



PROJECT IDENTIFICATION FORM (PIF)

PROJECT TYPE: Full-sized Project

TYPE OF TRUST FUND: LDCF

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PART I: PROJECT INFORMATION

Project Title:	Mainstreaming biodiversity into the management of the coastal zone in the Republic of Mauritius		
Country(ies):	Republic of Mauritius	GEF Project ID:	5514
GEF Agency(ies):	UNDP	GEF Agency Project ID:	4843
Other Executing Partner(s):	Mauritius Oceanography Institute (MOI) in collaboration with Rodrigues Regional Assembly and national entities in charge of environment, fisheries, tourism, agriculture and physical development	Submission Date:	August 22, 2013
GEF Focal Area (s):	Multi-focal Areas	Project Duration (Months):	60
Name of parent program:	N/A	Project Agency Fee (\$):	443,129

A. INDICATIVE FOCAL AREA STRATEGY FRAMEWORK:

Focal Area Objectives	Trust Fund	Indicative Grant Amount (\$)	Indicative Co-financing (\$)
BD 2: Mainstream Biodiversity Conservation and Sustainable Use into Production Landscapes, Seascapes and Sectors	GEFTF	2,011,133	12,720,000
BD1: Improve Sustainability of Protected Area Systems	GEFTF	1,907,132	5,300,000
LD 3: Reduce pressures on natural resources from competing land uses in the wider landscape	GEFTF	746,256	2,380,000
Total Project Cost		4,664,521	20,400,000

B. INDICATIVE PROJECT DESCRIPTION SUMMARY

Project Objective: To mainstream the conservation and sustainable use of biodiversity and ecosystem services into coastal zone management and into the operations and policies of the tourism and physical development sectors in the Republic of Mauritius through a 'land- and seascape wide' integrated management approach based on the Environmental Sensitive Areas' (ESAs) inventory and assessment.

Project Component	Type	Expected Outcomes	Expected Outputs	Trust Fund	Indicative Grant Amount (\$)	Indicative Cofinancing (\$)
1) Landscape-level planning and sectoral mainstreaming	TA	<p><i>Threats to biodiversity and ecosystem function are addressed across six landscapes containing 27,000 ha of Environmentally Sensitive Areas (ESAs) with critical importance for biodiversity and the supply of ecosystem services:</i></p> <p>(1) Balaclava-Pointe aux Piments Landscape (2) Le Morne Landscape (3) Vieux Grand Port Landscape (4) Poudre d'Or - Ile d'Ambre - Roche Noire Landscape (5) Northern Islets Landscape (6) Rivière Coco-SEMPA-Mourouk Landscape <i>(Total landscapes surface is approx. 150,000 ha)</i></p> <p>-Reduction in pressures to Coastal Wetlands, Shore and Offshore ESAs Systems in general and specifically within target landscapes (e.g. loss of coastal wetland habitats, coral trampling and unsustainable fishing).</p>	<p>1.1 Planning: Six landscape level management plans focusing on biodiversity conservation and sustainable land use are produced and supported by an open-access geo-based information system based on the Government of Mauritius Ecologically Sensitive Areas (ESA) Study. The planning across ESAs facilitates the application of the threat mitigation hierarchy—to avoid, and reduce threats to biodiversity and ecosystem function.</p> <p>1.2 ESA spatial mainstreaming Plan is legislated and enforced: (i) landscape level management plans are implemented- biodiversity and ecosystem services protection are incorporated into operational permitting/licensing systems governing land use in the coastal zone; (ii) critically sensitive areas designated as 'set-asides' where physical development/land clearance is prohibited.</p> <p>1.3 Standards and a certification system for the development of the tourism sector facilitate the mainstreaming of ESA management into their operations: (i) specific guidance on the application of the biodiversity mitigation hierarchy to mitigate the impacts of tourism enterprises is developed, tested and adapted; (ii) the effectiveness of practices monitored; and (iii) a recognised certification label for tourism enterprises is in place.</p> <p>1.4 A network of jointly managed ESA sites is developed across the six target landscapes (focus on Coastal Wetlands, Shore and Offshore ESA Systems).</p>	GEFTF	2,000,000 [\$1,900K from BD and \$100K from LD]	12,220,000

Project Component	Type	Expected Outcomes	Expected Outputs	Trust Fund	Indicative Grant Amount (\$)	Indicative Cofinancing (\$)
		- Tourism sector funding channelled to biodiversity increase (baseline and targets t.b.d.)	This involves local governments, the tourism industry, public utilities, housing & land, resource users and other relevant entities. Collaborative multi-stakeholder platforms for managing the sites are formed to support the process.			
2) Integration of MPA management into the wider landscapes	TA	<p><i>Threats to biodiversity in the offshore environment are mitigated and fish stocks protected in at least 8,000 ha of seascapes through the improved management of MPAs and no-take zones:</i></p> <ul style="list-style-type: none"> - Improvement in ecological indicators based on site-level assessment. (benthic composition, fish and invertebrates inventories) - Scores for METT, Financial Sustainability Scorecard for the MPA Sub-System and PA Mgt Capacity Development Scorecard show improvements vis-à-vis the baseline (% 's tbd) 	<p>2.1 Management effectiveness of the MPAs network is improved through management planning (where plans do not exist) and operations and business planning, where needed, alongside with improved surveillance, enforcement and ecological monitoring of MPAs: (1) Mauritius Main Island MPAs are strengthened (Balaclava, Blue Bay); (2) Rodrigues MPAs are strengthened through a community-based co-management approach (SEMPA and community proposed no-take zones Riviere Banane, Anse aux Anglais, Grand Basin and Passe Demi).</p> <p>2.2 An investment framework for MPAs is developed and contributes to improved financial sustainability of the PA sub-system: (i) a financing strategy for the MPA sub-system is developed and approved; (ii) reinvestments from the tourism sector in MPA management is facilitated; and (ii) increased predictable national budgetary appropriations</p>	GEFTF	1,796,000 [from BD]	4,800,000
3) Erosion control in sensitive areas	TA	<p><i>Ecosystem services are restored within:</i></p> <ul style="list-style-type: none"> - Erosion and soil loss are reduced in 200 ha erosion-prone watersheds - Ecosystem services restored in 15.4 ha in freshwater wetlands + 23.9 ha of associated buffer. - Evidence from other key LDPMAT indicators 	<p>3.1 Sustainable land management (SLM) techniques are applied to control erosion and water course sedimentation in the SEMPA watershed. Focus on Rivière-Coco and/or Rivière Mourouk applying e.g. terracing, fire management, waterway revegetation.</p> <p>3.2 Grand Baie Wetlands' Plan implemented, ensuring the restoration of essential ecosystem services in the 'Grand Mare Longue' 12 wetlands' network in Landscape #5 (e.g. water filtration, storage and flood control services, habitat and recreation) .</p>		646,256 [from LD]	2,380,000
		Subtotal			4,442,256	19,400,000
		Project Mgt Cost (PMC)		GEFTF	222,265	1,000,000
		Total Project Cost			4,664,521	20,400,000

C. INDICATIVE CO-FINANCING FOR THE PROJECT BY SOURCE AND BY NAME IF AVAILABLE, (\$)

Sources of Cofinancing	Name of Cofinancier	Type	Amount (\$)
National Government	Public investments executed by relevant sectoral ministries for CZM, MPAs and SLM (as per Programme-Based Budgets for 2013-2015)	Cash	18,400,000
National Government	Rodrigues Regional Assembly	Cash	1,000,000
Local Government	District governments in the targeted landscapes, Maurice Ile Durable Programme	Investment	650,000
Private Sector	Tourism operators in target landscapes	Cash	200,000
GEF Agency	UNDP	Cash	150,000
Total Co-financing			20,400,000

D. INDICATIVE TRUST FUND RESOURCES (\$) REQUESTED BY AGENCY, FOCAL AREA AND COUNTRY

GEF Agency	Type of Trust Fund	Focal Area	Country Name	Grant Amount (\$) (a)	Agency Fee (\$) (b)	Total (\$) c=a+b
UNDP	GEFTF	Biodiversity	Mauritius	3,918,265.00	372,235.18	4,290,500.18
UNDP	GEFTF	Land Degradation	Mauritius	746,256.00	70,894.32	817,150.32
Total Grant Resources				4,664,521.00	443,129.50	5,107,650.50

E. PROJECT PREPARATION GRANT (PPG)

	Amount Requested (\$)	Agency Fee for PPG (\$)
• (up to) \$150k for projects up to & including \$6 million	130,000	12,350

PART II: PROJECT JUSTIFICATION

A. PROJECT OVERVIEW

A.1. Project Description.

1. **Overview.** The project aims at conserving and sustainably managing land across six multi-use coastal and marine landscapes in the Republic of Mauritius (five in Mauritius Main Island and one in Rodrigues): (1) Balaclava – Pointe aux Piments; (2) Le Morne; (3) Vieux Grand Port; (4) Poudre d’Or - Ile d’Ambre - Roche Noire; (5) Northern Islets; (6) Rivière Coco-SEMPA-Mourouk Landscape (see Table 2 and Maps 1 and 2). Together they cover some 150,000 hectares of land- and seascapes and harbour within this area sites that are high in biodiversity values and important for the generation of ecosystem services (e.g. shoreline maintenance, storm protection, soil formation and retention, water provision and flood control). Biodiversity and ecosystem service values are being lost in all six landscapes due to careless coastal developments that reduce and degrade natural habitats, and cause land degradation, undermining ecosystem functionality and resilience, especially in sensitive lagoon areas. These threats are compounded by other anthropogenic pressures that exacerbate degradation (i.e. land-based pollution, climate change). In order to identify focus areas for environmental action in the country, in 2010 the government commissioned a comprehensive, spatially-based study to identify environmentally sensitive areas (ESAs). ESAs are defined as areas that are rich in biodiversity and that render essential ecosystem services, but which suffer from growing anthropogenic pressures. More than 1,300 ESA locations were identified, mapped and assessed in Mauritius and Rodrigues. They are classified according to 14 different ‘ESA Types’ that are grouped under five ‘ESA Systems’: 1) Wetlands; 2) Shore; 3) Offshore; 4) Forests; and 5) Stable Supply (of Water) (see Table 3 and Maps 3 and 4). The ESA Study provided a classification system for the identification and management of all ESAs. However, with the exception of forests, the recommendations emanating from the study have not heretofore been implemented. The protection of Forest ESAs is being engineered through the expansion of Mauritius’ terrestrial Protected Area Network (the “PAN”), co-supported by a UNDP-GEF Project. Coastal and marine areas have yet to receive due attention. Key habitats along the coast and in near shore waters of both Mauritius and Rodrigues face high anthropogenic pressures. Yet, they remain largely unprotected and are being unsustainably managed. ESAs within those areas fall under 7 ESA types and cover 49,058 hectares on both Mauritius and Rodrigues (this represents 40% of the total ESA surface, while the six landscapes in question encompass approximately 29,000 ha of these 7 ESA types) The project will address the threats to biodiversity in Coastal Wetlands, Shore and Offshore ESAs within the target landscapes through a three-pronged approach. First, it will support the incorporation of ESA recommendations into policies and enforceable regulations pertaining to coastal zone management (CZM). With a special focus on tourism and physical development in the coastal zone, threats to biodiversity and ecosystem functions and resilience will be mitigated. Second, the project will support the effective management of marine protected areas (MPAs) across the Republic, given that they are an important part of the coastal and marine land/seascapes targeted by the project. Third, the project will take measures to arrest land degradation in sensitive locations, designed to reduce coastal erosion and sedimentation and help restore ecosystem functions in key wetland areas. As a result of the project, biodiversity within coral reefs, seagrass beds, mangroves, inter-tidal mudflats, sand beaches and dunes, and coastal freshwater marshlands will be better protected and managed sustainably, both in Mauritius mainland and in Rodrigues.

2. **Context and issues.** The Republic of Mauritius is a small island state with a total land surface of 2,040 sq km, encompassing the main island of Mauritius¹ (1,865 sq km), Rodrigues (109 sq km) and two groups of outer islands, St. Brandon Archipelago (3 sq km) and Agalega (21 sq km). The country’s Exclusive Economic Zone (EEZ) extends over an area of more than two million square kilometres.

3. **Biodiversity Significance, Ecosystem Services and Resilience.** Mauritius forms part of the Western Indian Ocean Islands, one of the 25 internationally recognized biodiversity ‘hotspots’. The tropical climate, topography and history of isolation, has resulted in the evolution of a diverse biota with a high degree of endemism. Around 46% of all higher plants, 80% of birds, 94% of reptiles and 40% of the bat species are endemic. Terrestrial biodiversity is forest-dependent. Much of the extant forest has been lost: land clearance and forest degradation has already impacted more than 90% of Mauritius island’s land surface.² Marine biodiversity is in a better condition, but is also threatened. Extensive reef systems surround all of the islands of the archipelago. Rodrigues, in particular, harbours a large reef expanse, three times the size of the island. A total of 290 marine families comprising 1656 species have been recorded within the inshore area. Around 50 species are of economic importance including fish, molluscs, lobsters and shrimp. The marine fish fauna is exceptionally rich with 786 species identified. Coral diversity is also significant; 159 species of scleractinians have been identified. Mauritian seascapes and coastal areas are particularly important for a number of migratory species such as tuna and other bony fish, cartilaginous fish, marine turtles, whales, dolphins and many species of sea birds. St. Brandon Island in the Cargados Shoals is the nesting ground for two species of endangered marine turtles (*Chelonia mydas* and *Eretmochelys imbricate*) and is an important breeding ground for numerous seabird

¹ Including the offshore islets

² Forests, scrub and grasslands cover approximately 25% of Mauritius’ land surface and 30% of Rodrigues, and within it only a fifth of it has significant native content, i.e. grade 1 and 2 native vegetation as per the Page & D’Argent 1997 forest quality categorization.

colonies as are Round Island, Serpent Island and the islets around Rodrigues. Three Ramsar sites are recognised on Mauritius main island and are important habitats for more than a dozen regularly visiting migratory bird species as well as for 3 species of endemic plants.

4. Most of the useable land on the island of Mauritius has been put to production use. In spite of the extensive degradation and transformation that has occurred in many areas, coastal ecosystems and adjacent landscapes still maintain their basic ecological functions. The coastal strip provides prime land for habitation, recreation and tourism, while seascapes provide the basis of food provision through fisheries and also the country's main touristic attraction—beaches, nautical sports etc. Lagoon habitats are especially important in this regard. They contribute to the overall productivity of coastal waters by supporting a variety of habitats, including salt marshes, seagrasses, and mangroves. Ecosystem services provided by seagrass beds are rated the third most valuable globally on a per hectare basis – and Mauritius' ESAs include more than 21,000 ha of seagrass and algal beds, 84% of which are in Rodrigues. Seagrasses are sometimes labelled ecosystem engineers, because they partly create their own habitat: the leaves slow down water-currents increasing sedimentation, and the seagrass roots and rhizomes stabilize the seabed. Mangroves provide a variety of services: storm protection, sediment retention, filtration services, carbon sequestration and habitat for several species of fish and crustaceans. Many commercially important fish species directly depend on the habitats provided by the extensive root systems of mangroves during their juvenile grow outstage.

5. *Development Context.* The Republic of Mauritius is a stable democracy with high levels of human development (HDI is 0.737) and enjoying the fifth highest income per capita in Africa (current US\$8,755).³ The country also ranks fifth globally, in terms of population density (637 inhabitants per sq km, with 97% of its 1.3 million inhabitants living on Mauritius Island). Mauritius has secured remarkable welfare achievements in terms of increased life expectancy, lowered infant mortality and infrastructural development. The current development model is centred around the expansion of local financial institutions and the development of a domestic information telecommunications industry. Although the rate of population growth and fertility have decreased sharply since the mid-1990's, the high density and intensity of economic activities translate into competition for land, which poses a significant pressure on biodiversity and ecosystem services. Until the late 1990's, sugar cane production and associated manufacturing constituted the main sector in the economy, but the economy is undergoing a massive transformation. Currently, the entire agricultural sector contributes less than 3% of GDP.⁴ The tourism industry has grown rapidly in recent years (total revenue from the sector represents more than 30% of foreign earnings⁵), as have textiles and apparel manufacturing, financial services and, more recently, fish processing alongside with information and communications technologies. With at least 16% of GDP currently derived from international tourism, Mauritius is dependent on the maintenance of the natural beauty and services provided by its marine and terrestrial ecosystems. A similar situation applies to fisheries, where the availability of fish stocks, including of migratory species depends on the health of marine ecosystems. This is particularly important in the case of Rodrigues, given the island's remoteness and the local population's direct dependence on fish for food security and livelihoods.

6. *The Target Landscapes.* Six non-contiguous coastal and marine landscapes, covering some 150,000 hectares have been selected by the Government as the focus of project intervention. The choice was based on their biodiversity significance, level of threat, the importance of the ecosystem services rendered and the opportunity for sustainable management. The landscapes are: (1) Balaclava-Pointe aux Piments; (2) Le Morne; (3) Vieux Grand Port; (4) Poudre d'Or - Ile d'Ambre - Roche Noire; (5) Northern Islets; and (6) Rivière Coco-SEMPA-Mourouk. These landscapes comprise a large proportion of the ESAs in Mauritius under the Coastal Wetlands, Shore and Offshore categories. Any approach to biodiversity and coastal ecosystem management in these landscapes will need to reconcile physical development needs with conservation and sustainable land management. Effective mainstreaming of BD conservation and SLM into development is imperative. Three of the six landscapes include MPAs, which need to be better managed – to improve their effectiveness in addressing threats and eventually expanded to extend protection to core refugia for biodiversity. All of the targeted landscapes have considerable tourism attractions and tourism development is a major driver of land use change. The North, Le Morne, Mahbourg and Blue Bay are prime tourism destinations, while new developments are rapidly taking place on the eastern side of Mauritius island.

7. *The principal threats to biodiversity and ecosystem services are summarised below:*

Threat to biodiversity and threat drivers	Impact on biodiversity and ecosystem services
<p><i>(i) Habitat fragmentation and land use change.</i></p> <ul style="list-style-type: none"> ▪ Mangroves are still at risk from land use conversion, even though the loss of forest in Mauritius has slowed since 2005 and mangrove cutting has been banned since 2008. This is due to growing demand for physical development on high quality land, particularly in prime coastal areas. ▪ Coastal marshlands (most of which located in Flacq and Riviere du Rampart) are threatened by backfilling linked to the expansion of the built environment. This threatens a number of endemic plants found along the margins of marshlands. ▪ Beaches and sand dunes are experiencing erosion, mostly due to anthropogenic pressures. In many places the legal setback for construction is not being respected. ▪ Coral, mudflats and seagrassbeds suffer from a variety of threats. Reef trampling, careless anchoring practices and excess boat speed inside lagoon areas can damage coral. Land-use change upstream often results in increased sedimentation of lagoon areas, affecting water chemistry and oxygen levels. 	<ul style="list-style-type: none"> ▪ Loss of mangroves results in the reduction in the coastal storm protection and fish nursery services that these ecosystems naturally render. Where mangroves have been cleared, sediments are not properly filtered leading to high rates of soil runoff into lagoon areas, increasing turbidity -- shading the amount of sunlight that hits the reef area, and affecting overall lagoon productivity. ▪ Beaches sand dunes are important habitats for a number of coastal species and key recreational areas -- services that will be forfeited with the loss of these areas. ▪ Coastal livelihoods become impoverished as lagoon ecosystems become degraded. These unique habitats, so important for Mauritius, are especially vulnerable to physical, ecological, and associated societal disturbances. Because not all of the disturbances can be directly managed on site (e.g. climate change, ocean acidification), it is very important to reduce stressors to lagoon environments. The loss of their recreational value has a direct

³ UNDP 2012, WB Data 2012.

⁴ WB Data (2011 figure). Also, the contribution of the sugar sector to export earnings declined from 24% in 1994 to 11% of in 2009. Observatory of Economic Complexity [\[Link\]](#)

⁵ WB Data.

<i>Threat to biodiversity and threat drivers</i>	<i>Impact on biodiversity and ecosystem services</i>
Seagrass beds are in retreat and it is believed that it is mostly due to anthropogenic causes—sedimentation from coastal erosion (amplified by physical development and unsustainable land use) being a key issue.	bearing on tourism. Seagrassbeds will cease to capture carbon and will no longer play their part in the marine food chain. The sediment deposition function which is essential is also immediately lost.
<i>(ii) Overexploitation.</i> <ul style="list-style-type: none"> Reef resources, including fish, octopus and crustaceans, are at risk from overexploitation. Lagoon overfishing is particularly prevalent in Rodrigues, where fish catch have seen steep declines until management intervention could ensue. 	<ul style="list-style-type: none"> Fish stocks/populations, and the diversity of useful fish species, are reduced due to the simplification of the marine food chain and the significant off-take of biomass. Livelihoods that depend on fishing are negatively affected. Recreational values of lagoon habitats are also lost on this account, as sports fishing and diving depend on the health of marine life within lagoons.
<i>(iii) Erosion, invasive alien species (IAS) and pollution:</i> <ul style="list-style-type: none"> Land-based pollution from the increased economic activities causes eutrophication and hypoxia of marine life. So does excess sediment as a result from erosion, particularly in steep slopes, where the natural vegetation cover has been removed and where no soil retention measures have been applied. IAS are a persistent threat to Mauritian biodiversity and has been a particular menace for terrestrial habitats. In the coastal marine habitats, the impacts of IAS introduction on offshore islets have been pervasive. The drainage of ballast waters in port areas is a known—and avoidable—pathway for IAS invasion. It is currently poorly controlled in Mauritius, in spite of regulations. 	<ul style="list-style-type: none"> Eutrophication and hypoxia affects all key functions of marine life, adding a very strong stressor to the lagoon environment, which directly depend on sunlight and oxygen for life cycle functions. If excessive, as seen, it breaks down resilience and creates ‘dead zones’ -- e.g. in the area around Port Luis, where the marine ecosystems entered into total collapsed and became too simplified and too poor in biomass. Excess sediment in lagoons is most severe around river mouths and can be seasonally critical (e.g. during the rainy season). IAS infestation (and pollution) disrupts natural ecological relationships and resilience, with considerable costs to the economy (e.g. beaches may be shut down and fishing suspended due to fish die-off or toxic algae invasion).
<i>(iv) Climate change (expected impacts on biodiversity).</i> <ul style="list-style-type: none"> Increase in the frequency of tropical storms and sea level rise resulting in loss of coastal habitats and untimely ecological disturbances. More frequent and extensive incidents of coral bleaching can be expected. Increased CO2 concentration in the ocean causes acidification of the water, which significantly disrupts the life cycle of calcereous marine species. Certain species, fragmented landscapes and especially coral reefs are vulnerable. 	<ul style="list-style-type: none"> The functionality of certain ecosystems is especially vulnerable to environmental variations associated with changes in sea level, increased sea temperature and ocean acidification, all of which can be traced to known climate change impacts. These are additional stressors gradually affecting ecosystem resilience, on top of all others stressors, and they may push ecosystems and species beyond resilience thresholds. Another incident of massive coral bleaching can have a pervasive impact on tourism.

Land/Seascape Level Governance

8. ***Coastal zone management*** Mauritius has made important strides in advancing the coastal zone management agenda. In 2010, an Integrated Coastal Zone Management (ICZM) Framework was prepared by the *Ministry of Environment and Sustainable Development* (MoESD) and it is currently under implementation, with MoESD being responsible for coordination among with various entities. There are various tools for land/seascape level governance—Environmental Impact Assessments (EIA) and sectoral permitting systems with respect to tourism, land use and physical development, being the prime ones. They provide, alongside with relevant policies, a framework for mainstreaming biodiversity into CZM in Mauritius. MoESD is responsible for undertaking EIAs, for which the legal and administrative framework is in place. The Ministry also carries out environmental inspection. It also has sections dealing respectively with information and education, pollution abatement and control, policy and planning, environmental law and CZM. MoESD has been directly involved in the identification of ESAs by undertaking and validating the ESA Study. In addition to EIA, various types of sectoral permitting processes affect biodiversity and ecosystem services in the coastal zone. The *Ministry of Fisheries* (MoF) is responsible for issuing fishing permits to individuals and licenses to fishing vessels. On the coastal side, the *Ministry of Housing and Lands* (MHL) and the *Ministry of Tourism and Leisure* (MTL) are key entities with jurisdiction over sectoral development permitting systems. The former is responsible for the land-cadastre and the issuance of permits for the expansion of built-up areas. The *Tourism Authority*, the operational arm of MTL, is responsible for issuing operating licenses for hotels, restaurants and other tourism enterprises, including pleasure boating, dolphin watching, kite surfing and nautical activities. In addition, physical development also falls under three key entities. The first is the *Ministry of Local Government and Outer Islands* (MLG), which handles access to and solid waste management on islets and remote islands.⁶ The other two entities are the *Ministry of Energy and Public Utilities* (MEPU) and *Ministry of Public Infrastructure, National Development unit, Land Transport and Shipping* (MPI). Their role in authorising landscape level investments is important, but whether or not physical infrastructure will affect biodiversity and ecosystem services depends primarily on the outcomes of EIA processes. Another key entity for CZM is the *Beach Authority*, which operates under the aegis of the MLG and plays a key role in regulating, maintaining and enforcing access to and use of public beaches. There are currently more than 90 proclaimed public beaches throughout the Republic—all of which are ESAs. There has recently been a push to introduce “beach reprofiling” projects with the aim of expanding recreational development areas. The impacts and benefits of these undertakings on biodiversity and ecosystem services remain to be assessed.

9. On Rodrigues Island, jurisdiction over land/seascape level management has been delegated to the *Rodrigues Regional Assembly* (RRA), which has set up specific sectoral or thematic Commissions.⁷ The RRA is constituted with 21 members and an Executive Council headed by a Chief Commissioner. The Council meets every week to make decisions, draw up laws and manage the regional budget.

10. ***Protected Areas.*** PAs have heretofore constituted the main vehicle for biodiversity conservation in Mauritius. Three types of PAs are relevant in terms of coastal and marine ecosystem conservation: coastal PAs (which are ‘terrestrial’), protected islets and purely marine PAs. The management of State-owned terrestrial PAs is shared by two sub-divisions of the MoA: the *Forestry Service* (FS) and

⁶ Mauritius is divided into nine districts which consist of different cities, towns and villages. The island of Rodrigues gained autonomous status in 2002. Seven of the nine districts, are coastal (namely : Flacq, Grand Port, Savanne, Rivière Noire, Port Loius, Pamplemousses, Rivière du Rempart). Districts on Mauritius Island are divided into 1 city, 4 towns and 130 villages. On Rodrigues, there are 9 municipalities.

⁷ The Commission for Environment, Tourism, Forestry, Fisheries and Marine Parks is responsible for environment protection and conservation and other linked areas falling under sustainable development, such as tourism, fisheries and reforestation.

the *National Parks and Conservation Service* (NPCS).⁸ Terrestrial PAs include coastal forests (two within target landscapes⁹) and various coastal wetlands, including mangroves and coastal marshlands, located in State lands (all of which are ESAs but remain mostly unprotected, except for three RAMSAR sites). Not all of the coastal forests and wetlands are currently receiving due management attention. There is a broad PA management plan for these areas, but they are not yet integrated into an overall land-use plan. In addition, MoA is also responsible for the management of biodiversity on protected islets, six of which are comprised within Landscape #5 (see Map 1), covering 563 hectares. Of these, three are being explored by tourism operators. A Management Plan for the Protection and Conservation of Islets was prepared in 2004, but implementation is incipient. In turn, responsibility for purely marine MPAs involves several more entities (Table 1 provides an overview). Responsibility for all PAs in the Rodrigues' region, including of protected islets and MPAs, falls under the RRA. The *Ministry of Fisheries* (MoF) has responsibility for the management of Fishing Reserves, as per the 2007 'Fisheries and Marine Resources Act'.¹⁰ In practice, MoF delegates the direct authority for MPA management either to Albion Fisheries Research Centre, the Oceanographic Institute or to a site-level 'park authority', e.g. the Blue Bay Marine Park Patrol and Visitors Centre.

11. On Mauritius Island, MPAs cover some 6,000 hectares. Of these, the six fishing reserves were established in the 1980's, but are managed mostly with a view to production. Two Marine parks (proclaimed in 1997 with regulations passed in 2001) are managed for conservation and sustainable use (Balaclava and Blue Bay). Blue Bay has an approved management plan devised under the previous UNDP-GEF MSP "*Partnerships for Marine Protected Areas in Mauritius and Rodrigues*" (864 "Mauritius MPAs"). There are in addition, two turtle reserves on islets (Fregate and Pearl, but which fall outside the scope of this project). On Rodrigues, key marine environments enjoy a reasonable level of protection. In 2009, the South East Marine Protected Area or 'SEMPA', was proclaimed as a multi-use MPA with 4,343 hectare (3,604 ha inside the lagoon 738 ha outside). There have been gradual improvements in SEMPA's management effectiveness (based on a participatory approach. In 2007, the RRA gazetted four Marine Reserves as no-take zones in the northern seascape of the island. Both the SEMPA and no-take zone zones were identified by fishermen and -women through participatory processes. The zones are demarcated, management plans have been produced and alternative livelihood projects have been trialled.

Table 1. Overview of marine protection in Mauritius (see also Box 1 in Annex)

Type of MPA and site name	Location (Mauritius / Rodrigues)	Year of designation	Surface terrestrial (ha)	Surface marine (ha)	Total surface (ha)	Management authority
<i>Conservation and sustainable use MPAs *</i>			200	5,181	5,381	
South East Marine Protected Area	R	2009	0	4,343	4,343	RRA co-managed by fishermen association
Balaclava-Baie d' Arsenal Marine Park	M	Proposed	200	485	685	To be defined (terrestrial area may be larger)
Blue Bay Marine Park	M	2000	0	353*	353	Blue Bay Marine Park Patrol & Visitors Centre
<i>No-take Zones</i>			0	2,421	2,421	
Four marine reserves **	R	2007	0	2,421	2,421	Marine Reserves Coordination Committee
<i>Fishing Reserves</i>			1,355	4,447	5,802	
Reserved Fishing Areas in Rodrigues	R	1984	0	1,060	1,060	RRA
Flacq	M	1983	297	303	600	Ministry of Fisheries
Trou d'Eau Douce Fir	M	1983	558	142	700	
Port Louis	M	1983	500	742	1,242	
Grand Port – Mahebourg	M	1983	0	2,200	2,200	
<i>Turtle Reserves</i>			50	0	50	
Fregate Island Turtle Reserve	M	Proposed	30	0	30	Ministry of Agro-Industry and Food Security / Ministry of Local Gov and Outer Islands
Pearl Island Turtle Reserve	M	Proposed	20	0	20	
TOTAL			1,805	12,049	13,854	

Notes: * Declared Marine Parks under the Wildlife and National Parks Act in 1997, and reclassified as Marine Protected Areas (MPAs) under the Fisheries and Marine Resources Act of 2000. Blue Bay was designated Ramsar site in 2008, but the terrestrial area is not within the MPAs' legally gazetted boundaries. Balaclava awaits re-gazettal with an expanded area. ** These are Riviere Banane, Anse aux Anglais, Grand Basin and Passe Demi.

12. *Tourism and Biodiversity*. The country receives some 960,000 tourists per year (2011/12).¹¹ Repeatedly awarded as a "top island destination", the country has the highest rate of returning visitors in the world. Key attractions are beaches and water sports, but equally the environment, the climate and the high quality of services rendered by hotel and restaurant establishments. Recently, dolphin and whale watching has become a key attraction. The impacts of tourism on biodiversity and ecosystem services are closely related to scale. MoESD posits there is a direct correlation between the ratio of coastline occupation and loss of habitats in these areas; the number of coastal hotel sites went up from 29 in 1990, to 48 in 2004, to 116 in 2012.¹² Also, many—though not all—of the negative anthropogenic impacts seen in lagoon environments can be directly traced to the intensity of tourism activities. At the same time, eroded beaches, dead coral and poor quality coastal waters undermine the overall attractiveness of Mauritius as a destination. There is room for a comprehensive approach to managing tourism, so that ESAs become an integral part of the sector's development. Although elements of this "marriage" between biodiversity (including ecosystem services) and tourism are enshrined in MTL's vision, mission and strategy. The practice is yet to follow, even though there have been important advances lately. E.g. MTL, in collaboration with the Mauritius Standards Bureau and tourist

⁸ A separate and new category are private land reserves, for which a legal and management framework is emerging with support from the PAN project.

⁹ Les Mares (5 ha) is within Landscape 1, and Bras d'Eau (472 ha) within Landscape 3.

¹⁰ Act No. 27 of 2007 was enacted "to amend and consolidate the law relating to the management, conservation, protection of fisheries and marine resources and protection of the marine ecosystems".

¹¹ National Statistics (2011/12); WB Data (2012).

¹² Data from Ministry of Housing and Lands (2009 and 2013).

industry stakeholders have developed a “Draft Eco Label Standard” for the industry. There is still considerable progress to be made in this respect, including assessing the advantages and disadvantages of national vs. international certification and labelling. The former is considered expensive by operators, but the latter has the advantage of broader recognition and internationally set standards.

13. **Baseline Programmes.** The baseline may be broken into three parts: CZM, MPAs and the management of land in critical watersheds. More than 80% of the relevant baseline investments come from State budgetary resources. The assessment of relevant amounts was based on an analysis of the current Programme-Based Budget, consolidated by the Ministry of Finance and Economic Development for the period 2013 to 2015, with inputs from sectors (see Table 4 in [Annex](#)) and extrapolated for the project duration.¹³

The financial baseline for this project amounts to \$35.5 million and is broken-down as follows:

14. **Coastal Zone Protection (total baseline \$22.3M):** As part of MoA, NPCS and FS execute various programmes pertaining to the management of coastal forest PAs, coastal wetlands and protected islets. Relevant programmes for CZM under MoA (**Agriculture/Terrestrial BD**) represent a baseline of \$1.7M. MoESD is currently modernising its systems and internal processes for the management of EIAs, aimed at introducing more transparency, ease of access and effectiveness. There are also other relevant initiatives executed by the Ministry, e.g. on beach rehabilitation. The baseline investments executed by the MoESD that are relevant for the CZM aspects of the project amount to \$3.8M (Environment). Also relevant to CZM are some of the programmes under the MLH on land use management and the modernisation of the permitting system (e.g. Digital cadastre; Sustainable Development; Hydrological Surveys in Selected Coastal Zones). The relevant baseline for MLH amounts to \$3.5M (Housing & Lands). With respect to tourism, the MTL and the Tourism Authority implement several initiatives under the broad umbrella of programme ‘342 Sustainable Tourism’ (according to Treasury budget code classification). The bulk of the allocations under this programme are relevant to the project, in particular to Outputs 1.3 and 1.4. The baseline investment from the MTL and subordinated entities represents \$11.3M (Tourism). Other (non-State) relevant baseline programmes are noteworthy: e.g. the conservation work of national NGO and Mauritian Wildlife Foundation, the Regional Programme for the Sustainable Management of the Coastal Zones of the Countries (ReCoMaP) executed by the Indian Ocean Commission (IOC) with EU funding, as well as other bilateral and multilateral support for the CZM programmes and MPAs in the broad sense. For the latter, the following are highlighted: (i) the new EU-financed IUCN-executed regional programme on biodiversity and ICZM (2013-2017, hosted by IOC); (ii) JICA’s support to coastal zone adaptation (2012-on-going) and to sewage treatment infrastructures (end in 2012). Relevant investments under the mentioned multilateral, bilateral and NGO programmes was assessed at approximately \$750K per year, of which the part that contributes to CZM was assessed at \$1.5M over the life span of the project.

15. **Marine Protected Area Management (total baseline \$9.8M):** MoF is developing a Fisheries Management Plan for lagoon fishing. It also manages MPAs and provides capacity building support to fishermen and other stakeholders. The relevant baseline investment from MoF (**Fisheries**) totals \$6.3M. RRA earmarks every year a budget of \$0.2M for the management SEMPA. This amounts to \$1.0M from RRA (**Rodrigues**) over the duration of the project. In addition, relevant investments managed by Albion Fisheries Research Centre, Mauritius Oceanography Institute (MOI) and the Blue Bay Marine Park Authority represent together \$1.0M (MPAs) for the duration of the project. In terms of NGOs, bilateral and multilateral funds that contribute to MPA management, the programmes of Shoal Rodrigues and FFEM are worth mentioning and, with others in the pipeline, reach a total of \$1.5M (Extra-budgetary) for the duration of the project.

16. **Sustainable Land Management (total baseline \$9.8M):** MoA is initiating a programme for controlling both erosion and nitrogen-based pollution derived from agricultural watershed, which will have a positive impact on water quality in lagoon areas, and thereby contribute to SLM more broadly. Relevant programmes under MoA (**Agriculture/Terrestrial BD**) generate a baseline of \$3.9M.

17. **The Long-Term Solution.** The long-term solution is to effectively mainstream biodiversity concerns into CZM frameworks in Mauritius. The current ‘baseline scenario’ points out to a strong commitment from various national institutions, donors and CSOs to support mainstreaming action in different ways. However, there are visible gaps in the baseline investments and overall responses: 1) gaps in implementation of measures on the ground to safeguard biodiversity and ecosystem services in Coastal Wetlands, Shore and Offshore ESAs; 2) The management of the MPA sub-system will remain sub-optimal; and 3) Ecosystem service values will continue to be lost in coastal areas and marine areas if upstream impacts caused primarily by erosion and unsustainable land management are not addressed.

18. **Barriers.** There are three overarching barriers that stand in the way of advancing the preferred long-term solution:

Barrier #1. Incipient CZM and weak incorporation of bd/SLM concerns into land/seascape-level decision-making processes.

19. Mauritius has taken a number of steps to put in place a CZM framework. A core set of individuals in several Mauritian institutions have been trained, exposed to international best practices and capacitated to understand and address key CZM issues. Currently, there is an approved plan for ICZM, prepared in 2010 and a legislated national oversight committee, but the inter-institutional collaborative management framework that ICZM requires is only slowly developing. Also, responsibility for the various aspects of CZM remains diffuse, mirroring the situation for biodiversity and ecosystem service management. There are visible weaknesses with respect to the integration of biodiversity and ecosystem services management into decision-making processes governing land use. **First**, ESAs are currently not being considered in the decision-making calculus. Only a small minority of coastal and marine ESAs fall within PAs. The protection and sustainable management of these ESAs across land/seascapes are seriously handicapped due to inadequate legal protection (requirements to plan, monitor and enforce measures to avoid and reduce impacts on biodiversity and ecosystem services in sensitive

¹³ Programme-Based Budget 2012-2015, Ministry of Finance and Economic Development [\[Link\]](#). The PIF preparation working group has validated the relevance ratios for different programmes applied in Table 4 and the extrapolation calculations applied herein.

areas). There are also issues with enforcement of regulations (e.g. the construction setback on the coast is often not being respected and many coastal wetlands are being backfilled – it is also not clear if and when penalties apply). Some of the regulations could also benefit from strengthening (e.g. the biodiversity aspects of tourism regulations are restricted to undersea walks and a few more provisions; also water abstraction levels are at some points along the coast beyond the aquifers ‘refill capacity’). Second, while there is a wealth of information and data on biological resources, protected areas and ecosystem services in Mauritius, this information is not being systematically used by key institutions involved in land/seascape management – it is often not easily available. MoESD’s Environment Information System the ‘EIS’ could benefit from improvements in this respect. Third, the trade-offs inherent in land-use allocation, in areas that both rich in biodiversity but are also a tourism attraction, need to be negotiated on an informed and consultative basis. In spite of the importance of the tourism sector for the economy—and, conversely, of coastal and marine habitats for the tourism industry—there are no concerted efforts to jointly promote the sustainable management of biodiversity rich areas. There is a national framework for the tourism industry in Mauritius to adopt standards that take biodiversity conservation and sustainable use considerations into account. Implementation is however slow—and the absence of a certification scheme makes it difficult for companies to market their green credentials.

Barrier #2. MPAs and no-take zones are still a novelty in Mauritius and coverage across the Republic is insufficient.

20. MPA establishment and operationalisation is asymmetrical when comparing Mauritius and Rodrigues. The SEMPA in Rodrigues achieved full gazettal and operationalisation status between 2009 and 2012. The operationalisation of both Balaclava and Blue Bay in Mauritius (both established in 2000) is progressing, albeit slowly and also asymmetrically.¹⁴ (See Box 1 in [Annex](#)). In Rodrigues, there is strong engagement of the fisher community, including for the creation of no-take zones around the island. In Mauritius, there are presently no regulated no-take zones, except within Blue Bay MPA, and only as a proposed area yet to be zoned and set aside. Also, in terms of coverage, relative to the size of Mauritius island and the surface of its reefs, MPA coverage is insignificant. Less than 5,000 ha are gazetted MPAs and coastal PAs, of which only two sites have management plans, under initial stages of implementation (Balaclava and Blue Bay MPAs). On Rodrigues, the situation is different. The part of SEMPA that falls within the lagoon alone represents 15% of its surface. Still, there is a general lack of experience with MPA management—and an urgent need to expand the area under MPAs.

Barrier #3. Limited capacity to manage land resources at the landscape level through an integrated approach.

21. While the impacts of excess sedimentation in lagoon areas are visible in both Mauritius and Rodrigues, the problem presents itself differently in both islands. The problem in both locations can be traced to unsustainable land use practices that result in erosion and soil loss (soil runs off into streams and rivers, eventually concentrating in river mouth areas, where excess and unfiltered sediment is directly discharged into the sea with significant impacts on lagoon ecosystems). In Rodrigues, the problem derives from overgrazing, which has already denuded soils in several drainage basins. The exceptions are very steep slopes that unsuitable for agro-pastoral practices and where some forest cover has been maintained. Most of the land in Rodrigues is State owned but are often treated as communal. Over the decades, common land tenure has translated into unregulated access to and use of land resources, resulting in land degradation. In Mauritius, the issue of erosion is related to commercial agricultural practices. Much of the land is private and primarily dedicated to sugar cane farming, which has been losing productivity and profitability in the past few years. Owners have been gradually abandoning soil conservation measures as a consequence. In both Mauritius and Rodrigues, the problems of erosion, soil loss and land degradation are still poorly understood, as are the implications of sedimentation downstream in lagoon areas. Sustainable land management was an unknown concept in Mauritius until the last decade. Practitioners often overlook the root causes behind land degradation at the landscape level and fail to adopt an integrated approach to addressing it. A key challenge is poor access to information on the status of land resources and ecosystem functions, which constrains both national level planning and the design and execution of appropriate watershed management interventions. Another challenge pertains to the absence of widespread examples on how land use practices can be rendered more sustainable.

22. ***Expected Outcomes and Components of the project.*** The project is designed around three Components—described below.

Component 1. Landscape-level planning and sectoral mainstreaming.

This component will put in place a multi-stakeholder land/seascape management framework, including for site-based joint management, to ensure that developments in the coastal zone are congruent with biodiversity conservation and ecosystem service management needs. The Coastal Wetlands, Shore and Offshore ESAs will provide the locus for mainstreaming activities engineered under this Component. Six coastal and near shore waters landscapes are targeted. The following outputs are planned: ***Output 1.1. (Land/seascape Level Planning)***. The first step will be to make ESA data openly available to planners, developers, resource users and implementers. An online platform that builds on free mapping and navigation software will be developed and availed online. (The tool will be incorporated into MoESD’s Environment Information System the ‘EIS’). MoESD will host the platform and maintain it after the project closes. The system will be intuitive to use and should provide all the information that users need for making sound decision on land and seascape management pertaining specifically to biodiversity, ecosystem services and sustainable land management. Dynamic spatially-based plans will be developed for each of the target landscapes. ESA management recommendations will be translated into policy guidance for determining where development should be avoided; where it may be permitted- but subject to management controls, and what the threat mitigation requirements should be. Other studies will feed into the system (e.g. on the impact of ballast water discharge in port and marina areas, and on coastal erosion). Besides ESAs, the system may also be further developed to also feature: (i) species-level biodiversity data;

¹⁴ These asymmetries were also evidenced in through comparative METT analyses carried out as part of the TE process for UNDP-GEF PIMS 864 Mauritius MPAs.

(ii) ancillary information on biodiversity use (e.g. if a species is of interest to tourism, subject to CITES rules, has ABS potential or other); (iii) identification of critical areas for ecosystem services and their role in livelihoods; (iii) special land-use features such as, land tenure, infrastructure, economic activities (in particular tourism), population aggregations etc. The proposed landscape level planning will function as an implementation mechanism for the Maurice Ile Durable Policy and Action Plan, which the government has recently approved under the auspices of the MID Commission. The actual the implementation of the plans will be engineered through Outputs 1.2, 1.3 and 1.4, involving the key CZM stakeholders as follows: **Output 1.2 (ESAs legislated and enforced)**. Activities under this output will ensure that the existence of an ESA location is on the one hand fully taken into consideration into EIA processes, and on the other, into relevant operational permitting systems. The key focus will be on the land titling/real estate (under MHL), sports and artisanal fishing (under MoF), pleasure crafting and tourism enterprises (under MTL). In addition, the ESA Study made clear recommendations with respect to the conservation priority and management for each of the ESA locations. Under this output, decision on heightening the conservation status of selected sites will be made and legislated. **Output 1.3 (Mainstreaming into tourism)**. This output concerns the tourism sector specifically and its interface with biodiversity. Three aspects will be covered: policy mainstreaming, practical application of the biodiversity mitigation hierarchy, and finance. The following is planned: (i) Guidelines for biodiversity friendly tourism development will be developed. This will reinforce the adoption of good practices in biodiversity management and monitoring compliance, while also encouraging biodiversity off-settings. (iii) The project will support the adoption of a biodiversity-friendly certification label for tourism establishments and operators. Activities will build on the recent initiative by MTL, in collaboration with the Mauritius Standards Bureau and tourist industry stakeholders, to develop a “Draft Eco Label Standard” for the industry. Eco-labeling of specific operators will be conducted with a certification programme as a means to increase the awareness of the owner, staff and client and their potential to develop and manage their direct environment and their offers. The advantages and disadvantages of developing a national scheme or adopting internationally recognised label will be assessed during PPG. **Output 1.4 (Joint management and incentives)**. This output will facilitate on the ground site-level management jointly with residents’ committees, the tourism industry, resource users and other relevant sectoral authorities (focusing on e.g. mangrove management, native beach vegetation restoration etc).

Component 2. Integration of MPA management into the wider landscapes.

Interventions under this component will focus on MPAs. Two outputs are foreseen, as follows: **Output 2.1 (MPA management)**:¹⁵ Interventions under this output will be geared to enhancing the management effectiveness of MPAs in the target landscapes. Activities will include the preparation and implementation of management plans, and of operations and business plans, where needed. Support will also be provided for operationalising community no-take zones on the north of Rodrigues island. The proposal for operationalising the four no-take zones in Rodrigues (Riviere Banane, Anse aux Anglais, Grand Basin and Passe Demi) are a direct response to requests from fishermen, who will be affected by the access and use regulations pertaining to those zones. Fishermen saw the no-take zones as a necessity for preserving fish stocks and ensuring sustainability in fishing. This, in an on itself, increases the chances that the zones will be more quickly operationalised and their boundaries respected. This initiative is building on the strong basis provided by the SGP in the establishment and initial operationalisation of the zones, but it was noted that more support was needed for enforcement and operationalisation, which went beyond the scope of the SGP. This is aspect is obviously addressed, as the no-take zones will be part of a broader initiative provided by this project. It also builds on the positive experiences from the SEMPA, in terms of fishermen respecting the no-take zones within it. There are all indications that they remained effective, even after project end. If there are infractions, they are being addressed through the enforcement mechanisms foreseen in the SEMPA management plan. A portion of project funds will be used to co-support, together with RRA, sustainable livelihoods activities for affected fishermen, but more importantly to finance enforcement measures for operationalising the management plans for these no-take zones until other finance can fill the gap (this will leveraged through activities under the Output 2.2). With respect to SEMPA, Balaclava and Blue Bay, some of the gaps in MPA management identified in the previous project will be addressed. These relate to enforcement of management plans (e.g. patrolling) and resource use monitoring. Ecological monitoring will also be carried out for key sites. **Output 2.2 (MPA Financing)** Mauritius will develop an MPA system financing strategy—aimed at fully realising the values and benefits of MPAs, and increasing the financing flows to MPAs, commensurate with need. Facilitated by the MoF with support from MOI, all key entities will be included: RRA and Marine Reserves Coordination Committee for sites in Rodrigues, Ministry of Tourism and Leisure, Blue Bay Marine Park Patrol and Visitors Centre, MOA and Ministry of Local Gov and Outer Islands, for islets sites, and Albion Fisheries Research Centre. The IOC will be involved as a regional partner. The PA Systems Financial Sustainability Scorecard will be applied to the MPA sub-system, with a view towards clarifying financial flows and cost benchmarks for conservation effectiveness, and to establish a baseline and targets for financial sustainability. Two financing options will be pursued to improve sustainability—first—fostering tourism reinvestment in MPAs. Second, the project will support the efforts of PA authorities to broker finance from national budgetary appropriations for MPA management. In doing so, it will support the implementation of concrete measures for balancing costs, expenditures and needs across the MPA sub-system.

Component 3. Erosion control in sensitive areas.

23. This Component will address the issue of land-based erosion which affects lagoon environments through excess sedimentation. Two Outputs are planned: **Output 3.1 (SLM techniques applied)** will focus on changing land use practices in the SEMPA watershed in Rodrigues. Two contiguous catchment areas are proposed: Rivière Coco and Rivière Mourouk (approximately 200ha), both wedged between steep slopes and with rivers that run into SEMPA. Villagers in those areas have a close relationship to the MPA (many are fishermen or former fishermen). The project will work in close collaboration with the relevant Commissions in Rodrigues to select and

¹⁵ At least \$800K from this Component will be reserved for activities in Rodrigues, pending detailed budgeting and activity planning.

implement a suite of SLM techniques adapted to the landscapes (e.g. terracing, conservation tillage, grazing control, fire management, waterway and steep slope re-vegetation, etc.). **Output 3.2 (Wetlands rehabilitation)**. This last output is concerned with operationalizing a plan prepared as part of the ESA Study but not yet implemented and which pertains to a network of 12 wetlands within the Grand Mare Longue basin in Grand Baie (north Mauritius, within Landscape #5). Managing them involved the engagement of land-owners and State and include the restoration of water flows and avoidance of backfilling and dumping (hence a focus on access and use regulation).

24. **Incremental Cost Reasoning.** The project’s alternative from the baseline and expected global benefits follows:

<u>Current Baseline</u>	<u>Alternative</u>	<u>Global benefits¹⁶</u>
<ul style="list-style-type: none"> ▪ Coastal and marine biodiversity and ecosystem resilience in Mauritius will continue to be threatened and impacted by economic activities that fragment habitats and affect species. This is compounded by other, slow acting anthropogenic stressors (land-based pollution, climate change and ocean acidification). ▪ CZM frameworks will fail to promote an integrated approach that takes biodiversity and ecosystem services sufficiently into consideration. ▪ MPA management effectiveness will continue to be low and asymmetrical across the Republic with limited financial resources dedicated to it. ▪ Lagoon areas will continue to be impacted by unsustainable land use practices upstream. ▪ Wetlands near built-up areas will continue to be backfilled and dumped. 	<ul style="list-style-type: none"> ▪ Landscape level management plans are developed and effectively implemented, addressing threats to biodiversity and ecosystem integrity across ~150,000 ha of coastal and marine landscapes. ▪ Critically sensitive areas containing ESAs are designated as set asides and protected from physical development that could degrade their values and ecosystem services. ▪ Biodiversity and the maintenance of ecosystem services are incorporated into all relevant operational permitting/licensing systems, including EIA, effectively changing management practices within the land-use planning, tourism and other physical development sectors. ▪ The tourism sector is actively engaged in biodiversity and ecosystem management, deriving direct benefits from it, that outweigh costs. ▪ At least 8,000 ha of MPAs throughout the Republic of Mauritius benefit from improved management and a framework for investments that involves both the tourism sector and communities through sustainable livelihoods. ▪ Land-based threats to ecosystem integrity in lagoon areas are addressed through the implementation of SLM techniques and practices. ▪ Critical wetlands located in touristic landscapes are valued and sustainably managed by surrounding communities for the plethora of ecosystem services and benefits that they render. 	<ul style="list-style-type: none"> ▪ Global environmental benefits in all of the six landscapes targeted by the project, linked to biodiversity and ecosystem services described in detail in Box 3, will enjoy improved protection and maintenance. <p><u>Biodiversity</u></p> <ul style="list-style-type: none"> ▪ Coral communities extending at least 150km in length around Mauritius island (estimated length of coral rim within the 5 landscapes), plus within approximately 4,000 ha in Rodrigues will enjoy increased protection and improved management. ▪ Fish stocks in lagoon areas previously under pressure in target seascapes will have been able to recuperate and the marine trophic chain will be in better balance. ▪ Threatened species found within the land/seascapes targeted by the project will enjoy better survival chances. <p><u>Sustainable Land Management</u></p> <ul style="list-style-type: none"> ▪ The rate of soil loss in target watersheds is decreased, other ecosystem services maintained, while also removing stressors that cause hypoxia in lagoon areas. ▪ Essential ecosystem services in 15.4 ha of wetlands and 2.39 ha of associated buffer are rehabilitated.

25. **Co-financing.** The indicative co-financing amounts to **\$20 million**. Most of it will be availed by the national government through baseline investments from the Budget-Based Programming (either through the Ministry of Finance and/or entities in charge of Agriculture & Food Security, Housing & Lands, Environment & SD, Fisheries, and Tourism – see Table 4), in addition to the RRA and relevant local governments.

26. **Innovation** is embedded in the project’s land/seascape approach to changing the way biodiversity and ecosystem services are managed across the landscape. The ESAs will be afforded higher protection, while also allowing for sustainable economic development in the same economic and geographic space. This has not yet been done before in Mauritius. It is also an opportune moment to do this – given that pressures are accelerating., Another innovation aspect pertains to the use of open-access spatially-based technology to avail critical ESA information to a wide range of sectors. A number of systems exist, but none are open-access. This will foster participation and stakeholder engagement, both remotely and on the ground. **Sustainability and replicability of the project.** These two elements are part of the design of the financial aspects of various activities: (i) the project will build upon existing land use regulation systems and making them much more conservation compatible; (ii) the project will finance the overlay of biodiversity/ecosystem management planning and implementation, so that these can be absorbed by existing systems and entities – these entities are being reinforced to play this role; (iii) the work on MPA financial sustainability engineered through Output 2.2. Sustainability will also be ensured through consistent capacity building measures engendered by the project, benefitting government entities and other stakeholders. Capacity development is implicitly built into every activity. The project is highly replicable, because the landscape approach can be easily applied to other sites throughout Mauritius and in the region, in particular in a SIDS context. **Gender considerations¹⁷** will be fully integrated into the project strategy. The project will work closely with women’s associations and businesswomen. On Rodrigues, in particular fisherwomen are very active and organised and UNDP has previously worked closely with them through the MSP 864 Mauritius MPA.

¹⁶ See Box 3 for a reference of global benefits by ESA Type for the landscapes targeted by the project.

¹⁷ In 1995, the Constitution of Mauritius was amended to include gender in the definition of discrimination. In addition, the government adopted (in 2000) a law against sexual discrimination. All citizens are equal under Mauritian legislation, but the society remains firmly rooted in tradition, with a bias in favour of men in a wide range of societal relations.

A.2. Stakeholders

Stakeholder	Relevant Role
Mauritius Oceanography Institute	MOI has been selected through consensus as the entity of choice for executing the project at the national level, an operational role that it will fulfil by formally delegating specific activities to various entities, given that several of the project's outputs go beyond MOI's mandate. MOI will collaborate with the Coastal Zone Unit within the Ministry of Environment and SD for technical aspects.
MID Commission	Together with MOI, the MID Commission will play a key coordinating role in the project, in particular with respect to bringing together the key stakeholders for the implementation of landscape level plans. The MID Commission will also be responsible for securing government finance for implementing and enforcing the plans.
Relevant line ministries	Key line ministries to be engaged in the project are primarily those that provide the baseline investment for it, namely Agriculture (MOA), Housing & Lands (MHL), Environment (MoESD), Fisheries (MOF), Tourism & Leisure (MTL). MoESD will play a key role in Outputs 1.1 and 1.2 with ESA mainstreaming. MoA, MoF, MLH will also be important for Output 1.2 due to their role in the mainstreaming biodiversity in various permitting systems. Tourism is central to Outputs 1.3, 1.4 and 2.3. MoF will play a key role in MPA management under Component 2, while MoA will be key for Component 3.
RRA	The Rodrigues Regional Assembly will play a key role in Output 1.2, due to their role in permitting systems according to the subsidiarity principle, and in all Outputs under Components 2 and 3.
NGOs	There are a few active NGOs in the field of conservation worth mentioning. Mauritian Wildlife Foundation (MWF) is the national affiliate of BirdLife International and aims to help save critically threatened birds and plants from extinction. MWF has played a major role in monitoring and research programs, in implementing in situ and ex situ species conservation management and restoration projects, and in strengthening conservation partnerships with the private sector. MWF is actively involved in islet restoration, ecotourism on Ile aux Aigrettes, species recovery management for rare birds, forest surveys, rare plant propagation, and public education and awareness. Shoal Rodrigues has actively engaged fishermen in the establishment and operationalisation of the SEMPA. They received funding from the GEF's SGP, but equally from the Indian Ocean Commission through the Regional Programme for the Sustainable Management of the Coastal Zones of the Countries of the Indian Ocean (ReCoMaP), aimed at establishing and enforcing no-take zones around Rodrigues. CSOs will be fully engaged in the project.
Local communities	Local communities are a key stakeholder, in particular under Component 2, where they will be directly engaged in planning and management processes, having been the chief protagonist in the establishment of SEMPA and no-take zones.
Other stakeholders	Other stakeholders will include the tourism industry, land owners and local government, to be engaged in Output 1.5, centres of excellence (e.g. Albion), and multi- and bilateral partners with relevant activities within CZM and MPAs.

A.3 Risk.

Risk and Risk Level	Management Strategy
Institutional responsibilities for CZM and MPAs remain diffuse with no collaboration framework. [M]	Components 1 and 2 of the project have been specifically designed to foster collaboration among implementing partners. MOI will play a lead project execution role and will ensure coordination and collaboration among the different entities. The role delegated to other entities by MOI will be formalised through applicable agreements (e.g. MOUs) with clear TOR that will be developed during the PPG.
Landscape level plans are completed (on paper) and never implemented. [L]	Because the proposed landscape level planning is conceived as an implementation mechanism for the Maurice Ile Durable Policy and Action Plan, it will have funds ring-fenced for implementation by the MID Commission. In addition, the project will develop and explore various ways and modalities of implementing the plan through Component 1 activities. Under Output 1.2 it will target specific permitting systems involving the respective institutions. Output 1.3 has a specific focus on tourism, while 1.4 will involve coastal communities. All of this will increase the chances of the plans becoming effective with respect to conservation, and of involving the relevant stakeholders through sector-specific and location-specific actions.
Fishermen communities see the no-take zones in Rodrigues as a net income loss and fail to respect rules of access. [L]	The project will mitigate the risk of no-take zones failing to produce the desired results by developing, together with fishermen communities, a livelihoods programme for affected fishermen. There is already a sound basis for it established by the SGP, through which the zones were mapped and demarcated. In addition, enforcement will be supported by the project, with the full involvement of fishermen to ensure sustainability.
Expectations towards the engagement of the private sector prove ambitious. [L]	Specialised technical assistance will be contracted to ensure that private sector engagement is carried out with the best conditions possible. The goals of Output 1.4 and 1.5 have been built on a strong baseline from the MTL, which already embraced sustainability in its strategy. Certification has been tried with success in the sub-region and with support from UNDP-GEF (e.g. in Seychelles). This experience is replicable and will be brought to bear.
The level of threat to biodiversity and ecosystem services is higher than assumed [L]	The project builds on the thorough analysis of threats to biodiversity and ecosystem services carried out through the ESA Study. There is no indication of rapidly emerging threat ¹⁸ ; on the contrary, there is evidence of gradually increasing capacity to address these threats, including at systemic level (e.g. policies, laws and finance). Management capacity across all the responsible entities can also be enhanced, including through this project to deal with additional threats.
The project locations are subject to currently approved land use plans with possible negative socio-environmental impacts [L]	Land-use and plans drawn by MHL can potentially affect the environment in a negative manner and, by consequence, the sustainability of project efforts. However, project design is slated to address these risks by avoiding and mitigating them through a mainstreaming approach, by e.g. mainstreaming biodiversity concerns into spatial planning. (Output 1.2). Social risks are considered low, given that land tenure is generally stable in Mauritius. Overall, the project is seeking a win-win situation from sectoral engagement.

A.4. Coordination

¹⁸ Climate change and ocean acidification are slowly emerging threats.

Programmes, and Initiatives	Proposed collaboration
On-going and recently closed UNDP-GEF BD and SLM projects and SGP	<p>The choice of coastal-marine focus and the mainstreaming/SLM approach also reflect a strategic and progressive approach to the utilisation of GEF resources. The on-going UNDP-GEF PAN Project focuses on forests and terrestrial protected areas, leaving coastal and marine issues outside its scope. The UNDP-GEF MSP Mauritius MPAs pioneered the concept of MPA in the Republic and made significant progress in operationalising the SEMPA on Rodrigues. The recommendations from its TE Report were to take the achievement to the next level. Both the ‘PAN’ and the ‘MPA’ projects have prepared the terrain for this project in terms of advancing with the biodiversity conservation agenda in different ways and on different fronts. Finally, the project is a tool for implementing the policy recommendations of the SLM project concluded in 2011. More specifically, synergies will be sought with the following GEF projects / programmes:</p> <p>(1) <i>SGP</i> During the PPG, the project will work with the SGP to scope the relevance of past and prospective SGP projects in Mauritius with respect to Output 2.2. The SGP has been instrumental in leading local communities to propose the no-take zones MPAs around Rodrigues.</p> <p>(2) <i>PAN Project</i>: The project will also work together with the PAN project to coordinate approaches for the engagement of the private sector and establishment of protected areas. There is significant scope for learning, collaboration and cross fertilisation between the two projects.</p> <p>(3) <i>SLM MSP</i>: The project learned lessons and build from achievements of the SLM project (closed in 2011), including the FLIS system which helped identify land degradation hotspots.</p> <p>(4) <i>NBSAP and IW initiatives</i>: The project will also collaborate with the on-going BD EA on NBSAP update project. Collaboration with IW initiatives will also be sought, e.g. on ballast water and fisheries management.</p>
Baseline programmes and other related CZM, MPA and SLM initiatives	<p>The project will work closely with MOA, MHL, MoESD, MOF and MTL, in the implementation of baseline programmes listed in Table 4. The project will also work together with the ReCoMaP project and other related initiatives, in particular the newly approved EU-financed IUCN-executed regional programme on biodiversity and ICZM, also hosted by the IOC, as well as those financed by JICA, and CSO implemented initiatives on coastal and marine biodiversity and SLM. UNDP will work to ensure that previous experiences on MPA operationalisation, CZM and land management are taken into account in further intervention planning.</p>

B. DESCRIPTION OF THE CONSISTENCY OF THE PROJECT WITH:

B.1 National strategies and plans or reports and assessments under relevant conventions

27. **Policies.** This project is country-driven and its current concept is consistent with, and supportive of, the following national development strategies and plans: At the national level, the National Environmental Policy (NEP, 2008) defines the overarching environmental objectives and strategies for the country, which provides a framework for the implementation of the National Biodiversity Strategy and Action Plan (NBSAP, 2006); the Forestry Policy of 2006; the Fisheries Act No 27 of 2007 (which serves as the sectoral policy), the National Tourism Policy (2005/6), which calls for ‘low-impact’, ‘high-end’ tourism and sustainability and the Sustainable Land Management (draft) Policy and Investment Plan (2011). The NBSAP is currently being updated/revised to incorporate the Aichi Targets. In addition, the Maurice Île Durable (MID) Policy, Strategy and Action Plan which covers a number of environmental and sustainable development aspects. This project will make an important policy contribution to the biodiversity and ecosystem services aspects of the MID, which specifically posits: “*Economic development along with environmental protection and social justice are the basis of sustainable development. However, the linkages between economy, environment and society are intricate and diverse. Similarly, natural resources are the foundation of the country’s future.*”¹⁹ Furthermore, the project will serve as a key implementation tool for the Mauritius’ Integrated Coastal Zone Management Framework (2010). It is also in line with the Ministry of Environment’s position on the importance of coastal and marine resources, as stated in their recent Outlook Report: “*Recommendations of the Integrated Coastal Zone Management Framework and the Environmentally Sensitive Areas Study should be implemented with emphasis on the six pressure zones: Grand Baie, Ile D’Ambre, Le Morne, Belle Mare, South Coast of Mauritius and East Coast of Rodrigues.*”²⁰

28. **Aichi Targets.** The project will contribute to Mauritius’s achievement of the Aichi Targets as follows: Target 4, to the extent that the project will engage governments, business and various other stakeholders to manage biodiversity within safe ecological limits (e.g. through the joint site management activities); and Target 11, as the project will contribute to improving the management effectiveness of the MPA sub-system; Target 12, as it contributes to the reducing the loss of known threatened species, possibly preventing their extinction across the land/seascape; Targets 14 and 15, as it relates to the enhancement of ecosystems’ functions, their structure and resilience, including in the face of climate change, through the project’s mainstreaming approach. In particular on Target 10, Component 3 of the project focuses on enhancing ecosystem resilience on site (also addressing Target 6) with considerable benefits downstream, by removing stressors to lagoon environments from unsustainable land use through a SLM approach. **UNCCD:** The project addresses various of the thematic priorities of the Convention (as per the ten-year Strategy), in particular those that relate to the linkages between land degradation and biodiversity (e.g. restoring land and ecosystem productivity and fighting soil loss).

B.2. GEF focal area and/or fund(s) strategies, eligibility criteria and priorities

¹⁹ MID site, retrieved on 22 Jul 2013 [[Link](#)].

²⁰ Ministry of Environment & Sustainable Development (2011): *Mauritius Environment Outlook Report: Summary for Decision-Makers.*

29. The project will contribute to Objective 2 of the GEF5 Focal Area Strategy (BD2), *'Mainstream biodiversity conservation and sustainable use into production landscapes, seascapes and sectors'*. The mainstreaming approach has been chosen because it allows the project impact to go beyond site-based action and focus on sectoral impacts and the wider landscape. It will lift the management ESAs to the land/seascape level. It also creates scope for ensuring that biodiversity and ecosystem services can be integrated into sectoral policies and practices, e.g. through the permitting systems or through the 'Tourism & Biodiversity' policy annex. The project will also contribute to Strategic Objective 1 of the GEF-5 Focal Area Strategy (BD1), *'Improve the Sustainability of Protected Area Systems'*, Outcome 1.1: *Improved management effectiveness of existing and new protected areas*. In addition, the project also contributes to the achievement of Objective 3 of the GEF5 Land Degradation Strategy (LD3), which is to *'Reduce pressures on natural resources from competing land uses in the wider landscape'*. The project will focus on specific issues related to watershed erosion and its interaction with the downstream areas.

B.3 The GEF Agency's comparative advantage for implementing this project

30. UNDP approaches the issues of biodiversity management and ecosystem resilience from a development and governance points of view. The agency's goal is to capacitate beneficiary countries to maintain and enhance the beneficial services provided by biodiversity and ecosystems to secure livelihoods, fight poverty and promote development. In 2012, UNDP's Ecosystems and Biodiversity Framework 2012-2020 was approved by UNDP's Executive Group. It establishes the benchmark of achievements and strategic thinking behind UNDP's programming in the Ecosystems and Biodiversity domain. Biodiversity issues are also addressed at the level of the current Country Programme Document (CPD) for the period 2013 to 2016, Pillar 3, which pertains to Energy and Environment. In relation to biodiversity and SLM specifically, UNDP Mauritius is pursuing a diversified portfolio of work on sustainable management of natural resources particularly relevant to a SIDS. This effort will address the conservation of biodiversity, management of marine and coastal resources, sustainable land management, integrated water resources management and waste management. The Country Office counts on three dedicated environment programme officers, plus support from other programme staff, operations and the Country Office's senior management staff. The Country Office team is supported by the UNDP Regional Coordination Unit—based in Addis Ababa, Ethiopia.

PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)

A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S):

NAME	POSITION	MINISTRY	DATE (MM/dd/yyyy)
Mr. Ali MANSOOR	Financial Secretary	Ministry of Finance and Economic Development	07/31/2013

B. GEF AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF/LDCF/SCCF/NPIF policies and procedures and meets the GEF/LDCF/SCCF/NPIF criteria for project identification and preparation.					
Agency Coordinator, Agency name	Signature	Date (MM/dd/yyyy)	Project Contact Person	Telephone	Email Address
Adriana Dinu, UNDP/ GEF Officer-in-Charge and Deputy Executive Coordinator		August 22, 2013	Fabiana Issler, Regional Technical Advisor, Ecosystems & Biodiversity, Africa	+27-12-3548128	fabiana.issler@undp.org

ANNEX

Table 2. Interim surface estimates based on polygons on Maps 1 and 2

Target Landscapes*	Mauritius	Rodrigues	Terrestrial	Marine	TOTAL*
(1) Balaclava-Pointe aux Piments Landscape	x		3,746	937	4,683
(2) Le Morne Landscape	x		13,516	26,952	40,468
(3) Vieux Grand Port Landscape	x		19,450	19,450	38,900
(4) Poudre d'Or - Ile d'Ambre - Roche Noire Landscape	x		7,858	7,858	15,716
(5) Northern Islets Landscape	(offshore)		14,042	28,075	42,117
(6) Rivière Coco-SEMPA-Mourouk Landscape		x	6,135	6,135	12,269
TOTAL			64,747	89,406	154,153

* Thorough descriptions and surface assessments for the landscapes will be prepared during PPG

Table 3. Overview of ESA typology and coverage by GEF projects in the Republic of Mauritius

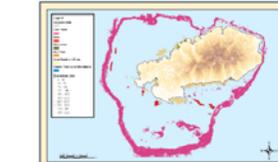
ESA Systems and Types:	This project*	PAN project	Mauritius	Rodrigues	TOTAL
1. Wetlands Systems			10,971	1,233	12,204
a. Coastal Marshlands	x		406	0	406
b. Upland Marshlands			65	0	65
c. Lakes and Reservoirs			1,146	0	1,146
d. Rivers and Streams			8,290	553	8,843
e. Mangroves	x		145	24	169
f. Inter-tidal Mudflats	x		919	656	1,575
2. Shore Systems			2,885	8	2,893
a. Sand Beach and Dunes	x		2,885	8	2,893
3. Offshore Systems			19,064	24,951	44,015
a. Seagrass and Algal Beds	x		3,279	17,765	21,044
b. Coral Reefs	x		6,306	7,005	13,311
c. Islets	x		1,269	181	1,450
4. Forest Systems			8,210	0	8,210
a. High Native Content (Flora)		x	not specified	0	not specified
b. Native Fauna Habitat (endemic birds, bats and lizards)		x	not specified	0	not specified
5. Stable Supply Systems			45,282	8,054	53,336
a. Boreholes (aquifer wells)			72	3	75
b. Steep Slopes (soil stabilization, viewscape)			45,210	8,051	53,261
TOTAL for all ESA Systems			86,412	34,246	120,658
*Surface of ESA Types on focus in this project by system:			Mauritius	Rodrigues	TOTAL
1. Coastal Wetlands Systems (1a, 1e, 1f)**	x		1,470	680	2,150
2. Shore Systems**	x		2,885	8	2,893
3. Offshore Systems (98% marine)	x		19,064	24,951	44,015
TOTAL			23,419	25,639	49,058
Coastal wetlands and shore systems above as % of the islands' land surface	**		2%	6%	3%

Table 4. Estimates of baseline investments from the Programme-Based Budgeting by Ministry of Finance and Economic Development

Government Sector	Programme Code and Title	Allocations in Rs millions				TOTAL \$million	Relevance for the project*	\$ million Baseline	Note
		2013	2014	2015	TOTAL				
Agric & Food Security	485 Forestry	203	212	216	631	20.4	5%	1.0	Coastal forests and wetlands; Protected Islets
Agric & Food Security	468 Native Terrestrial Biodiversity	66	91	86	243	7.9	30%	2.4	Coastal forests and wetlands; Protected Islets
Housing & Lands	643 Land management and physical planning	446	420	417	1283	41.5	5%	2.1	Digital cadastre; Sustainable Development; Hydrological Surveys in Selected Coastal Zones
Environment & SD	402 Environmental Protection and Conservation	201	200	191	592	19.1	12%	2.3	Beach rehabilitation; "Clean & Green Mauritius" Initiative; EIA capacity
Fisheries	487 Fisheries Development and Management	266	263	256	785	25.4	15%	3.8	Fisheries Management Plan for lagoon fishing; Management of MPAs (a constraint); Cap. building of fishermen & other stakeholders
Tourism	342 Sustainable Tourism	90	88	84	262	8.5	80%	6.8	Licensing and monitoring tourism enterprises and pleasure crafts; Broadening tourism product to include eco-tourism (a constraint)
TOTAL		1,272	1,274	1,250	3,796	123	15%	18.3	

* As assessed by each of the sectoral partners for each sector; and on the basis of totals for the overall relevance. The amounts covers only 2013-2015. The total baseline for these programmes is in fact larger as it is based on extrapolation of the amounts in this table for the period 2013-2018.

Click on Maps' icons for viewing in full resolution.

<p>Map 1. Landscapes 1-5 on Mauritius</p>	<p>Map 2. Landscape 6 on Rodrigues</p>	<p>Map 3 and Map 4. Coastal Wetlands, Shore and Offshore ESA Systems on Mauritius and Rodrigues respectively</p>		<p>Map 5. No-take Zones on Rodrigues</p>
				
<p>Download GoogleEarth's kzm files through Link.</p>				

Box 1. Notes on Marine Protected Areas in Mauritius

SEMPA: The South Eastern Marine Protected Area (SEMPA) covers 4,343 ha (3,604 ha inside the lagoon 738 ha of which is outside the lagoon), and it was formally gazetted in 2009 (see Map 2). Ecological monitoring of the areas has been carried out since 2007 (four reports were produced so far) and a zoning plan for the MPA was designed in consultation with fisher communities. MPA regulations were updated to include the zoning plan in 2011. The SEMPA zoning plan subdivides the area into three main types of zone with different management objectives. The zones include: 3 Multiple-Use Zones (1 'open' and 2 'seasonal', covering 70% of the MPA surface), plus 11 Conservation Zones (30% of the surface), which are permanently closed to fishing, and are equivalent to 'no-take' zones. Between 2010 and 2011 the zones were demarcated, rangers and community resource observers were employed and trained in the monitoring of marine resources and surveillance. In 2011 other staff were employed and a management plan was prepared. Since project end, RRA maintains basic support for SEMPA management. SEMPA is facing challenges related to ensuring continued surveillance, managing emerging threats to biodiversity, including from adjacent watersheds and in providing alternative livelihoods to fishermen who are now faced with limited access to reef resources. Financial sustainability also needs improvement.

Community-Managed No take zones on Rodrigues: The four Marine Reserves in the northern seascape of Rodrigues Island have been gazetted in 2007: Riviere Banane, Anse aux Anglais, Grand Basin and Passe Demi. Together, they cover 2,421 ha (1,371 ha of which is inside the lagoon and 1,049 ha of which is in deeper water outside the lagoon on the surrounding reef). The reserves were selected by the local communities through an extensive consultation process that was supported by the local marine NGO Shoals Rodrigues under a grant from the GEF Small Grants Programme implemented by the UNDP. The reserves were demarcated but enforcement has been weak and management near to non-existent, in three of the four areas. The exception was Riviere Banane: a management plan was prepared and the area was enforced for a period of time between 2007-2008, during which time octopus fishers noted an improvement in their catches. Enforcement then ceased due to a lack of suitable facilities for the surveillance teams. In 2010, a Marine Reserves Coordination Committee (MRCC) was established, composed of representatives of the relevant Government Authorities; representatives of the Fishers Associations; the local marine NGO (Shoals Rodrigues) and other key stakeholders. During 2011, a second project run by Shoals Rodrigues, in collaboration with the RRA with financial support from the GEF Small Grants Programme implemented by the UNDP and the Regional Programme for the Sustainable Management of the Coastal Zones of the Countries of the Indian Ocean (ReCoMaP), financed by the European Union, aimed to build capacity within the MRCC to support the management of the marine reserves and facilitated the preparation of a joint management plan. The management plan was prepared and written by the local stakeholders, and is due to go to public consultation in early 2012.

The Blue Bay and Balaclava Marine Parks: These two MPAs on Mauritius Main Island cover an extent of sea of 353 ha and 485 ha respectively with depth ranging from 1 to 15 m in certain areas. They were declared as Marine Protected Areas in 2000. The terrestrial part of the Blue Bay Marine Park is now designated as a "Wetland of International Importance (Ramsar site)" since 2008. More than 50 different species of corals have been identified in the marine area of these MPAs. **Blue Bay:** A thorough management plan for Blue Bay has been prepared in 2012. The costing and operational aspects in the management plan remain however to be treated in more depth or through separate plans. The park authority for the MPA was established in 2010 and has been active since—the Blue Bay Marine Park Patrol and Visitors Centre. For **Balaclava** progress has been slower. No management plan has been fully developed for the MPA (or is only in draft form). For now, Albion Fisheries Research Centre has been providing management support for the MPA. The Balaclava MPA is located in a highly-sought touristic area (Arsenal), where at least three major hotel chains maintain establishments. It is possible that the park could be extended to cover certain sensitive coastal areas, consolidating the 'Balaclava-Baie d'Arsenal Marine Park'. This is in progress. There is scope for collaboration with nearby hotels for achieving conservation goals. **Both MPAs:** In 2012, a carrying capacity study for Balaclava and Blue Bay was prepared. It established, through quantitative methods, an estimate of the carrying capacity for each of the MPAs based on the recreational area size and individual space requirements of resource users. Recent high resolution (1m, 2009-2011) satellite imagery (GoogleEarth 2011) of both MPAs were imported and geo-referenced in ArcGIS 9.3 to identify and map surrounding features. Much is needed to operationalise these MPAs in Mauritius.

Box 2. Note on the 'coastal zone' concept and the project's scope

The concept of coastal zone is legislated in Mauritius through the Environmental Protection Act (2002) and it is defined as strip located 1km from the high water mark, both landward and seaward. This project is concerned with the coastal strip and with near shore waters all the way to the reef's edge, which is at times located up 5km from shore (e.g. in Rodrigues). The project is also concerned with islets within target landscapes. Therefore, the concept of CZM is used here as an implementation vehicle. The best definition of spatial coverage is provided by ESAs included in the project scope (Table 3) and illustrated in maps.

Box 3. Key Biodiversity Values in Selected Landscapes by ESA Type (extracted and adapted from the ESA Report)

ESA Type 1a) Coastal Marshlands:

Coastal marshlands are found exclusively on the island of Mauritius with more than half of these occurring in the north and north east regions (**Landscapes 1 and 5**). They form naturally in sub-zero depressional areas. These areas act as spatial sinks to surface flow in areas of low soil permeability and storage capacity. They form naturally in the coastal backwash region behind sand dunes and berms or where lava flow geometries have generally led to subterranean or occluded surface drainage. Many marshlands have also developed in the artificial depressions created through past mining and agricultural activities. In Mauritius, coastal marshlands are dominated by a few, cosmopolitan water plants such as *Typha* and *Acrostichum*. Coastal marshlands provide a number of important environmental services that remain largely non-monetized. The most important value of these areas rests with their hydrological function and flood mitigation role. The value of those marshlands adjacent to built up areas increases since the spread of impermeable surfaces prevents storm-water runoff in areas with low stream densities. Coastal marshlands (many of which are covered by the Grand Baie Wetlands' Plan – reference to Output 3.2) also provide wildlife and endemic species habitat (in particular migratory waterbirds and endemic invertebrates), as well as carbon storage ecosystem services.

ESA Type 1e) Mangroves:

In Mauritius, mangroves cover around 145 hectares of land area. These are distributed around the island but are mainly found in the north east in the Poudre D'Or area, eastern side between Trou D'eau Douce and Ile Aux Cerfs (**Landscape 4**), the south at Le Bouchon and St Martin (**Landscape 3** for the latter), and the south western side from Le Morne to La Preneuse (**Landscape 2**). In Rodrigues, mangroves cover an area of around 24 hectares and have been planted in most places. Mangrove stands are thriving well especially in the region of Baie Diamant and Baie Malgache in the Northwest, Baie Topaze in the south west and Anse Mourouk in the south east (**Landscape 6** for the latter). Besides various ecosystem services rendered by mangroves (storm protection, sediment retention, filtration services and carbon sequestration), mangroves also render services that are highly valuable to fisheries. The mesh of mangrove roots produces a quiet marine region for many young organisms. In areas where roots are permanently submerged, they may host a wide variety of organisms, including algae, barnacles, oysters, sponges, and bryozoans, which all require a hard substratum for anchoring while they filter feed. Shrimps and mud lobsters use the muddy bottom as their home. Mangrove crabs improve the nutritional quality of the mangal muds for other bottom feeders by mulching the mangrove leaves. In at least some cases, export of carbon fixed in mangroves is important in coastal food webs. The habitats also host several commercially important species of fish and crustaceans.

ESA Type 1f) Inter-tidal mudflats:

Mudflats are sedimentary intertidal habitats created by deposition in low energy coastal environments, particularly estuaries and other sheltered areas. Mudflats, like other intertidal areas, dissipate wave energy, thus reducing the risk of eroding and flooding low-lying land. Intertidal mudflats around Mauritius can be seen mainly at the major river mouths or else along the shoreline like at Case Noyale (**Landscape 2**). The largest of all the mudflats and the most well known mudflats is located at Rivulet Terre Rouge Estuary some 3 km north from Port Louis. The Rivulet Terre rouge Estuary Bird Sanctuary was proclaimed as a reserve in 1999 and as a wetland site of international importance by the Ramsar Bureau in 2001. The estuary covers an area of around 26 ha and is internationally important for 14 species of regularly visiting migratory birds and 3 species of endemic plants species like the *Sesuvium ayresii*. Mudflats are characterised by high biological productivity and abundance of organisms, but low diversity with few rare species (may include mats of benthic microalgae (diatoms and euglenoids) and mucilage (*mucopolysaccharides*). Most importantly, inter-tidal mudflats provide a rich habitat for an extensive list migratory bird species (among them Crab Plover (*Dromas ardeola*), Pied Avocet (*Recurvirostra avosetta*), Grey Plover (*Pluvialis squatarola*), Ringed Plover (*Charadrius hiaticula*), Bar Tailed Godwit (*Limosa lapponica*), Whimbrel (*Numenius phaeopus*), Eurasian Curlew (*Numenius arquata*), Redshank (*Tringa tetanus*), Greenshank (*Tringa nebularia*), Greater Sand Plover (*Charadrius leschenaultia*), Terek Sandpiper (*Xenus anerus*), Common Sandpiper (*Actitis hypoleucos*), Ruddy Turnstone (*Arenaria interpres*), Curlew Sandpiper (*Calidris ferruginea*).

ESA Type 3a) Seagrass and Algal Beds:

Nine species of seagrasses from the family of Hydrocharitaceae and Cymodoceaceae can be found both around Mauritius and Rodrigues. These are flowering plants that lives entirely submerged in the in marine, fully-saline environments, completing their full life story including pollination while submerged under water. They are often found in association with algae and in close proximity to coral reefs. In Maritius the main distribution is in the region of Melville, Poudre D'Or to Poste Lafayette in the north east (**Landscape 4**), Grand River South East to Mahebourg in the south east (**Landscape 3**), Le Morne, Riviere Noire in the south west (**Landscape 2**), Flic en Flac and Albion in the west and Mont Choisy in the North (**Landscape 1**). The patches vary greatly in terms of cover density. In Rodrigues, the seagrass beds are usually multispecific with different species coexisting and further forms assemblages with other macroalgae. The main patches with dense seagrass can be seen in the region from Mourouk to Gravier in the south east (**Landscape 6**), Petite Butte to Baie Topaze through Anse Quitor in the south west, Baie Malgache in the north west and Anse Aux Anglais to Grand Baie in the north. Seagrass meadows provide food and shelter for many organisms, and are a nursery ground for commercially important prawn and fish species. The high primary production rates of seagrasses are closely linked to the high production rates of associated fisheries. These plants support numerous herbivore- and detritivorebased food chains, and are considered very productive pastures of the sea. The associated economic values of seagrass meadows are very large, although not always easy to quantify.

ESA Type 2a) Sand beach and dunes:

Within Mauritius, sand beach and dune systems are found almost entirely within the Pas Geometrique, an 80 m strip of State Land covering virtually the entire coastline of Mauritius. They are formed from depositional surfaces through a dynamic process of sediment accumulation and ablation linked to tidal and sea surge oscillations. The main areas of coastline dominated by beach and dune systems run from Port Louis north to Anse La Raie (**Landscapes 1 and 5**) and then along the eastern coast from Roches Noires south to Poste Lafayette. The longest formation in the country can be found extending from Providence south to Trou d'Eau Douce in the Palmar State Reserve region. In the south, the main features are present immediately south of Mahebourg, including Pointe Jerome and the Blue Bay area (**Landscapes 4 and 3**), and attached to the Le Morne Brabant peninsula (**Landscape 2**). Significant beach and dune systems are also attached to a number of offshore islets, including Ile aux Bénitiers in the southwest and the Flat-Gabriel Island Complex lagoon in the north (**Landscape 5** for the latter). In Rodrigues, apart from Ile aux Sables and Ile aux Cocos which are composed entirely of sand deposits, sandy beaches occur in limited areas on the other islets (e.g. Gombrani and Crab Islands) but are more consequent in some regions of the main island mainly from Pointe Roche Noire to Mourouk in the south east (**Landscape 6**), with a smaller stretch at Baie de l'Est in the east and even smaller regions scattered along the coastline between Pointe Cotton and Pointe aux Cornes. Many species inhabiting sandy beaches and dunes have widespread distribution, but due to restriction of this type of habitat in Mauritius and elsewhere, their relative value has often increased. Particularly noteworthy are two beaches where turtles have been recorded to lay eggs in Mauritius. Two sandy islets to the north west of Rodrigues sustain large seabird colonies. Besides the scenic beauty, sand beach and dune systems provide a number of important services attached to coastal zone protection and recreational use in particular.

ESA Type 3b) Corals and Coral Reefs:

Fringing reefs protect extensive shallow lagoons nearly all way around the islands of Mauritius. These formations have coalesced over time to form a nearly continuous belt extending approximately 233 km in length around the island. Most are well established spur and groove reefs with an algal ridge. The lagoons have large beds of branching and tabular corals *Acropora formosa*, *A. cythera*, *A. hyacinthus* and patches of *Pavona*, *Porites*, *Platygyra*, *Galaxea*, *Montipora* are common. In all the lagoons of Mauritius and around Rodrigues, corals can be observed, but in varying abundance. There exist very dense patches of healthy corals, in spectacular formation, in the marine parks of Blue Bay (**Landscape 3**) and Balaclava (**Landscape 1**) (with more than 50 species of coral found in the former), and also at Belle Mare (between **Landscapes 3 and 4**). Dense patches can also be seen at Le Morne (**Landscape 2**). Rodrigues has an immense lagoon area (approx. 235 km²), but the coverage of dense, live corals are somewhat localized to specific areas such as Couzoupa, adjacent to the deep channel in the south east of the island, and at Murail Paul, close to the southern tip of the coral reef or adjacent to the reef flat immediately opposite the channel entrance at Port Mathurin (**Landscape 6**). Coral reefs have more than simply existence value, and are important not only for the diverse life they and their affiliated ecosystems support, but to the human population as well. Reef-associated plants and animals provide people with a number of valuable products and services, including food (fish are often the only source of protein for coastal communities), new medicine (coral reef species offer particular promise in pharmaceutical products because of the array of chemicals produced by many organisms for self-protection), recreation (one of the main attractions for tourism) and coastal protection (from cyclones e.g.).

ESA Type 3c) Islets:

There are 175 offshore islets including small rocky outcrops that often surround larger formations in the Republic. Of these, six are outside lagoon areas and within **Landscape 5** (Gunner's Quoin, Flat Island, Gabriel Islet, Pigeon House Rock, Round Island and Serpent Island). Else, islets are also found in a considerable density of islets along the north-eastern shore near Poudre D'Or (**Landscape 4**) and another cluster in the Mahebourg region (**Landscape 3**). The latter group represents an ancient reef platform that has subsequently eroded to yield a constellation of smaller islets similar to the formations found along the southern coast of Rodrigues (**Landscape 6** and as part of the SEMPA). Islets represent some of the most important habitats for native and endemic plant and animal species in the country and even the region. For example, the best remnants of the coastal hardwood forest of the Mascarene Islands occur on an islet (Ile aux Aigrettes) in the south east of Mauritius while remnants of the palm-rich dry forest which has been completely destroyed on mainland Mauritius survive on Round Island and in a more degraded state also on Gunner's Quoin and the Flat Island-Ilot Gabriel complex. Where these have been degraded through a long history of exotic introductions, islets represent the best last opportunity to restore coastal ecosystem's biological communities to a semblance of their past composition since they tend to be less accessible to alien species (e.g. Round Island has never been reached by rats) and are more amenable to successful control of invasive alien species (e.g. goats and rabbits have been eradicated from Round Island, hares from Gunner's Quoin, and rats from Ile aux Aigrettes, Gunner's Quoin and the Flat island-Ilot Gabriel complex). Such eradications are currently impossible in mainland areas. Particularly noteworthy are the remaining reptilian and plant populations found only on the Northern Islets (**Landscape 5**) as well as the large colonies of sea birds residing on several islets such as Ile aux Serpents, Round Island and Gunner's Quoin on Mauritius, or Ile aux Cocos and Ile aux Sables on Rodrigues (**Landscape 6**).

Source: *Environmentally Sensitive Areas Classification Report*. Prepared for the Ministry of The Environment and NDU, Government of Mauritius, Republic of Mauritius. NWFS Consultancy, Portland, OR, USA. Final Version 15 June 2009.