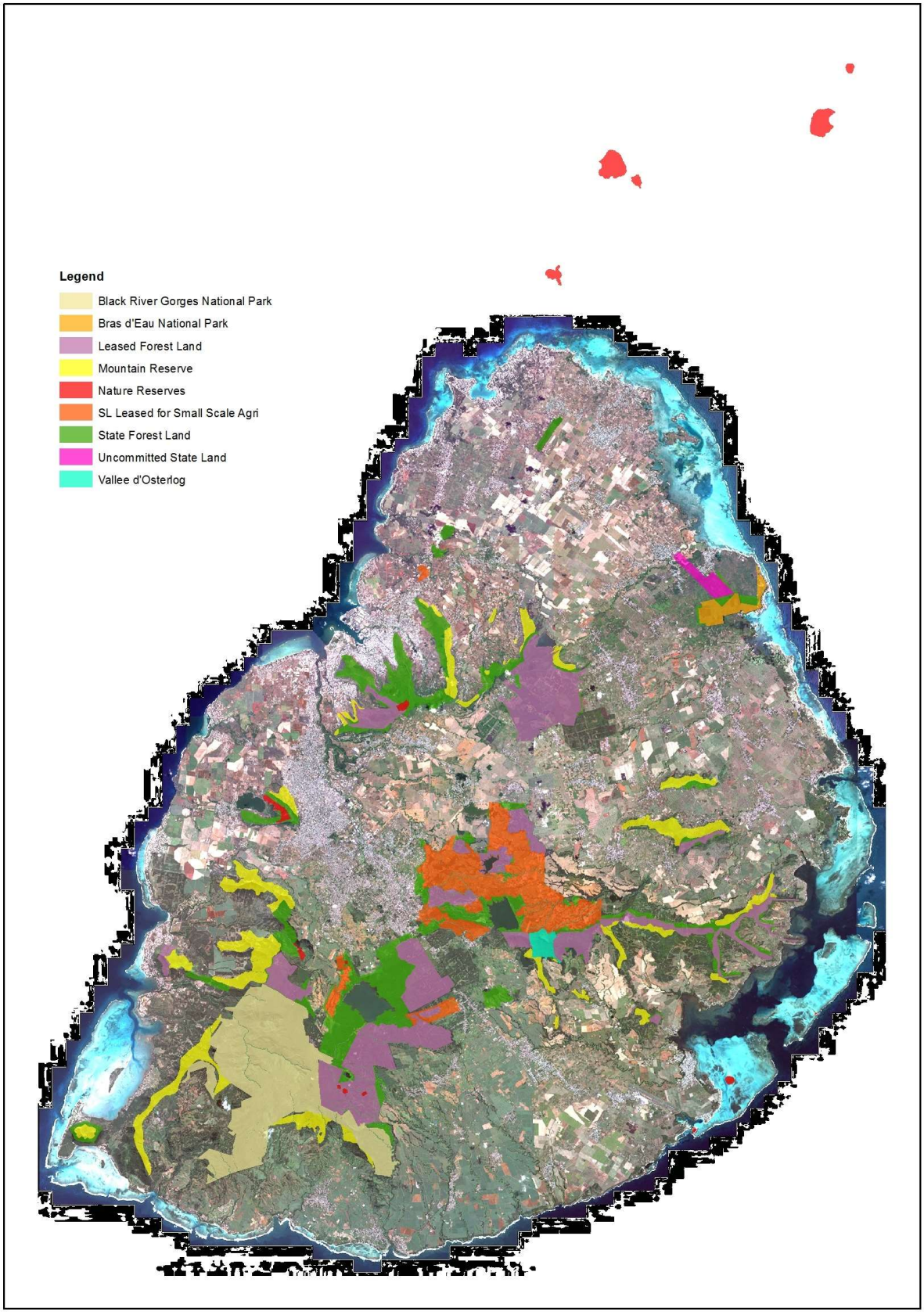

Figure 1: Spatial data from the Environmentally Sensitive Areas (ESA) Analysis of 2009 and recent protected area data superimposed on high resolution satellite imagery of Mauritius of 2104

The process leading to PANES

All stakeholders, not to mention the nation at large, will be the beneficiaries of a successfully implemented PANES, also referred to as the Strategy. Humans are the primary source of negative impacts on the environment. On the positive side, however, they can be key contributors to building a rigorous and resilient PAN. Therefore, stakeholder involvement has been central in the development of the PANES. Three National Workshops, the Visioning workshop, the 2nd PANES workshop and the Validation workshop, have been major milestones in the process of developing the PANES. Primarily the workshops provided the ground for the development of a Vision and Mission Statement for the PAN. These workshops also allowed for the elaboration of Strategic Objectives, under which a number of Action Categories and Actions have been identified. Critical inputs have also been gathered through the Legal and Institutional Working Group, the Tourism Working Group, a working group on conservation mapping, a working group on a business model for the PAN, targeted stakeholder meetings, and various technical studies.

The Imperative

According to Aichi Target 11 adopted under the Convention on Biological Diversity (CBD), each nation should aim to expand its protected land area to 17% of the country's land area by 2020[2]. The formal State Protected Areas in Mauritius, consisting of National Parks, Nature Reserves and Ramsar Sites cover only 4% of the country (see Figure 2a below). However, certain other areas, including State Forest and other lands already enjoy varying degrees of protection. The incorporation of these areas into the PAN can bring its surface area close to the Aichi Target with 16% of the country's surface area under protection (see Figure 2b below and Table 3 in the main text) of Mauritius, which quite coincidently happens to be close to the Aichi Target. However, for that to happen their management effectiveness[3] will need to be improved in order to reach the required International Union for the Conservation of Nature (IUCN) standards. Consequently, a large part of the PANES is devoted to improving the management of the current protected areas as well as those that should be earmarked for incorporation into the PAN.

Reaching the Aichi Target will be a major accomplishment for Mauritius. Yet conservation planning conducted during the development of the PANES shows that some valuable biodiversity will fall outside the Aichi Target of 17% in any case. Therefore, while the immediate target is to expand the PAN to 16% through the incorporation of areas that already enjoy certain levels of protection by elevating their status through strengthening their management, further expansion to include other important biodiversity areas should be encouraged and can occur gradually through time.

How do we fare in comparison to other islands in the Western Indian Ocean?

The Madagascar and Indian Ocean Islands hotspot is composed of the island nation of Madagascar and several neighbouring island groups: the Mascarenes, Comoros, and Seychelles in the western Indian Ocean. Seychelles, Mauritius and the bulk of the Comoros are independent nations, whereas the island of Réunion is a French overseas department and the Comorian island of Mayotte is a French

[2] Convention on Biological Diversity: Strategic Plan for Biodiversity Conservation 2011-2020.

[3] Management effectiveness refers to having adequate legislation in place as well as enforcing them for biodiversity conservation and the maintenance of ecosystems as well as enforcing them as per the PANES Vision and Mission Statement. See also the IUCN definition of a Protected Area.

overseas territory. The importance of this globally important hotspot is fully recognised. How then does Mauritius fare in terms of reaching the Aichi Target in comparison with other countries in this hotspot? For the purposes of comparison, we used two reputable information sources. UN data[4] for 2014 shows our neighbour Réunion to have 76.3% of its surface as protected area. Seychelles has 42.1% of the country protected, Comoros 10.2%, Madagascar 4.9% and Mauritius is lagging behind with only 4.4% of its terrestrial surface area protected. If we use the UNEP's Protected Planet database[5] for 2016, a similar picture emerges with Seychelles having 42%, Comoros 10%, and Madagascar and Mauritius having 5% of their surfaces areas protected.

Although the Aichi Target is 17% globally, it is widely accepted that islands require larger areas to be under protection, not only because they are unusually species rich but exceptionally fragile in terms of their ecological infrastructure that also have low capacities to recover[6]. As a fast-developing island with by far the highest population density[7] in the hotspot, this is particularly important to Mauritius which is considered one of the most vulnerable countries in terms of natural disasters and climate change. The PANES therefore is a very timely document that will help Mauritius to translate its international commitments into reality while improving its ecological resilience at the same time.

A solid foundation

The Protected Area expansion presented in the PANES is based on thorough and comprehensive conservation planning. Concepts such as representation, persistence, irreplaceability and vulnerability were used to determine the biodiversity value of lands and to set targets. The PANES conservation planning was informed by various data sources such as the Environmentally Sensitivity Area (ESA) analysis for Mauritius that was done over several years ending in 2009[8], the latest available biodiversity information, and high resolution ground cover analysis performed on the latest satellite imagery for Mauritius dating from 2014. Maps were developed that provide a spatial guideline for the expansion of the PAN subject to ground truthing. These maps can help to guide urban expansion and infrastructure planning in Mauritius. The PANES maps are compatible with spatial information systems in the Ministry of Housing and Lands. They can inform planning and decision-making such as guided by the Town and Country Planning Act, and where relevant can be reflected in the Outline Planning Schemes and Development Strategy Maps. Development of the PANES included participation of broad groups of stakeholders and culminated in the broad-based mapping workshop held on the 3rd August 2015 and National Workshops held in February and November 2015.

The Strategy considers three geographical areas. The first is the ***existing*** Protected Area Network (PAN), which consists of the current officially declared protected areas in Mauritius making up just

[4] See: http://data.un.org/Data.aspx?d=MDG&f=seriesRowID%3a784. Source: Millennium Development Goals Database, United Nations Statistics Division.

[5] The data source is UNEP's World Conservation Monitoring Centre (WCMC) which is supported by IUCN and its World Commission on Protected Areas (WCPA).

[6] See for instance, Calado *et al*. 2014: *Small Islands Conservation and Protected Areas*.

[7] In 2015 Mauritius had 622 people/square kilometre compared to Comoros with 424, Réunion with 344, Seychelles with 204, and Madagascar with 42. Source: World Bank data for 2105, see: http://data.worldbank.org/indicator/EN.POP.DNST; for data for Réunion for 2105 s obtained at: http://www.countrymeters.info/en/Reunion.

[8] The National Development Strategy identifies Environmentally Sensitive Areas (ESAs) as natural assets for the nation that should be managed and protected to achieve sustainable development. Preliminary mapping of the ESAs was done by the Ministry of Housing and Lands, and detailed maps and verification was done through a study commissioned by the Ministry of Environment.

over 4% of the country's total terrestrial surface area. It is generally accepted that the existing PAN falls far short of protecting key ecological assets and meeting international targets. The second area is the ***proposed*** Protected Area Network (PAN). This is an area into which the existing PAN can readily be expanded, considering its components already enjoy varying degrees of protection already. This will expand the PAN to over 16%, nearing international targets and achieving nationally defined priorities. Areas in this Proposed PAN include Le Morne World Heritage Site, Mountain Reserves, River Reserves, the undeveloped parts of the Pas Géométriques, privately owned areas already under conservation and any other reserves proclaimed under the relevant act. State Forest Lands, including Leased Forest Lands are also included.

It was agreed at the PANES National Workshops held on the 31st March and the 1st April 2016, that the Existing Protected Area Network (PAN) consists of National Parks, Nature Reserves and Ramsar Sites[9] (please refer to the map on the left in Figure 2 a and b below). These areas are listed as official Protected Areas in the Fifth National Report (FNR) though there was no specific reference to the term Protected Area Network as such. These areas amount to about 4% of the country. By including the areas in the proposed PAN (please refer to the map on the right in Figure 2 b below), the total area of the PAN will increase to 16%. This figure is proposed as the official and minimal target for PAN expansion, while the inclusion of further high biodiversity lands should be encouraged as the opportunity may arise. Expansion to this initial 16% will require that protection be deemed effective to the extent required by the IUCN definition of Protected Areas (please see interest block on page 1). Protection in the proposed PAN can be improved for instance in mountain reserves where the Forestry Service has an oversight mandate. State Forest Lands can be proclaimed as National Forest as per provisions in the Forest and Reserves Act 1983.

Beyond the existing and proposed PAN are further areas that have significant biodiversity value. They can be incorporated into the PAN when practical and feasible. Much of this land belongs to the private sector and this land can be viewed as land for ***potential*** inclusion in Protected Area Network at some point in time, when conditions are favourable for this to happen, and these lands are referred to as ***Potential Areas for Inclusion in the PAN***. Initiatives to incorporate such lands into the PAN should be encouraged and the PANES provides guidelines for how this can be approached.

Where are these potential areas for inclusion into the PAN? Obviously not all areas are equally important in terms of biodiversity. Different expansion priorities can be set based on the how important different areas are in terms of their biodiversity. The entire surface area of Mauritius was rated along a differential scale from least to most important, following established conservation planning methodology that is explained in more detail in the main document. These ratings generate a composite Expansion Priority Index from 3 to 25, below 3 having minimal biodiversity value.

Figure 3a presents further areas that can potentially be added to the proposed Protected Area Network. These additional areas contain significant biodiversity in the top bracket of lands with important biodiversity, namely 20 - 25 (see main document for detailed explanation). These lands add another 4,529 ha to the proposed PAN, or 2.4% of the surface area off Mauritius, bringing the total to just over 18%. Figure 3b presents further areas of potential inclusion when more areas with high biodiversity is included *albeit* starting from a lower Expansion Priority Index value of 13, the point that

[9] Referring to terrestrial Ramsar Sites (Pointe d'Esny and Rivulet Terre Rouge Bird Estuary).

falls midway between the very low biodiversity values and the highest biodiversity values. These potential inclusions will add 17,231 ha, or 9.2% of the country to the future PAN, bringing the total to 25.2% of the country.

Figure 4 takes the areas for potential inclusion in Figure 3b and connect them through corridors, which is an established principle in conservation planning. The resulting area, presented in yellow, covers about 30% of the country. Although the Proposed PAN is the official and immediate target, bringing the Protected Area Network to cover 16% of the country, it is further proposed that the yellow area, referred to as the Potential PAN for short, is what the country aspires to protect[10]. All areas with unique biodiversity are vulnerable and should be considered high priority conservation areas. They will likely to be lost to conservation if present land use trends continue. These areas cannot easily be replaced and their loss could severely impact the achievement of Mauritius' conservation targets. Such zones should receive special attention during town and regional planning, as well as the implementation and formation of biodiversity corridors and stepping stones. It is important to note that initiatives to the proposed and potential PAN can occur in parallel.

The bulk of high biodiversity land beyond the 16% target indicated in Figure 2b below is under private ownership (the areas indicated in yellow in Figure 4). The Protected Area Network can be expanded onto this private land through the Biodiversity Stewardship Programme through participation and commitment from private landowners. The newly passed Native Terrestrial Biodiversity and National Parks Act of 2015 makes provision for such cases where conservation use of land is desired. The Biodiversity Stewardship Programme is one of the tools of this Strategy that can enhance conservation in Mauritius.

[10] In the preparation phase of the PAN, conservation planning proposed that 30 – 35% of the country be protected, which is not as much as the 42% of the Seychelles. It is generally accepted that the global Aichi Target may not be sufficient for small islands with high biodiversity and fragile ecosystems that may not recover easily.

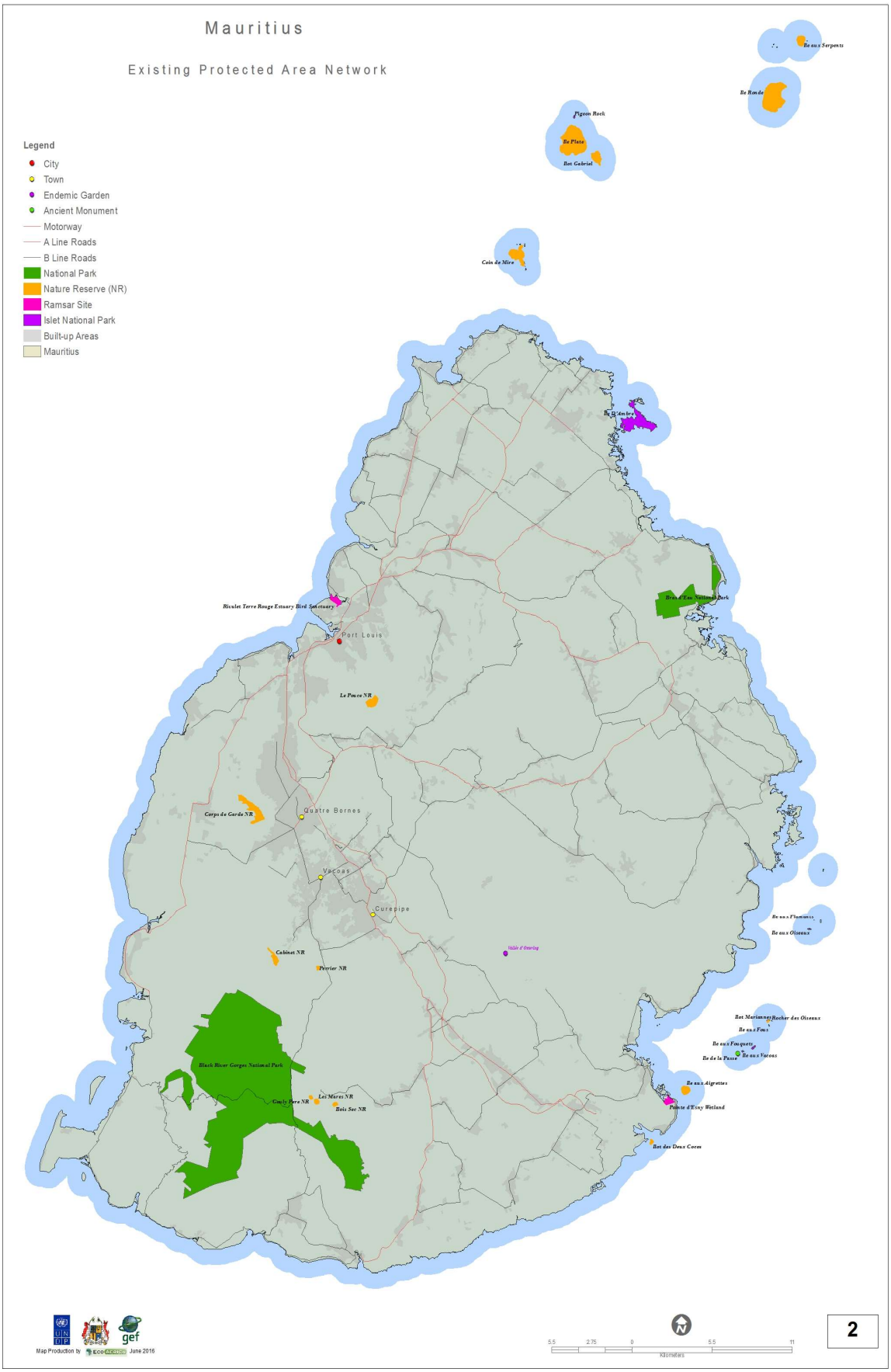

Figure 2a: Existing Protected Area Network with State Protected Areas

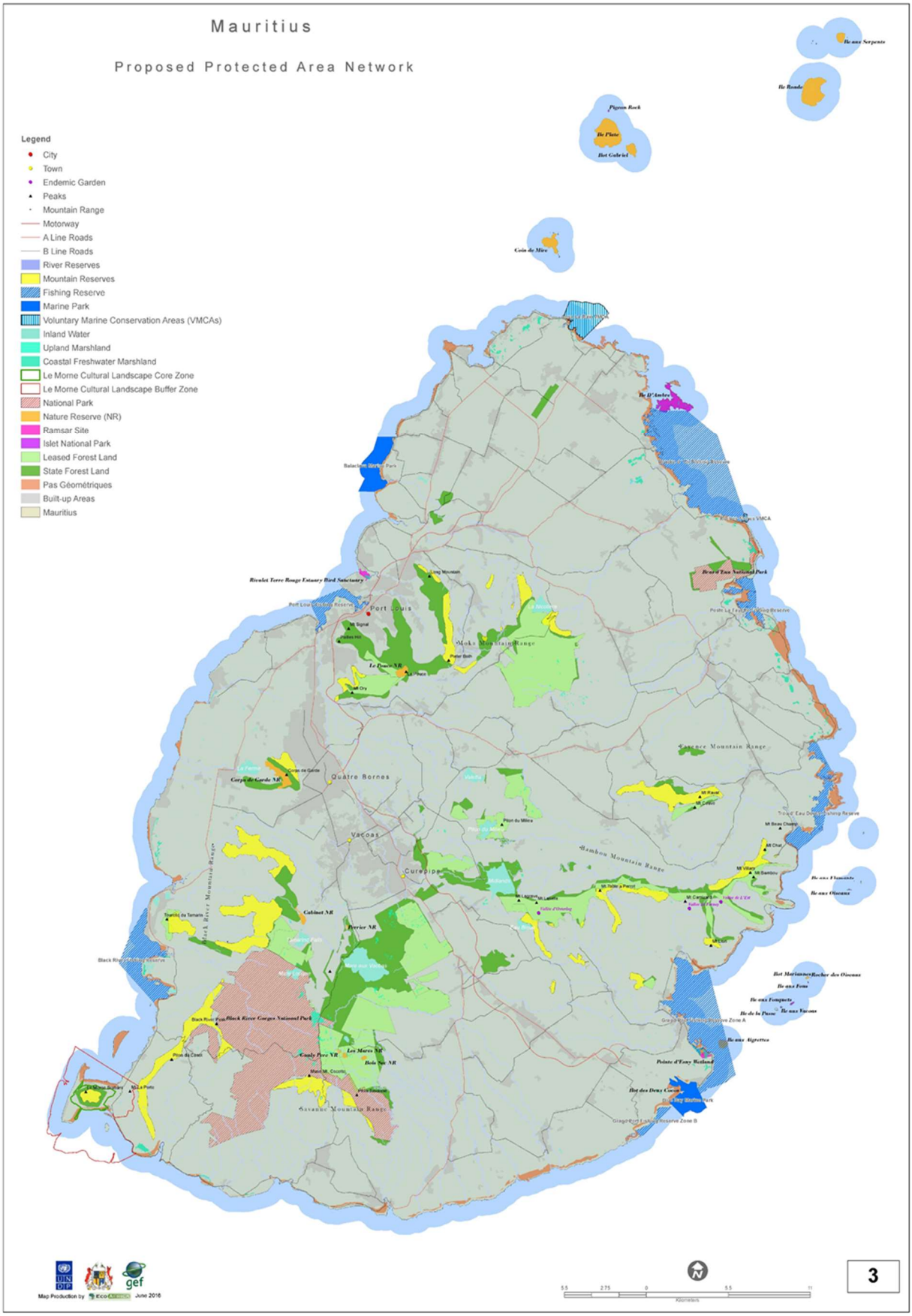

Figure 2b: The Proposed Protected Area Network

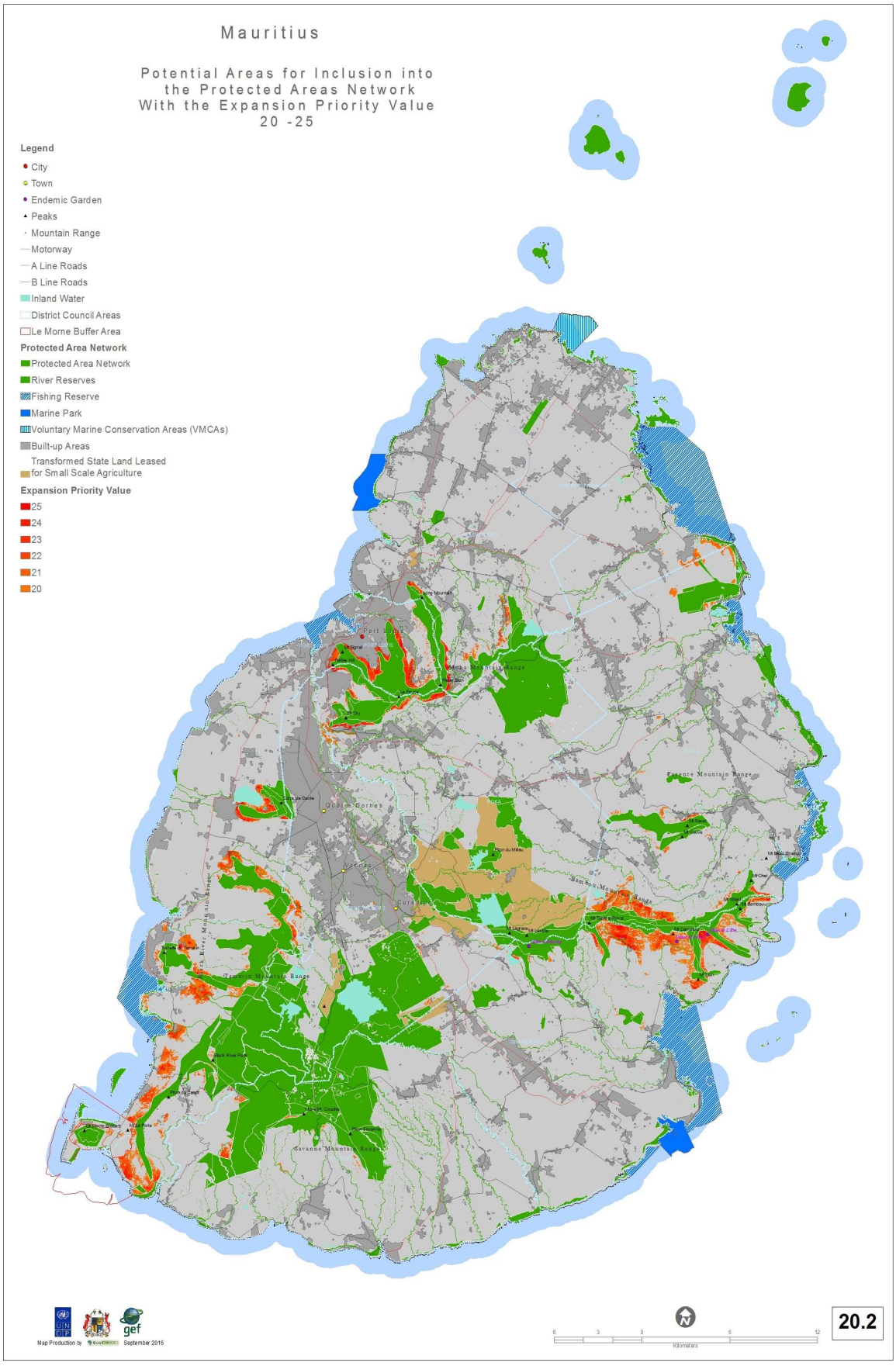

Figure 3a: Areas of high biodiversity for proposed inclusion into the Protected Area Network (PAN)

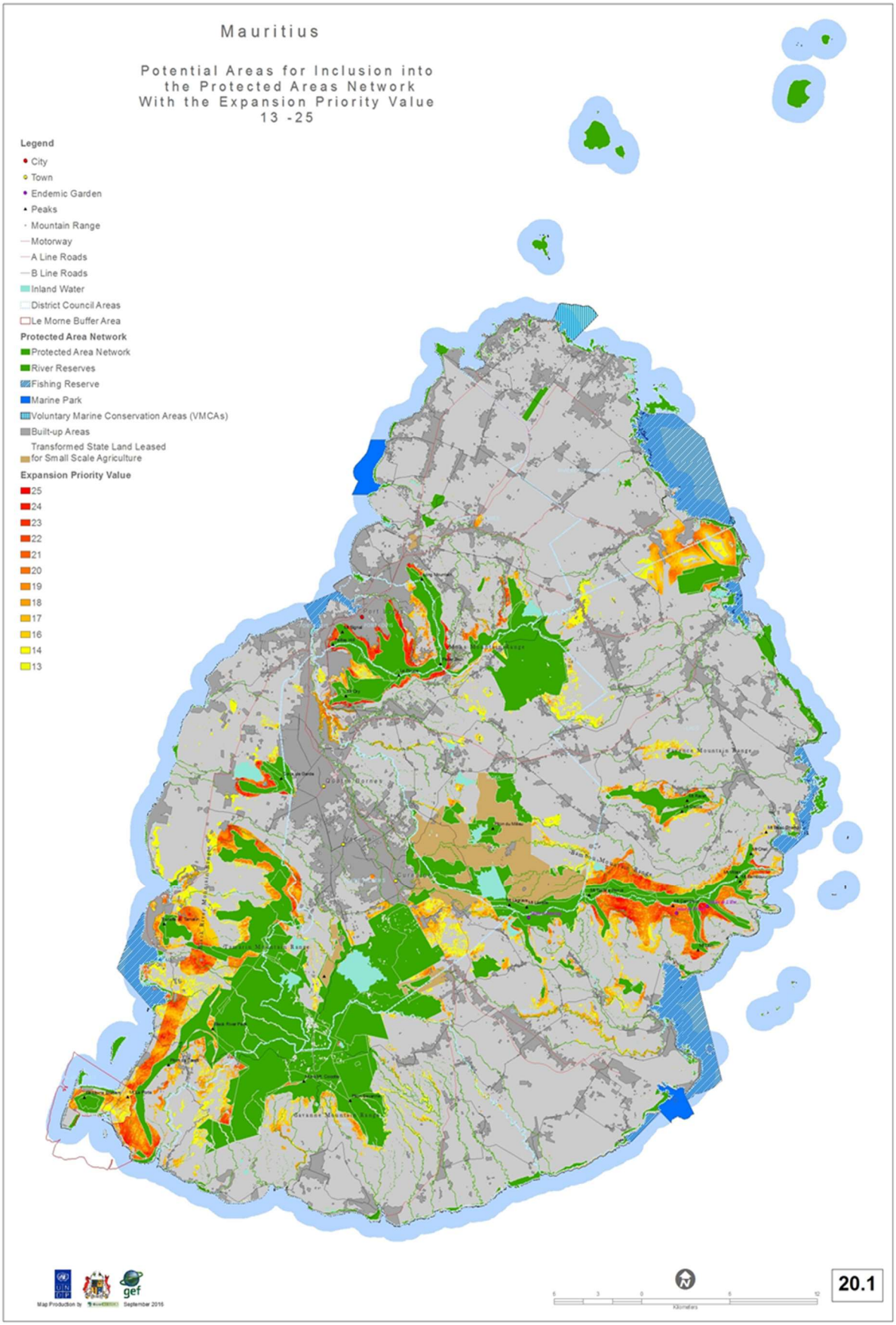

Figure 3b: Areas of moderate to high biodiversity for proposed inclusion into the PAN

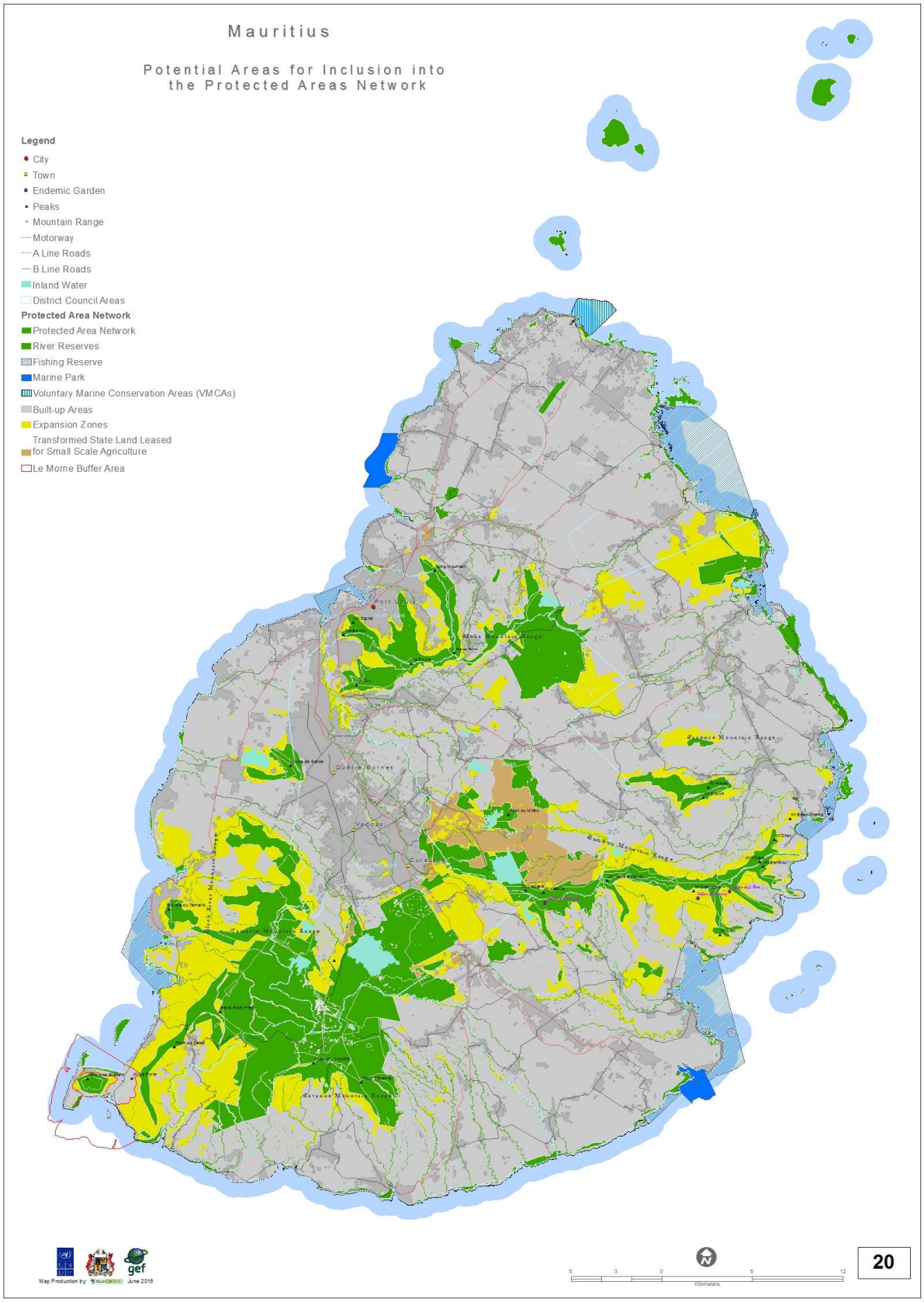

Figure 4: The Existing and Proposed Protected Area Network is indicated in green, and Potential Areas for Inclusion into the PAN is indicated in yellow

The future PAN is not only a noble but essential objective that will lead to the adequate protection of our biodiversity and ecological systems. Significant resources, political will and collaboration between stakeholders will be necessary to achieve the target depicted in Figure 2b, and to expand it further into the yellow areas indicated in Figure 4 as opportunity may allow. Likely not all of the areas shown will end up as being part of the PAN. It is also possible that further areas may be added as new information comes to light. The PANES is after all a Strategy and not a detailed spatial plan for Mauritius. Conservation planning provides broad guidelines that can only be refined through ground truthing. The biodiversity network across Mauritius is an evolving one, and undoubtedly will improve biological connectivity and enhance ecosystem resilience.

As far as possible, expansion efforts must seek to create a representative and ecologically functional Protected Area Network in the most effective and efficient manner possible. Within this context, initial efforts should focus on land that can be most easily and quickly secured. Given the challenges that will be encountered in expanding the PAN, it is important that efforts be focussed on achieving as much as possible in as short a time as possible to consolidate easily available areas of the potential PAN as corridors or stepping stones; such areas being examples of 'low hanging fruits'.

Private landowners and the public need to gain an understanding of the PAN expansion programme, and develop a level of trust in it, on the basis that when it succeeds in its objectives the PAN will provide benefits to all landowners, land-users and the country at large. Opportunities to secure land for conservation purposes that are relatively simple should be emphasized initially, with more complex arrangements being developed as the programme progresses. The highest priority expansion areas must receive urgent attention.

The green and blue republic

The potential PAN surface area also extends along River Reserves thus strengthening links with the marine environment. The Marine Protected Areas, Fishing Reserves, the Le Morne Lagoon Buffer Zone, Marine Parks, and Voluntary Marine Conservation Areas are effectively part of the Protected Area Network, albeit a marine component under control of other ministries. Ultimately, they too should be considered as part of the official PAN of Mauritius.

The logic of the Strategy

The development of the PANES has a logical foundation. Stakeholders support a strategy more readily if they understand the logic behind it, and thus far and array of stakeholders have contributed to its contents. The PANES is driven by a broad Vision that give rise to Missions that provide the broad directives from which the Strategic Objectives are derived. The latter are served by Action Categories consisting of specific actions. The Action Categories and Actions, form the bulk of the Implementation Plan (see Figure 5).

Figure 5: Logic of the Strategy

The legal framework

Mauritius is signatory to many International Conventions. Several strategies and laws have been developed in Mauritius, some of them before the country became a signatory to the relevant Conventions. This has resulted in some retrospective amendments being made to the legislation in order for the country to comply with the requirements of the Conventions. The Forest Policy is highlighted as a key document that deals with the management and rehabilitation of State Forest Land for the protection of ecosystem services.

The Native Terrestrial Biodiversity and National Parks Act (also referred to as 'the Act') replaces the Wildlife and National Parks Act of 1993. The objectives of the Act are to improve provisions for the protection, conservation and management of native terrestrial biodiversity and to give effect to national level implementation of biodiversity related Conventions to which Mauritius is party. The Act enables the Minister to enter into such an agreement, for the purposes of protecting the habitat of wildlife, with a private landowner. The Act contains many other useful provisions in terms of advancing the PAN, like the registration of protected species of plants with the Director of National Parks and Conservation Service, by the owner or occupier of the land. The legal review, conducted as part of the PANES development process, points to numerous other amendments that could strengthen the implementation of the PANES, and thus the management of the PAN.

The institutional framework

The effective implementation of PANES requires an efficient and effective institutional framework that carries the support of all key parties, in particular the Ministry of Agro Industry and Food Security (MoAIFS) on whom the onus lies to ensure the establishment and welfare of the Protected Area Network (PAN). A lengthy and consultative institutional framework study gave input into how the lead institutions, the National Parks and Conservation Service (NPCS) and the Forestry Service (FS), can be better configured to implement the PANES without impeding their current activities. Many other Ministries such as the Ministry of Social Security, National Solidarity, and Environment Sustainable Development (MSSNSESD), the Ministry of Tourism (MoT), the Ministry of Housing and Lands (MoHL)

and the Ministry and Arts and Culture (MoAC) all have prominent roles to play in this multi-sector initiative.

Major competencies needed

During the development of the PANES over the last two years, four major areas of competency were identified that need to be developed and institutionalised. They are Conservation Planning, Biodiversity Stewardship, Nature-based Tourism Development, and Invasive Alien Species (IAS) management. Currently, a great deal of biodiversity conservation work is being undertaken by the NPCS including conservation plans. Progress in IAS management and Nature-based Tourism Development has already been made, though much can still be done for the latter to reach its full potential. Although a relatively new concept, the potential of nature-based tourism has been fully recognised by, and is supported by the MoT.

It is useful to consider what competency areas should exist in the *total institutional framework* (not referring to individual organisations but an overall framework that will serve the needs of the PAN). Frameworks, that exist either as individual organisations or composite frameworks of several organisations, would typically have the following divisions:

a) Administrative and Management Support;
b) Financial Services;
c) Monitoring, Evaluation, Enforcement and Regulation;
d) Conservation and Scientific Services;
e) Protected Area Network Management; and
f) Nature-based Tourism Development.

Figure 6 lists the specific roles that are linked to the above areas of competency, particularly in relation to the implementation of the PANES. There are of course areas of competencies in both lead institutions that do not relate to the PANES such as commercial forestry, and some obligations that NPCS has such as CITES.

The four major competencies readily fit into the above competency areas: Conservation Planning has a natural place under Conservation and Scientific Services, and Invasive Alien Species (IAS) Management fits readily under Protected Areas Management. Biodiversity Stewardship fits well under protective area management as per the new Native Terrestrial Biodiversity and National Parks Act of 2015.

Protected Area systems worldwide strongly rely on tourism as the main source of income other than Government funds. Generally, a major section of the organisation is dedicated to this purpose, often at the same level as park management or other main functions of the organisations. It is therefore proposed that Nature-based Tourism Development is placed at the same level as other main competencies in the framework.

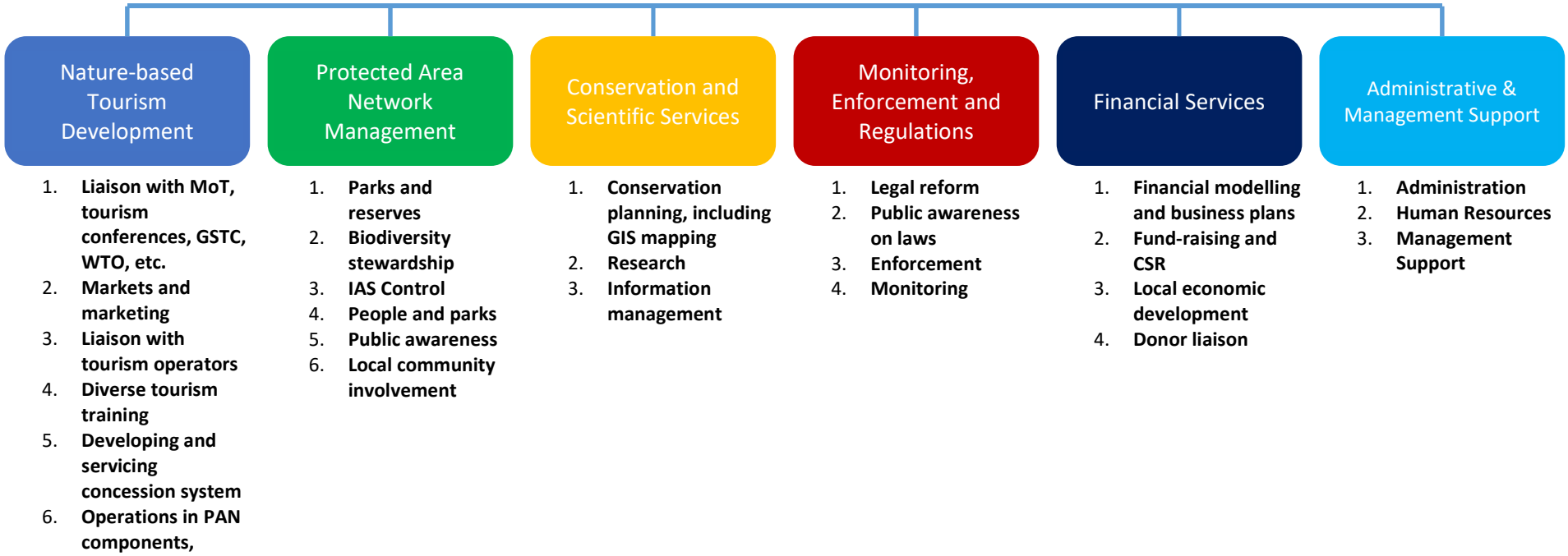

Figure 6: Major competency areas in the conceptual institutional framework for the Protected Area Network with activity categories under each one

What is the PANES?

The PANES, first and foremost, is a strategy. It is not a detailed implementation or operational plan, but a document that conveys the 'big picture'. The Strategy describes how the PAN can be expanded and what will be necessary for this to occur in a broad sense. The development of the PANES was supported by extensive research, careful analyses of results and deliberations by working groups and further technical input, which has been merged with additional input from stakeholders. To manage the information input into the Strategy, a Reference Bundle has been created that includes detailed thematic Support Documents that are the end results of technical and participative processes in their own right[11]. Figure 7 depicts the structure of the PANES.

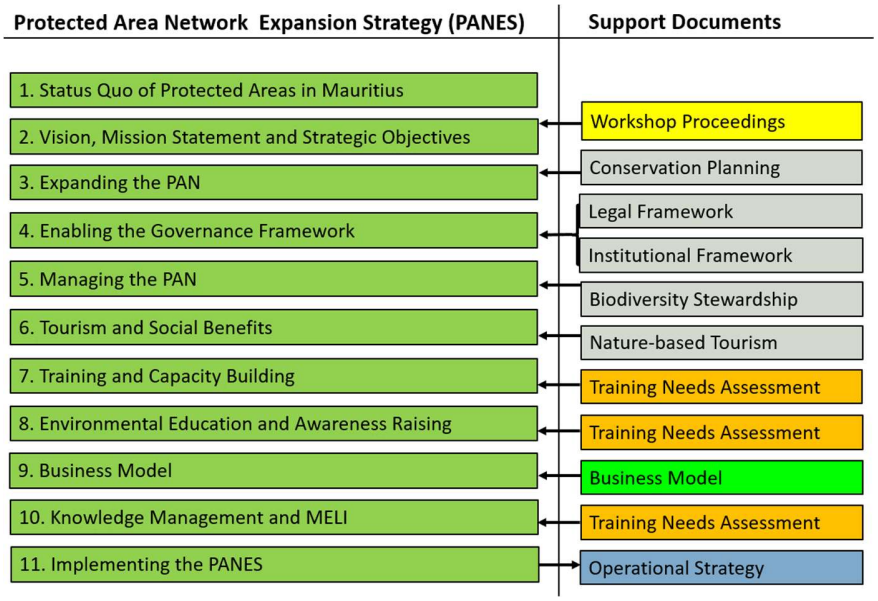

Figure 7: Structure of the Strategy showing Supporting Documents

Who drives the PANES?

As the state party responsible for signing conventions and safeguarding the country's natural assets, it is the Government that has to drive the implementation of the PANES, in particular the Ministry of Agro Industry and Food Security who is the focal point for biodiversity conservation matters. However, the PANES should be mainstreamed throughout all relevant ministries. Furthermore, the private sector, in particular landowners, NGOs and the public will all play important roles in its implementation. Without a sustained and truly collaborative effort, the PANES will remain a dream on paper.

[11] Support Papers have their origins in research and technical processes that led to Discussions Papers that were discussed and further enhanced in an iterative manner until they 'matured' as Support Documents for the PANES.

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List of Acronyms

BENP	Bras d'Eau National Park
BRGNP	Black River Gorges National Park
CBD	Convention for Biological Diversity
CEPF	Critical Ecosystem Partnership Fund
CITES	Convention on International Trade in Endangered Species
CSR	Corporate Social Responsibility
EA	EcoAfrica Environmental Consultants
ESA	Environmentally Sensitive Areas
ES	Ecosystem Service/s
EPA	Environmental Protection Act of 2002
EPI	Expansion Priority Index
ESA	Environmentally Sensitive Areas
FNR	Fifth National Report
FRA	Forests and Reserves Act of 1983
FS	Forestry Service
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIS	Geographic Information System
GoM	Government of Mauritius
GSTC	Global Sustainable Tourism Council
Ha	Hectare
KM	Knowledge Management
IAS	Invasive Alien Species
IBA	Important Bird Area
ICT	Information Communications Technology
IUCN	International Union for Conservation of Nature
LIWG	Legal and Institutional Working Group
LMCL	Le Morne Cultural Landscape
MBC	Mauritius Broadcasting Corporation
MELI	Monitoring, Evaluation, Learning and Intervention
MoAC	Ministry of Arts and Culture
MoAIFS	Ministry of Agro Industry and Food Security
MSSNSESD	Ministry of Social Security, National Solidarity, Environment and Sustainable Development
MoHL	Ministry of Housing and Lands
MoFED	Ministry of Finance and Economic Development
MoT	Ministry of Tourism
MoOEMRFS	Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping
MTPA	Mauritius Tourism Promotion Authority

MWF	Mauritian Wildlife Foundation
NGO	Non-Governmental Organisation
NDS	National Development Strategy
NBSAP	National Biodiversity Strategic Action Plan
NCCAPF	National Climate Change Adaptation Policy Framework
NIASSAP	National Invasive Alien Species Strategy and Action Plan
NPCS	National Parks and Conservation Service
NTBNPA	National Terrestrial Biodiversity and National Parks Act
PA	Protected Area
PA&ID	Public Awareness and Information Dissemination
PAN	Protected Area Network
PANES	Protected Area Network Expansion Strategy
PIC	Pesticides in International Trade
PMU	Project Management Unit
POPS	Persistent Organic Pollutants
PPG	Policy for Planning Guidance (PPG)
ROM	Republic of Mauritius
SEA	Strategic Environmental Assessment
SFA	Shooting and Fishing Leases Act of 1966
SIDS	Small Island Developing State
SSR	Sir Seewoosagur Ramgoolam
SWOT	Strength, Weakness, Opportunity, Threat
TDWG	Tourism Development Working Group
TWG	Tourism Working Group
UoM	University of Mauritius
UNCCD	United Nations Convention to Combat Drought and Desertification in Africa
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
WHS	World Heritage Site
WHL	World Heritage List
WTO	World Trade Organisation

Chapter One: Status Quo of the Protected Area Network in Mauritius

1.1 Introduction to the Republic of Mauritius

The Republic of Mauritius consists of two main islands, Mauritius (1,865 km2) and Rodrigues (109km2) and outer islands, namely St Brandon, Agalega, Chagos Archipelago including Diego Garcia, Tromelin, and Cargados Carjajos[12], 49 offshore islets surround Mauritius while eighteen islets lie in the lagoon of Rodrigues. Mauritius' total land area is 2,040km2. It has an Exclusive Economic Zone (EEZ) of over 2.3 million km2 (see Figure 8), of which 99 % is still unexplored. Its ocean territory extends from the coast of Mauritius, Rodrigues, St Brandon (Cargados Carajos Shoals), Agalega, Tromelin and Chagos Archipelago.

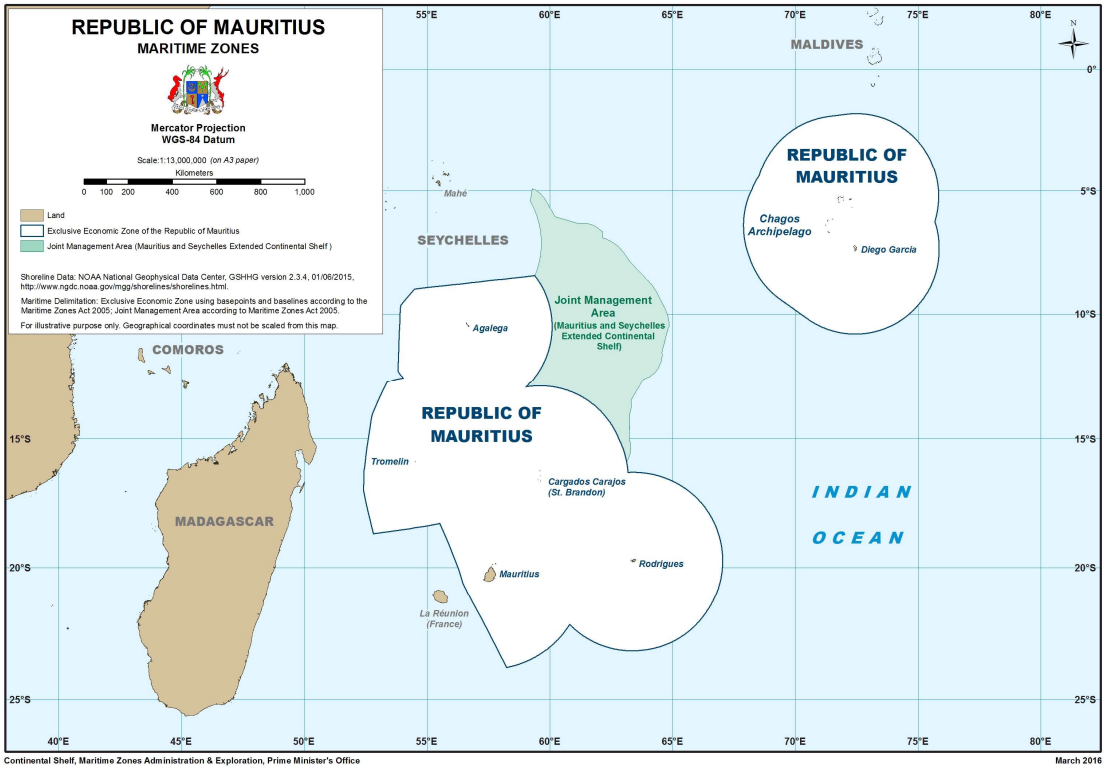

Figure 8: Exclusive Economic Zone and Extended Continental shelf of the Republic of Mauritius

As per the requirements of the "Expanding Coverage and Strengthening Management Effectiveness of the Protected Area Network (PAN) on the Island of Mauritius" project, this strategy document caters specifically for mainland Mauritius including its surrounding islets only. The overall goal of the GoM/UNDP/GEF PAN project is to conserve the globally significant native forest biodiversity of Mauritius and its objective is to expand and ensure effective management of the protected area network to safeguard threatened biodiversity.

[12] Constitution of Mauritius, 1968

1.2 Role of Protected Areas

Mauritius has diverse ecosystems, plant and animal species, landscapes and sites of historical and cultural significance. Forming part of the Mascarene Archipelago in the Western Indian Ocean, Mauritius, Rodrigues and Réunion were never connected to a continental landmass and this isolation, together with the age of the islands (Mauritius being more than 8.9 million years old), allowed some of the richest and most extraordinary terrestrial biodiversity to evolve, giving rise to a high percentage of endemic species. The endemic biodiversity of Mauritius is thus extremely unique and diverse[13].

Traditionally, Protected Areas (PAs) have played a role in conserving species and natural habitat. This is of course very important, specifically in terms of the protection of ecosystem services, like fresh water provided by Protected Areas in Mauritius. Yet Protected Areas have a much larger role to play, both nationally and globally. 'Protected Areas are an important part of a nation's climate change adaption strategy, as they reduce threatening processes to species and ecosystems and as such maximise their potential to adapt to climate change[14].' Protected Areas play a fundamental role in national, regional, and global climate change adaptation strategies. It is now fully accepted that Protected Areas safeguard and enhance the resilience of ecosystems and protect water resources and other vital services that human communities rely on for their wellbeing[15]. Protected Areas thus provide a crucial lifeline in times of global environmental change.

What is a Protected Area?

The International Union for Conservation of Nature (IUCN) definition for a Protected Area has been adopted for the PANES, stating that "*A protected area is a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values. (IUCN Definition 2008)".*

There is a suite of tools available to secure the conservation of both species and natural habitat, but arguably the most effective, reliable tools are provided through the establishment of effectively managed Protected Areas. Protected Areas provide legal status to important areas and can effectively ensure the persistence of species and the maintenance of critically important ecological functions in the landscape. A system of connected Protected Areas plays a vital role in ensuring the ecological resilience of landscapes, including urban and peri-urban landscapes, enabling them to better adapt to climate change effects such as drought, floods and other environmental pressures. Other mechanisms that can complement Protected Areas include regional and local planning tools, such as Outline Planning Schemes and Development Strategy Maps in the case of Mauritius.

Determining the economic value of Protected Areas is often difficult. This is because the value of environmental services such as the provision of clean, reliable water, productive soils, pollination of crops, the cycling of nutrients and carbon sequestration, are yet to be included in mainstream financial evaluations. However, this is increasingly being done as part of Strategic Environmental Assessment (SEA) processes designed to guide regional developments[16]. Furthermore, many non-monetary values of Protected Areas are not fully tangible in accounting terms, as they relate to the aesthetics and

[13] Ministry of Agro Industry and Food Security of Mauritius (MoAIFS). 2015. Page 11.
[14] International Union for Conservation of Nature (IUCN). 2014.
[15] Keenleyside, K., et al. 2014.
[16] Geneletti, D. 2013.

character of a region, and they are often largely emotional and psychological. Such values are difficult to quantify when valuing the 'sense of place', for instance. Nonetheless, these values are important to healthy, functional landscapes and the societies that exist within them; being particularly important within a highly-transformed environment, such as is found in Mauritius. Protected Areas provide opportunities to escape the commotion of urban environments and provide a basis for nature-based recreation and leisure. Because of the value that Protected Areas and open space in general give to the character of a region, they tend to have positive economic impacts on real estate prices and the wellbeing of the communities situated around them.

Protected Areas within Mauritius play a vital role in the protection of the country's biodiversity, which besides being important to ecological functioning is also critical in fulfilling both national and international obligations related to biodiversity conservation. Furthermore, they are fundamental in maintaining ecological infrastructure[17], fundamental to the survival and wellbeing of the people of Mauritius, and in shaping the character and aesthetic appeal of the country, as it continues to develop and urbanise.

1.3 History of Protected Areas in Mauritius

Europeans have visited Mauritius from the beginning of the sixteenth century, ships from Portugal probably around 1510. There are historians who firmly believe that Arabs visited Mauritius prior to Europeans and recent archaeological discovers at Bras d'Eau can lead to a changing view of the history of Mauritius. Mauritius was first settled by Europeans with the arrival of Dutch settlers in 1598 and was later ruled by the French from 1715 and the British from 1810. Mauritius has a significant history of slavery, with Le Morne Cultural Landscape, testimony to the resistance to slavery, being recognized as a World Heritage Site (WHS). Indentured labour is also hallmarked at the Aapravasi Ghat WHS and interpretation centre. Mauritius achieved independence in 1968.

The arrival of people marked the beginning of the transformation of the natural environment. They exploited high quality hardwoods and native forests made way for other land-uses, such as urban settlements and the production of sugar cane. The expansion of the sugar cane industry and to a lesser extent the forestry sector, has resulted in significant reduction of native forests and decline in the state of freshwater bodies and wetlands over time. The remaining biodiversity on the Island is now under severe threat and it is estimated that less than 2% (refer to 9) of the remaining native vegetation cover is in good[18] condition[19].

[17] The South African National Biodiversity Institute defines 'ecological infrastructure' as naturally functioning ecosystems that deliver valuable services to people, such as water and climate regulation, soil formation and disaster risk reduction. It is the nature-based equivalent of built or hard infrastructure, and can be just as important for providing services and underpinning socio-economic development (refer to http://www.sanbi.org/biodiversity-science/science-policyaction/mainstreaming-biodiversity/ecological-infrastructure).

[18] As defined by Page and D'Argent (1997) where 'good' condition is defined as forest with native canopy of greater than 50%.

[19] Critical Ecosystem Partnership Fund (CEPF). 2014. Page 21.

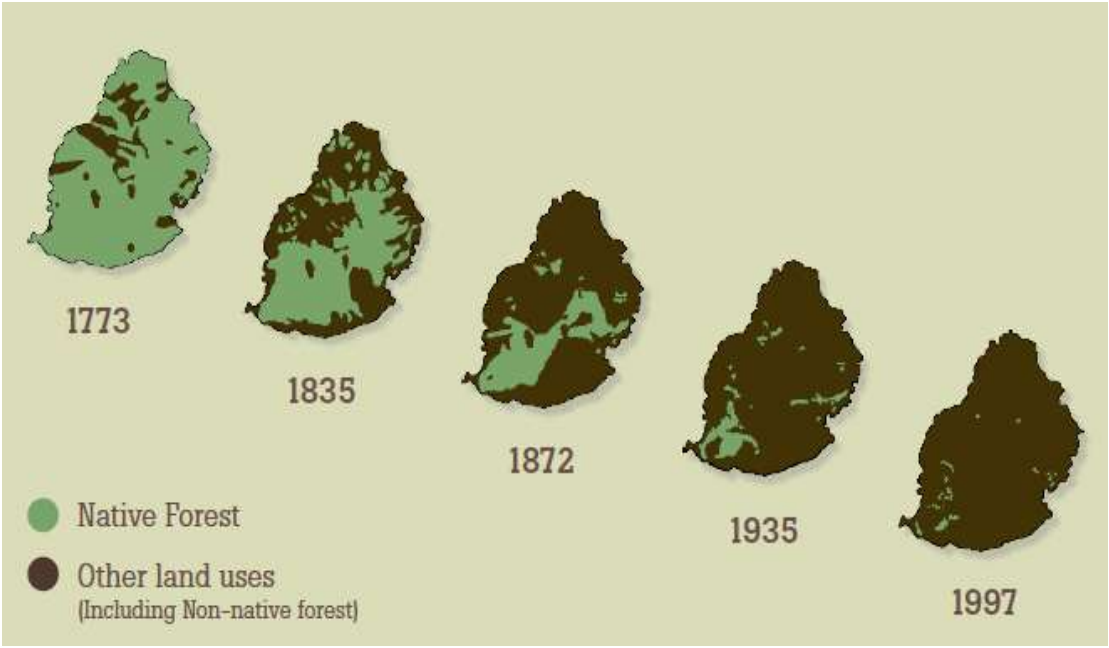

Figure 9: Degradation of Native Forest Habitat[20] in Mauritius

In 1966, the Shooting and Fishing Leases Act was passed to safeguard the forest areas on State Land that had been privately leased for shooting deer and for fishing. To further protect the remaining forests, the Forest and Reserves Act of 1983 was developed. This law made provision for the protection of the Mountain Reserves, River Reserves and Road Reserves, as well as for the designation of selected areas of State Land as Nature Reserves. Forestry has been practised in Mauritius since early occupation and the Forestry Service was established in 1883, with efforts to protect native forests already under way at that time. Today the Forests and Reserves Act of 1983 enables the Forestry Service (FS) to govern State Forest Lands and Nature Reserves in Mauritius, and it recognises that the FS is focussing more and more on biodiversity protection and rehabilitation[21] within the context of a dwindling commercial forestry sector[22].

The enactment of the Wildlife and National Parks Act of 1993 was stimulated by the rapid reduction in native forest cover which caused the decline of species such as the Mauritius Kestrel (*Falco punctatus*) and many species of native plants. This Act allowed for the establishment of National Parks and mandates the National Parks and Conservation Service (NPCS) to manage native terrestrial biodiversity within them. Black River Gorges National Park was the first National Park to be proclaimed in Mauritius in 1994. Today the Native Terrestrial Biodiversity and National Parks Act of 2015, having replaced the Wildlife and National Parks Act, enables NPCS to better manage National Parks and biodiversity in Mauritius. This Act now also allows for the establishment of Private Reserves on privately owned land.

Several other sets of legislations have been enacted over the last 15 years to protect biodiversity and the natural environment in Mauritius and the Ministry of Agro Industry and Food Security governs the

[20] Vaughan, R. E. and Wiehe, P. O. 1937. Page, W.S. and D'Argent, G. 1997.
[21] It is well noted that the conversion of exotic forests into native forest is a long and complex process.
[22] Commercial Forestry has been on the decline in Mauritius for several decades and the intention is to phase out the industry; however, there is a strong link between this part of the activities of the Forestry Service and PAN, as land decommissioned from commercial forestry can be rehabilitated in time to recover native forests and wetlands.

management of terrestrial Protected Areas. The Fisheries and Marine Resources Act of 2007 also allows for biodiversity protection in the marine environment and is governed by the Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping (MoOEMRFS). Although the marine component is not addressed by the Protected Area Network Expansion Strategy (PANES), the link between the terrestrial and marine components is crucial for the strengthening of the Protected Area Network (PAN) in Mauritius and the protection of crucial ecosystem services and ecological biomes or areas.

1.4 Types of Protected Areas in Mauritius

The different types of Protected Areas (PAs) in a country or region make up its Protected Area Network (PAN). For the purposes of the PANES, the PAN refers to terrestrial PAs. They fall under one Ministry whose mandate relates to terrestrial biodiversity, namely the Ministry of Agro Industry and Food Security. From a functional point of view, Marine Protected Areas are of course part and parcel of the overall PAN in a country.

What is a Protected Area Network?

A Protected Area Network (PAN) is a collection of Protected Areas (PAs) that stretches across a particular country or territory. For the purposes of the PANES, it was agreed that all important biodiversity lands that enjoy a certain degree of protection may be considered as part of the potential PAN.

Before engaging in an in-depth analysis of what areas can potentially be included in a future PAN, it is useful to consider the overall conservation landscape of Mauritius. To that end areas that include some form of protection are briefly discussed below.

1.4.1 National Parks

National Parks are managed by the National Parks and Conservation Service (NPCS). There are currently two mainland National Parks in Mauritius, being Black River Gorges National Park and Bras d'Eau National Park, with eight islets national parks.

a) Black River Gorges National Park

The Black River Gorges National Park (BRGNP) was proclaimed on the 15th June 1994 under Section 11 of the Wildlife and National Parks Act of 1993 and became the first National Park in Mauritius. Black River Gorges National Park falls under the International Union for Conservation of Nature (IUCN) Protected Area Category II[23]. Part of the BRGNP is also a United Nations Educational, Scientific and Cultural Organisation (UNESCO) Man and Biosphere Reserve. The Park covers 3.5% of the Island of Mauritius' surface area, hosting most of the endemic plant and animal species in Mauritius, with at least 600 species of native flowering plants and ferns. It is the only area where all 9 endemic bird species of Mauritius can still be found and is the largest Protected Area in Mauritius. Nonetheless a great deal of the landscape of BRGNP is considerably altered as a result of invasive alien plant and animal species.

[23] IUCN Category II Protected Areas are large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible, spiritual, scientific, educational, recreational, and visitor opportunities (refer to http://www.iucn.org/about/work/programmes/gpap_home/gpap_quality/gpap_pacategories/).

b) Bras d'Eau National Park

The natural habitat and ecology of Bras d'Eau National Park (BENP) has been influenced by the natural and human history of the Island of Mauritius. Bras d'Eau National Park falls into the IUCN Protected Area Category II. BENP is a very important cultural landscape[24] that is rich in historical ruins that date from various time periods, and one that brings insight into how humans and nature interacted on the Island. BENP hosts an important population of Paradise Flycatcher which has been isolated from the main population for more than 200 years and may harbour genetic variability lost from the other remnant population. BENP also hosts the last existing native coastal forest of mainland Mauritius. The natural habitat has also been considerably degraded as a result of invasive alien plant and animal species. Parts of BENP were used for forestry and fruit plantations. These are now being converted back to native forest as part of the restoration of the BENP.

c) Islets National Parks

There are eight islets[25] national parks namely; Île d'Ambre, Pigeon Rock, Île aux Flammants, Île aux Oiseaux, Rocher aux Oiseaux, Île aux Fous, Île aux Fouquet and Ilot Vacoas which have been proclaimed in 2004. Four remain closed reserves and these include Île aux Fous, Ilot Vacoas, Pigeon Rock and Rocher aux Oiseaux. The Islets National Parks have a total terrestrial coverage of 174.2 ha and hosts endemic biodiversity. Management Plans have been developed for these islets since 2008 but are yet to be gazetted.

1.4.2 Nature Reserves

Nature Reserves are under the jurisdiction of the Forestry Service (FS) according to the Forests and Reserves Act of 1983. There are currently 14 declared Nature Reserves[26] in Mauritius, including seven on the mainland and seven offshore islets.

a) Mainland Nature Reserves

The seven mainland Nature Reserves include Perrier, Les Mares, Gouly Père, Cabinet, Bois Sec, Le Pouce and Corps de Garde. The reserves have been designated due to the rare and endangered plant species occurring in them and contribute significantly to the protection of unique biodiversity in Mauritius. These terrestrial Nature Reserves currently have no dedicated Management Plans to guide their protection and use.

b) Offshore Islets

The seven islets proclaimed as Nature Reserves include Île Plate (or Flat Island), Ilot Gabriel, Ilot Marianne, Île Ronde, Île aux Aigrettes, Coin de Mire (or Gunner's Quoin) and Île aux Serpents (or Serpent Island). Management Plans for these islets are at different stages of development[27]. Management of these islets, except for Île aux Aigrettes (leased to Mauritian Wildlife Foundation), has been handed over to the NPCS since 2006.

[24] Heritage sites have recently been identified and mapped in Bras d'Eau National Park, in order to further examine the specific history of the area, pointing to possibly being some of the oldest human settlements in Mauritius. See: *The Archaeological and Historical Significance of Bras d'Eau National Park* by J.L. Haines (2016) and *A Brief Report on Bras d'Eau Sugar Estate* by Babita Bahadoor (2015), Research and Technical Unit, Aapravasi Ghat

[25] They fall under the Native Terrestrial Biodiversity and National Parks Act of 2015, First Schedule.

[26] Forests and Reserves Act of 1983, Second Schedule.

[27] Coin de Mire and Île aux Serpents have final Management Plans under Phase 1 of the Development of Management Plans for Conservation and Management of Offshore Islets for Mauritius. Île Plate, Ilot Gabriel and Ilot Marianne have draft Management Plans as part of Phase 2. Île Ronde and Île aux Aigrettes have Management Plans developed by NPCS in collaboration with the MWF.

1.4.3 Ramsar Sites

There are currently three Ramsar Sites in Mauritius, two of them forming part of the terrestrial PAN being Rivulet Terre Rouge Estuary Bird Sanctuary[28] (area of 26 ha and managed by NPCS) and Pointe d'Esny Wetland[29] (area of 22 ha and managed by FS). Blue Bay Marine Park[30] (area of 353 ha and managed by MoOEMRFS) forms part of the marine environment and is not included in the terrestrial PAN.

1.4.4 Mountain Reserves

Mountain Reserves are overseen by the Forestry Service (FS) and are defined in the Forests and Reserves Act of 1983. The FS must approve any activities within Mountain Reserves. The Mountain Reserve line is defined as the top third of the mountain range in elevation, calculated between the mountain baseline and ridge. The baselines for the mountain ranges are specifically described in the Act[31]. All but one of the Mountain Reserves fall on private land[32] and many contribute significantly to the protection of remnant forests and water catchment areas and as such the protection of ecological infrastructure and ecosystem services.

1.4.5 River Reserves

River Reserves are overseen by the Forestry Service and are defined[33] in the Forests and Reserves Act of 1983. The FS must approve any activities within River Reserves. These reserves are available for restoration and improvement of ecological infrastructure, where such land is not yet utterly transformed by other infrastructure, like roads, urban development, water reservoirs, bulk transfer routes and agriculture. The River Reserves are measured to each side of the watercourse, from the edge of the watercourse, to be 16 metres in the case of rivers, 8 metres in the case of rivulets and 3 metres in the case of feeders. This measurement is valid if no escarpment exists above the watercourse, in which case the River Reserve is defined from the edge of the watercourse to the edge of the escarpment. River Reserves and wetland systems provide a vital function in terms of the protection of fresh water in Mauritius. Investment into the restoration of specifically freshwater biodiversity and native habitats will enhance resilience and support ecological services to further improve the ability of Mauritius to deal with environmental changes related to climate change.

1.4.6 Private Conservation Areas

There are currently some privately-owned lands under active conservation, such as Emile Series, Mondrain, Ebony Forest and La Vallée de Ferney.

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[28] Rivulet Terre Rouge Estuary Bird Sanctuary was proclaimed as a Reserve on the 27th August 1999 under Section 11 of the Wildlife and National Parks Act 1993. It has been listed as a Ramsar Site on the 30th September, 2001 as ID Ramsar No. 1094.

[29] Pointe d'Esny Wetland was listed as a Ramsar Site on the 16th September, 2011 under ID Ramsar No. 1988. It is vested to the FS as Forest Land under the Forests and Reserves Act of 1983.

[30] Blue Bay Marine Park was proclaimed as a Marine Protected Area under the Fisheries and Marine Resources Act Of 2007. Blue Bay Marine Park was listed as a Ramsar site on the 30th January 2008 and listed as ID Ramsar No. 1744.

[31] Forests and Reserves Act of 1983, First Schedule lists twenty (20) mountain ranges and includes 1) Port Louis and Calebasses Ranges, 2) Mont Piton, 3) Montagne Fayence, 4) Montagne Blanche, 5) Petit Malabar, 6) Grande Malabar, 7) Corps de Garde, 8) Candos Hill, 9) Rempart, 10) Tamarind and Terre Rouge Ranges, 11) Riviere Noire and Morne Brabant Ranges, 12) Savanne Range, 13) Perruche, 14) Bambous and Creole Ranges, 15) Lagrave and Chevillard or d'Auvillard Ranges, 16) Montagne Chaumont, 17) Montagne Pauline, 18) Montagne Dalais, 19) Montagne Maurice and 20) Mountain Vernon. Baselines are detailed for fourteen (14) of the mountain ranges defined.

[32] The exception to this is the Mountain Reserve on top of Le Morne Brabant, which falls on State Land.

[33] The Fourth Schedule in the Forests and Reserves Act of 1983 provides a detailed list of rivers and rivulets across Mauritius.

The Native Terrestrial Biodiversity and National Parks Act of 2015 provides for the designation of Private Reserves on private land worthy of conservation, in order to protect biodiversity and ecosystem services into the future. Private Reserves form part of the proposed Biodiversity Stewardship Programme, where additional categories of stewardship areas are also detailed. The essence of biodiversity stewardship is that it is based on a spirit of collaboration amongst stakeholders and landowners volunteer participation in the programme.

1.4.7 World Heritage Sites

Mauritius has two World Heritage Sites (WHSs), being Le Morne Cultural Landscape[34], and Aapravasi Ghat. Le Morne specifically plays an important role as a Protected Area in terms of hosting and protecting endemic biodiversity. Furthermore, the connection between the main island and the Le Morne Brabant Peninsula is a crucial biodiversity corridor, and also provides a landscape connection between the mountain and the sea. The Buffer Zone provides a corridor to the Black River Gorges National Park. Application was made to the United Nations Educational, Scientific and Cultural Organisation (UNESCO) for inscription of the Le Morne Cultural Landscape (LMCL) on the World Heritage List (WHL) in 2006. Conditions for inscription in 2008 include the proper management of the land and seascapes[35].

1.4.8 National Heritage Sites

The National Heritage Trust also has a role to play as they manage all listed heritage sites including islets, such as Île de la Passe which has been identified as an Islet with significant reptilian biodiversity. NPCS provides advice on the biodiversity conservation management aspect of this Islet and the Mauritian Wildlife Foundation (MWF) through a Memorandum of Understanding with the Ministry of Arts and Culture, has been delegated to implement biodiversity conservation management. This and many other cultural sites in Mauritius are closely linked to nature and should as such be protected.

1.4.9 State Forest Lands

State Forest Lands[36] are defined as all those areas that fall under the jurisdiction of the Forestry Service (FS) according to the Forests and Reserves Act of 1983. This Act empowers the Conservator of Forests to declare any forest on such land as a National Forest, thus protecting such resources against other land-uses. The Act also empowers Forestry Officials to apprehend people found to be carrying out illegal activities within lands managed by the FS. This is particularly important in terms of State Forest Lands leased out to the private sector for hunting and fishing. There is a tendency to clear forests on such leased lands for deer ranching, thus degrading the biodiversity on the land. Such leases are further governed by the Shooting and Fishing Leases Act of 1966. The Forest Policy in Mauritius is currently undergoing review and it is accepted that the diminishing forestry sector will continue to stimulate the conversion of commercial forests into native forests through diversifying activities, as is already underway. State Forest Lands have a crucial role to play in protecting biodiversity and ecosystem services in Mauritius, and provide essential linkages between National Parks and Nature Reserves. State Forest Lands also constitute a significant portion of the water catchment areas of Mauritius and is critical in the protection of the freshwater sources.

[34] Le Morne Heritage Trust Fund. 2013.
[35] Le Morne Heritage Trust Fund. 2013. Page 14.
[36] It is noted that State Land is governed by various Ministries. For the purpose of this report, State Forest Lands denote those lands governed by the Forestry Service. Portions of these State Forest Lands are leased according to the Shooting and Fishing Leases Act of 1966 and referred to as Leased State Forest Land.

1.4.10 Undeveloped Pas Géométriques

The Pas Géométriques provides public access to the coastline and is thus of crucial importance to the wellbeing of the people of Mauritius as public open space. Many hotels have been developed on leased components of this land around the coastline of Mauritius. Undeveloped or unallocated portions of the Pas Géométriques[37], still remain under vegetation, and as such are under threat from development due to the popularity of the coastal areas. These remaining undeveloped portions also fulfil a vital function in the protection of coastal biodiversity and coastal ecosystem functions. Some of these remaining areas also host rare and endemic species which must be protected, while others host degraded native biodiversity. Thus, even if degraded these areas are degraded they have potential in terms of coastal rehabilitation and restoration of the coastal environment of Mauritius, where little open coastal land remains.

1.4.11 State Gardens

The Vallée D'Osterlog Endemic Garden encloses 275 hectares of sub humid mountain forest. The Foundation was set up under the Vallée d'Osterlog Endemic Garden Foundation Act 2007. As per the provision of the Act, one of the main objectives of the Foundation is to ensure the protection of flora and fauna in the Garden

1.4.12 Lakes and Reservoirs

Lakes and reservoirs are not currently considered Protected Areas, although many already fall within or alongside Protected Areas. It is a clear that lakes and reservoirs together with the related wetlands should be incorporated into the PAN and be considered as Protected Areas.

1.4.13 Craters and Lava Tunnels

Mauritius has three craters being Trou aux Cerfs in Curepipe, Bassin Blanc in the district of Savanne and Trou Kanaka situated northeast of Bassin Blanc. These are unique habitats and should be included into the PAN as Protected Areas. There are also many lava tunnels, many of which have already been identified in the Environmentally Sensitive Areas (ESA) mapping, as are many other environmental attributes across the Republic of Mauritius. Lava tunnels are well noted in the Bras d'Eau area, requiring further research. They are classified as State Land.

1.4.14 Marine Areas

Mauritius has two Marine Protected Areas. These are Balaclava Marine Park and Blue Bay Marine Park. There are also six Fishing Reserves, five Fisheries Reserved Areas and four Marine Reserves. Voluntary Marine Conservation Areas[38] have also been established at Anse la Raie and Roches Noires. Although not in the focus of the PANES in terms of expansion, the marine component of the PAN is of critical importance to the overall protection of biodiversity and ecosystem function in Mauritius.

[37] The undeveloped/unallocated portions of the Pas Géométriques excludes urban areas and hence Public Beaches couched within them. Furthermore, since Public Beaches do not host significant native biodiversity and are highly utilised recreational public open spaces along the coastline. Rehabilitated areas within Public Beaches can in the future be considered to be included into the PAN, if of significant biodiversity importance.

[38] Pers. Comm. Francois Rogers, Reef Conservation. September 2015.

1.5 The current situation with Protected Area Network in Mauritius

The Fifth National Report of 2104 lists National parks, Nature Reserves and Ramsar Sites as officially protected areas. It was agreed at the PANES National Workshops held on the 31st March and the 1st April 2016 that the ***Existing Protected Area Network*** consists of National Parks, Nature Reserves and Ramsar Sites[39], although there are also other important areas that enjoy some form of protection. The total area under formal Protected Areas amounts to about 4.4% of the country.

For the details of formal Protected Areas and their localities please refer to Table 1 and Figure 10 below.

Table 1: List of Formal State Protected Areas as presented in the Fifth National Report of 2014

Name	Conservation status	Area (ha)
Formal State Protected Areas – mainland and offshore islets		
Black River Gorges	National Park	6,574.00
Bras D'Eau		497.20
Perrier	Nature Reserve	1.44
Les Mares		5.10
Gouly Pere		10.95
Cabinet		17.73
Bois Sec		5.91
Le Pouce		68.80
Corps de Garde		90.33
Rivulet Terre Rouge Estuary Bird Sanctuary	Ramsar Site: Wetlands of International Importance	26.00
Pointe D'Esny		20.00
Vallée D'Osterlog Endemic Garden Foundation	National Protected Area	275
Pigeon Rock	Islet National Parks	0.63
Ile D'ambre		128
Rocher des Oiseaux		0.1
Ile aux Fous		0.3
Ile aux Vacoas		1.36
Ile aux Fouquets		2.49
Ilot Flamants		0.8
Ile aux Oiseaux		0.7
Round Island	Islet Nature Reserve	168.84
Ile aux Serpents		31.66
Flat Island		253
Gabriel Island		42.2
Gunner's Quoin		75.98
Ilot Mariannes		1.98
Ile aux Aigrettes		24.96

While Figure 10 depicts the formal Protected Areas in Table 1, termed collectively as the Existing Protected Area Network, Figure 11 depicts the Proposed Protected Area Network based on the components in Table 2.

[39] Referring to terrestrial Ramsar Sites (Pointe d'Esny and Rivulet Terre Rouge Bird Estuary).

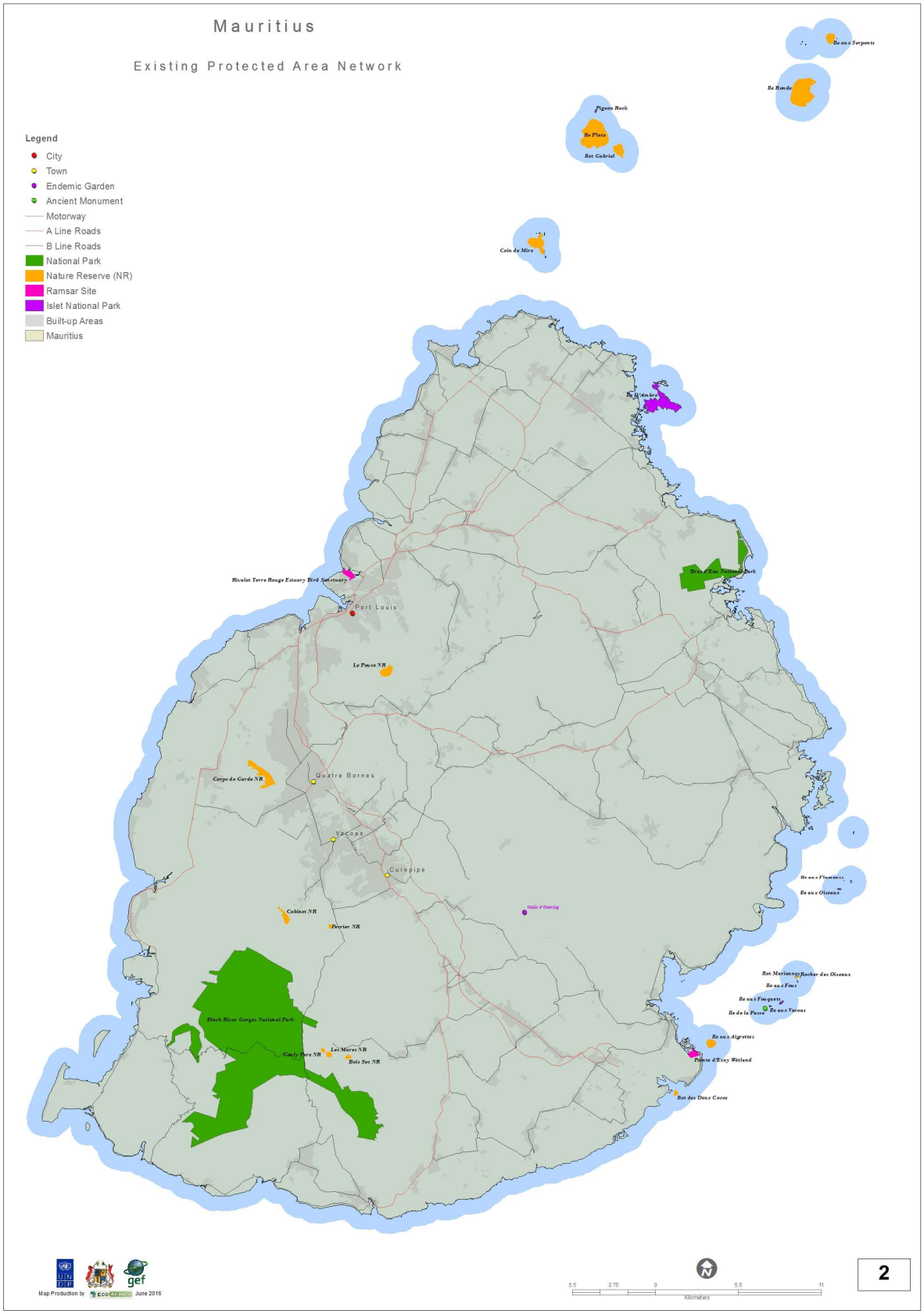

Figure 10: The Existing Protected Areas Network of Mauritius comprising of National Parks, Nature Reserves and Ramsar Sites

1.6 From *existing* to *proposed* Protected Area Network

According to Aichi Target 11 adopted under the Convention on Biological Diversity (CBD), each nation should aim to expand its protected land area to 17% of the country's land area by 2020[40]. The formal State Protected Areas in Mauritius, consisting of National Parks, Nature Reserves and Ramsar Sites cover just over 4% of the country (Figure 10 above). However, certain other areas, including State Forest and other lands already enjoy varying degrees of protection. The incorporation of these areas into the PAN can bring its surface area to about 16% (Figure 11 below) of Mauritius, which quite coincidently happens to be the Aichi Target. It must be stressed again that, although all the areas in this Proposed PAN are under some degree of protection, they do not enjoy a level of protection deemed effective to the extent required by the IUCN definition of Protected Areas (please see interest block on page 1). Consequently, a large part of the PANES is devoted to improving the management of the current protected areas as well as those that should be earmarked for incorporation into the PAN.

Reaching the Aichi Target will be a major accomplishment for Mauritius. Yet conservation planning conducted during the development of the PANES, as explained in Chapter 3 below, shows that some biodiversity falls outside the 16% of the country's surface area mentioned above. This is not surprising considering that Mauritius falls in the Mascarene hotspot where there is much irreplaceable biodiversity. While the immediate target is to expand the PAN to 16% through the incorporation of areas that already enjoy certain levels of protection by elevating their status through strengthening their management, further expansion into other relevant potential areas for nature conservation and its associated ecosystem services should be encouraged and can occur gradually through time.

The Strategy considers three geographical areas. The first is the ***existing*** Protected Area Network (PAN), which consists of the current officially declared protected areas in Mauritius. It is generally accepted that it falls short of protecting key ecological assets and meeting international targets. The second area is the ***proposed*** Protected Area Network (PAN). Area in it already enjoy varying degrees of protection in the pursuit of, international targets and national priorities, yet protection is inadequate for inclusion into the official PAN. Areas include Le Morne World Heritage Site, Mountain Reserves, River Reserves, the undeveloped parts of the Pas Géométriques, privately owned areas already under conservation and any other reserves proclaimed under the relevant act. State Forest Lands, including Leased Forest Lands are also included, as they enjoy a certain measure of protection. A third type of geographic area known as ***potential*** areas of inclusion in the PAN is dealt with in Chapter 3.

The Existing Protected Area Network (PAN) was agreed at the PANES National Workshops held on the 31st March and the 1st April 2016 as consisting of National Parks, Nature Reserves and Ramsar Sites[41] (Figure 10 above). These areas are listed as official Protected Areas in the Fifth National Report (FNR) though the term Protected Area Network is not used as such. These areas amount to about 4% of the country. By expanding the PAN to the additional areas in the Proposed PAN as shown in Table 2 and Figure 11 below, the total area of the PAN will increase to some 16% of the country's surface. This area is proposed as the official PAN target which should be pursued without delay, recognising that further biodiversity land should be incorporated when opportunities avail themselves.

[40] Convention on Biological Diversity: Strategic Plan for Biodiversity Conservation 2011-2020.
[41] Referring to terrestrial Ramsar Sites (Pointe d'Esny and Rivulet Terre Rouge Bird Estuary).

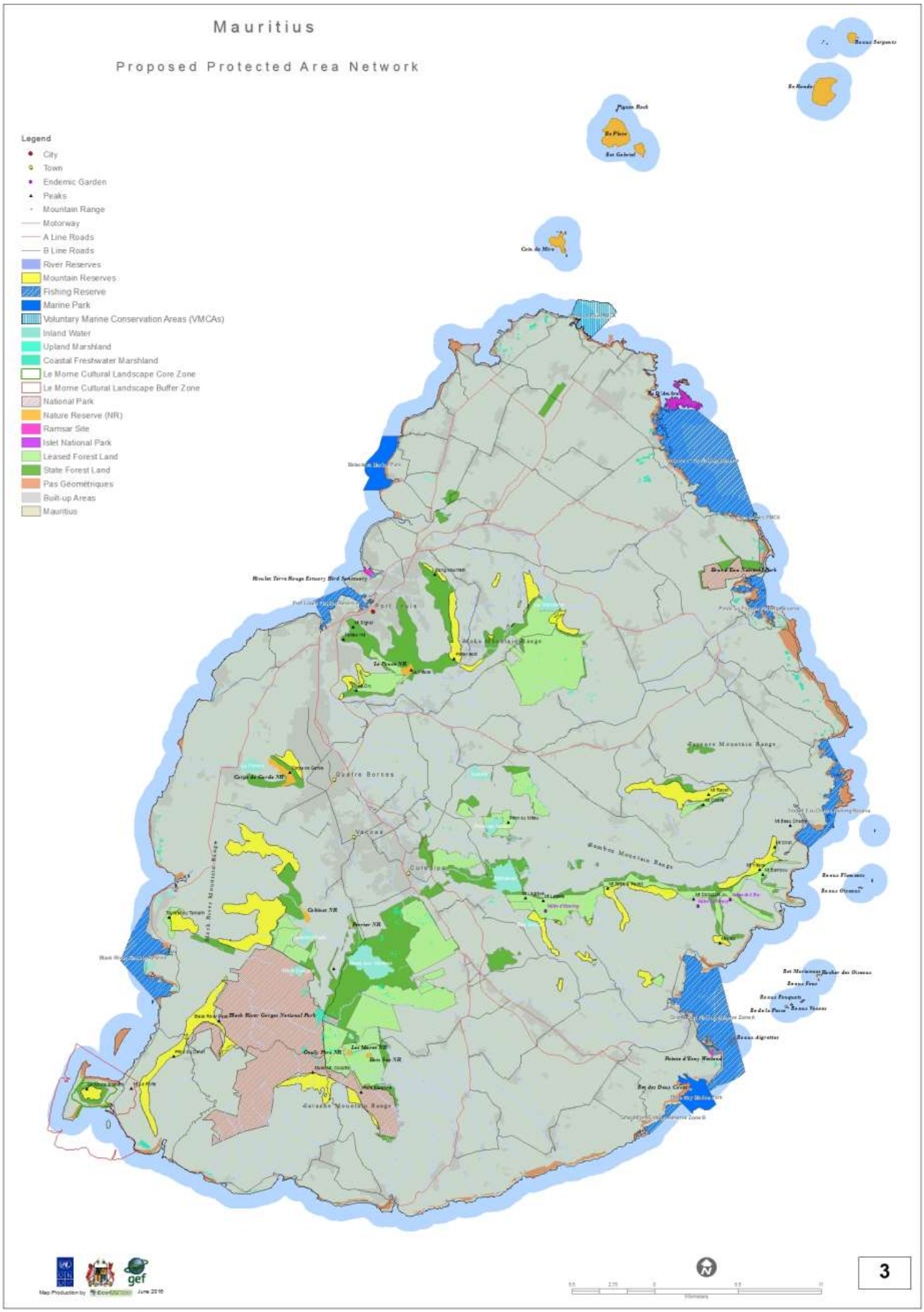

Figure 11: Proposed Protected Area Network with various Protected Areas having some degree of protection

Table 2: Types of Protected Areas in the Existing (dark green) and Potential (light green) Protected Area Network

#	Type	Authority	Legislation	What is protected?	Area (ha)	Source [42]
1.	National Parks	MoAIFS through NPCS	Native Terrestrial Biodiversity and National Parks Act, 2015	Biodiversity and ES within National Parks	7,071.2	FNR
2.	Islets National Parks	MoAIFS through NPCS	Native Terrestrial Biodiversity and National Parks Act, 2015	Biodiversity and ES within National Parks	134.38	FNR
3.	Nature Reserves	MoAIFS through FS	Forests and Reserves Act, 1983	Biodiversity and ES within Nature Reserves	200.26	FNR
4.	Nature Reserves (Islets)	MoAIFS through FS	Forests and Reserves Act, 1983	Biodiversity and ES within Nature Reserves	598.62	FNR
5.	Ramsar Sites	NCPS FS	Native Terrestrial Biodiversity and National Parks Act, 2015 Forests and Reserves Act, 1983[43]	Wetlands and Water Birds	46.0	FNR
6.	Vallee D'Osterlog Endemic Garden	Vallee D'Osterlog Endemic Garden Board	Vallee D'Osterlog Endemic Garden Foundation Act, 2007	Biodiversity and ES within the area	275.0	FNR
7.	Mountain Reserves	MoAIFS through FS	Forests and Reserves Act, 1983	Biodiversity and ES within Mountain Reserves	3800.0	FNR
8.	River Reserves	MoAIFS through FS	Forests and Reserves Act, 1983	Biodiversity and ES within River Reserves	2740.0[44]	FNR
9.	World Heritage Site: Le Morne	MoAC through NHT and LMTF	National Heritage Fund Act, 2003 Le Morne Heritage Trust Fund Act, 2004	Biodiversity and ES in Core Area and Buffer Zone (terrestrial)	783.1[45]	LMHTF [46]MHL
10.	National Heritage Site	MoAC through NHT	National Heritage Fund Act, 2003	Île de la Passe	2.19	FNR
11.	State Forest Lands	MoAIFS through FS	Forests and Reserves Act, 1983	Biodiversity and ES within State Forest Lands	Approx. 2,200[47]	FS
12.	Leased State Forest Lands	MoAIFS through FS	Shooting and Fishing Leases Act, 1966	Biodiversity and ES within State Forest Lands	Approx. 11,000	FS
13.	Undeveloped Pas Géométriques	MoHL with FS	Pas Géométriques Act, 1895	Trees within the domain public	803.5[48]	EA
14.	Private Conservation Areas[49]	MoAIFS through NPCS	Native Terrestrial Biodiversity and National Parks Act, 2015	Biodiversity and ES within privately-owned areas	213.0	NPCS

[42] Note that, as no central database exists for the PANES to date, different sources of data are used and this may lead to small inconsistencies. Shapefiles for maps were largely derived from 2009 ESA data which is the most complete GIS dataset to date for the purposes of conservation planning. Conservation planning, however, is a broad-scale exercise and ground-truthing is implicit. When a Conservation Planning Unit is established data can be centralised as precise figures will be available for surfaces such as certain State Forest Lands that are currently being updated.

[43] In the case of Pointe d'Esny Wetland, which is vested as Forest Land under the Forests and Reserves Act of 1983.

[44] EcoAfrica has generated shapefiles based on specifications in the Forest and Reserves Act of 1983 that indicate a slightly higher figure. However, the official figures are used here.

[45] This area excludes the marine component of the Buffer Zone, situated within Le Morne Lagoon.

[46] Official figures from nomination dossier with amended Buffer Zone (source: MHL and LMHTF).

[47] Approximate figures are provided for State Forest Lands and Leased State Forest Lands as leases on State Forest Lands that naturally fluctuate. Note that State Forests are currently being mapped and ground truthed.

[48] This figure includes forest on the Pas Géométriques but also undeveloped areas as can be seen on the 2014 satellite imagery, considering the importance and scarcity of undeveloped coastal areas and the possibility of rehabilitating them.

[49] It is necessary to clarify that these are private areas under some level of conservation, yet they are not necessarily declared as such and are not declared Private Reserves at the time of compiling this document. The total area formally accepted to be under private conservation is reflected here, yet remains indicative. Such areas require further mapping.

Table 3 provides a summary of the Existing PAN, the Existing and Proposed PAN (which is the official target for expansion, in die dark green), and the additional high biodiversity areas that can be added through time when the environment is conducive for this, giving an idealistic figure of just over 30%. This high figure will only be obtained with voluntary inclusion of private lands, and there are very positive signs that will become a trend that can be fostered through a Biodiversity Stewardship Programme.

Table 3: Existing PAN and Proposed PAN in relation to total surface area of Mauritius

Area	Ha	% of country surface
Existing PAN	8,325.46	4.4
Existing and Proposed PAN (Figure 11)	29,867.25	16.00
Potential Areas for Inclusion (yellow on Figure 16)	25,430.50	13.63
Existing PAN + Proposed PAN + Potential Areas for Inclusion (green and yellow on Figure 16)	55,297.75	29.63
Total Land Area of mainland Mauritius (including surrounding islets)	186,557	100.00

1.7 Assessing the Protected Area Network (PAN) in Mauritius

The total Existing and Proposed Protected Area Network (PAN) in Mauritius as described above, and shown in Table 2 and Figure 11 covers 29,867hectare (ha) or 16%[50] of the land area of mainland Mauritius and the surrounding islets.

Beyond the areas in the Existing and Proposed PAN there are further areas that have significant biodiversity value as revealed through state of the art conservation planning. Such areas can eventually be incorporated into the PAN when practical and feasible, and the rational as well as approaches to their incorporation into the PAN are treated in detail in Chapter 3.

The Convention on Biological Diversity (CBD) calls for the strengthening of biodiversity conservation by safeguarding ecosystems, species and genetic diversity. CBD Aichi Target 11 details the aim of conserving 17% of land and inland water areas and 10% of marine areas by 2020. These areas should be ecologically well represented and well connected through a system of Protected Areas and other effective area-based conservation measures, as well as integrated into a wider landscape[51]. Areas of particular importance for biodiversity and ecosystem services should be protected through effective management of the PAN in Mauritius.

[50] The 5th National Report on the Convention on Biological Diversity (CBD), April 2015 details that 7.6% of the total surface area of the Republic of Mauritius falls into Protected Areas. This area calculation takes into account the area of the Republic of Mauritius and accounts for State Protected Areas, as well as Mountain Reserves, River Reserves, Pas Géométriques and Private Conservation Areas, amongst others. The PANES on the other hand uses the formal State Protected Areas to define the current PAN, as illustrated in Figure 10, comprising 4.4% of the terrestrial area of the mainland of Mauritius and surrounding islets. It must be noted that a difference in area measurement exists due to the fact that, i) the area of the entire Republic (including Rodrigues, Agalega and outer islands) is different to that of the mainland and surrounding islets, and ii) slightly different datasets have been used, with the figures used in the PANES being based in the most recent available GIS data. Such data discrepancies can be addressed once a consolidated data set is established by the Conservation Planning Unit, which can then be used by all institutions across Mauritius.

[51] Strategic Goal C in Convention on Biological Diversity (CBD). 2010. Page 14.

These above imperatives provide the rationale that a biodiversity network should focus on representativeness, as much as on management effectiveness. Currently the formal State declared Protected Areas in Mauritius amount to approximately 4%[52] and efforts are thus required to improve the status and extend the PAN. For Mauritius in particular, rehabilitation and restoration form a major part of achieving this target, due to the fact that the terrestrial biodiversity is already significantly degraded and transformed.

Species and native habitat in Mauritius remain under threat from both Invasive Alien Species (IAS) and development pressures, which are common problems in other countries also. In Mauritius, institutional overlap in the management of the various types of Protected Areas, as well as limited funding and skills, also hamper effective Protected Area management. It has thus been concluded that:

- Management of Protected Areas needs to be strengthened; and
- Protected Areas need to be expanded to be representative of all ecosystem types.

The concept of a representative PAN in Mauritius is relatively new and stakeholders, as well as the broader public need to become more familiar with PAN, the value it has, and the crucial role that this network fulfils in climate change adaption for the country. Specifically, the PAN provides Mauritius with fresh water, amongst many other critical ecosystem services, on which the economy and human wellbeing on the Island are based.

1.8 A matter of urgency

Mauritius is developing very fast with its natural areas become islands in an urbanising country with agricultural development in the rural areas (see Figure 1 in the Synthesis). When the overlay of 2009 ESA data plotted on the latest satellite imagery of 2014 is examined closely, there are clear indications that development is starting to occur in the areas previously regarded as environmentally sensitive. To what extent this is the case is not easy to establish without work on the ground, and there may be slight inaccuracies in the spatial coverage of the ESA data. However, it is well known that open space is at a high premium. The apparent areas where development has occurred in ESAs is indicated by black areas in the overlay mapping is shown in Figure 12 below. Considering that this may have happened over a relatively short period of time is ominous and cautions that the trends depicted in Figure 9 may be progressing.

[52] Formal State Protected Areas as detailed in the Government of Mauritius (GoM)/United Nations Development Programme (UNDP)/Global Environmental Fund (GEF) Project Document. 2010. Page 32, as well as the Fifth National Report 2014.

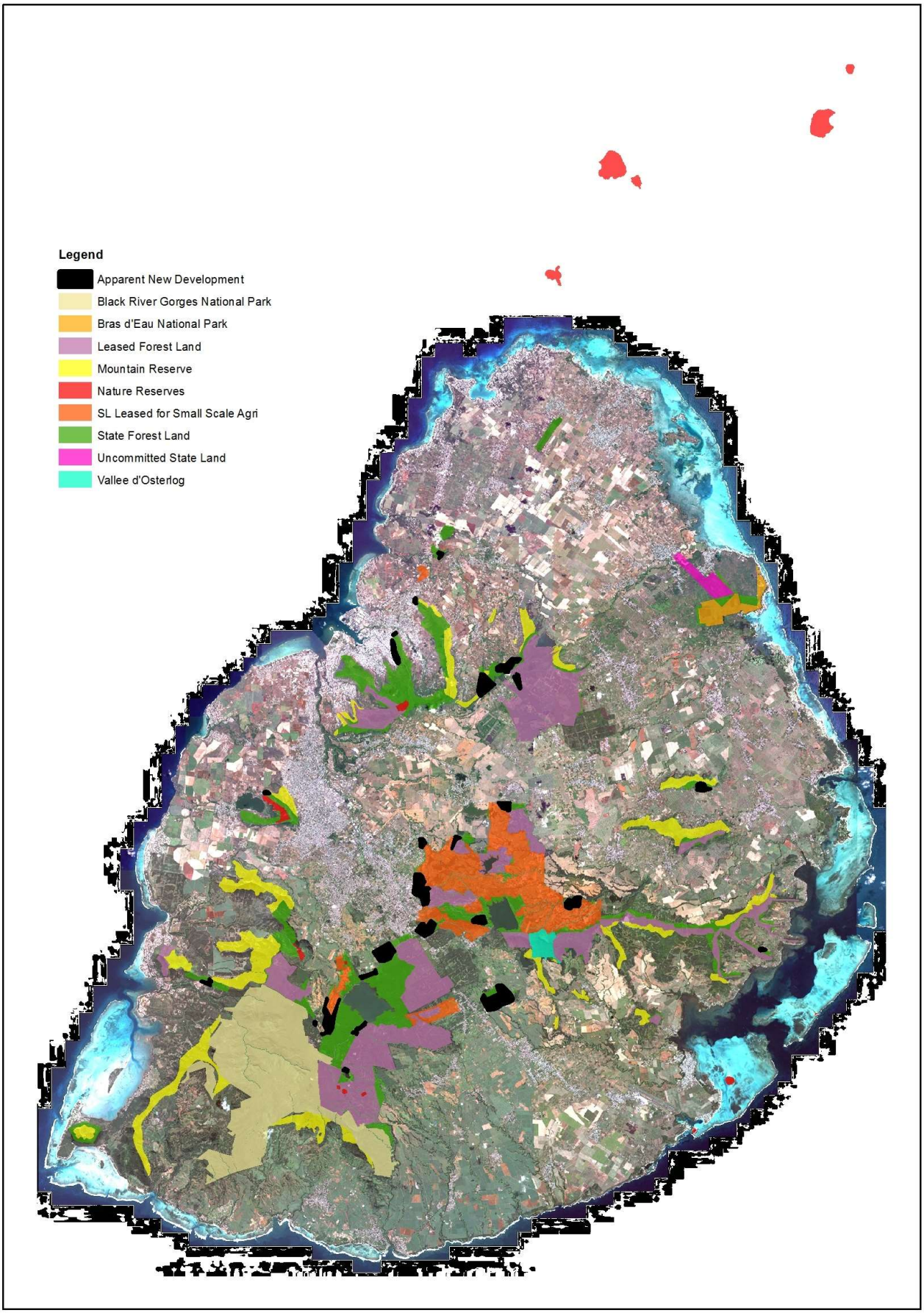

Figure 12: Black shapes indicate the extent of possible development in Environmentally Sensitive Areas that may have occurred over the 5 years between 2009 and 2014

1.9 The Protected Area Network (PAN) Project

In spite of the many advances made with Protected Areas in Mauritius, there is an acceptance that the Protected Area Network (PAN) in its present form is not representative of all habitat types in Mauritius and does not adequately protect all species and/or the critical ecosystems required to maintain the ecological integrity[53] of Mauritius. In response, the Government of Mauritius (GoM), with support from the United Nations Development Programme (UNDP) and funding from the Global Environment Facility (GEF), launched the PAN Project[54]. The overall objective of the PAN Project is to expand Protected Area coverage and to strengthen the management effectiveness of the existing Protected Areas. It further seeks to restore critical areas of biological significance and to maintain and improve ecosystem functions.

The Existing and Proposed PAN includes all areas that have some form of protection and covers 16% of the Island. This PAN must also be expanded further, primarily to private land falling outside the current network of Protected Areas and by connecting Protected Areas, in order to better represent the various ecosystem types in Mauritius. For PANES will guide expansion on a well-founded basis, in an efficient manner, and within the context of Mauritian specificities.

The PAN Project brings an ongoing opportunity to bring all relevant stakeholders together in the formulation and implementation of the Strategy. A common Vision for a Protected Area Network (PAN) for Mauritius has been agreed upon, as well as innovative mechanisms and actions on how the Strategy can be implemented. Solid conservation planning provides targets and priorities, and a re-evaluation of the legal and institutional frameworks provides steps for legal and institutional strengthening and reform. An enabling framework has been created so that the Vision can be pursued without delay and outcomes achieved and managed effectively.

[53] 'Ecological integrity' is a relatively new concept that is being actively discussed by ecologists and a consensus has not yet emerged as to its definition. In 1999, the British Columbia Parks Legacy Panel determined that an ecosystem has ecological integrity when 'the structure, composition and function of the ecosystem are unimpaired by stresses from human activity; natural ecological processes are intact and self-sustaining, the ecosystem evolves naturally and its capacity for self-renewal is maintained; and the ecosystem's biodiversity is ensured.'

[54] The PAN Project refers to the GoM/UNDP/GEF 'Expanding coverage and strengthening management effectiveness of the protected area network on the Island of Mauritius'. The project has as its major aims the expansion of the Protected Area Network, as well as improving the management of Protected Areas.

Chapter Two: Vision, Mission Statement and Strategic Objectives for the Protected Area Network Expansion Strategy

2.1 Vision

The Vision serves as a guiding light or ultimate goal that determines the framework for the PANES. The Strategy provides the road map by which it can be pursued. This Vision for the Protected Area Network in Mauritius has been developed by a diversity of stakeholders. Broad-based workshops, working groups and intensive meetings[55] have been held and the country has looked at the Protected Area Network, with the aim of creating a clear Vision, Mission Statement and Strategic Objectives that will provide a guide to all involved, as follows:

Vision for the Protected Area Network

Protect, conserve and restore native biodiversity, natural landscapes and ecosystem services in Mauritius to benefit present and future generations.

2.2 Mission Statement

The Mission Statement was developed with stakeholders in the 2nd National Workshop for the Protected Area Network Expansion Strategy, and is as follows:

Mission Statement for the Protected Area Network

1. Create a Protected Area Network that sustains and protects the natural, social, economic and cultural values of Mauritius.
2. Implement a broad-scale programme of ecological rehabilitation and restoration for the persistence of the native species of Mauritius and the resilience of its ecosystems.
3. Provide opportunities for people to discover, enjoy and appreciate the country's unique nature and to derive benefits from its protection.
4. Ensure the maintenance and provision of ecosystem services and critical ecological functions to enable Mauritius to withstand environmental pressures such as drought, severe storms and climate change in the face of a growing and urbanising population.
5. Engender a love of nature and a deeper understanding of the importance of our critical ecosystems and biodiversity.
6. Set an outstanding example in Mauritius that advances global sustainability initiatives and contributes to a habitable Planet.

[55] National workshops were held in February and November 2015 to discuss the Vision for the PAN, define what Protected Areas are in Mauritius, and also look at the Mission Statement and Strategic Objectives. See the Proceedings of the Visioning Workshop and the Proceedings of the 2nd PANES Workshop. The LIWG and TWG have been active throughout the PANES process. Numerous meetings have also been held with NPCS, FS and other stakeholders to work through the details of formulating the Strategy.

The Vision and related Mission Statement flow logically into the Strategic Objectives for the Protected Area Network Expansion Strategy (PANES).

2.3 Strategic Objectives

The Strategic Objectives derived from the Mission Statement detail specific directions in which effort should be focused for the implementation of the PANES. These Strategic Objectives have been elaborated on during the 2nd National Workshop for the PANES, as follows:

Strategic Objective 1: To establish, expand and maintain a Protected Area Network (PAN) that is representative of ecosystems, safeguards the unique biodiversity of Mauritius and adequately protects its natural assets.

Strategic Objective 2: To apply effective institutional arrangements and ensure continuous and adequate capacity building for the purposes of implementing the Protected Area Network Expansion Strategy (PANES), as well as for updating and further elaboration as may be needed.

Strategic Objective 3: To develop, amend and otherwise continuously improve the legal framework that supports the establishment, maintenance and sustainable use of the Protected Area Network (PAN).

Strategic Objective 4: To develop tools and safeguards to support and ensure the efficient and effective management of all the different Protected Areas that make up the Protected Area Network (PAN).

Strategic Objective 5: To develop innovative programmes and mechanisms to expand the Protected Area Network (PAN) to include all key biodiversity areas as far as possible, including certain private lands.

Strategic Objective 6: To secure funding and to maintain the PAN in its present and future forms as expressed in the PAN Vision.

Strategic Objective 7: To restore indigenous ecosystems as essential components of the country's ecological infrastructure for water, biodiversity and other ecosystem services.

Strategic Objective 8: To unlock opportunities that will bring tangible and intangible benefits to Mauritius, including nature-based tourism, local economic development, especially in the rural areas, and leisure areas and spiritual havens. This includes enabling civil society to mainstream biodiversity and conservation into business practices.

Strategic Objective 9: To disseminate biodiversity information and good practises and influence political and economic decision-makers in favour of biodiversity and conservation priorities for a habitable Planet.

For the purpose of the PANES, Action Categories have been identified under each of the Strategic Objectives, as detailed in each relevant Section of the PANES. All the Strategic Objectives and related Action Categories are compiled together into the Implementation Plan for the PANES. From here-on, Strategic Objectives relating to the contents of a particular chapter will be listed at its start.

Chapter Three: Expanding the Protected Area Network

3.1 Strategic Objective 1

Strategic Objective 1: To establish, expand and maintain a Protected Area Network (PAN) that is representative of ecosystems, safeguards the unique biodiversity of Mauritius and adequately protects its natural assets.

3.2 Conservation Planning

The expansion of the Protected Area Network (PAN) is based on state of the art conservation planning[56]. Conservation planning considers the objectives of representation and persistence as specific conservation targets[57]. Representation[58], persistence[59], irreplaceability[60] and vulnerability[61] are key tenets in conservation planning which results in proposed Expansion Zone Maps. These maps provide a spatial guideline for the expansion of the PAN, and inform urban and infrastructural planning in Mauritius. A limitation affecting the approach to conservation planning in Mauritius is the lack of systematic grid data on biodiversity[62]. Biodiversity data does exist, having been compiled by a variety of specialists with differing levels of research effort applied to different areas.

The biodiversity in the Black River Gorges National Park has been subject to a relatively high level of research, as compared to the forest and shrub land areas in and around Bras d'Eau National Park for instance, which have yet to be thoroughly investigated. In fact, little is known about this area, which is vulnerable and one of the largest remaining dry coastal lowland forests in the Mascarene Islands[63]. Precaution must therefore be adopted when considering biodiversity information in Mauritius, for data gaps and uncertainties exist, with new species and species previously thought to be extinct still being rediscovered[64]. Research effort has been sporadic in other Protected Areas with, for example considerable research being undertaken on Round Island and Île aux Aigrettes, but much less in other Nature Reserves. The valuation of ecosystem services (ES) is underway, most recently so with the revision of the National Biodiversity Strategic Action Plan.

[56] For details please refer to the PANES Support Paper on Conservation Planning.
[57] Margules, C.R. and Pressey, R.L. 2000.
[58] The use of multiple layers of biodiversity to map and classify the features of biodiversity for planning is more likely to result in better representation of most of the features. Adapted from and refer to Margules, C.R. and Pressey, R.L. 2000.
[59] The ability for biodiversity to persist and evolve naturally over a long time is a key consideration in conservation planning. Connectivity between the various Protected Areas will greatly influence the persistence of some of the species in Mauritius. See: Margules, C.R. and Pressey, R.L. 2000.
[60] 'Irreplaceability' can be defined as a value assigned to biodiversity or specific species or habitats that when destroyed or extinct, cannot be replaced.
[61] 'Vulnerability' is the risk of an area to being transformed by extractive uses should protection not be in place, or if protection is inadequately managed and/or enforced. An Island like Mauritius has many development pressures which may take precedence to conservation goals and targets, if no clear protection is given to the features, species and habitats.
[62] Also refer to Desmet, P. 2009.
[63] Pers. Comm. Dr Vincent Florens. University of Mauritius. 22nd April 2015.
[64] Pers. Comm. Dr Claudia Baider. Mauritius Herbarium. 21st April 2015.

3.3 Participatory Approach

Conservation planning and the development of the Strategy at large, was marked by intense stakeholder engagement[65], involving key stakeholders, including NGOs, interest groups, landowners, planners and decision makers. Biodiversity experts in Mauritius were also involved in the sourcing of biodiversity information, as well as the identification of data gaps and uncertainties. Such data was then combined with parameters such as physical slope of the land, proximity of areas to the potential PAN, and vulnerability[66]. Stakeholders were involved throughout the process involving the definition of the PAN, the consolidation of biodiversity information, analysis and conservation target setting. Specifically, the baseline and analysis of parameters were further discussed in the national conservation planning workshops held with stakeholders on the 3rd and the 4th August 2015. In these workshops the parameters were scrutinised and refined, as well as the ratings allocated to various areas within each of the parameters. The updated results of the analyses were further presented and discussed with stakeholders at the national workshop on the 23rd November 2015, inviting final input into the conservation planning.

3.3.1 Defining the expanded PAN

A National Visioning Workshop for PAN was conducted on the 13th February 2015 to define and clarify the aim of the PAN and the extent and parameters that need to be considered for the expansion of the PAN. From the outcomes of the Visioning Workshop, the *desired* PAN was defined as a constellation of areas providing for the conservation of biodiversity and ecosystem services, and extends beyond the limits of formally Protected Areas. The Proposed PAN Map in Figure 11 includes a range of protected areas under some degree of protection, though the level of protection they enjoy will need to be elevated before they can be considered as part of the PAN. These areas are an obvious starting point for the expansion of the PAN and form the official and minimum target for the PAN.

3.4 Consolidating Biodiversity Information

The conservation planning conducted during the Phase 1 of the PAN Project was taken into account, and the most current biodiversity information incorporated in the conservation planning for the PANES. In short, the biodiversity information used in the spatial analyses include the conservation planning maps from phase 1 of PAN[67], forest mapping and grades study[68], recent Key Biodiversity Areas[69] identified for Mauritius, wetlands, marshlands and inland water bodies from the Environmentally Sensitive Areas (ESA) dataset[70] and the Important Bird Areas (IBAs)[71] for Mauritius. Coastal biodiversity was also included as a variable and includes mangroves, coastal vegetation, coastal rocks and beaches, as sourced from the Land Cover Data[72]. Additional biodiversity information

[65] Refer to further detail in the *Support Paper: Conservation Planning for the Protected Area Network Expansion Strategy for Mauritius.*
[66] Vulnerability relates to biodiversity areas that would be vulnerable if no conservation action was not in place. Desmet, P. 2009.
[67] Desmet, P. 2009.
[68] Page, W.S. and D'Argent, G. 1997.
[69] Critical Ecosystem Partnership Fund (CEPF). 2014. Page 39.
[70] Ministry of Environment (MoE). 2009. Note: This document is currently being updated by the MSSNSESD.
[71] Safford, R. and Hawkins, F. 2013.
[72] GIS data commissioned by United Nations Development Programme (UNDP). 2015.

showing the location of Critically Endangered[73] plant species was sourced from the Mauritian Wildlife Foundation (MWF)[74]. More specifically the distribution of *Diospyros chrysophyllus* and *Diospyros leucomelas* was mapped by MWF.

Botanical gardens and green urban areas sourced from the Land Cover Data were noted during data gathering, as some host either important diversity and/or ecosystem services. Additional biodiversity information gained from the stakeholder consultation process was also considered and mapped. Since the additional biodiversity information was not all scientifically collected, it was not included into the spatial analyses, yet was used as a reference during the analyses and identification of the expansion areas. The point locations of Critically Endangered plant species have also not been included in the spatial analyses, as these point locations are not yet described as spatially delimited areas.

3.5 Spatial Analysis

The geographic information system (GIS) spatial analysis makes use of 4 spatial parameters to map the highest and lowest areas of sensitivity and/or importance, including:

1. **Biodiversity:** existing biodiversity data from various sources was used to determine areas of high biodiversity value that can be a basis for prioritising potential expansion areas;

2. **Proximity to the potential PAN:** areas in close proximity to the potential Protected Area Network are prioritised in terms of expansion potential, with the closest areas being allocated higher values than more distant areas;

3. **Slope:** areas with steeper slopes are valued more highly for expansion than areas with gentle slopes, since remnant biodiversity in Mauritius correlates to areas of steeper slopes that remain relatively inaccessible; and

4. **Vulnerability:** is defined as the vulnerability of biodiversity areas under threat if no conservation action was in place. Two spatial variables are used to determine this indicator, a) distance from the coast (areas closer to the coast tend to be more prone to development), and b) distance from urban areas (the closer to urban areas, the more vulnerable natural areas become). These two variables are combined to indicate vulnerability of the biodiversity, as represented in that spatial parameter.

Variables within each parameter are rated[75] spatially on a scale of 1 to 5, with the value of 5 representing the highest expansion priority and the value of 1 representing the lowest expansion priority. The biodiversity parameter is weighted by 2, while all the remaining parameters have a weighting of 1, as was decided in the mapping validation workshop with NPCS and FS on the 4th August 2015.

[73] The IUCN Red List of Threatened Species for Mauritius has recently been revised in Mauritius.
[74] Mapping received from Mauritian Wildlife Foundation in July 2015.
[75] Refer to further detail in the *Support Paper: Conservation Planning for the Protected Area Network Expansion Strategy for Mauritius.*

Since four spatial parameters have been identified, with the biodiversity parameter being weighted twice as high as the others, the highest Expansion Priority Index value that can be attained is 25. The entire surface area of Mauritius was rated along a differential scale from least to most important, following established conservation planning methodology. The result is visible in a composite Expansion Priority Index from 3 to 25, values below 3 having limited biodiversity value. The Expansion Priority Index Map (Figure 13) illustrates the EPI with the highest priority expansion areas indicated in red. The lowest EPI value is 3, which is of no importance for Protected Area expansion.

The Expansion Priority Map shows a range of priority values between the upper and lower limits. The higher the priority level, the more intense the shade of red on Figure 13. As one slides up and down the priority scale the size of the surface area would obviously change.

The Expansion Priority Map shows that there are areas with significant biodiversity value beyond the existing and proposed PAN. They can be incorporated into the PAN when practical and feasible. Much of this land belongs to the private sector and this land can be viewed as land for ***potential*** inclusion in Protected Area Network at some point in time, when conditions are favourable for this to happen, and these lands are referred to as ***Potential Areas for Inclusion in the PAN***. Initiatives to incorporate such lands into the PAN should be encouraged and the PANES provides guidelines for how this can be approached.

How should we approach these further areas for potential inclusion into the PAN? They exist and they are important. However, not all of them are equally important in terms of biodiversity. Therefore, different expansion priorities can be set based on the how important the different areas are in terms of biodiversity.

Figure 14 presents further areas that can potentially be added to the Proposed Protected Area Network (see Figure 11). These additional areas contain significant biodiversity in the top bracket of lands with important biodiversity, namely 20 - 25 (see Expansion Priority Index map, Figure 13). These lands add another 4, 529 ha to the proposed PAN, or 2.4% of the surface area off Mauritius, bringing the total to just over 18%.

Figure 15 presents further areas of potential inclusion when more areas with high biodiversity is included albeit starting from a lower Expansion Priority Index value of 13, the point that falls midway between the very low biodiversity values and the highest biodiversity values. These potential inclusions will add 17,231 ha, or 9.2% of the country to the future PAN, bringing the total to 25.2% of the country.

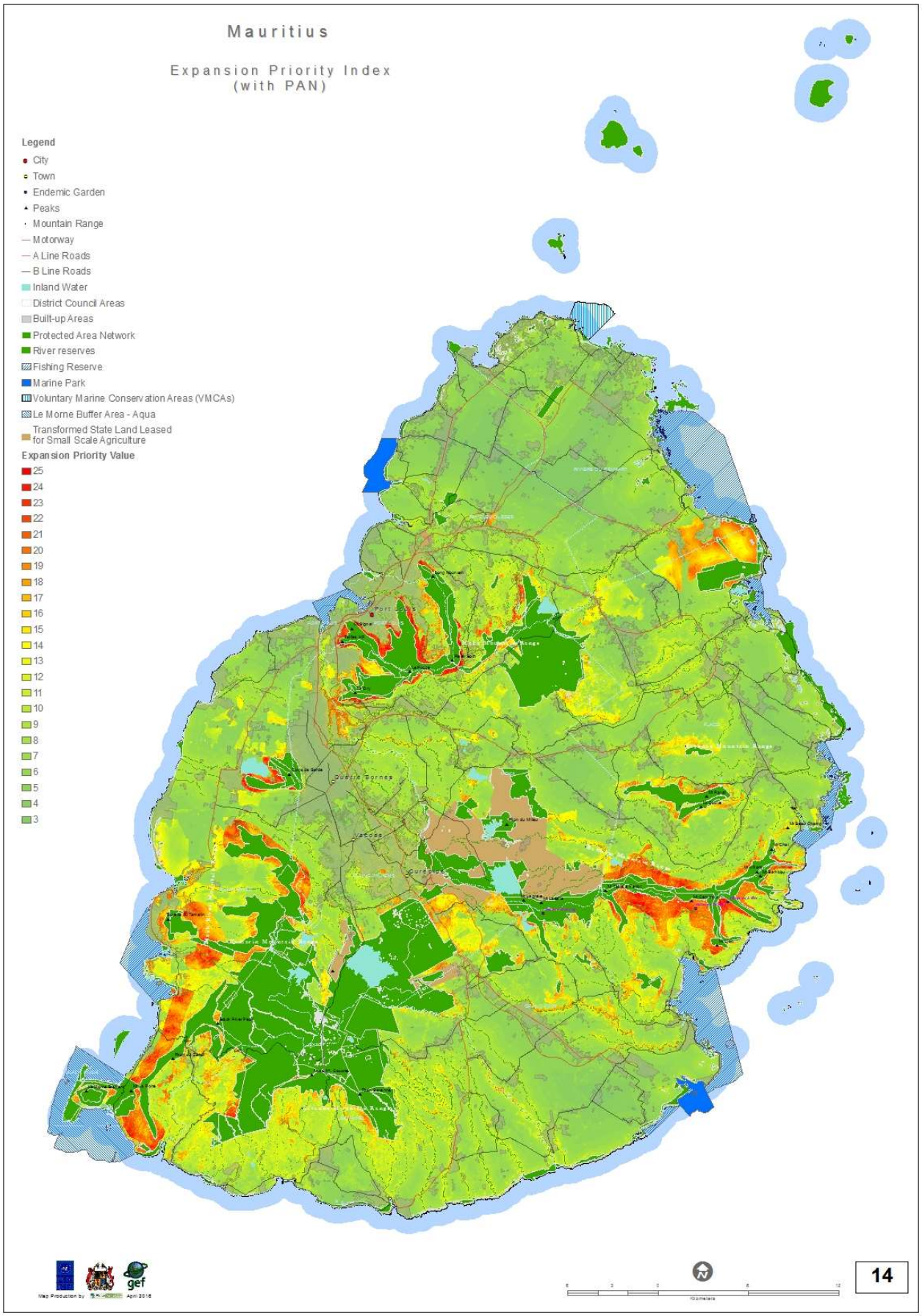

Figure 13: Expansion Priority Index Map for the Protected Area Network, showing the areas of high biodiversity that fall outside the Proposed Protected Area Network (dark green)

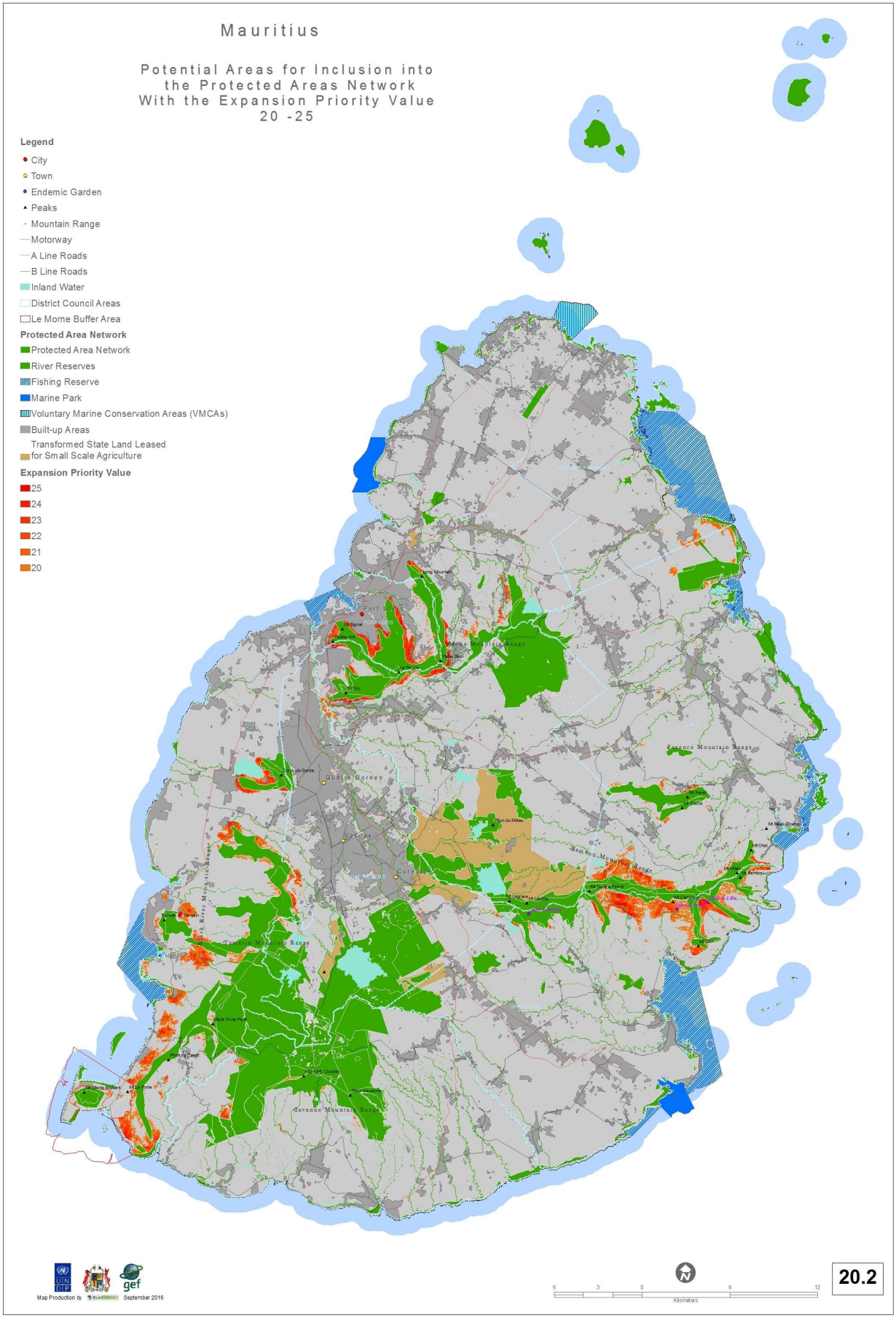

Figure 14: The areas shaded in orange to red represent areas of high biodiversity (values of 20 -25 on the Expansion Priority Index) while green present the target known as the Proposed Protected Area Network

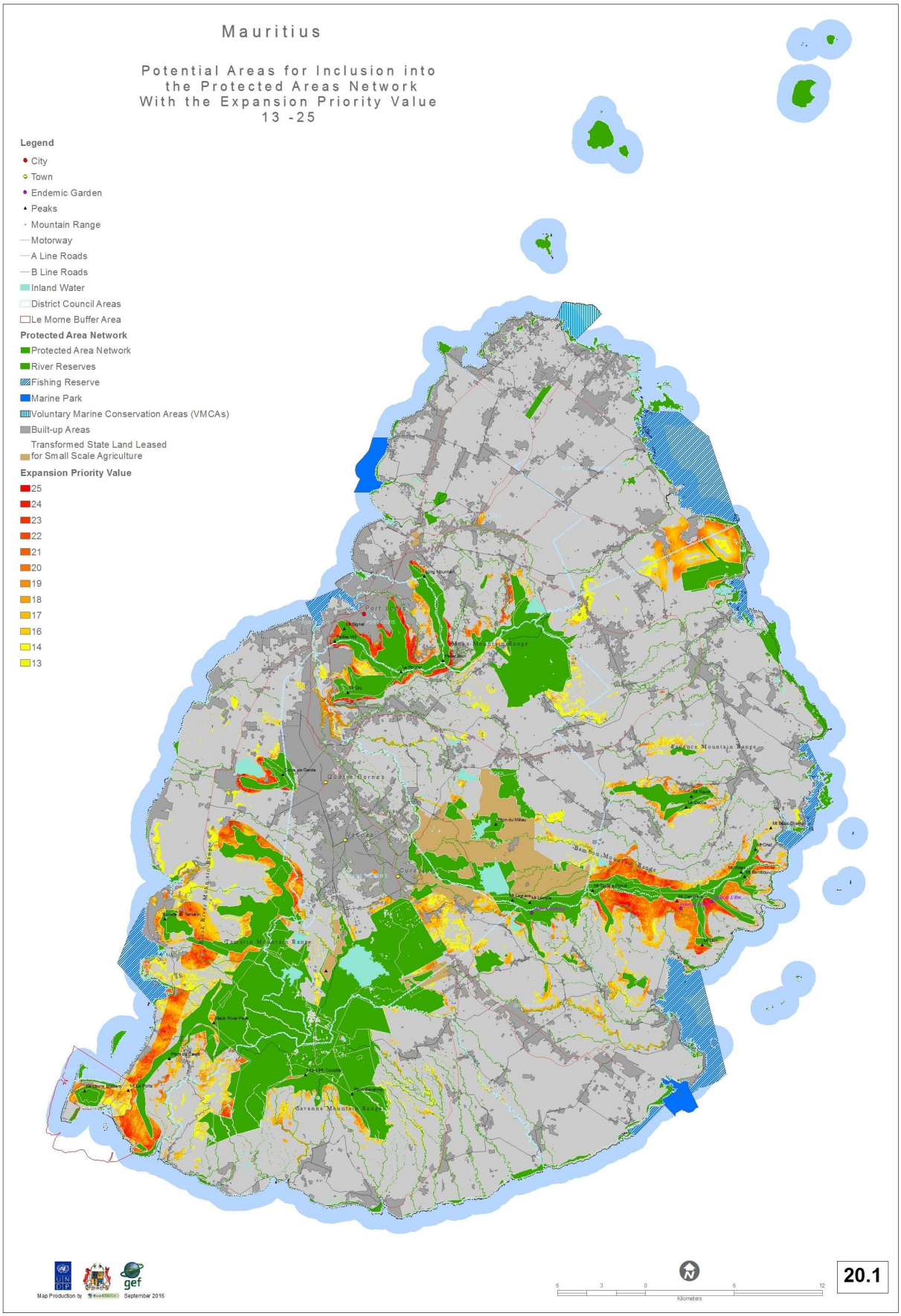

Figure 15: The areas shaded in orange to red represent areas of moderate to high biodiversity (values of 13 -25 on the Expansion Priority Index) while green present the target known as the Proposed Protected Area Network

Figure 16 takes the areas for potential inclusion in Figure 3b and connect them through corridors (see also Section 3.7) which is an established principle in conservation planning. The resulting area, presented in yellow, covers about 30% of the country. Although the Proposed PAN is the official and immediate target, bringing the Protected Area Network to cover 16% of the country, it is further proposed that the yellow area, referred to as the Potential PAN for short, is what the country aspires to protect[76].

All areas with unique biodiversity are vulnerable and should be considered high priority conservation areas. They will likely to be lost to conservation if present land use trends continue. These areas cannot easily be replaced and their loss could severely impact the achievement of Mauritius' conservation targets. Such zones should receive special attention during town and regional planning, as well as the implementation and formation of biodiversity corridors and stepping stones. It is important to note that initiatives to the proposed and potential PAN can occur in parallel.

The bulk of high biodiversity land beyond the 16% target (indicated in Figure 11) is under private ownership (the areas indicated in yellow in Figure 16). However, the Protected Area Network can be expanded onto this private land through the Biodiversity Stewardship Programme through participation and commitment from private landowners. The newly passed Native Terrestrial Biodiversity and National Parks Act of 2015 makes provision for such cases where conservation use of land is desired. The Biodiversity Stewardship Programme is one of the tools of this Strategy that can enhance conservation in Mauritius.

The future PAN is not only a noble but essential objective that will lead to the adequate protection of our biodiversity and ecological systems. Significant resources, political will and collaboration between stakeholders will be necessary to achieve the target depicted in Figure 11, and to expand it further into the yellow areas indicated in Figure 16 as opportunity may allow. Likely not all of the areas shown will end up being part of the PAN in the future. It is also possible that further areas may be added as new information comes to light. The PANES is after all a Strategy and not a detailed spatial plan for Mauritius. Conservation planning provides broad guidelines that can only be refined through ground truthing. The biodiversity network across Mauritius is an evolving one, and undoubtedly will improve biological connectivity and enhance ecosystem resilience.

As far as possible, expansion efforts must seek to create a representative and ecologically functional Protected Area Network in the most effective and efficient manner possible. Within this context, initial efforts should focus on land that can be most easily and quickly secured. Given the challenges that will be encountered in expanding the PAN, it is important that efforts be focussed on achieving as much as possible in as short a time as possible to consolidate easily available areas of the potential PAN as corridors or stepping stones; such areas being examples of 'low hanging fruits'.

Private landowners and the public need to gain an understanding of the PAN expansion programme, and develop a level of trust in it, on the basis that when it succeeds in its objectives the PAN will provide benefits to all landowners, land-users and the country at large. Opportunities to secure land for conservation purposes that are relatively simple should be emphasized initially, with more complex arrangements being developed as the programme progresses. The highest priority expansion areas

[76] In the preparation phase of the PAN, conservation planning proposed that 30 – 35% of the country be protected, which is not as much as the 42% of the Seychelles. It is generally accepted that the global Aichi Target may not be sufficient for small islands with fragile ecosystems that may not recover easily.

must receive urgent attention but again, PAN Expansion is not a linear process and advances are in part led when the opportunity arises.

An Expansion Priority Index value of 13 and up, for instance, covers roughly 30 % of the mainland and surrounding islets area of Mauritius. This means if all areas that have a value of 13 and up would be declared as Protected Area, that the Protected Area Network would cover 30% of Mauritius. While the corresponding global CBD target of 17% of land area under protection can be used as a yard stick[77], all remaining habitat in Mauritius with some biodiversity value should be considered important. It is worth noting that the conservation planning conducted in PAN Phase 1, envisaged that between 30 and 35% of the land area ideally needs to be included in the PAN[78].

The Expansion Priority index is a useful tool to view different percentages of high biodiversity land at the push of a button. For instance, we used the Expansion Priority Index to indicate what areas would fall in the PAN if the most valuable 30% of Mauritius could be designated as Protected Area. This does not mean the target is now 30% - the tool simply provides an instant and very useful spatial picture in terms of informing land use planning, etc. The Potential Areas for Inclusion into the PAN, indicated by yellow in Figure 16 is based on this 30% figure. It does not mean they have to be included in the PAN; however, the fact that those areas fall in this 30% should indicate to anyone that they have high biodiversity value and should be treated accordingly.

3.6 Conservation Targets

The PANES conservation planning is the spatial analysis of land areas that have important potential for expansion of the PAN. The currently existing formal State Protected Areas in Mauritius cover only 4.4% of the land area or a total area of 8,325 ha. The spatial target in the PAN Project Document was set as expanding areas under formal protection by an additional area of 6,893 ha. The PAN Project has aimed to achieve 14,920 ha or 7.4%[79] of land area under protection and effective management. The PANES indicators and targets, as well as what targets can be achieved as Expansion Zones on State Forest Land, other State Land and private land, are summarised below.

[77] The 17% yardstick is an arbitrary value more on political will rather than scientific evidence. Noss and Cooperidge (1994) and other researchers conclude that between 25 to 75% of the world's lands and waterways would need to be protected in order to maintain biodiversity and ecological processes. We should therefore aim for the 32%.
[78] Refer to Desmet, P. 2009. Page 45.
[79] Government of Mauritius (GoM)/United Nations Development Programme (UNDP)/Global Environmental Fund (GEF) Project Document. 2010. Page 32.

Table 4: PAN Project[88] Outcome 1 with Spatial Indicators, Baseline and Targets

Objective / Outcomes	Spatial Indicator	Baseline	PAN Project Targets	Proposed PANES Targets[80]
Objective *Expand, and ensure effective management of the Protected Area Network to safeguard threatened biodiversity*	Land coverage (ha) of the formal Protected Area Network on mainland Mauritius and the islets: State Protected Areas[81] Private Protected Areas[82]	 8,027 ha 0 ha	 11,700 ha 3,220 ha	 ≈23,000[83] ha 6,540[84]ha
Outcome 1 *Systemic framework for PA expansion improved*	Number of 'Land Types'[85] included in the PAN	8 of 16	12 of 16	15 of 16
	Ecological corridors and marine-land linkages incorporated into the PAN	None	2 (1 in South; 1 in North)[86]	3
	Number of rare and threatened plant species (of 231 with a known distribution) having at least 1 wild population represented in the PAN. Previously considered extinct Extirpated in the wild Critically Endangered Endangered Vulnerable	 2 1 44 25 62	 6 2 70 33 71	To be determined[87]

Table 4 is extracted from the PAN Project Document that details project Outcome 1, with spatial indicators, targets and long term possibilities for the PAN. The spatial results possible in the long term

[80] Refer to further detail on the areas measured in the *Support Paper: Conservation Planning for the Protected Area Network Expansion Strategy for Mauritius.*

[81] State Protected Areas will be greatly increased through areas already under some level of protection for which management efficiency can be increased so they can be included into the PAN. Those areas are denoted in Fig 2b and Fig 10 as the official and minimum target for PAN expansion.

[82] Private Protected Areas will be encouraged and supported through a Biodiversity Stewardship Programme.

[83] This rounded value includes all state protected areas as per Table 2.

[84] The figure represents the total of all Mountain and River Reserves as per Table 2. However, the value can change depending on the willingness of the private sector to incorporate land into the PAN through the Biodiversity Stewardship Programme or other incentives

[85] The following land types have been classified for the mainland: Central intermediate lava plateau; Central late lava plateau; Chamarel inter-mountain valley flat & slopes; Eastern coastal valley flats & slopes; Late lava plains & inland slopes; Lower mountain slopes; NE, E & southern intermediate lava plains & slopes; NW intermediate lava plains & slopes; Riverine lands; Sand beaches & dunes; Western coastal valleys, plains & slopes; Central uplands early lava plains & slopes; Inland water body; Old volcanic mountain & gorges; Coastal salt marshes; and Lakes.

[86] The targeted areas are: (i) the southern corridor stretching from the SW of the Island (Le Morne/Souillac /Chamarel) across to the Bambous Mountains; (ii) the northern corridor stretching from the NE (Le Pouce/Port Louis) across to the Aubin/Roches Noires area, and (iii) the Bel-Ombre area, where efforts are underway to link the mountain forest to the lagoon and coral reef).

[87] Rare and threatened plant species will be assessed and determined as part of further PAN Project activities.

[88] Government of Mauritius (GoM)/United Nations Development Programme (UNDP)/Global Environmental Fund (GEF) Project Document. 2010. Page 48.

for PANES conservation planning are detailed above, as a possibility for Mauritius, showing an estimated result of what can be aspired to in a practical sense over time.

The PANES targets exceed those given in the PAN Project Document, with the addition of 'State Forest Lands and other State Land' proposed for inclusion into the PAN. The PAN can be expanded further gradually, to include additional high biodiversity land through a biodiversity stewardship programme that will eventually exceed the Aichi Target. The setting of these higher targets shows that Mauritius takes the restoration of ecosystem services seriously. Such services must be protected at all costs, particularly on a small island. Options have been identified for the proclamation of a variety of Protected Areas and biodiversity stewardship areas, on both state and private land. Including such lands will further help to secure ecosystem services.

Expansion Target for the Protected Area Network (PAN)

The current Protected Area Network (PAN) covers 8,325 ha or 4.4% of the mainland area of Mauritius and islets.

The Existing and Proposed PAN covers roughly 29,867 ha or 16% of the mainland area of Mauritius and islets. This is close to the 17% CBD Aichi Target.

3.7 Biodiversity Corridors and Stepping Stones

Expansion of the PAN, specifically through biodiversity stewardship on private land, will strengthen the creation of biodiversity corridors and biodiversity stepping stones, establishing linkages between different Protected Areas, as well as between the terrestrial and marine environment. This is especially the case with River Reserves, which already provides connectivity between various ecosystem types and Protected Areas. This broadening biodiversity network across Mauritius will improve biological connectivity[89] and enhance ecosystem resilience[90].

3.8 Expanding the PAN beyond the Proposed PAN

The Expansion Priority Index allows for pragmatism and flexibility in terms of target setting as circumstances change through time. Lands with different levels of priority can be identified through setting a higher or lower threshold value on the Expansion Priority Index. In cases where private lands have exceptional biodiversity, special effort can be taken through the biodiversity stewardship programme to encourage voluntary expansion of the PAN.

By now it should be clear that there are two sets of areas involved in the expansion of the PAN. They are distinguished by different land ownership regimes, different levels of protection they currently enjoy, and the processes that will lead to their inclusion into the PAN.

The Proposed PAN map (Figure 11), which is the official target, shows state land that can be included into the PAN as well as areas of private land. On the other hand, the yellow area in the map for

[89] 'Biological connectivity' refers to the degree to which the landscape within the PAN facilitates or impedes the movement of species and seeds. The degree of such connectivity determines the amount of dispersal, which influences gene flow, local adaption, risk of extinction and the potential to move as species cope with climate change.

[90] The IUCN defines 'ecosystem resilience' as the capacity of the ecosystem to return to the state prevailing prior to a natural disturbance, such strong wind and fire, or in the contemporary context, the effects of climate change.

Potential Areas for Inclusion into the PAN (Figure 16) includes private land not categorised as Mountain and River Reserve.

The Potential Areas for inclusion into PAN Map shows the total area that should ideally be in the PAN. If the Existing PAN, the Proposed PAN and in yellow Expansion Zones on Figure 16 are added together, they cover roughly 30% of the total terrestrial surface. By far the greater part of the Expansion Zones, as illustrated in yellow on Figure 16, are private lands that can be included in the PAN on a voluntary basis.

The Proposed PAN is a given as a target for PAN expansion, and will bring the country close to the Aichi Target with the percentage of surface effectively protected being 16%. However, there are further areas of high biodiversity value, based on their threshold value on the Expansion Priority Index, regardless of land ownership. Both state and private land areas contain areas of high biodiversity value, and considering how easily biodiversity can be lost and ecosystems damaged, it is not appropriate to focus on state-owned land only for expanding the PAN.

The new Native Terrestrial Biodiversity and National Parks Act of 2015 provides for the designation of Private Reserves, thus enabling the highest category of land that can be incorporated under the Biodiversity Stewardship Programme[91] as land conserved for conservation use.

All lakes, reservoirs and wetlands, together with their water catchment areas are critical in protecting fresh water supply in Mauritius, and should be considered high priority areas for incorporation as Protected Areas.

3.9 Linking to the Marine Environment

The PAN extends along all River Reserves thus already strengthening the links to the marine environment. The Marine Protected Areas, Fishing Reserves, Le Morne Lagoon Buffer Zone and Voluntary Marine Conservation Areas can be managed under the PAN, and can eventually lead to inclusion of the marine component. The PANES strengthens linkages to the marine environment in the southwest around Le Morne, the Bel Ombre area in the south, and the Bambous Mountains in the southeast, where adjacent rivers reach the coastline.

[91] Refer to further detail in the *Support Paper: Developing a Biodiversity Stewardship Programme for the Protected Area Network Expansion Strategy for Mauritius.*

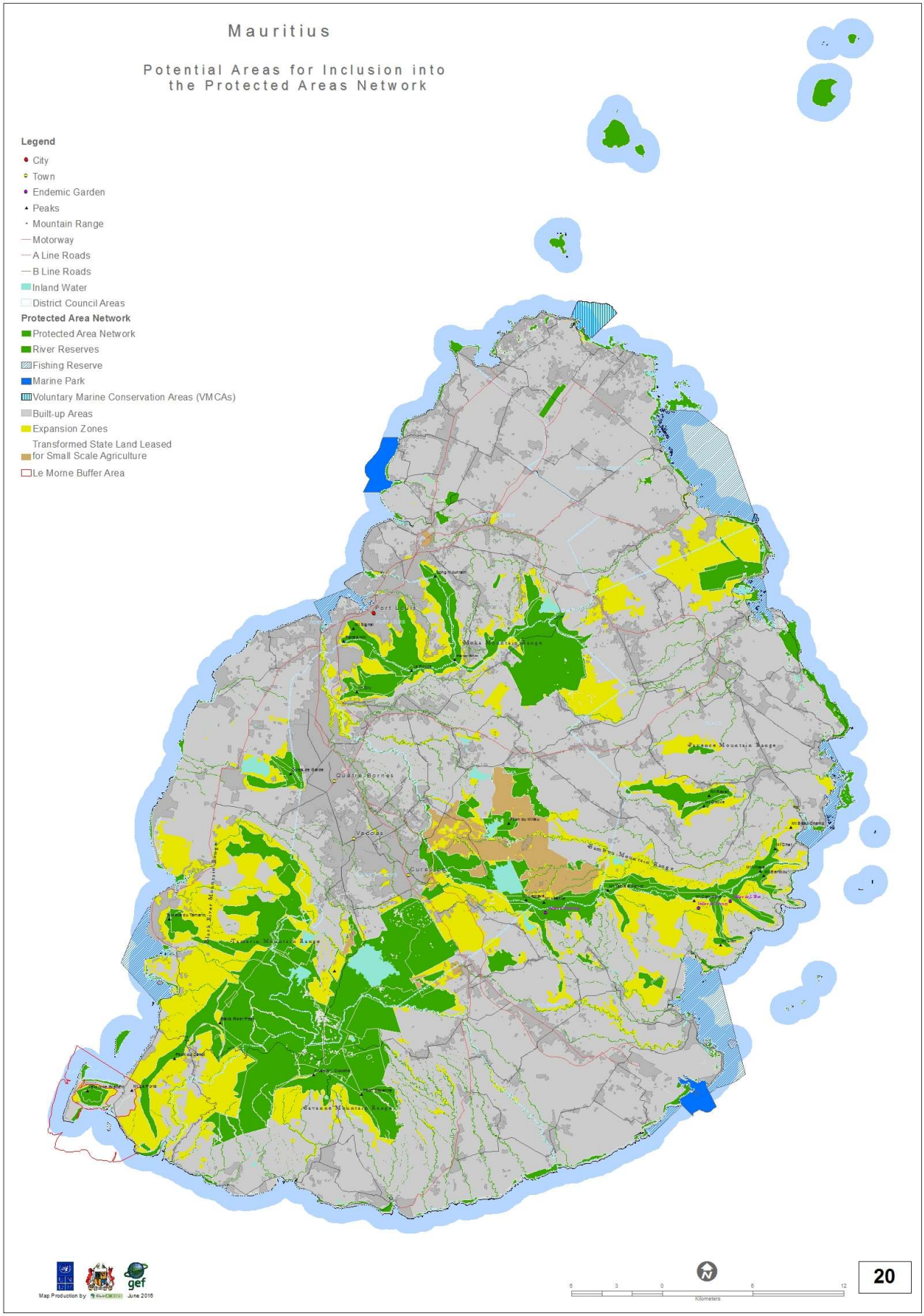

Figure 16: The Potential Expansion Zones (yellow) and Proposed Protected Area Network (green)

3.10 PANES Map Set

The PANES map set includes 35 maps[92] developed during the conservation planning. Maps developed during the analyses include 21 expansion analyses layers and a further 14 map tiles, at a scale of 1:25 000, showing the Expansion Index.

The spatial analysis mapping includes a Base Map, the Existing PAN and Proposed PAN Maps, and the Potential Areas for Inclusion in the PAN Map. There are various spatial parameter maps, culminating in the Expansion Priority Index Map and Expansion Potential Index Map. The Potential Areas for Inclusion into the PAN Map is the result of the spatial analysis, and reflects a threshold value on the Expansion Priority Index (EPI) of 13. The EPI is a dynamic tool, and it can be used to produce maps showing areas of varying degrees of priority. The Potential Areas for Inclusion into the PAN is also mapped at a scale of 1:25 000, showing the Expansion Priority Index values.

The Expansion Priority Index is mapped at a scale of 1:25 000, resulting in 14 map tiles across the Island of Mauritius, including all the islets. Expansion Zones are demarcated by considering the Land Cover Data, showing areas of varying priority according to the Expansion Potential Index. These proposed Expansion Zones can be adopted into Development Strategy Maps in the respective Outline Planning Schemes, and allow for improved land-use decision making, as related to the expansion of development and urban areas in relation to the expansion of Protected Areas in Mauritius. The 1:25 000 maps show both priority and landownership. The area of the Expansion Zones is presented on each respective map to aid in the implementation of expanding the PAN.

3.11 Action Categories

3.11.1 Establish a Conservation Planning Unit

A Conservation Planning Unit should be set up as soon as possible. The unit can start investigating which high priority areas need to be incorporated in the PAN. Fine-scale mapping can also be conducted to more specifically refine the boundaries of such expansion areas. Sufficient resources will need to be set aside to achieve this. The PAN Project Management Unit (PMU) can facilitate the establishment of this unit and can initially provide resources, as well as facilitate training for the members of the unit. Cost effective operational considerations must be explored from the outset, in order to reduce unnecessary future costs associated with operating GIS with conservation planning capability. Partnerships with other stakeholders must be built, as part of knowledge management.

3.11.2 Conduct Research and Biodiversity Assessment

There are a number of information gaps and research priorities which can provide guidance in support of the effective implementation of PANES. Much information exists and this needs to be compiled into a coherent and accessible database, forming an important part of knowledge management for the PAN. It is well noted that efforts to 'ground-truth' the Environmentally Sensitive Areas mapping is underway, and this together with any other current studies, must of course be factored into the proposed studies below.

Specific studies to be undertaken should include:

[92] Refer to further detail in Appendix 2 of the *Support Paper: Conservation Planning for the Protected Area Network Expansion Strategy for Mauritius.*

1. Socio-economic research is required, especially around the willingness and cost benefit to private sector stakeholders forming part of the PAN;

2. Biodiversity sensitivity assessment of inland freshwater and coastal ecosystems, with a strong emphasis on retaining all remaining natural habitats and restoring habitat. Specifically, a national riverine assessment is needed to determine the most important and vulnerable rivers and riverine corridors requiring protection and active rehabilitation;

3. An ecosystem evaluation provided by natural habitat in Mauritius in an effort to demonstrate the long-term value of the PAN, its expansion and the associated ecological restoration work that has been and needs to be undertaken;

4. A study on the impact of Climate Change on the native biodiversity in Mauritius

5. The forest grades study completed by Page and D'Argent in 1997 should be updated to include the most recent 'ground-truthing' done by the MSSNSESD in ESAs, as well as areas that are being rehabilitated within the PAN Weeding Programme and those restored under other programmes; and

6. A national coastal biodiversity study to include recent work conducted by the Fisheries Department on the study of mangroves and coastal biodiversity, including wetlands, to determine coastal biodiversity sensitivity and grading of the highly vulnerable coastal ecosystem.

Chapter Four: Enabling the Governance Framework

4.1 Strategic Objectives 2, 3 and 4

Strategic Objective 2: To apply effective institutional arrangements and ensure continuous and adequate capacity building for the purposes of implementing the Protected Area Network Expansion Strategy (PANES), as well as for updating and further elaboration as may be needed.

Strategic Objective 3: To develop, amend and otherwise continuously improve the legal framework that supports the establishment, maintenance and sustainable use of the Protected Area Network (PAN).

Strategic Objective 4: To develop tools and safeguards to support and ensure the efficient and effective management of all the different Protected Areas that make up the Protected Area Network (PAN).

4.2 International Conventions

Mauritius has remained an active supporter of conservation by being a signatory to many International Conventions that support the protection of biodiversity, specifically to the Convention on Biological Diversity (CBD) (Rio, 1992), which states that each contracting party shall, as far as possible and as appropriate:

- *Establish a system of protected areas or areas where special measures need to be taken to conserve biological diversity;*
- *Develop, where necessary guidelines for the selection, establishment and management of protected areas or areas where special measures need to be taken to conserve biological diversity;*
- *Regulate or manage biological resources important for the conservation of biological diversity whether within or outside protected areas, with a view to ensuring their conservation and sustainable use;*
- *Promote the protection of ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings; and*
- *Rehabilitate and restore degraded ecosystems and promote the recovery of threatened species, inter alia, through the development and implementation of plans or other management strategies.*

Mauritius is also a signatory to various other International Conventions relating to biodiversity conservation, including:

1. African Convention for the Protection of Nature and Natural Resources (1968);
2. Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar, 1971);
3. Convention for the Protection of the World Cultural and Natural Heritage (1972);
4. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (1973);

5. Vienna Convention for the Protection of the Ozone Layer (1985);
6. Montreal Protocol on Substances that Deplete the Ozone Layer (1987);
7. UN Framework Convention on Climate Change (UNFCCC) (1992);
8. Convention on Migratory Species (1994);
9. Convention to Combat Drought and Desertification (UNCCD) (1995);
10. Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region (Nairobi, 1995);
11. Kyoto Protocol to the United Nations Framework Convention on Climate Change (1997);
12. Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (PIC) (Rotterdam, 1998);
13. African Eurasian Water Bird Agreement (1999);
14. Cartagena Protocol on Biosafety to the Convention on Biological Diversity (CBD) (2000);
15. Convention on Persistent Organic Pollutants (POPS) (Stockholm, 2001);
16. Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilisation (2002); and
17. Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation to the Convention on Biological Diversity (2014).

In cases where national laws have not been specifically developed under the relevant international convention, such conventions remain binding on the nation. In time, laws can be developed in areas that require specific management and regulation.

4.3 National Strategies and Laws

Several strategies and laws have been developed in Mauritius, some of which were developed before the country became a signatory to the relevant conventions. This has resulted in some retrospective amendments being made to the legislation in order for the country to comply with the requirements in the conventions. This section highlights the key issues that are directly linked to the PAN for Mauritius, and proposes specific legislative amendments[93].

4.3.1 National Development Strategy

Planning legislation is primarily guided by the National Development Strategy (NDS) for Mauritius, which remains relevant until 2020. The NDS provides guidelines for planning and implementation across all sectors, based on targets that are set for each of the thematic areas, biodiversity conservation being one such thematic area. The consideration of the PANES and the inclusion of the proposed Expansion Zones in the revision of the NDS would go a long way to strengthening the profile of the environmental and ecosystem restoration requirements, ensuring that the future economy of Mauritius is well founded on ecosystems that are more resilient to climate change and on the sustainable use of natural resources.

The National Development Strategy (NDS) makes provision for the creation of green open spaces in and around urban areas to improve urban development. Such green wedges or green open spaces act as important social areas within high development density urban areas. The value of such landscapes is important in improving the quality of life of all Mauritians, who live predominantly in urban

[93] Refer to *Support Paper: Legal Review for the Protected Area Network Expansion Strategy for Mauritius.*

settlements. Opportunities for further creating these spaces could be looked at with public private partnerships, collaboration with developers and other funds, like the National Environmental Fund.

The NDS also classifies the southwest areas around the Black River Gorges and the Savanne Mountain range as a natural zone. Strategically, this zone should have environmental improvements to leisure, recreational and education facilities with no development within the PAN other than those that meet key environmental and landscape criteria, and which are approved.

The NDS also identifies Environmentally Sensitive Areas (ESAs) as natural assets for the nation that should be managed and protected to achieve sustainable development. Preliminary mapping of the ESAs was done by the Ministry of Housing and Lands, and detailed maps and verification was done through a study commissioned by the Ministry of Environment. The NDS also acknowledges the need for urgent protection and management of ESAs such as wetlands, lagoons, mountains and natural areas that are under pressure from development. Many of these areas fall within privately owned land and as such, the NDS calls for innovative ways to incentivise private landowners to implement good management practices on Mountain and River Reserves[94]. In addition, the NDS also calls for the inclusion of areas of outstanding natural beauty as part of the ESA identification exercise. In addition, the need for blue/green corridors has also been identified in the NDS – open space corridors and gardens which can be used to further support biodiversity protection through and in urban settlements. The NDS therefore endorses and promotes the protection of the natural areas for their national and global significance. The NDS provides a firm platform on which to implement the PANES.

Mauritius has a number of other national policies relating to biodiversity protection, all of which are relevant to the PANES and include the:

1. *Forest Policy (2006)*
   The Forest Policy is highlighted as a key document that deals with the management of State Forest Lands for the protection of ecosystem services. These lands are an essential component of the PAN and biodiversity protection and effective management of these lands should be considered during the current review of the Forest Policy.

2. *National Biodiversity Strategic Action Plan (2006 – 2015)*
   The National Biodiversity Strategic Action Plan (NBSAP) for Mauritius sets out prioritised activities, with structured goals and targets, as determined by extensive stakeholder consultation and input. They share common working principles centred on in-situ conservation and ecosystem approaches. Activities are based on the development of representative and viable protected area networks, the control of invasive alien species, the management of key components of biodiversity, the enhanced identification & monitoring of biodiversity and mechanisms to enable sustainable use through ecotourism development and sound management of natural resources.

[94] The National Development Strategy (NDS) specifically states that 'Funding from new development or redevelopment (for example via the National Environment Fund) could be used to increase and enhance tree cover and offer a financial incentive for owners to maintain natural assets which would benefit all Mauritians. It may be that State control of forests is the best management mechanism to ensure forest longevity and protection of particular rare and endangered species. Wider planning obligation mechanisms should be used particularly if new developments benefit from a backdrop of tree cover or utilise tree cover as part of the ambience of a leisure or recreational experience (for example in the hunting and shooting reserves).' Government of Mauritius (GoM). 2003. Page 142.

3. *National Invasive Alien Species Strategy and Action Plan (2009 – 2018)*
   The National Invasive Alien Species Strategy and Action Plan (NIASSAP) represents a coordinated approach to the management of the IAS threat in the country. This initiative recognises the roles and responsibilities of all levels of government in regulating the management of IAS and the importance of the involvement of non-governmental and civil society organisations, the private sector and the general public. The importance of regional and international cooperation to enhance actions undertaken at national and local levels is emphasised, given the Republic of Mauritius' status as a Small Island Developing State (SIDS).

4. *National Climate Change Adaptation Policy Framework (2013)*
   The National Climate Change Adaptation Policy Framework (NCCAPF) highlights the importance of adaptation to Mauritius, forecasting that half of the islands' beaches could disappear by the middle of the century. Such an event would be disastrous for both coastal ecosystems and for the economic prosperity of the island, which relies heavily on tourism. The NCCAPF also suggests that water scarcity is likely to increase, predicting a 13% reduction in island water resources by 2050. It highlights the importance of looking after ecological infrastructure, much of which is contained in the PAN.

4.3.2 Native Terrestrial Biodiversity and National Parks Act of 2015

The Native Terrestrial Biodiversity and National Parks (NTBNP) Act of 2015 has replaced the Wildlife and National Parks Act of 1993. The NTBNP Act proposes significant changes involving the implementation of the Convention on International Trade in Endangered Species (CITES) and the protection of biodiversity on private land through the designation of Private Reserves. Sections 12, 13 and 14 of the Act enable the Minister to establish Private Reserves on private land. This provides the legal mechanism for biodiversity conservation on private land, and enables Protected Area expansion.

It has been pointed out by Legal and Institutional Working Group (LIWG) members, as well as other parties, that the danger exists that landowners may destroy biodiversity to prevent their land being declared as Private Reserves. Therefore, great care should be taken to explain the NTBNP Act to all stakeholders. More clarifications and reassurances are required to ensure that that the Act's provisions on Private Reserves do not have adverse consequences. Administration of the Biodiversity Stewardship Programme provides a framework according to which to implement the new Private Reserves. Great care should however be taken when implementing the proposed Biodiversity Stewardship Programme, and to proceed in a highly collaborative manner in order to build trust and mutual benefits.

Private landowners are now able to explore opportunities in terms of having Private Reserves designated on their land. Like other landowners they can apply for licences to conduct nature-based tourism on their land and benefit from being a PA. Such permissions should be contingent on the approval of biodiversity management plans, and incentives for land owners converting land to Private Reserves should be explored. Such provisions can be catered for in the drafting and passing of a regulation under Section 49 of the NTBNP Act that can focus on operationalising Private Reserves and the expansion of the Protected Area Network[95], as well as addressing the establishment of a Biodiversity Stewardship Programme.

[95] A proposed name for the new regulation could be the 'Private Reserves and Protected Area Network Regulations 201x'.

The NTBNP Act also further enables biodiversity conservation on private land through the requirement for the registration of protected plant species with the Director of National Parks and Conservation Services, by the owner or occupier of the land.

The NTBNP Act is an improvement over the Wildlife and National Parks Act, in that it allows for Protected Area expansion onto private land. The legislation governing Protected Areas administered by the Forestry Service and those administered by the National Parks and Conservation Service could however be better aligned[96].

4.3.3 Forests and Reserves Act of 1983

The Forests and Reserves Act of 1983 (FRA) establishes a Nature Reserves Board, the mandate of which is to advise the Minister of Agro Industry and Food Security on the identification of Nature Reserves and on all matters relating to Nature Reserves. The FRA also enables the authorised officer, currently the Conservator of Forests, to declare State Land as a National Forest, which may then only be used as forest land. Section 12 of the FRA enables any forest officer or police officer, the Chief Surveyor, the authorised officer, or the owner or occupier of the land on which an offence is committed, without warrant, to arrest any person found committing an offence under the FRA (Section 12(1)).

Section 8 of the FRA allows a landowner of a Mountain Reserve to cut or remove dead or dying trees or live trees, under the authorisation of the Conservator of Forests, and under such conditions as the latter may impose (Section 8(2)). Similarly, the authorised officer or Conservator of Forests may require the land in a Mountain or River Reserve to be planted or re-planted in a manner that is deemed fit (Section 9). Provisions ensuring compliance with the clearing or rehabilitation of Mountain and River Reserves are thus already stipulated, yet enforcement needs to be strengthened.

The FRA is however unclear in its provisions on Nature Reserves. The FRA lacks details on requirements for their proclamation, the attributes that would qualify sites as Nature Reserves, or any management requirements, including the need for management plans. In terms of internationally accepted norms for management effectiveness, the operation and maintenance of the Nature Reserves and the use of resources provided for them can be improved by putting good management plans in place. Similarly, the provisions for Mountain Reserves in particular, and River Reserves to a lesser extent, can also be improved. This is particularly the case in relation to the control of Invasive Alien Species (IAS).

The rapid rate of degradation of native habitat as a result of IAS infestation raises significant concerns about the general state of Mountain and River Reserves, in which active protection of ecosystem services needs to be strengthened. In terms of enforcement, forestry officers are already legally able to act against offenders in terms of the FRA. The management requirements of Mountain and River Reserves are however not well defined and the ability of citizens to combat Invasive Alien Species infestations is severely hampered by the need to obtain permission from an authorising officer to do so.

4.3.4 Shooting and Fishing Leases Act of 1966

The Shooting and Fishing Leases Act of 1966 (SFA) makes provision for State Land to be leased to the private sector for the purposes of shooting/hunting game, fishing or rearing/hunting fowl. The leases granted under this Act do not exceed 14 years and only give the lessee the right to hunt/shoot and fish, as well as to clear an area that does not exceed 5% of the surface area of the leased land as

[96] Refer to *Support Paper: Institutional Framework for the Protected Area Network Expansion Strategy for Mauritius.*

grazing area for deer. As per existing provision of the lease, stocking density of the deer should not be more than 2.5 deer/ha[97]. All other rights to manage the land have been left to the Forestry Services.

Proposed amendments to Shooting and Fishing Leases, when renewed, include a requirement for a biodiversity conservation agreement to be put in place, and can be included in addition to Section 3 (1) (c). An inclusion to Section 10 (2) further elaborates the point that biodiversity conservation should be valued and incentivised[98]. Finally, Section 17 can also include additional provisions that support biodiversity conservation and ecosystem restoration through entering into biodiversity conservation agreements.

A consideration in the allocation or renewal of Shooting and Fishing Leases is the extension of the lease period, which currently stands at 14 years. Such provisions could alternatively be included into a new Section 11 A of the SFA to provide for biodiversity agreements that would apply to new leases and to extensions of leases, depending on the preferred style adopted by the State Law Office in the process of making such amendments.

4.3.5 Environmental Protection Act of 2002, amended in 2008

The main environmental management related legislation for Mauritius is the Environmental Protection Act (EPA) of 2002, as amended by Act No. 6 of 2008. The Ministry of Environment[99] is the central authority for the protection of the environment in Mauritius and was once the focal point for various International Conventions, such as the Convention on Biological Diversity. This secretariat role of the Ministry of Environment was subsequently moved to the National Parks and Conservation Services. The Ministry of Environment remains the focal point for the UN Framework Convention on Climate Change (UNFCCC) and the administrative focal point for the UN Convention to Combat Drought and Desertification (UNCCD), whilst the Implementing Agency for UNCCD is the Forestry Service, under the aegis of the MoAIFS.

The EPA 2002 is the umbrella legislation for the general protection of environmental assets. However, it is to be noted that there are other legislations which specifically cater for the protection, rehabilitation and management of biodiversity, including all ESAs such as forests, rivers, wetlands, mangroves, and reservoirs, amongst others. The ESA reports highlighted the need for inclusion of the concept of environmental stewardship in legislation to encompass biodiversity conservation and the protection of ESAs for their different ecosystem function and services[100]. Environmental features are well enough defined in the ESA mapping, providing a 2009 national baseline that can be used for Environmental Impact Assessment in the country to inform decision-making on planning and development, as governed by the EPA.

Provision is made in Section 2 of the EPA in terms of environmental stewardship, which makes provision for every person in Mauritius to preserve and enhance quality of life by caring responsibly for the natural environment. This *de facto* also includes environmental protection on privately owned land and State Land, as well as the protection of biodiversity, ESAs, and ecosystem restoration, amongst others.

[97] Stocking density will have to be adjusted to match the carrying capacity of each area.
[98] Refer to *Support Paper: Developing a Biodiversity Stewardship Programme for the Protected Area Network Expansion Strategy for Mauritius.*
[99] The Ministry of Environment refers to the recently named Ministry of Social Security, National Solidarity, and Environment Sustainable Development (MSSNSESD).
[100] Government of Mauritius (GoM). 2009.

The principle of Protected Areas and the Protected Area Network can be aligned with the proposed definitions in the Native Terrestrial Biodiversity and National Parks Act of 2015. In general, the Environmental Protection Act provides an overall framework under which all other biodiversity related legislation can be operationalised.

4.3.6 Town and Country Planning Act of 1954 and Planning and Development Act of 2004

The two main laws that govern the planning framework in Mauritius are the Town and Country Planning Act of 1954 and the Planning and Development Act of 2004. While the Planning and Development Act was prepared in 2004 to replace the Town and Country Planning Act, not all the sections of this new Act have been proclaimed. Outline Planning Schemes and the related Development Strategy Maps remain in place and these can be updated in time to incorporate the proposed Expansion Zones.

In addition to these planning laws, the Investment Protection Act of 2002 and the Local Government Act of 2011 are also passed to guide planning and development in the country. There are also numerous Policies for Planning Guidance (PPGs) in place to provide planning guidance at a more detailed level.

It is important that these laws are also cognisant of the need to protect biodiversity and the natural environment of Mauritius. Without this consideration, some of the areas of biodiversity importance may be used for other development purposes. Amendments to the planning legislation are recommended in order to emphasise integrated planning through the protection of biodiversity and ecosystems services. It is also noted that planning legislation is currently under review in Mauritius, and the recommend changes[101] should be considered for incorporation into any proposed amendments to the planning legislation.

4.4 Institutional Framework

Development pressures on the natural environment are mounting and the reliance on the natural resources is ever increasing. Safeguarding biodiversity has been described as a race against time, especially in the case of Mauritius. It is fully accepted that, to stem the tide of degradation a strong, well-coordinated, consolidated and sustained effort is required, and the Protected Area Network Expansion Strategy (PANES) can be a major contribution to this effort. However, the effective implementation of PANES requires an effective institutional framework[102] supported by all key parties, in particular the Ministry of Agro Industry and Food Security (MoAIFS), on whom the onus lies to ensure the establishment and welfare of the Protected Area Network (PAN).

The existing institutional framework for Protected Areas in Mauritius has been long in the making. Since colonial times there has been growing awareness of the uniqueness and value of the country's unique natural assets. Multiple sets of legislations have been enacted to meet new challenges in terms of the protection of specific species and components of habitats and ecosystem services in

[101] Refer to the *Support Paper: Legal Review for the Implementation of the Protected Area Network Expansion Strategy.*
[102] Refer to the *Support Paper: Proposed Institutional Framework for the Implementation of the Protected Area Network Expansion Strategy.*

Mauritius[103]. While every citizen, many Government departments, businesses, and NGOs have a role to play in protecting the environment, the two lead institutions in terms of the PANES are the FS and the NPCS.

As per the NTBNPA, NPCS is required to keep under review the need to reserve land and promote conservation in relation to the use or development of State and private land, thus conferring a clear mandate for this institution.

With the possibility of FS gearing more towards conservation activities, a future formalised collaboration between the two institutions will have to be elaborated. Such a process needs to be driven by the by the responsible Ministry, currently the MoAIFS.

During the development of the PANES over the last two years, four major areas of competency were identified that need to be developed and institutionalised. They are Conservation Planning, Biodiversity Stewardship, Nature-based Tourism Development, and Invasive Alien Species (IAS) Control. The first two competencies are new to the institutions and, while a good start has already been made in terms of IAS Control and Nature-based Tourism Development, the latter is in its infancy in the areas under control of the FS and the NPCS. However, although a relatively new concept in the country at large, the potential of nature-based tourism has been recognised, and it is receiving increasing support from the MoT[104].

It is useful to consider what competency areas should exist in the *total institutional framework* (not individual organisations, but as a framework to serve the totality of the PAN). Frameworks, that exist either as individual organisations or composite frameworks of several organisations, would typically have the following 'divisions' (see Figure 17):

a) Administrative and Management Support;
b) Financial Services;
c) Monitoring, Evaluation, Enforcement and Regulations;
d) Conservation and Scientific Services;
e) Protected Area Network Management; and
f) Nature-based Tourism Development.

The four major competencies readily fit into the above areas: Conservation Planning has a natural place under Conservation and Scientific Services, and Invasive Alien Species (IAS) Control fits readily under Protected Area Network Management, as this activity is central to protective area management. Biodiversity Stewardship fits well under protective area management following the new NTBNP Act of 2015. Protective area systems worldwide emphasise tourism development, as the main source of income other than Government funding. Generally, a major section of the organisation is dedicated to this purpose, often at the same level as park management or other main functions of the organisations. It is therefore proposed that Nature-based Tourism Development is at the same level as other main competencies in the framework.

[103] Mauritius has a dense and complicated legal landscape for biodiversity and ecosystem conservation, which is described in a comprehensive legal review encapsulated in the *Support Paper: Legal Review of the Protected Area Expansion Strategy for Mauritius*.

[104] The status of and potential for nature-based tourism development in Mauritius is detailed in the *Support Paper: Nature-based Tourism Development for the Protected Area Expansion Strategy for Mauritius.*

Figure 17: Depiction of the major competency areas in a combined institutional framework for the implementation of the Strategy and the management of the Protected Area Network

To better understand what the competency areas in Figure 18 will entail, activity categories are added below each competency area[105].

Three of the new competencies to be developed and institutionalised are highlighted in red in Figure 18. The fourth competency, namely nature-based tourism, is itself a major competency category (or 'division').

In addition, Monitoring and Enforcement was flagged a major area that needs strengthening, not only during the institutional framework meetings but throughout the PANES process, such as in the National Visioning Workshops and by the Legal and Institutional Working Group (LIWG). Public Awareness and Education at all levels and Knowledge Management were also highlighted as major areas requiring attention. While these three areas are not new competencies as such, they require considerable support in terms of resources and capacity building for the PAN to be managed effectively. This is not to say that other competency areas are not important. Such areas are well reflected in the Missions and the Strategic Objectives of the PANES[106]. They will also be covered in detail in the Implementation Plan of the PANES.

As pointed out, both NPCS and FS have duties that span the entire range of the functional divisions in Figure 17 and Figure 18. Strategic plans for the two organisations are encapsulated in an Operational Strategy for the PANES (see Section 11.2) that aims at maximizing contributions of both organisations to conservations initiatives with a proper and agreed monitoring system in place. Capacity building is founded on a training needs assessment[107] of the organisations.

[105] The word 'division' is deliberately avoided as it may carry certain connotations in terms of how the civil service is organised, and hence may lead to confusion in how it is used.
[106] The Mission Statement and Strategic Objectives were discussed at the 2nd National Workshop and are detailed in the *Workshop Proceedings: 2nd National Workshop for the Protected Area Network Expansion Strategy in Mauritius.*
[107] Refer to the Training Needs Assessment for Protected Area Network Management in Mauritius (MoAIFS, 2015)

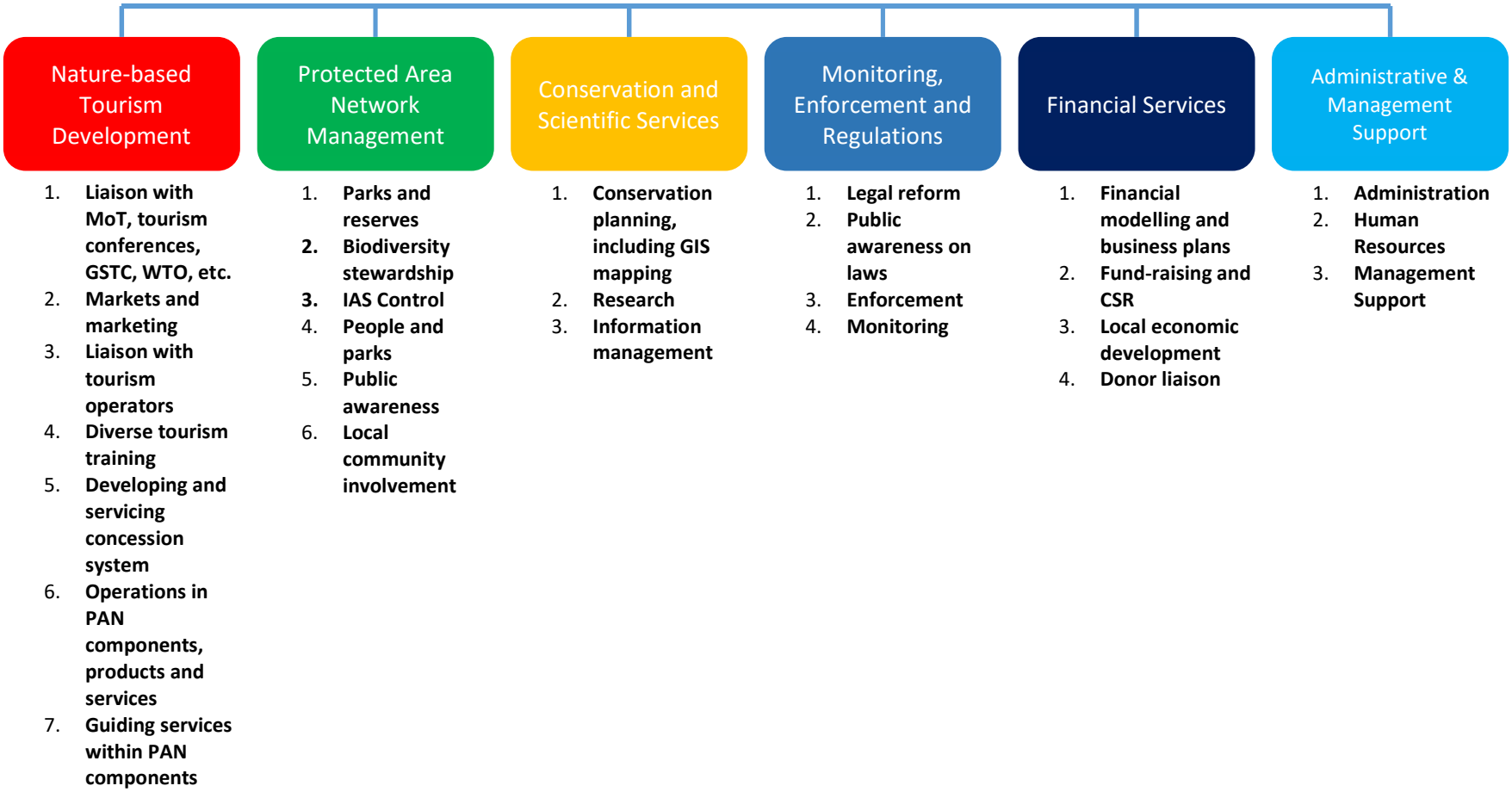

Figure 18: Major areas of competency in the conceptual combined Protected Area Network institutional framework with activity categories added under the main headings

4.5 Law Enforcement

The legislation that supports the implementation of the PANES, like all legislation, is only as good as the level of compliance. Law enforcement has been identified as a major area that needs institutional strengthening, not only during the institutional framework meetings but throughout the PANES process, such as in the National Visioning Workshops and by the LIWG. Such strengthening and elevation in importance will require focused attention and some accompanying adjustments to the way they are operationalised.

4.6 Action Categories

4.6.1 Monitoring and Enforcement

The monitoring and enforcement of Shooting and Fishing Leases, Gardiennage Leases and the Forests and Reserves Act will require adequate resources, training and coordination within the FS. With the enactment of the NTBNPA, NPCS will also require additional resources to implement the provision of the act. These resources need to be sourced and allocated, starting with proactive steps of liaising with landowners and stakeholders in monitoring activities. Reactive enforcement breaks down relationships and stimulates conflict. The successful implementation of PANES relies on a collaborative spirit and building strong cooperative relationships between stakeholders is necessary. Monitoring and enforcement should thus be approached in this spirit.

4.6.2 Legal Reform

Like most countries, legal reform in Mauritius can be a lengthy process, particularly when new legislation is proposed to replace existing laws, or amending existing laws. The PAN expansion process presents an opportunity to strengthen existing and proposed legislation and to address the priorities for protecting the remaining landscapes of biodiversity importance in Mauritius. Both short term and long term strategies are therefore proposed.

The short-term strategy for the PAN prioritises specific amendments to the current legislation to address both the discrepancies and deficiencies in the legislation, as well as opportunities for the sustainable use of the Protected Areas.

The long-term strategy for the PAN envisages the development of a new “Protected Areas Bill” (or amendment of existing legislation) that covers all Protected Areas under one piece of legislation. It may be that the new Bill provides for a single conservation authority or otherwise clearly allocates such responsibilities over more than one authority, avoiding overlap or situations of mixed jurisdiction such as currently exists with the islets.

Legal reform is linked to institutional strengthening to a large extent, and the two ideally should be synchronized. Institutional synergies can be optimised for biodiversity conservation initiatives in Mauritius. Practically speaking, maximising institutional synergies will involve many intermediate steps to achieve benchmarks. It is recommended that specialised and technical assistance be applied under the guidance of the Ministry to ensure that institutional strengthening proceeds in an optimal manner.

It should be noted that legislative improvements are part of a wider process. Laws will need to be implemented and enforced for them to effectively address issues related to the protection of biodiversity and ecosystems services. It is crucial that further synergies are built with relevant stakeholders that may be involved in the implementation. Consistency in decisions is crucial and comes not only with having mandates clearly defined, but also through coordination amongst Government departments. Raising awareness among enforcement officials and legal personnel in the State Law Office of the importance of biodiversity conservation and ecosystem function is crucial. Furthermore, there is a need for strong political will to enable these changes in legislation.

4.6.3 Institutional Framework

The proposed institutional framework for the PANES relies strongly on configuring and engaging the lead institutions, the NPCS and the FS, based on their respective strengths, weaknesses and complementarities. There will also be several units created, as well as national committees, in which both institutions, as well as other stakeholders will be involved.

Chapter Five: Managing the Protected Area Network

5.1 Strategic Objectives 4, 5 and 7

Strategic Objective 4: To develop tools and safeguards to support and ensure the efficient and effective management of all the different Protected Areas that make up the Protected Area Network (PAN).

Strategic Objective 5: To develop innovative programmes and mechanisms to expand the Protected Area Network (PAN) to include all key biodiversity areas as far as possible, including certain private lands.

Strategic Objective 7: To restore indigenous ecosystems as essential components of the country's ecological infrastructure for water, biodiversity and other ecosystem services.

5.2 Management Plans

Management plans are standard tools for guiding the management of Protected Areas. A management plan describes the values and principles of a particular Protected Area (PA), sets strategic objectives and targets, allocates available resources accordingly, and provides for the coordination between the stakeholders involved in the management of the specific area/s. A well designed management plan that is implemented effectively unlocks the potential of a PA and greatly improves its prospects for protecting and enhancing its essential features. It also describes the institution/s that will be responsible for the management of the area.

A management plan is typically anchored by the Vision and Mission Statement of the Protected Area. The Vision and Mission Statement lead to a set of Strategic Objectives that have been worked out together with stakeholders. Management issues and responses are typically linked to these Strategic Objectives and from a Strength, Weakness, Opportunity and Threat (SWOT) analysis. The responses are presented in a series of action categories or programmes, each one with its own specific set of actions, which make up an Action Plan or Implementation Plan. Once approved, management plans need to be adequately resourced in order to enable implementation.

All components of the PAN must have management plans that are current and are being implemented with regular monitoring and evaluation. Without this it is not possible to answer the questions of 'How are we doing as a Protected Area, and as a Protected Area Network?' Management plans must be developed as a priority for the components of the PAN, making use of a recognised format and process of compilation and adoption.

Good examples to follow are the management plans for Bras d'Eau National Park and Black River Gorges National Park. It is proposed that management plans are reviewed every five years. An annual operational plan guides activities for the year and is revised on an annual basis.

5.3 Biodiversity Stewardship

Biodiversity stewardship in general refers to the wise use, management and protection of a resource. Within the context of the PAN Expansion Strategy, biodiversity stewardship[108] refers to the wise use of natural resources on land in which various land-use activities occur other than biodiversity conservation activities alone. The aim of stewardship is to ensure that species, habitats, ecosystems and critical ecological functions are restored, maintained and enhanced for present and future generations.

Biodiversity stewardship recognises landowners as the custodians of their land, including the biodiversity and natural resources, and it is expected that the landowners would have a strong interest in, and/or show a strong practical commitment to biodiversity conservation. It is a mechanism that promotes the wise use and management of natural resources. The re-establishment of biodiversity and ecological function and resilience, through the form of binding agreements with landowners and lessees, as well as other Ministries governing environmental resources. In Mauritius, the opportunity to put stewardship agreements in place exists with private landowners and lessees making use of State Land, as well as other Governmental agencies.

A Biodiversity Stewardship Programme can be established in Mauritius and land swaps are an established mechanism that could be used, if necessary. The Biodiversity Stewardship Programme can be implemented by the National Parks and Conservation Service (NPCS) on private land through the designation of Private Reserves under the Native Terrestrial Biodiversity and National Parks Act of 2015, or through forming contract agreements for lower level conservation areas and on high priority conservation areas adjoining potential Protected Areas. The Forestry Service (FS) can implement the Biodiversity Stewardship[109] Programme on Leased State Forest Lands, when considering the renewal of existing leases and granting of new leases.

5.3.1 Principles of Biodiversity Stewardship

The primary goal of a Biodiversity Stewardship Programme should be to secure critical biodiversity through binding agreements with landowners or lessees[110]. This may include remnant habitat or it may be one or more threatened endemic species that requires protection. The rationale behind this is to secure what remnant biodiversity remains and to rehabilitate and restore critical biodiversity in an effort to create a resilient, connected, ecologically functioning Protected Area Network. The threat of further habitat degradation or loss can be most effectively addressed by investing in conservation efforts and resources.

Biodiversity stewardship is an approach to entering into agreements with landowners to protect and manage land in biodiversity priority areas, led by conservation authorities. Biodiversity stewardship recognises landowners as the custodians of biodiversity on their land. It is based on voluntary commitments from landowners, with a range of different types of biodiversity stewardship

[108] In the context of the PAN Project the terms 'land stewardship' and 'biodiversity stewardship' are used interchangeably; biodiversity occurs on the land and the land is looked after in such a way that the biodiversity is actively promoted, or at least not negatively impacted upon.

[109] In the context of this document, "Stewardship" for Leased lands refers to agreements that will maximise the biodiversity conservation undertaken by the lessees. This does not imply that there will be any transfer of the ownership of the land.

[110] Refer to previous footnote.

agreements that can be developed (typically through interactions between the landowner and the conservation authority) to support conservation and sustainable resource use. Some types of biodiversity stewardship agreements are formally declared as Protected Areas, and the Native Terrestrial Biodiversity and National Parks (NTBNP) Act of 2015 makes provision for this. The following principles relate to biodiversity stewardship in Mauritius:

1. **Landowner focused extension** – biodiversity stewardship agreements between landowners and conservation authorities should be supported with resources, like available expertise and operational funding, to ensure that there is extension capacity within the authorities to support and assist landowners who enter into agreements;

2. **Focus on biodiversity priorities** – resources and effort should be focussed on areas identified as high priority and areas that are at high risk;

3. **Site security** – in order to secure the resources and efforts put into biodiversity conservation by the State, the legal status of land with high biodiversity value should be secured through formal proclamation and binding agreements between landowners and conservation authorities; and

4. **Building collaboration** – cooperation across property boundaries is often necessary to achieve landscape-level conservation outcomes, particularly in efforts such as Invasive Alien Species management. Partnerships, based on mutual trust, also need to be built and are vital between conservation agencies, the State, NGOs and private landowners.

5.3.2 Biodiversity Stewardship Categories

The Native Terrestrial Biodiversity and National Parks (NTBNP) Act 2015 recognises the need for Private Reserves and provides for a legal mechanism for such designation. In terms of Section 12, Private Reserves may be designated on private land for:

a) the protection, enhancement or restoration of natural ecosystems, wildlife habitat or habitat of rare, threatened or endangered plant or animal species;
b) the retention of significant botanical, zoological, geological or morphological features of the land; or
c) the conservation of air, soil or water.

This marks a significant step towards biodiversity protection on private land in Mauritius and can be further supported through the establishment of a Biodiversity Stewardship Programme.

Through a process of establishing the stewardship programme, it is recommended that a set of biodiversity stewardship categories be developed[111]. The following categories can be used to guide this process:

1. **Key species conservation** – this category should be applied to land set aside exclusively for biodiversity conservation and such land could ideally be designated as Private Reserves under

[111] Regulations can be drafted and passed under the Native Terrestrial Biodiversity and National Parks Act to establish and support the Biodiversity Stewardship Programme, amongst other aspects.

the NTBNP Act. Such land would fit within one of the IUCN Protected Area Categories and would be focussed on biodiversity conservation:

2. **Conservation** - this category should be applied to land set aside for biodiversity conservation and other economic activities having minimal impact on the ecosystem. Such a designation would of course allow for typically related activities in conservation areas, like ecotourism ventures (lodges etc.), and appropriate nature-based activities, such as hiking, mountain-biking, canoeing, canopy tours, etc.;

3. **Conservation/ sustainable production** – this category should be applied to land in which there is a balance between production from the land and its biodiversity conservation imperatives. Such land would fit within one of the IUCN Protected Area Categories, but its use would be based more on a balance between biodiversity conservation and production on the land. Uses would include those in the first category, but could also include responsible, sustainable deer production or some other form of sustainable agriculture, which is compatible with biodiversity conservation and relevant to Leased State Forest Lands; and

4. **Contract agreement** – this category should be viewed as an entry level contract between the landowner or lessee and the government, in which the landowner or lessee may be reluctant to immediately commit the land to one of the higher categories. It may not fall within one of the IUCN Protected Area Categories, but should be viewed as a means of building a relationship of trust between the conservation authorities and the landowner or lessee with the goal of moving into one of the higher categories. The contract should ideally be of a short-term nature, with the intention to make it longer term in the future. There would be few limitations on the use of the land other than the contract stipulating specific obligations that the landowner or lessee may have towards biodiversity conservation on the land, for example the clearing of Invasive Alien Species. Care should be taken that such clearing should not have a negative impact on ecosystem services.

The stewardship categories can be discussed with landowners and lessees and be formally agreed upon within stewardship agreements and management plans. Various areas within tracts of lands can also fall into different stewardship categories, thus allowing flexibility in terms of different activities on different portions of land.

5.3.3 Role of NGOs

In accordance with the principle of building collaboration, it is important to highlight the vital role that NGOs can provide to a Biodiversity Stewardship Programme. In many instances NGOs have resources, skills and flexibility that is limited in government conservation agencies, which are complementary to those within the conservation agency and vice versa. Furthermore, NGOs often are more easily able to negotiate with the private sector, as they may already have developed relationships and partnerships with landowners and individual companies, who may sometimes be reluctant to partner with Government. In some instances, NGOs may be better placed to implement biodiversity stewardship in partnership with conservation agencies based on their relationships and expertise. As far as possible, strong relationships should be developed between the conservation sector and the

NGO sector, with a view to complementing efforts and collaborating to develop strong, effective relationships with landowners and the private sector.

5.3.4 Development of a Biodiversity Stewardship Programme

Given the challenges that will be encountered in expanding the Protected Areas in Mauritius, it is important that efforts focus on achieving as much as possible in as short a time as possible. Private landowners, the private sector and the public need to gain an understanding of the PAN Expansion Strategy and the Biodiversity Stewardship Programme, and to develop a level of trust in it, on the basis that it will succeed in its objectives and provide benefits to landowners and land-users. Opportunities to secure biodiversity gains should be sought initially, with more complex arrangements being developed as the programme progresses.

5.3.5 Provision of Incentives

As the Biodiversity Stewardship Programme evolves, a suite of incentives to provide benefits to landowners who enter the programme should be established. In similar programmes around the world some of the most effective incentives have been shown to be the access that landowners get to expertise and technical assistance in developing and managing their land for biodiversity conservation.

There are a range of other incentives that can be considered and should be tailored to Mauritian conditions, to ensure that landowners receive tangible benefits for their conservation actions. These would include:

- **Legal:**
    a) Securing of existing land-use in the event that a landowner would like to have the land conserved for posterity.
- **Financial:**
    a) Rise in real estate property close to the Protected Area Network, or National Parks, for example;
    b) Payment for ecosystem services;
    c) Exemptions or reductions of taxes, leasing fees and property rates, where applicable;
    d) National treasury / fiscal incentives, such as income or company tax rebates e.g. for ecotourism activities and other economic activities;
    e) Provision of equipment or infrastructure support (e.g. fencing); and
    f) Contributions towards the costs of Invasive Alien Species management (initial clearing and maintenance weeding and predator control).
- **Non-financial:**
    a) Assistance in Protected Area planning and management;
    b) Scientific advice, support, expertise and technical assistance;
    c) Reintroductions of species – provision of native and endemic species;
    d) Training – providing the skills for conservation managers/field rangers/workers;
    e) Environmental Awareness;
    f) Marketing as a tourism destination that has significant biodiversity value;
    g) Cooperation and support amongst other biodiversity stewardship sites; and
    h) Priority areas for Corporate Social Responsibility (CSR) funding.

- **Other Value Added:**

  If private land designated as a Private Reserve borders a Protected Area special agreements can be entered with the landowner, such as access to the national park through their land, which brings immense ecotourism advantages to the Private Reserve. A designation can even be made such as the 'Greater Black River Gorges National Park' which means a landowner can become part of a National Park and benefit from joint marketing.

5.4 Invasive Alien Species (IAS) Management

Invasive Alien Species management is underway in Mauritius, with good practice guidelines being developed under the PAN Project. The proliferation of IAS is a significant issue in all Protected Areas in the country and increased and sustained efforts will be required to effectively restore ecological integrity.

5.5 Action Categories

5.5.1 Compile Management Plans

Compile management plans or management frameworks that are applicable for all areas within the PAN including Nature Reserves, Mountain Reserves, River Reserves, Ramsar Sites, Leased State Forest Lands and the Pas Géométriques, for instance. Such plans can be developed in time, making use of a recognised format and process of compilation and adoption.

5.5.2 Establish Biodiversity Stewardship Programme

A Biodiversity Stewardship Programme can be established according to the *Support Paper: Developing a Biodiversity Stewardship Programme for the Protected Area Network Expansion Strategy for Mauritius.* Consisting of staff from both the NPCS and the FS, a Biodiversity Stewardship Unit must be set up. This unit may be more loosely configured compared to the Conservation Planning Unit, which should have dedicated staff, since biodiversity stewardship is more cross-cutting and may require a broader range of staff to make it work. However, at least one or two people should be dedicated to the Biodiversity Stewardship Unit.

A Biodiversity Stewardship Committee can also be established to oversee the programme and can be chaired by Ministry of Agro Industry and Food Security with the NPCS, being the custodian agency of biodiversity conservation in Mauritius providing technical advice. This committee should also include other members, like FS, MSSNSESD, MoHL, MWF, senior staff from the MoAIFS and private sector representatives. The PAN PMU can facilitate the establishment of this unit and committee, as well as detail the operational specifics for a period, like who should chair and for how long.

NPCS and FS have different geographic areas to focus on in terms of establishing a Biodiversity Stewardship Programme. NPCS can focus on high priority areas, landowners adjacent to National Parks, and lands that can be incorporated as Private Reserves. FS can focus on Leased State Forest Lands and work with current and future lessees in terms of biodiversity stewardship.

5.5.3 IAS Management

Both NPCS and FS are currently controlling IAS in high biodiversity areas, NPCS more so than the FS, although a dedicated unit is yet to be established. The need for IAS management across the PAN is enormous. Increased collaboration must be promoted to ensure coordination and the sharing of knowledge, information and resources (e.g. through the reinforcement of ongoing initiatives or the setting up of a dedicated IAS Management Unit within the NPCS). NPCS is already active in this regard, as is FS, private sector and NGOs. The PAN PMU can facilitate the establishment of such a unit, as well as help to streamline the operations that are already underway. A simple collaborative Action Plan can for instance be formulated.

Chapter Six: Tourism and Social Benefits

6.1 Strategic Objective 8

Strategic Objective 8: To unlock opportunities that will bring tangible and intangible benefits to Mauritius, including nature-based tourism, local economic development, especially in the rural areas, and leisure areas and spiritual havens. This includes enabling civil society to mainstream biodiversity and conservation into business practices.

6.2 Tourism in Mauritius

The economy of Mauritius has diversified over the past 30 years from a sugar monoculture dominated economy to a multi-sectoral one that includes export-oriented textile manufacturing, fisheries, information and communications technology and tourism. In the review of the National Development Strategy (NDS), the Government recognises the importance of the country's natural resources for the tourism industry. The document highlights the fact that the basis of the Island's tourism success and quality image is largely attributable to its exceptional natural assets, including the majestic mountain peaks, lagoons and coral reefs, sandy beaches and coastal seas[112].

The tourism sector is a significant contributor to the economy of Mauritius. In 2015, around 1,153,723 tourists visited Mauritius compared to the figure of 1,038,968 in 2014 originating primarily from France, Germany, Italy, United Kingdom, Réunion**,** China and India. The contribution of the Tourism Sector to Gross Domestic Product (GDP) in 2015 was 7.8%[113]. According to the World Tourism Council, the total contribution of travel and tourism to the total gross domestic product (GDP) in 2013 was 25.3% and is forecast to grow to 26.6% of the GDP in 2024. Employment data for the Tourism Sector indicates employment in restaurants, hotels and travel and tourism establishments with 10 or more workers. The latest available statistics as of the end March 2015 show that employment increased by 1.2% to reach 29,123 as compared to 28,772 jobs for March 2014

The tourism sector in Mauritius is governed by the Ministry of Tourism (MoT). The Vision of the Ministry is to make Mauritius a leading and sustainable island destination. The functions of the Ministry are shared by the two parastatals, the Mauritius Tourism Promotion Authority (MTPA- which was established under the MTPA Act 1996) and the Tourism Authority, as enabled by the Tourism Authority Act (2006), as amended in 2008. The MTPA is responsible for the promotion of the destination." The Tourism Authority is responsible for the issue, renewal of Tourist Enterprise Licences and the formulation of standards, guidelines and code of practice for tourist enterprises.

Mauritius has recognised the opportunity to boost tourism within the Indian Ocean region and develop the region into a key global player in the travel and tourism industry. To this end, Mauritius

[112] Government of Mauritius (GoM). 2003.
[113]Statistics Mauritius. 2016.

has collaborated with other regional destinations to establish the Vanilla Islands Organisation. Mauritius and the Seychelles are founding members of the Indian Ocean Vanilla Islands concept[114].

The Indian Ocean Vanilla Islands initiative comprises of the countries of Mauritius, Seychelles, La Réunion, Madagascar, Comoros, Mayotte and the Maldives. The vision of the Vanilla Islands Organisation is to position the Indian Ocean region as a quality world-class holiday destination that offers unparalleled diversity and one of the last frontiers of sustainable tourism. To achieve this, the organisation aims to collaborate with the member state tourism establishments, authorities and tourism promotion infrastructure to attract high-end visitors to the region[115].

6.3 Nature-based Tourism Development

The precise definition of ecotourism and nature-based tourism has long been debated. At its simplest, nature-based tourism is described as travel to natural places. Within this broad category, ecotourism is described as responsible travel to natural areas that conserves the environment, sustains the wellbeing of the local people, and involves interpretation and education[116]. Both descriptions are grounded in the concept of sustainable development.

Mauritius has a wealth of natural, cultural and historical heritage. While the tourism industry currently focuses largely on drawing international visitors to the marine and coastal landscape, there is growing recognition of the untapped[117] tourism potential of the significant natural and cultural heritage.

To gain further insight into the views of Mauritians about the importance of their National Parks, a survey was conducted as part of the PANES development process with residents of three villages bordering the Black River Gorges National Park (Grande Rivière Noire, Petite Rivière Noire and Case Noyale). The vast majority of the respondents had visited the Park and the most popular activity in the Park included walking/jogging or leisure walking. Almost all of the visitors to the park expressed an interest in return visits. The results of the survey further suggest that visitors are informed about the Park through different channels. International visitors are primarily informed of the BRGNP through agents or by people they know. Mauritian visitors on the other hand, are primarily informed about the Park through the fact that it is a known place or via the internet[118] [119].

Interestingly, when questioned about the possible functions of a National Park, few respondents identified environmental importance or water catchment as key functions. The main perceived functions included the aesthetic properties, tourism attraction and relaxation[120]. This indicates that the BRGNP is viewed as more significant for its tourism and recreation opportunities than for the other environmental services that it provides.

[114] eGlobal Travel Media. 2015.
[115] Vanilla Islands Organisation. 2015.
[116] The International Ecotourism Society (TIES). 2015.
[117] It is acknowledged that the primary attraction of Mauritius will remain sand sea and sun and inland tourism will remain a relatively small niche with the bulk of the inland tourism potential being from the Mauritian market.
[118] EcoAfrica. 2015b.
[119] It must be noted that many Mauritians visit the BRGNP during specific periods for gathering of Chinese guava.
[120] EcoAfrica. 2015a.

It is indisputable that the strengthening of nature-based tourism and recreation will help to diversify the tourism product portfolio and to promote conservation efforts within the country's Protected Area Network. It will also contribute to social and economic development and improve the wellbeing of Mauritians by the creation of business opportunities for small entrepreneurs.

As part of its Tourism Development Plan in 2002, the Ministry of Tourism aimed to stimulate interest in non-coastal locations such as the Black River Gorges National Park. It is a popular attraction for both Mauritians and foreigners and the numbers are growing. One of the reasons the number of Mauritians using the Park is increasing is that recreational/leisure areas are being sought as an alternative to crowded beaches.

Although close to the coast, tourism in Bras d'Eau National Park similarly would veer away from typical beach tourism. Marketing of the country's tourism assets does not however, elaborate much on nature-based tourism products, but primarily promotes the Island's white sandy beaches, its good quality hotels, its pleasant climate, and as a destination for weddings, conferences, and film shootings[121]. The development and innovative marketing of more culture and nature-based tourism products in the country provides an exciting opportunity for diversifying the country's tourism products and client base.

The Government is working hard to promote ecotourism in the country. The Ministry of Tourism is driving a process to develop an eco-label scheme and has consulted with relevant stakeholders to develop the Mauritian Standard for sustainable tourism. This standard specifies the requirements for tour operators seeking to achieve an eco-label. The scheme will be managed by a Project Steering Committee comprising multi-sectoral partners and will be supported by a Project Implementation Unit within the Tourism Authority[122].

The Ministry of Tourism and External Communications has prepared guidelines for ecotourism development. These guidelines recognise that while ecotourism development presents both a potential to cater for the new demand, as well as an avenue for tourism product diversification, the development should avoid irreversible change to the country's natural areas. To this end, the guidelines state that successful ecotourism projects must:

i. be well planned, financed, managed and marketed in order to meet the stringent environmental and recreational demands of a true ecotourism development;
ii. effectively promote the preservation of entire local ecosystems, not just individual species, vistas or sites; and
iii. be economically viable in order to attract financing and be sustainable.

In 2004, the Ministry of Housing and Lands published Design Guidance for Eco Tourism Development in the form of a Design Sheet to ensure an orderly and harmonious development. The Ministry has also developed Design Guidance for Hotels and Integrated Resort Development, as well as other

[121] Lallchand, S. 2013.
[122] Ministry of Tourism and External Communications. 2014.

Design Sheets that consider special design circumstances and supplement the Eco Tourism Development Design Sheet.

The Tourism Authority caters for nature-based tourism operators through the Tourist Enterprise Licence and has issued a checklist of requirements for Ecotourism Activities (nature-based tourism activities or adventure-related tourism activities or both). The cost of this annual licence is dependent on the type and number of activities listed. Additional permits and authorisations are required if food and beverages are prepared and/or sold.

Nature-based tourism operators in Mauritius are currently organised as individual entities or businesses. Some key inland nature-based activity products that are offered include mountain biking, kayaking, canyoning, trail running, hiking and trekking. While no formal association or accreditation for nature-based or ecotourism is currently in place in Mauritius, a process has been initiated through the PANES with the Tourism Working Group (TWG) to establish such an association. Furthermore, nature-based tourism guides are not required to undergo any specific training or registrations additional to the requirements for standard tour guides.

The need for change in the tourism sector in Mauritius is reflected in the vision outlined by the Ministry of Tourism and External Communication, in a strategic paper published on the 17th March, 2015. The strategy proposes a plan of action, which aims to: i) enhance the product, ii) accentuate accessibility, iii) revitalise the existing marketing strategy, and iv) restructure the institutions. Within these four categories, the proposed strategy touches on a number of priorities that are supportive of the development of nature-based tourism in Mauritius. Responsible tourism is highlighted as a priority with specific reference to conserving the environment, sustaining the wellbeing of local people and involving interpretation and education. The plan also proposes the creation of additional tourist sites to boost cultural tourism[123].

6.4 Increasing Social Benefits

To ensure the long term financial sustainability of the tourism industry and to maintain a competitive edge as a priority regional and global tourism destination, the improvement of the country's Protected Areas represents a key opportunity. If planned and managed well, strengthening and expanding the Protected Area Network will support both the diversification of the tourism industry and maintain and improve the natural resource base upon which the country depends.

Responses to the survey conducted with local residents of the three villages bordering the BRGNP revealed that there is an awareness of the benefits inherent in Protected Areas. Benefits and opportunities identified by residents included infrastructural development, economic development through new businesses and jobs, youth development through sport and other physical activities, which help to reduce the risk of delinquency and substance abuse, health benefits through access to walking/jogging tracks, and social cohesion through the provision of facilities for family/social outings[124].

[123] Ministry of Tourism and External Communication. 2015b.
[124] EcoAfrica. 2015a.

Experience elsewhere has revealed the extensive positive impacts to the local economy and job creation from the development of tourism and recreation in Protected Areas[125] [126]. Research has however, also shown that both political commitment and financial resources are insufficient to enhance the coverage and effectiveness of Protected Areas to yield the multiple benefits that they can provide[127]. The tourism-related opportunities presented to Mauritius through the PANES development and implementation are many. Increased recognition, funding, planning and enforcement through improved Protected Area management in Mauritius are urgently required for the realisation of these and other opportunities.

The link between the protection of Mauritius' biodiversity and the diversification of the economy is highlighted in the National Development Strategy: 'As the economy continues to evolve and moves from an agrarian to a more developed manufacturing and services-based society there is an emerging consensus that the conservation of the natural environment in Mauritius, the enhancement of the country's quality tourism industry, the protection of its unique coastline and lagoons and the conversion of ex-sugar cane lands for new forms of built development are all inextricably linked.'[128]

The Protected Area Network expansion initiative is highly relevant to the tourism industry and most timely considering the thrust toward the diversification of tourism in Mauritius. It presents an opportunity to grow and improve the tourism products and activities available to both domestic and foreign visitors through the development of more cultural, historical and natural products. The expansion offers opportunities to attract a diversified tourist base, as well as for extending the time that tourists visit the country by offering regionally linked and competitive ecotourism products.
Supplementing the tourism and recreation products through the expansion of the Protected Area Network, could also relieve the pressure on the coastal belt and provide more recreation opportunities inland. It also provides an opportunity for the establishment of more public/private partnerships and for contributing to educational and research facilities.

Nature-based tourism and the Protected Area Network expansion process also offer an important opportunity to educate the nation on the uniqueness, fragility and importance of the sustainability of Mauritius as a Small Island Developing State (SIDS). Mauritius, like all other SIDS, is particularly vulnerable to specific challenges associated with their small size and geographical and economic isolation. These challenges include a heavy dependence on coastal and marine resources for livelihood and food security; restricted access to limited freshwater resources; a significant reliance on tourism, which is in itself vulnerable to climate variability and change, natural disasters and socio-economic and political trends and events; and limited land availability and the associated land degradation challenges such as waste management and biodiversity loss. Raising awareness of these challenges and stimulating innovative solutions can be supported by responsible nature-based tourism development within the country's precious and vulnerable Protected Areas.

The link between tourism development and the PAN expansion initiative also introduces the opportunity for revenue generation for conservation through additional tourism activities within the

[125] Stynes, D. J. 2011.
[126] Cui, Y., Mahoney, E. and Herbowicz, T. 2013.
[127] Watson, J., et al. 2014.
[128] Government of Mauritius (GoM). 2003.

Protected Areas. Financing for Protected Areas management in Mauritius is currently received primarily through the Government and international donors. Developing appropriate and well-managed nature-based tourism products within Protected Areas (through concessions and other revenue streams), has the potential to supplement existing finances to strengthen Protected Area management.

6.5 Action Categories

6.5.1 Establish a Nature-based Tourism Development Working Group

A Tourism Development Working Group (TDWG) for the PAN should be set up, comprising of staff from both NPCS and FS, as well as officials from MoT and a representative from the private sector operators. The operation and chair of this working group can be decided upon at the first official meeting, which can be facilitated by the PAN Project PMU[129]. Its primary function would be to ensure collaboration between Government, the private sector, NGOs and other stakeholders and to provide guidance on how the nature-based tourism industry can be developed and supported.

6.5.2 Compile a Nature-based Tourism Development Plan

A Nature-based Tourism Development Plan should be commissioned and developed with the participation of all the major stakeholders involved with nature-based tourism and ecotourism in Mauritius. The members of the current PANES Tourism Working Group should be strongly involved in the development of this plan. The plan will harness the support and collaboration of the widely divergent stakeholders and different Ministries involved. The first step is the compilation of a Terms of Reference for its development.

6.5.3 Conduct Research and Assessment

There are a number of information gaps and research priorities which can provide guidance in support of the effective implementation of PANES. Specific studies identified include:

1. Study of income generating opportunities related to nature-based based tourism, to develop and boost income generating potential for the PAN.

2. Detailed tourism research in an effort to identify the types of and demand for complementary nature and adventure-based activities that could be provided in Mauritius, in support of the existing established tourism industry; and

3. Research on the social value of Mauritius' PAN in the context of a growing population, and high levels of development and urbanisation. These values are likely to include cultural, psychological and health values associated with the provision of valuable open space, natural areas and opportunities for nature-based recreation and leisure.

[129] The current Tourism Working Group, which was created to provide guidance on the development of the PANES, can simply be re-oriented to boost the development of nature-based tourism in the PAN. It can also be expanded and supported pro-actively.

Chapter Seven: Training and Capacity Building

7.1 Strategic Objective 2

Strategic Objective 2: To apply effective institutional arrangements and ensure continuous and adequate capacity building for the purposes of implementing the Protected Area Network Expansion Strategy (PANES), as well as for updating and further elaboration as may be needed.

Capacity building is an urgent and ongoing requirement for effective management of the PAN, as well as for its expansion, and a cross-cutting theme that runs through the Strategic Objectives, although only Strategic Objective 2 is listed above. It surfaces as a major need in management plans and is reflected in action plans.

7.2 Training Needs for the PAN in General

Training has been identified as a crucial component of both strengthening the management of Protected Areas, as well as a requirement for the successful expansion of the PAN. Training is a cross cutting component to the implementation of the PANES and influences the effective implementation of all Strategic Objectives.

Training and capacity building at all levels have been assessed, specifically within the two lead institutions of NPCS and FS, as detailed within the *Training Needs Assessment for Protected Area Network Management in Mauritius* [130]. The report proposes a training programme focusing on all levels of staff in NPCS and FS. Training requirements have been identified, categorised and prioritised, and include:

1. General Work Skills;
2. Financial and Resource Management;
3. Human Resource Management;
4. Staff Development and Training;
5. Communication;
6. Technology and Information;
7. Project Development and Management;
8. Field Skills;
9. Natural Resource Assessment;
10. Conservation Management;
11. Socio-economic and Cultural Assessment;
12. Sustainable Development and Communities;
13. Protected Area Policy and Planning;
14. Site Management;
15. Enforcement;
16. Recreation and Tourism; and
17. Awareness, Education and Public Relations.

[130] Mauremootoo, J. 2015.

Further details related to the implementation of the training programme are in the *Training Needs Assessment for Protected Area Network Management in Mauritius*.

7.3 Targeted Training Needs for the PANES

All of the above are areas where it is necessary to build capacity for the effective running of the PAN in the broadest sense. However, during the development of the PANES over the last two years, four major areas of competency were identified that need to be developed and institutionalised. They are Conservation Planning, Biodiversity Stewardship, Nature-based Tourism Development, and Invasive Alien Species (IAS) Management.

The first two are new to the institutions, while Nature-based Tourism requires a proper foundation, followed by further development that will require training and capacity building. IAS management received a major boost under the PAN Project and momentum has been built which should be maintained. A 'Good Practice Manual' will be a useful tool in this instance.

During the development of the PANES, Public Awareness and Education, Knowledge Management and Monitoring and Enforcement were identified as major areas of competency that require strengthening. This is not to say that other areas are not important, as reflected in the Missions and the Strategic Objectives of the PANES[131]. They are all discussed in the training needs assessment[132] and also receive attention in the Implementation Plan of the PANES.

7.3.1 Conservation Planning

The major response in the PANES is that a Conservation Planning Unit should be created. The training needs of this unit include getting a thorough understanding of the PANES, all the maps, and associated data. To do so, at least some of the staff in this unit will have to be competent in GIS, as well as the legislation pertaining to the PAN and PANES. They will also need to be conversant with the principles and practises of conservation planning.

7.3.2 Biodiversity Stewardship Programme

The main intervention here is the establishment of a Biodiversity Stewardship Programme, run by the NPCS and the FS who can be organised into a loosely aligned Biodiversity Stewardship Unit. A Biodiversity Stewardship Committee is also proposed as biodiversity stewardship requires the integral involvement of a range of stakeholders, including private landowners and NGOs. They will all need training and exposure, as indicated in the PANES Implementation Plan, including a study tour for key members of the unit to places where biodiversity stewardship is established.

7.3.3 Nature-based Tourism Development

Tourism development in Protected Areas, and across the PAN (such as in the development of tourism routes) must be carefully planned. If it develops in an *ad hoc* manner, problems will arise that may be difficult to undo later. The main intervention is a Nature-based Tourism Development Plan that covers all aspects, including product development, services, institutional arrangements between the

[131] The Missions and Strategic Objectives were discussed at the 2nd National Workshop and are detailed in the *Workshop Proceedings: 2nd National Workshop for the Protected Area Network Expansion Strategy in Mauritius.*
[132] Mauremootoo, J. 2015.

different parties, as well as training. It is well worth noting that tourism development is government led, but private sector driven. In any manner, training that must be given immediately and can be initiated through exposure to tourism development in other Protected Areas Networks, such as South African National Parks with comparable ecosystems.

7.3.4 Public Awareness and Education

It is widely accepted throughout the world that public awareness and education are cornerstones of Protected Areas. Without strong public awareness building and environmental education these Protected Areas will stand a very good chance of failing. Public awareness of the PAN, let alone the PANES, presently falls far short and lags behind the rest of the good work that has been done. Environmental education and interpretation has reached new levels in state of the art Protected Areas across the world. Public Awareness and Education is cross-cutting and falls in several of the major competency areas in Figure 17 (including tourism, enforcement, park management and even conservation services); however, the competency can be concentrated in the People and Parks part under Protected Area Network Management. Again, a good start is a short trip abroad for technical staff to visit a PAN where this is done effectively. Other training and capacity building steps are listed in the PANES Implementation Plan.

7.3.5 Monitoring and Enforcement

Training needs for monitoring and enforcement at a first glance pertain to the PAN rather than the PANES; however, it does not make sense to expand Protected Areas if the current state of monitoring and enforcement is inadequate. There are various views on the state of monitoring and enforcement, which differ starkly between the official views of the lead departments and other stakeholders.

7.3.6 Knowledge Management

In any organisation, Knowledge Management (KM) is a critical part of making the organisation function properly, and the machinery for the PAN is no exception. When the PAN is going to be expanded further, this becomes even more important. The essentials of a good KM system revolve around sourcing information, storing it in a secure manner, and making it easily accessible to those who may need it (see Chapter 10 below). End users can include a range of stakeholders. A PA management KM system is currently being developed under the PAN Project and will have its own training needs.

7.4 Action Categories

7.4.1 Implement the Training Programme

The recommendations expressed in *Training Needs Assessment for Protected Area Network Management in Mauritius*[133] must be implemented, as well as the recommendations made in the Implementation Plan. It is proposed that a complete Capacity Building and Training Plan be drawn up that covers training and capacity building needs for both lead institutions, as well as other stakeholders involved as partners in managing the PAN, for easy reference and to facilitate the implementation and monitoring of training.

[133] Mauremootoo, J.R. 2015. *Training Needs Assessment for Protected Area Network Management in Mauritius*. Report produced for the UNDP/GEF Project: 'Expanding coverage and strengthening management effectiveness of the protected area network on the Island of Mauritius'.

Chapter Eight: Environmental Education and Awareness Raising

8.1 Strategic Objective 9

Strategic Objective 9: To disseminate biodiversity information and good practises and influence political and economic decision-makers in favour of biodiversity and conservation priorities for a habitable Planet.

8.2 Awareness Raising

Awareness of the PAN and the state of the environment in Mauritius, amongst all Mauritians, is key to the success of the PAN. A multi-pronged approach to raising awareness amongst all stakeholders, at all levels and making use of all avenues is required. Awareness should not proceed in an *ad hoc* manner, as is so often the case. Many parts of an effective, long-running campaign rely on other parts in order to penetrate a diverse audience in a lasting manner. Therefore, a carefully designed Public Awareness and Information Dissemination (PA&ID) Plan is needed, particularly if designed in close collaboration with stakeholders. Fortunately, Mauritius already has much of the information and communications technology (ICT) infrastructure that is needed. Much information has been collected during the development of the PANES and the elaboration of the management plans of Bras d'Eau and Black River Gorges National Parks, and a number of key actions are listed in the PANES Implementation Plan.

8.3 Environmental Education

Environmental education within organisations outside of NPCS and FS is also of critical importance to the successful implementation of the PANES. The level of knowledge of the PAN and its value amongst political decision-makers, the business sector, students at schools and the general public will directly determine the value placed on the PAN and about future decisions about its use. Global climate change highlights the fact that ecosystem integrity and resilience will need to be prioritised if Mauritius is to survive a rapidly changing world. The provision of fresh water is one example of the crucial role the PAN plays in the lives of so many Mauritians and in the survival of many endangered species. The many components of the PAN mean that there is ample opportunity for putting in place state of the art interpretation in these PAs across Mauritius, and these 'education outlets' must be fully utilised.

It must be stressed that awareness raising and environmental education should be such that a change in behaviour is ultimately affected, and it is not restricted to information sharing only. Experiential learning is particularly effective, as has been shown in programmes 'connecting with protected areas' with youth and other segments of society. This type of approach should be stepped up as a matter of urgency.

8.4 Action Categories

8.4.1 Implement an Awareness Raising Campaign

The awareness raising campaign must be continued under the leadership of the MoAIFS, together with partner organisations, following a Public Awareness and Information Dissemination Plan.

8.4.2 Implement an Environmental Education Programme

An environmental education programme can be initially implemented by the PAN Project PMU, together with partner organisations and in collaboration with the education and awareness sections of NPCS and FS, and as such be transferred to NPCS and FS, as well as other partners.

8.4.3 Develop Interpretation Centres and Programmes

The Protected Areas need to have state of the art interpretation centres as far as possible. Furthermore, visits to the PAs, especially by school children, should be seen as ideal opportunities to infuse environmental education in this 'captive audience' through effective Interpretation Plans.

8.4.4 Capitalise on Existing Infrastructure, Media and Facilities

Mauritius is a country that is strong in ICT. Some media outlets have shown a strong interest in producing a series on the PAN, and this can be done in many innovative ways. Because of its high visibility, film and video provide ideal opportunities for leveraging CSR funding. Interactive and social media can serve awareness raising and environmental education needs very well.

Chapter Nine: Business Model

9.1 Strategic Objective 6

Strategic Objective 6: To secure funding and to maintain the PAN in its present and future forms as expressed in the PAN Vision.

9.2 A Business Model for PAN

Protected Areas the world over struggle to reach financial sustainability. However, because their value in terms of tourism revenue, ecosystem and other services is increasingly recognised, those governments who can afford it, make sure that their Protected Area Networks are adequately funded.

The Business Model for PAN[134] provides an integrated financial strategy that will address questions related to the costs and benefits of the PAN and its expansion, its management, and benefits for the nation at large. It shows how the PAN 'makes sense financially' and what the implications are for the country in terms of its extension.

Typically, a Protected Area Network business model describes how, at least in part, the PAN could pay for itself, and turn a profit for certain stakeholder groups. Such a model provides a general framework to estimate costs and benefits of Protected Areas that can be applied and adjusted with the implementation of the PANES. The model briefly considers the needs of the lead institutions in terms of implementing the PANES.

There are various opportunities related to diversifying income and funding streams. The costs related to managing and expanding Protected Areas, and how such costs are absorbed, have also been considered. Strengthening management of the PAN and expanding the area under protection in terms of the PANES will require additional funds to those currently allocated to the implementing agencies. The National Parks and Conservation Fund is a source of such funds and an important component of the business model.

Existing funding mechanisms and the annual operational costs of both NPCS and the FS form a basis for the business model. The business model details both current realities and the future implications of strengthening management and expanding the PAN. Such a model has been developed through establishing and working with a Working Group comprising of key staff from both NPCS and FS. This is in line with the participative process conducted for PANES to date and ensures that the financial model fits the institutional context closely. Furthermore, this ensures that the model is also well embedded in both NPCS and FS, thus supporting a more effective implementation of the PANES.

[134] Currently under development.

Chapter Ten: Knowledge Management and MELI

10.1 Strategic Objective 9

Strategic Objective 9: To disseminate biodiversity information and good practises and influence political and economic decision-makers in favour of biodiversity and conservation priorities for a habitable Planet.

10.2 Knowledge Management

There are many different definitions of a Knowledge Management (KM) framework. A KM framework allows for systematically and transparently inputting, accessing and adding value to information so that it contributes to the effectiveness and efficiency with which an individual, organisation or network can execute their mandate. A KM framework combines technology, processes and protocols and most critically, the people in a system that manages knowledge for the benefit of the entity and the wider system of which this entity relates to, or is part. In the case of the PANES the entities are those organisations responsible for the management of the PAN and the wider system comprising of stakeholders in Mauritius and internationally. More simply put, a good KM system revolves around the most effective ways of sourcing information, storing such information in a secure manner, and making it easily accessible to those who may need it. Currently such a system is being investigated for the two lead organisations.

10.3 The MELI System

A simple and comprehensive Monitoring, Evaluation, Learning and Intervention (MELI) tool should be established for the PAN. In essence, it can form part of the overall KM framework, as it relies on readily available information (or ways of getting it), and in turn generates reports and information that will inform adaptive management.

Monitoring is the action of determining where implementation of the Action Plan stands. It is the ongoing, systematic collection of data to provide management and the main stakeholders with a good indication of the progress in terms of the Implementation Plan on the use of allocated funds for these purposes.

Evaluation informs the manager and stakeholders of the degree of effectiveness in terms of outcomes and impacts of the activities. Once indicators are identified, baselines must ideally be established against which to measure progress. Evaluation must also assess unplanned outcomes and impacts for which established baseline values may not exist.

Learning refers to continuous learning from, and the insights gained from the results of the monitoring and evaluation. Good practices have already started to be identified and more can be generated as the PAN Project progresses.

Intervention is the evidence-based action resulting from the Monitoring, Evaluation and Learning that must be taken to overcome obstacles or challenges faced during the implementation of the Strategy. The MELI is therefore a system of adaptive management, where collective ownership is encouraged, transparency is promoted, and a greater degree of cooperation and support from all stakeholders can be expected.

While an organisation can monitor its progress in terms of implementing actions in the Implementation Plan, it is neither appropriate nor credible, and indeed very difficult for an organisation on its own to measure the effectiveness and impacts of its actions. It is therefore highly recommended that stakeholders who are affected by the efficacy of an organisation, including potential beneficiaries be involved at some point in the MELI. This is readily achieved by way of stakeholder consultation, working groups and Boards.

10.4 Action Categories

10.4.1 Establish a Knowledge Management System for PAN

Develop and implement a Knowledge Management System for the PAN.

10.4.2 Put in place a MELI System for the PAN

Develop and implement a MELI System for the PAN.

Chapter Eleven: Implementing the PANES

11.1 Strategic Objectives, Action Categories and Implementation Plan

Implementing the PANES involves the detailing and implementation of Actions, which are in support of the Vision and Mission Statement. The Vision and Mission Statement for the PANES have led to a set of Strategic Objectives, under which various Action Categories have been identified in this Strategy. Action Categories, Strategic Actions, Performance Indicators, Main Stakeholders, Lead Parties and Timeframes are listed for each Strategic Objective in the matrix below.

The PANES Implementation Plan further presents an overarching set of Action Categories required to implement the PANES. The PANES is a strategic document, and therefore provides directives to the level of Action Category, under which fall broad Actions with their respective Indicators. Specific Actions are detailed in a related Operational Strategy document, which provides the lead organisations with detailed steps that need to be implemented.

Strategic Objective 1: To establish, expand and maintain a Protected Area Network (PAN) that is representative of ecosystems, safeguards the unique biodiversity of Mauritius and adequately protects its natural assets.					
Action Category	***Strategic Action***	***Performance Indicators***	***Main Stakeholders***	***Lead Parties***	***Timeframe***
1. Strengthen management in the PAN	1.1 Establish a Conservation Planning Unit 1.2 Establish a Biodiversity Stewardship Unit 1.3 Implement Training Programming focussing on top priorities 1.4 Secure funding to adequately resource the PAN	1.1 Functional Conservation Planning Unit 1.2 Functional Biodiversity Stewardship Unit 1.3 Effective training modules completed 1.4 Approved funding	**NPCS**, **FS**, Remote Sensing Unit, MoHL, MSSNSESD, MoFED, NGOs, Private Sector, Landowners	MoAIFS	2017 onwards
2. Expand the PAN into proposed Expansion Zones	2.1 Determine high priority areas and open discussions with landowners 2.2 Negotiate agreements with landowners in line with the Biodiversity Stewardship Programme	2.1 Discussions held with high priority area landowners 2.2 Stewardship agreements in place	**NPCS**, **FS**, MoHL, MSSNSESD, MoFED, NGOs, Private Sector, Landowners	MoAIFS	2017 onwards
3. Conduct Research and Biodiversity Assessments	3.1 Identify information gaps and research priorities for the PAN 3.2 Conduct proposed studies, factoring in the 'ground-truthing' of Environmentally Sensitive Areas mapping and other existing studies 3.3 Develop partnerships with other stakeholders	3.1 A list of identified information gaps and research priorities is compiled 3.2 Reports for each study stored in the PAN GIS and KM system and accessible to stakeholders 3.3 List of partners with MoUs in place	UoM, Ministry of Education MSSNSESD MoOEMRFS **FS** NGOs, Herbarium, Donor Agencies, Private Sector	NPCS	2017 onwards

Strategic Objective 2: To apply effective institutional arrangements and ensure continuous and adequate capacity building for the purposes of implementing the Protected Area Network Expansion Strategy (PANES), as well as for updating and further elaboration as may be needed.					
Action Category	***Strategic Action***	***Performance Indicators***	***Partners***	***Main Stakeholders***	***Timeframe***
1. Institutional Framework	1.1 Establish the required four main competencies, being i) Conservation Planning, ii) Biodiversity Stewardship, iii) Nature-based Tourism Development and iv) IAS Control 1.2 Strengthen other three competencies, being i) Monitoring and Compliance, ii) Awareness and Education, iii) Knowledge Management	1.1 Four main competencies are institutionalised and operating effectively 1.2 Other three competencies are strengthened and more effective	**NPCS** **FS** UNDP, MoFED, MoHL, MSSNSESD, MoOEMRFS	MoAIFS	2017 – 2019
2. Implement the Training Programme	2.1 Top priority training and capacity building for the four competencies must be identified, and put in place: i) Conservation Planning, ii) Biodiversity Stewardship, iii) Nature-based Tourism Development and iv) IAS Control (according to the PAN Training Needs Assessment and Programme) 2.2 Training and capacity building for i) Monitoring and Enforcement, ii) Public Awareness and Environmental Education and iii) Knowledge Management (according to the PAN Training Needs Assessment and Training Programme) 2.3 Develop partnerships with stakeholders	2.1 Training modules for each of the four competency areas effectively implemented with the required participants 2.2 Training modules for each of the three competency areas effectively implemented with the required participants 2.3 List of partners with MoUs in place	**NPCS** **FS** UNDP, NGOs, UoM, Other Partners	MoAIFS	2017 – 2019

Strategic Objective 3: To develop, amend and otherwise continuously improve the legal framework that supports the establishment, maintenance and sustainable use of the Protected Area Network (PAN).					
Action Category	***Strategic Action***	***Performance Indicators***	***Main Stakeholders***	***Lead Parties***	***Timeframe***
1. Legal Reforms	1.1 Address top priority legal reforms required as per Legal Support Paper	1.1 Top priority legal amendments are documented and passed through Parliament	**NPCS** **FS** State Law Office, Other Ministries	MoAIFS	2017 onwards

Strategic Objective 4: To develop tools and safeguards to support and ensure the efficient and effective management of all the different Protected Areas that make up the Protected Area Network (PAN).					
Action Category	***Strategic Action***	***Performance Indicators***	***Main Stakeholders***	***Lead Parties***	***Timeframe***
1. Monitoring and Enforcement	1.1 Prioritise monitoring and enforcement in annual operational planning 1.2 Strengthen monitoring and enforcement 1.3 Develop partnerships with stakeholders	1.1 Monitoring and enforcement is prioritised 1.2 Effective monitoring and enforcement 1.3 List of partners with MoUs in place	**NPCS** **FS** Other Ministries, NGOs, Mauritius Police Force, District and village councils	MoAIFS	2017 – 2026
2. Develop Management Plans	2.1 Prioritise Protected Areas that most urgently require Managements Plans 2.2 Compile Managements Plans for all Protected Areas within the PAN	2.1 List of high priority PAs requiring Management Plans 2.2 Approved Management Plans are put in place and updated	**NPCS** **FS** Other Ministries, Landowners, NGOs, Donor Agencies, Landowners	MoAIFS	2017 – 2019

Strategic Objective 5: To develop innovative programmes and mechanisms to expand the Protected Area Network (PAN) to include all key biodiversity areas as far as possible, including certain private lands.					
Action Category	***Strategic Action***	***Performance Indicators***	***Main Stakeholders***	***Lead Parties***	***Timeframe***
1. Establish Biodiversity Stewardship Programme	1.1 Establish Biodiversity Stewardship Advisory Council 1.2 Establish a Biodiversity Stewardship Unit 1.3 Discuss and negotiate with landowners	1.1 Functional Biodiversity Stewardship Advisory Council meeting regularly 1.2 Biodiversity Stewardship Unit functional 1.3 Agreements in place with landowners	**NPCS** **FS** UNDP, NGOs, State Law Office, Private Sector, Others	MoAIFS	2017 – 2019

Strategic Objective 6: To secure funding and to maintain the PAN in its present and future forms as expressed in the PAN Vision.					
Action Category	***Strategic Action***	***Performance Indicators***	***Main Stakeholders***	***Lead Parties***	***Timeframe***
1. Secure Funding for the PAN	1.1 Secure funding sources 1.2 Administer funds effectively	1.1 Approved funding 1.2 Funding effectively spent on achieving defined objectives	**NPCS** **FS** MoFED, Private Sector, Landowners, Donor Agencies, Other Ministries	MoAIFS	Ongoing until 2026
2. Develop Income Generating Streams for the PAN	2.1 Identify and develop income generating streams through various mechanisms 2.2 Develop partnerships, PPPs and concessions	2.1 Identify, develop and support income generating streams 2.2 MoUs or agreements with partners	**NPCS** **FS** MoFED, Private Sector, Landowners, Donor Agencies, Other Ministries	MoAIFS	Ongoing until 2026

Strategic Objective 7: To restore indigenous ecosystems as essential components of the country's ecological infrastructure for water, biodiversity and other ecosystem services.					
Action Category	***Strategic Action***	***Performance Indicators***	***Main Stakeholders***	***Lead Parties***	***Timeframe***
1. Establish IAS Control Unit	1.1 Setting up of IAS management Unit 1.2 Strengthen IAS Control in Mauritius	1.1 Functional IAS Control Unit operating effectively 1.2 Increased area in which effective IAS Control has been implemented	**NPCS** **FS** UNDP, Donor Agencies, Private sector by way of Corporate Social Responsibility, Landowners	MoAIFS	2017 onwards
2. Establish an Ecosystem Rehabilitation Programme	2.1 Compile an Ecosystem Rehabilitation Programme 2.2 Implement the Ecosystem Rehabilitation Programme	2.1 Approved Ecosystem Rehabilitation Programme 2.2 Ecosystem Rehabilitation Programme effectively implemented	MoAIFS, UNDP, Donor Agencies, Private sector, Landowners	NPCS FS	Ongoing until 2026

Strategic Objective 8: To unlock opportunities that will bring tangible and intangible benefits to Mauritius, including nature-based tourism, local economic development, especially in the rural areas, and leisure areas and spiritual havens. This includes enabling civil society to mainstream biodiversity and conservation into business practices.					
Action Category	***Strategic Action***	***Performance Indicators***	***Main Stakeholders***	***Lead Parties***	***Timeframe***
1. Establish Nature-based Tourism Development Working Group	1.1 Establish the Nature-based Tourism Development Working Group (TDWG) 1.2 Facilitate the establishment of nature-based tourism development	1.1 Operational TDWG 1.2 TDWG supporting nature-based tourism development in and around the PAN	**NPCS** **FS** Private Sector, NGOs, Others	MoT, MoAIFS	2017 – 2018
2. Compile Nature-based Tourism Development Plan	2.1 Compile the Nature-based Tourism Development Plan working together with relevant stakeholders 2.2 Implement the Nature-based Tourism Development Plan	2.1 Approved Nature-based Tourism Development Plan 2.2 Nature-based Tourism Development Plan effectively implemented	**NPCS** **FS** MoT, Private Sector, NGOs, Others	MoT, MoAIFS	2017 – 2018
3. Conduct Research and Assessment	3.1 Determine and commission the top priority research required to facilitate nature-based tourism development	3.1 Reports for each study	**NPCS** **FS** MoT, Private Sector, NGO's, Donor Agencies Tertiary Educational institutes	MoT, MoAIFS	2017 onwards

Strategic Objective 9: To disseminate biodiversity information and good practises and influence political and economic decision-makers in favour of biodiversity and conservation priorities for a habitable Planet.					
Action Category	***Strategic Action***	***Performance Indicators***	***Main Stakeholders***	***Lead Parties***	***Timeframe***
1. Implement an Awareness Raising Campaign	1.1 Compile a Public Awareness and Information Dissemination (PA&ID) Plan 1.2 Implement a Public Awareness and Information Dissemination (PA&ID) Plan for PAN	1.1 Approved Public Awareness and Information Dissemination Plan 1.2 Public Awareness and Information Dissemination Plan implemented effectively	All Ministries, MBC, Newspapers, Private Sector, Schools, NGOs	NPCS FS	Ongoing until 2025
2. Implement an Environmental Education (EE) Programme	2.1 Compile an Environmental Education Programme for PAN 2.2 Implement the Environmental Education Programme for PAN	2.1 Approved Environmental Education Programme 2.2 Environmental Education Programme implemented effectively	**NPCS** **FS** MSSNSESD, MoOEMRFS, UoM, Schools, NGOs	Ministry of Education	Ongoing until 2025
3. Establish Interpretation Programmes and Centres	3.1 Develop and implement an Interpretation Programme to include development of Interpretation Centres 3.2 Implement the Interpretation Programme	3.1 Approved Interpretation Programme, including Interpretation Centres 3.2 Interpretation Programme implemented effectively	MSSNSESD, MoOEMRFS, UoM, Schools, NGOs, Private Sector	NPCS FS	2017 – 2019
4. Capitalise on Existing Infrastructure, Media and Facilities	4.1 Identify 'quick win' opportunities and partners 4.2 Prepare content for use in popular media	4.1 List of opportunities and partners 4.2 Materials distributed through media	**NPCS** **FS** MBC, Newspapers, Private Sector,	MoAIFS	2017 – 2018
5. Establish a Knowledge Management (KM) System	5.1 Define a KM System 5.2 Implemented the KM System	5.1 Approved KM System 5.2 KM System implemented effectively	MoHL, MSSNSESD, MoOEMRFS, UoM, NGOs, Donor Agencies	NPCS FS	2017 – 2019

6. Put in place a MELI System	6.1 Define the MELI System 6.2 Build MELI into annual performance monitoring within the institutions	6.1 Approved MELI System 6.2 MELI System embedded into institutional annual performance monitoring and linked to the Training Programme	**NPCS** **FS** MoFED, Donor Agencies, Private Sector	MoAIFS	2017 – 2018

11.2 Operational Strategy for PANES

The Operational Strategy for PANES is a tool for use by the two lead institutions. It provides a link between the broad PANES and more detailed, practical implementation. It is derived from the PANES Implementation Plan, which links logically to the Vision, Mission Statement, Strategic Objectives and Action Categories detailed in the Strategy.

The Operational Strategy provides a simple road map that each organisation can follow to implement the PANES. The implementation of these Strategic Actions will need to be adapted to circumstances at the time, and the application of the MELI system can inform such changes.

The Operational Strategy should ideally be reviewed annually.

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