GoS-UNDP-GEF Project
"Strengthening Seychelles' protected area system through NGO management modalities"

Third Field Report

Final Report for the
"*Consultancy for the identification of priorities for the expansion of the marine and terrestrial protected area system of the Seychelles*"

Prepared by
Dr Rebecca Klaus

Ministry of Environment & Energy
P.O. Box 445 Victoria, Mahé, Seychelles

Acronyms

AMSSI	Association of Members of Seychelles Sea Cucumber Industry
ASCLME	Agulhas and Somali Current Large Marine Ecosystem Project
ASFA	Artisanal Shark Fishers Association
CBD	Convention on Biological Diversity
CCRU	Cambridge Coastal Research Unit
CITES	Convention on International Trade in Endangered Species
COI	Commission de l'Ocean Indien
CORDIO	Coral Reef Degradation in the Indian Ocean
COTS	Crown-of-Thorns Starfish
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EMPS	Environment Management Plan of Seychelles 2000-2010
ENGO	Environmental Non-governmental Organisation
FBOA	Fisher Boat Owners Association
GBIF	Global Biodiversity Information Facility
GCRMN	Global Coral Reef Monitoring Network
GEF	Global Environment Facility
GIF	Green Islands Foundation
GIS	Global Information System
GVI	Global Vision International
ICRI	International Coral Reef Initiative
ICS	Island Conservation Society
IDC	Island Development Company
IMPASP	Integrated Marine Protected Area Systems Plan (a component of SEYMEMP)
IOSEA	Indian Ocean and South East Asian turtle agreement
IOTC	Indian Ocean Tuna Commission
IUCN	International Union for the Conservation of Nature
MCSS	Marine Conservation Society of Seychelles
MEE	Ministry of Energy and Environment
MFA	Ministry of Foreign Affairs
MLUH	Ministry of Land Use and Habitat
MPA	Marine Protected Areas
NGO	Non-governmental organisation
NIC	National Inter-ministerial Committee
NPTS	Nature Protection Trust of Seychelles
OBIS	Ocean Biogeographic Information System
PA	Protected Area
PCA	Plant Conservation Action Group
PCU	Project Coordination Unit
PUC	Public Utilities Company
PFA	Praslin Fishermen's Association
SSB	Seychelles Standards Bureau
STB	Seychelles Tourism Board
SCMRT-MPA	Seychelles Centre for Marine Research and Technology / Marine Parks Authority
SEYMEMP	Seychelles Marine Ecosystem Management Project
SFA	Seychelles Fishing Authority
SIF	Seychelles Islands Foundation
SNCRN	Seychelles National Coral Reef Network
SNPA	Seychelles National Parks Authority
TAG	Turtle Action Group
TRASS	Terrestrial Restoration Action Society of Seychelles
ZSL-EDGE	Zoological Society London

Executive Summary

The present report is the third output from the "***Consultancy for the identification of priorities for the expansion of the marine and terrestrial protected area system of the Seychelles***" under Component 1, Output 1.1 (Part 2) of the "***Strengthening Seychelles' protected area system through NGO management modalities***" project (hereafter referred to simply as the Protected Areas project), is a GEF funded project implemented by the GoS through the Environment Department (ED) and UNDP Project Coordination Unit (PCU). The aim of the present consultancy was to support the GoS to commence the process of identifying priorities for the expansion of the marine and terrestrial protected area system of the Seychelles, determine marine and terrestrial protected area targets and to map priority areas.

The Republic of Seychelles is situated in the western Indian Ocean and is responsible for a vast Exclusive Economic Zone (EEZ) and 155 islands spread across more than 12 degrees of latitude and 16 degrees longitude covering an area of 1.35 million km^2. The Government of Seychelles (GoS) has strived to protect the marine and terrestrial biodiversity for which it is responsible and declared a large number of protected areas (PAs). Recently the GoS has made bold new commitments to expand the PA estate beyond the Aichi Targets set by the CBD Strategic Plan for Biodiversity 2011–2020[1].

In making these commitments, the GoS recognised that it would be necessary to review and assess the adequacy of the existing marine and terrestrial protected area network in order to identify priority gaps for the future expansion of the national network. The GoS plans decided to adopt a Systematic Conservation Planning (SCP) approach in order to achieve this and to employ the use of decision-support tools such as MARXAN to help identify these priority areas for protection.

SCP and other complimentary planning approaches such as Marine Spatial Planning (MSP) are data demanding step-wise processes that can be thought about as a series of inter-linked activities. Each individual activity consists of a number of iterative steps, which may involve adaptive feedback loops, and require review. Contribution and input from local experts is integral to the success of these processes. In anticipation of this fact, the GoS has adopted a phased approach and integrated these planning processes into a number of different projects to facilitate the sequential progression and to allow time for the refinement of outcomes.

The initial phase of this planning effort is being implemented under the GoS-UNDP-GEF funded Protected Areas project. The Protected Areas project's development goal is ***to facilitate working partnerships between diverse government and non-government partners in the planning and management of the protected area system in Seychelles*****.** The project will achieve this through two components, along with their associated outcomes, outputs and activities. These are: Component 1 *Strengthened management framework for protected areas in Seychelles*; and Component 2 *Expanded and strengthened management of protected areas in Seychelles*. The present consultancy falls under Component 1.

The GoS-UNDP-GEF Protected Area project is only one of a suite of interlinked projects in the UNDP-GEF portfolio for Seychelles that are being implemented through the UNDP-PCU. Many of these other projects include closely related or complimentary activities related to improving or mainstreaming biodiversity management. These include projects to support baseline biodiversity data collection, compilation, organisation and analyses alongside other activities to related to applied marine and terrestrial resource management. The most closely related projects include the recently completed GoS-UNDP-GEF "*Capacity Development for Improved National and International Environmental Management in Seychelles*", the GoS-UNDP-GEF "Mainstreaming Biodiversity Management into Production Sector Activities", and the recently started GoS-UNDP-GEF "*Expansion and Strengthening of the Protected Area Subsystem of the Outer Islands of Seychelles and its Integration into the broader land and seascape*".

The present report summarises the main findings from the Seychelles Systematic Conservation Planning (SEY-SCP) process that was implemented through the GoS-UNDP-GEF Protected Areas project to identify priority areas for potential protected area expansion in the Seychelles marine and terrestrial environment. The goal for protected area expansion set by the Seychelles Government was 50% of all terrestrial areas, and 30% of the

[1] CBD Aichi Target 11: *By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are..... ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes*

Seychelles EEZ, 15% of which would be identified as 'no-take' areas. The key steps in this process, the main findings and recommendations from this study are summarised below:

- As a first step towards commencing the SEY-SCP process, the UNDP-GEF PA Project established a new procedure to facilitate and promote the sharing of data about the distribution of species and the state of the marine and terrestrial environment in Seychelles. Such a procedure did not exist previously in Seychelles, which meant that datasets held by individual researchers, or ENGOs for example, or indeed different government agencies, were not readily available to Government for use in these types of large planning processes. Establishing the data sharing procedures was a major step forward towards improving understanding and knowledge about the biodiversity of the Seychelles, and planning for sustainable use and conservation management into the future.
- Following a process of consultation and a review of the literature, the best available data were sourced through the data sharing process. Datasets obtained through this process included both raw and published data from national organisations and individuals, as well as from other regional and global sources. The datasets were reviewed and then converted into an appropriate format so that they could be used in the GIS. As would be expected, many of the datasets obtained were either limited in their spatial extent and focused on one or two islands or at best an island group, or the data were recorded using different methodologies and over different timeframes. Where possible common or similar datasets were processed and then combined so as to create a new harmonised dataset covering a larger area, although this was not always possible.
- The datasets collected and prepared were used to create a series of derived data layers for use in the SEY-SCP process for the marine and terrestrial environment. The derived datasets included spatial data layers illustrating the distribution of marine and terrestrial habitats, existing protected areas, key ecological processes, priority species and species groups. Data layers representing the distribution of different resource uses within Seychelles marine and terrestrial environment were also prepared.
- An integrated hierarchical classification scheme was developed for the purposes of the SEY-SCP, which attempted to harmonise between previously used marine and terrestrial classification schemes. The integrated classification scheme was used to create a new base map for Seychelles, in which existing habitat datasets were combined where available and the gaps infilled using data from the freely available Landsat 8 series.
- The integrated classification scheme was used to prepare an integrated habitat map to illustrate the distribution of both marine and terrestrial environments throughout the Seychelles EEZ. This process resulted in the creation of new data layers covering some of the critical coastal and shallow marine 'process' habitats (e.g. beaches, coral reefs, seagrass beds and mangroves). While there was some data available for each of these critical habitats previously, the data were disparate, and only covered one or two islands, or an island group at best, and they generally did not cover the entire Seychelles EEZ.
- The design principles and objectives for the protected area network were discussed and with national stakeholders at the 2nd SEY-SCP workshop. These discussions included identifying the priority marine and terrestrial habitats and targets for the protected status of these habitats were agreed. This same workshop also provided the opportunity to discuss the priority species for inclusion in the model.
- Spatial data on the distribution of priority species was sourced from the literature and through the data sharing process described above. As the variation in the spatial distribution of many of the priority species would be adequately captured by variations in the spatial distribution of the habitats, only those priority species with discrete ranges and for which there was comprehensive spatial data available were included.
- In addition to preparing the datasets to represent the habitats and associated biodiversity, datasets were also prepared to represent the socio-economic environment of Seychelles and the distribution of different human resource uses. These data were combined and used to prepare a spatial data layer representing the current status or condition of the marine and terrestrial environment.
- Conservation 'opportunities' and 'constraints' were also identified and mapped. Opportunities in this context refers to areas that are not already legally gazetted but already subject to a certain level of management that would be compatible with protected area status (e.g. private islands, fisheries management areas), or areas that are already proposed for protection at the national level or recognised as being of conservation importance at the regional or international level. Constraints in this context refers to areas where there may be conflicts with conservation and protected area expansion due to the importance of the area to other existing or proposed socio-economic uses, such fishing, aquaculture or oil and gas.

- MARXAN conservation planning software was designed as a decision support tool to help planners to solve complex conservation planning problems in both landscapes and seascapes. More specifically MARXAN was originally desiged to help solve a mimmum cost model, which aims to identify the most spatially efficient system of protected areas that both meet the conservation design targets while minimising the total socio-economic cost of protected area expansion to other resource users. While ideally these cost surfaces would be prepared using the monetary value for each specific sector and or the total ecosystem goods and services this is often not technically feasible. More commonly, the 'cost' surfaces are derived using the best available data to represent relative socio-economic costs which takes into consideration that habitat condition, as well as potential opportunities and constraints data layers. In this context areas in good condition and opportunities are considered to be lower cost, while poor condition or degraded areas and areas with existing or proposed socio-economic constraints are considered to higher costs.
- In order to minimise the potential cost of protected area expansion, while still achieving the conservation goals and specific targets, different 'cost' data layers were constructed to represent trade-offs that might be required with respect to climate change, industrial and semi-industrial fishing, small scale fishing and a combination of these aforementioned costs. Seven different 'cost' surfaces were prepared for use in the MARXAN model scenarios. In the first cost layer (scenario 01), the 'cost' of all the planning units was set as being equal to 1. In this scenario, the cost of protected area expansion is determined by the number of planning units irrespective of other socioeconomic uses. The second cost layer (scenario 02) used a "threat" data layer derived by Maina et al. (2008) as the cost for each planning unit. This "threat" dataset, which was prepared by combining and weighting nine different satellite derived datasets, was designed to represents the potential suspectibility of coral reefs to coral bleaching related stress under future climate change scenarios. The types of climate change related impacts that cause coral bleaching will also affect other aspects marine biodiversity. So for this purpose, the "threat" data layer was used as a proxy to represent the potential negative impact of climate change related on the status of the wider marine environment, with more susceptible areas being more costly. The third and fourth cost data layers focused on how protected area expansion may interact with / trade off against the fisheries sector and were calculated using fisheries specific constraints data layers. In the first of these fisheries specific cost layers (scenario 03), the only costs included were the constraints associated with small-scale fisheries.). In the second fisheries specific cost layer (scenario 04) the only costs included were the constraints associated with industrial and semi-industrial fishing (scenario 05). The fifth cost layer (scenario 05) was constructed by combining the habitat condition, opportunities and the constraints associated with industrial and semi-industrial fishing. The sixth cost layer (scenario 06) was constructed by combining the habitat condition, opportunities and all the constraints data layers (including the fisheries related data). The final cost layer (scenario 07) was constructed combining scenario 02 and scenario 06 to represent combined costs with consideration of future climate change scenarios.
- The mapping of the cost layers was achieved using the following equations:
    - Cost scenario 01 = [equal to 1 for all planning units]
    - Cost scenario 02 = ["threat" as per Maina et al (2008)]
    - Cost scenario 03 = [small scale fisheries data layers]
    - Cost scenario 04 = [industrial and semi-industrial fisheries constraints]
    - Cost scenario 05 = Area x [(condition modifier x (industrial and semi-industrial fisheries constraints x 10) - opportunities modifier)]
    - Cost scenario 06 = Area x [((condition modifier x constraints modifier) – opportunities modifier)].
    - Cost scenario 07 = Area x [((("threat" as per Maina et al (2008) x 10) + condition modifier) x constraints modifier)-opportunities modifier)]
- The final version of the SEY-SCP model combined 191 features, which includes 65 habitat types, and a further 126 data layers representing either ecological process habitats (e.g. productivity) or the spatial distribution of priority species. These datasets include the current best available data for both terrestrial and marine species and / or their critical habitats (e.g. foraging, nesting / spawning grounds).
- Before running the Marxan analysis two assessments were completed: A protected area assessment to determine the representativeness of the existing protected area estate, and; a threat assessment to determine which of the different habitat types were most at risk and in greatest need of protection.
- The results of the protected area assessment revealed that the current legally declared protected area network in the Seychelles covers a total of 216 km^2 of the 465.5 km^2 of land (46.43% coverage) and 387.8

km^2 of the 1,351,207.8 km^2 of sea (<1%)[2]. Although the terrestrial protected area network exceeds the CBD Aichi target 11, the assessment revealed that there is a severe lack of representation in both the existing terrestrial and marine protected area estate in Seychelles. Only two out of the 55 habitats mapped qualified as being 'Well protected' (>90%), one habitat qualified as being 'Moderately protected' (50-90%), and ten habitats were considered to be 'Poorly protected' (5-49%). As such there are currently 42 habitats, or 78% of the habitat types mapped that are 'Not protected' (<5%).

- The results of the threat assessment revealed that all island types, with the exception of raised atolls, were 'Critically Endangered'. The results of the threat assessment in the marine environment were more variable, with some habitats being classified as being 'Critically Endangered' while other habitats were identified as being of 'Least Concern'. The results of the threat assessment were used to help refine the targets for use the spatial prioritisation. Where there were discrepancies between the targets identified using this method and those set by stakeholders during the consultation process and agreed at the 2nd SEY-SCP, the targets set by stakeholder during the consultation took precedent.
- The SEY-SCP model was run using the seven cost surfaces outlined above for two protected coverage goals as per the commitment made by the Seychelles Government as follows: (i) 50% terrestrial and 30% marine and (ii) 50% terrestrial and 15% marine.
- The outputs from each of the different scenarios consistently highlighted certain areas as being important for the protected area expansion in Seychelles. In principle, the outputs from any one of the cost surface models could justifiably be used to inform the expansion of the Seychelles protected area estate to meet the coverage goals of 50% on the land and 30% or 15% in the sea.
- The scenario explored in greatest detail was the full cost model without "threat" (Scenario 06) (Figure A and B). The outputs from Scenario 06 were used to identify the key priority focus areas for protected area expansion to cover 30% (406,364.84 km^2) of the EEZ, including 15% (207,875.18 km^2) of higher priority core areas and 50% (465.40km^2) of the land (Figure A and B).
- The priority areas identified include a suite of small areas which could potentially be declared as core areas with a higher protection status, embedded within a set of larger priority areas which could be declared as sustainable use areas, with a lower protection status. The priorities areas identified using the different cost surfaces were similar between each of the scenarios.
- Further work is now needed to refine the exact boundaries for the expansion of the protected area estate through consultation with key stakeholders and government.
- In summary, the expansion of the protected area estate into the priority areas identified through this process would vastly improve the protected area coverage in the sea but also the representativeness of the protected area estate in both realms, thereby helping Seychelles progress towards meeting the full CBD Aichi target 11, which aims for representative as well as the total percent coverage as a target.

Convention on Biodiversity AIchi Target 11: By 2020, at least 17 per cent of terrestrial and inland water areas and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, **ecologically representative** and **well-connected systems** of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascape.

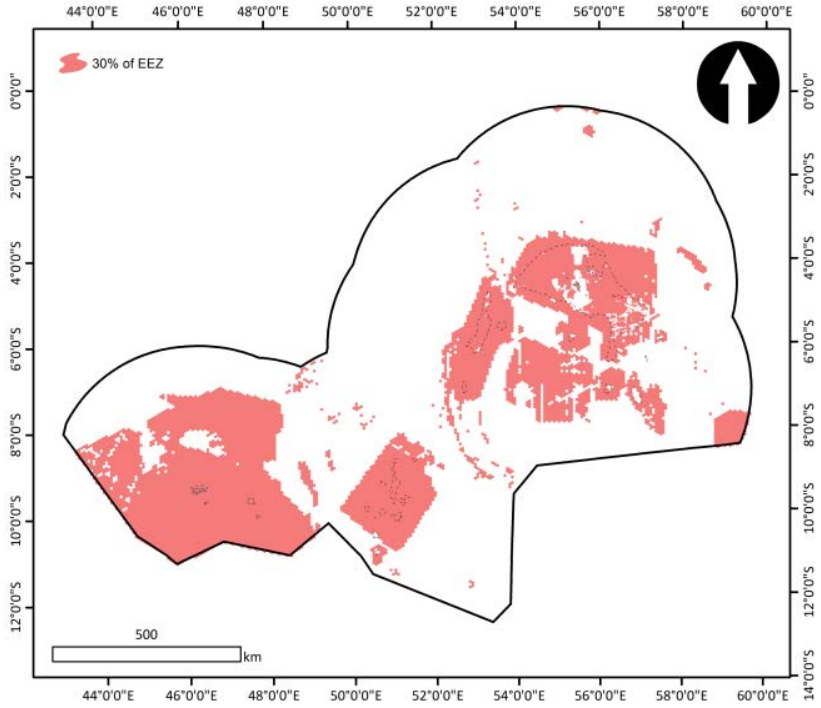
- Ultimately whether or not Government is able to progress towards fully realising the expansion of the protected area estate will depend upon the availability of resources (both financial and human) to support the expansion and support from all stakeholders. The larger areas identified through this process will impact upon industrial and semi-industrial fisheries. However the larger proposed "Sustainable use" areas that have been identified through this process are also closely compatible with the existing "Fisheries Exclusion Zones" which provides an initial basis for these types of discussions.

Recommendations and Next Steps

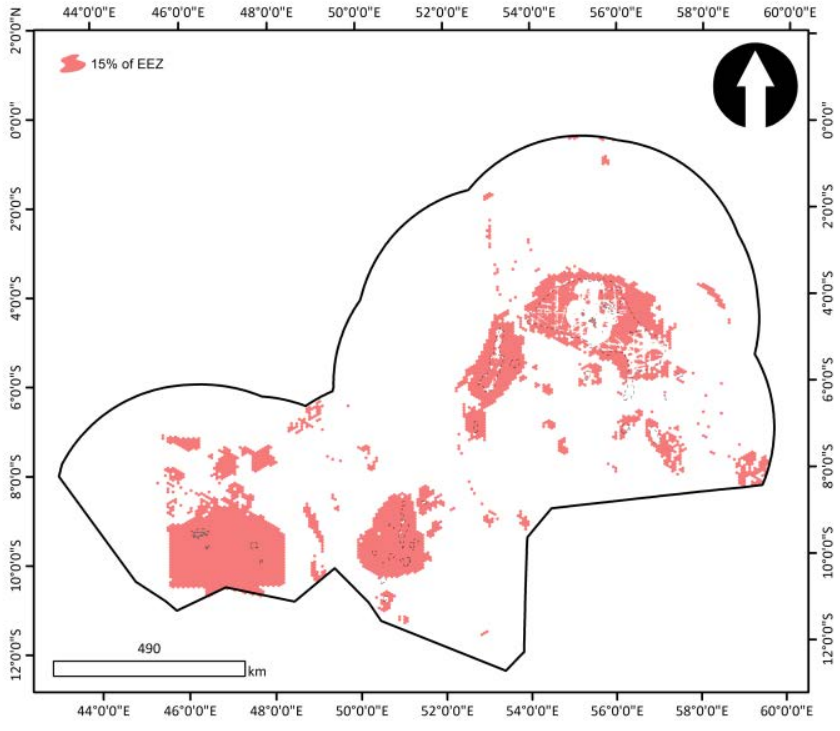
[2] All the data compiled for the purposes of the SEY-SCP analysis needed to be transferred into the GIS and then reprojected using one standard equal-area projection which could be used throughout the analyses. Various equal-area projections were considered (e.g. Lamberts equal-area cylindrical projection) and these options were also discussed with the TNC GIS person in May 2014. The TNC GIS person recommended that all the data be reprojected using the Universal Transverse Mercator (UTM) projection, because this was commonly used in Seychelles. The recommendation was to use UTM40S as the standard projection even though Seychelles EEZ transgresses three UTM zones (from west to east UTM38S, UTM39S, and UTM40S), because this was the zone covering the central Seychelles and any of the errors associated with using one of the three zones would be less than would result from using one of the other global equal-area projections.

- Systematic conservation planning is an iterative process that requires feedback from stakeholders. The outputs from MARXAN models are intended as to provide decision support. While the best available data was used for the current SEY-SCP process, there is always scope to improve the input datasets used in modelling process, especially for such a biodiverse island nation like Seychelles. Suggestions and recommendations towards improving the quality and availability of data that can be used in these types of planning processes and on the next steps towards realising the expansion of the protected area network in Seychelles include the following:
    - Undertake a thorough review of the existing protected area network and the original legal gazettes and associated maps to ensure that the boundaries of the existing protected areas are correct.
    - Determine whether all of the existing protected areas notably those that are not currently being enforced (e.g. Shell Reserves or Nature Reserves) should be maintained or de-gazetted with a view to consolidating the protected area estate and investing in new areas that are viable.
    - Maintain the data sharing procedures established through this project and eventually embed such a procedure into policy so as to ensure that data collected within the Seychelles are available for similar planning processes in the future.
    - Invest in the necessary hardware, software and human resources needed to improve the capture, storage and management of biodiversity data. Examples of the types of improvements that could be made would include the establishment of a biodiversity database, harmonisation of data collection methods and/or reporting formats, at least for the critical habitats (e.g. coral reefs, seagrasses and mangroves) and key species.
    - Expand upon the procedures established to report annually to Government by providing a standard data template in which data must be submitted annually alongside the annual reports.
    - Undertake further habitat mapping work using high resolution satellite imagery (or aerial photography) to improve the availability of consistent detailed maps showing the spatial distribution terrestrial and shallow nearshore habitats that have been ground-verified.
    - Ecological niche based modeling of the distribution patterns of key species would increase the amount of data available for use in spatial prioritisation processes.
    - Spatial prioritisation techniques can be used to refine or define zoning plans for core areas (e.g. Aldabra) and the main inner islands, where there is more detail data available for use in prioritisation processes.
    - Continue to build upon the existing procedures whereby private entities and ENGOs support the management of some new protected areas while also expanding and building the capacity of the Seychelles National Parks Authority (SNPA). This will be important even if only a proportion of the new protected estate would be privately managed, as there will still need to be an authority with both the mandate and experience to be able to provide guidance and proper oversight to ensure that the management, surveillance and enforcement of these areas is consistent and legal.
    - Consider using Marxan with Zones to enhance the protected area network design. Marxan with Zones allows the planner to design a model that can allocate protected areas to different protected area types, not just protected or unprotected. Each type or zone then has the option of its own actions, objectives and constraints, with the flexibility to define the contribution of each zone to achieve targets for pre-specified features (e.g. species or habitats).

(a) Proposed protected area expansion for the Seychelles using "Threat" (Maina et al 2008) as cost (Scenario 00).

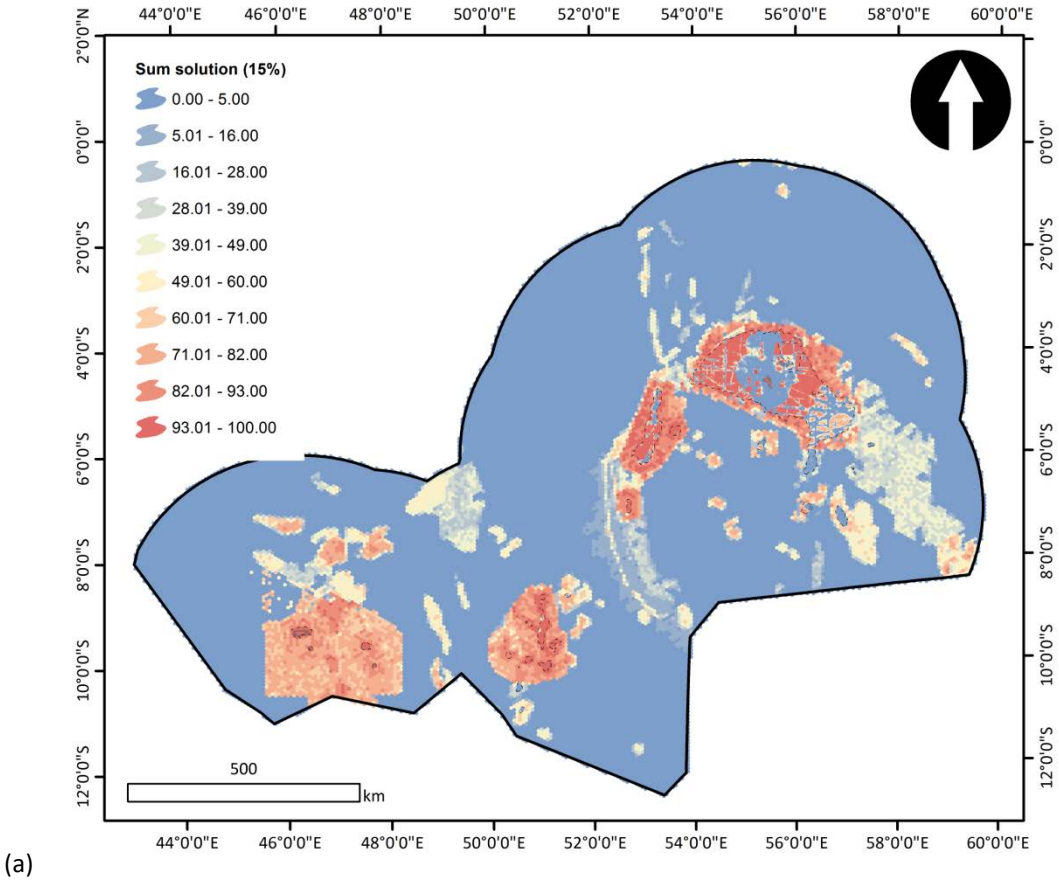


(a)



(b)

Figure A: Proposed protected area expansion for the Seychelles using the full cost model (habitat condition layer, opportunity and constraints layers' (without threat) prepared for this project (Scenario 06) using targets of (a) 30% sea and 50% land and (b) 15% sea and 50% land.



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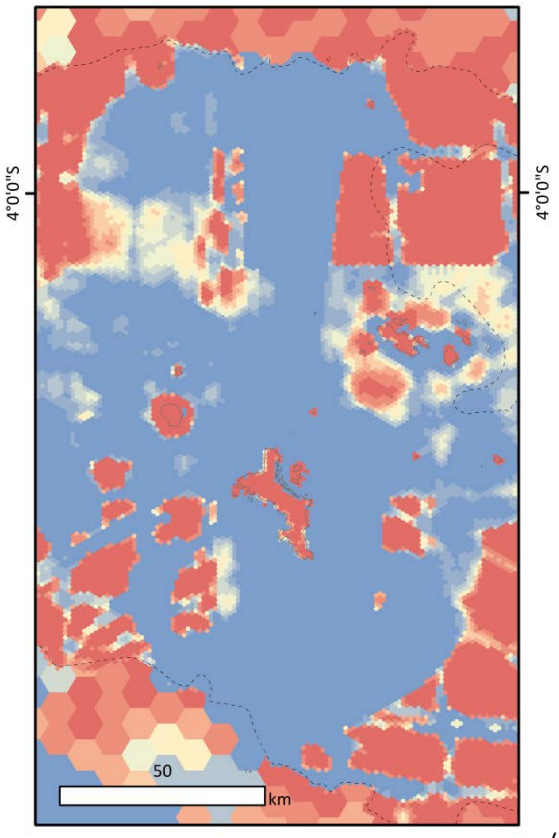
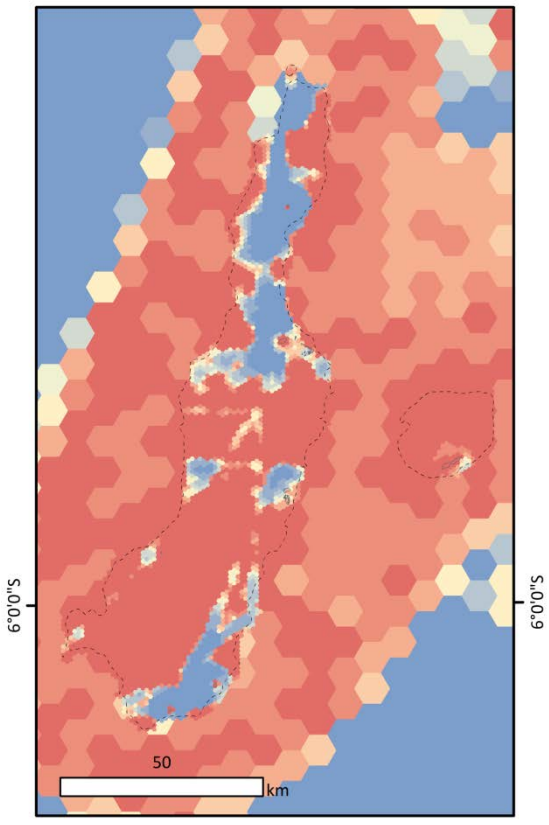


(b)



(c)

Figure B: Sum solution selection frequency for Scenario 06 using targets of 15% sea and 50% land.

Reports
Klaus R. 2014a. First Field Report on "Consultancy for the identification of priorities for the expansion of the marine and terrestrial protected area system of the Seychelles" (February 2014). Report prepared for the GoS-UNDP-GEF Project "Strengthening Seychelles' protected area system through NGO management modalities" on behalf of the Government of Seychelles, Ministry of Environment & Energy, P.O. Box 445 Victoria, Mahé, Seychelles. 89p.
Klaus R. 2014b Seychelles Systematic Conservation Planning (SEY-SCP) - Expert Workshop. 16th-17th July 2014 Seychelles Fishery Authority, Training Room, Port Victoria Mahe, Seychelles. Report prepared for the "Consultancy for the identification of priorities for the expansion of the marine and terrestrial protected area system of the Seychelles", as part of the GoS-UNDP-GEF Project "Strengthening Seychelles' protected area system through NGO management modalities" on behalf of the Government of Seychelles, Ministry of Environment & Energy, P.O. Box 445 Victoria, Mahé, Seychelles. 9p.
Klaus R. 2014c. Second Field Report for the "Consultancy for the identification of priorities for the expansion of the marine and terrestrial protected area system of the Seychelles". Report prepared for the GoS-UNDP-GEF Project "Strengthening Seychelles' protected area system through NGO management modalities" on behalf of the Government of Seychelles, Ministry of Environment & Energy, P.O. Box 445 Victoria, Mahé, Seychelles. 40p.
Klaus R. 2015 (this report) Third Field Report for the "Consultancy for the identification of priorities for the expansion of the marine and terrestrial protected area system of the Seychelles". Report prepared for the UNDP-GEF-GoS Project "Strengthening Seychelles' protected area system through NGO management modalities" on behalf of the Government of Seychelles, Ministry of Environment & Energy, P.O. Box 445 Victoria, Mahé, Seychelles. XXp.

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1 INTRODUCTION

The aim of the present consultancy was to identify priorities for the expansion of the marine and terrestrial protected area system of the Seychelles, to determine marine and terrestrial protected area targets and to map priority areas. The background to the planning process and previous activities are described in the other reports (Klaus 2014a, b and c). The purpose of the present report is to document the Systematic Conservation Planning approach implemented through the GoS-UNDP-GEF PA Project, including a description of the following steps:

- Data sourcing and data catalogue
- Data review and mapping
  - Mapping of Habitats
  - Mapping Pressures or Condition
  - Mapping of Protection
  - Mapping of Species
  - Mapping of Ecological Processes
  - Mapping of Opportunities
  - Mapping of Constraints
  - Mapping of Costs
- Systematic Conservation Planning Process
  - Assessment of ecosystem threat status
  - Assessment ecosystem protection level
  - Marxan spatial prioritization analyses

2 DATA SOURCING & DATA CATALOGUE

2.1.1 Data scoping

Data scoping is the process of identifying and defining the types of data needed and the potential sources of those data for use in the planning process. The Data scoping phase for the SEY-SCP commenced in December 2013 and continued through into 2014. The process drew upon three main sources of information: (i) consultations with national data owners, including individual researchers, non-governmental or private organizations, parastatals, and government authorities, (ii) a review of the available literature (web-based resources, grey literature reports and scientific publications) and (iii) a review of external sources of data from regional or international organisations.

Consultations at the national level commenced during the first field mission (3rd-15th December 2013), and were continued following the first 'SEY-SCP Stakeholder Engagement Workshop 01', held on 4th December 2013, at the Botanical Gardens, Mont Fleuri, Mahe, Seychelles. After this first workshop a series of one-to-one consultation meetings were arranged with individual researchers, ENGOs, parastatals, and government authorities (4th and 15th December 2013). These face-to-face consultations continued during second (3rd-7th February 2014) (Klaus 2014a), third (9th-18th May 2013) (Klaus 2014b), and fourth (13-24th July 2014) field missions (Klaus 2014c).

National or international data holders identified through the consultation process or the literature and who were not possible to meet face-to-face, were sent an introductory email, together with background materials to explain the project and request their assistance and collaboration in sharing data for the SEY-SCP process.

2.1.2 Stakeholder Liaison Plan and Stakeholder Tracker

The data scoping phase revealed the existence of many potentially useful datasets. In order to manage the correspondence with potential data contributors a 'Stakeholder Tracker' was prepared to document the correspondence from first point of contact through to data sharing.

2.1.3 Data Sharing Agreements

While certain international and national data holders were willing to share data following the first round of consultations, these consultations also revealed the need to establish a more formal data sharing procedure to manage the sharing of more sensitive datasets. A key output from the first phase of the consultancy was therefore the preparation of a draft Data Sharing Agreement (DSA) (Klaus 2014a). This first draft of the DSA

was circulated to a limited number of data holders for comments. The circulation of the formal data requests and the DSA was put on hold pending agreement from GoS on both the content of the DSA and the proposed governance framework. The finalisation of these arrangements were also put on hold so as to allow for the alignment of the SEY-SCP process with other parallel planning processes (see below). Once these matters were resolved, UNDP-PCU submitted the revised DSA to the GoS-MEE legal department for review. The legal review of the final draft version of the DSA raised some minor concerns which were duly corrected. The final version of the DSA that was circulated to data holders with the data requests is in **Annex 1A.**

2.1.4 Distribution of Data Requests

A Data Request Form (DRF) was prepared for each of the potential data holders that had been identified during the initial data scoping phase. The DRF listed the specific types of data that were of interest to the SEY-SCP process, an example of which is provided in **Annex 1B.** The DRF was packaged together with background information documents explaining how the data holder could assist in the planning process and the preferred data formats for submission (see **Annex 1C**). If during the initial correspondence the data holder indicated that they required a formal signed DSA, then a document package was prepared and sent to the data holder together with a signed DSA from GoS-MEE ED via UNDP-PCU. If the data holder did not request a formal signed DSA from the GoS, the document package was sent directly to the data holder by the consultant with the Data Manager at GoS-MEE ED in copy in the correspondence.

2.1.5 Alignment of SEY-SCP process with the TNC MSP project

The Nature Conservancy (TNC) was awarded a grant from Oceans Five to support a similar protected planning process as part of the 'Debt-for-Adaptation' swap. A meeting was held at UNDP-PCU with TNC staff in February 2014 to discuss how best to align and coordinate activities between both projects so as to avoid duplication of effort and minimize stress to data owners. The agreement reached between the projects during that meeting was as follows:

i. There would be two-way sharing of data between TNC and the PA Project and the DSA agreement and background materials that had been prepared under the PA Project would be modified in order to make them applicable to both projects and other potential planning processes.
ii. The division of labour between TNC and the GoS-UNDP-GEF PA Project was agreed as follows:
    a. TNC would support the compilation of socio-economic and human-use data and lead in the calculation of the cost data layers, which would be made available for use in both models. TNC had experts within their global team (Eddie Game and Josh Goldstein) that would be responsible for preparing the cost data sets.
    b. SEY-SCP PA project process would continue to scope and source the biodiversity related datasets. TNC would thereby benefit from the data scoping, compilation and processing efforts ongoing with support from the PA project. The PA project would benefit from the TNCs efforts in compiling the data and preparing the cost data layers.
iii. There would be collaboration in terms of workshops.

The consultant maintained regular contact with the TNC team between February and May 2014, provided advice and commented on draft documents when requested. The consultant was also put in direct contact with the TNC staff assigned to develop the cost data layers (Eddie Game and Josh Goldstein). The consultant had email and skype discussions with the TNC GIS team about the availability of different datasets, means of processing and calculating the cost data.

In May 2014 there was a change in the composition of the TNC team. A new GIS person was recruited due to the unavailability of Eddie Game and Josh Goldstein. TNC requested copies of all of the data compiled to date under the PA Project. These data was transferred to the TNC GIS person during the Third Field Visit (9th to 18th May 2014). The consultant spent time working with the TNC GIS person to explain the challenges with obtaining data, what data had already been obtained and what was pending, the processing completed to date, and the structure of the datasets within the Data Catalogue, including the projection and processes she was proposing to use to construct the derived datasets.

Unfortunately the collaboration with the TNC team did not proceed a planned. There were various further changes to composition of TNC team and it was not until January 2015 that the TNC team settled on approach that they were going to use to develop the MSP. It was at this point that it became apparent that they were not going to develop the socio-economic cost data layers as had previously been agreed. Instead the approach

that they decided to take was to be based upon consultation about the zoning scheme instead of using spatial prioritisation analyses.

2.2 WORKSHOPS FOR TECHNICAL WORKING GROUPS

The First Field Report (Klaus 2014a) recommended establishing expert technical working groups and organising a series of working group meetings / workshops to bring together biological / ecological specialists (e.g. marine and terrestrial species, habitat) and human-user group specialists (e.g. fisheries, other extractive industries, tourism etc.) to discuss the content of the model in terms data input, priority features for inclusion and the specific targets. The proposed purpose of these workshops as outlined in Klaus (2014a) was proposed as follows:

Workshop 2: Technical specialists (e.g. biological / ecological and human user group specialist) will be invited to a second workshop the purpose of which will be to discuss and agree:

- the overarching goal and specific objectives of the planning process;
- the priority features for inclusion in the model;
- the specific targets for each feature (e.g. 20% seagrass);

During the workshop(s), technical specialists would be split into their respective groups to further discuss and agree:

- the priority features for inclusion in the model;
- the specific targets for each feature of concern (e.g. 20% seagrass);
- the datasets already compiled for use in creating the derived data layers;
- any of the derived data layers that are already available for review;
- the methods and/or means to fill critical data gaps (e.g. expert knowledge);

Workshop 3: The technical specialists will be invited to a third workshop the purpose of which will be to review:

- the derived data layers that will be used as an input into the model;
- the first draft output data layers (ecological threat and protected area assessments) and;
- first results from the spatial prioritization;

This workshop would provide the opportunity to review and revise input and derived data layers and targets where necessary.

Workshop 4: The technical specialists will be invited to a fourth workshop the purpose of which will be to review:

- the derived data layers used as an input into the model;
- the final draft output data layers (ecological threat and protected area assessments) and;
- second results of the spatial prioritization.

The First Field Report (Klaus 2014a) also acknowledged the need for the broader engagement of the general public in these types of planning process. This gap and the need for a broader public outreach campaign had however already been recognised during the PPG phase of the new GoS-UNDP-GEF Outer Islands (OI) project. The OI Project which includes a component activity related to MSP that was intended to be a follow-on from the PA Project, also included an activity "to establish a National Dialogue" which was included to support public outreach and engagement and feedback.

3 DATA RECEIPT AND REVIEW

3.1 DATA RECEIPT

When data was submitted by a data holder to the Data Manager (Mr Justin Prosper at GoS-MEE ED) the following steps were undertaken:

- The data was placed in a folder together with the 'Data Request Form' and the signed DSA where this had been required / supplied;
- The data were recorded in the 'Data Register', including the date of receipt, source and format.
- The data was reviewed and spatial data uploaded to the base 'Data Catalogue';
- Non spatial data / information was further reviewed as outlined below.

A review of all of these data was repeated in processing final set of derived layers. The Data Manager is responsible for the maintenance of the datasets and their correct use.

3.2 DATA REVIEW

To enable data to be loaded into the Data Catalogue the format of the data submitted was reviewed against the data format criteria described in the background documentation. A number of data holders shared useful information that were geospatial but that had not been converted into a GIS format. These information were checked to see if the datasets could be re-worked into one of the formats within the Project timeframe. If the data needed to be reworked, only the most appropriate and relevant spatial data was reworked and incorporated into the Data Catalogue. Where the data was not in the correct format but was deemed essential for the Project, it was converted to the correct geospatial format.

Examples of some of the types of data provided by data holders and the type of geoprocessing undertaken to convert these to a more suitable format included:

- Excel workbook data were converted into new point feature classes and the coordinates converted into the correct format for uploading to the catalogue.
- Word documents / PDFs with maps were converted and digitized into new feature classes.
- Aerial photos that were used to generate new data and to verify data received from other stakeholders.
- Unprojected shapefiles (.shp files) that needed to be converted into the correct coordinate system.
- Unprojected raster datasets (.grid and other formats) were converted into the correct coordinate system.

Once the files were successfully converted, the new data were checked to identify any invalid or topologically incorrect geometry, which was then corrected.

All the data compiled for the purposes of the SEY-SCP analysis that needed to be transferred into the GIS also needed to be reprojected using one standard equal-area projection which could be used throughout the analyses. Various equal-area projections were considered (e.g. Lamberts equal-area cylindrical projection) and these options were also discussed with the TNC GIS person in May 2014. The TNC GIS person recommended that all the data be reprojected using the Universal Transverse Mercator (UTM) projection, because this was the most commonly used projection in Seychelles. The recommendation was to adopt the use of UTM40S as the standard projection even though Seychelles EEZ transgresses three UTM zones (from west to east UTM38S, UTM39S, and UTM40S), because this zone covered the central Seychelles and any of the errors associated with using one of the three zones would be less than would result from using one of the other global equal-area projections.

4 PREPARATION OF DERIVED DATA LAYERS

The datasets compiled into the Data Catalogue were allocated to specific folders as follows:

- Habitats
- Condition
- Protected areas
- Species
- Ecological processes
- Opportunities

- Constraints

The data sources used in the preparation of these derived datasets are further described below.

4.1 MAPPING OF HABITATS

4.1.1 Scope

The ideal habitat dataset for SCP or MSP is a fully integrated, hierarchically nested, high resolution map illustrating the distribution of biotopes, defined as the physical habitat in combination with their associated biological communities. These types of comprehensive habitat / biotopes maps are rarely available at a national level and more commonly it is necessary to use proxy datasets, derived from other data sources such as soil types or geomorphological features among others.

The Data Scoping exercise revealed a number of habitat maps covering the terrestrial and marine habitats in Seychelles (Table 1). These datasets had been prepared using a range of different mapping techniques ranging from the digitisation of ortho-photographs to classification of aerial or satellite derived multispectral imagery. Each dataset typically covered part of or a whole island or island groups, and there were significant gaps.

In the terrestrial environment, national level effort to map the islands has largely focused upon using high resolution ortho-rectified aerial photographs. The most recent set of orthophotos was obtained between 2011 and 2012 and the majority of the digitisation work has been completed by staff at the GoS-MLUH GIS Centre. An exception to this, are the maps showing the vegetation cover on the five inner islands that were prepared with support from the GoS-UNDP-GEF Mainstreaming Biodiversity project (Senterre and Wagner 2014).

In the marine environment, there have been various efforts to map nearshore shallow marine habitats over the years using both aerial photography and satellite imagery. Stoddart (1984) produced coarse scale maps showing the distribution of reefs around Mahé, prior to the reclamation work. Bigot et al. (2003) used ortho-rectified aerial photographs to map the shallow marine habitats around Mahé and the islands in the Ste Anne Marine Park, which were ground-truthed by SCUBA. Several different reef types were identified and the sensitivity of the habitats were assessed based upon the proximity to and magnitude of anthropogenic threats and/or impacts.

In 2005, the Golden Shadow Expedition supported by the Khaled bin Sultan Living Oceans Foundation, mapped the 13 islands of the Amirantes using Compact Airborne Spectrographic Imager (CASI) in combination with (Spencer et al. 2009). The images were ground-truthed by a team of surveyors from the Cambridge Coastal Research Unit (CCRU) of Cambridge University and the Seychelles Centre for Marine Research and Technology-Marine Parks Authority (SCMRT-MPA). Over 1500 ground reference points were recorded and the accuracy of the maps was reported to range from 66-77% (Spencer et al. 2009). The study found that seagrass was the most dominant cover type around these islands, with cover ranging from 13-84%, dominated by *Thalassia hemprichii* and *Thalassodendron ciliatum* (Spencer et al. 2009).

Bijoux (2008) used aerial photography together with GoogleEarth images to map the shallow benthic communities within five of the Marine National Parks (Baie Ternay, Port Launay, Ste Anne, Curieuse and Ile Cocos) by digitisation. The maps were ground-truthed using a systematic transect-based method. The maps produced showed the distribution of both biotic and abiotic habitats. Curieuse MNP had the highest cover of macro-algae (64%) and seagrass (37%) including *Thalassodendron ciliatum* and an extensive beds of the rare *Enhalus acocroides*.

In 2010 the Green Islands Foundation used a similar technique to map Denis Island and Grande Anse Praslin to provide the basis for management. The mapping was implemented through project entitled 'Modelling Integrated Coastal Zone Management Scenarios in the Seychelles' with support from ReCoMaP.

More recent mapping efforts include: an Environmental Sensitivity Atlas that was prepared with through the World Bank funded Marine Highways project to provide the basis for the Seychelles National Oil Spill Contingency Plan. These maps illustrate coastal areas sensitive to erosion or other hazards, such as cyclones and tsunamis.

The CCRU mapped the Aldabra lagoon in 2010 using QuickBird satellite data (Hamylton et al. 2012). The satellite imagery was ground-truthed and regression analysis was used to model the distribution of live coral, bare carbonate sand, macroalgae and dead coral.

The outer reef of Aldabra has also now been mapped by the Seychelles Island Foundation (SIF), with support from Bangor University and the GoS-UNDP-GEF PA project. The ground-truthed data are in the process of being used to classify a GeoEye satellite imagery.

Maps of Denis and North Island were prepared using QuickBird imagery by CCRU, with field data collection by GIF under a project funded by the Mangroves for the Future. Maps of Bay Ternay and Intendence were also prepared by CCRU, with field data collection by Marine Conservation Society Seychelles (MCSS) under the same Mangroves for the Future project. Updated spatial biodiversity assessments of North and Denis Island were carried out by MCSS for GIF under a contract within the PA Project.

Table 1: List of the data sources used in creating the derived habitat maps

Dataset received	Data type	Source / Reference
Bathymetry	GIS data	Web-source
Digital elevation models	GIS data	GoS-MLUH
Orthophotos 2011/2012 and 1999	GIS data	GoS-MLUH
Maps of the geology of the Seychelles islands	Maps and written descriptions	Baker (1963)
Geomorphology of the oceans	GIS data	Harris et al. (2014)
Environmental Sensitivity Atlas of Mahe	GIS data	Bigot et al. (2003)
Atlas of the Amirantes	GIS data	Spencer et al. (2009)
Marine and terrestrial habitat map of North Island	GIS data	GIF (2014a)
Marine and terrestrial habitat map of Denis Island	GIS data	GIF (2014b)
Marine and terrestrial habitat map of Baie Ternay	GIS data	MCSS (2014a)
Marine and terrestrial habitat map of Intendence	GIS data	MCSS (2014b)
Marine habitat maps of the inner island MPAs	GIS data	Bijoux (2008)
Habitats of the outer islands	Written descriptions	Skerret et al. (2010)
Vegetation maps of the inner islands	Written descriptions	Hill et al. (2002a-j)
Vegetation maps of Mahe, Praslin, La Digue, Curieuse and Silhouette.	GIS data	Senterre and Wagner (2014)
Beaches	Incomplete GIS data	GoS-MLUH
Mangroves and wetlands	Incomplete GIS data	GoS-MLUH
Rivers	Incomplete GIS data	GoS-MLUH
UNEP-WCMC coral reef data layer	GIS data	Web-source
Landsat 8 OLI satellite imagery	GIS data	This report (Klaus 2015)

4.1.2 Process

The existing datasets illustrating the distribution of terrestrial and marine habitat were reviewed for coverage and consistency (Table 1). As the majority of the maps had been prepared by different research groups, with support from different projects, over different timescales, both consistency and coverage were limited.

Aside from the topographic and bathymetric data, the most consistent datasets with the broadest coverage across the EEZ were the maps of the geomorphology of the oceans (Harris et al. 2014), the geological maps and written descriptions about the islands included in Baker et al. (1963), the vegetation maps for the inner islands prepared by Hill et al. (2002a-j) and the Millennium Coral Reef maps (Andrefouet et al. 2009).

A map to illustrate the broad scale distribution of marine and terrestrial habitats in the Seychelles EEZ was initially prepared using two main data sources: (i) the marine geomorphological classification prepared by Harris et al. (2014), which is a global dataset that characterises key benthic features and; (ii) the Millennium Coral Reef maps prepared by Andrefouet et al. (2009).

The Harris et al. (2014) dataset includes three base data layers covering the abyss, slope and shelf (<200m), layers that classify the abyss and shelf by elevation, and then individual data layers illustrating key seabed features (e.g. seamounts, guyots, trenches, canyons etc.). The relevant data layers from the Harris et al. dataset were overlaid and merged into one data layer covering the entire Seychelles EEZ.

Despite repeated requests from the Data Manager, permission to use the Millennium Coral Reef maps was not forthcoming from the author. This presented a significant challenge and meant there was a need to identify alternative data for use in creating the baseline maps for the SEY-SCP process.

It was therefore decided to prepare a new geomorphology dataset for the shallow marine habitats and terrestrial areas using the freely available multi-spectral satellite image data from Landsat-8 Operational Land

Imager (OLI) (as described below). Before commencing this process, a classification scheme was devised for use in the mapping as described below.

4.1.2.1 Integrated habitat classification scheme for the Seychelles

The review of existing datasets and additional literature was used to devise an integrated habitat classification scheme for use in the SEY-SCP process. The aim was to develop an integrated classification scheme that would transgress both marine and terrestrial domains. The integrated scheme devised is nested across 6 main levels, each of which can be subdivided into a number of distinct classes. The first four levels of the scheme are primarily geomorphological while the final two levels cover the finer scale habitat types and associated biological communities. Each of the levels in the classification scheme can be used independently or the classes can be integrated across all six levels to provide the highest level of resolution. The levels are described below and in further details in Tables 2 to 4.

- **Level 1** in the classification scheme identifies whether or not the area of interest is located in the 'Abyss', on the 'Slope', 'Shelf', or 'Land' (Table 2). These data were mainly derived from Harris et al (2014) classification scheme, with the exception of the shallow marine and terrestrial areas that were re-mapped as part of this project, as described above.
- **Level 2** in the classification scheme subdivides the area into the 18 different geomorphological feature classes according to the full resolution of the individual data layers included in the Harris et al. (2014) scheme, with the exception of the shallow marine and terrestrial areas that were re-mapped as part of this project, as described below (Table 2)**.**
- **Level 3** of the scheme provides a coarse scale subdivision of the shelf areas into 'Atoll', 'Bank' or 'Continental'. This level in the classification scheme permits the distinction between the 'continental' inner islands of the Seychelles and the Mahe Plateau, and the outer coralline islands, which can be further subdivided into Atolls or Banks (Table 3).
- **Level 4** provides a finer scale classification of the shelf classes identified in Level 3. At this level, the islands and their associated reef types are distinguished. This includes the 7 reef types that were originally described by Stoddart (1984) and then further disaggregated by Hamylton et al. (2010) for the Amirantes (Table 3).
- **Level 5** in the classification scheme distinguishes between the dominant 'physical' habitat types or zones, in terms of beaches, wetlands, outer reef slopes etc. (Table 4)
- **Level 6** in the classification scheme identifies the dominant 'biological' community types, which were derived from previous classification schemes / existing datasets (Table 4).

The integrated scheme presented above aims towards a fully systematic hierarchical biotope classification scheme, in which the different physical and biological classes are nested within larger geomorphological groupings. These biotopes could be further refined by using additional modifiers to distinguish between the degree of exposure and other variables.

Table 2 Descriptions of the classes included in Level 1 and Level 2 of the integrated habitat classification scheme. Sources include (a): Harris, P.T., Macmillan-Lawler, M., Rupp, J., Baker, E.K., 2014. Geomorphology of the oceans. Marine Geology 352, 4-24; (b): This report (Klaus 2015)

Level 1	Level 2	Description
Abyss[a]		The abyss is "*the area of seafloor located at depths below the foot of the continental slope and above the depth of the hadal zone*" (defined as deeper than 6000 m). The abyss feature layer was created by clipping a layer representing the ocean with the shelf, slope and hadal layers. The abyssal layer is classified into three categories based on roughness:
	Abyssal plains[a]	<300m relief
	Abyssal hills[a]	300–1000 m relief
	Abyssal mountains[a]	>1000 m relief
	Trench[a]	Trenches are "a long narrow, characteristically very deep and asymmetrical depression of the sea floor, with relatively steep sides" (IHO,2008). Trenches are generally distinguished from troughs by their "V"shape in cross section.
	Rise[a]	Rises otherwise known as continental rises, are features that abut the continental margins. These are characterised by a smooth sloping seabed as indicated by evenly spaced slope parallel contours. They were mapped using a global map of sediment thickness and were restricted to areas where sediment thickness was >300 m.
	Spreading ridges[a]	Mid-ocean spreading ridges are "*the linked major mid-oceanic mountain systems of global extent*" (IHO, 2008). Spreading ridges are distinguished from other ridges in Harris et al. (2014).
	Ridge[a]	In Harris et al., (2014) ridges are confined to "*an isolated (or group of) elongated narrow elevation(s) of varying complexity having steep sides, often separating basin features*" (IHO, 2008). These were manually added by hand where necessary and were confined to features greater than 1000m in relief (i.e. "ridges" overlapped with other categories, especially plateaus, the abyssal mountains classification layer) and overlap parts of the mid-ocean ridges.
	Seamount[a]	Seamounts are "*a discrete (or group of) large isolated elevation(s), greater than 1000 m in relief above the sea floor, characteristically of conical form*" (IHO, 2008). Seamounts are scattered throughout the Seychelles EEZ region. Both seamounts and guyots extend across an enormous depth range, and studies in the region have shown that they support a wealth of marine life and a high degree of endemism (Rogers et al. 2009).
	Guyot[a]	Guyots are "*an isolated (or group of) seamount (s) having a comparatively smooth flat top. Also called tablemount(s)"* (IHO, 2008). Guyots are similar in importance to seamounts. The main difference is that they have a flat top. These tend to occur as the result of crustal subsidence as the oceanic plate carries an island into deeper or lower oceanic crust areas.
	Rift valley[a]	Rift valleys are confined to the central axis of mid-ocean spreading ridges; they are elongated, local depressions flanked generally on both sides by ridges (Macdonald, 2001). They were mapped by hand based on 100 m contours. Rift valleys cover the largest fraction of abyssal zone in the Arctic Ocean. The greatest area of rift valleys occurs in the Indian Ocean where they cover 165,220 km .
	Canyon[a]	Submarine canyons are defined as "steep-walled, sinuous valleys with V-shaped cross sections, axes sloping outwards as continuously 2963 m, respective mean depths). Canyons are common throughout the EEZ. Canyons are extremely important structures as they can influence local oceanography, directing the flow currents and, create localised upwelling (Harris 2011). Canyons may also act as a conduit to transport sediments

Level 1	Level 2	Description
		and nutrients from the continental shelf to the deep sea. As a result of these functions, canyons are often associated with commercially important pelagic and demersal fish species. Canyons have also been associated with species of conservation importance such as the coelacanth, *Latimeria chalumnae* (Nulens et al. 2011) elsewhere in the WIO region.
Slope[a]		The continental slope is "*the deepening sea floor out from the shelf edge to the upper limit of the continental rise, or the point where there is a general decrease in steepness*" (IHO, 2008). Harris et al. (2014) manually digitised the foot of the slope at a nominal spatial scale of 1:500,000 in ArcGIS based on 100 m contours and 3D viewing. ArcGIS was used to highlight zones of abrupt changes in seabed gradient (contour spacing) which suggests the foot of slope. Otherwise the first significant decrease in gradient encountered in a seaward direction from the shelf break was selected as the foot of slope. Note the foot of slope locations is based only on bathymetric data and interpretation is not intended to define the foot of slope under Article 76 of the 1982 United Nations Convention on the Law of the Sea, particularly in areas of geomorphologically complex, continent–ocean transition.
	Plateau[a]	Plateaus are "*flat or nearly flat elevations of considerable areal extent, dropping off abruptly on one or more sides*" (IHO, 2008). In Harris et al. (2014) plateaus were digitised by hand based on 100 m contours.
Shelf[a,b]		The continental shelf is defined by IHO (2008) as "*a zone adjacent to a continent (or around an island) and extending from the low water line to a depth at which there is usually a marked increase of slope towards oceanic depths*". The low-water mark is the 0 m depth contour. The continental shelf is classified by vertical relief to highlight zones of abrupt changes in seabed gradient (contour) yielded three classes: Low-relief shelf; Medium-relief shelf; and High-relief shelf.
	Shelf - low relief[a]	<10m elevation
	Shelf - medium relief[a,b]	10–50 m elevation
	Shelf - high relief[a,b]	>50 m elevation
	Shelf valleys[a]	Shelf valleys at high latitudes incised by glacial erosion during the Pleistocene ice ages form elongated troughs, typically trending
	Terrace[a]	Terraces on continental slopes are "an isolated (or group of) relatively flat horizontal or gently inclined surface(s), sometimes long and narrow, which is (are) bounded by a steeper ascending slope on one side and by a steeper descending slope on the opposite side" (IHO, 2008).
Land[a,b]	Land[a,b]	Terrestrial areas were identified from the Landsat image dataset prepared for this project.

Table 3 Descriptions of the integrated classification of the shelf areas included in Level 3 and Level 4 of the integrated habitat classification scheme. Sources include Baker (1963), Hamylton et al (2010), and this report (Klaus 2015).

Level 2	Level 3	Level 4	Description
Shelf	**Atoll**	Atoll (sea-level) rim	Sea level atolls are those without significant areas of raised or elevated limestone. In Seychelles waters these include: Farquhar, Providence and Alphonse and Bijoutier/St Francois.
		Atoll (sea-level) lagoon	
		Atoll (sea-level) land on reef	
		Atoll (raised) rim	Raised atolls are those that have been uplifted and have land areas that are composed of significant deposits of limestone. In Seychelles the raised atolls include Aldabra, Cosmoledo and Astove all of which have significant lagoons.
		Atoll (raised) lagoon	
		Atoll (raised) land on reef	
		Atoll (submerged) rim	Submerged atolls are those where the annular shape of the atoll is still distinct, but submerged beneath sea level. There is only one example of this in Seychelles, namely Desroches.
		Atoll (submerged) lagoon	
		Atoll (submerged) land on reef	
	Bank	Bank - barrier complex	These are the shallow reefal and rocky structures around the edge of the Amirantes.
		Bank - lagoon	The Bank lagoon refers to the deeper open water area within the Amirantes.
		Bank - platform reef (sand cay) rim	Sand cay platform reefs are the Type 1 platform reefs as defined in Hamylton et al. 2012, and include Sand cay, Etoile, African Banks and Remire.
		Bank - platform reef (sand cay) land on reef	
		Bank - platform reef (rock base) rim	Rock base platform reefs are the Type 2 platform reefs as defined in Hamylton et al. 2012, and include Marie-Louise, Desnoeufs and Boudeuse. These rocky island have narrow peripheral reefs that are sat on the margins of extensive shallow rock platforms.
		Bank - platform reef (rock base) land on reef	
		Bank - platform reef (infilled) rim	Infilled platform reefs are the Type 3 platform reef as defined in Hamylton et al. 2012, and include Darros and Poivre. Infilling of the platform surface has allowed the development of subaerial islands that exceed 2km^2.
		Bank - platform reef (infilled) land on reef	
		Bank - platform reef (atoll-like) rim	Atoll-like platform reef are those on the bank with an atoll-like appearance (St Josephs)
		Bank - platform reef (atoll-like) lagoon	
		Bank - platform reef (atoll-like) land on reef	
		Bank - platform reef (raised) rim	Raised platform reefs include St Pierre and Assumption
		Bank - platform reef (raised) land on reef	
		Bank - drowned bank	Drowned banks are the submerged structures within water depths <30 m.
		Bank - patch reef complex	The shallow submerged structures within the Amirantes.
	Continental	Shelf - barrier complex	The shallow structures encircling the Mahe Plateau
		Shelf - lagoon	The deeper open water areas within the Mahe Plateau
		Shelf - patch reef complex	The shallow structures within the Mahe Plateau
		Shelf - platform reef (sand cay) rim	The platform reef around the sand cay islands to the north of the Mahe Plateau
		Shelf - platform reef (sand cay) land on reef	The land on the platform reef to the north of the Mahe Plateau
		Island - subtidal	The granitic rock structures around the islands Mahe Plateau
		Island - fringing reef	The carbonate fringing reefs around the islands on the Mahe Plateau
		Island - land	The granitic islands

Table 4 List of the physical habitat and biotope types at Level 5 and Level 6 of the integrated habitat classification scheme respectively, which are provided here for completeness, although not all of these classes were used in the final derived habitat map. These attributes were derived from existing classification schemes such as Hill et al. (2004) and Senterre and Wagner (2014) on the land and Spencer et al. (2009) for the marine environment.

L5 Code	L5 Attribute	L6 Code	L6 Attribute
1	Beach	1	fine sediments / mud
2	Pass	2	sand (bare)
3	basin / depression	3	rock (bare)
4	shallow lagoon	4	sand and rubble (bare)
5	shallow lagoon with constructions	5	coral rubble with coralline algae
6	deep lagoon	6	low density seagrass and macroalgae
7	deep lagoon with constructions	7	medium density seagrass
8	patch reef	8	high density seagrass
9	Ridge	9	coral spurs with coralline algae
10	reef flat	10	hard coral community
11	outer reef slope	11	macroalgal assemblage
12	inner reef slope	12	halimeda bed
13	subtidal reef flat	13	sargassum bed
14	shallow terrace	14	soft coral assemblage
15	shallow terrace with constructions	15	rocky coast shrubby fringe
16	deep terrace	16	sandy coast shrubby fringe
17	deep terrace with constructions	17	coastal forest
18	islet / champignon	18	ravine forest
19	sand cay	19	water surface
20	sand cay with phosphatic sandstone	20	mangrove forest
21	raised limestone	21	swamp forest
22	lowland belt	22	coastal open marsh
23	submontane belt	23	saxicuolous of lowland
24	lower montane belt	24	open saxicuolous
		25	saxicuolous forest
		26	mesic forest
		27	sand dunes
		28	freshwater pond
		29	freshwater pond surrounds
		30	tortoise turf
		31	Grasslands

4.1.2.2 Landsat-8 OLI data

Landsat is the longest running series of earth observation satellites carrying high resolution multispectral sensors suitable for mapping both marine and terrestrial environments. Landsat-8, the most recent in the series, officially began operations on 30th May 2013. Data is recorded within standard scenes, identified by a World Reference Grid (WRS-2) path and row number, that cover the same footprint on earth every 16 days. Each scene is made freely available to download from the online archive within days of acquisition[3].

The data recorded by the OLI sensor onboard Landsat-8 is composed of 11 spectral bands, each of which covers a different spectral bandwidth (Table 5 and Figure 1). The bands include a spectrally narrow blue 'coastal' band, a standard set of blue, green and red bands in the visible spectrum, three bands in the near infra-red and short-wave infrared spectrum, a cirrus band and panchromatic band (Figure 1). The multispectral data has a spatial resolution of 30 m by 30 m pixels, which can be merged with the panchromatic band, which has pixels of 15 m by 15 m, to create a higher resolution dataset. The bands can be used in different combinations for mapping both marine and terrestrial habitats.

Table 5: Landsat-8 satellite data characteristics

Band	Name	Pixel size (m)	Spectral bandwidth (µm)
Band 1	Coastal / Aerosol	30	0.435-0.451
Band 2	Blue	30	0.452-0.512
Band 3	Green	30	0.533-0.590
Band 4	Red	30	0.636-0.673
Band 5	Near Infra-red	30	0.851-0.879
Band 6	SWIR-1 Infra-red	30	1.566-1.651
Band 7	SWIR-2	30	2.107-2.294
Band 8	Pan 15m	15	0.503-0.676
Band 9	Cirrus 30m	30	1.363-1.384
Band 10	TIRS-1	100	10.60-11.19
Band 11	TIRS-2	100	11.50-12.51

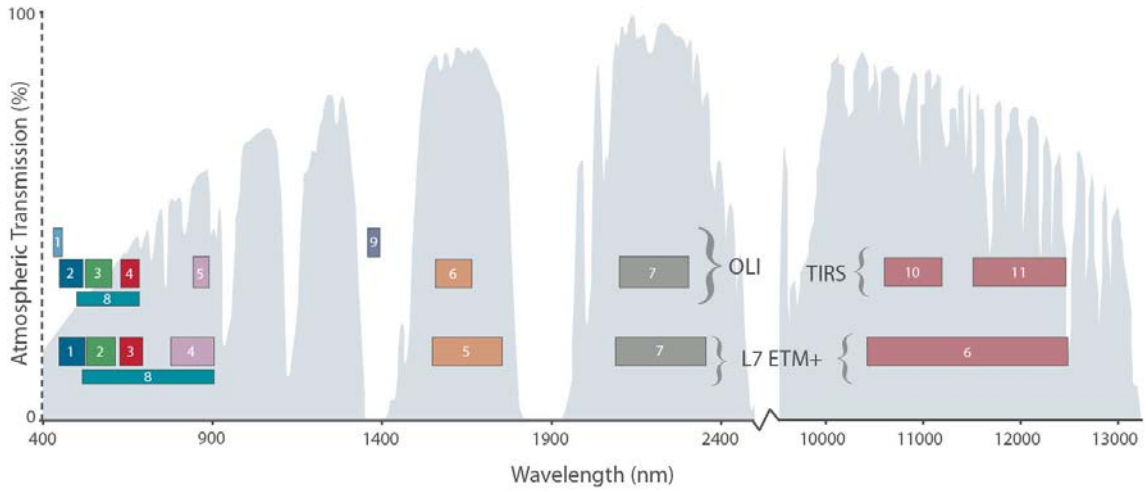


Figure 1: Graphic comparing the Landsat-8 spectral bands with those of Landsat-7 ETM+. The Landsat-8 OLI includes a coastal band (band 1) and a cirrus band (band 9), as well as the standard multispectral bands in the blue, green and red wavelengths, which have been further refined. (Source: L. Rocchio & J.Barsi http://landsat.gsfc.nasa.gov/?p=3186).

[3] http://earthexplorer.usgs.gov/

The Seychelles EEZ is covered by 74 Landsat scenes, only 15 of which cover terrestrial and optically shallow marine areas. Figure 2 shows the footprints of the 15 Landsat scenes that cover terrestrial and shallow water areas and their respective path and row numbers.

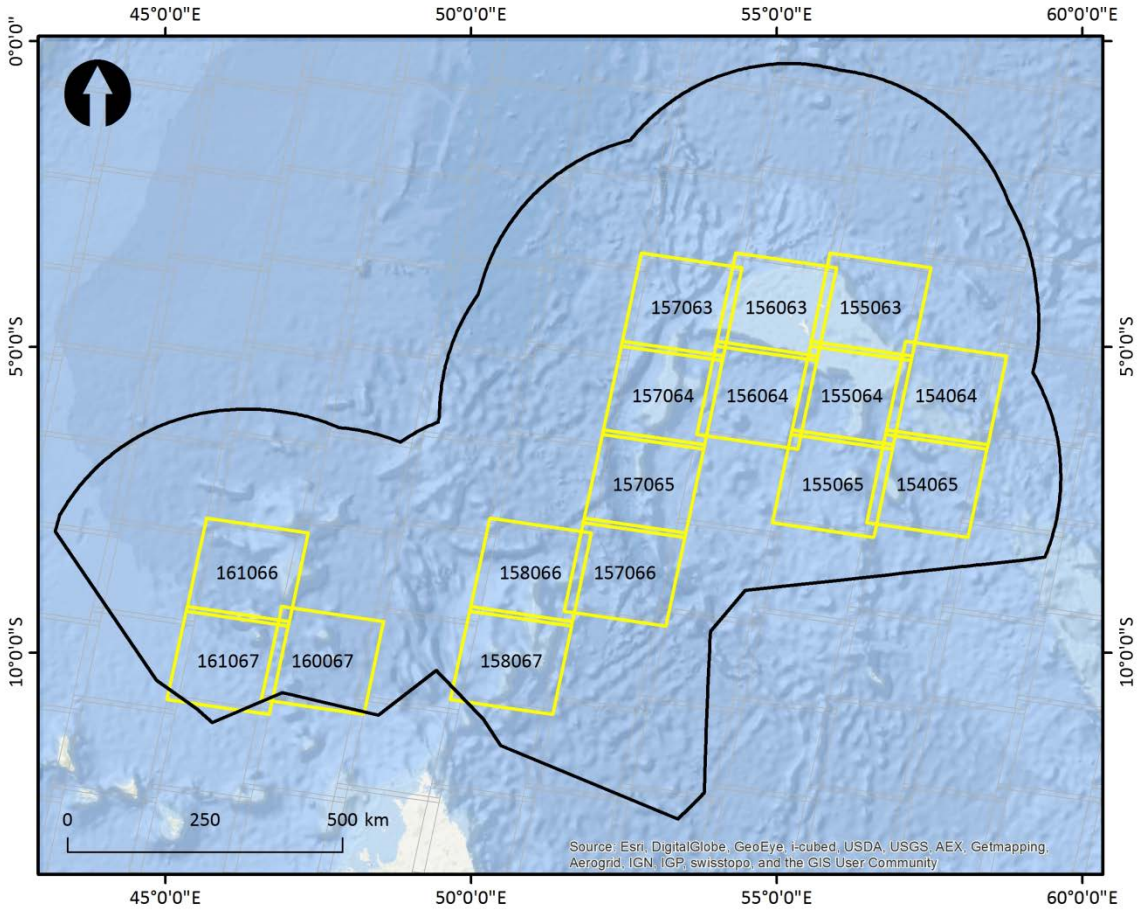


Figure 2: Map showing the distribution of Landsat-8 satellite images available over terrestrial and shallow water areas within the Seychelles EEZ. The numbers indicate the path and row number of the satellite scene according to World Reference System-2 (WRS-2).

The availability of recent Landsat data from the online archive[4] was reviewed for each the 15 scenes shown in Figure 2. The review identified a total of 93 potentially suitable scenes that had been acquired during the last year and had <10% cloud cover. These 93 scenes were downloaded and imported into the correct format so that could be further checked for suitability in terms of the distribution of cloud cover and appearance of other aberrations not visible when viewing the data online. The review identified a final subset of 22 Landsat images that were selected for pre-processing, with duplicate images from different dates for scenes where there was cloud coverage over part of the area of interest.

The selected 22 Landsat scenes were pre-processed as follows: (i) the full scene was clipped to the specific area of interest, to minimise computer processing requirements and; (ii) standard radiometric and atmospheric correction techniques were applied separately to the multi-spectral image bands and single panchromatic band. (iii) The corrected multispectral and panchromatic images were merged to increase the pixel resolution of the multispectral image from the standard 30 m to 15 m. (iv) The data were masked to create separate images for land and sea areas. (iv) Sun-glint correction techniques were applied to the marine areas to remove the influence of surface reflections from the water surface, which can reduce the visibility of subtidal habitats. (vi) The land and sea images were processed separately using a combination of image segmentation and isodata classification techniques to create maps showing the distribution of habitat types.

[4] http://earthexplorer.usgs.gov/

The exact processing steps employed differed for each satellite image depending on the characteristics of the scene (which affected whether additional pre-processing was required) and the existence of ground-truthed habitat data. Where existing ground-truthed habitat maps were available these data were used and the Landsat data just used to infill the gaps in between the existing datasets. The ground-truthing data was also used to aid the classification of the images to fill these gaps. In areas where there was little or no existing ground-truthed data, unsupervised classification techniques were used in combination with expert knowledge to interpret the classified imagess. The orthorectified aerial photographs were also used to aid interpretation of the satellite image maps where necessary.

The individual maps prepared for the shallow marine habitats on the continental shelf using the Landsat and other datasets were combined, using the geomorphological features of the terrestrial and marine environment at Level 4 in the marine and Level 5 on the land. These data were then merged together with the Harris et al (2014) data covering the deeper water areas. The combination of these datasets resulted in a total of 51 marine and terrestrial habitat types. The combined vector dataset was converted into a raster dataset and gridded to 50m by 50m resolution.

As this work was well outside the terms of reference for the existing consultancy, there was insufficient time to fully resolve and map both terrestrial and marine habitats to L6, apart from some of the critical habitats. For example, this process allowed for the preparation of provisional maps of beaches, coral reefs, seagrass beds and mangroves forests, covering the whole of the Seychelles EEZ. The provisional maps of seagrass beds were prepared using the three classes that had been used by Spencer et al. (2009) for the Amirantes (high density seagrass beds, medium density seagrass and low density seagrass with macroalgae). There was good alignment between the datasets. It should be noted that while these maps are fit for the purpose of the planning process, they do not replace the need for further detailed ground-truthed habitat mapping.

4.1.3 Outputs

The final habiat map was created by merging the satellite derived maps showing geomorphological features at Level 4 and Level 5, spanning from the islands across the shelf to approximately 30m depth, with the deep ocean features from Harris et al (2014) (Figure 5 to Figure 7). Additional feature data layers were also extracted for certain 'ecological process' habitats using the Level 6 data (e.g. seagrass and mangroves).

Table 6 List of the habitat data layer prepared in the model

sey_islands_base_utm40s	This report (derived from various sources)
sey_geomorph_L4_utm40s	This report (derived from various sources)

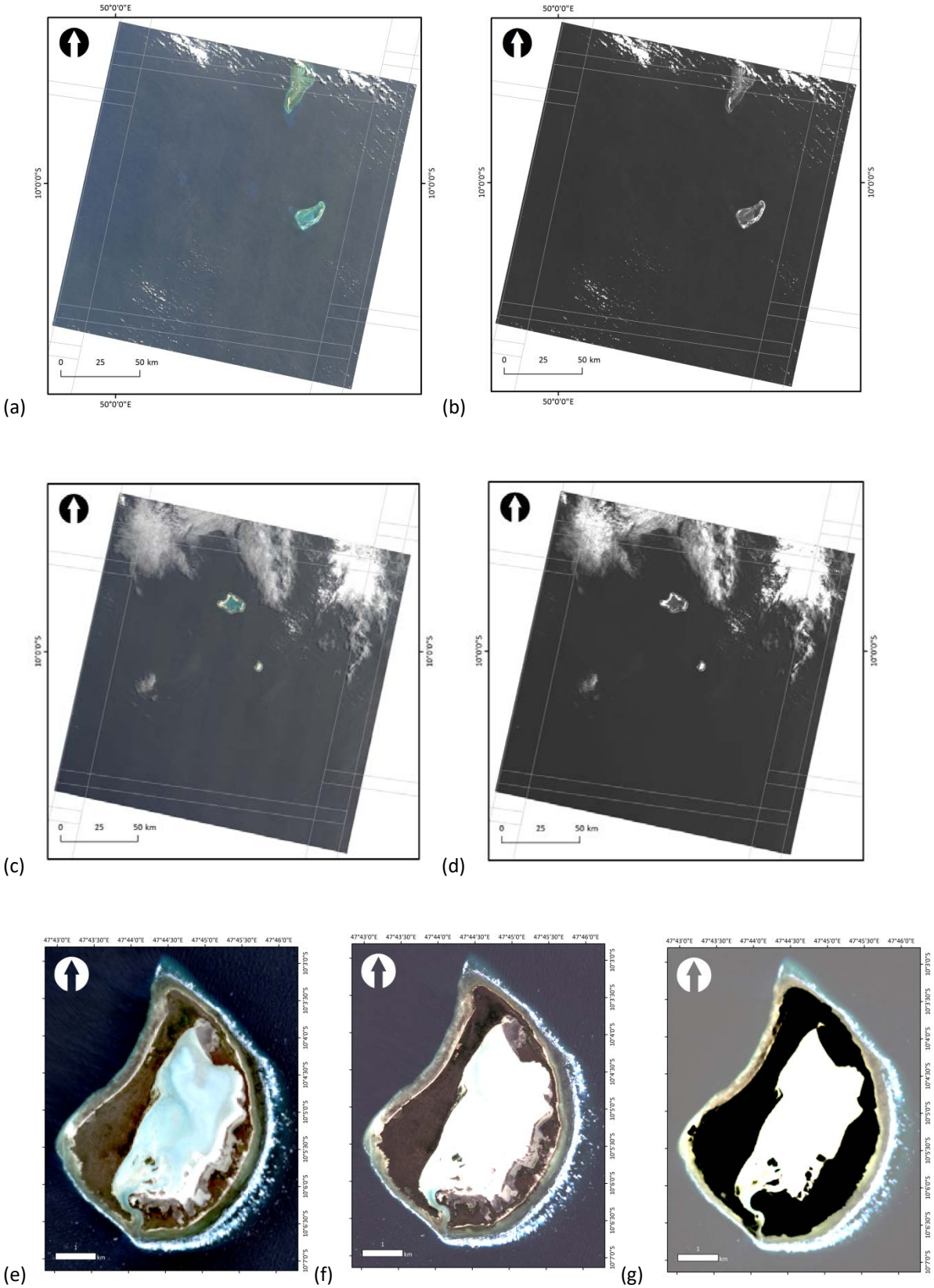


Figure 3 Raw Landsat 8-OLI (a-c) multispectral data and (b-d) panchromatic data for Farqhuar and southern Providence and Cosmoledo and Astove, respectively. Maps showing the processing steps for Astove showing (e) raw Landsat 8-OLI, (f) pan-sharpened, and (g) land masked and de-glinted.

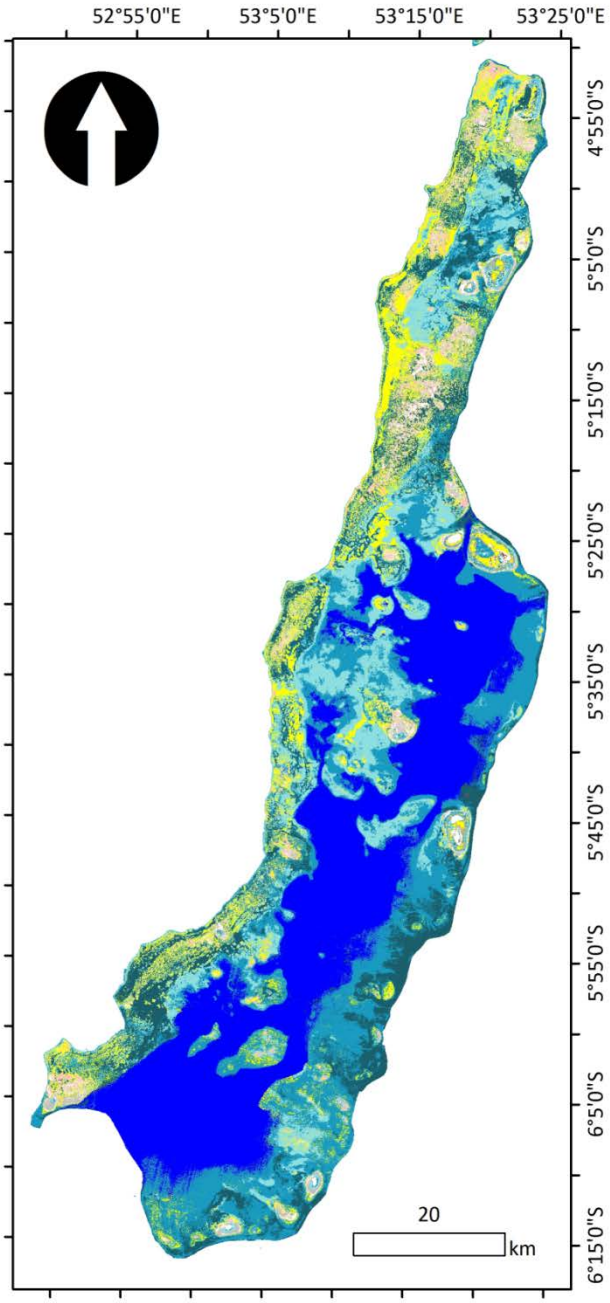


Figure 4 Processed Landsat 8-OLI for the Amirantes

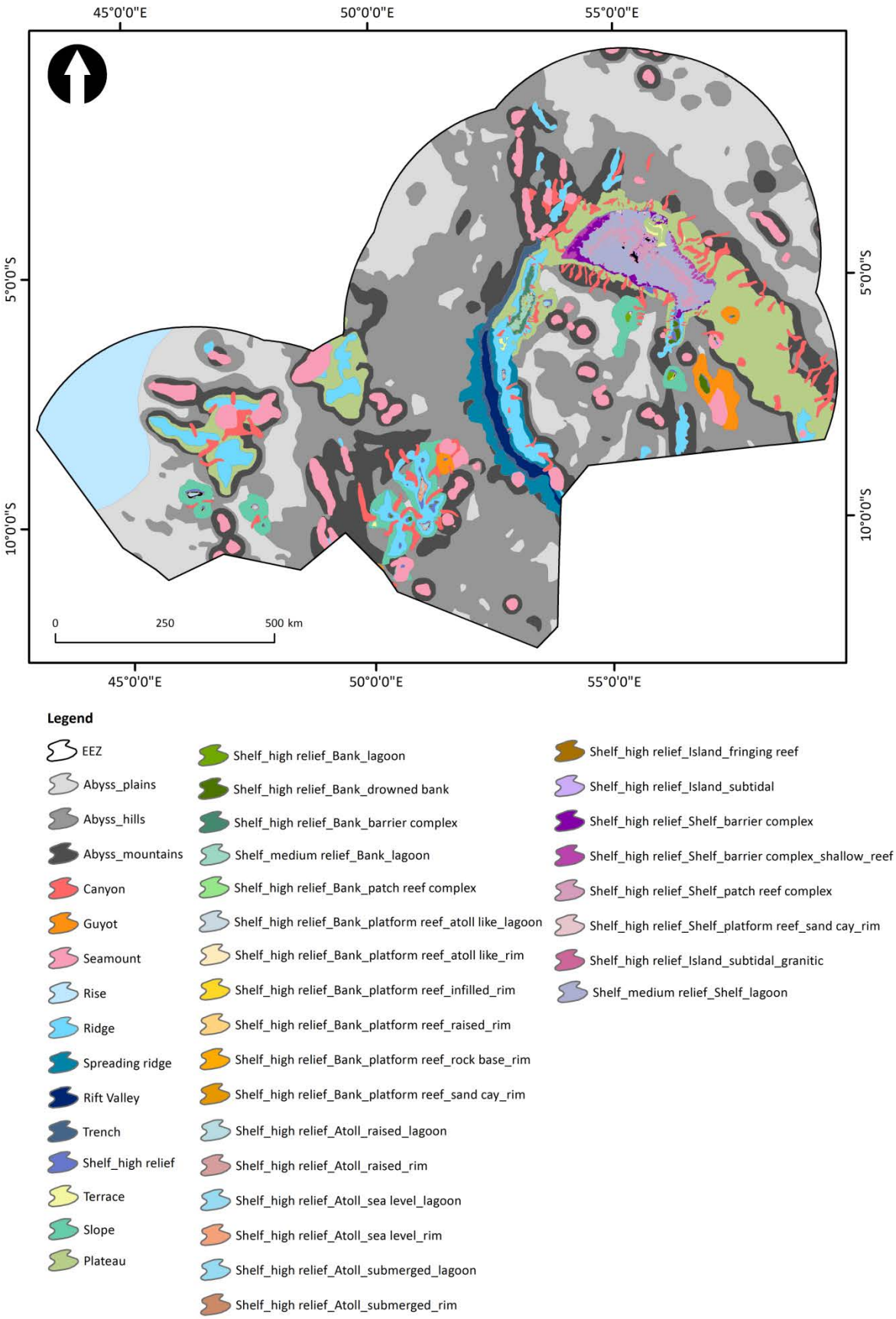
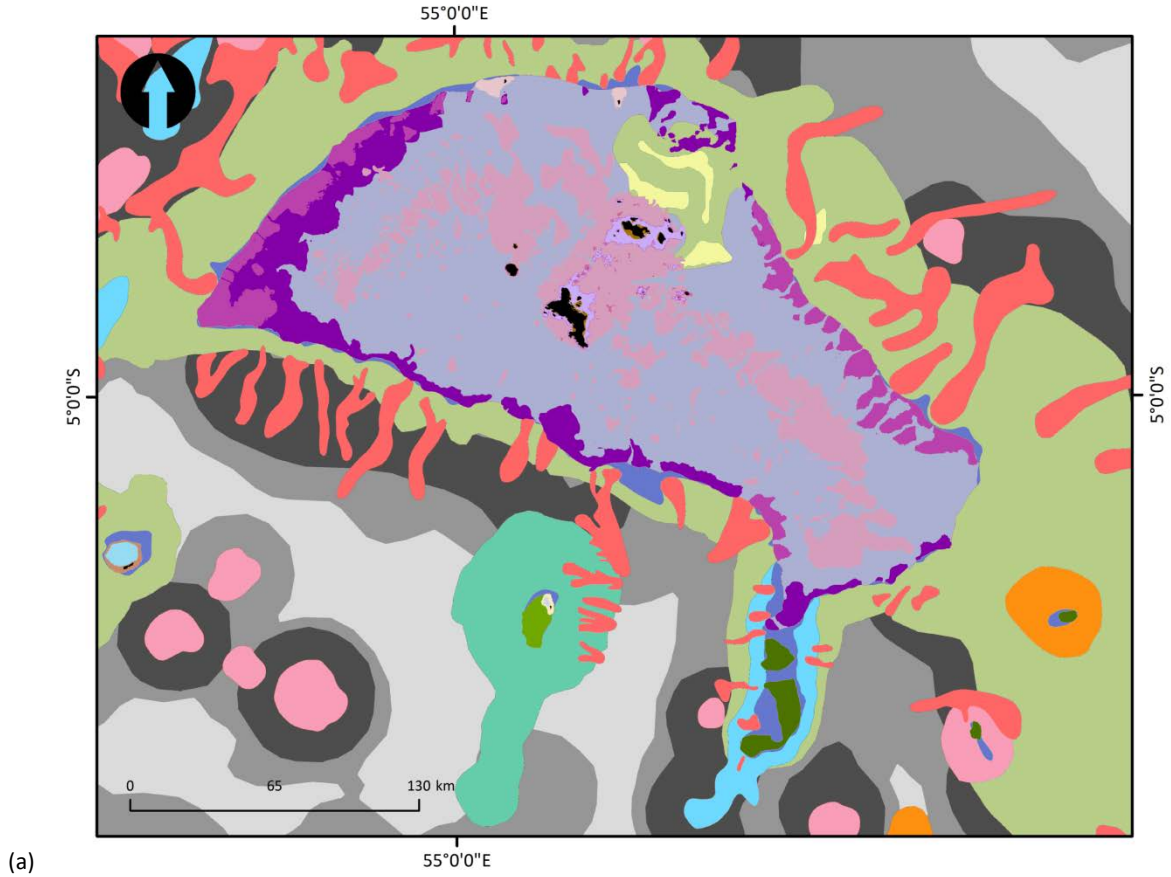
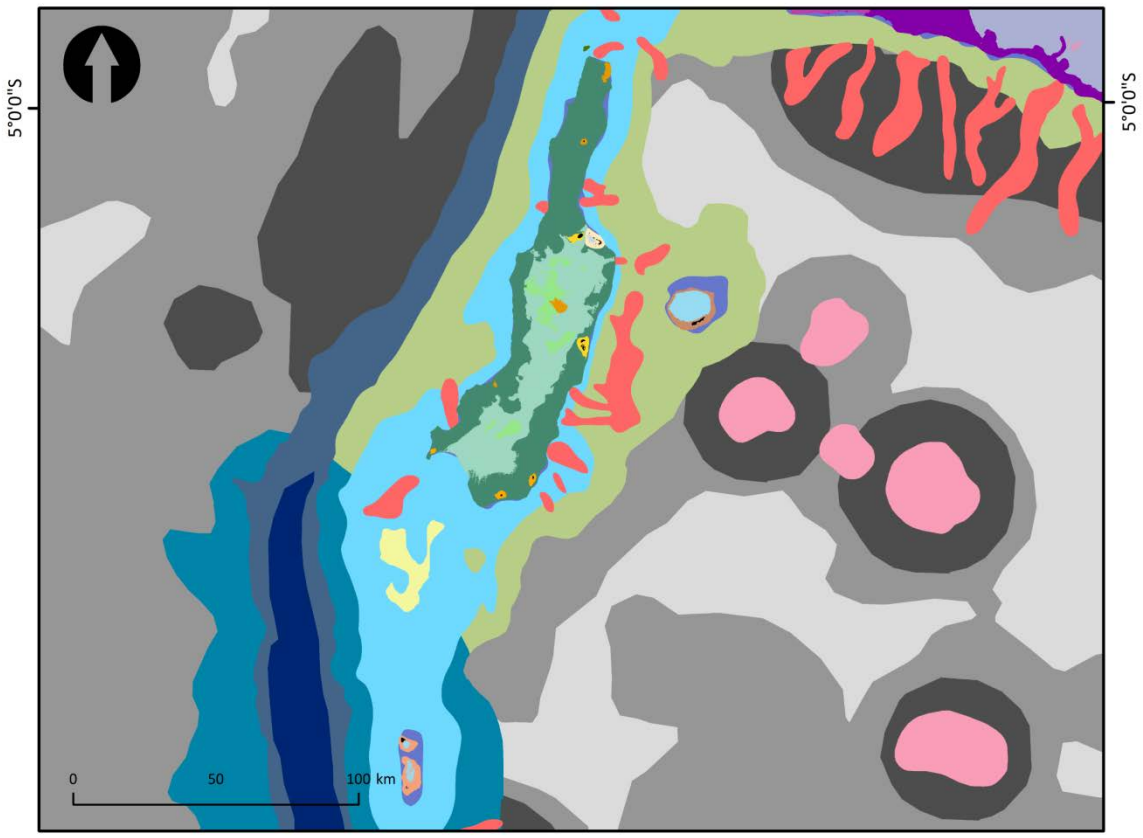


Figure 5 Map showing the distribution of geomorphological features in the Seychelles EEZ using the integrated habitat classification scheme.

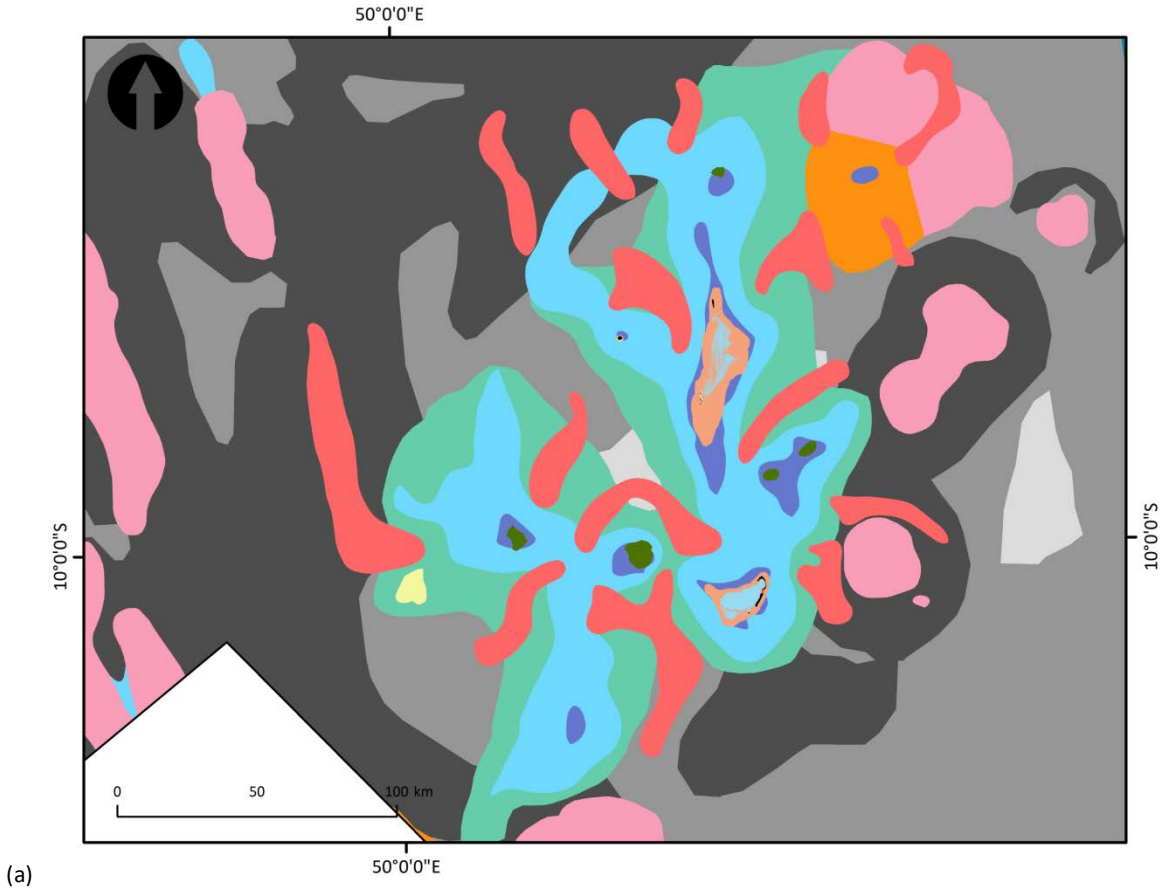


(a)

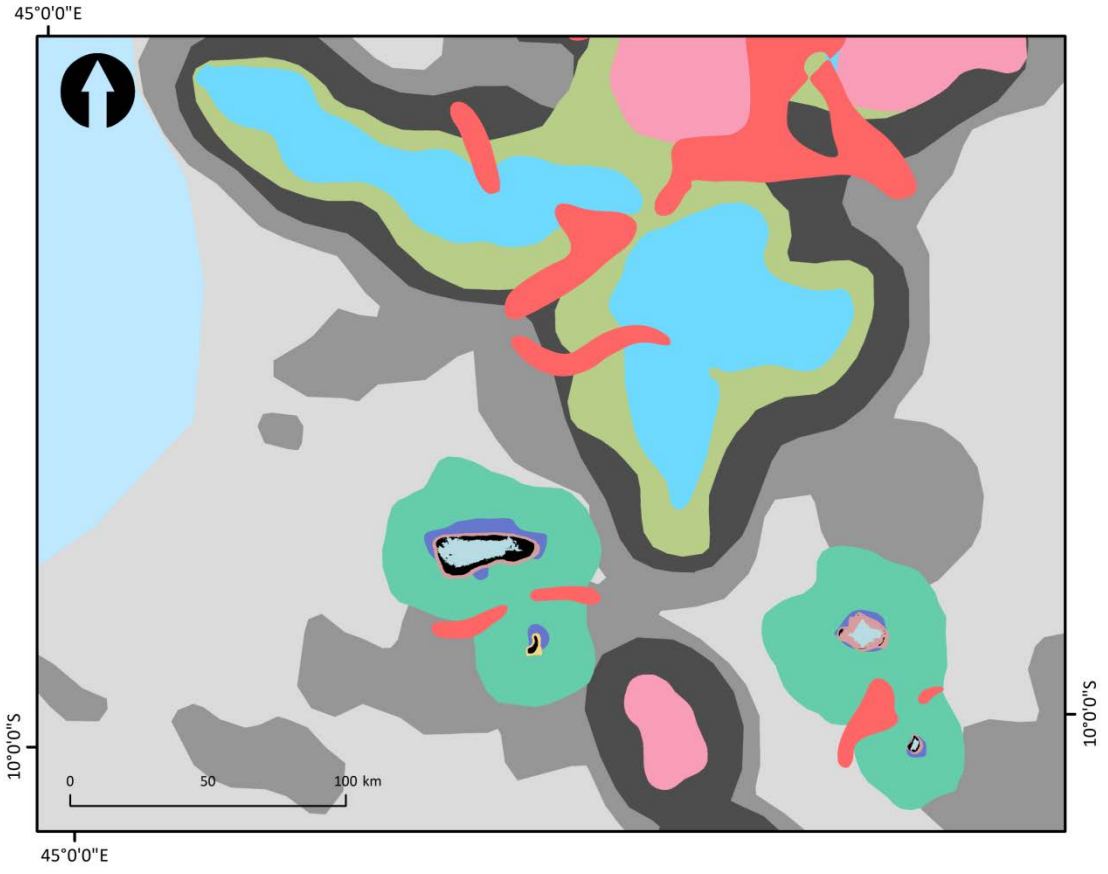


(b)

Figure 6 Map showing the distribution of geomorphological features around (a) the Mahe Plateau and (b) the Amirantes using the integrated habitat classification scheme (for legend see Figure 5).



(a)



(b)

Figure 7 Map showing the distribution of geomorphological features around (a) Providence and Farqhuar and (b) the Aldabra and Cosmoledo groups of islands using the integrated habitat classification scheme (for legend see Figure 5).

4.2 MAPPING PRESSURES OR CONDITION

4.2.1 Scope

The second set of data needed for SCP is data reflecting the condition of habitats or other biodiversity features. Spatial data on ecological condition is often not available in a directly accessible form and has to be inferred from datasets representing the pressures on the marine and terrestrial environments. The major drivers of change or pressures on ecosystems differ in terrestrial and marine environments, and their relative importance varies across habitat types. Mapping ecological condition is thus complex, and requires the use of different approaches in terrestrial and marine environments.

In the terrestrial environment, ecosystem condition is often inferred from a land cover or land use map where available. In the marine environment, this data layer usually needs to be created through mapping the different major pressures on marine and coastal ecosystems. The types of pressures mapped includes both direct pressures, where the habitat has been transformed (e.g. reclamation, dredging, infrastructure) and indirect pressures (e.g. fishing effort, shipping, wastewater outfalls etc.). Indirect or diffuse pressures are often the most difficult to represent spatially, because they co-occur within proximity to the coast, and can have a cumulative impact. One approach that is often used to address the mapping of the cumulative impact types is to use a 'drivers-of-change' analysis, which is the approach used here.

Table 7: List of the data sources used in creating the derived maps of habitat condition

Dataset	Data type	Source / Reference
Population census data 2002 and 2010	GIS shapefiles	NBSS
Land Use Data	GIS shapefiles	GoS-MLUH
Roads	GIS shapefiles	GoS-MLUH
Buildings	GIS shapefiles	GoS-MLUH
Anthropogenic impact data layers	GIS shapefiles	Senterre et al. (2014)
Infrastructure (powerlines, waste sites, wastewater sites, desalination intake pipes, side drains etc.)	GIS shapefiles	PUC
Anthropogenic structures mapped in habitat maps	GIS shapefiles	Spencer et al. (2009)
Reclaimed land	GIS shapefiles Digitisation	This report (Klaus 2015)
Dredging	GIS shapefiles	GoS-MLUH
Seismic surveys	GIS shapefiles	Petroseychelles
Fisheries Landing Sites	GIS shapefiles	SFA
Reef gleaning fisheries	GIS shapefiles	SFA
Beach seine fisheries	GIS shapefiles	SFA
Pirogue fisheries	GIS shapefiles	SFA
Outboard fisheries	GIS shapefiles	SFA
Lobster fishing grounds and catch data	GIS shapefiles	SFA
Vessel Monitoring Data – artisanal whalers	Excel	SFA
Vessel Monitoring Data – semi-industrial	Excel	SFA
Vessel Monitoring Data - sea cucumber	Database	SFA
SFA – long line fisheries 2002 -2008 (1 degree grid)	Excel	SFA
SFA – purse seine fisheries 2002-2008 (1 degree grid)	Excel	SFA
Dive site locations	Interviews	This report
Dive site locations	GIS shapefiles	GoS-MEE (Justin Prosper) and SFA (Calvin Gerry)
International data on shipping intensity	Csv	Halpern et al., 2008

4.2.2 Process

Mapping the condition of marine and terrestrial habitats was achieved through creating a series of individual pressure layers (e.g. areas with high fishing intensity or coastal development), and then aggregating these layers to develop a proxy data layer to illustrate ecological condition.

A separate grid was created for both the terrestrial and marine environment. Data layers were compiled and scaled 0 to 1 in order to provide a representation of the cumulative impacts over the planning area (e.g. where the pressure is present, the value was set to 1, if the pressure was not present then the value was set to zero).

Ecological conditions can range from natural or near-natural through to extremely modified. For the purposes of the SEY-SCP Project, the condition was summarised into three categories for terrestrial and marine habitats, namely 'natural', 'degraded' or 'transformed' for terrestrial habitats, and 'good', 'moderate' or 'poor' for marine habitats.

Where the data available for a specific impact was represented by a point or a line, buffers were used to create a spatial representation of the feature that could then be included in the derived data layer. Buffers were also used to represent additional indirect impacts upon the adajcent areas. Where there was uncertainty about the impact but it was likely to decline with distance, a fixed distance buffer was used in order to represent higher intensity impact close to the source that then tapers away with distance.

4.2.2.1 Mapping Terrestrial Habitat Condition

In the terrestrial environment, transformed areas were considered to be those that could never be returned to a natural state, such as built up areas, roads, runways, waste sites and power stations. Degraded areas included areas that could be rehabilitated to its natural state if sufficient funds were available. Natural areas were considered to be the areas left over after these other states had been mapped.

The mapping of ecosystem condition had been completed by Senterre and Wagner (2014) for the five main inner islands, and this dataset was used as the basis for preparing a proxy map of ecosystem condition for terrestrial areas on the other islands using the following stages:

- Existing data on land use, land cover, infrastructure, agriculture were collated. The data was supplemented by additional digitisation, especially in the where data was sparse.
- Land use pressures represented by lines or points were buffered to enable them to be incorporated into the derived layer.
- The outer islands have all been used as plantations or farmed at some stage in their history with the exception of some parts of the southern islands. These islands were thus all classified as 'degraded' unless the area had been 'transformed'.

4.2.2.2 Mapping Marine Habitat Condition

The approach used to map marine habitat condition was different from in the terrestrial environment. Individual pressure layers were developed for different anthropogenic pressures as follows:

- ***Population pressure:***
    - *Coastal Development*: The proportion of the planning unit that was 'transformed' in the terrestrial area was calculated, and normalized to a 0-1 range.
    - *Population density*: To represent the relative impacts associated with differences in human population density within the vicinity of the coast a 1km buffer[5] was created and attributed with population density data from the National Bureau of Statistics (Figure 9a). The population of the outer islands was estimated as no data was made available from IDC. The data was rescaled to 0 to 1.
    - *Tourism density*: To represent the relative impacts associated with tourism density within the vicinity of the coast a fixed distance buffer was created around hotels and guesthouses (Figure 9b). The data was inverted so that it represented a greater impact in areas closer to the hotels. The mean inverted distance was calculated per planning unit and the data rescaled 0 to 1.
- ***Coastal Infrastructure:***
    - *Dredging*: The boundary of the dredged areas were buffered by 100m to account for inaccuracies in the GIS data and indirect impacts to adjacent habitats associated with dredging operations (e.g. sedimentation). The proportion of each planning unit that had been dredged was then calculated. The proportions were converted to a 0-1 ratio using the formula n/n90 where n is the actual value for a grid and n90 is the 90th percentile value. Values above 1 were then reclassified to 1. This approach normalized distributions which would otherwise have their values distorted by skewed distributions and a few high values.

[5] The use of a 1km buffer along the coast is generally used as a standard means to representing impacts associated with population pressure.

- *Reclaim*: Reclaimed areas were buffered by 100m to account for inaccuracies associated with GIS data and indirect impacts to adjacent habitats associated with reclaimation works (e.g. sedimentation). The proportion of each planning unit that had been reclaimed was calculated. The proportions were converted to a 0-1 ratio as above.
- *Moorings*: The location of known fixed boat moorings were buffered by 100m to account for indirect impacts to adjacent habitats associated with the boats using the moorings. The proportion of each planning unit was calculated. The proportions were converted to a 0-1 ratio as above.

- ***Water Quality:***
  - *Desalination plants*: The location of the intake and outfall pipes for the desalinations plants were not provided. To accommodate for this data gap, a fixed distance buffer was used to represent impacts associated with desalination outfalls from each desalination plant. The data was inverted to represent a greater impact in areas closer to the river mouth. The mean inverted distance was calculated per planning unit and the data rescaled 0 to 1 (Figure 10a).
  - *Fish landing stations*: There is also often poor water quality within the vicinity of fish landing stations. To represent this pressure a 1km buffer was created around each of the fish landing stations. A standard grid (50m by 50m) was prepared to illustrated distance from main fish landing station. The distance layer was inverted so that the values nearest to the landing station to represent a greater impact. The buffer was used to clip the inverted distance layer and the data were rescaled from 0 to 1 (Figure 10b).
  - *Waste water outfalls*: As there was no specific information available on the different volumes of water discharged from each outfall, a fixed distance buffer was used to represent impacts. The distance from each waste water outfall was calculated to within 1km. The data was inverted so that it represented a greater impact in areas closer to the outfalls. The mean inverted distance was calculated per planning unit and the data rescaled 0 to 1 (Figure 11a).
  - *River discharge*: As there was no specific information available on the different volumes of water discharged from each river, a fixed distance buffer was used to represent impacts associated with river plumes. The distance from each river mouth was calculated to within 1km. The data was inverted to represent a greater impact in areas closer to the river mouth. The mean inverted distance was calculated per planning unit and the data rescaled 0 to 1.
- ***Shipping***:
  - *Ports zone of influence*: The influence of distubances associated with ship traffic entering and leaving the main ports was represented using a 5km buffer. The distance from the port was calculated within 5km of the main ports. The distance was inverted and the mean inverted distance per planning unit was calculated and the data rescaled 0 to 1..
  - *Shipping intensity*: International data on shipping intensity from Halpern et al. (2008) were used to calculate average shipping intensity values per planning unit. These values were converted to a 0-1 ratio using the formula n/n90, where n is the actual value for a grid and n90 is the 90th percentile value. Values above 1 were reclassified to 1. This approach normalized distributions which would otherwise have their values distorted by a few high values (Figure 12a).
  - *Shipping channel*: The shipping channel that transects across the Mahe Plateau was used to represent the area of most intensive use by ships coming into and out of the Port of Victoria. The inverted distance from port grid data layer was clipped using the shipping channel layer and the mean value per planning unit were calculated and rescaled 0 to 1 (Figure 12b).
- ***Fisheries*:**
  - *Small scale fisheries*: There is a large diversity of small scale fisheries in Seychelles using different types of gear and operating from different types of vessel. SFA provided a GIS shapefile representing the key lobster fishing grounds. Shapefiles to illustrate the distribution of other types of small scale fisheries were not available and needed to be created. The distribution of effort by these different fisheries was discussed at the second stakeholder workshop. Vector data layers were then created to illustrate the distribution for each of the small scale fisheries which included: reef gleaning (walking), outboards, pirogues, shark fishing and sports fishing (jigging, popping, and bone fish). A standard grid (50m by 50m) was prepared illustrating the inverted distance from main fish landing station. The vector files for each fishery were used to clip the distance layer data. The data layers for each fishery were then rescaled 0 to 1. Figure 13 a-b are provided as examples of the maps created to represent distribution of fishing effort by the outboard boats and shark fishers.

- *Semi-Industrial Fisheries / Whalers / Sea Cucumber*: SFA provided Vessel Monitoring System (VMS) data for three of the main fisheries (semi-industrial long liners, the whalers, and the sea cucumber fishery) for multiple years. The VMS data were converted from the excel spreadsheet format in which they were provided into point data. The data was then filtered by travelling speed to remove points where the fishing boat was in transit. The filtered data were used to create a separate point density map on a 50m by 50m grid, using a 5000m wide search radius. The draft point density maps prepared for each of these fisheries were reviewed by the staff from SFA, and these discussions helped to refine the speed thresholds used to filter these datasets. For example, the semi-industrial boats set their lines on the edge of the Mahe plateau while the boat is stationary. The VMS data for this fishery was therefore filtered to retain only locations for speeds of less than 1 knot (Figure 15). The sea cucumber fishery, which employs SCUBA divers, and the boats will most likely be drifting when the divers are deployed and picked up. The sea cucumber VMS data was therefore filtered to retain locations for speeds of less than 1 knots to represent drift speed (Figure 16). The artisanal boats or whalers will also drift while fishing and so these VMS data were also filtered for speeds of less than 2 knots. It was also suggested that the initial representation of fishing effort for the whalers needed to be modified due to the influence of the restrictions put on these vessels during the period when piracy was a major concern in the region. The influence of piracy on the distribution of fishing effort by whalers had been previously assessed by Calvin Gerry from SFA. The study compared VMS data and CPUE from 2004 to 2008 with patterns in 2009 and 2010 (Figure 17). The data showed the effect of the controls put in place to restrict fishing to the southern part of the plateau. The whaler VMS data was thus further filtered and only the data from 2013 and 2014 used in the analysis (Figure 18). The final filtered set of points for each of these fisheries was then used to create a separate point density map on a 50m by 50m grid, using a 5000m wide search radius. The mean value per planning unit was calculated and the data were re-scaled from 0 to 1.
- *Industrial Fisheries*: SFA made available the 1 degree landing data for the longline and purse seine fleets fishing in Seychelles EEZ between 2004 and 2012. These data were used to calculate the total mean catch per degree grid cell. The mean values per planning unit were calculated and the total mean catch was re-scaled to values ranging from 0 to 1, where 0 is no pressure and 1 where pressure is the highest level.

In addition to the above, other natural pressures were also mapped during this process (e.g. cyclones, earthquakes, ultraviolet radiation and ocean acidification) (Figure 11b). These data layers were not eventually used in the present model but they have been made available to GoS-MEE GIS Unit.

Once all of the above datasets had been prepared, the marine habitat condition layer was then compiled using a combination of the datasets. The pressure per planning unit was calculated by using the equation Nmean*Nmax to normalise and rescale the data from 0 to 1. The combined data was then reclassified as either "Poor", "Moderate" or "Good" using a Natural Break (Jenks).

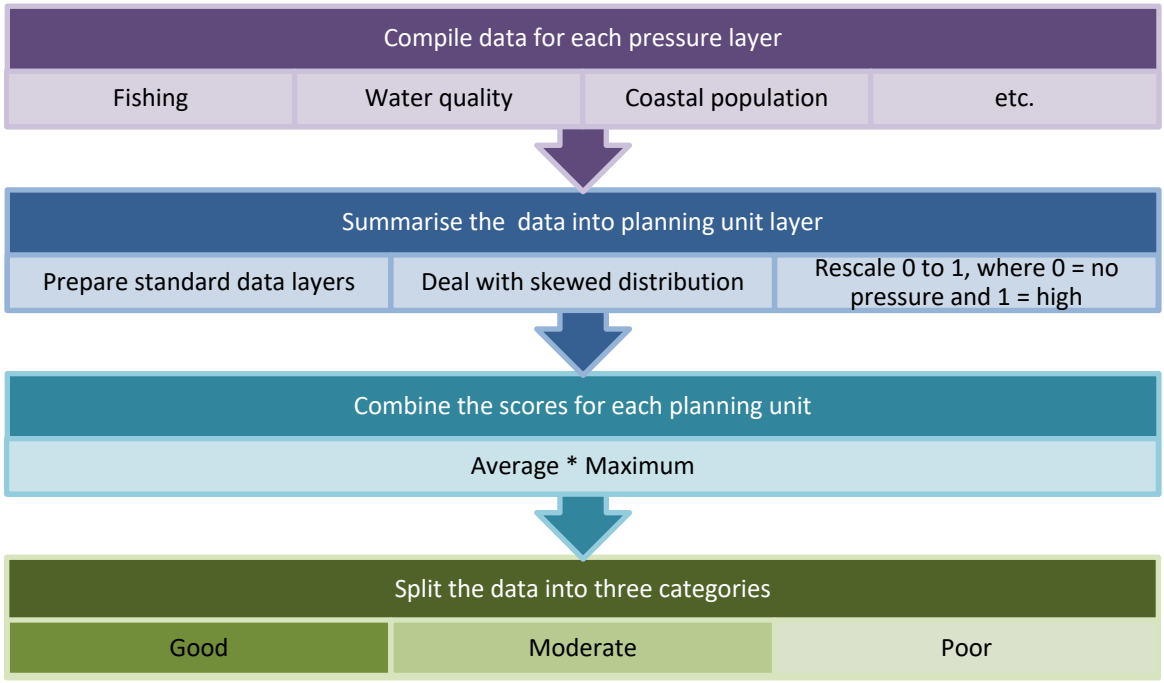
To create the final condition layer, the land and the marine condition data layers were then merged to form one dataset. The work flow is illustrated schematically in Figure 8. Examples of the individual presssure layers are presented in Figure 9 to Figure 18. The final marine pressure layer is presented in Figure 19 and the combined marine and terrestrial pressure layer is presented in Figure 20.

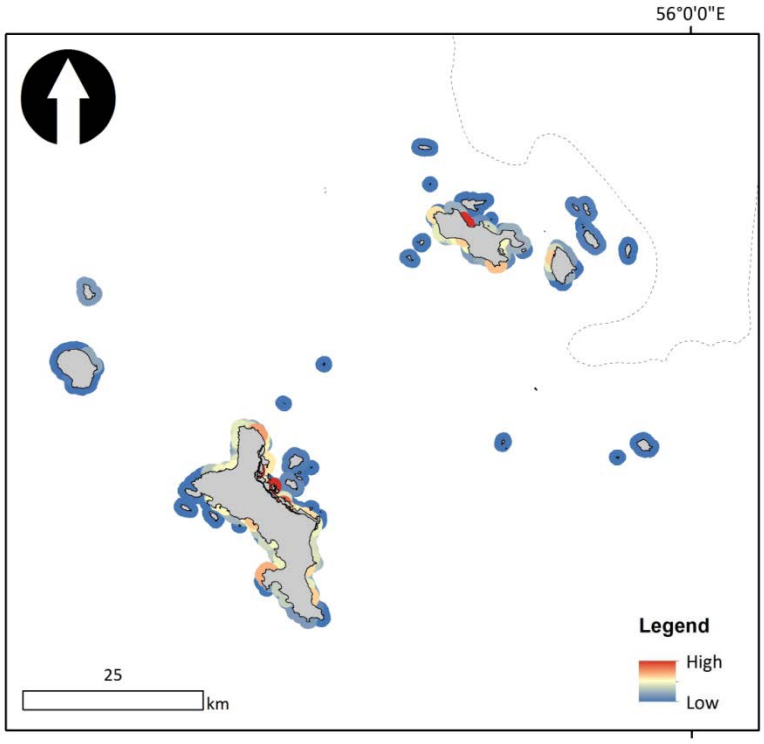
The condition data layer was then used in combination with the habitat data layer as part of the threat assessment and in combination with the opportunities and constraints data layers to determine the 'cost' data layer for use in the MARXAN spatial prioritisation.

Table 8: List of the derived maps of habitat condition

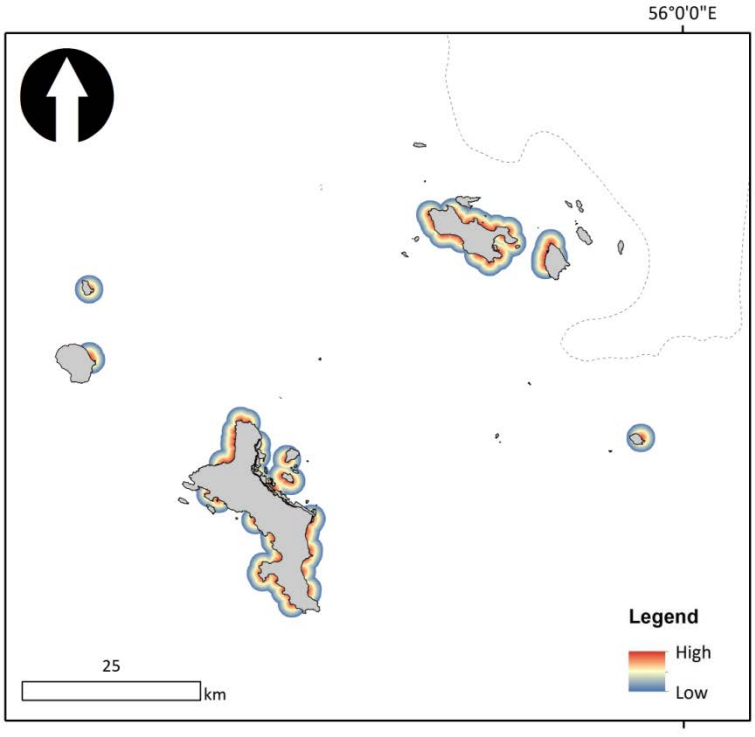
Dataset	Data type	Source / Reference
sey_condition	GIS shapefiles	This report (Klaus 2015)

Figure 8: Flow diagram illustrating the steps involved in the preparation of the marine pressure layers



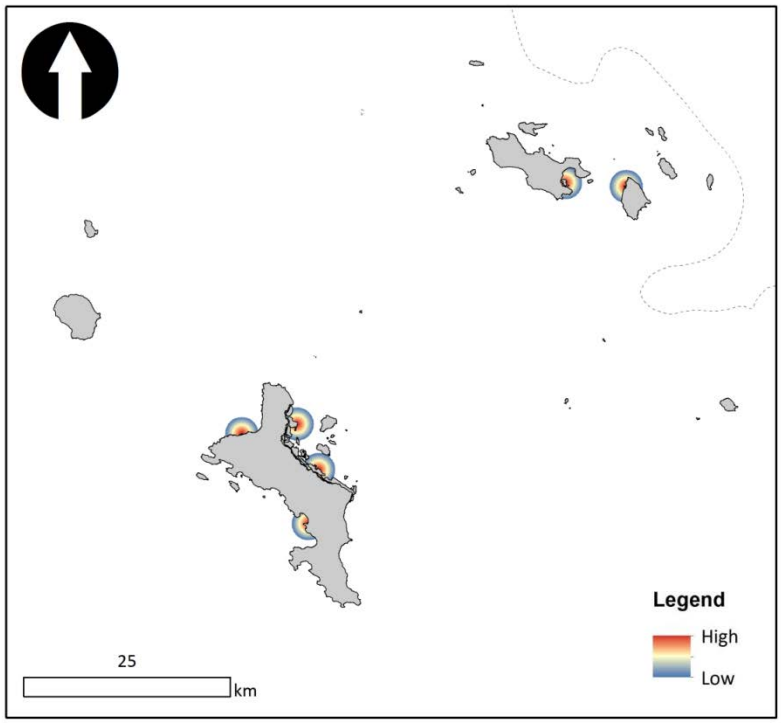


(a)

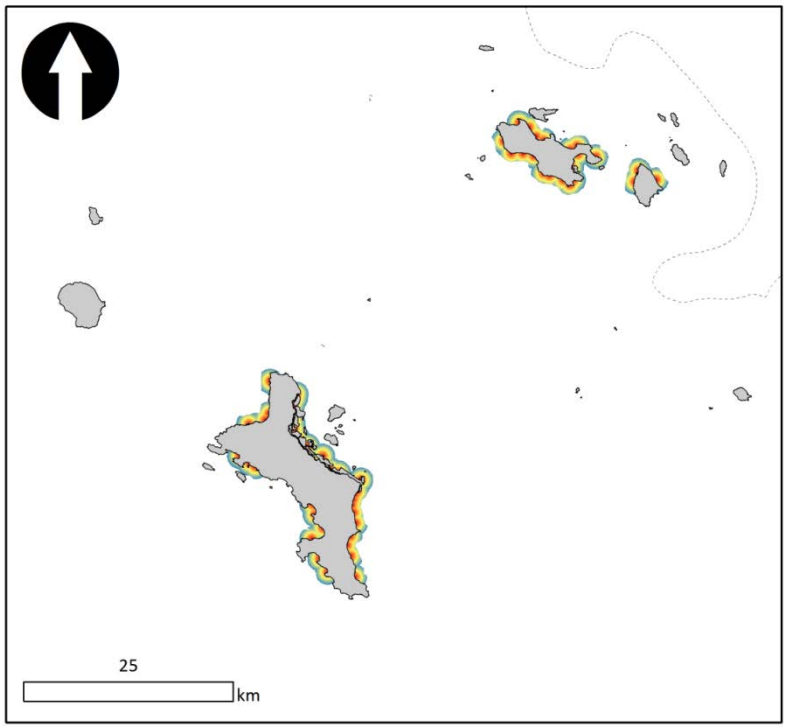


(b)

Figure 9 Map showing (a) coastal population density and (b) proximity to hotels, as a representation of pressure associated with tourism both rescaled 0 to 1.

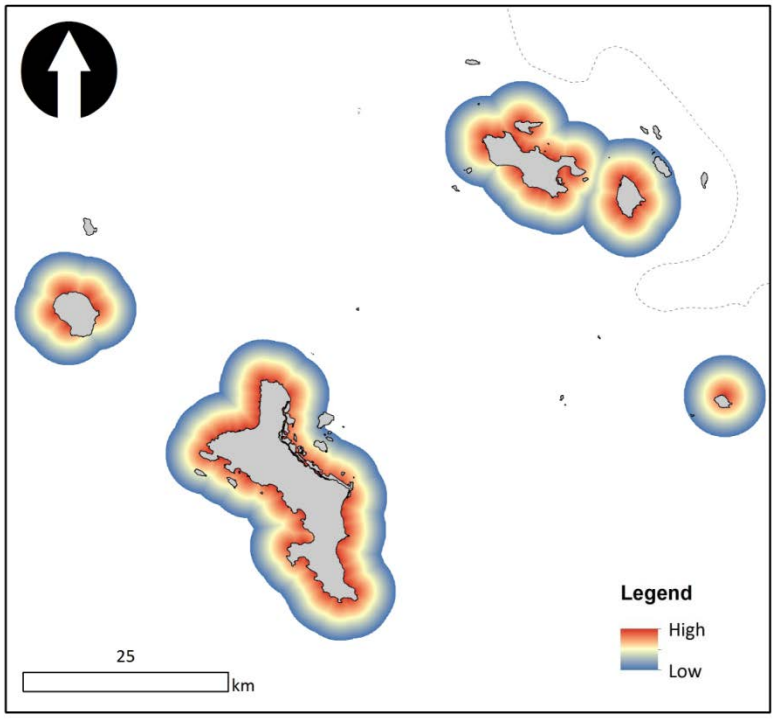


(a)

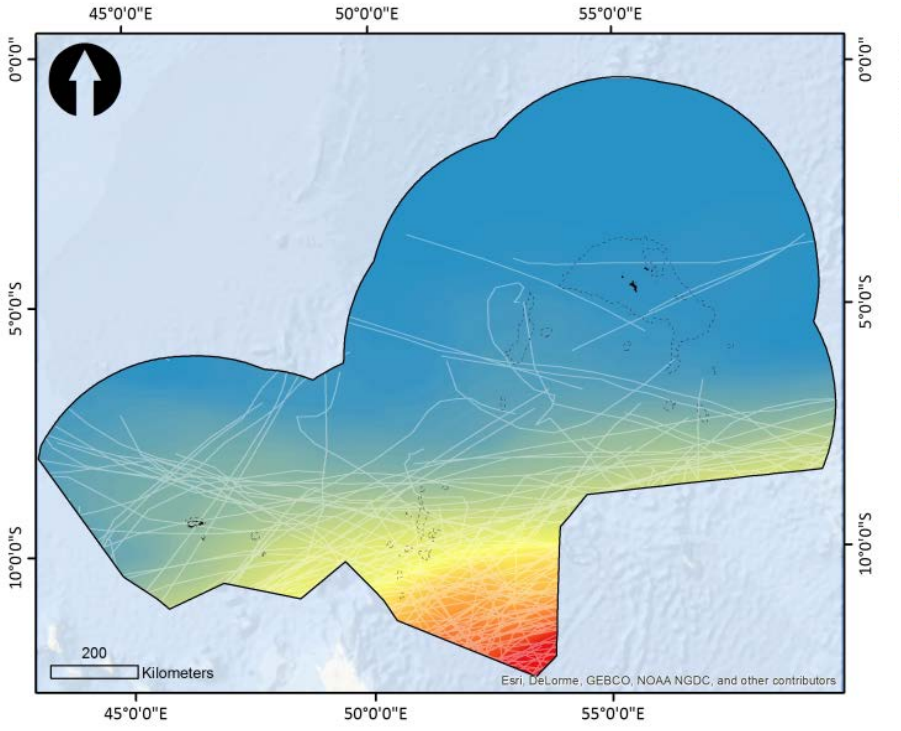


(b)

Figure 10 Map showing pressures on coastal water quality related to proximity (a) desalination plants and (b) to fish landing stations rescaled 0 to 1.

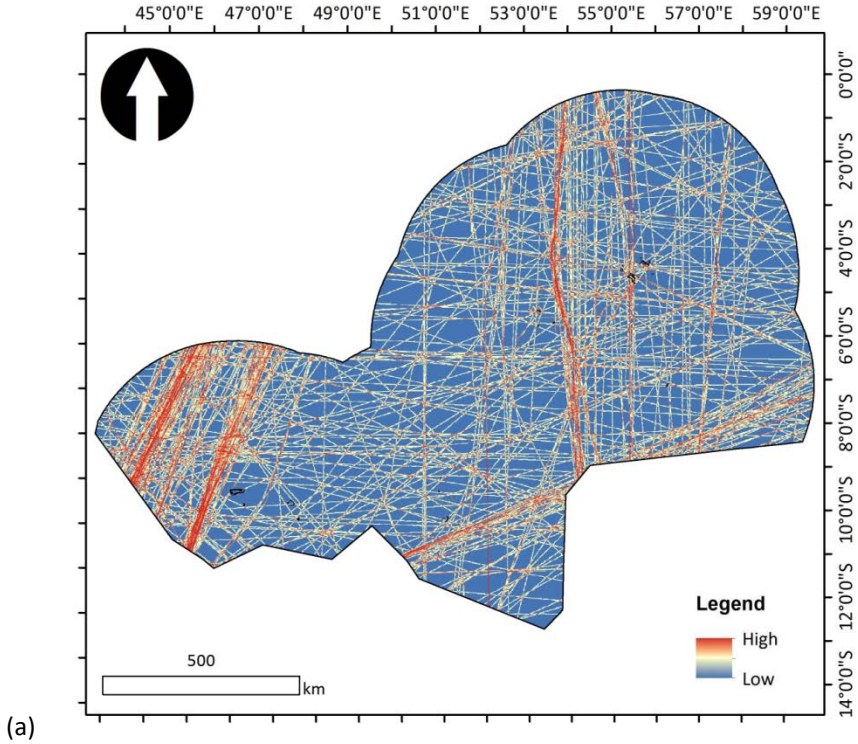


(a)

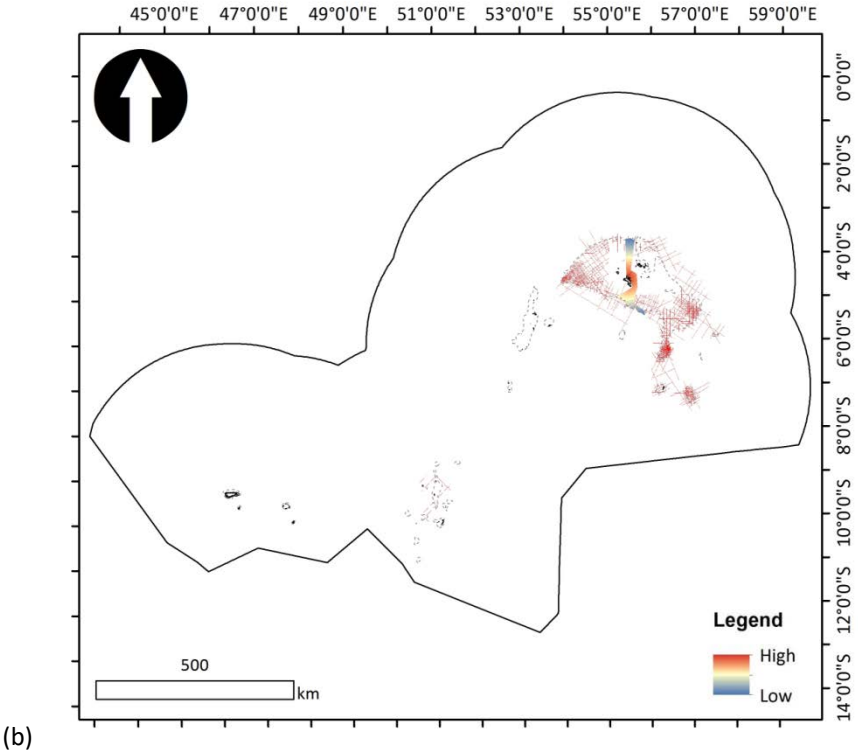


(b)

Figure 11 Map showing the distribution of pressures on coastal water quality associated with (a) river run-off and one of the other 'natural' threats (b) cyclones.

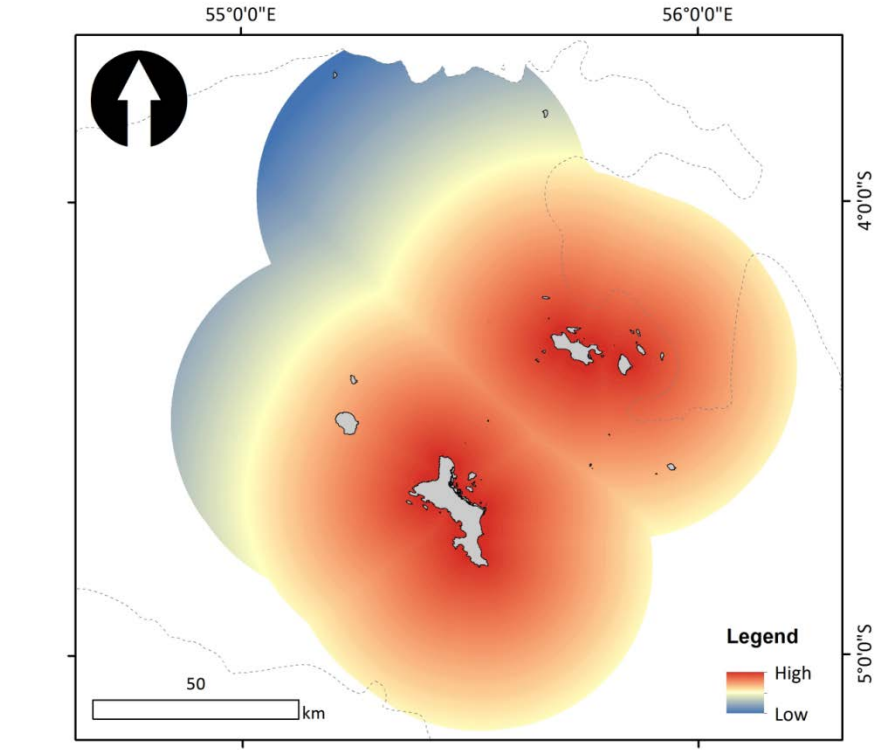


(a)

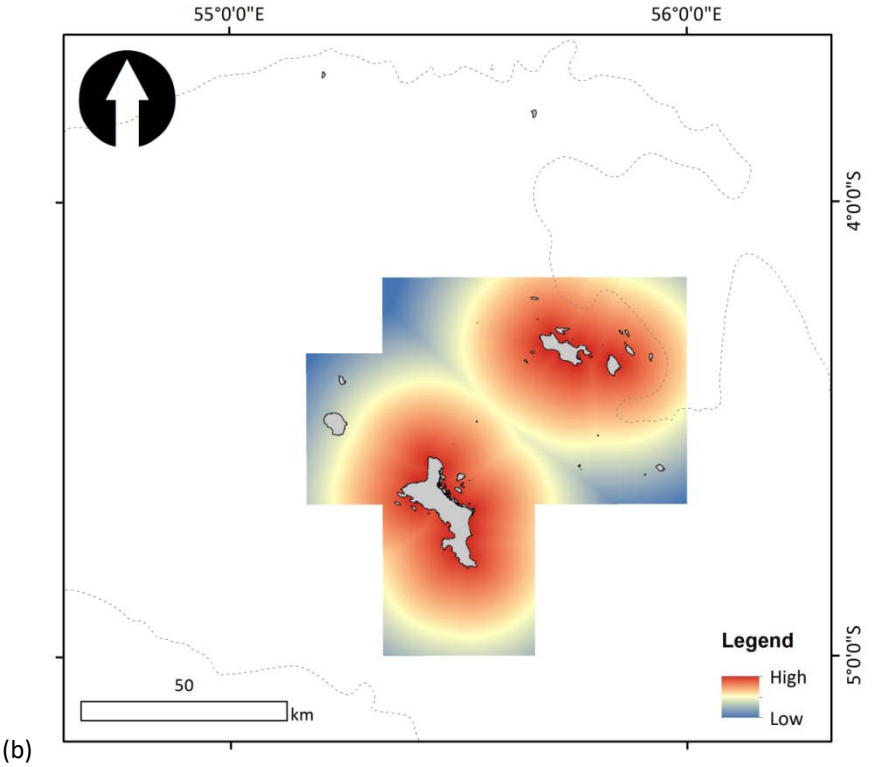


(b)

Figure 12: Map showing (a) distribution of shipping activity (Halpern 2008) and (b) distance from port within the main shipping lane across the Mahe Plateau and seimic survey activity.



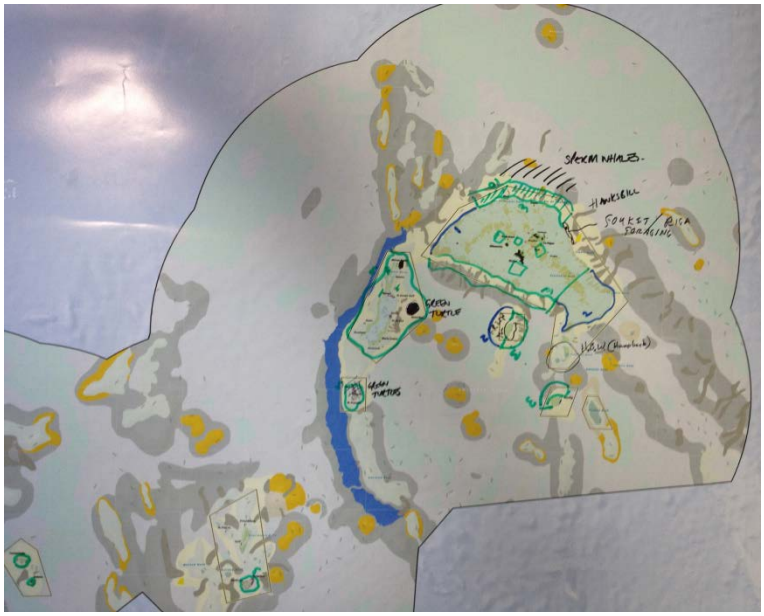
(a)



(b)

Figure 13: Map showing the distribution of fishing effort by (a) outboard boats and (b) shark fishers.

(a)



(b)

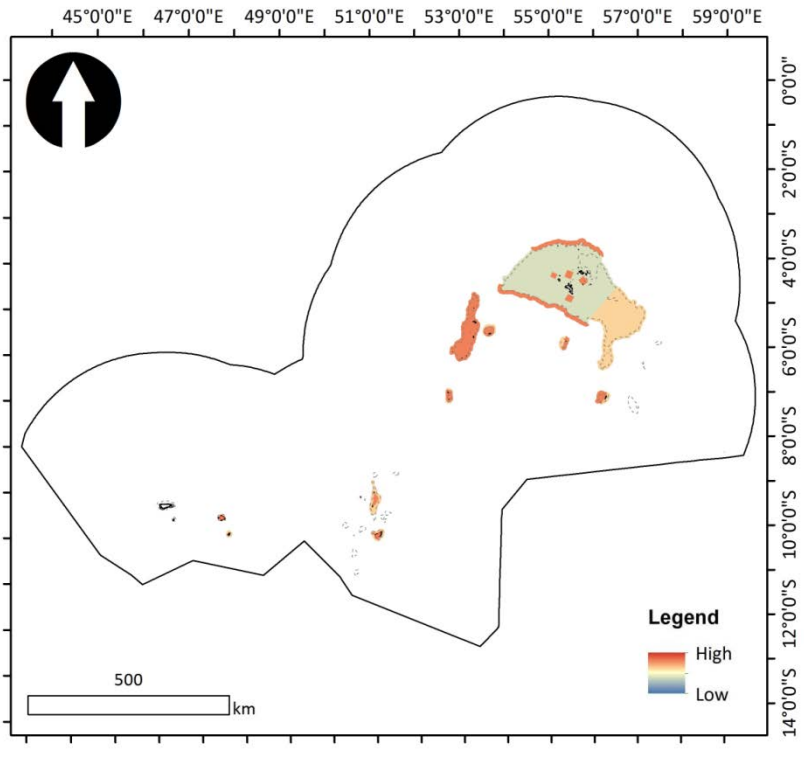
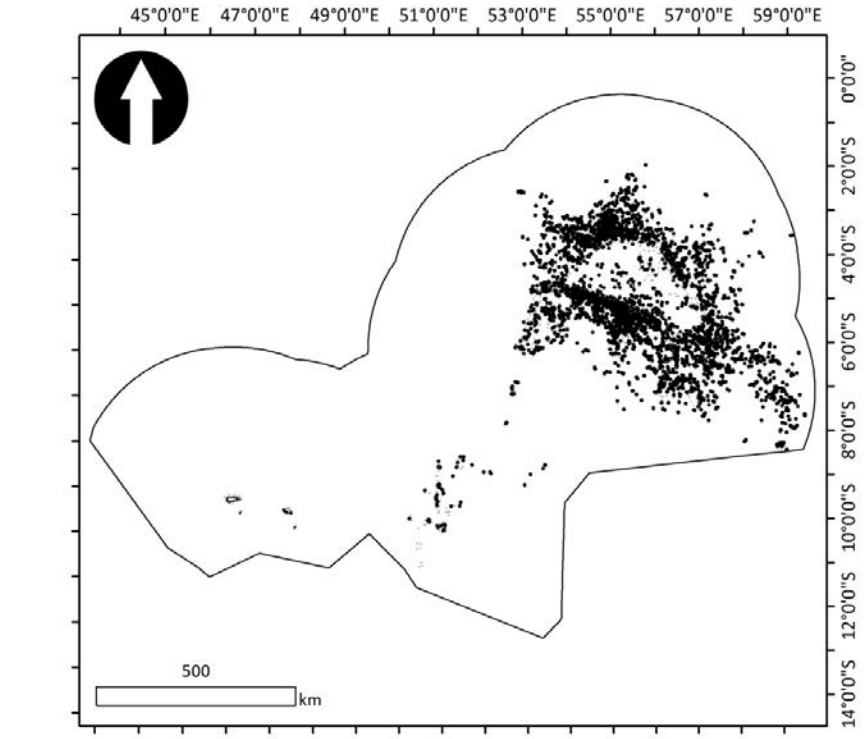
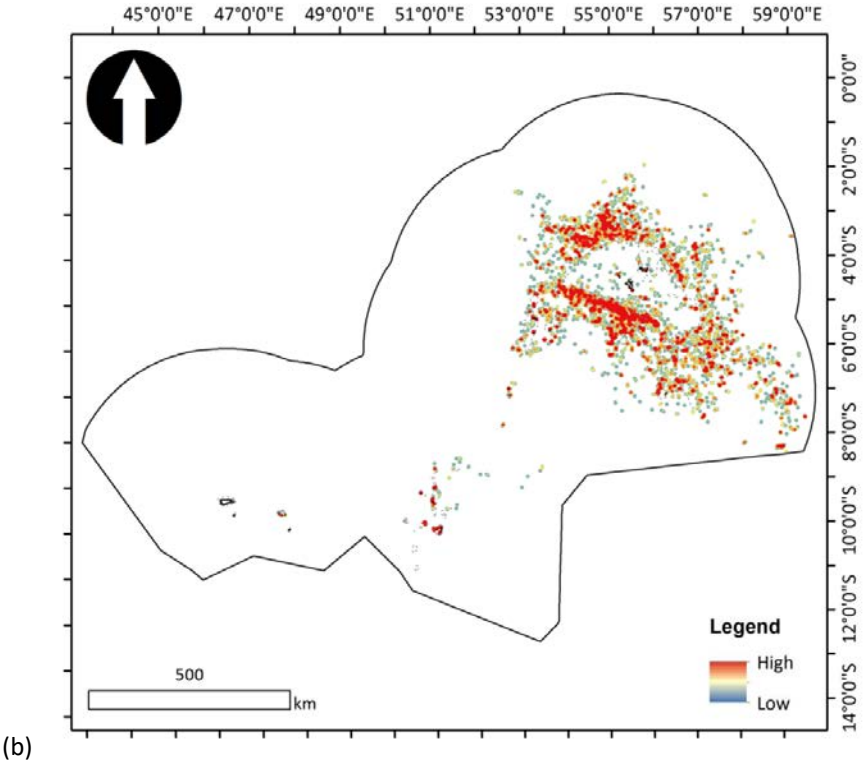


Figure 14: Distribution of fishing effort and priority areas (a) as identified by the Seychelles Sports Fishing Association in green on the maps, the numbers on the map indicate the importance (1= low, 2 medium and 3 = high) and (b) as mapped in the GIS.

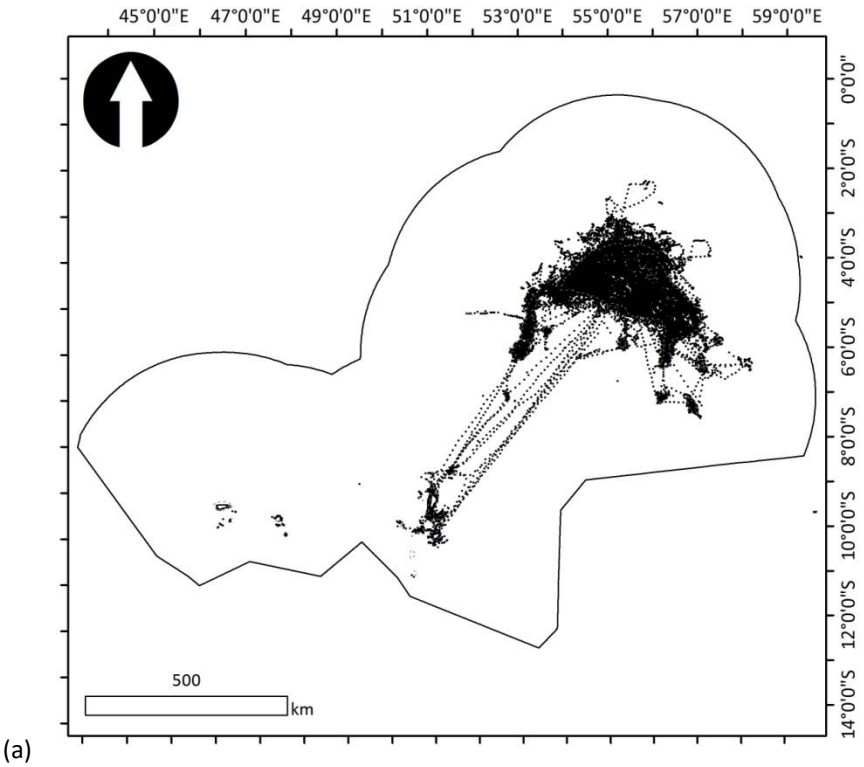


(a)

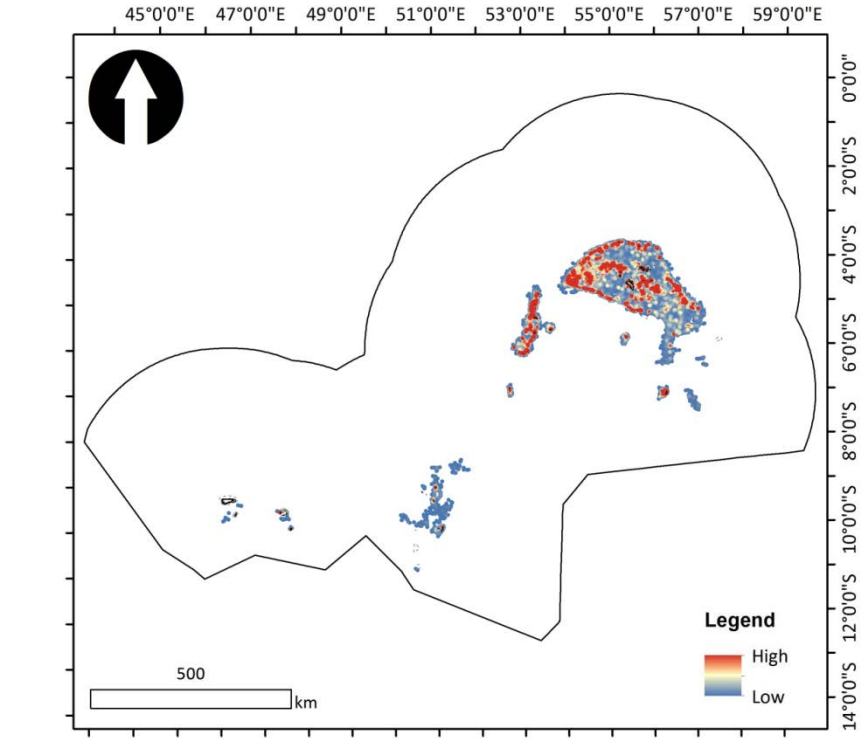


(b)

Figure 15 Semi-industrial fishery (a) vessel monitoring system data showing the distribution boats traveling <1knot between 2009 and 2012 and (b) point density map, showing the intensity of fishing effort, re-scaled from 0 to 1.



(a)



(b)

Figure 16 Sea cucumber fishery (a) vessel monitoring system data showing the distribution of fishing effort effort between 2009 and 2012, and (b) point density map, showing the intensity of fishing re-scaled from 0 to 1.

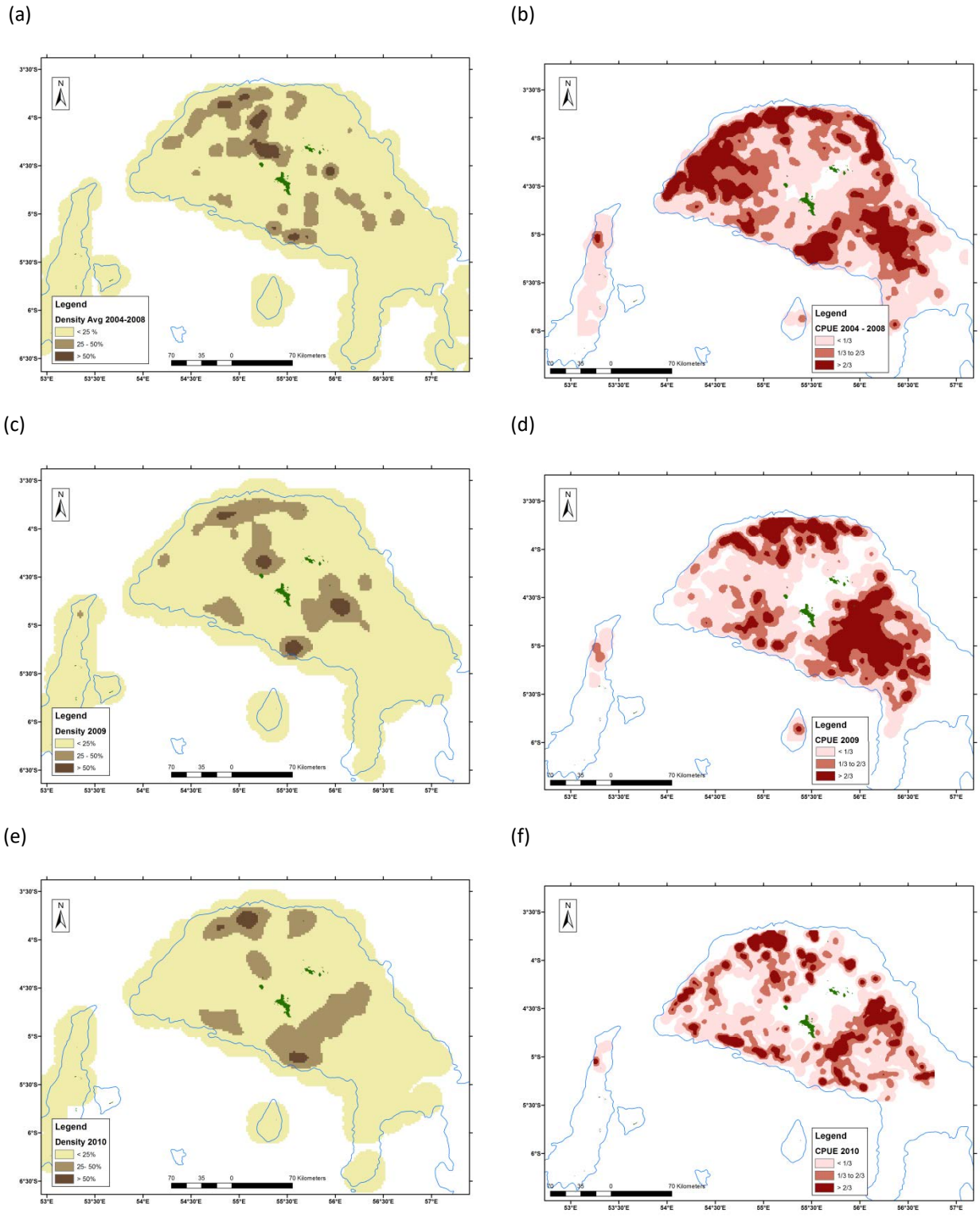
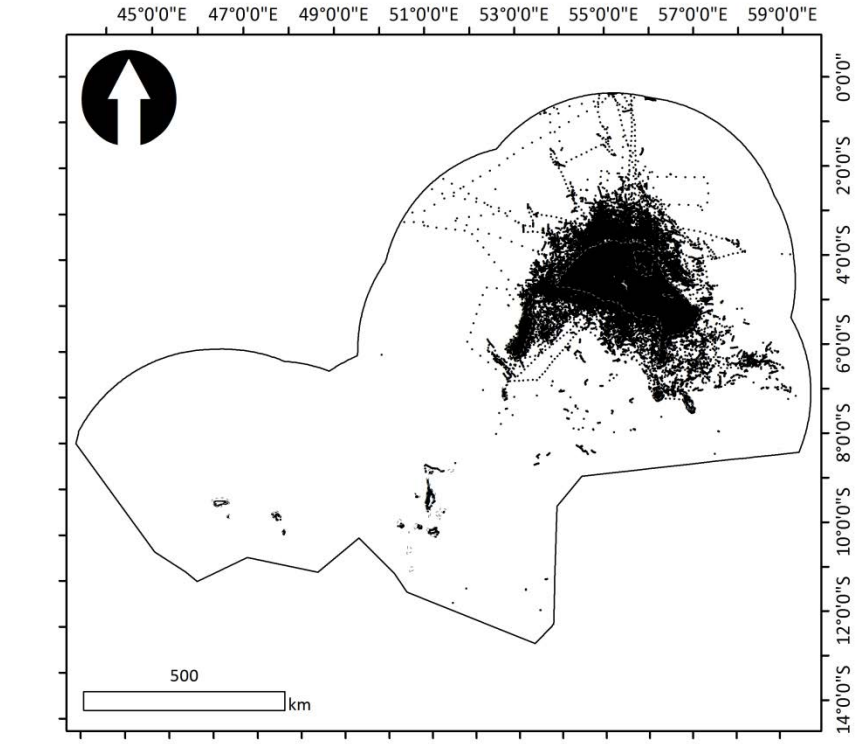
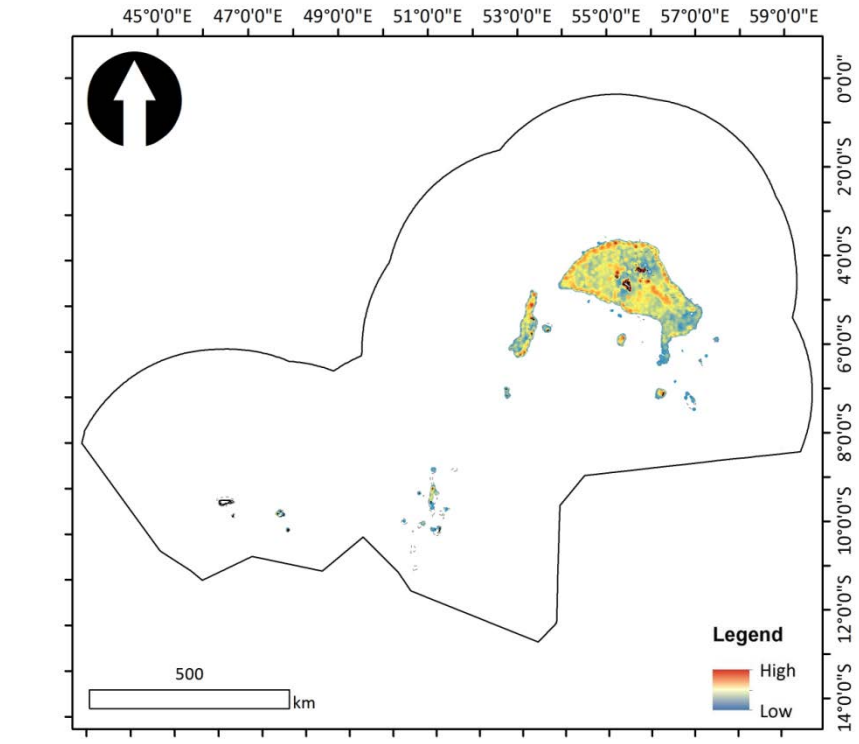


Figure 17: Distribution of fishing effort by whalers (a) 2004-2008 and (c) 2009 and (e) 2010 and Catch per unit Effort in (b) 2004-2008, (d) 2009 and (f) 2010 (Source: Calvin Gerry SFA).



(a)



(b)

Figure 18: Whalers (a) vessel monitoring system data showing the distribution of fishing effort between 2013 and 2014 and (b) point density map, showing the intensity of fishing effort, re-scaled from 0 to 1.

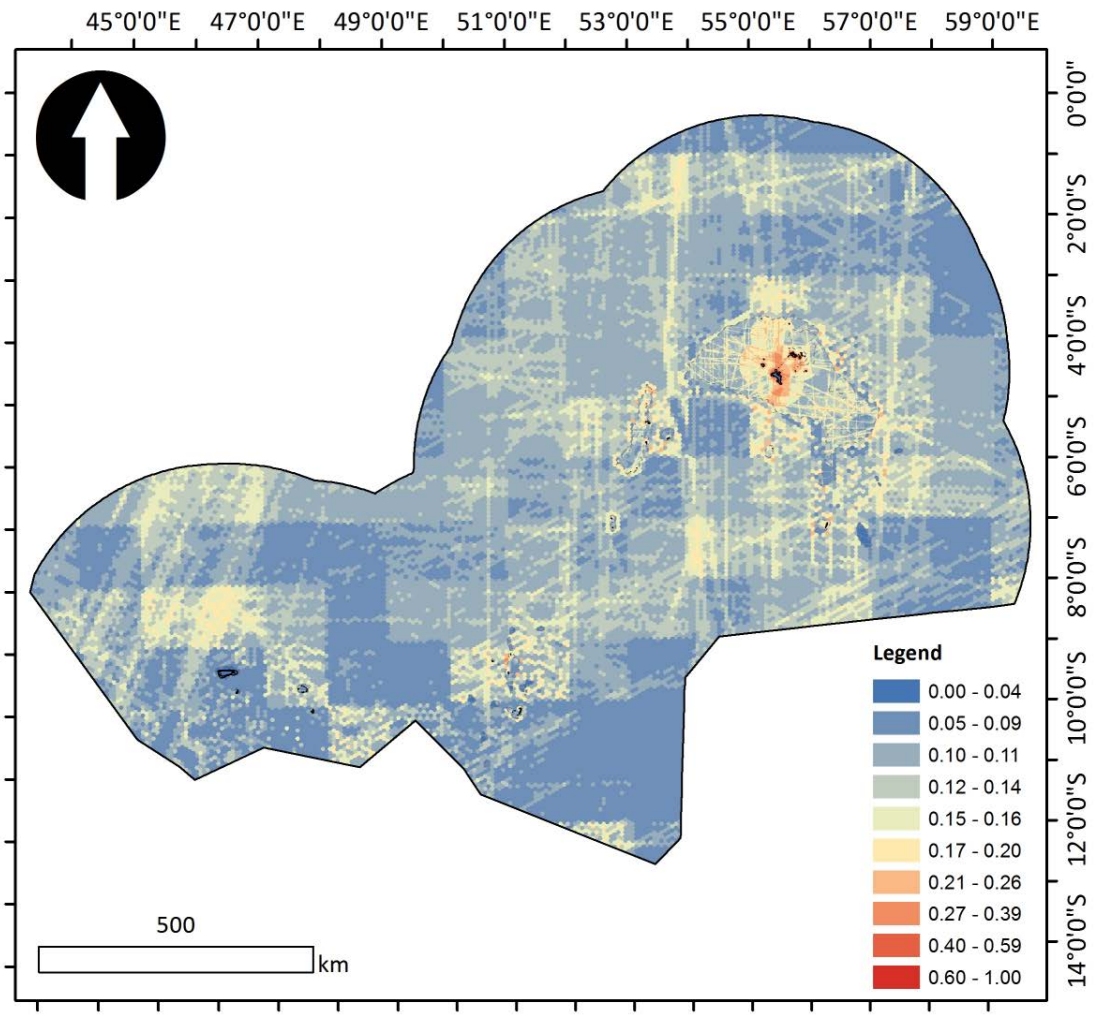
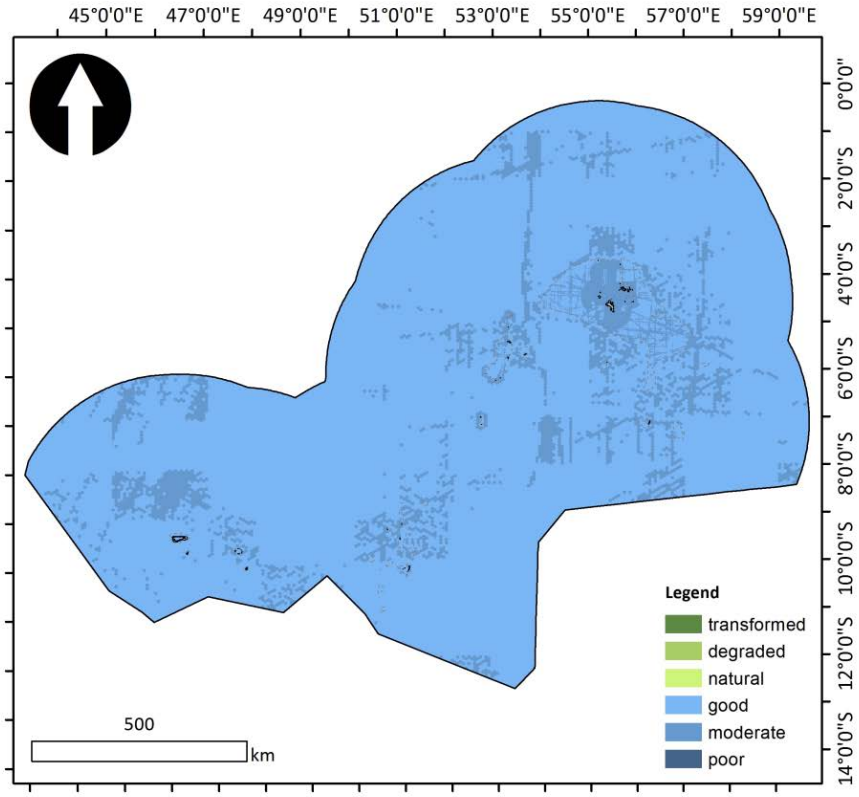
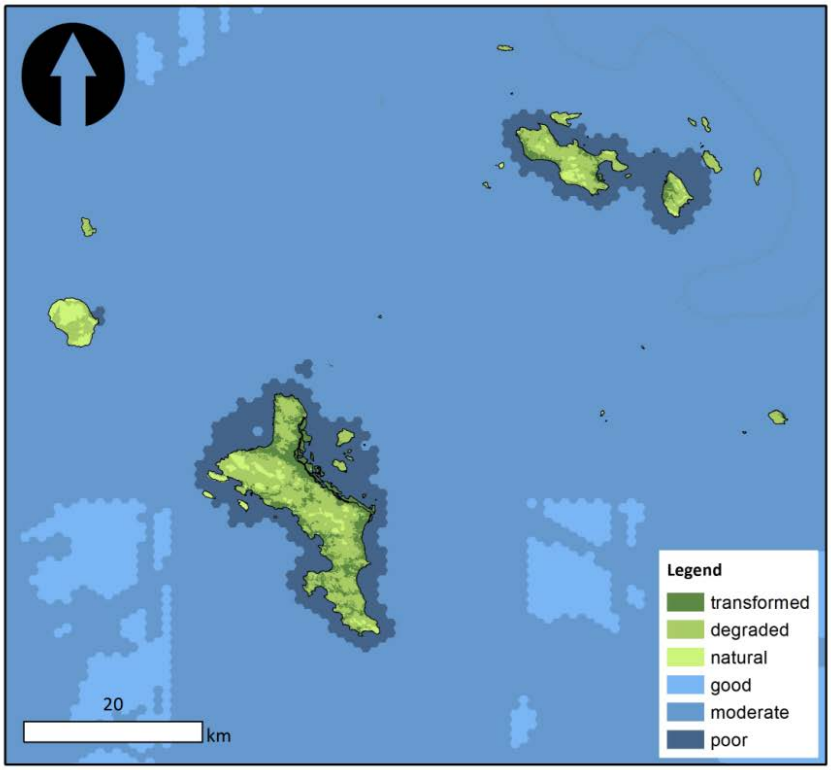


Figure 19: Marine conditions layer showing the combined score for all pressure layers.



(a)



(b)

Figure 20: Map showing the combined marine and terrestrial condition layer for (a) the EEZ and (b) the inner islands.

4.3 MAPPING OF PROTECTED AREAS

4.3.1 Scope

The third set of data needed for SCP is the extent and status of existing protected areas. This dataset is used to determine the extent of habitats that are unprotected and can be used to refine targets used in the models.

4.3.2 Process

GIS data files illustrating the extent of the declared protected areas were obtained from various sources. These data were compiled to create individual data layers illustrating the full extent of each type of protected area in Seychelles. A combined data layer was prepared showing all the protected area types.

During the data compilation process, it became apparent that there were several different versions of the GIS shapefiles for the protected area in circulation, and for others there was no GIS data available. One of the protected areas which did not appear on any of the GIS datasets was King Ross island, also known historically as L'Ile Lamperiarie. A review of the literature revealed a reference which gave the geographic location for L'Ile Lamperiarie as being 5°45'S and 53°46'E, which is closest to Desroches island (Montgomery Martin 1839). The location of this protected area is however still uncertain.

Table 9 List of data sources used to construct the protected areas data layer

Data types received	Data type	Source / Reference
Various layers showing the distribution of protected areas and proposed protected areas	GIS shapefiles	GoS-MEE
Various layers showing the distribution of protected areas.	GIS shapefiles	GoS-MLUH

4.3.3 Outputs

The table below list the data layers created from mapping protection. An excel spreadsheet which listed the sites for which there was no spatial data available was also prepared. These were mainly the "Areas of Outstanding Natural Beauty".

There needs to be a full review of the original regulations and the original maps that were submitted at the time each area was legally gazetted, as was previously recommended (Klaus 2014a). Information about other informally managed areas, such as private islands that are not formally designated but equally important to document, have been captured and used in the creation of an "Opportunities" layer.

Table 10: List of output datasets prepared for the protected area data layer

Dataset prepared	Type	Reference
sey_PA_all	GIS shapefile	This report (Klaus 2015)
sey_AONB_all	GIS shapefile	This report (Klaus 2015)
sey_AONB_all	Excel spreadsheet indicating missing datasets.	This report (Klaus 2015)
sey_UNESCO_WH_all	GIS shapefile	This report (Klaus 2015)

4.4 MAPPING OF SPECIES

4.4.1 Scope

Data illustrating the distribution of species is typically used to refine or enhance the spatial prioritization process. For this reason, the species included in the prioritization process are normally those species with a restricted range or a particular habitat requirement, as common or widespread species are accommodated for through the habitat representation data layers. Priority species normally include IUCN Red Listed species together with other national or local assessments of threat and culturally significant species. The preference is for data sets derived from observations or surveys, etc. preferably over the entire planning domain, and/or data on key sites, however these types of data are often not available at a consistent resolution over the entire planning domain. Other datasets that are often used a outputs from species habitat modeling.

Table 11: List of some of the data sources used in creating the derived maps of priority species

Dataset	Data type	Source / Reference
Seychelles Biodiversity Conservation Report 2012	*.pdf	GoS-MEE
Seychelles Biodiversity Conservation Report 2013	*.pdf	GoS-MEE
IUCN Red List	*.txt file	http://www.iucnredlist.org/
IUCN Red List – reptiles	GIS shapefile	http://www.iucnredlist.org/
IUCN Red List – amphibians	GIS shapefile	http://www.iucnredlist.org/
GBIF	*.txt file point	http://www.gbif.org/
OBIS	*.txt file	http:// www.iobis.org/
Aquamaps	csv 5 km grid	http://www.aquamaps.org/
Turtle nesting beaches	Access database	MCSS
Turtle nesting beaches	Word document	Jeanne Mortimer
Turtle nesting	Word document	Jeanne Mortimer
Turtle foraging	Verbal and written descriptions	Jeanne Mortimer
Seychelles Bird Record Committee	Excel spreadsheet	www.seychellesbirdrecordscommittee.com/
Probability of the distribution of whale sharks – EEZ	*.txt Word document	Sequeira et al. (2011a); Sequeira et al (2011b)
Probability of the distribution of whale sharks - Mahe	GIS shapefile	MCSS

4.4.2 Process

The priority species for inclusion in the data model were discussed at the 2nd SEY-SCP Workshop. These species included IUCN Red Listed species and other nationally important species as listed in Appendix 3. The technical experts present at the workshop were asked to review the species lists and rank the species in terms of conservation priority, where 1 = lowest priority, 2 = moderate priority and 3 = highest priority.

The best available data on the highest priority species (rank = 3) was then compiled from different data sources including direct observation data provided by ENGOs, together with other regional and global data sources (e.g. OBIS, GBIF and IUCN). Only those species with discrete or distinctive ranges for which there was comprehensive distribution coverages were selected for inclusion in the model.

A summary of how these datasets were compiled is provided below:

- *Terrestrial Mammals*: the location of the known roosts for the Seychelles Sheath-Tailed Bat were obtained from GoS-MEE and the locations buffered by 100m.
- *Marine Mammals*: The species of marine mammals identified as being the highest conservation priority during the 2nd SEY-SCP workshop were as follows: Dugong (*Dugong dugong*), Sei whale (*Balaenoptera borealis*), Brydes whale (*Balaenoptera brydei*), Blue whale (*Balaenoptera musculus*), Fin whale (*Balaenoptera physalus*), Short finned pilot whale (*Globicephala macrorhynchus*), Risso's dolphin (*Grampus griseus*), Pygmy sperm whale (*Kogia breviceps*), Dwarf sperm whale (*Kogia sima*), Humpback whale (*Megaptera novaeangliae*), Killer whale (*Orcinus orca*), Sperm whale (*Physeter macrocephalus*), and False killer whale (*Pseudorca crassidens*). Dugong are only known to occur within the lagoon at Aldabra, so a GIS shapefile to illustrate their distribution was created using the habitat data. Data illustrating the distribution of other 12 highest priority species of marine mammals was

obtained from Aquamaps[6] as *.csv files. The *.csv files were converted into point maps, projected to UTM40S and then kridged to create probability distribution maps (Table 12). Areas where there was a predicted probability distribution of >0.5 were extracted and used to create a combined shapefile showing the areas with highest numbers of priority marine mammals. Examples of the maps produced are shown in Figure 21.

- *Land/shore/seabirds*: Technical experts at the 2nd SEY-SCP Workshop identified 35 species of birds as being of high conservation priority, which included 17 species of seabirds, 4 species of shorebirds and 14 species of seabirds. Data on the distribution of these bird species was prepared using data from the Seychelles Birds Record Committee (SBRC), Seychelles Biodiversity Conservation reports (2012 and 2013) and other sources, including information on the distribution of these birds species and their nesting areas provided by ENGOs (Table 12).
- *Reptiles*: The Seychelles has 3 species of terrestrial snake, of which 2 are endemic; and more than 20 species of lizards, skinks and geckos plus 3 species of terrapins, one of which is either extinct or never existed and another is introduced. Data on the distribution of 18 of reptile species was obtained from the IUCN Red List (Table 12), which included: Dwarf bronze gecko (*Ailuronyx tachyscopaeus*), Giant bronze gecko (*Ailuronyx trachygaster*), Seychelles Tiger Chameleon (*Archaius tigris*), *Hemidactylus_mercatorius*, Brauer's burrowing skink (*Janetaescincus braueri*), Vesey-Fitzgerald's burrowing skink (*Janetaescincus veseyfitzgeraldi),* Seychelles house snake (*Lamprophis geometricus*), Seychelles wolf snake (*Lycognathophis seychellensis*), Gardiner's Burrowing Skink (*Pamelaescincus gardineri*), yellow-bellied sea snake (*Pelamis platura*), Abott's day gecko (*Phelsuma abbotti*), Gold dust day gecko (*Phelsuma laticauda*), Seychelles day gecko (*Phelsuma astriata*), La Digue Day Gecko (*Phelsuma sundbergi*), Seychelles skink (*Trachylepis seychellensis*), Seychelles sucker-tailed gecko (*Urocotyledon inexpectata*) and Madagascar girdled lizard (*Zonosaurus madagascariensis*). These data were crossed checked against the Seychelles Biodiversity Conservation reports (2012 and 2013) and other publications on reptiles. Although Aldabra has the largest surviving wild population of giant land tortoise in the Indian Ocean, this species was not identified as a priority for inclusion in the model as the species is already protected on Aldabra and populations on other islands have been introduced. The distribution of hawksbill (*Eretmochelys imbricata*) and green turtle (*Chelonia mydas*), were not mapped as they are found throughout Seychelles waters. Nesting beaches, nesting areas and foraging grounds for these species were mapped under the ecological processes.
- *Amphibians*: Data on the distribution of priority amphibians was obtained from IUCN Red List. These data were validated using information from the scientific literature where feasible and cross checked against the information in the Seychelles annual biodiversity and conservation report.
- *Fishes*: While there was some data available on the distribution and biomass of coral reef fishes, these data were mostly from coral reef monitoring programmes, which are not currently operational on all of the islands. Indeed the most comprehensive datasets for fishes were from fisheries derived data.
- *Whale shark's*: Sequiera (2011a) effort-corrected whale shark sightings data from the industrial purse-seine fishery and used these data to prepare predicted probability distribution maps by season. These seasonal distribution datasets were reclassifed so as to only include predicted distributions with a probability >0.5. The seasonal data were combined to create a map illustrating the distribution of whale shark's >0.5 throughout the year.
- *Whale sharks* (Mahe): MCSS used ecological niche based modelling to prepare probability maps to predict the distribution of whales sharks around Mahe. Areas where there was a probabilty of >0.5 occurrence were extracted and included in the model.

[6] http://www.aquamaps.org/

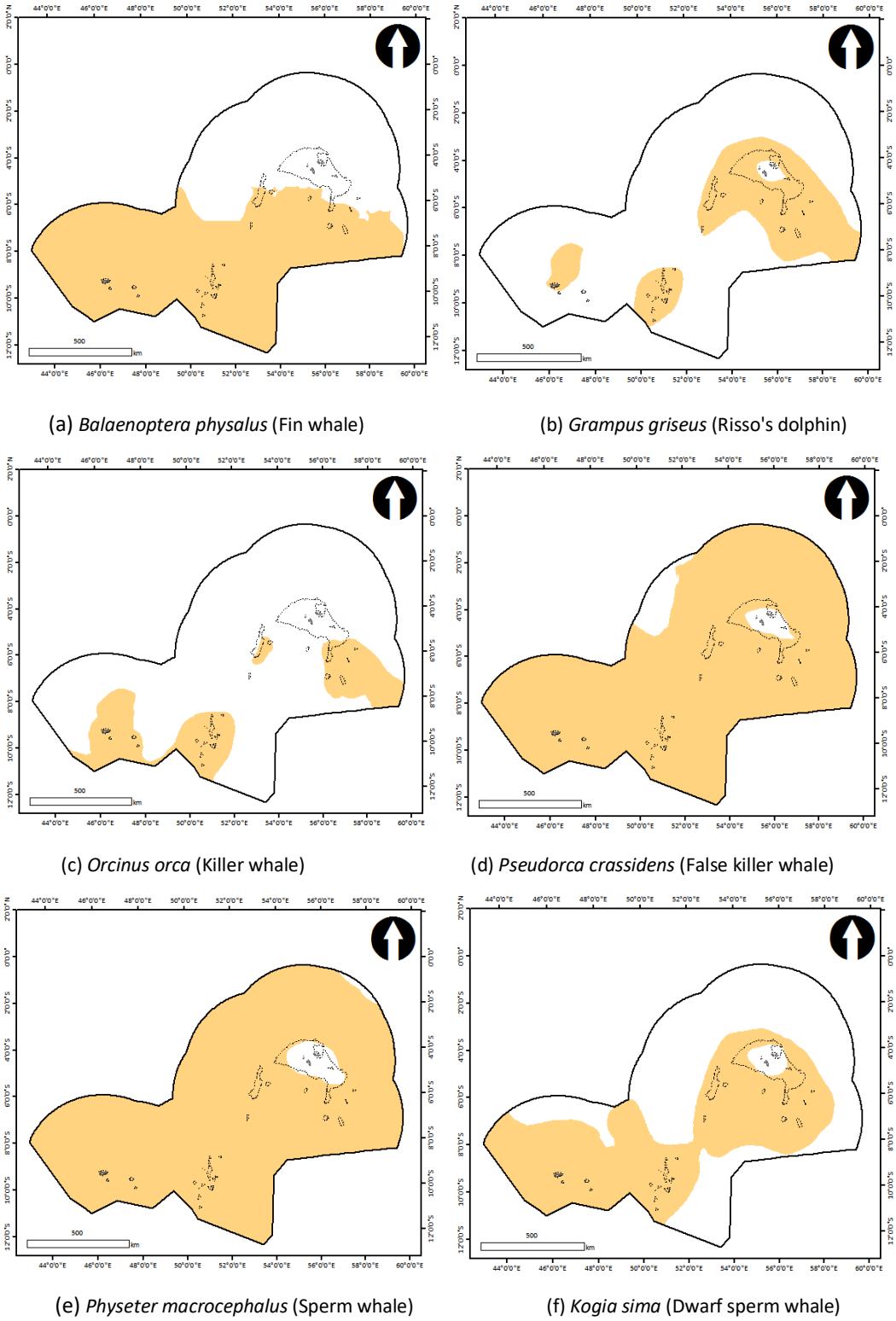
4.4.3 Outputs

The table below lists the datasets prepared for use in the model.

Table 12: List of some of the data outputs created in the mapping priority species

Dataset	Data type	Data source / process
Mammals		
sey_stb_roost	Location of roosts buffered by 100m	GoS-MEE
sey_dugong	Area covered by Aldabra lagoon extracted from habitat map	
sey_marmam_Balaenoptera acutorostrata	*.csv files from Aquamaps.	Aquamaps (2014) This report (Klaus 2015)
sey_marmam_Balaenoptera borealis (Sei whale)		
sey_marmam_Balaenoptera brydei (Brydes whale)		
sey_marmam_Balaenoptera musculus (Blue whale)		
sey_marmam_Balaenoptera physalus (Fin whale)		
sey_marmam_Globicephala macrorhynchus (Short finned pilot whale)		
sey_marmam_Grampus griseus (Risso's dolphin)		
sey_marmam_Kogia breviceps (Pygmy sperm whale)		
sey_marmam_Kogia sima (Dwarf sperm whale)		
sey_marmam_Megaptera novaeangliae (Humpback whale)		
sey_marmam_Orcinus orca (Killer whale)		
sey_marmam_Physeter macrocephalus (Sperm whale)		
sey_marmam_Pseudorca crassidens (False killer whale)		
Land birds		
sey_birds_land_Acrocephalus_sechellensis	SBRC presence / absence data (Excel)	Species records represented by island polygons converted into GIS shapefiles, unless species ranges were better defined (e.g. *Otus insularis*).
sey_birds_land_Aerodramus_elaphrus		
sey_birds_land_Alectroenas_pulcherrima		
sey_birds_land_Ardeola_idae		
sey_birds_land_Butorides_striatus_degens		
sey_birds_land_Copsychus_sechellarum		
sey_birds_land_Coracopsis_barklyi		
sey_birds_land_Dryolimnas_cuvieri_aldabranus		
sey_birds_land_Falco_araea		
sey_birds_land_Foudia_sechellarum		
sey_birds_land_Gallinula_chloropus		
sey_birds_land_Hypsipetes_crassirostris		
sey_birds_land_Nectarinia_dussumieri		
sey_birds_land_Otus_insularis		
sey_birds_land_Terpsiphone_corvina		
sey_birds_land_Threskiornis_bernieri		
sey_birds_land_Zosterops_modestus		
Shorebirds		
sey_birds_shore_Ixobrychus_sinensis	Presence data (Excel)	Species records represented by 100m buffer polygon either side of shoreline
sey_birds_shore_Nycticorax_nycticorax		
sey_birds_shore_Ardea_cinerea		
sey_birds_shore_Bubulcus_ibis		
Seabirds		
sey_birds_sea_Anous_stolidus	Presence data (Excel)	SBRC presence data converted into a buffer polygon, representing: 50km foraging range.
sey_birds_sea_Anous_tenuirostris		10km foraging range.
sey_birds_sea_Fregata_ariel		500km foraging range.
sey_birds_sea_Fregata_minor		500km foraging range.
sey_birds_sea_Gygis_alba		50km foraging range.
sey_birds_sea_Sterna_sumatrana		10km foraging range.
sey_birds_sea_Sterna_dougallii		10km foraging range.
sey_birds_sea_Phaethon_lepturus		1000km foraging range.

sey_birds_sea_Phaethon_rubricauda		5000km foraging range.
sey_birds_sea_Puffinus_pacificus		100km foraging range.
sey_birds_sea_Papasula_abbotti		100km foraging range.
sey_birds_sea_Sula_dactylatra		100km foraging range.
sey_birds_sea_Sula_sula		100km foraging range.
sey_birds_sea_Sula_leucogaster		100km foraging range.
sey_birds_sea_Numenius_arquata		1km foraging range.
Reptiles		
sey_reptiles_iucn_nov2013_Ailuronyx_seychellensis.shp	GIS shapefile	IUCN (2006)
sey_reptiles_iucn_nov2013_Ailuronyx_tachyscopaeus.shp		IUCN (2006)
sey_reptiles_iucn_nov2013_Ailuronyx_trachygaster.shp		IUCN (2006)
sey_reptiles_iucn_nov2013_Archaius_tigris.shp		IUCN (2006)
sey_reptiles_iucn_nov2013_Hemidactylus_mercatorius.shp		IUCN (2006)
sey_reptiles_iucn_nov2013_Janetaescincus_braueri.shp		IUCN (2006)
sey_reptiles_iucn_nov2013_Janetaescincus_veseyfitzgeraldi.shp		IUCN (2006)
sey_reptiles_iucn_nov2013_Lamprophis_geometricus.shp		IUCN (2006)
sey_reptiles_iucn_nov2013_Lycognathophis_seychellensis.shp		IUCN (2006)
sey_reptiles_iucn_nov2013_Pamelaescincus_gardineri.shp		IUCN (2006)
sey_reptiles_iucn_nov2013_Pelamis_platura.shp		IUCN (2010)
sey_reptiles_iucn_nov2013_Phelsuma_abbotti.shp		IUCN (2006)
sey_reptiles_iucn_nov2013_Phelsuma_astriata.shp		IUCN (2006)
sey_reptiles_iucn_nov2013_Phelsuma_laticauda.shp		IUCN (2006)
sey_reptiles_iucn_nov2013_Phelsuma_sundbergi.shp		IUCN (2006)
sey_reptiles_iucn_nov2013_Trachylepis_seychellensis.shp		IUCN (2006)
sey_reptiles_iucn_nov2013_Urocotyledon_inexpectata.shp		IUCN (2006)
sey_reptiles_iucn_nov2013_Zonosaurus_madagascariensis.shp		IUCN (2006)
Amphibians		
sey_amphibians_iucn_nov2013_Ptychadena_mascareniensis.shp	GIS shapefiles	IUCN, Conservation International & NatureServe (2008)
sey_amphibians_iucn_nov2013_Grandisonia_alternans.shp		IUCN, Conservation International (2012)
sey_amphibians_iucn_nov2013_Grandisonia_brevis.shp		
sey_amphibians_iucn_nov2013_Grandisonia_larvata.shp		
sey_amphibians_iucn_nov2013_Grandisonia_sechellensis.shp		
sey_amphibians_iucn_nov2013_Hypogeophis_rostratus.shp		
sey_amphibians_iucn_nov2013_Praslinia_cooperi.shp		
sey_amphibians_iucn_nov2013_Sechellophryne_gardineri.shp		
sey_amphibians_iucn_nov2013_Sechellophryne_pipilodryas.shp		
sey_amphibians_iucn_nov2013_Sooglossus_sechellensis.shp		
sey_amphibians_iucn_nov2013_Sooglossus_thomasseti.shp		
sey_amphibians_iucn_nov2013_Tachycnemis_seychellensis.shp		IUCN, Conservation International (2013)
Cold water corals		
cw_sol.shp (*Solenosmilia variabilis)*	GIS shapefiles	Davies and Guinotte (2011)
cw_ena.shp (*Enallopsammia rostrata)*	GIS shapefiles	Davies and Guinotte (2011)



(a) *Balaenoptera physalus* (Fin whale)

(b) *Grampus griseus* (Risso's dolphin)

(c) *Orcinus orca* (Killer whale)

(d) *Pseudorca crassidens* (False killer whale)

(e) *Physeter macrocephalus* (Sperm whale)

(f) *Kogia sima* (Dwarf sperm whale)

Figure 21: Maps showing distribution maps of some of the marine mammals derived from Aquamaps (2012).

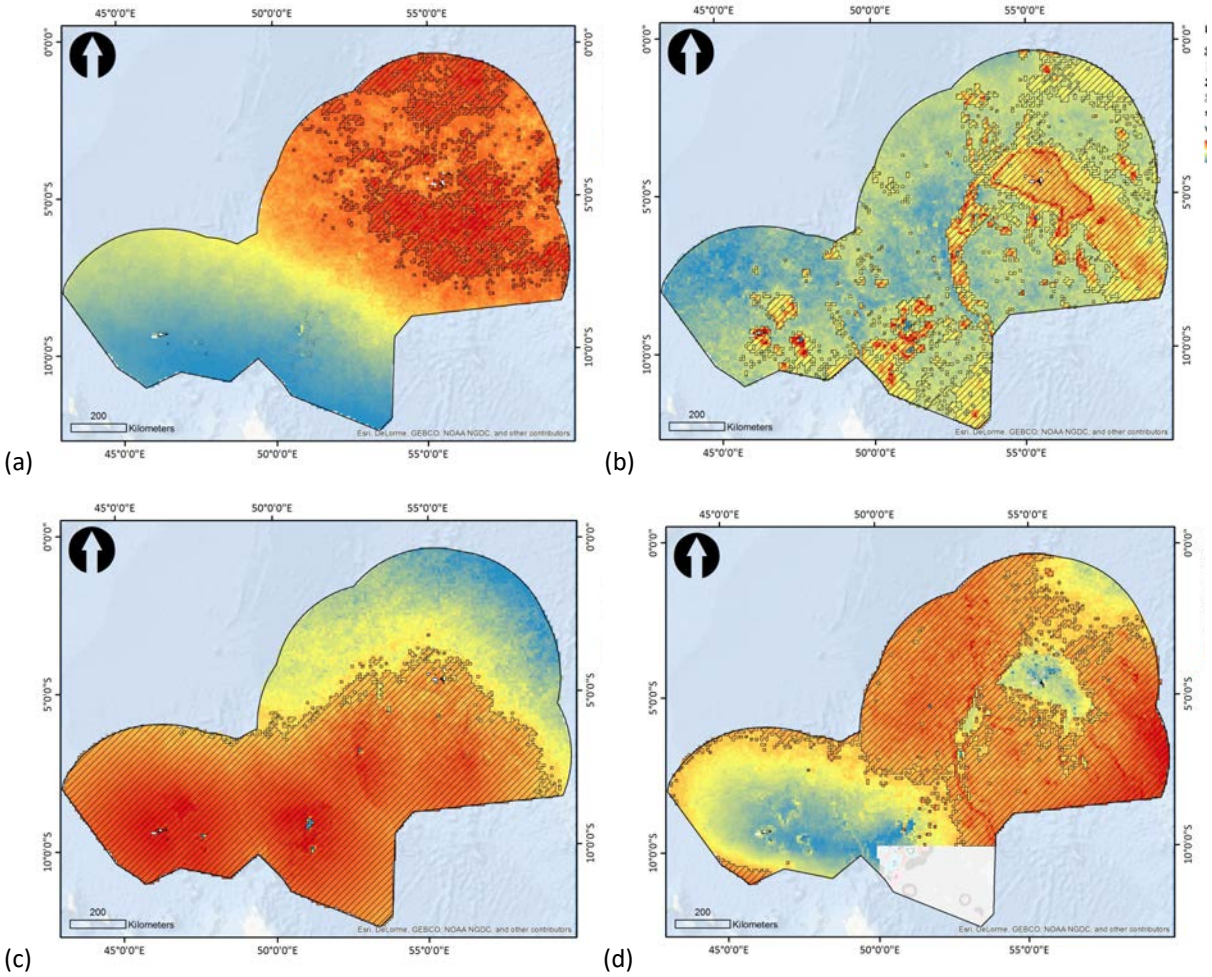


Figure 22: Maps showing probability distribution maps for whale shark's during (a) 1st season (January to March) (b) 2nd season (April to June) (c) 3rd season (July to September) and (d) 4th season (October to December). Cross-hatching shows the areas where the predicted probability was >0.5 (Source: Sequeira et al. 2011b).

4.5 MAPPING OF ECOLOGICAL PROCESSES

4.5.1 Scope

The presence of species, and even habitats, is not sufficient to ensure long term persistence of biodiversity. Therefore important ecological processes on which the persistence of biodiversity depends are also included in these types of spatial prioritisation models. Direct mapping of ecological processes is difficult; so proxies or surrogates are often developed to identify particularly productive habitats, potential corridors, areas of potential importance for climate change adaptation, and areas of high biodiversity heterogeneity.

Table 13: List of data sources used in creating the derived maps of processes and their proxy habitats

Data	Data type	Source / Reference
Integrated habitat map	GIS shapefile and raster grid	This report (Klaus 2015)
Vegetation maps	GIS shapefile and raster grid	Senterre and Wagner (2014)
Riverine	GIS shapefile and raster grid	Senterre and Wagner (2014)

4.5.2 Process

- *Key Biodiversity Areas (KBAs)* identified by Senterre et al. (2013) were included as the priority focus areas for the terrestrial habitats.
- *Other critical habitats*: Various key process habitats were identified and mapped during the preparation of the integrated habitat classification scheme, these included mangroves and wetlands, rivers, seagrasses and coral reefs and submerged reefal structures located on the Mahe Plateau. Riverine habitats as mapped by Senterre and Wagner (2014) were also included as these were areas where new species were found. Other key process habitats were also identified for critical species including turtles, fish spawning grounds, feeding grounds for frigate birds.
- *Chlorophyll-a:* The Mahe Plateau is one of the most productive areas within the western Indian Ocean region. To capture and represent the areas of highest productivity, the mean and maximum productivity was mapped using satellite-derived 9km ocean colour data for chlorophyll-a concentrations (2003 to 2014) from the MODIS satellite. The data were clipped to the Seychelles EEZ and reclassified. The areas where there was above average mean and maximum chlorophyll-a concentrations were converted into polygons and transferred into the planning unit layer.
- *Critical habitats for sea turtles:* Both *Eretmochelys imbricata and Chelonia mydas* are known to feed and breed within Seychelles waters. The following data layers were prepared for these species:
    - *Turtle nesting beaches:* Turtle nesting beaches were mapped and ranked using the data provided by MCSS for Mahe and from verbal and written descriptions provided by Dr Jeanne Mortimer for the other islands. The beaches were buffered by 10 m and classified to illustrate the importance of the beach as a nesting site using a scale of 1 to 4, where 1 is the lowest priority and 4 the highest priority.
    - *Distribution of nesting turtles:* The distribution of both *Eretmochelys imbricata and Chelonia mydas* during the nesting season was represented by a 1 km buffer around each of the islands / atolls where these species are known to nest. These areas were ranked in terms of their importance using a scale of 1 to 4, where 1 is the lowest and 4 the highest priority.
    - *Turtle foraging habitats:* Maps were prepared showing the distribution of foraging grounds for juvenile and adult *Eretmochelys imbricata and Chelonia mydas.* The foraging grounds were ranked in terms of importance using a scale of 1 to 4, where 1 is the lowest priority and 4 the highest priority.
- *Fish spawning grounds*
    - Rabbitfishes*:* The distribution of known spawning grounds for rabbitfishes was provided by Jude Bijoux from SFA and the planning units where these spawning grounds were located were identified.
    - Grouper: The distribution of spawning grounds for various grouper species were provided by Jude Bijoux from SFA, and the planning units where these spawning grounds were located were identified.
- *Frigate foraging grounds*
    - A dataset was provided by Dr Henri Weimerskirch which showed the locations of foraging frigatebirds from Aldabra (Weimerskirch et al. 2010). The frigatebirds were tracked with Argos transmitters attached to the back feathers. The data set include for each individual

track the date, latitude, longitude of each location. The individual tracks were combined and boundary polygons created to represent the overlapping feeding range of this species.

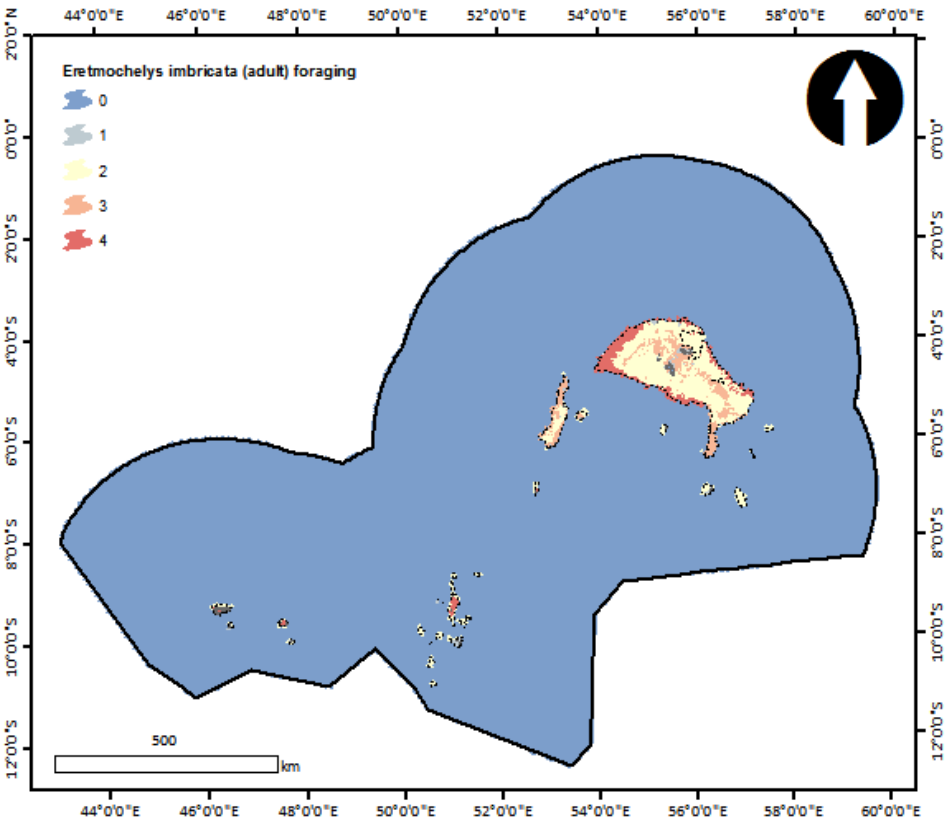
- *Blue whale breeding grounds*: Data on the location of blue whale breeding grounds were digitised from Kizka (2009).
- *Humpback whale breeding grounds:* Data on the location of humpback whale breeding grounds were digitised from Kizka (2009).
- *Spermwhales hunting ground:* Data on the location of sperm whale hunting grounds were digitised from outputs from the 2nd SEY-SCP Workshop.

4.5.3 Outputs

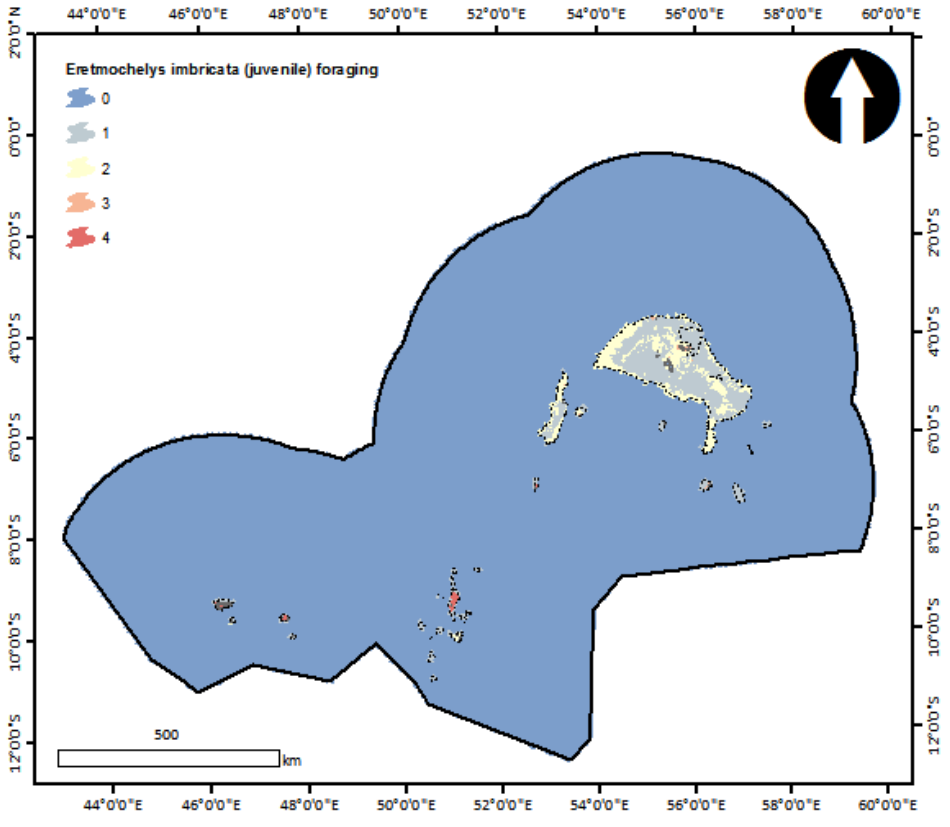
The table below shows the list of ecological process datasets prepared for inclusion in the model.

Table 14: List of output datasets prepared for the mapping of processes and their proxy habitats

Data	Data type	Source / Reference
sey_wetlands_mangroves	GIS shapefile	GoS-MLUH; This report (Klaus 2015)
sey_seagrass	GIS shapefile	This report (Klaus 2015)
sey_beaches	GIS shapefile	GoS-MLUH; This report (Klaus 2015);
sey_rivers	GIS shapefile	GoS-MLUH
sey_riverine	GIS shapefile	Senterre and Wagner (2014)
sey_chla_max	Grid	MODIS Aqua 9km satellite data
sey_chla_mean	Grid	MODIS Aqua 9km satellite data
sey_turtle_EI_adult_foraging	GIS shapefile	Digitised from written descriptions by Jeanne Mortimer
sey_turtle_EI_juvenile_foraging	GIS shapefile	
sey_turtle_CM_adult_foraging	GIS shapefile	
sey_turtle_CM_juvenile_foraging	GIS shapefile	
sey_turtle_EI_nesting	GIS shapefile	
sey_turtle_CM_nesting	GIS shapefile	
sey_turtle_beaches	GIS shapefile	
sey_turtle_EI_adult_foraging	GIS shapefile	
sey_blue_whale_breeding_kiszka	GIS shapefile	Digitised from Kiska (2009)
sey_humpback_breeding_kiszka	GIS shapefile	Digitised from Kiska (2009)
sey_spermwhale	GIS shapefile	Digitised during 2nd SEY-SCP Workshop

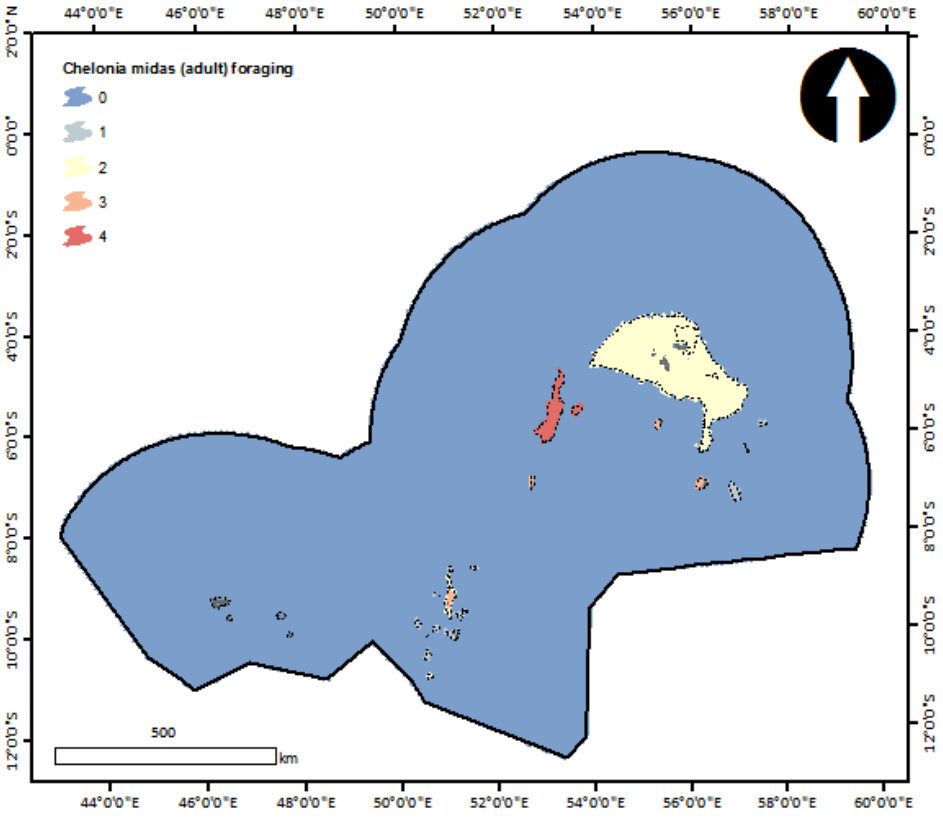


(a)

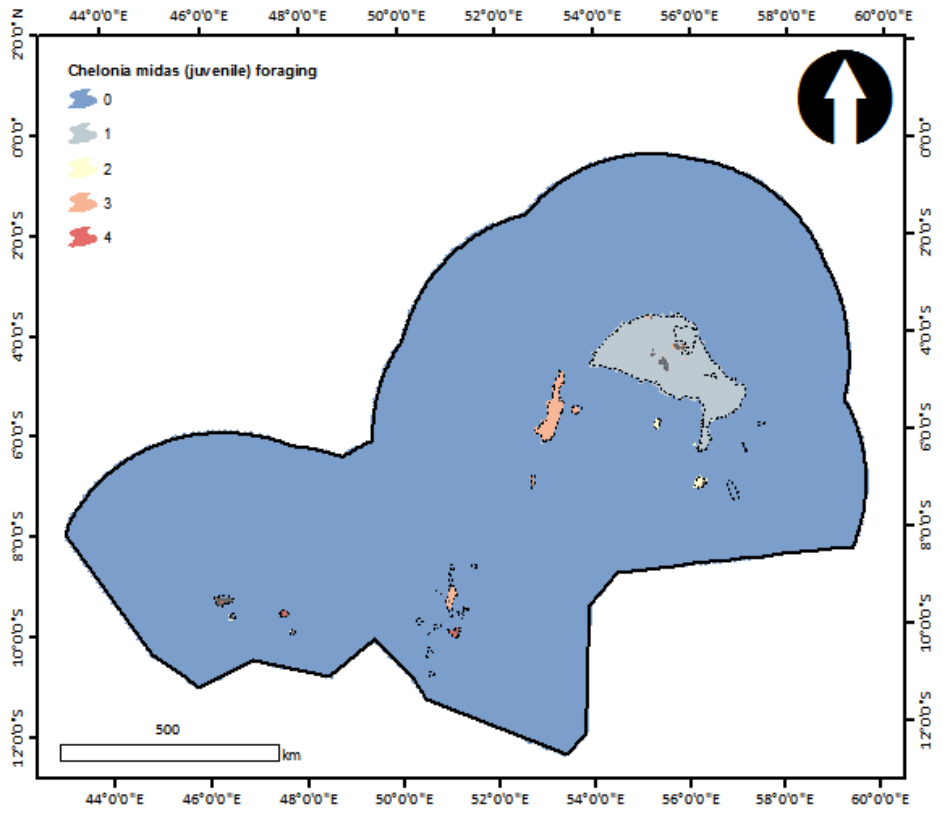


(b)

Figure23: Maps showing distribution of (a) adult and (b) juvenile Hawksbill turtle foraging grounds



(a)



(b)

Figure 23 (continued): Maps showing distribution of (a) adult and (b) juvenile Green turtle foraging grounds

4.6 MAPPING OF OPPORTUNITIES

4.6.1 Scope

Opportunities are areas that are not yet formally protected but offer the potential to enhance a protected area network due to existing sympathetic land use or other management practices. These areas are very important to identify for the spatial prioritization. The primary opportunities identified for Seychelles included areas that have not yet been formally recognised as protected area but are already being managed in a way that affords a certain level of habitat or species protection (e.g. private islands). Other opportunities identified included areas that have been recognised as important for the conservation of species or habitats through other regional or international processes (e.g. Important Bird Areas, Important Seabird Areas, and Ecologically and Biological Significant Areas).

Table 15: List of data used for the mapping of opportunities

Data	Data type	Source / Reference
sey_AONB	GIS shapefile	GoS-MEE
sey_nature_reserves	GIS shapefile	GoS-MEE
sey_shell_reserves	GIS shapefile	GoS-MEE
sey_forest_reserves	GIS shapefile	GoS-MLUH
sey_fisheries_reserves	Boundary coordinates	Shapefile prepared from the coordinates in the Fisheries legislation (Klaus 2015)
sey_fisheries_comanaged_areas	Jpeg of the Praslin fisheries	SFA for jpeg and shapefile - this report (Klaus 2015)
sey_PA_proposed_cabinet	GIS shapefile	Seychelles Government Cabinet Memorandum (2011) "Proposal to designate 96% of Curieuse Island, South & Goëlettes Islands (Farquhar), Polyte islands and Grande Ile (Cosmoledo), Desnoeufs Island, Saint Francois & Bijoutier Islands, Assumption Island and South Island (Poivre) as Protected Areas under the National Park and Nature Conservancy Act", Presented by Minister for Home Affairs, Environment, Transport & Energy, April 2011.
sey_PA_proposed_outer	GIS shapefile	Dataset prepared during the development of the UNDP-GEF Outer Islands Protected Area Project.
sey_private_islands	Private islands were identified and a 1 km buffer created around each island	This report (Klaus 2015) for Fregate GIF provided shapefiles of the proposed boundaries for North and Denis Island
sey_aldabra_extension	A 1 km buffer was created around the existing protected area	This report (Klaus 2015)
sey_darros_proposed	GIS shapefile	GoS-MEE
sey_cousin_proposed	A 1 km buffer was created around the island	This report (Klaus 2015)
sey_iba_all_existing	Online map of Important Bird Areas (IBA)	Digitised from BirdLife International website. http:// www.birdlife.org/
sey_iba_seabirds_proposed	GIS shapefile of Seabird Important Bird Areas (IBA) modified.	Seabird IBAs proposed by Lascelles et al. (2014)
sey_kbas_all	GIS shapefile of Key Biodiversity Areas (KBAs). The unmapped KBAs were added to complete the dataset.	Senterre et al. (2013)
sey_wiomer_all	Report *.pdf	Expert identified areas of conservation opportunity (e.g. WIOMER Strategy) (COI 2012)
sey_ebsa_all	Report *.pdf GIS shapefile	Report on Ecologically and Biologically Significant Areas (EBSAs) (CBD 2013) and GIS data provided by Piers Dustan.
oil and gas exclusion zone	GIS shapefiles	Petroseychelles

4.6.2 Process

Areas representing good opportunities identified for use in the model were processed as follows:

- *Proposed protected area:* The boundaries for previously proposed protected areas were compiled. These included the boundaries of the areas proposed in the Cabinet Memo from 2011, the areas proposed for protection through the new UNDP-GEF Outer Islands project, the proposed extension for Aldabra, D'Arros and St Joesphs Atolls, and Cousin.
- *Private Islands:* Areas under the control of another entity or authority, which may have a biodiversity benefit due to the exclusion of activities were also identified and mapped. These included the private islands of Denis, North, and Fregate.
- *Fisheries Exclusion Areas:* The Seychelles Fisheries Act includes the boundaries of areas that are designated as exclusion zones for industrial fisheries (purse-seine and longliners). These fisheries exclusion zones are being managed for fisheries.
- *Important Bird Areas*: The Seychelles has 20 formally recognised IBAs. A data layer was created for the areas using information on each IBA from the Birdlife website.
- *Important Seabird Areas*: As part of the UNDP-GEF PA Project, Ben Lascalles prepared a data layer illustrating the proposed distribution of important seabird areas for Seychelles (Lascelles 2014).
- *Co-management areas:* The Praslin fisheries co-management area was digitised using the boundary coordinates and a jpeg map provided by SFA.
- *WIOMER Priority Areas:* The WIOMER Marine Ecoregional Planning process was led by WWF, with support from a project with the Indian Ocean Commission (COI). The process developed a strategy and proposed a Vision, and 51 marine priority seacapes and sites of specific importance and 7 key initiatives for regional action (2010 to 2015). The priority area process identified 15 priority areas within Seychelles waters for protection (Table 16).
- *EBSAs*: The Secretariat for the Convention on Biological Diversity led a process in the southern Indian Ocean to identify Ecologically and Biologically Significant Areas (EBSAs). Through this process, three areas were identified that included part of the Seychelles EEZ (Table 17).

The individual opportunities once mapped were ranked as a strong opportunity (3), moderate opportunity (2) or weak opportunity (1). ArcMap Zonal statistics was then used to calculate the average value per planning unit.

Table 16 WIOMER priority areas that were identified for Seychelles (WWF 2012)

No	Significance	Name
1	Transnational	Marine conservation area
2	Deepwater priority	Northern Mozambique Channel
3	Deepwater priority	Somalian Upwelling
4	Global	North Seychelles Deep Ocean Basin
5	Global	Mahe Plateau
6	Global	Amirantes Ridge
7	Global	Coco de mer seamount
8	Global	Aldabra
9	Global	Cosmoledo
10	Regional	Astove
10	Global	Providence ocean ridge and plateau
11	Subregional	Farqhuar
12	Global	Alphonse
13	Global	Saya de Malha

Table 17 EBSA priority areas that were identified for Seychelles (CBD 2012)[7]

Area	Title	Abstract
24	Northern Mozambique Channel	The Northern Mozambique Channel can be presented as a homogeneous ecological biogeographic sub-unit characterized by a strong dynamic of gyres and eddies contributing to the high connectivity between islands. The current pattern linked to

[7] https://www.cbd.int/doc/?meeting=EBSA-SIO-01

		these eddies and gyres dynamics has led to the highest concentration of biodiversity in this area of the WIO, also considered as the Coral Triangle of the WIO.
29	Mahe, Alphonse and Amirantes Plateau	The Mahe, Alphonse and Amirantes Plateau is an area of high diversity. It is a breeding, feeding and nursery area for cetaceans and provides migratory paths for these species, with important feeding sites for pelagic fish, especially tuna and shark species. Coral reefs and mangroves are characteristic of this area, providing important sites for fish spawning and nurseries, while mangroves help in reducing sedimentation and runoff to coral reefs. The plateau assists in the conservation of seabirds through provision of breeding and feeding sites. Important nesting sites for green and hawksbill turtles are found here. This area has been described as one of the most important areas of primary productivity in the Western Indian Ocean
32	Saya de Malha Bank	The Saya de Malha Bank is the largest of three shallow banks forming the Mascarene Plateau,, located in the Western Indian Ocean along the underwater Mascarene Ridge that spans the distance between the Seychelles and Mauritius. The Mascarene Plateau, being remote, with emergent land and small islands only at its southern extreme, is not yet well-known globally, or well-studied, but there are strong indications of unique oceanographic features and habitats, including the largest seagrass beds and shallow-water biotope in the world, species endemism and significant aggregations of marine mammals and seabirds. Mauritius and the Seychelles have individual or joint jurisdiction over the waters and entire seabed of the plateau, though the waters over the Saya de Malha Bank are beyond national jurisdiction in the high seas

4.6.3 Outputs

The data layers listed above were used to create an opportunity data layer. The data was re-scaled 0 to 10.

Table 18: List of output datasets prepared for the mapping of opportunities

Data layer prepared	Data type received	Source
sey_opportunities	GIS shapefile	Sum score for all the above listed opportunities.

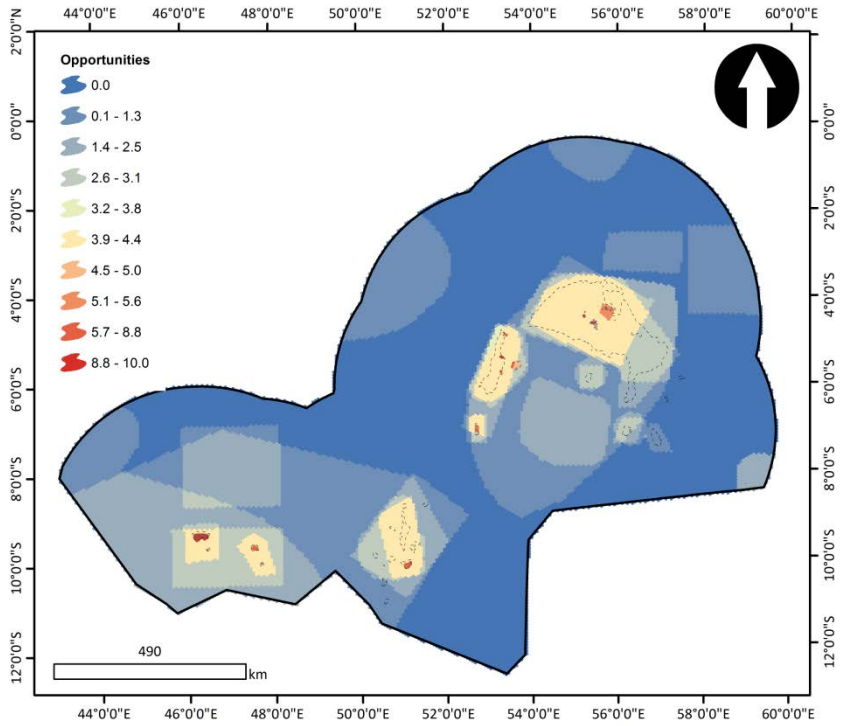


Figure 24: Map of opportunities rescaled 0 to 10.

4.7 MAPPING OF CONSTRAINTS

4.7.1 Scope

Constraints are areas where there are existing human resource uses or areas that have been proposed for a different use in the future (e.g those that have been earmarked for residential or infrastructure development, or areas where developments have already been approved, or where other factors may reduce potential for effective conservation actions). Various constraints were identified in relation to fisheries, aquaculture, oil and gas development, shipping, and land uses as listed in .

Table 19.

Table 19: List of data sources used for the mapping of constraints

Data type	Data type received	Source
Land use including urban areas	GIS shapefile	GoS-MLUH
Areas with low conservation value (e.g. reclaim)	GIS shapefile	GoS-MLUH
Oil and gas concession areas	GIS shapefile	Petroseychelles
Areas proposed aquaculture development	GIS shapefile	SFA
Fisheries	GIS shapefile	SFA

4.7.2 Process

The individual constraints once mapped were ranked as (3) strong, (2) moderate and (1) weak constraints. The individual data layers were then summed together to produce a final data layer that was rescaled 0 to 10.

4.7.3 Outputs

The data layers listed above were used to create a constraints data layer as illustrated in Figure 25.

Table 20: List of output datasets prepared for the mapping of opportunities

Data layer prepared	Data type received	Source
sey_constraints	GIS shapefile	Sum score for all the above listed opportunities.

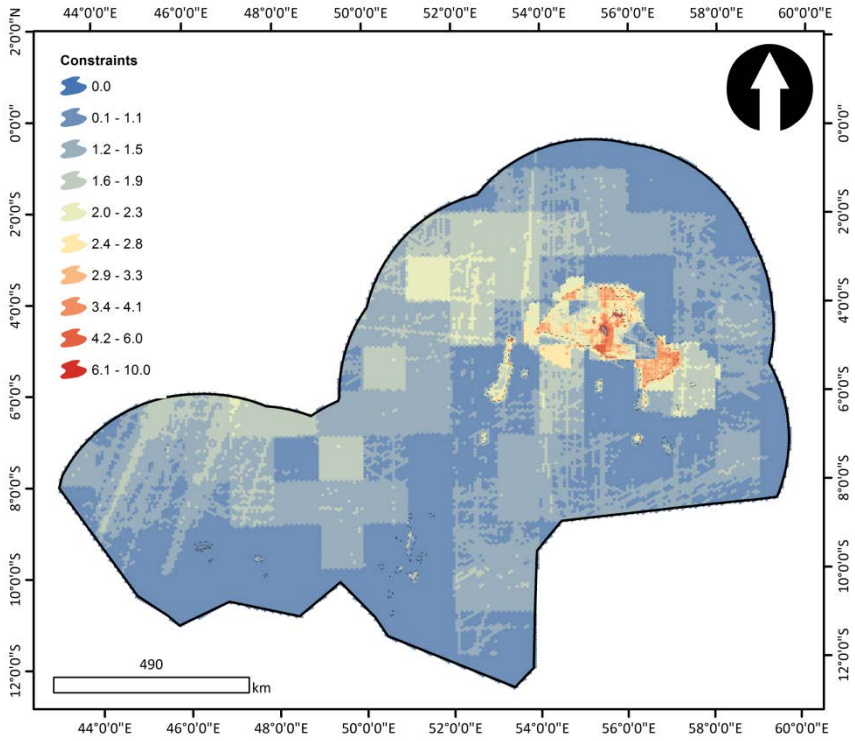


Figure 25: Maps showing constraints rescaled 0 to 10.

4.8 DEVELOPMENT OF COSTS SURFACES

4.8.1 Scope

Cost surfaces are used in the spatial prioritisation process to help guide the MARXAN selection algorithm towards meeting conservation objectives while still minimising the potential economic impacts.

4.8.2 Data Sources

The habitat condition data layer and the opportunity and constraints data layers were used in combination to construct the 'cost' surfaces for use in the spatial prioritisation process.

4.8.3 Process

Seven different cost layers were prepared to represent the potential 'cost' of including additional areas in the Protected Area network.

For the first cost layer (scenario 01), the cost of all the planning units was set as being equal to 1. This is the simplest cost layer, as it represents the cost in terms of the number of planning units, without regard for any other potential socio-economic activities that might be occuring within the same planning unit. The mapping of the 'cost' for this data layer was achieved using the following equations:

- Cost for Scenario 01 = [all planning units equal 1]

For the second cost layer (scenario 02), the cost of the planning units was set using the "threat" data derived by Maina et al. (2008). This dataset was originally developed to represent the relative susceptibility of coral communities to coral bleaching as a result of climate induced thermal stress, under future climate change scenarios. The data was prepared using the weighted combination of nine different satellite-derived environmental variables for the entire WIO region, and areas that are more susceptible to future climate change related impacts have higher values. For this purpose, higher value areas were considered to be more costly or risky additions to the protected area network, as there would be a greater likelihood of the area being impacted by climate related stresses in the near future. The suite of stressors represented in this dataset will likely to result in changes in other aspects of the broader marine environment besides affecting coral bleaching. So in this context, this "threat" data layer was used as a proxy to represent the potential impact of climate change related stress on the general marine environment. The mapping of the 'cost' for this data layer was achieved using the following equations:

- Cost for Scenario 02 = [Threat layer as per Maina et al (2008)]

The next two cost data layers were fisheries specific, developed to illustrate how protected area expansion may interact with a trade off against the fisheries (scenario 03 and 04). In the first of these, the cost was the summation of all the different types of small-scale fisheries (scenario 03). In the second of these fisheries specific cost layers, the cost was a summation of the costs associated with the industrial and semi-industrial fishing (scenario 04). The mapping of the 'cost' for these data layers was achieved using the following equations:

- Cost for Scenario 03 = [all small-scale fisheries data layers]
- Cost for Scenario 04 = [industrial purse seine + longline + semi-industrial long line]

The fifth cost layer (Scenario 05) was constructed using a combination of the habitat condition layer, the opportunity and the the industrial fisheries contraint data layers as used in Scenario 04. The mapping of the cost for this scenario was achieved using the following equations:

- Cost for Scenario 05 = [Condition modifier x ((industrial purse seine + longline + semi-industrial long line) x 10) - Opportunities modifier]

The sixth cost layer (scenario 06) was constructed using a combination of the habitat condition layer, the opportunity and the total constraints layers. The mapping of the total 'cost' for scenario was achieved using the following equations:

- Cost for Scenario 06 = [(Condition modifier x Constraints modifier)– Opportunities modifier].

The seventh cost layer (scenario 07) combined the "threat" cost layer (used in scenario 02) with the total costs calculation scenario 06). The mapping of the 'cost' for this data layer was achieved using the following equations:

- Cost for Scenario 07 = [(Threat layer as per Maina et al (2008) x 10) + (Condition modifier x Constraints modifier)-Opportunities modifier]

Table 21: List of data outputs created for costs

Dataset	Data type	Source / Reference
Cost01	GIS shapefile / pu_layer	This report (Klaus 2015)
Cost02	GIS shapefile / pu_layer	Maina et al. (2008)
Cost03	GIS shapefile / pu_layer	This report (Klaus 2015)
Cost04	GIS shapefile / pu_layer	This report (Klaus 2015)
Cost05	GIS shapefile / pu_layer	This report (Klaus 2015)
Cost06	GIS shapefile / pu_layer	This report (Klaus 2015)
Cost07	GIS shapefile / pu_layer	This report (Klaus 2015) and Maina et al. (2008)

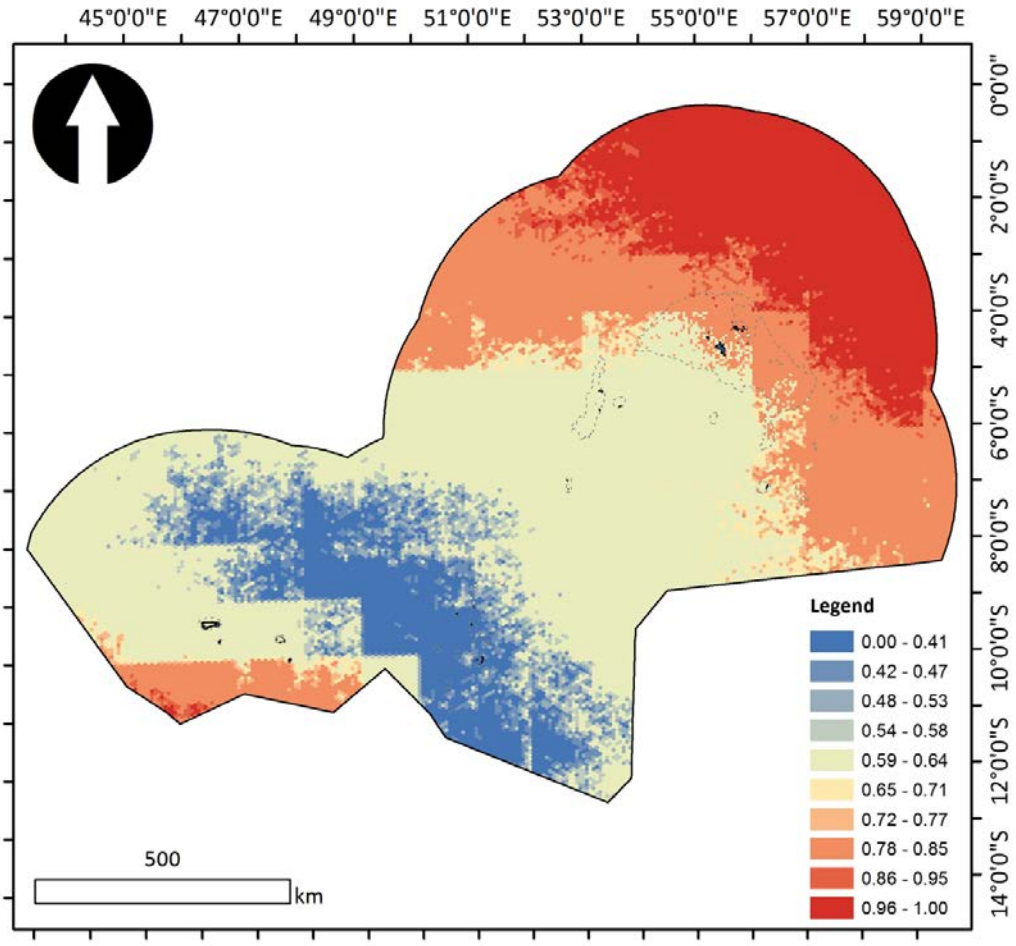


Figure 26: Map showing the threat data layer (Maina et al 2008).

4.9 DATA QUALITY

The datasets prepared for use in the SEY-SCP process were based upon the best available data at the time the study was completed. With GIS derived datasets there are always some errors and plenty of scope to improve and refine the data inputs as new datasets become available. Future iterations could also incorporate additional datasets derived from ecological niche-based species distribution modelling for example.

5 SYSTEMATIC CONSERVATION PLANNING PROCESS

The derived data layers were used to conduct a systematic conservation assessment for the Seychelles EEZ. The systematic conservation assessment involved three main analyses, that used these data layer as detailed in the Table 22 below and included: an assessment of ecosystem protection, ecosystem threat, followed by the spatial prioritisation process, using Marxan.

Table 22: Summary of the major data categories included in each of the three primary analyses

	Protection	Threat	Prioritisation
Habitats	●	●	●
Protected Areas	●		●
Condition		●	●
Species			●
Processes			●
Opportunities and constraints			●

5.1 ASSESSMENT OF ECOSYSTEM PROTECTION LEVEL

The map of habitats and protected areas were used in combination to evaluate the current coverage of different habitat types within the existing protected area network. This analysis goes beyond stating overall percentages of land or sea area that are protected, and examines the habitat representativeness achieved within the existing network at an ecosystem wide level. For this purpose, *protected* means those areas that are formally proclaimed or declared, and have a formal legal status, even if they are not effectively enforced.

At present, the current legally declared protected areas within the Seychelles cover a total of 216 km^2 of the 465.5 km^2 of land area, which is equivalent to a total of 46.43% coverage, and 387.8 km^2 of the 1,351,207.8 km^2 of sea, which is <1% of the total EEZ, as calculated using the GIS (Table 23 and Table 24).

The representativeness of habitat coverage within the existing protected areas was calculated and classified using the scheme in Table 25, in the GIS[8]. If more than 90% of a habitat was within an existing protected area, the habitat type was considered to be 'Well protected'. Conversely, if the habitat type did not occur in any protected area or if the coverage was less than 5%, the ecosystem was considered 'Not protected'.

The results of the assessment and the proportion of each habitat type that is protected within the terrestrial and marine network are presented in Table 26 and Table 27 respectively.

Only one of the terrestrial habitat types qualified as being 'Well Protected' whereby more than >90% of the island type is protected. All other types are either 'Not protected' (<5%) or 'Poorly protected' (5-49%) (Table 26). The only 'Well Protected' terrestrial habitat type was the raised limestone atolls i.e. Aldabra. The 'Poorly protected' islands includes all islands in the Amirantes, including the sand cay islands, the sand cay islands with phosphatic limestone and the main granitic islands.

If this analysis were to only consider the protected areas that are under active management then only the raised limestone atolls would qualify as being 'Well protected'.

The results of this assessment in the marine realm revealed that none of the 40 marine habitat types would qualify as being "Well protected", one habitat would qualify as 'Moderately protected' (50-90%), ,and five habitat types would be considered to be 'Poorly protected' (5-49%), while the rest are 'Not protected' (<5%).

If this analysis were to only consider the protected areas that are under active management then the 'Poorly protected' areas would not be included.

In summary, the current protected area network in Seychelles can be characterised as follows: (i) the network covers considerably more land than sea area (Table 24); (ii) The existing protected areas on both the land and sea are generally small (Table 23); (iii) There is a large number of the legally declared areas that are not currently managed (Table 24) and; (iv) the protected areas are not representative of the diversity of either marine or terrestrial habitats (Table 26) and (Table 27).

[8] All the data compiled for the purposes of the SEY-SCP analysis when they were transferred into the GIS needed to be reprojected into one standard equal-area projection for use in the analyses.

The results of the protected area assessment show that there is a severe lack of representation in the existing terrestrial and marine protected area estate in Seychelles. Only two out of the 55 habitats mapped qualified as being 'Well protected' (>90%), both of which are terrestrial, one marine habitat qualifies as being 'Moderately protected' (50-90%), and ten habitats both terrestrial and marine were considered to be 'Poorly protected' (5-49%), which means that there are 42 habitats that are currently 'Not protected' (<5%).

Table 23: Mean size of existing terrestrial and marine protected areas in Seychelles

		Area	Area GIS (UTM40S)	
		(km^2)	(km^2)	(ha)
Marine	Mean	25.0	27.2	2,721.44
	SE	18.6	19.0	1,900.93
	Median	**1.6**	**1.7**	**174.78**
	Minimum	0.0	0.9	85.55
	Maximum	281.2	288.7	28,867.94
Terrestrial	Mean	10.4	10.4	1,036.93
	SE	7.3	7.6	755.96
	Median	**0.1**	**0.1**	**8.80**
	Minimum	0.0	0.0	0.09
	Maximum	152.6	157.7	15,767.03

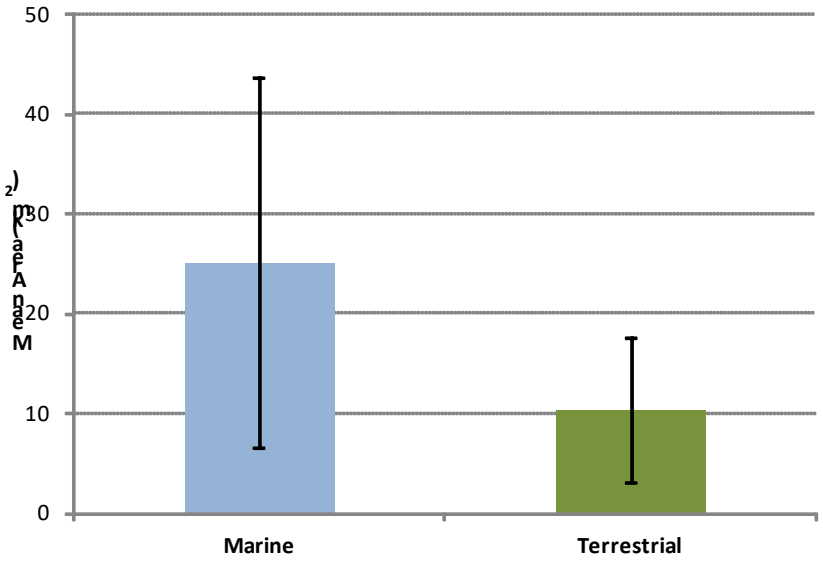


Figure 27: Mean size of terrestrial and marine protected areas in Seychelles

Table 24 The Protected Areas of the Seychelles.

N.B. There are notable differences between the 'official' area coverages stated for Seychelles and the area coverages as calculated using GIS. It is highly probable that the official area coverages given for some of these protected sites were determined before the advent of GIS and are likely to be best guess estimates (e.g. Nature Reserves are all stated as being 0.1km^2). Some of the differences may be due to uncertainties in the boundaries of the protected areas. While the best available data was used to map the protected areas in this process a thorough review of the original legislation including the maps that were submitted at the time the areas were gazetted needs to be undertaken. There may also be minor differences in the areas due to the use of the UTM40S projection used in the SEY-SCP process.

Official name	Realm	Management Authority	Authority Type	IUCN	Date	Type (Legislation)	Official Area (km^2)	GIS Area (km^2)	GIS Area (ha)
Port Launay Marine National Park	Marine	SNPA	Parastatal	II	1979	National Park[b]	0.3	1.63	163.29
Baie Ternay Marine National Park	Marine	SNPA	Parastatal	II	1979	National Park[b]	0.3	0.87	87.09
Silhouette Island Marine National Park	Marine	SNPA	Parastatal	NA	1987	National Park[b]	10	21.32	2131.84
Aride Special Reserve	Marine	ICS	NGO	1b	1975	Special Reserve[b]	0.68	0.95	95.36
Ile Cocos, Ile La Fouche, Ilot Platte	Marine	SNPA	Parastatal	II	1997	National Park[b]	0.01	0.86	85.55
Saint Anne Marine National Park	Marine	SNPA	Parastatal	II	1973	National Park[b]	14	9.65	965.41
Curieuse Marine National Park	Marine	SNPA	Parastatal	II	1979	National Park[b]	0.03	13.41	1340.74
Morne Seychellois National Park	Terrestrial	SNPA	Parastatal	II	1979	National Park[b]	31.02	31.29	3129.47
Praslin National Park (excluding VDM)	Terrestrial	SNPA	Parastatal	II	1979	National Park[b]	5.3	3.25	325.37
Valley De Mai	Terrestrial	SIF	NGO	IV	1983	Nature Reserve[a]	0.19	0.19	19.60
La Digue Special Veuve Reserve	Terrestrial	SNPA	Parastatal	1b	1980	Special Reserve[b]	0.21	0.08	7.88
Moyenne Island National Park	Terrestrial	Private	NGO	Na	2009	National Park[b]	0.09	0.088	8.80
Aldabra Atoll Special Nature Reserve	Terrestrial	SIF	NGO	1b	1981	Special Reserve[b]	152.6	157.67	15767.03
Silhouette Island National Park	Terrestrial	SNPA	Parastatal	Na	2010	National Park[b]	18.6	19.88	1988.06
La Digue (Anse Severe-Anse Gros Ros) Shell Res.	Marine	SFA	Parastatal	Na	1987	Shell Reserve[c]	1.58	1.57	157.70
Praslin (Point ZanguireûPt Chevalier) Shell Res.	Marine	SFA	Parastatal	Na	1987	Shell Reserve[c]	1.74	1.75	174.78
Mahe (North East Pt.-Carana) Shell Res.	Marine	SFA	Parastatal	Na	1987	Shell Reserve[c]	2.99	1.08	108.34
Mahe (Anse Faure-Fairy Land) Shell Res.	Marine	SFA	Parastatal	Na	1987	Shell Reserve[c]	1.08	3.35	334.47
Valley De Mai UNESCO WH	Terrestrial	SIF	NGO	IV	1983	World Heritage Site[d]	0.19	0.19	19.60
Cousin Special Nature Reserve	Terrestrial	NS	NGO	1a	1975	Nature Reserve[b]	0.29	0.29	28.91
Cousin Nature Reserve	Marine	NS	NGO	1b	1980	Special Reserve[b]	0.27	1.58	158.18

Official name	Realm	Management Authority	Authority Type	IUCN	Date	Type (Legislation)	Official Area (km^2)	GIS Area (km^2)	GIS Area (ha)
Aldabra Lagoon and surround MNP	Marine	SIF	NGO	1a	1981	Special Reserve[b]	281.2	288.68	28867.94
Africa Banks Marine	Marine	MLUH	Government	Ib	1987	Protected Area[f]	8.20	8.25	824.43
Africa Banks Terrestrial	Terrestrial	MLUH	Government	Ib	1987	Protected Area[f]	8.20	0.02	1.97
Aldabra UNESCO WH	Both	SIF	NGO	Na	1982	World Heritage Site[d]		446.35	44634.97
Aride Island Special Nature Reserve	Terrestrial	ICS	NGO	1a	1975	Special Reserve[b]	0.71	0.71	70.78
Port Launay Marine National Park	Marine	SNPA	Parastatal	Na	2007	RAMSAR [e]	0.3	1.63	163.29
Aldabra Lagoon and surround MNP	Marine	SIF	NGO	Na	2010	RAMSAR [e]	281.2	288.68	28867.94
Mare Aux Cochons	Terrestrial	DoE	Government	Na	2010	RAMSAR [e]	0.05	0.003	0.32
La Plaine Hollandaise	Terrestrial	DoE	Government	Na	2010	RAMSAR [e]	0.05	0.036	3.61
Recif Island National Park	Terrestrial	SNPA	Government	Na	2010	National Park[b]	0.1	0.13	13.49
Etoile	Terrestrial	DoE	Government	IV	1966	Nature Reserve[a]	0.1	0.0009	0.090
Boudeuse	Terrestrial	DoE	Government	IV	1966	Nature Reserve[a]	0.1	0.015	1.55
Les Mammelles	Terrestrial	DoE	Government	IV	1966	Nature Reserve[a]	0.1	0.059	5.94
Ile Vache	Terrestrial	DoE	Government	IV	1966	Nature Reserve[a]	0.1	0.0468	4.69
Beacon Island (or Ile Seche)	Terrestrial	DoE	Government	IV	1966	Nature Reserve[a]	0.1	0.02	2.16
Booby (or Ile aux Fous)	Terrestrial	DoE	Government	IV	1966	Nature Reserve[a]	0.1	0.024	2.43
King Ross (or Lamperiaire)	Terrestrial	DoE	Government	IV	1966	Nature Reserve[a]	0.1	Unknown	Unknown

a =Wild Animals and Bird Protection Act
b = National Parks and Nature Conservancy Act
c = Seychelles Fisheries Act
d = UNESCO World Heritage National Parks and Nature Conservancy Act
e = RAMSAR Convention
f = Protected Areas Act

Table 25: Protected Assessment Classes

Category	Quantity
Not protected	Zero or less than 5% of protection
Poorly protected	5-49% of protection
Moderately protected	50-99% of protection
Well protected	>90% of protection

Table 26: Land area and protected status per island type

Island type	Total Area (km^2)	Percent Total Land Area (%)	Area Protected (km^2)	Percent Protected (%)	Protection Status
Land_Shelf_platform reef_land on reef_sand cay with phosphatic sandstone	2.05	0.44	0.00	0.00	Not protected
Land_Atoll_raised_land on reef_raised limestone	172.76	37.11	158.80	91.92	Well protected
Land_Atoll_sea level_land on reef_sand cay	9.10	1.96	0.00	0.00	Not protected
Land_Atoll_sea level_land on reef_sand cay with phosphatic sandstone	3.23	0.69	0.00	0.00	Not protected
Land_Atoll_submerged_land on reef_sand cay with phosphatic sandstone	3.74	0.00	0.00	0.00	Not protected
Land_Bank_platform reef_atoll like_land on reef_sand cay	1.55	0.33	0.00	0.00	Not protected
Land_Bank_platform reef_atoll like_land on reef_sand cay with phosphatic sandstone	0.45	0.10	0.00	0.00	Not protected
Land_Bank_platform reef_infilled_land on reef_sand cay with phosphatic sandstone	13.58	2.92	0.58	4.26	Not protected
Land_Bank_platform reef_raised_land on reef_raised limestone	12.94	2.78	0.00	0.00	Not protected
Land_Bank_platform reef_rock base_land on reef_raised limestone	0.41	0.09	0.02	3.77	Not protected
Land_Bank_platform reef_rock base_land on reef_sand cay with phosphatic sandstone	0.55	0.12	0.00	0.00	Not protected
Land_Bank_platform reef_sand cay_land on reef_sand cay	0.01	0.00	0.00	11.70	Poorly protected
Land_Bank_platform reef_sand cay_land on reef_sand cay with phosphatic sandstone	0.27	0.06	0.02	7.44	Poorly protected
Land_Island_land_granitic rock	236.10	50.72	56.68	24.00	Poorly protected
Land_Island_land_reclaim	8.77	1.88	0.02	0.27	Not protected
TOTAL	**465.51**		**216.12**	**46.43**	

Table 27: Marine area and protected status per habitat type

Class_name	Total Area (km2)	Percentage of EEZ	Protected Area (km²)	Percent protected	Protected
Abyss_plains	289,598.08	21.43	0.00	0.00	Not protected
Abyss_hills	469,518.01	34.75	0.00	0.00	Not protected
Abyss_mountains	167,183.13	12.37	0.00	0.00	Not protected
Canyon	36,942.21	2.73	0.00	0.00	Not protected
Guyot	10,015.27	0.74	0.00	0.00	Not protected
Seamount	54,050.86	4.00	0.00	0.00	Not protected
Rise	68,706.23	5.08	0.00	0.00	Not protected
Ridge	51,897.64	3.84	0.00	0.00	Not protected
Spreading ridge	18,272.97	1.35	0.00	0.00	Not protected
Rift Valley	7,920.93	0.59	0.00	0.00	Not protected
Terrace	1,102.96	0.08	0.00	0.00	Not protected
Trench	7,039.29	0.52	0.00	0.00	Not protected
Slope	25,026.30	1.85	0.00	0.00	Not protected
Plateau	94,122.97	6.97	0.00	0.00	Not protected
Shelf_high relief	3648.13	0.27	1.553	0.04	Not protected
Shelf_high relief_Atoll_raised_lagoon	265.27	0.02	198.38	74.78	Moderately protected
Shelf_high relief_Atoll_raised_rim	232.31	0.02	86.6	37.28	Poorly protected
Shelf_high relief_Atoll_sea level_lagoon	226.1	0.02	0.00	0.00	Not protected
Shelf_high relief_Atoll_sea level_rim	691.33	0.05	0.00	0.00	Not protected
Shelf_high relief_Atoll_submerged_lagoon	122.64	0.01	0.00	0.00	Not protected
Shelf_high relief_Atoll_submerged_rim	67.95	0.01	0.00	0.00	Not protected
Shelf_high relief_Bank_barrier complex	2,117.60	0.16	0.525	0.02	Not protected
Shelf_high relief_Bank_drowned bank	1,437.84	0.11	0.00	0.00	Not protected
Shelf_high relief_Bank_lagoon	441.00	0.03	0.00	0.00	Not protected
Shelf_high relief_Bank_patch reef complex	212.76	0.02	0.00	0.00	Not protected
Shelf_high relief_Bank_platform reef_atoll like_lagoon	14.66	0.00	5.07	34.6	Poorly protected
Shelf_high relief_Bank_platform reef_atoll like_rim	52.98	0.00	0.00	0.00	Not protected
Shelf_high relief_Bank_platform reef_infilled_rim	91.01	0.01	6.10	6.70	Poorly protected
Shelf_high relief_Bank_platform reef_raised_rim	23.13	0.00	0.00	0.00	Not protected
Shelf_high relief_Bank_platform reef_rock base_rim	18.57	0.00	7.68	41.34	Poorly protected
Shelf_high relief_Bank_platform reef_sand cay_rim	38.65	0.00	16.625	43.01	Poorly protected
Shelf_high relief_Island_fringing reef	72.45	0.01	0.00	0.00	Not protected
Shelf_high relief_Island_subtidal	478.24	0.04	16.205	3.39	Not protected
Shelf_high relief_Shelf_barrier complex	4,218.01	0.31	0.00	0.00	Not protected
Shelf_high relief_Shelf_barrier complex_reef_flat	2,855.63	0.21	0.00	0.00	Not protected
Shelf_high relief_Shelf_patch reef complex	8,316.98	0.62	6.345	0.08	Not protected
Shelf_high relief_Shelf_platform reef_sand cay_rim	134.62	0.01	0.00	0.00	Not protected
Shelf_high relief_Island_subtidal_granitic	75.95	0.01	10.24	13.48	Poorly protected
Shelf_medium relief_Bank_lagoon	1,295.30	0.10	0.00	0.00	Not protected
Shelf_medium relief_Shelf_lagoon	22,661.83	1.68	5.873	0.03	Not protected

TOTAL	**1,351,207.78**		**387.8**	**0.03**	

5.2 ASSESSMENT OF ECOSYSTEM THREAT STATUS

The assessment of ecosystem threat status aims to evaluate the degree to which habitats are still intact or degraded. The threat assessment uses the habitat condition data layer to evaluate what area of habitat remains in a natural or near-natural state. ArcMap was used to tabulate the areas of each habitat by condition (natural, degraded, transformed, or good, moderate or poor state). Each habitat type was then classified, using a system similar to that used in the IUCN Red List criteria (i.e. critically endangered, endangered, threatened, vulnerable etc.) based on the proportion of each that remained in a good condition.

For definitions of the ecosystem threat status categories:

- **Critically Endangered (CE)** habitats are those that have little of their original extent left in a natural / good condition. The majority of the habitat has been modified to such an extent that the functional value and associated species diversity has been reduced. Any further loss of these habitats should be avoided, and the remaining areas made the focus of conservation action.
- **Endangered (EN)** habitats are those areas that are close to becoming critically endangered. Any further loss of natural habitat or deterioration of condition in these habitats types should be avoided, and the remaining healthy examples should be the focus of conservation action.
- **Vulnerable (VU)** habitats are those that still have the majority their original extent in a natural / good condition, despite some loss or deterioration in condition. These habitats are likely to have lost some of their functional value and are at risk of losing some of their associated biodiversity.
- **Least Concern (LC)** habitats are those that have experienced little or no loss of natural habitat or deterioration in condition.

The proportion of each habitat type in a natural / good condition was then evaluated against a series of thresholds to determine the threat status for each habitat as shown in Table 28:

- The first of the thresholds that was used to set the cut-off for 'Critically Endangered' habitats was the CBD biodiversity target of 17% on land and 10% in the sea. The portion of natural/ good habitat was evaluated against this threshold, and those with less coveage, were classified as 'Critically Endangered'.
- The second threshold was set at the initial target plus 20% (i.e. 37% on the land and 30% in the sea). This was the cut-off point used to classify 'Endangered' habitats. The remaining portion of natural / good habitat was evaluated against this threshold, and those habitats with less than this threshold were classified as 'Endangered'.
- The third threshold that was used to set the cut off for 'Vulnerable' was 50% for both the land and sea. The remaining portion of natural / good habitat was evaluated against this threshold, and habitat types with less than this threshold were classified as 'Vulnerable'.
- The fourth threshold that was used to set the cut-off for 'Least Concern' habitats was those where there was >50% of the habitat that remained in natural/good condition.

The results of the threat assessment are shown in Table 29. According to the threat assessment all land habitats are classified as 'Critically Endangered' with the exception of raised atolls (Table 29). The results of the threat assessment for marine habitats shows more variability. The abyssall habitats for example were all classified as being of 'Least concern' in terms of threat.

The results of the threat assessment were also compared to the outcomes of 2nd SEY-SCP Workshop, during which stakeholders selected the priority habitats in need of greater protection and set habitat specific targets.

Habitat types that were identified as being of 'Least Concern' through this assessment, such as seamounts, drowned banks, and the trench, which are known to support high biodiversity were included as a high priority in the analysis as they had been identified as important by stakeholders.

Table 28 Thresholds used to define the threat status for the different habitat types on land and in the sea

Realm	Critically Endangered	Endangered	Vulnerable	Least Concern
Land	0 to 17%	18% to 37%	38% to 50%	>50%
Sea	0 to 10%	11 to 30%	30% to 50%	>50%

Table 29: Threat status of the different marine and terrestrial habitat types, showing the habitat type, the percentage of each habitat that was in 'natural / good', 'degraded / moderate' and 'transformed / poor' condition and threat status.

Habitat type	Natural / Good	Degraded /Moderate	Transformed / Poor	Threat Status
Abyss_plains	93.24	6.76	0.00	Least Concern
Abyss_hills	91.78	8.22	0.00	Least Concern
Abyss_mountains	90.67	9.33	0.00	Least Concern
Canyon	**82.49**	**17.51**	**0.00**	**Vulnerable**
Guyot	**84.24**	**15.76**	**0.00**	**Vulnerable**
Seamount	**91.64**	**8.36**	**0.00**	**Least Concern**
Rise	83.96	16.04	0.00	Vulnerable
Ridge	79.77	20.23	0.00	Endangered
Spreading ridge	96.52	3.48	0.00	Least Concern
Rift Valley	98.28	1.72	0.00	Least Concern
Terrace	65.75	34.25	0.00	Endangered
Trench	**90.93**	**9.07**	**0.00**	**Least Concern**
Slope	**73.14**	**26.86**	**0.00**	**Endangered**
Plateau	**77.03**	**22.97**	**0.00**	**Endangered**
Shelf_high relief	81.19	18.81	0.00	Vulnerable
Shelf_high relief_Atoll_raised_lagoon	99.97	0.03	0.00	Least Concern
Shelf_high relief_Atoll_raised_rim	97.54	2.46	0.00	Least Concern
Shelf_high relief_Atoll_sea level_lagoon	90.47	9.53	0.00	Least Concern
Shelf_high relief_Atoll_sea level_rim	83.12	16.88	0.00	Vulnerable
Shelf_high relief_Atoll_submerged_lagoon	73.88	26.12	0.00	Vulnerable
Shelf_high relief_Atoll_submerged_rim	64.94	35.06	0.00	Endangered
Shelf_high relief_Bank_barrier complex	49.56	50.44	0.00	Critically Endangered
Shelf_high relief_Bank_drowned bank	98.97	1.03	0.00	Least Concern
Shelf_high relief_Bank_lagoon	55.52	44.48	0.00	Endangered
Shelf_high relief_Bank_patch reef complex	70.92	29.08	0.00	Critically Endangered
Shelf_high relief_Bank_platform reef_atoll like_lagoon	0.80	99.20	0.00	Critically Endangered
Shelf_high relief_Bank_platform reef_atoll like_rim	21.21	78.79	0.00	Critically Endangered
Shelf_high relief_Bank_platform reef_infilled_rim	22.46	77.54	0.00	Critically Endangered
Shelf_high relief_Bank_platform reef_raised_rim	99.78	0.22	0.00	Least Concern
Shelf_high relief_Bank_platform reef_rock base_rim	16.62	83.38	0.00	Critically Endangered
Shelf_high relief_Bank_platform reef_sand cay_rim	46.40	53.60	0.00	Critically Endangered
Shelf_high relief_Island_fringing reef	0.33	9.35	90.32	Critically Endangered
Shelf_high relief_Island_subtidal	0.04	61.15	38.82	Critically Endangered
Shelf_high relief_Shelf_barrier complex	66.63	33.37	0.00	Endangered
Shelf_high relief_Shelf_barrier complex_reef_flat	68.09	31.91	0.00	Endangered
Shelf_high relief_Shelf_patch reef complex	29.09	70.14	0.76	Critically Endangered
Shelf_high relief_Shelf_platform reef_sand cay_rim	38.65	61.35	0.00	Critically Endangered
Shelf_high relief_Island_subtidal_granitic	0.83	86.93	12.24	Critically Endangered

Shelf_medium relief_Bank_lagoon	84.17	15.83	0.00	Vulnerable
Shelf_medium relief_Shelf_lagoon	45.67	54.32	0.02	Critically Endangered
Land_Shelf_platform reef_land on reef_sand cay with phosphatic sandstone	21.21	57.94	20.85	Critically Endangered
Land_Atoll_raised_land on reef_raised limestone	90.55	9.40	0.05	Least Concern
Land_Atoll_sea level_land on reef_sand cay	9.13	88.10	2.77	Critically Endangered
Land_Atoll_sea level_land on reef_sand cay with phosphatic sandstone	0.70	84.57	14.73	Critically Endangered
Land_Atoll_submerged_land on reef_sand cay with phosphatic sandstone	0.00	82.72	17.28	Critically Endangered
Land_Bank_platform reef_atoll like_land on reef_sand cay	13.16	86.84	0.00	Critically Endangered
Land_Bank_platform reef_atoll like_land on reef_sand cay with phosphatic sandstone	0.00	80.11	19.89	Critically Endangered
Land_Bank_platform reef_infilled_land on reef_sand cay with phosphatic sandstone	0.22	68.40	31.38	Critically Endangered
Land_Bank_platform reef_raised_land on reef_raised limestone	1.53	95.84	2.63	Critically Endangered
Land_Bank_platform reef_rock base_land on reef_raised limestone	1.23	98.77	0.00	Critically Endangered
Land_Bank_platform reef_rock base_land on reef_sand cay with phosphatic sandstone	0.00	83.64	16.36	Critically Endangered
Land_Bank_platform reef_sand cay_land on reef_sand cay	0.00	100.00	0.00	Critically Endangered
Land_Bank_platform reef_sand cay_land on reef_sand cay with phosphatic sandstone	0.00	80.19	19.81	Critically Endangered
Land_Island_land_granitic rock	13.94	60.55	25.51	Critically Endangered

5.3 MARXAN SPATIAL PRIORITISATION ANALYSES

The outputs from the protection level, ecosystem threat status assessments, derived datasets representing on features of conservation concern (i.e. habitats, species and ecological processes), as well as the opportunities and constraints, and inputs from the biodiversity workshop / and other expert inputs were used to construct the Marxan model. Seven model scenarios were set up and run. The outputs from these models were then used to identify where conservation actions focused on Protected Area expansion might be prioritized in order to maximize gains and minimize potential future loss of biodiversity, as well as minimizing socio-economic impacts, costs and conflict with other human resource user groups.

5.3.1 Planning Units

The first step in constructing the Marxan model is the preparation of a planning unit layer (pu_layer) which consists of the planning units that will be used in the analyses. The construction of the pu_layer is informed by various factors including: the size of the total area or planning domain; limitations associated with the coarsest resolution of the datasets available for use; the objective of planning process and use of the outputs (e.g. a process to assist in the prioritisation of an area or the preparation of site specific zoning plans for implementation).

There are also other practical considerations in constructing the pu_layer. The use of smaller planning units allows for the development of more efficient solutions. However the size of the unit should not be finer than the available data or coarser than what might be required for management. Furthermore, while some planning

processes might demand the use of different sized or shaped units (e.g. watersheds), the use of consistently sized units helps to avoid biases in the analyses. The size of the units also affects the number of units needed to cover the planning domain. The number of units has a strong influence on both the number of possible solutions and the time required to process the data.

For the SEY-SCP process, various planning layer files were prepared to test the size and number of units needed to cover the Seychelles EEZ. The test pu_layers were prepared using QMarxan 1.8.0 Lisboa. All pu_layers had a regular hexagonal grid with the units ranging in size from 10 to 50 km^2 (Table 30). The size of planning unit considered most appropriate for use in the SEY-SCP process was 25 km^2. This planning unit layer had 55,625 units, which was deemed appropriate for the purpose.

After TNC started work in Seychelles, it was agreed that both the SEY-SCP process and the MSP process should try to use the same planning unit layer to maintain consistency between the Marxan analyses.

The planning unit layer prepared combined larger planning units over the deep water with smaller units on the continental shelf, so that the analysis would be stratified. This mixed size class planning unit layer was used for the initial analyses. There were however several challenges encountered with using this mixed planning unit file, which will be explained later.

Table 30: Comparison of planning unit layers and number of planning units

Area of unit (km^2)	Area of unit (m^2)	Number of units
1000	10,000,000	136,187
2000	20,000,000	68,301
2500	25,000,000	55,625
3000	30,000,000	45,647
4000	40,000,000	34,309
5000	50,000,000	27,400

5.3.2 Data preparation

Once the planning unit layer has been created the next step in preparing for a Marxan analysis is to prepare the datasets so that they can be summarised into one single unified dataset associated with the planning unit layer. The pre-processing and preparation of the datasets is the most time consuming part of preparing for any Marxan analysis. Both the large number of units in the mixed planning unit layer and the mixed size classes meant that data pre-processing was at least an order of magnitude longer than would have been required in using a larger more consistently sized planning unit.

5.3.3 Marxan Analysis Approach

The SEY-SCP process adopted a number of principles during the spatial prioritization:

- The assessment was designed to meet the overall goals set by the Seychelles Government commitment to protect 50% on the land and 30% of the sea with 15% no-take and with more specific targets for high priority features, while reducing conflict with other competing resource users. This was achieved through using a cost surface approach to help avoid transformed areas and favour areas where opportunities existed for conservation activities, or alternatively areas where costs for implementing conservation were lowest, while also avoiding areas with known constraints for conservation activities or where costs for implementing conservation activities would be highest.

The cost surface approach was also used to help avoid creating fragmented land / seascapes.

- The assessment aimed to meet all targets as far as possible while also avoiding transformed or poor condition areas. Natural/good condition areas were favoured by using the cost surface and by locking out transformed areas from the final analyses, as by definition these are areas where the habitat has already been lost.
- The habitat condition data and the integrated habitat map were used to identify areas of Endangered and Critically Endangered habitat, and high targets were used to force these areas into the analysis.
- Targets were set for areas with high conservation opportunity (e.g. KBAs, IBAs, EBSA and WIOMER) in order to favour selection of these areas.
- Calibration of the BLM was used to encourage the clumping of the output ando help identify contiguous blocks of high priority focus areas rather than a scatter of priority sites.
- The study utilized the protection targets for habitats as the priority focus for the analysis. Targets were also set for the range of other biodiversity features used in the planning process. These targets were set based upon the IUCN Criteria where feasible.

5.3.4 Marxan Scenarios

The analyses followed standard Marxan processes as outlined in the good practices handbook (Ardron et al. 2008). The 64-bit Marxan (version 2.4) (Ball et al. 2009) was used to map areas to meet representation targets for conservation features. The conservation features and input files were setup using the QMarxan in QGIS 1.8.0 Lisboa. The software Zonae Cognito was used to assist in the initial calibration of the Marxan input parameters prior to running Marxan. Further calibrations used an iterative approach to identify appropriate Species Penalty Factor (SPF) values and Boundary Length Modifier (BLM). The scenarios used 100 runs of 1,000,000 iterations each, and the outputs were used to define site selection frequency for the spatial prioritization.

Various trial scenarios were tested in preparation for the final runs as presented below. These trials included 126 conservation features with the 55 geomorphological habitat types, various ecological process habitats (e.g. mangroves and wetlands, turtle nesting beaches, foraging grounds for adults and juvenile green and hawksbills turtle), species data layers across six bioregions. The focus of the trials was to explore (a) the potential configurations to achieve a protected area estate with 50% coverage on the land and either a 15% or 30% coverage of the sea, (b) to test the influence of planning unit status and (c) the percentage targets.

The percentage coverage targets used for the habitats were discussed and agreed with participants at the 2nd SEY-SCP Workshop (Klaus 2014b). These targets were compared against the threat assessment results and where there was a discrepancy, the targets set at the Workshop took precedent. Targets were set against the original extent of each habitat type (hence the baseline is the extent of each habitat prior to anthropogenic impacts). The model was then run with a single target of either 15% or 30% for habitats and bioregions. Next the model was run with variable percentages for the conservation features between 15% up to 50% of under-represented priority habitats. High priority features were given a species penalty factor of 2.

The influence of status of the potential configuration of protected areas was also tested. The status of each planning unit can be set at 0 = which means the unit is available for inclusion in the model; 1= which means they act as 'seed' areas; 2 = which means they are locked into the model, which is that status used for existing protected areas and; 3 = which means the planning unit is excluded or locked out, which is the status that is used for poor / transformed areas.

The status was initially set as 0 for all areas in the first two scenarios. In the second two scenarios the existing protected areas were 'locked in' to the model, the fisheries restricted zones were included as seed areas and the poor marine areas and transformed terrestrial areas were 'locked out'. The difference between the latter two scenarios is that the percentage for the targets changed, with high priority habitats and species being allocated a high percentage.

In the final set of scenarios run under PA Project there were 190 features included in the model, as listed in Appendix 3. This final set of scenarios tested the influence of the different cost data layers (as described under section 4.7.2) on potential configuration of protected areas. The cost surfaces were used to ensure preferential selection of least transformed, high opportunity and least conflict sites.

In the base scenario (scenario 01) the cost of all planning units was set as being equal to 1. The second cost layer was constructed from the threat data set by Maina et al (2008). The next two cost data layers were fisheries specific developed to illustrate how protected area expansion may interact with a trade off against the fisheries costs (scenario 03 and 04). In the first of these, the only constraints included were those associated with small scale fisheries (scenario 03). The other cost layer considered only those costs associated with the industrial and semi-industrial fisheries (scenario 04). The fifth cost layer used a combination of the habitat condition layer, the opportunity and the the industrial and semi-industrial fisheries constraint layer (scenario 05). The sixth cost layer used a combination of the habitat condition layer, the opportunity and the the combined constraints layer (scenario 06). While the final cost layer (scenario 07) combined the habitat condition layer, the opportunity and the combined constraints layer with threat layer.

6 RESULTS

The results of a Marxan analysis includes several outputs. The two main outputs are the: (i) The 'Best Solution' which shows the best result from all of the runs i.e. when the Marxan model for any particular scenario is repeated 100 times, Marxan identifies which out the 100 was the best run or 'Best Solution' and; (ii) the 'Sum Solution' map which shows the number of times each planning unit was selected i.e. when the Marxan model for any particular scenario is repeated 100 times, the planning unit can then have a 'Sum Solution' value of 0 to 100.

The 'Sum Solution' maps which are the focus of these analyses represent the areas that Marxan has repeatedly identified as being important for meeting the targets and summarize the number of times (expressed as a percentage) that a planning unit has been included in a potential spatial configurations which meets the targets while also minimizing costs according to the parameters used in the Marxan analysis.

Table 31 shows the 'Best' and 'Sum' solution maps for the trial scenarios run using just 'threat' as the cost data layer, but with different status and target settings. The changes made to the input parameters for each set out of outputs are listed on the left hand column of these tables, including any changes made in terms of the initial status of the planning units, costs etc.

Similarly, the maps presented in

Error! Not a valid bookmark self-reference. to Table 39 maps (a to d) show: (a) the 'Best solution, (b) the 'Sum' solution, (c) the cost model. In these maps, the selection frequencies illustrated in (b) are typically highest where costs (c) are lowest. The maps (d) show the planning units that were selected most frequently, the proposed protected area boundaries based upon the 'Sum' solution maps. Each (d) map represents 30% of the sea and 50% of land, with the exception of Table 37, which illustrates 15% coverage for Scenarion 06. The

The outputs from the prioritisation process for these different scenarios on the land are fairly consistent throughout. High priority areas are identified areas on all the island types, and these areas mostly agree with KBAs identified by Senterre et al. (2013). The outputs from the prioritisation process for these different scenarios in the sea show more variation, however the (b) 'Sum' solution maps and (d) the proposed protected area boundary maps in Table 32 to Table 39, consistently highlight several large blocks of planning units that Marxan repeatedly identifies as being important to meeting the protected area targets irrespective of the cost layer being used.

For example in Scenario 01 (Table 32), selection frequency (b) is highest around the shallower continental shelf areas, with large blocks identified in the south west of the EEZ around Aldabra, Assumption, Cosmoledo and Astove. Another large block is apparent around the Farqhuar / Providence group, the Amirantes and Mahe Plateau.

In Scenario 02 (Table 33), the best solution (a), selection frequency (b), and proposed protected area maps (d) correspond closely with areas where threat (c) is lowest. In this scenario a large area in the south west, spanning between the seamounts north of Aldabra to Farqhuar and Providence is selected most frequently due to this area containing priority habitats and being an area of lower cost in terms of the potential future 'threat' of climate related stressors. Other areas that are selected frequently include areas on the ridge leading up to the Amirantes and the Mahe Plateau. Areas to the north and east of the Mahe plateau where costs in this scenario are highest are not selected as frequently.

The next two scenarios were designed to illustrate the trade-offs with regards fisheries. In Scenario 03 (Table 34) the selection frequency is highest where costs are lowest in terms of the small scale fisheries. In this scenario map (d) identifies several key areas which include: an area around Aldabra, Assumption, Cosmoledo and Farqhuar and Providence and the seamounts and guyots to the north, an area around the Amirantes. Fewer areas are selected on the Mahe Plateau and the specific areas that are selected are where costs related to small scale fisheries are lowest.

In Scenario 04 (Table 35), the selection frequency is highest where costs are lowest with respect to industrial and semi-industrial fisheries. There is a large area that extends from the south west side of the EEZ northwards grouping areas around Aldabra and Assumption, Cosmoledo and Astove and Farqhuar and Providence with the seamounts north of Aldabra. There is another grouping around the Mahe Plateau and southwards across the Saya de Malha bank, where costs related to industrial fisheries are lower.

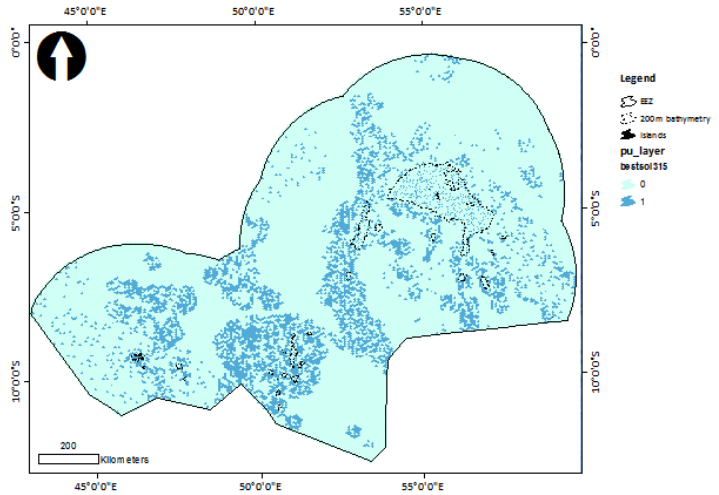
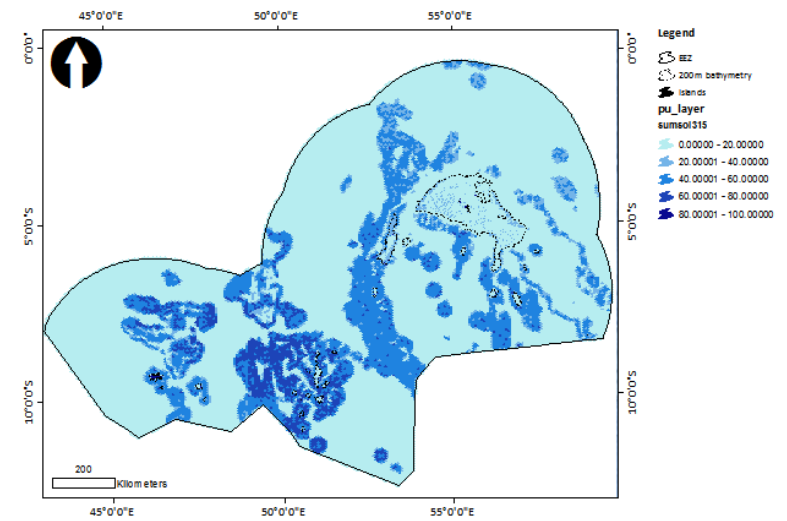
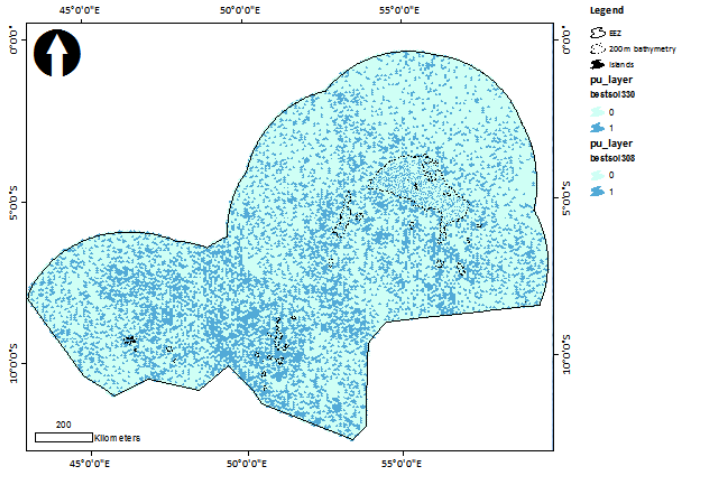
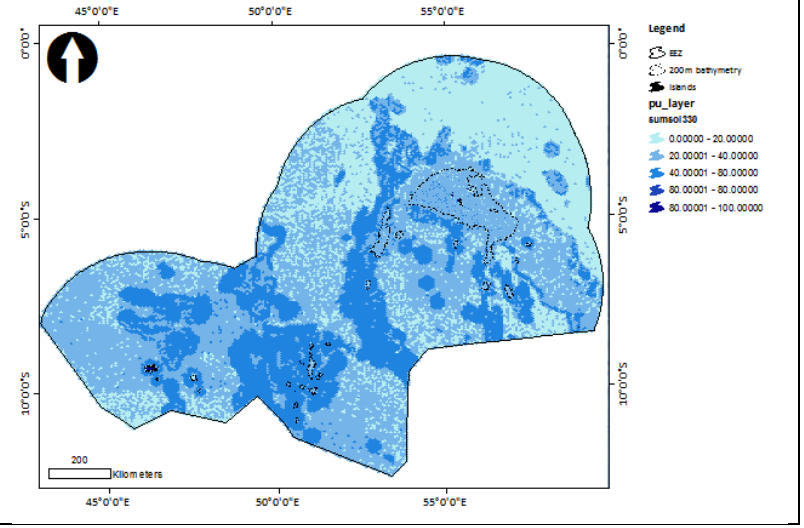
In Scenario 05 (Table 36), as with Scenario 04, the selection frequency is highest where costs are lowest with respect to industrial and semi-industrial fisheries. This scenario however also takes into consideration condition and opportunities. Compared with Scenario 04, there are smaller tighter groupings with the highest selection frequency being around Aldabra and Assumption, Farqhuar and Providence, the Amirantes and the Mahe Plateau. Individual seamounts and guyots and chains of these strutures are also highlighted.

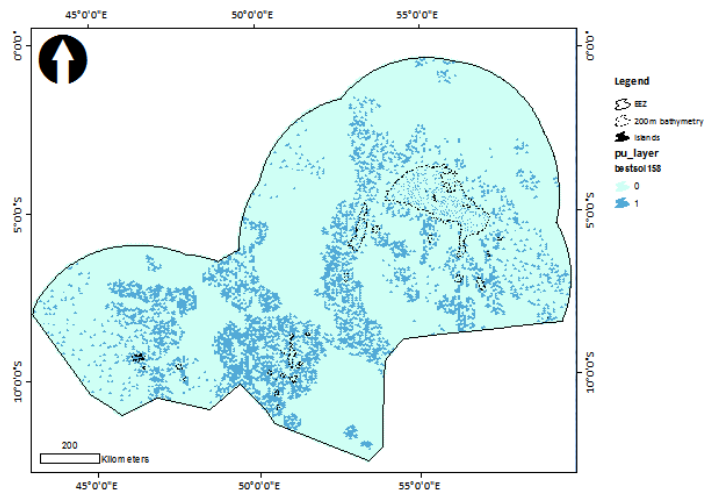
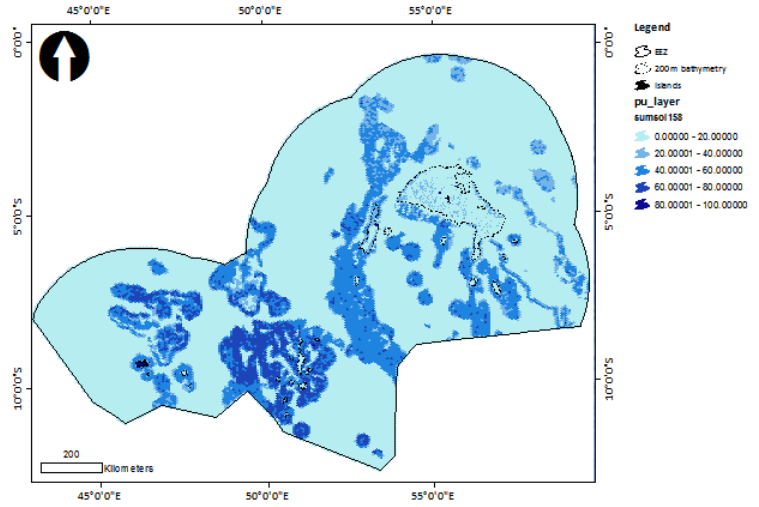
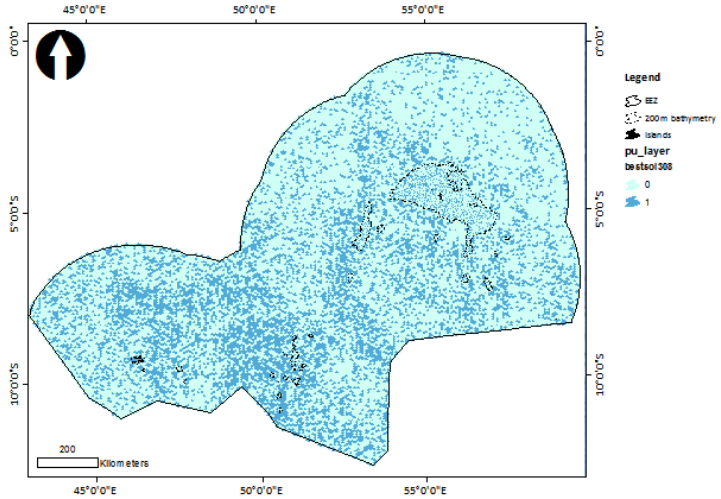
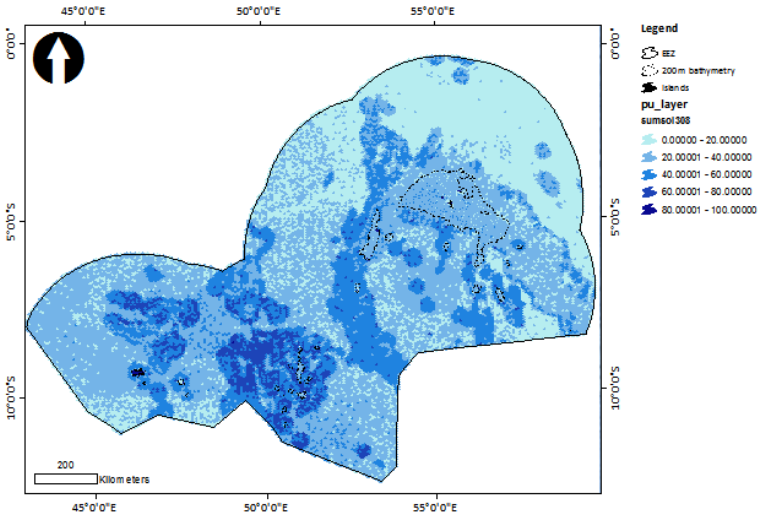
In Scenario 06 (Table 37 and Table 38) the results of full cost model, calculated using condition, opportunities and all constraints, was used to identify 30% and 15% of the sea areas respectively. The areas selected most frequently as shown in map (d) include: a grouping of the seamounts and guyots north of Aldabra with areas around Aldabra, Assumption, Cosmoledo and Astove, a grouping around Farqhuar and Providence, the Amirantes and Alphonse, the area around the Mahe Plateau, and seamounts and guyots in the central basin south of the Mahe Plateau, and a small area on the Saya de Malha Bank.

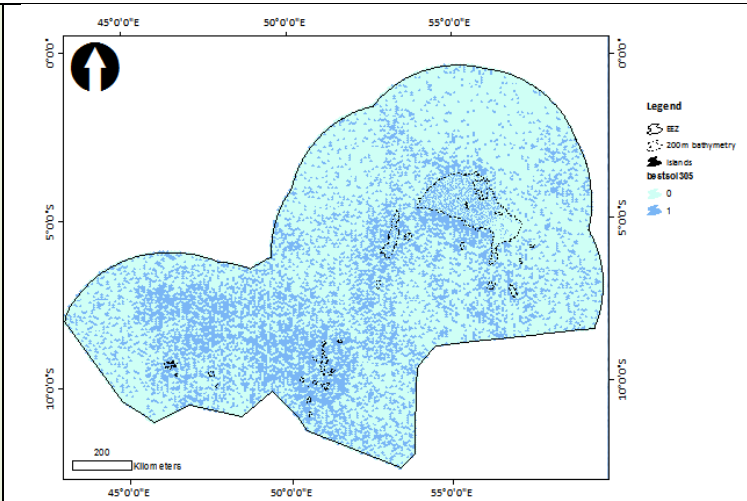
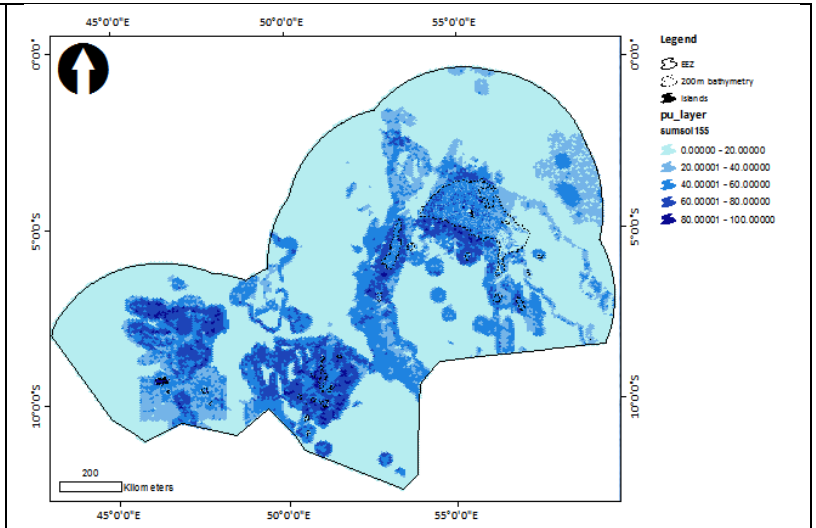
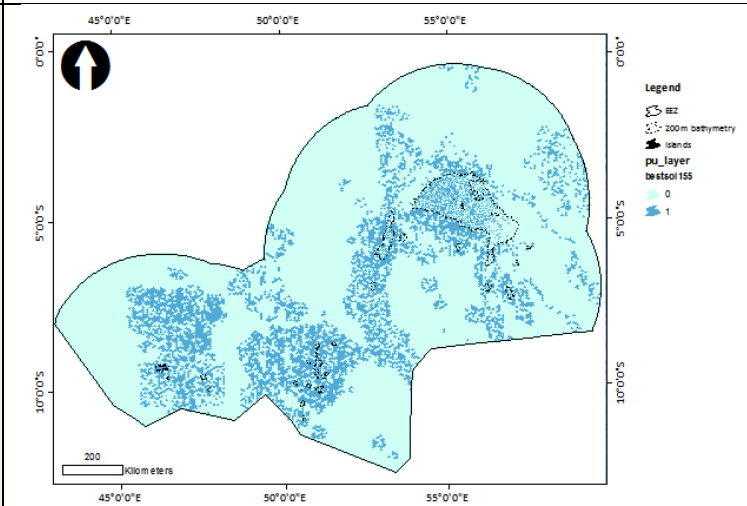
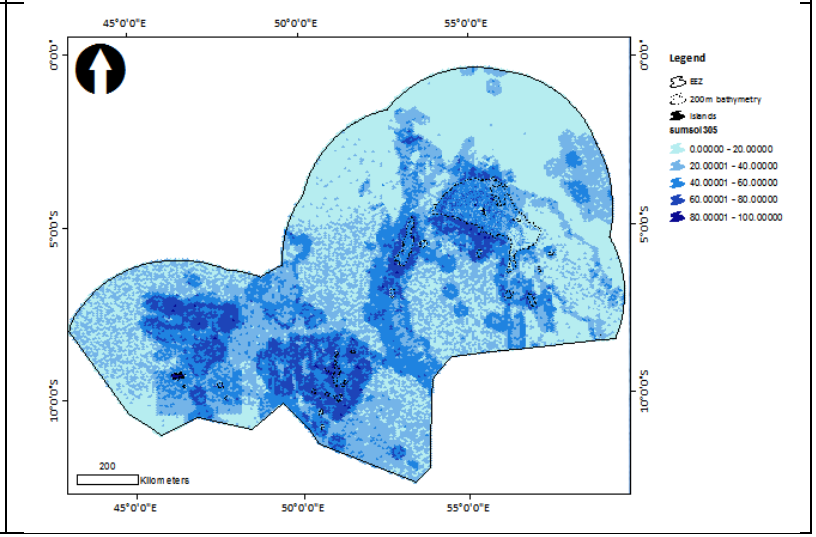
In Scenario 07 (Table 39) the selection frequency is highest where costs are lowest in terms of the full cost model that considers, condition, opportunities and constraints, together with the future threat of climate change. In this scenario map (d) identifies several key areas which include: the seamounts and guyots north of Aldabra and in the central basin, and areas around Aldadra, Farqhuar and Providence, the Amirantes, and Mahe Plateau south to the Sayha de Malha bank that are selected most frequently. Unlike Scenario 06, the seamounts to the east and north of the Mahe Plateau are not frequently selected as result of the higher cost in the north east with the inclusion of the threat layer. Also a larger area is selected on the plateau south of Mahe.

Table 32 to Table 39 illustrate the results from the seven Marxan models run with the variable costs data layers.

Table 31: Trial scenario with habitats and basic species data, where the cost is equal to "threat" as per Maina et al (2008)

Habitats and Species	Best Solution	Sum Solution
50% land, 15% sea, with 15% to 100% of high priority features. **Cost =** Threat **Locked in =** none **Seed =** none **Locked out =** none		
50% land, 30% sea, with 15% to 50% of high priority features. **Cost =** Threat **Locked in =** none **Seed =** none **Locked out =** none		

Habitats and Species	Best Solution	Sum Solution
Targets = 50% land, 15% sea, with between 15% to 50% of high priority features **Cost =** Threat **Locked in =** Protected areas (effective) **Seed =** none **Locked out** = none		
Targets = 50% land, 30% sea, with 15% of low priority features; up to 50% of high priority features. **Cost** = Threat **Locked in =** Protected areas (effective) **Seed =** none **Locked out** = none		

Targets = 50% land, 15% sea, with between 15% to 100% of features. **Cost =** Threat **Locked in =** Protected areas (effective) **Seed =** Fisheries Restricted Zones **Locked out =** Land (Transformed) and Marine (Poor) areas		
Targets = 50% land, 30% sea, with between 15% to 50% of features. **Cost =** Threat **Locked in =** Protected areas (effective) **Seed =** Fisheries Restricted Zones **Locked out =** Land (Transformed) and Marine (Poor) areas		

Error! Not a valid bookmark self-reference. to Table 39 maps (a to d) **Error! Not a valid bookmark self-reference.**show: (a) the 'Best solution, (b) the 'Sum' solution, (c) the cost model. In these maps, the selection frequencies illustrated in (b) are typically highest where costs (c) are lowest. The maps (d) show the planning units that were selected most frequently, the proposed protected area boundaries based upon the 'Sum' solution maps. Each (d) map represents 30% of the sea and 50% of land, with the exception of Table 38, which illustrates 15% coverage for Scenarion 06. The

The outputs from the prioritisation process for these different scenarios on the land are fairly consistent throughout. High priority areas are identified areas on all the island types, and these areas mostly agree with KBAs identified by Senterre et al. (2013). The outputs from the prioritisation process for these different scenarios in the sea show more variation, however the (b) 'Sum' solution maps and (d) the proposed protected area boundary maps in **Error! Not a valid bookmark self-reference.** to Table 39, consistently highlight several large blocks of planning units that Marxan repeatedly identifies as being important to meeting the protected area targets irrespective of the cost layer being used.

For example in Scenario 01 (Table 32), selection frequency (b) is highest around the shallower continental shelf areas, with large blocks identified in the south west of the EEZ around Aldabra, Assumption, Cosmoledo and Astove. Another large block is apparent around the Farqhuar / Providence group, the Amirantes and Mahe Plateau.

In Scenario 02 (Table 33**Error! Not a valid bookmark self-reference.**), the best solution (a), selection frequency (b), and proposed protected area maps (d) correspond closely with areas where threat (c) is lowest. In this scenario a large area in the south west, spanning between the seamounts north of Aldabra to Farqhuar and Providence is selected most frequently due to this area containing priority habitats and being an area of lower cost in terms of the potential future 'threat' of climate related stressors. Other areas that are selected frequently include areas on the ridge leading up to the Amirantes and the Mahe Plateau. Areas to the north and east of the Mahe plateau where costs in this scenario are highest are not selected as frequently.

The next two scenarios were designed to illustrate the trade-offs with regards fisheries. In Scenario 03 (Table 34) the selection frequency is highest where costs are lowest in terms of the small scale fisheries. In this scenario map (d) identifies several key areas which include: an area around Aldabra, Assumption, Cosmoledo and Farqhuar and Providence and the seamounts and guyots to the north, an area around the Amirantes. Fewer areas are selected on the Mahe Plateau and the specific areas that are selected are where costs related to small scale fisheries are lowest.

In Scenario 04 (Table 35), the selection frequency is highest where costs are lowest with respect to industrial and semi-industrial fisheries. There is a large area that extends from the south west side of the EEZ northwards grouping areas around Aldabra and Assumption, Cosmoledo and Astove and Farqhuar and Providence with the seamounts north of Aldabra. There is another grouping around the Mahe Plateau and southwards across the Saya de Malha bank, where costs related to industrial fisheries are lower.

In Scenario 05 (Table 36), as with Scenario 04, the selection frequency is highest where costs are lowest with respect to industrial and semi-industrial fisheries. This scenario however also takes into consideration condition and opportunities. Compared with Scenario 04, there are smaller tighter groupings with the highest selection frequency being around Aldabra and Assumption, Farqhuar and Providence, the Amirantes and the Mahe Plateau. Individual seamounts and guyots and chains of these strutures are also highlighted.

In Scenario 06 (Table 37 and Table 38) the results of full cost model, calculated using condition, opportunities and all constraints, was used to identify 30% and 15% of the sea areas respectively. The areas selected most frequently as shown in map (d) include: a grouping of the seamounts and guyots north of Aldabra with areas around Aldabra, Assumption, Cosmoledo and Astove, a grouping around Farqhuar and Providence, the Amirantes and Alphonse, the area around the Mahe Plateau, and seamounts and guyots in the central basin south of the Mahe Plateau, and a small area on the Saya de Malha Bank.

In Scenario 07 (Table 39) the selection frequency is highest where costs are lowest in terms of the full cost model that considers, condition, opportunities and constraints, together with the future threat of climate change. In this scenario map (d) identifies several key areas which include: the seamounts and guyots north of Aldabra and in the central basin, and areas around Aldadra, Farqhuar and Providence, the Amirantes, and Mahe Plateau south to the Sayha de Malha bank that are selected most frequently. Unlike Scenario 06, the seamounts to the east and north of the Mahe Plateau are not frequently selected as result of the higher cost in

the north east with the inclusion of the threat layer. Also a larger area is selected on the plateau south of Mahe.

Table 32 Total cost for Scenario 01 where cost is equal to 1 for all planning units showing (a) Best solution (b) Sum Solution (c) cost data layer and (d) proposed PA expansion.

<table>
<tr><th>Scenario 01</th><th>(a) Best Solution</th><th>(b) Sum Solution (%)</th></tr>
<tr><td rowspan="2">Targets = 50% land, 30% sea, with 15% of low priority features; up to 50% of high priority features.

Cost = 1

Locked in = none

Seed = none

Locked out = none

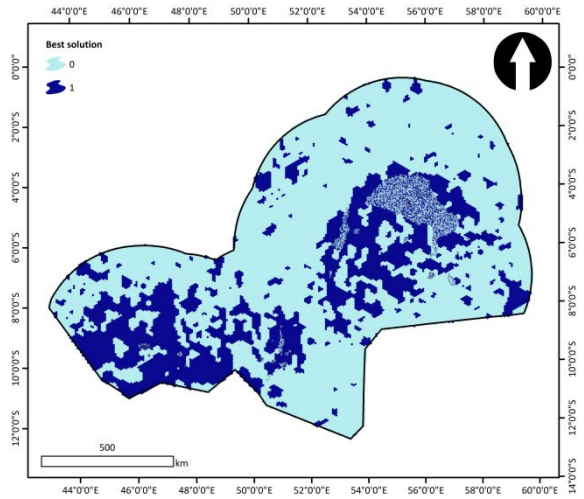
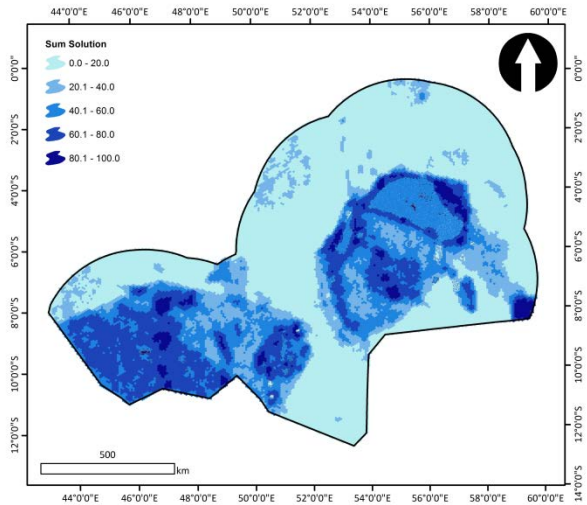
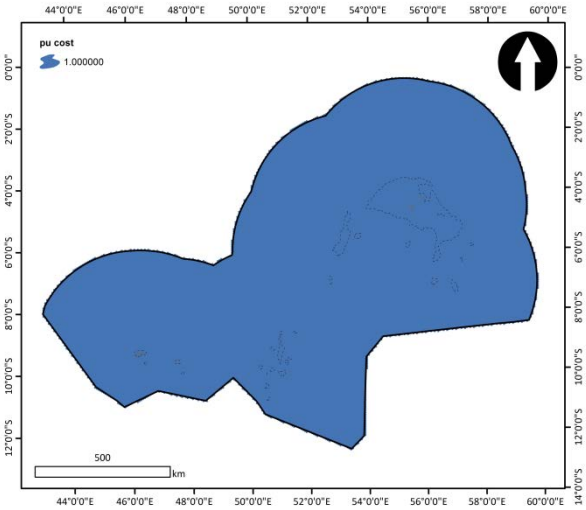
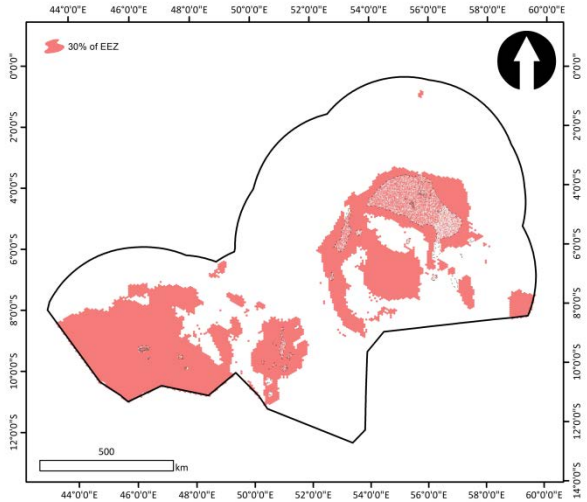
BLM = 0.0002</td><td> 
</td><td> 
</td></tr>
<tr><th>(c) Cost</th><th>(d) Proposed PA coverage 30% of the EEZ (>20% selection frequency)</th></tr>
<tr><td></td><td> 
</td><td> 
</td></tr>
</table>

Table 33 Total cost for Scenario 02 where cost is 'threat' as per Maina et al (2008) showing (a) Best solution (b) Sum Solution (c) cost data layer and (d) proposed PA expansion.

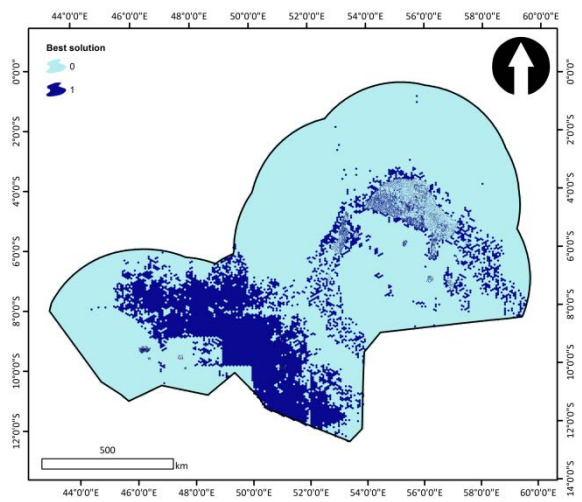
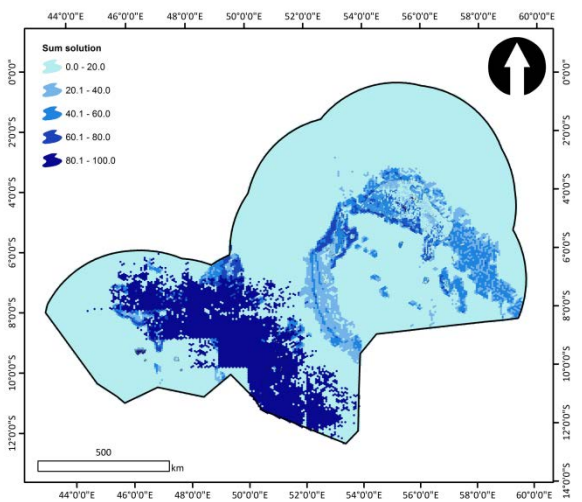
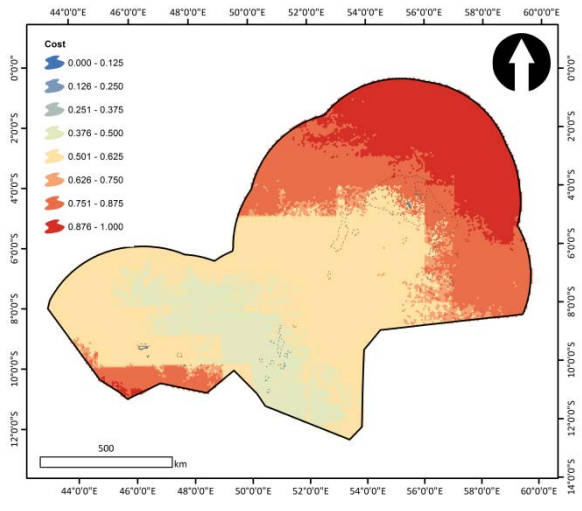
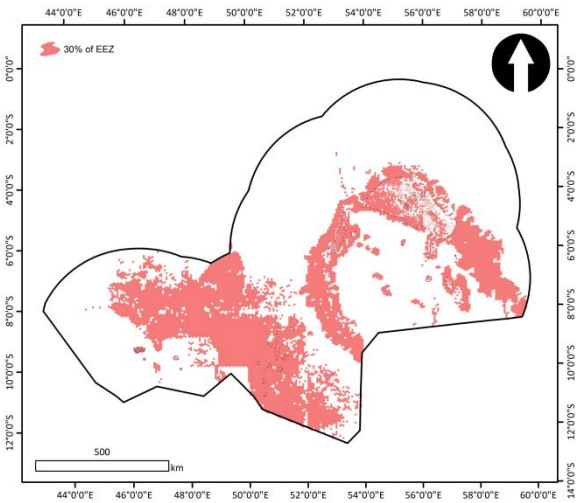
Scenario 02	(a) Best Solution	(b) Sum Solution
Targets = 50% land, 30% sea, with 15% of low priority features; up to 50% of high priority features. **Cost =** Threat **Locked in** = none **Seed =** none **Locked out** = none **BLM** = 0		
(c) Cost	**(d) Proposed PA coverage 30% of the EEZ (>20% selection frequency)**	
		

Table 34 Total cost for Scenario 03 where cost is small-scale fisheries only showing (a) Best solution (b) Sum Solution (c) cost data layer and (d) proposed PA expansion.

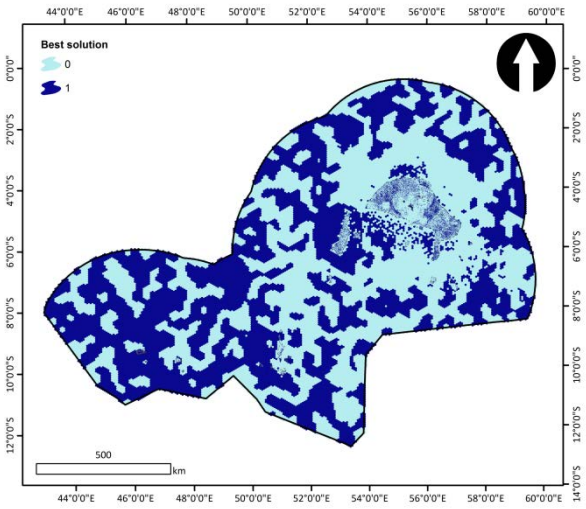
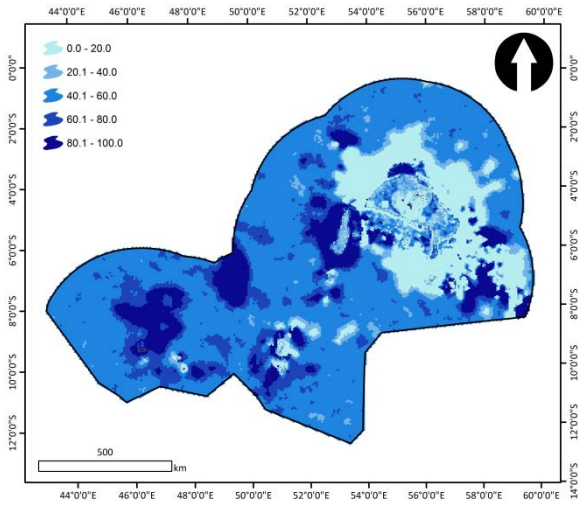
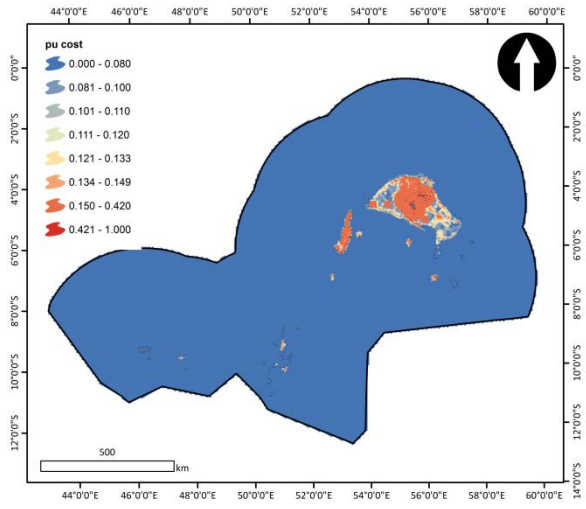
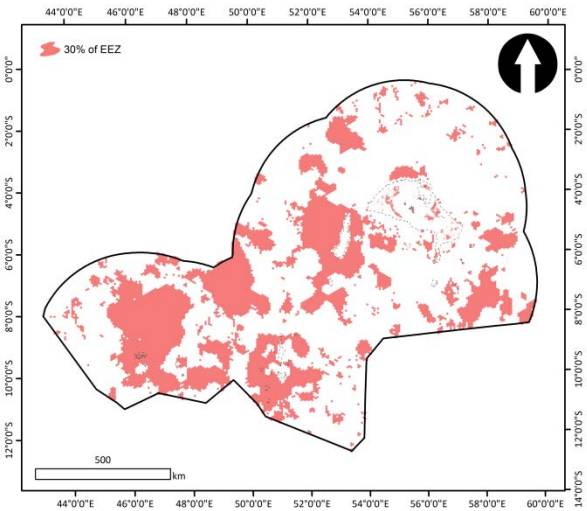
Scenario 03	(a) Best Solution	(b) Sum Solution
Targets = 50% land, 30% sea, with 15% of low priority features; up to 50% of high priority features. **Cost =** (small scale fisheries data layers) **Locked in** = none **Seed =** none **Locked out** = none **BLM** = 0.00001		
	(c) Cost	**(d) Proposed Protected Area Boundaries (>20% selection frequency)**
		

Table 35 Total cost for Scenario 04 where cost is industrial and semi-industrial fisheries only, showing (a) Best solution (b) Sum Solution (c) cost data layer and (d) proposed PA expansion

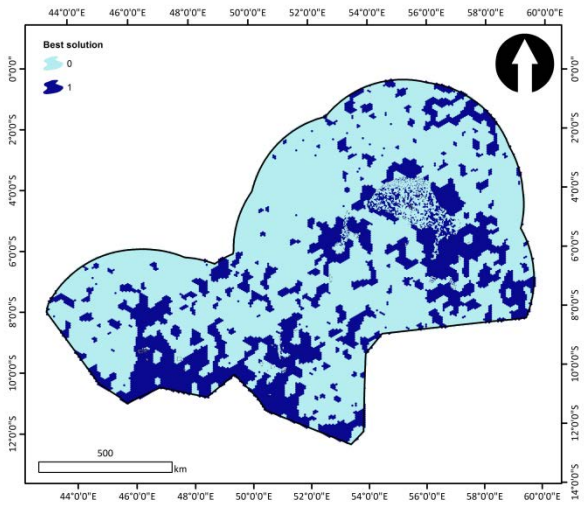
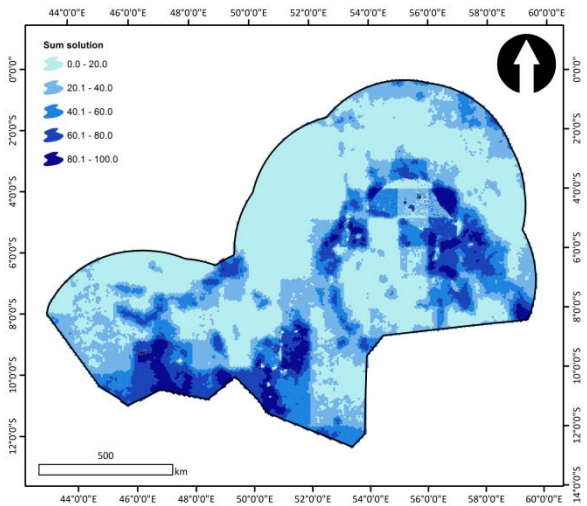
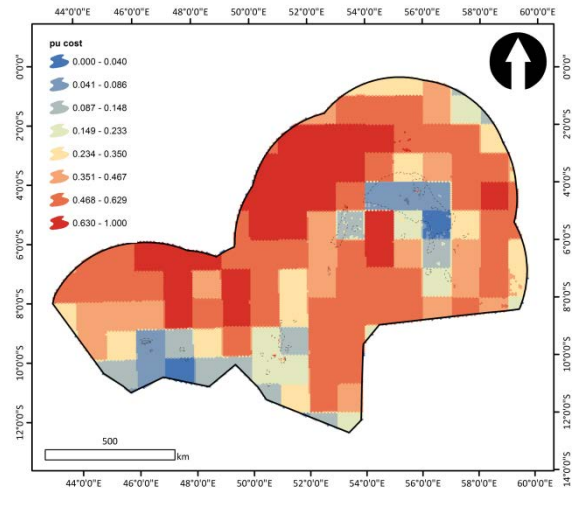
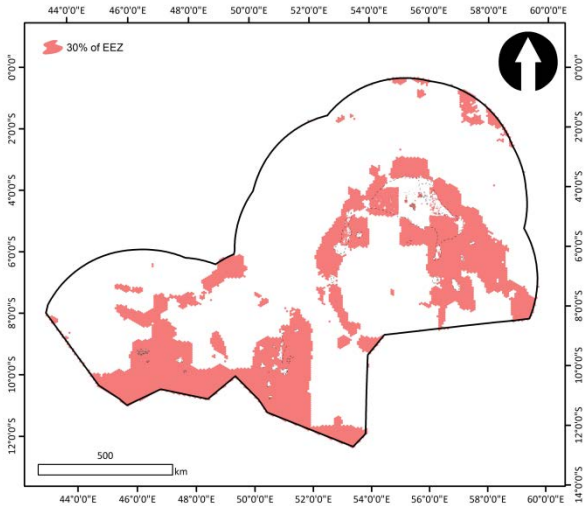
Scenario 04	(a) Best Solution	(b) Sum Solution
Targets = 50% land, 30% sea, with 15% of low priority features; up to 50% of high priority features. **Cost =** (industrial purse seine + longline + semi-industrial long line) **Locked in** = none **Seed =** none **Locked out** = none **BLM** = 0		
	(c) Cost	**(d) Proposed Protected Area Boundaries (>50% selection frequency)**
		

Table 36 Total cost for Scenario 05 where cost was calculated using habitat condition, constraints related to industrial and semi-industrial fisheries, and opportunities showing (a) Best solution (b) Sum Solution (c) cost data layer and (d) proposed PA expansion

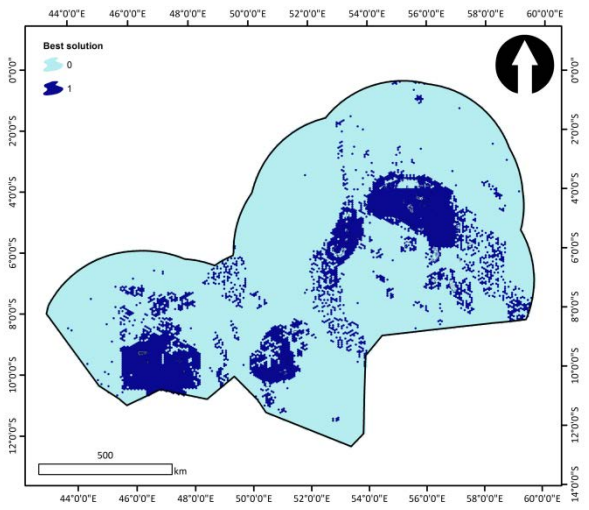
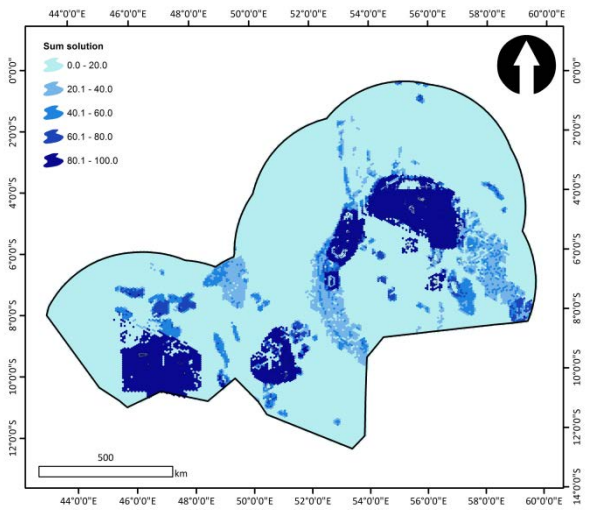
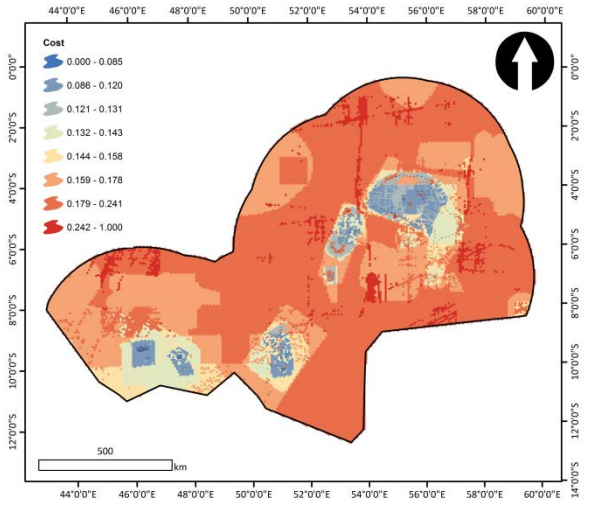
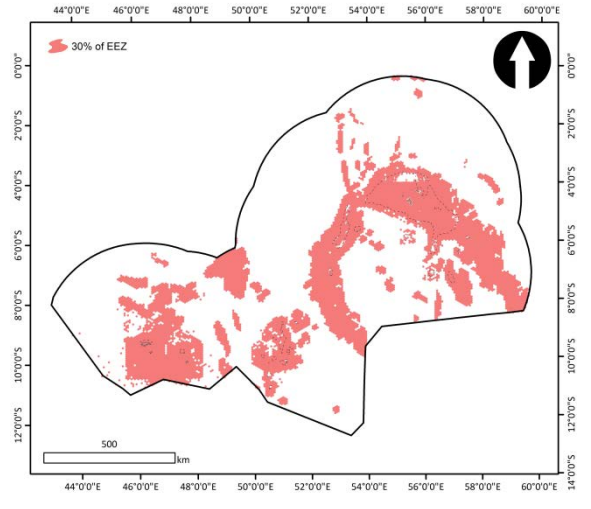
Scenario 05	(a) Best Solution	(b) Sum Solution
Targets = 50% land, 30% sea, with 15% of low priority features; up to 50% of high priority features. **Cost =** Area x (Condition modifier x ((industrial purse seine + longline + semi-industrial long line) x 10) - Opportunities modifier **Locked in** = none **Seed =** none **Locked out** = none **BLM** = 0		
(c) Cost	**(d) Proposed Protected Area Boundaries (>50% selection frequency)**	
		

Table 37 Total cost for Scenario 06 where cost is the full cost model using all constraints, showing (a) Best solution (b) Sum Solution (c) cost data layer and (d) proposed PA expansion.

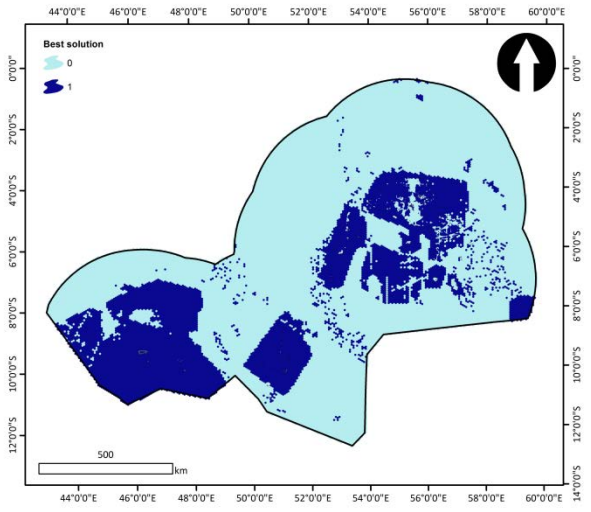
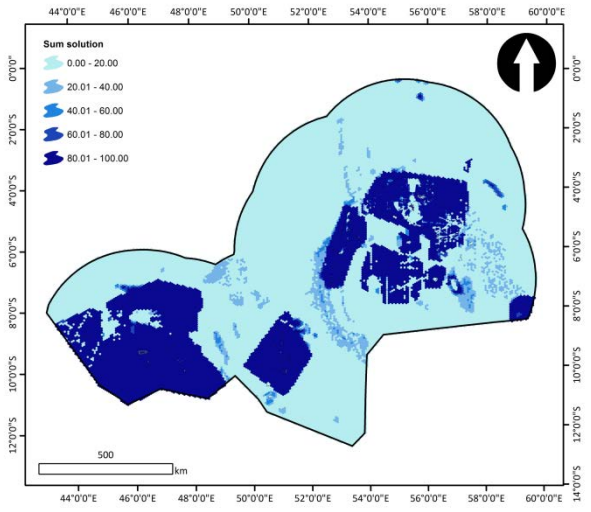
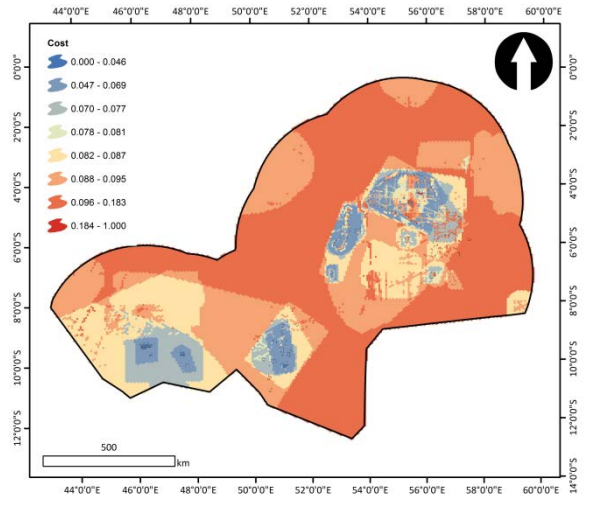
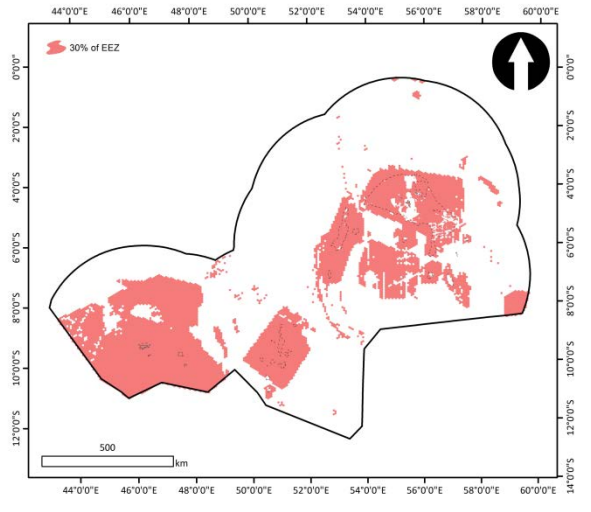
Scenario 06	(a) Best Solution	(b) Sum Solution
Targets = 50% land, 30% sea, with 15% of low priority features; up to 50% of high priority features. **Cost =** Area x (Condition modifier x Constraints modifier – Opportunities modifier) **Locked in** = none **Seed =** none **Locked out** = none **BLM** = 0		
	(c) Cost	**(d) Proposed Protected Area Boundaries (>50% selection frequency)**
		

Table 38 Total cost for Scenario 06 where cost is the full cost model, with a target of 15% in the sea instead of 30%, showing (a) Best solution (b) Sum Solution (c) cost data layer and (d) proposed PA expansion.

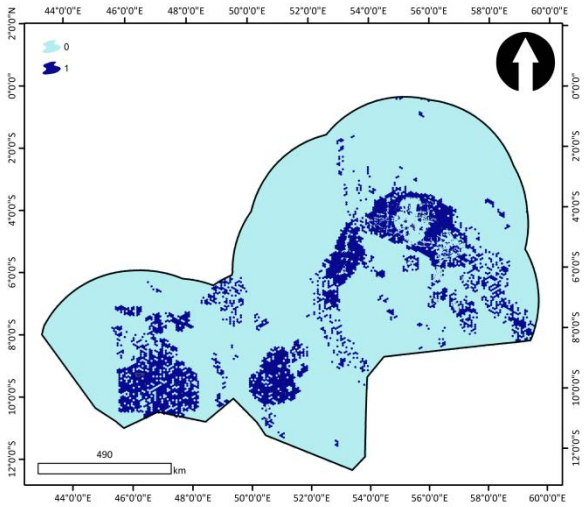
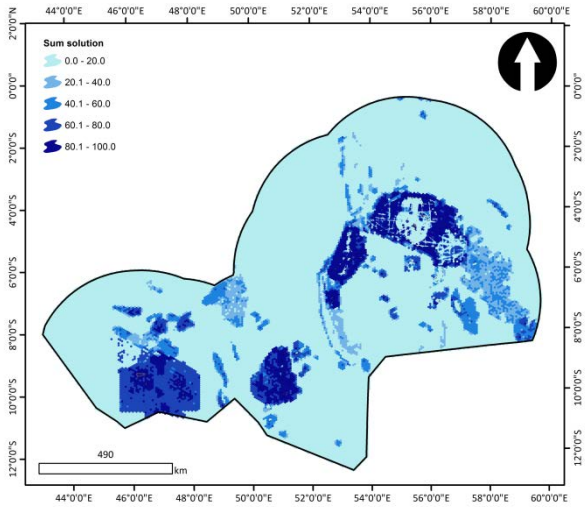
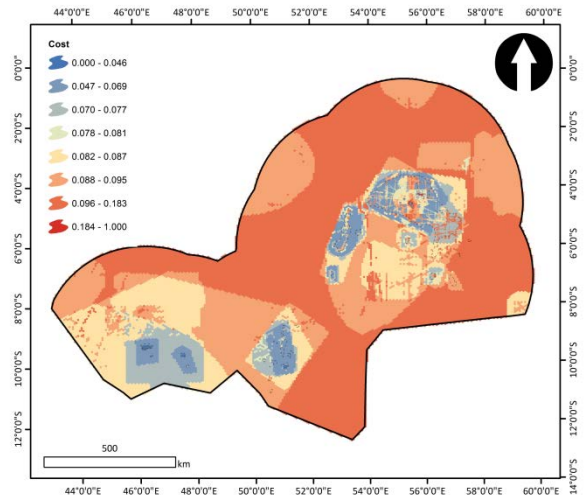
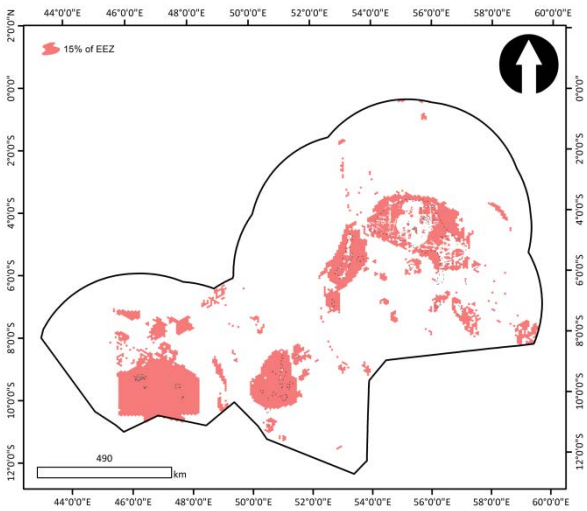
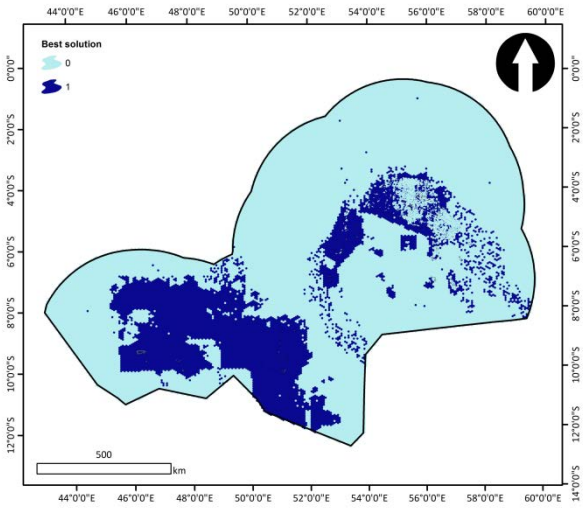
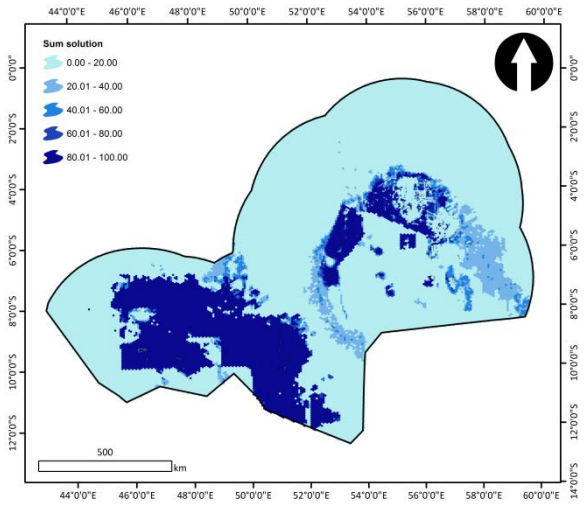
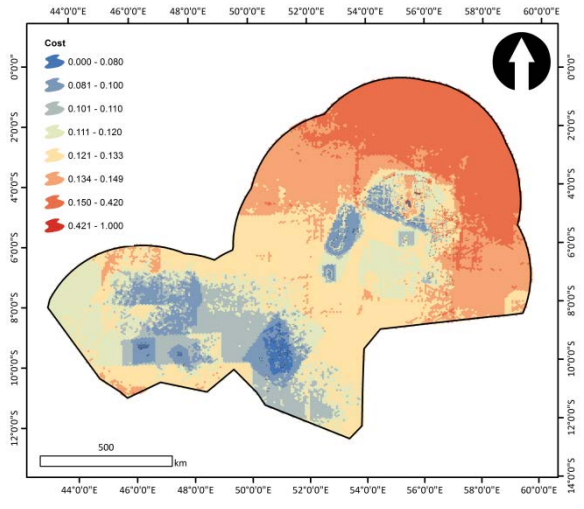
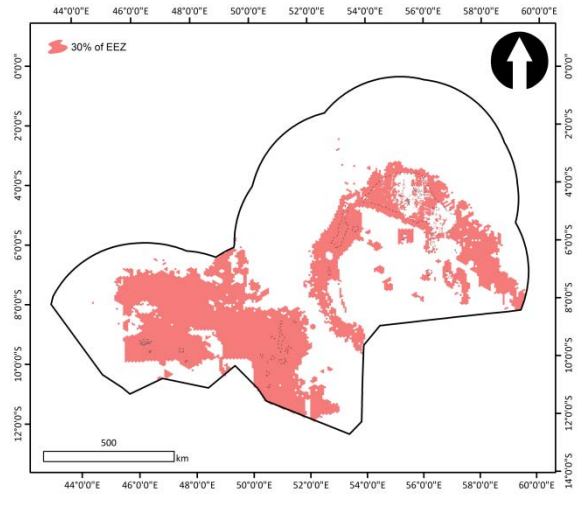
Scenario 02	(a) Best Solution	(b) Sum Solution
Targets = 50% land, 15% sea, with 15% of low priority features; up to 50% of high priority features. **Cost =** Area x (Condition modifier x Constraints modifier)- Opportunities modifier **Locked in** = none **Seed =** none **Locked out** = none **BLM = 0**		
	(c) Cost	**(d) Proposed PA coverage 30% of the EEZ (>20% selection frequency)**
		

Table 39 Total cost for Scenario 07 where cost is the full cost model plus threat, showing (a) Best solution (b) Sum Solution (c) cost data layer and (d) proposed PA expansion.

Scenario 07	(a) Best Solution	(b) Sum Solution
Targets = 50% land, 30% sea, with 15% of low priority features; up to 50% of high priority features. **Cost =** Area x ((Threat x 10) +(Condition modifier x Constraints modifier)-Opportunities modifier) **Locked in** = none **Seed =** none **Locked out** = none **BLM = 0**		
(c) Cost	**(d) Proposed PA coverage 30% of the EEZ (>20% selection frequency)**	
		

Any of the above outputs, in particular Scenario 06 and 07 could justifiably be used to aid the identification of priority areas for the expansion of the protected area estate in Seychelles, depending on the national priorities. Further modifications to the cost layers may be developed for example if there were other fisheries datasets provided.

For these purposes, the final Marxan outputs from Scenario 06, which used the complete cost layer based upon existing data are illustrated and described in more detail below. **Error! Reference source not found.** and Figure 29 show the Sum Solution selection frequency maps for Scenario 06 using the 30% target. Figure 30 and Figure 31 show the Sum Solution maps for Scenario 06 using the 15% target. These maps identify several broad groups which are even more apparent on the maps which just shows the planning units with the highest selection frequency (Figure 32). The red areas in Figure 32a **Error! Reference source not found.**cover 30% of the EEZ, the target set in the commitment made by the Seychelles Government, while the red areas in Figure 32b cover 15% of the EEZ, the target set for no-take zones.

The main groupings identified through Scenario 06 include:

(i) Group 1: Aldabra, Assumption, Cosmoledo, Astove and the seamounts to north (Asquith Rise):

(ii) Group 2: Providence, Farqhuar and St Pierre and surrounding Banks

(iii) Group 3: Amirantes including Alphonse and Desroches

(iv) Group 4: Mahe Plateau, Continental Slope, Coetivy, Platte.

(v) Group 5: Saya de Malha

(vi) Group 6: Seamounts and Guyots, including a large grouping in the central basin including Fortune Bank and other scattered seamounts

The large groupings identified as priorities through the Marxan spatial prioritisation process using the targets of 15% and 30% coverage of the EEZ and 50% on the land show a close congruence with the existing Fisheries Restricted zones reveals the areas (Figure 32 a and b**Error! Reference source not found.**).

The Fisheries Restricted zones segregate international industrial fisheries from national small scale fisheries and cover 9% of the Seychelles EEZ. These zones are currently the biggest existing marine management area legislated for in Seychelles waters and boats operating within these zones are monitored using the VMS system. While the current extent of the Fisheries Restricted zones are not legislated for under the PA policy, they could be integrated within this scheme, if management plans for these areas were to be produced and the fisheries within these zones were to be sustainably managed and enforced. While the mandate for managing these areas would need to remain with the Seychelles Fisheries Authority, these areas could then also be classified as "Sustainable use" areas under the new Protected Area policy. Improving the cross-compatibility and alignment between the fisheries legislation and the protected area policy that was developed under the current PA may provide a pragmatic solution that would more likely allow Seychelles to achieve a 30% protected area target.

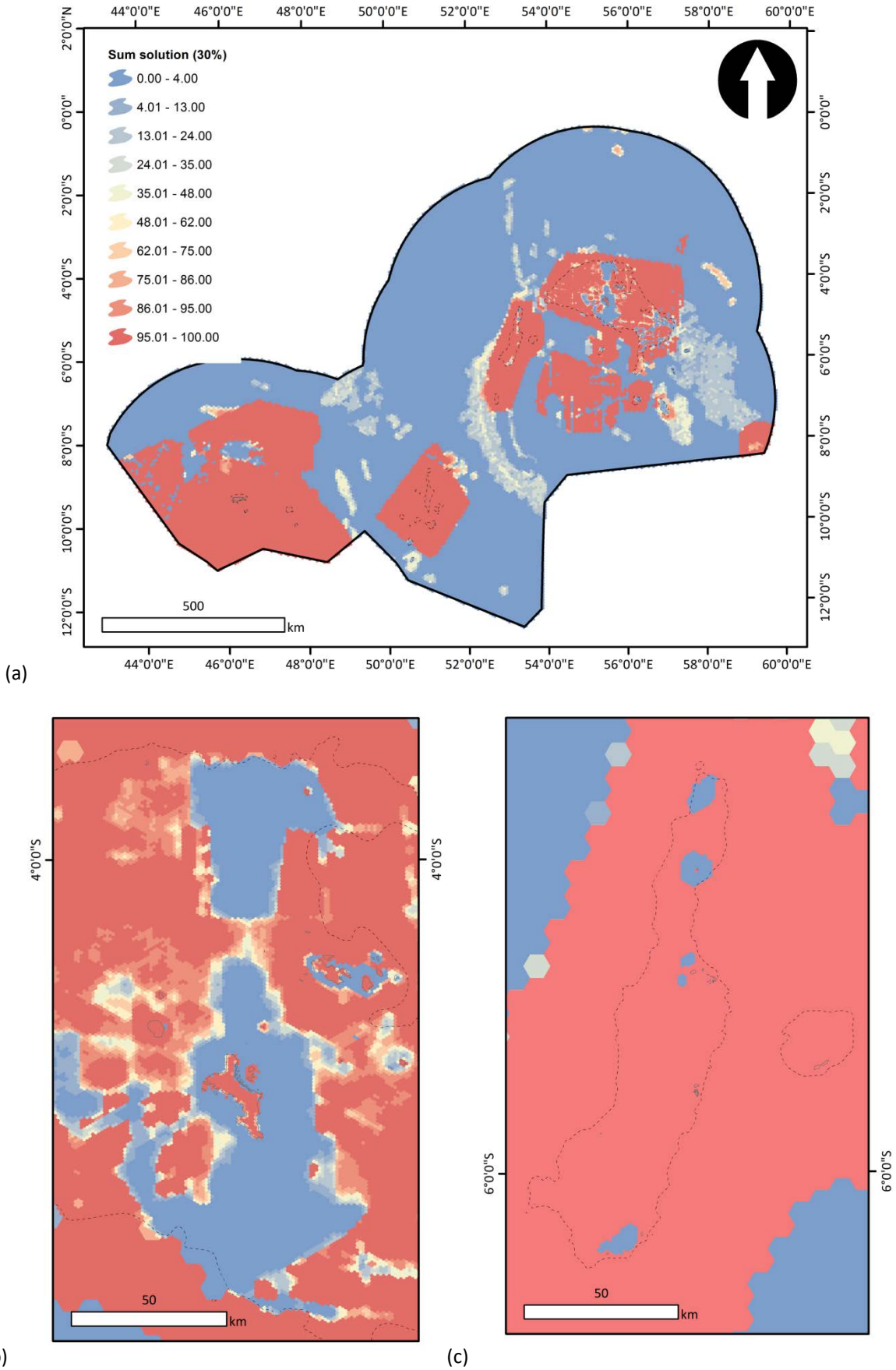
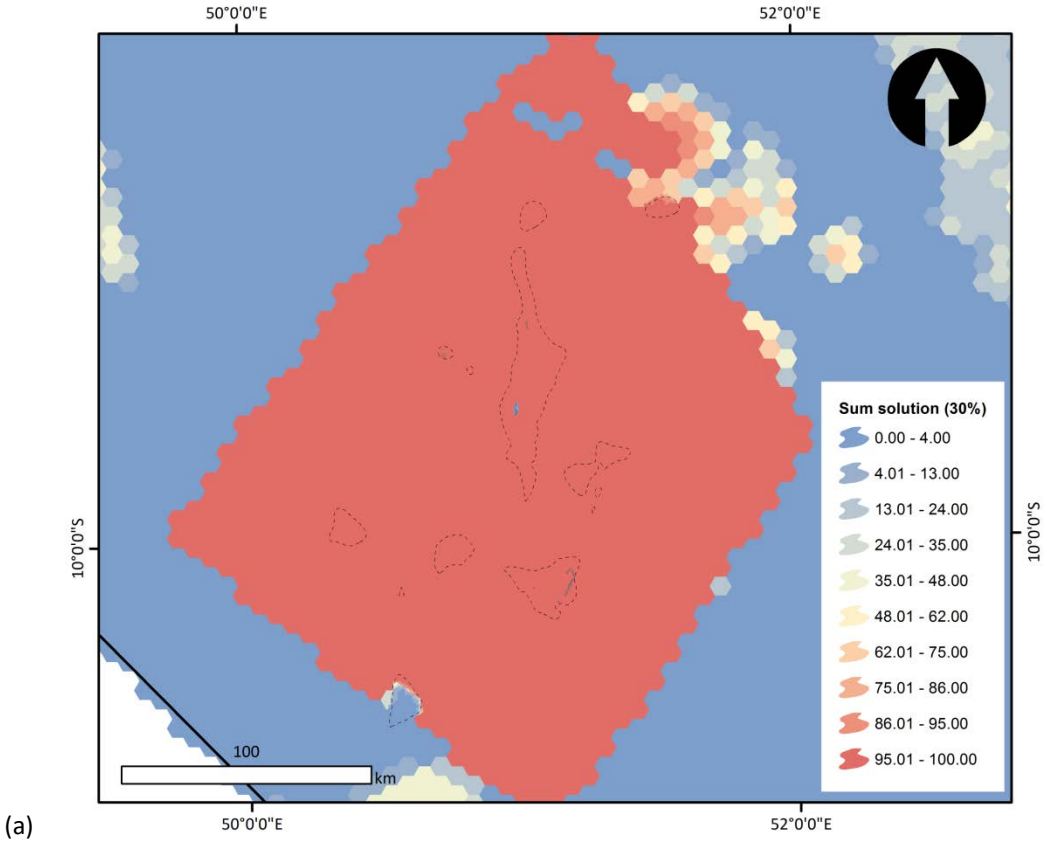
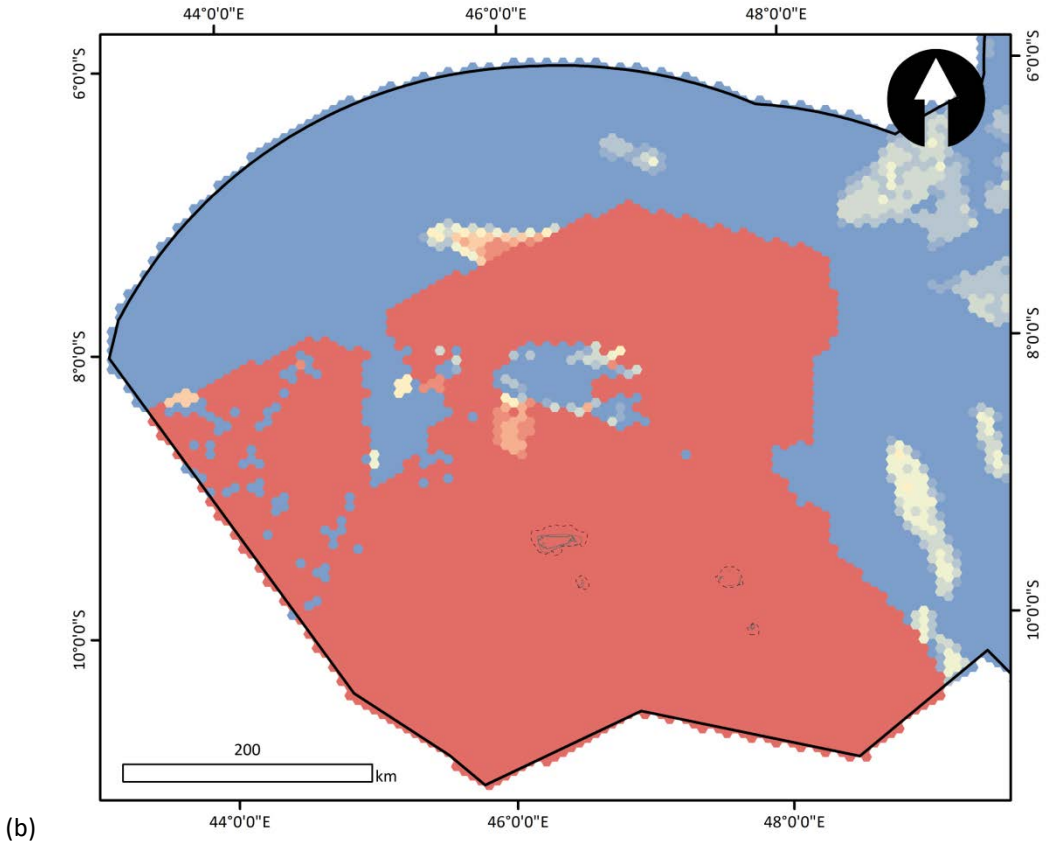


Figure 28: Sum solution selection frequency for Scenario 06 at 30% sea and 50% land (BLM=0), showing (a) EEZ (b) Mahe Plateau and (c) Amirantes.

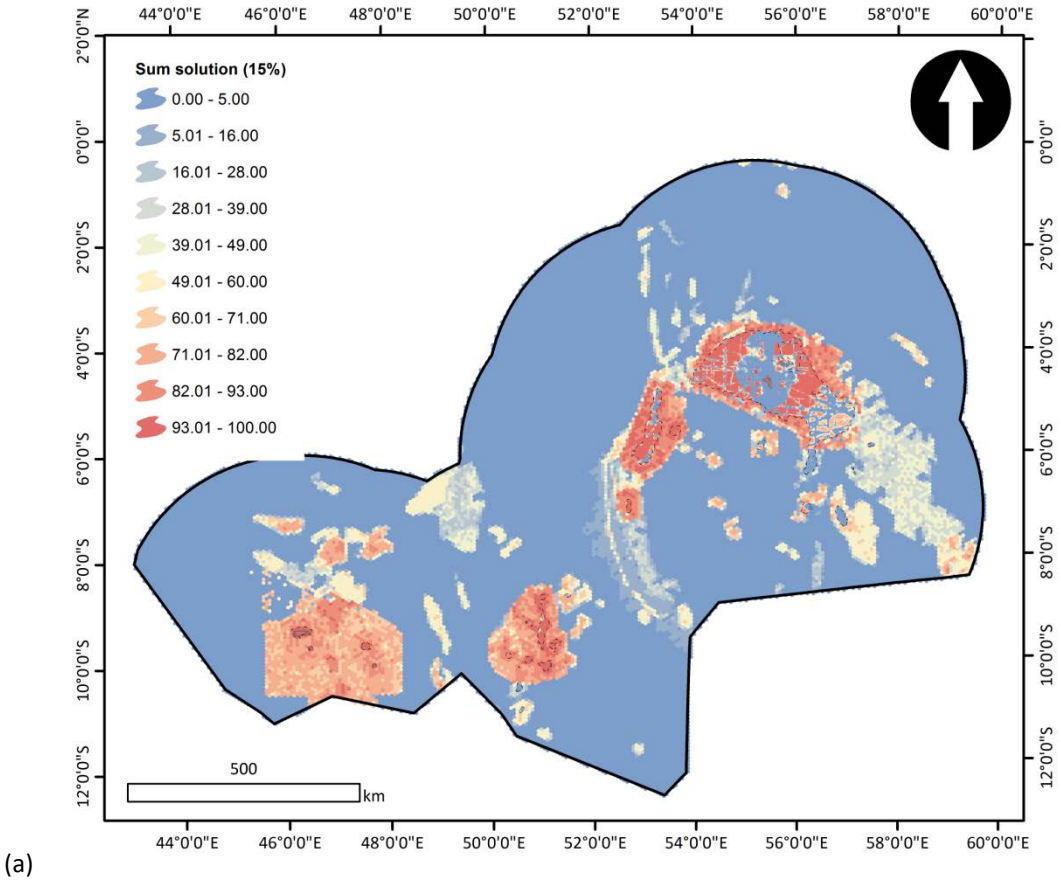


(a)

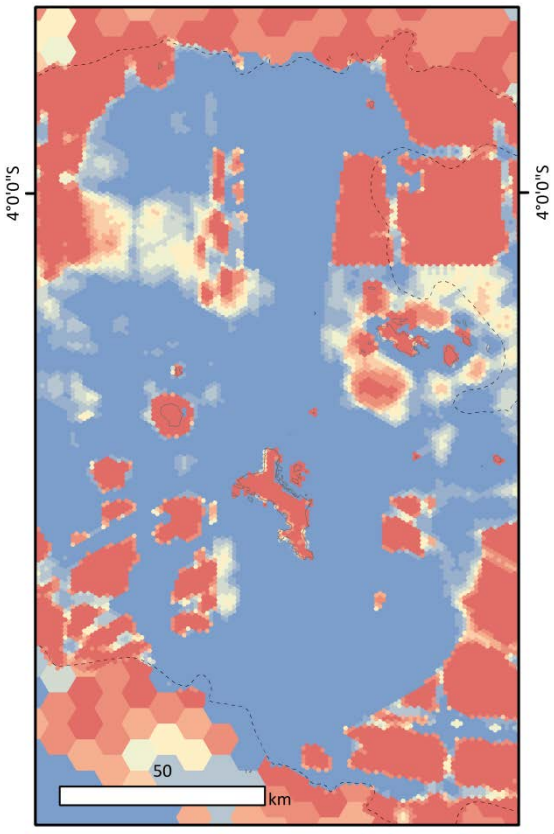


(b)

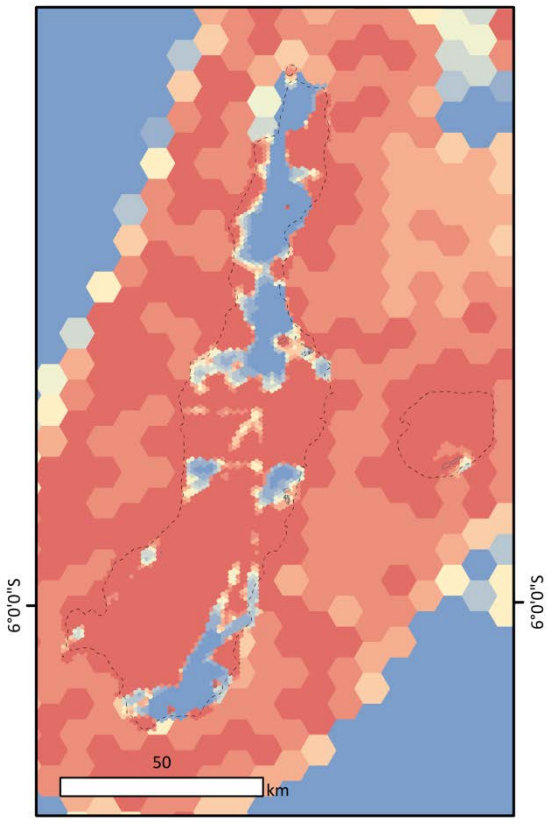
Figure 29: Sum solution selection frequency for Scenario 06 at 30% sea and 50% land (BLM=0), showing grouping around (a) Farqhuar and Providence and (b) Aldabra / Assumption and Cosmoledo and Astove.



(a)

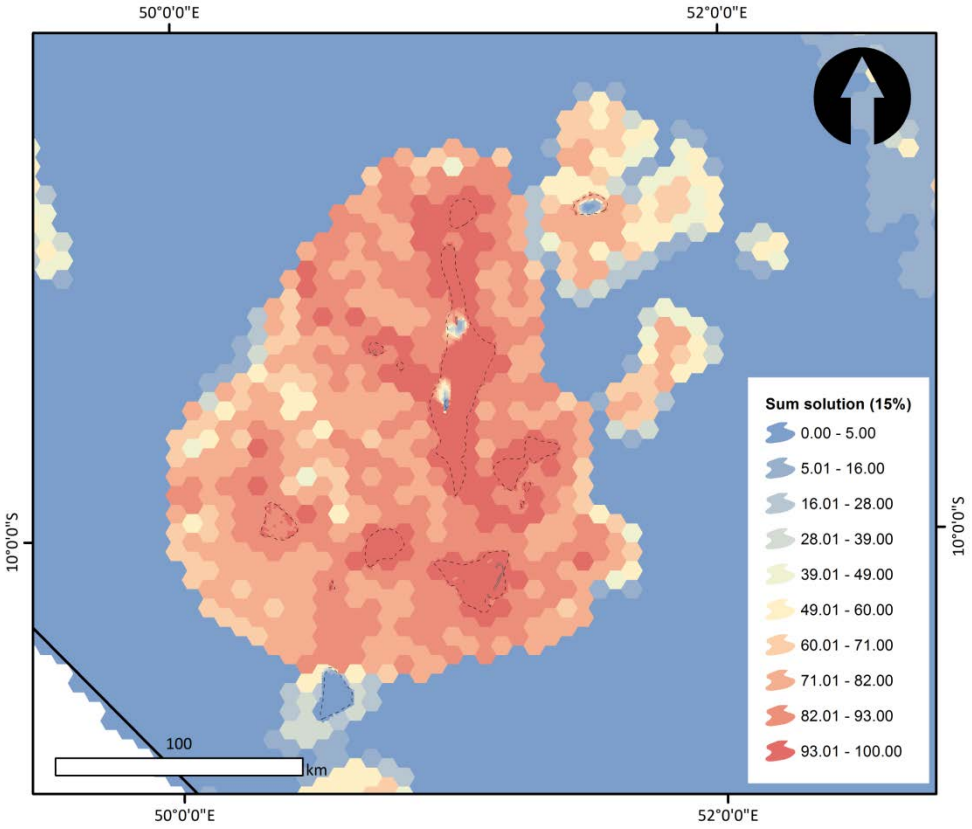


(b)

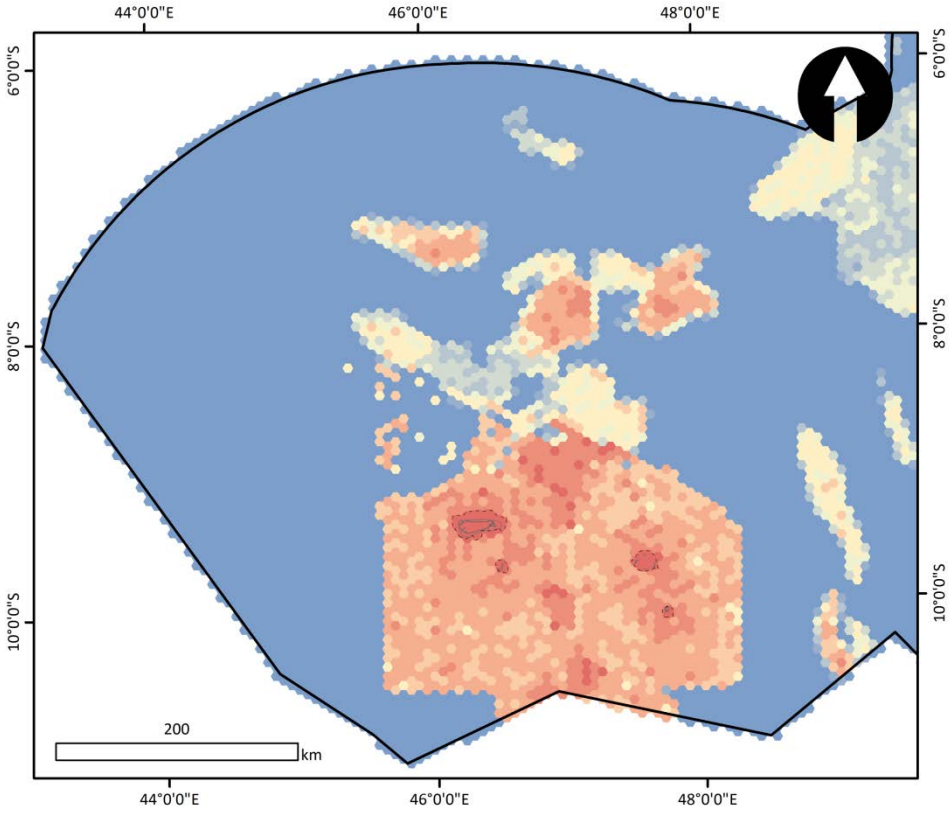


(c)

Figure 30: Sum solution selection frequency for Scenario 06 at 30% sea and 50% land (BLM=0), showing (a) EEZ (b) Mahe Plateau and (c) Amirantes.

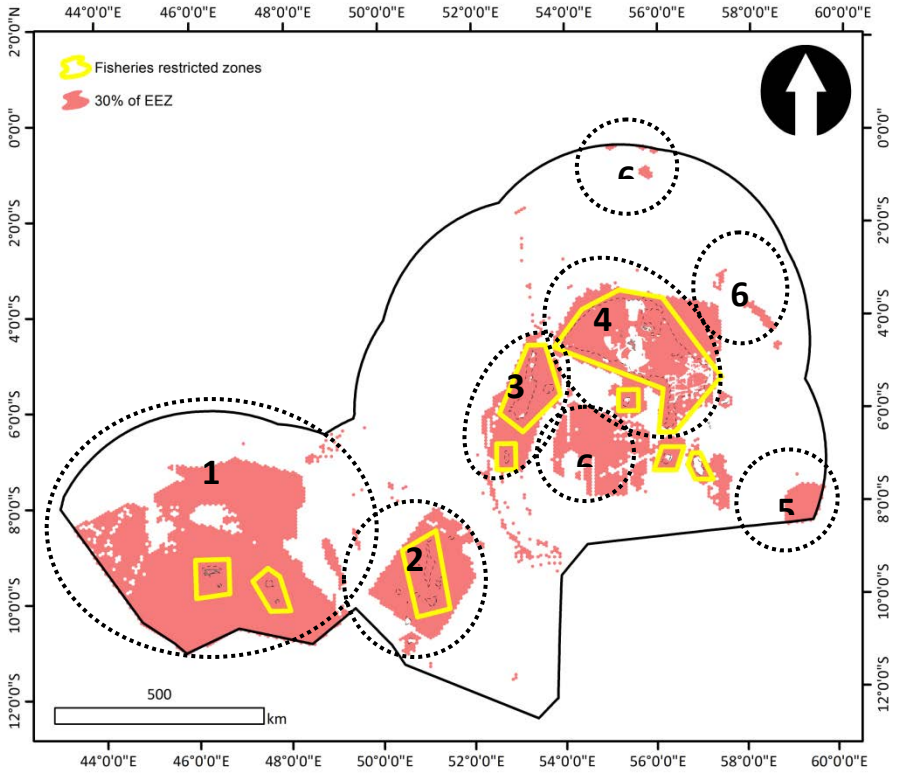


(a)

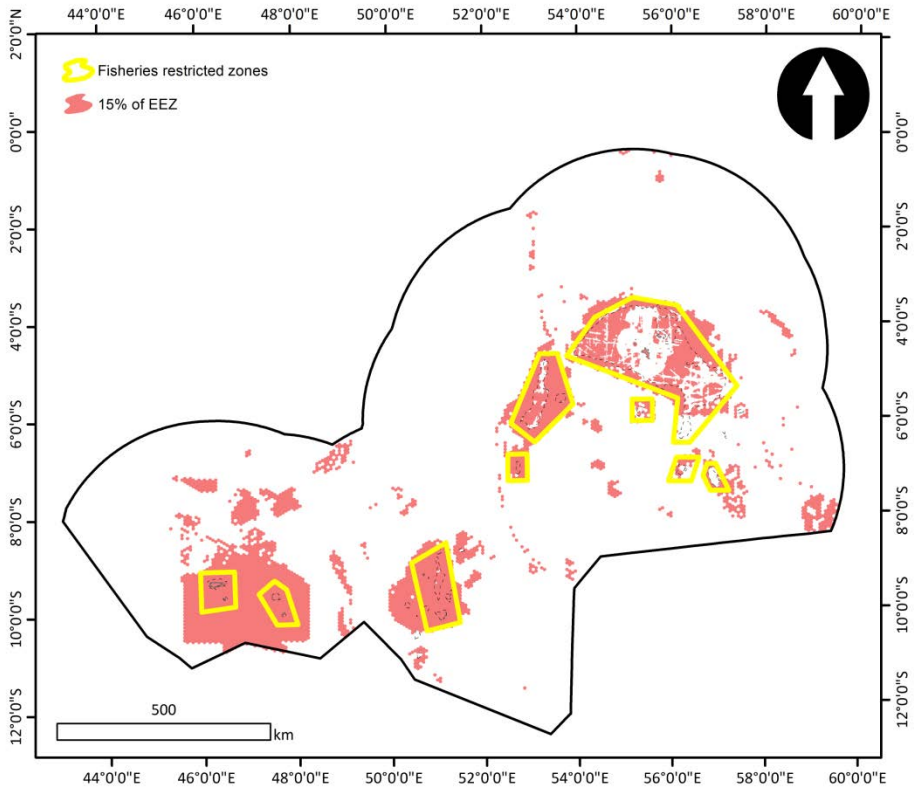


(b)

Figure 31: Sum solution selection frequency for Scenario 06 at 30% sea and 50% land (BLM=0), showing grouping around (a) Farqhuar and Providence and (b) Aldabra / Assumption and Cosmoledo and Astove.



(a)



(b)

Figure 32: Sum solution selection frequency for Scenario 06 showing (a) 30 % sea and 50% land (BLM=0) where the selection frequency was >30% and (b) 15% sea and 50% land (BLM=0), where the selection frequency was >50%. Also shown are the Fisheries restricted zones.

7 CONCLUSIONS

Convention on Biodiversity AIchi Target 11: By 2020, at least 17 per cent of terrestrial and inland water areas and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, **ecologically representative** and **well-connected systems** of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascape.

The Seychelles has made considerable progress over the years in terms of declaring protected areas. Progress towards meeting the CBD targets has been more substantial on the land than in the sea.

The aim of the present consultancy was to identify priorities for the expansion of the marine and terrestrial protected area system of the Seychelles, determine and map priority marine and terrestrial protected area. The results of the SEY-SCP process highlight a suite of broad areas that the Seychelles Government can consider for use in the expansion of the national protected area estate. The areas identified include a suite of small 'core' areas that could be allocated high level protected area status. These core areas are nested within a suite of larger areas, which could be designated at a lower level of protection, such as "Sustainable Use". The expansion of the protected area network into these priority areas would vastly improve the protected area coverage in the sea but also the representative of the protected area estate in both realms. This would help Seychelles progress towards meeting the full obligation as stated in CBD Aichi target 11, which aims for representative as well as total percent coverage for protected areas.

Further work will be needed to refine the exact boundaries of each area before they are legally gazetted and this will hopefully be achieved in consultation with all relevant stakeholders. Indeed this process does not replace the need for more detailed zoning work at the island or island group level, which would be feasible especially in areas where more detailed spatial data is already available (e.g. Aldabra, the Amirates or the inner island groups). There is complimentarity between the larger groupings or areas identified for consideration herein and the existing management within Seychelles waters. The larger proposed "Sustainable use" areas that have been identified through this process, for example, are complimentary in dimension and distribution to the existing "Fisheries Exclusion Zones" that already subdivide the Seychelles waters into areas where national fisheries are given precedent over the international fleets. While the proposed protected area expansion would need to be discussed at the time the EU fisheries agreements are negotiated, these areas are not a huge departure from the existing scheme which should provide a solid basis to facilitate the discussions.

Ultimately whether or not the Seychelles Government is able to progress towards fully realising the expansion of the protected area estate into these larger areas will depend upon the availability of resources (both financial and human) to support the expansion. As discussed in the recently completed protected area capacity assessment (AAI Enterprises 2014) the main underlying factors affecting PA management in Seychelles are: (i) the lack of funds which are required for staffing, staff training, equipment and facilities and (ii) limitations in the available human resource base to fulfil the key roles e.g. Park Ranger, Research/Conservation officer and administrator. The AAI Enterprises (2014) report recommended the establishment of an inter PA governance structure representative of all implementing institution and ideally hosted by the SNPA to support management capacity building.

8 RECOMMENDATIONS AND NEXT STEPS

While the best available data was used in the SEY-SCP process, there is always scope to improve on the datasets, especially for such a biodiverse island nation like Seychelles. Suggestions to improve the availability of the baseline datasets that can be used for these types of broad scale planning processes include the following:

- Undertake a thorough review of the existing protected area network and the original legal gazettes and associated maps to ensure that the boundaries of the existing protected areas are correct.
- Determine whether all of the existing protected areas that are not currently being enforced (e.g. Shell Reserves or Nature Reserves) should be maintained or degazetted with a view to consolidating the protected area estate and investing in areas that are viable.
- Maintain the data sharing procedures established through this project and eventually embed such a procedure into policy so as to ensure that data collected within the Seychelles are available for similar planning processes in the future.

- Invest in the necessary hardware, software and human resources needed to improve the capture, storage and management of biodiversity data. Examples of the types of improvements that could be made would include the establishment of a biodiversity database, harmonisation of data collection methods and/or reporting formats, at least for the critical habitats (e.g. coral reefs, seagrasses and mangroves) and species.
- It should be noted that while there was good alignment between the existing habitat maps and those produced for the purposes of the SEY-SCP and thes maps are fit for the purpose of the planning process, they do not replace the need for further detailed ground-truthed habitat mapping.
- There is a need to undertake further habitat mapping work using high resolution satellite imagery (or aerial photography) to improve the availability of consistent detailed maps showing the spatial distribution terrestrial and shallow nearshore habitats.
- Ecological niche based modeling of the distribution patterns of key species would increase the amount of data available for use in spatial prioritisation processes.
- Spatial prioritisation techniques can be used to refine or define zoning plans for core areas (e.g. Aldabra) and the main inner islands, where there is more detail data available for use in prioritisation processes.
- Continue to expand and build upon the existing trend whereby private entities and NGOs support the management of protected areas while also expanding and building the capacity of the Seychelles National Parks Authority (SNPA). This will be important even if a proportion of the new protected estate were to be managed by private entities or ENGOs, as there will still need to be an authority with both the mandate and experience to be able to provide guidance and proper oversight over these new protected areas even if only to ensure that the surveillance and enforcement of these areas is consistent and legal.
- Consider using Marxan with Zones to enhance the protected area network design. Marxan with Zones allows the planner to design a model that can allocate protected areas to different protected area types, not just protected or unprotected. Each type or zone then has the option of its own actions, objectives and constraints, with the flexibility to define the contribution of each zone to achieve targets for pre-specified features (e.g. species or habitats).

9 CHALLENGES

The aim of the present consultancy was to identify priorities for the expansion of the marine and terrestrial protected area system of the Seychelles, determine marine and terrestrial protected area targets and map priority areas. The ToR was recognised as being overly ambitious from the outset, a point that was raised by the consultant with both the PCU and the Project Manager at the start of the contract. Other constraints on the completion of the original ToR were outlined in the First Field Report and included: the need for agreement on the: governance framework for the SEY-SCP process, particularly in relation to the formation of a consortium, associated planning committee and formalisation of the data sharing agreements. During this phase, the consultant was able to pursue certain baseline datasets, but it was not considered appropriate to pursue other potentially more sensitive datasets until these matters had been resolved. At that time there was also recognition that there was need for greater coordination of planning related activities within the GEF portfolio and those to be supported by other organisations, so as to avoid duplication of effort and maximise the benefits for Seychelles from available resources. The first part of the consultancy thus evolved considerably away from the original ToR, from one of purely data compilation and processing into one that was orientated more towards the provision of advice and guidance in the preparation for planning.

The second part of this consultancy demanded a significant amount of time in attempting to align the SEY-SCP process with the MSP activities planned by TNC. Unfortunately the agreement that was reached between the PA Project and the TNC at the meeting in February 2014, whereby the two projects would collaborate in terms of data collection, processing and sharing, was not realised. While the PA project revised the DSA and background materials to make the wording more generic and applicable to both SEY-SCP and MSP, and shared all of the background data compiled with TNC in May 2014, there was no reciprocal data sharing from TNC to the PA Project. Indeed when the consultant requested access to datasets processed by TNC, the request was refused. Furthermore, the TNC team did not collect data on human-uses or prepare the cost data layers as had been agreed. This meant that the consultant had to input additional time into preparing the baseline datasets on human-use and the compilation of these data into cost data layers.

Beyond this there were also delays in obtaining certain key datasets. Although some organisations shared data nearly immediately upon request other organisations took a lot longer to deliver their data. Certain key datasets were only sent through in September 2014, with the latest dataset being submitted in January 2015. Additional time was then required to process these data from the format in which they were received into one that would make the data useable. One of the key datasets for which permission was sought was the Millennium Coral Reef Maps (Andrefouet et al. 2009). Permission to use these data was eventually granted in March 2015, which was too late for them to be included in the present version of the model. The 2nd Stakeholder Workshop had identified concerns with regards these data which were addressed in the integrated habitat scheme (e.g. separation between granitic and coralline reefs on the Mahe Plateau, and the 'reef' habitats being areas of hard ground with either seagrass or coral).

10 BIBLIOGRAPHY

Ardron, J.A, Possingham, H.P. and Klein C.J. (eds) 2008 Marxan Good Practices Handbook. Pacific Marine Analysis and Research Association, Vancouver, BC, Canada 155 pages. www.pacmara.org.

Allnutt TF, McClanahan TR, Andréfouët S, Baker M, Lagabrielle E, McClennen C, et al. (2012) Comparison of Marine Spatial Planning Methods in Madagascar Demonstrates Value of Alternative Approaches. PLoS ONE 7(2): e28969. doi:10.1371/journal.pone.0028969

Ateweberhan, M McClanahan, T Graham, N Sheppard, C. 2011, Episidic heterogenous decline and recovery of coral cover in the Indian Ocean, Coral Reef, No.30, pp. 739-752

Ball, I.R., H.P. Possingham, and M. Watts. (2009). Marxan and relatives: Software for spatial conservation prioritisation. Chapter 14: Pages 185-195 in Spatial conservation prioritisation: Quantitative methods and computational tools. Eds Moilanen, A., K.A. Wilson, and H.P. Possingham. Oxford University Press, Oxford, UK.

Baker, B 1963, Geology and mineral resources of the Seychelles archipelago, Geol. Surv. Kenya. Mem., No. 3

Bertrand, J., 1988. Selectivity of hooks in the handline fishery of the Saya de Malha Banks (Indian Ocean). Fisheries Research, 6: 249-255.

Bijoux, J Decomarmond, A Aumeeruddy, R 2008, Status of the marine environment report Seychelles, UNEP-GEF WIO-LAB Project: Addressing Land Based Activities in the Western Indian Ocean, pp. 92 (Unpublished report)

Braithwaite, C. J. R. 1984. Geology of the Seychelles. In: Biogeography and Ecology ofthe Seychelles Islands. Ed. D. R. Stoddart. Dr W. Junk Publishers.Catry, T Ramos, J Jaquemet, S Faulquier, L Berlincourt, M Hauselmann, A Pinet, P Le Corre, M 2009, Comparative foraging ecology of a tropical seabird community of the Seychelles, Mar. Ecol. Prog.Ser., No.374, pp.259-272

CBD (2012) Report of the Southern Indian Ocean Regional Workshop to Facilitate the Description of Ecologically or Biologically Significant Marine Areas. UNEP/CBD/RW/EBSA/SIO/1/4 (https://www.cbd.int/doc/?meeting=EBSA-SIO-01)

COI (2012) Document de Synthèse de l'Analyse Ecorégionale de l'Ecorégion Marine des Iles de l'Océan Indien occidental (Commission de l'Océan Indien); WIOMER project.

Christiansen, S. 2010. Saya de Malha Banks – A potential MPA. WWF Briefing.

Davies AJ, Guinotte JM (2011) Global Habitat Suitability for Framework-Forming Cold-Water Corals. PLoS ONE 6(4): e18483. doi:10.1371/journal.pone.0018483

Duncan RA (1990) The volcanic record of the Reunion hotspot. In: Duncan, R. A., Backman, J., Peterson, L. C, et al., 1990 Proceedings of the Ocean Drilling Program, Scientific Results, Vol. 115

Fisher, R. L., Johnson, G. L., and Heezen, B. Z. 1967. Mascarene Plateau, Western Indian Ocean. Bulletin of the Geological Society of America, 78: 1247-1266.

Gallienne, C. P. and Smythe-Wright, D. 2005. Epipelagic Mesozooplankton Dynamics around the Mascarene Plateau and Basin, Southwestern Indian Ocean. Philosophical Transactions: Mathematical, Physical and Engineering Sciences, 363: 191-202.

GOBI. 2009. Saya de Malha Banks—Case study. http://www.gobi.org/Our%20Work/rare-1

Graham, N Wilson,S Jennings, S Polunin, N Bijoux, J Robinson, J 2006. Dynamic fragility of oceanic coral reef ecosystems, PNAS 2006

Grandcourt, E. M. 2003. The effect of intensive line fishing on the virgin biomass of a tropical deepwater snapper, the crimson jobfish (Pristipomoides filamentosus). Fishery Bulletin April 01, 2003: http://www.accessmylibrary.com/coms2/summary_0286-23362382_ITM. Last accessed 3 December 2010.

Hagan AB, Spencer T, Ashworth J, Bijoux J, Quatre R, Callow M and Stobart B 2010 Morphology and marine ecology of Boudeuse, Amirantes, Seychelles. Atoll Research Bulletin 575, ii + 13pp.

Hagan AB, Spencer T, Ashworth J, Bijoux J, Quatre R, Callow M, Stobart B and Matyot P 2010 Terrestrial and marine ecology of Desnoeufs, Amirantes, Seychelles. Atoll Research Bulletin 576, ii + 22pp.

Hagan AB, Spencer T, Ashworth J, Bijoux J, Quatre R, Callow M and Stobart B 2010 Terrestrial and marine ecology of Etoile, Amirantes, Seychelles. Atoll Research Bulletin 577, ii + 14pp.

Hagan AB, Spencer T, Ashworth J, Bijoux J, Quatre R, Callow M, Stobart B and Matyot P 2010 Terrestrial and marine ecology of Marie-Louise, Amirantes, Seychelles. Atoll Research Bulletin 578, ii + 30pp.

Hagan AB, Spencer T, Ashworth J, Bijoux J, Quatre R, Callow M and Stobart B 2010 Terrestrial and marine ecology of Poivre, Amirantes, Seychelles. Atoll Research Bulletin 579, ii + 33pp.

Hamylton, S (2011) The use of remote sensing and linear wave theory to model local wave energy around Alphonse Atoll, Seychelles, Estuarine, Coastal and Shelf Science, 95: 349-358.

Hamylton, S. (2011) An evaluation of waveband pairs for water column correction using band ratio methods for seabed mapping in the Seychelles, International Journal of Remote Sensing, 32: 9185 - 9195.

Hamylton, S. & Spencer, T. (2007) Classification of Seagrass habitat structure as a response to wave exposure at Etoile Cay, Seychelles, European Association of Remote Sensing Laboratories, EARSeL Proceedings, 6(2): 82-94.

Hamylton, S. and Spencer, T. (2011) Geomorphological modeling of tropical marine landscapes: Remote sensing, patches and spatial statistics, Continental Shelf Research, Special Issue on Coastal Remote Sensing, 31: 151-161.

Hamylton, S. & Prosper, J (2012) Development of a Spatial Data Infrastructure for coastal management in the Amirante Islands, Seychelles, International Journal of Applied Earth Observation and Geoscience, 19: 24-30.

Hamylton, S., Hagan, A., & Spencer, T. (2009) Development of an island habitat classification scheme for the Amirante Islands, Seychelles, WIO Journal of Marine Science, 6 (3) 15-34.

Hamylton SM, Hagan AB, and Spencer T (2010) Development of a regional habitat classification scheme for the Amirantes Islands, Seychelles. Western Indian Ocean Journal of Marine Science 9: 293-302.

Hamylton, S., Hagan, A & Doak, N (2012) Observations of Dugongs at Aldabra Atoll, Western Indian Ocean: Lagoon Habitat Mapping and Spatial Analysis of Sighting Records, International Journal of Geographic Information Science, 26: 839-853.

Hamylton, S., Spencer, T & Andréfouët, S. (2012) Comparing coral reef geomorphic and habitat diversity at the landscape scale, Amirantes Archipelago, western Indian Ocean, Estuarine, Coastal and Shelf Science, doi.org/10.1016/j.ecss.2012.06.001.

Hamylton S, Spencer T and Hagan AB (2012) Coral reefs and reef islands of the Amirantes Archipelago, Western Indian Ocean. In: Harris PT and Baker EK (Eds.), Seafloor Geomorphology as Benthic Habitat: GeoHAB Atlas of Seafloor Geomorphic Features and Benthic Habitats. Elsevier, Amsterdam, 341-348.

Hamylton, S., Spencer, T & Hagan, A (2012) Spatial modelling of benthic cover using remote sensing data in the Aldabra lagoon, western Indian Ocean, Marine Ecology Progress Series, doi: 10.3354/meps09779.

Hemsley, W. B. 1916. Flora of Seychelles and Aldabra. Journal of Botany, 54: 1-24.

Hemsley, W. B. 1919. Flora of Aldabra: with notes on the flora of the neighbouring islands. Kew Bulletin of Miscellaneous Information, 108-153.

Hemsley, W. B. & Turrill, W. B. 1917. Plants of Seychelles and Aldabra. Journal of Botany, 55: 285-288.

Hilbertz, W., Gutzeit, F., Goreau, T. 2002. Saya de Malha Expedition March 2002. funded by the Lighthouse Foundation, pp. 1-107. http://www.lighthousefoundation.org/fileadmin/LHF/PDF/saya_de_malha.pdf (Last accessed 3 December 2010).

Hill, M. & Currie, D. Wildlife of Seychelles. Collins Traveler's Guide. Collins.

Hill, M. J., Vel, T. M., Holm, K. J., Parr, S. J. & Shah, N. J. 2002a. Bird (Island Seychelles). Geology, Topography and Climate. Atoll Research Bulletin, No. 495: 10-28

Hill, M. J., Vel, T. M., Holm, K. J., Parr, S. J. & Shah, N. J. 2002b. Conception (Island Seychelles). Geology, Topography and Climate. Atoll Research Bulletin, No. 495: 30-47.

Hill, M. J., Vel, T. M., Holm, K. J., Parr, S. J. & Shah, N. J. 2002c. Cousin (Island Seychelles). Geology, Topography and Climate. Atoll Research Bulletin, No. 495: 49-70

Hill, M. J., Vel, T. M., Parr, S. J. & Shah, N. J. 2002d. Curieuse (Island Seychelles). Geology, Topography and Climate. Atoll Research Bulletin, No. 495: 72-94.

Hill, M. J., Vel, T. M., Holm, K. J., Parr, S. J. & Shah, N. J. 2002e. Denis (Island Seychelles). Geology, Topography and Climate. Atoll Research Bulletin, No. 495: 96-117.

Hill, M. J., Vel, T. M., Holm, K. J., Parr, S. J. & Shah, N. J. 2002f. Félicité (Island Seychelles). Geology, Topography and Climate. Atoll Research Bulletin, No. 495: 118-138.

Hill, M. J., Vel, T. M., Parr, S. J. & Shah, N. J. 2002g. Grand Soeur (Island Seychelles). Geology, Topography and Climate. Atoll Research Bulletin, No. 495: 140-154.

Hill, M. J., Matyot, P., Vel, T. M., Parr, S. J. & Shah, N. J. 2002h. Marianne (Island Seychelles). Geology, Topography and Climate. Atoll Research Bulletin, No. 495: 156-175.

Hill, M. J., Vel, T. M., Parr, S. J. & Shah, N. J. 2002i. North Island (Seychelles). Geology, Topography and Climate. Atoll Research Bulletin, No. 495: 176-199.

Hill, M. J., Vel, T. M., Holm, K. J., Parr, S. J. & Shah, N. J. 2002j. Thérèse (Island Seychelles). Geology, Topography and Climate. Atoll Research Bulletin, No. 495: 200-219.

Jeffrey, C. 1968. Seychelles. In: Conservation of Vegetation in Africa south of the Sahara. Eds. I. Hedberg & O. Hedberg. Acta Phytogeogrraphica Suecica, 54: 275-279.

Kiszka, J., Berggren, P., Rosenbaum, H., Cerchio, S., Rowat D., Drout-Dulau, V., Razafindrakoto, Y., Vely, M., Guissamula, A. 2009, Ceatacean sin the South West Indian Ocean: a review of diversity, distribution and conservation issues, SC/61/018

Kiszka, J., Berggren, P., Rosenbaum, H., Cerchio, S., Rowat D., Drout-Dulau, V., Razafindrakoto, Y., Vely, M., Guissamula, A. 2009, Ceatacean sin the South West Indian Ocean: a review of diversity, distribution and conservation issues, SC/61/018

Lascelles, B 2014 Marine Important Bird Areas in Seychelles: Review and update of sites qualifying for seabirds. Report to GoS-UNDP-GEF PA Project. 23p.

Maguire, J. J., Sissenwine, M., Csirke, J., Grainger, R., and Garcia, S. 2006. The state of world highly migratory, straddling and other high seas fishery resources and associated species. FAO Fisheries Technical Paper. No. 495. Rome: FAO. 84p.

Maina, J., Venus, V., McClanahan, T.R. & Ateweberhan, M. (2008). Modelling susceptibility of coral reefs to environmental stress using remote sensing data and GIS models in the western Indian Ocean. Ecol. Mod., 212, 180-199.

Maina, J., McClanahan, T.R., Venus, V., Ateweberhan, M., & Madin, J. (2011) Global Gradients of Coral Exposure to Environmental Stresses and Implications for Local Management. PLoS ONE 6(8): e23064. doi:10.1371/journal.pone.0023064

Matatiken, D. & Dogley, D. 2005. Guide to Endemic Palms and Screw Pines of the Seychelles Granitic Islands. Plant Conservation Action Group, Victoria, Mahé, Seychelles.

Meyerhoff, A. A. and Kamen-Kaye, M. 1981. Petroleum Prospects of Saya de Malha and Nazareth Banks, Indian Ocean: Geologic Notes. AAPG Bulletin, 65.

Milchakova, N. A., Phillips, R. C., and Ryabogina V. G. 2005. New data on the locations of seagrass species in the Indian Ocean. Atoll Research Bulletin, 537: 178-188.

Montgomery Martin, R. 1839 Statistics of the Colonies of the British Empire in the West Indies, South America, North America, Asia, Australia, Asia, Africa and Europe: From the Official Records of the Colonial Office.

Mortimer, J 2004, Seychelles Marine Ecosystem Management Project (SEYMEMP): Turtle Component (Seychelles Turtle Conservation Project), Final Report, Global Environment Facility (GEF) & Seychelles Government; Ministry of Environment and Natural Resources (MENR)

Nath, B. N. and M. S. Prasad. 1991. Manganese nodules in the exclusive economic zone of Mauritius. Marine Mining 10: 303-335.

New, A. L., Stansfield, K., Smythe-Wright, D., Smeed D. A., Evans, A. J., and Alderson, S. G.. 2005. Physical and biochemical aspects of the flow across the Mascarene Plateau in the Indian Ocean. Phil. Trans. R. Soc. 363: 151–168.

Obura, D, Church, J, Gabrié, C. 2012. Assessing Marine World Heritage from an Ecosystem Perspective: The Western Indian Ocean. UNESCO world Heritage Centre.

Payet, R. 2004. Research, assessment and management on the Mascarene Plateau: a large Marine ecosystem perspective. Philosophical Transactions of the Royal Society A, 363: 295-307.

Procter, J. 1984b. Floristics of the granitic islands of the Seychelles. In: Biogeography and Ecology of the Seychelles Islands. Ed. D. R. Stoddart. Dr W. Junk Publishers.

Renvoize, S. A. 1979. The origins of Indian Ocean Island floras. In: Plants and Islands. Ed. D. Bramwell. Academic Press.

Rowat D (2007) Occurrence of whale shark (Rhincodon typus) in the Indian Ocean: a case for regional conserva tion. Fish Res 84: 96–101

Rowat D, Engelhardt U (2007) Seychelles: a case study of climatic teleconnection between hydrologic variables community involvement in the development of whale and large-scale atmospheric circulation patterns with shark ecotourism and its socio-economic impact. Fish Res 84: 109–113

Rowat D, Gore M, Meekan MG, Lawler IR, Bradshaw CJA (2009a) Aerial survey as a tool to estimate whale shark abundance trends. J Exp Mar Biol Ecol 368: 1–8

Sanders, M. J. 1993. Fishery performance and the value of future entitlements under quota management: A case study of a handline fishery in the southwest Indian Ocean. Fisheries Research, 18: 219-229.

Segan, D.B., E.T. Game, M.E. Watts, R.R. Stewart, H.P. Possingham. (2011). An interoperable decision support tool for conservation planning. Environmental Modelling & Software, doi:10.1016/j.envsoft.2011.08.002

Seychelles Fishing Authority 2010, Seychelles Fishing Authority Annual Report 2007 – 2010, Seychelles Fishing Authority, Victoria, Mahe, Seychelles

Sequeira, A., Mellin, C., Rowat, D., Meekan, M.G., Bradshaw, C.J.A., (2012). Ocean-scale prediction of whale shark distribution. Divers. Distrib. 18, 504–518.

Sequeira A, Mellin C, Rowat D, Meekan MG, Bradshaw CJA (2011a) Ocean-scale prediction of whale shark distribution. Diversity and Distributions 18(5): 504–518. http://dx.doi.org/10.1111/j.1472-4642.2011.00853.x

Sequeira A, Mellin C, Rowat D, Meekan MG, Bradshaw CJA (2011b). Data from: Ocean-scale prediction of whale shark distribution. Dryad Digital Repository. http://dx.doi.org/10.5061/dryad.kg495

Sequeira, A., Mellin, C., Delean, S., Meekan, M.G., Bradshaw, C.J.A., (2013a). Spatial and temporal predictions of decadal trends in Indian Ocean whale sharks. Mar. Ecol. Prog. Ser. 478, 185–195.

Sequeira, A.M.M., Mellin, C., Fordham, D.A., Meekan, M.G., Bradshaw, C.J.A., (2013b). Predicting current and future global distributions of whale sharks. Glob. Chang. Biol.. http://dx.doi.org/10.1111/gcb.12343 (in press).

Sequeira, A.M.M., Mellin, C., Meekan, M.G., Sims, D.W., Bradshaw, C.J.A., (2013c). Inferred global connectivity of whale shark Rhincodon typus populations. J. Fish Biol. 82, 367–389.

Shor Jr., G. G. and Pollard, D. D. 1963. Seismic Investigations of Seychelles and Saya de Malha Banks, Northwest Indian Ocean. Science, 142: 48 – 49.

Stewart R.R., Possingham HP. 2005. Efficiency, costs and trade-offs in marine reserve system design. Environmental Modeling and Assessment 10: 203–213.

Stoddart, D. R. 1984. Impact of man in the Seychelles. In: Biogeography and ecology of the Seychelles Islands. Ed. D. R. Stoddart. Dr W. Junk Publishers. The Hague.

Swabey, C. 1970. The endemic flora of the Seychelle Islands and its conservation. Biological Conservation, 2: 171-177.

UNCLOS. 2008. Joint submission by the Republic of Mauritius and the Republic of Seychelles. http://www.un.org/Depts/los/clcs_new/submissions_files/submission_musc.htm. Last accessed on 3 January 2011.

Vierros, M. 2009. The Saya de Malha Banks. GOBI Illustration case study. http://openoceansdeepseas.org/Our%20Work/rare-1/at_download/pdf. pp. 1-6.

Vortsepneva, E. and Spiridonov, V. 2008. Saya de Malha –an invisible island in the Indian Ocean. Review of historical surveys of environmental conditions and biodiversity. Report to the Lighthouse Foundation, Moscow, Russia, pp. 1-42.

Walker, RJ, Whitmore, N., Rafeliarisoa, T.H., Hamylton, S. (2012) The effect of habitat degradation on the long term survival of the Critically Endangered Madagascar spider tortoise (Pyxis arachnoides). Biological Conservation, 152: 152–158.

Walsh, R. P. D. 1984. Climate of the Seychelles. In: Biogeography and Ecology of the Seychelles Islands. Ed. D. R. Stoddart. Dr W. Junk Publishers.

Watts, M.E, I.R. Ball, R.R. Stewart, C.J. Klein, K. Wilson, C. Steinback, R. Lourival, L. Kircher, and H.P. Possingham. (2009). Marxan with Zones: software for optimal conservation based land- and sea-use zoning, Environmental

Modelling & Software (2009), doi:10.1016/j.envsoft.2009.06.005 [Add to Citavi project by DOI] Electronic Preprint pdf (367KB) Final Published Version

White, F. 1983. The Vegetation of Africa. UNESCO.

Weimerskirch H., Le Corre M., Tew Kay E. & Marsac F. (2010). Foraging movements of great frigatebirds from Aldabra Island: relationship with environmental variable and interactions with fisheries. Progress in Oceanography 86: 204-213

Vesey-Fitzgerald, D. 1940. On the vegetation of Seychelles. Journal of Ecology, 28: 465-483.

ANNEX 1A - BACKGROUND DOUMENTS

DATA SHARING AGREEMENT

BETWEEN

THE GOVERNMENT OF SEYCHELLES REPRESENTED BY ENVIRONMENT DEPARTMENT

AND

Seychelles Islands Foundation

This Agreement is made and entered into by and between the Government of Seychelles, Environment Department, hereinafter referred to as "ED", and Seychelles Islands Foundation, hereinafter referred to as "SIF".

CONTACTS:	**ENVIRONMENT DEPARTMENT**
Name:	Mr Wills Agricole (Representing interests of MEE/ED)
Job Title:	Principal Secretary
Address:	Ministry of Environment, Botanical Gardens, Victoria, Mahe
Phone:	4670512
E-mail:	w.agricole@meteo.gov.sc
CONTACTS:	**Seychelles Islands Foundation**
Name:	Dr Frauke Dogley
Job Title:	CEO - Seychelles Islands Foundation
Address:	P O Box 853, Victoria, Mahe, Seychelles
Phone:	+ 248 4321 735
E-mail:	ceo@sif.sc

1. DEFINITIONS

1.1 '*Agreement*' means this Data Sharing Agreement, including all documents attached or incorporated by reference.
1.2 '*Constraints*' means the restrictions set by the Data Owner or Data Provider on access to the dataset, as set out in Schedule 7.2.
1.3 '*Data Manager*' The person or organization responsible for the receipt, storage and dissemination of the data under the conditions dictated by this agreement, which for the purposes of this process will be Government of Seychelles Environment Department.
1.4 '*Data Owner*' The legal entity possessing the right to create a digital record of a dataset. The record may be a product derived from another, possibly non-digital product, which may affect the right.
1.5 '*Data Provider*' A custodian of data that is making it technically available, and which may or may not be the data owner. If not, they will have permission to make the data available and will formerly provide written proof of same.
1.6 '*Data Processor*' An authorised custodian of data that has received data for processing (which may include a '*Data Provider*'.

1.7 '*Data Storage*' refers to the state data is in when at rest.
1.8 '*Data Repository*' refers to the location the data will be stored when at rest, which for the purposes of this process will be Government of Seychelles Environment Department.
1.9 '*Data Sharing*' The process of and agreements for making data available for use.
1.10 *'Disclosure'* means to permit access to or release, transfer, or other communication of data.
1.11 *'Metadata'* means contextual information and attributes describing the data that comprises the material provided by the Data Provider, as described in Schedule 8.
1.12 '*Processing'* includes collecting, storing, amending and disclosing data.
1.13 *'Sensitive data'* Any data that the provider EDs not want to make available (e.g. precise localities of endangered species).
1.14 *'Seychelles Planning Consortium'* (SEYPC) The Seychelles planning process will implemented by the current UNDP/GEF Protected Areas project, by future projects supported UNDP/GEF and other implementing partners, which collectively are referred to as the Seychelles Planning Consortium.

2. PURPOSE OF THE DATA SHARING AGREEMENT

2.1 The purpose of this Data Sharing Agreement (DSA) is to provide the Data Manager, with access to data for use in the Seychelles Planning Process, which will include an assessment of the existing system of marine and terrestrial protected areas, the identification of priority areas for inclusion in the expansion of the Seychelles protected area network, and for the development of design options for a multi-use marine zoning and climate change adaptation plan to optimise the sustainable use and effective management of the Seychelles Exclusive Economic Zone (EEZ). .

2.2 The data provided will be used to (1) produce ecological and human-use data layers and (2) for spatial analysis using decision support software such as Marxan.

2.3 Decision support software will be used, to iteratively identify: (1) areas of high conservation value using ecological data only; (2) areas of high conservation utility that minimize impacts to marine users and coastal communities; and (3) areas of high conservation value that incorporate reserve design principles.

2.4 The results of the Seychelles Planning process are intended to help advance marine and terrestrial planning in the Seychelles by providing a comprehensive and publicly accessible source of information to support planning decisions, as far as is permitted by the terms of use.

3. PERIOD OF AGREEMENT

3.1 This Agreement shall begin on [insert date], and end on when the Seychelles Planning Process has been finalised, unless terminated sooner as provided herein.

4. DESCRIPTION OF DATA TO BE SHARED

4.1 Get from Data Request Form

5. DATA TYPES

5.1 Data and information collected and compiled for the purpose stated above by the Data Manager or an authorised Data Processor thereof, may be divided into three classes of data as listed below:

5.2 Raw data: A 'raw dataset' is the data that is provided from a Data Provider, bearing in mind these may be shared in different formats (e.g. as a hardcopy map, a database and the contents thereof, Excel spreadsheets, ESRI shapefile, text files etc.).

There are three sub-classes of raw datasets:

i. Raw data (GoS-UNDP-GEF-SIF): A new *'raw dataset'* that was generated under the current GoS-UNDP-GEF Protected Areas Project and other UNDP-GEF Projects that is shared by a Data Provider.

ii. Raw dataset (other): A new *'raw dataset'* that was generated under other projects with support of another funding body that is provided by a Data Provider.

iii. Raw dataset (historic): A historical *'raw dataset'* is an archive dataset that was generated under any project with support of another funding body is provided by a Data Provider.

5.3 Processed dataset: A 'processed dataset', is data that has been processed and summarized to create a comprehensive data set within the Seychelles EEZ for a particular theme (e.g. turtle-nesting beaches). Processed data may contain data from many Data Providers, which may include the ED, other National institutions and other sources; and

5.4 Marxan ready file: A 'Marxan-ready file' is a file prepared by the Data Manager or Data Processors for input into the decision-support tool Marxan. These files summarize the amount of each feature (e.g. turtle-nesting beaches) in a particular area.

6. DATA OWNERSHIP

6.1 Data ownership rests with the originator and/or Data Provider;

6.2 Data Owners can be either an individual, an organisation or their representative, including ED or another National Institution, or a combination of the aforementioned;

6.3 Data Providers are responsible for obtaining permission from the data originators and for supplying associated metadata and citation requirements;

6.4 Data provided by National Institutions are deemed to be National contributions to the purpose and would remain the intellectual property of those institutions;

6.5 Raw data (GoS-UNDP-GEF-SIF) associated metadata, data collection activities and resulting products are deemed to be joint contributions to the purpose and would remain the joint intellectual property of those organisations;

6.6 Raw data (other) and Raw data (historic) must be attributed with comprehensive metadata, terms of use restrictions and citation requirements.

6.7 The Data Manager will actively pursue and support the repatriation of other data sets to Seychelles for the purpose of this Agreement.

7. USE OF DATA

7.1 TERMS OF USE

7.1.1 Data Owners and or Data Providers can determine the terms and conditions of the use of the data by others through this Agreement;

7.1.2 Data Manager and any authorised Data Processors must only use the data for the purpose set out by the Data Owner/Data Provider, established in this Agreement;

7.1.3 Citation requirements supplied by Data Providers in the metadata must be respected and followed without exception;

7.1.4 Use of any derived data products must acknowledge and abide by the terms of use set for the source / raw data;

7.1.5 Metadata must always be made publicly available even if the data themselves are severely restricted;

7.1.6 The requirements in this section shall survive the termination or expiration of this agreement or any subsequent agreement intended to supersede this DSA.

7.2 RESTRICTIONS

7.2.1 There are three main classes of restrictions that may be placed on any raw, processed and Marxan input datasets under the terms of this agreement:

i. **Unrestricted use- Citation- Non-commercial (SEY-01):** These data are open access for non-commercial use by anyone, including the public, as long as the original authors and source are cited. Data Providers grant anyone a non-exclusive license to handle and process the dataset content as long as the original authors and source are cited.

ii. **Restricted use- Citation- Non-commercial (SEY-02):** Data Providers grant the Data Manager and authorised Data Processors a non-exclusive license to handle and process the dataset for any purpose without notification, as long as the original authors and source are cited.

iii. **Restricted use- Seychelles Planning process exclusively- Citation- Non-commercial (SEY-03) (default):** Data Providers grant the Data Manager and authorised Data Processors a non-exclusive licence to handle and process the dataset for the purpose of this Agreement exclusively, as long as the original authors and source are cited. Any other future use of the data would require the Data Providers permission.

There are two more classes of data restrictions that may be related to 'processed' and Marxan inputs files:

iv. **Restricted use- Data Providers- Citation- Non-commercial (SEY-04):** Data Providers grant the Data Manager and authorised Data Processors permission to redistribute a processed dataset to other Data Providers that contributed to the dataset, as long the original authors and source are cited.

This might be an appropriate category where raw data from more than one contributor have been combined by a Data Processor to generate a combined processed data product (e.g. shapefile showing the distribution of seagrass beds or turtle nesting beaches).

v. **Restricted use- Seychelles Planning process exclusively- Review- Citation- Non-commercial (SEY-05)**: Data Providers grant the Data Manager and authorised Data Processors a non-exclusive licencelicense to handle and process the processed dataset if the Data Providers are allowed to review the data and original authors and source are cited.

This might be an appropriate category to use where raw data from more than one contributor have been combined to create a processed dataset and a Marxan input file, and the original Data Providers may wish to review the file before the data is used in the Marxan analysis.

8. MECHANISM FOR DATA SHARING AND ACCESS

8.1 METADATA

8.1.1. Data Providers shall describe the datasets provided whether from new or historical data sources. Data Managers will assist in writing the metadata where required.

8.1.2 Internationally recommended standards for data description shall be used in all cases (metadata standards and ontologies by MMI, JCOMM, IODE, ICAN).

8.1.3 Metadata formats used by the Data Manager shall comply with Open Geospatial Consortium (OGC) and ISO standards.

8.1.4 Metadata for all data collected, compiled, stored, and processed by the Data Manager for the purpose of this Agreement shall be made publically available as soon as practically possible.

8.2 DATA MANAGEMENT

8.2.1. Once data passes from a Data Provider to the Data Manager the responsibility for the handling and processing of these data under the terms of this agreement will be transferred

(bearing in mind, as stated above, that "processing" includes collecting, storing, amending and disclosing data);

8.2.2. The Data Manager will be responsible for ensuring compliance with this Agreement and terms of use and constraints in handling or processing datasets specified by the Data Provider;

8.2.3 Individuals authorised by the Data Manager to receive data, whether they are staff or sub-contractors, are considered to be "Data Processors" i.e., processing those data "on behalf of" the ED. A Data Processor must at all times handle and process data solely in accordance with the instructions of the Data Manager and terms of this Agreement. Any violations of the terms of agreement for a data set may be a violation of intellectual property rights and result in legal action against the person or organization concerned.

8.3 DATA SECURITY

8.3.1 All data provided by SIF shall be deposited in a secure central repository held by the Data Manager; and

8.3.2 Access to these data will be restricted to Data Manager and authorized Data Processors who need it to perform their official duties in the performance of the work as detailed in the Purpose of this Agreement.

8.4 DATA CONFIDENTIALITY

8.4.1. The Data Manager acknowledges the confidential nature of the information provided and agrees that their staff and sub-contractors with access shall comply with terms of use and confidentiality of the data.

8.4.2 Individuals will access data gained by reason of this Agreement only for the purpose of this Agreement. In addition to any contractual arrangements, each individual with data access shall read and sign a copy of the "Statement of Confidentiality and Non-disclosure" (Annex 1) prior to access to the data. Copies of the signed forms shall be sent to and kept by the Administrator identified on Page 1 of this Agreement.

8.4.3 Should any authorized person break the terms of the Agreement, the Data Manager may at disqualify the person. Notice of disqualification shall be in writing and shall terminate a disqualified person's access to any information provided by the Data Manager pursuant to this Agreement immediately.

8.4.4 In the event that the Data Manager fails to disqualify an authorised person for breaking the Agreement or fails to comply with any terms of this Agreement, SIF shall have the right to terminate this Agreement and take any legal action deemed appropriate to recover the data provided.

8.5 PUBLICATIONS

8.5.1 Plans for publications (including tasks and time lines) will be discussed with all Data Providers and Data Owners in advance.

8.5.2 All publications of derived or processed data provided under this agreement will only be produced with the appropriate data source citations as agreed in this agreement.

8.5.3 No publication of individual un-processed or un-combined data may be made without an explicit agreement with the data provider / owner with respect to authorship, intellectual property rights and citations.

8.6 CITATIONS

8.6.1. Citation requirements supplied by Data Providers in the metadata must be respected and followed without exception;

8.6.2 Citation requirements supplied by Data Processors in the metadata must be respected and followed without exception;

8.6.3 Citation requirements supplied by Data Manager in the metadata must be respected and followed without exception.

9 COMMERCIAL GAIN

9.1 Information and datasets, as well as products developed from these dataset during the planning process, shall under no circumstances be sold or used for commercial gain, either during or after the planning process.

10 INDEMNIFICATION

10.1 Each party to this Agreement shall be responsible for any and all acts and omissions of its own staff, employees, officers, agents and sub-contractors. Each party shall furthermore defend and hold harmless the other party from any and all claims, damages, and liability of any kind arising from any act or omission of its own staff, employees, officers, agents, and sub-contractors.

11 AMENDMENTS AND ALTERATIONS TO THIS AGREEMENT

11.1 With mutual consent, SIF and ED may amend this Agreement at any time, provided that the amendment is in writing and signed by authorized staff.

12 TERMINATION

12.1 For convenience either party may terminate this Agreement at any time by giving not less than six months' written notice to the other.

12.2 For cause either party may terminate this Agreement with immediate effect by giving notice to the other party if either party has failed to comply with any terms of this Agreement which cannot be remedied or is not remedied within 30 days after a notice from the first party specifying non-compliance and its remedy.

12.3 Either party shall promptly notify the other in writing of the termination and the reasons for termination, together with the effective date of termination. In case of termination, the dataset concerned shall be destroyed by the offending party and written notification of destruction shall be provided.

13 GOVERNING LAW

This Agreement shall be governed by the laws of the Republic of Seychelles.

14 SIGNATURES

The signatures below indicate agreement between the parties.

Signature	Signature
Printed Name: **Mr Wills Agricole**	Printed Name: Frauke Dogley
Job Title: **Principal Secretary**	Job Title: CEO
Organisation: **Ministry of Environment and Energy**	Organisation: Seychelles Islands Foundation
Date:	Date:

STATEMENT OF CONFIDENTIALITY AND NON-DISCLOSURE

As an employee/sub-contractor of the Government of Seychelles Environment Department, I have access to information provided for the purpose of the Seychelles Planning process. This information is confidential, and I understand that I am responsible for maintaining this confidentiality. I understand that the information may be used solely for the purposes of work.

- I have been informed and understand that all information related to this DSA is confidential and may not be disclosed to unauthorized persons. I agree not to divulge, transfer, sell, or otherwise make known to unauthorized persons any information contained in this system.
- I also understand that I am not to access or use this information for my own personal information but only to the extent necessary and for the purpose of performing my assigned duties as an employee/sub-contractor of ED under this Agreement. I understand that a breach of this confidentiality will be grounds for disciplinary action which may also include termination of my employment / contract and other legal action.
- I have read and understood the above, and agree to abide by this DSA.

Signature	
Printed Name	
Organization	
Job Title	
Email	
Phone number	

GoS-MEE Administrator: The employee/sub-contractor has been informed of their obligations including any limitations, use or publishing of confidential data.

Signature	
Printed Name	
Organization	
Job Title	
Email	
Phone number	

This Data Sharing Agreement was prepared as part of the GoS-UNDP-GEF Project
"Strengthening Seychelles' protected area system through NGO management modalities"

ANNEX 1B - DATA REQUEST FORM

Seychelles Planning Consortium- DATA REQUEST FORM

GoS-UNDP-GEF Project "Strengthening Seychelles' protected area system through NGO management modalities

Name:	Frauke Dogley; Nancy Bunbury				Organization:	Seychelles Islands Foundation											
Email:	ceo@sif.sc; nancy@sif.sc				Telephone /Mobile:												
DataSet	**Author**	**Status**	**Title**	**Subject**	**Abstract**	**Publication_Reference**	**Terms_of_Use_Rawdata**	**Terms_of_Use_Proce**	**Terms_of_Use_Marxa**	**Language**	**Format**	**Type**	**Extent**	**West Bounding Coordinate**	**South Bounding Coordinate**	**East Bounding Coordinate**	**North Bounding Coordinate**
e.g. ASCLME01	Jarvis et al. 2008	Completed	ASCLME: Elevation data	ASCLME; land; geomorphology; geology; elevation	Digital elevation model (DEM) was downloaded from CGIR website. The DEM is derived from the shuttle Topographic Radar Mission (SRTM). We utilized DEM as an input factor for slope steepness (S), which is a parameter that adjusts	Jarvis et al. 2008. Digital elevation model.				English	Geotiff		WIO countries				
	SIF			Coco-de-Mer	Coco-de-mer distribution maps - Praslin / Valley de Mai	e.g. SIF (2013) Coco-de-mer distribution data. Spreadsheets. Seychelles Islands Foundation, Victoria, Mahe, Seychelles. Http://www.sif.sc											Praslin
	SIF			Marine species records	Checklist of marine species Aldabra												Aldabra
	SIF			Terrestrial species records	Checklist of terrestrial species Aldabra												Aldabra
	SIF			Seabird monitoring	Seabird monitoring data												Aldabra / Praslin
	SIF			Seabird nesting	Seabird nesting colony distribution data												Aldabra / Praslin
	SIF			Seabird monitoring	Seabird tracking data Frigatebirds												Aldabra
	SIF			Landbird monitoring	Landbird monitoring data (Aldabra / Praslin VDM)												Aldabra / Praslin
	SIF			Landbird nesting	Landbird nesting distribution data (Aldabra / VDM)												Aldabra / Praslin
	SIF			Landbird monitoring	Landbird distribution / adundance data (e.g. Madagascar Pond Heron)												Aldabra
	SIF			Landbird monitoring	Landbird distribution / adundance data (e.g. Black Parrot)												Praslin
	SIF			Landbird monitoring	Landbird distribution / adundance data (e.g. Picard Rail)												Aldabra
	SIF			Turtle monitoring	Turtle monitoring data Aldabra	e.g. SIF (2000-2013) Turtle monitoring data											Aldabra
	SIF			Turtle monitoring	Satellite tagged turtle tracks												Aldabra
	SIF			Tortoise monitoring	Tortoise distriution / abundance data Aldabra												Aldabra

ANNEX 1C - SEYCHELLES PLANNING CONSORTIUM - BACKGOUND DOCUMENTS

UNDP-GEF Project "Strengthening Seychelles' Protected Area System through NGO management modalities"

GUIDING PRINCIPLES FOR DATA SHARING FOR THE SEYCHELLES PLANNING CONSORTIUM



UNDP-GEF Project "Strengthening Seychelles' Protected Area System through NGO management modalities"

CONTENTS

UNDP-GEF Project "Strengthening Seychelles' Protected Area System through NGO management modalities"

INTRODUCTION

The initial phase of the Seychelles planning process is being implemented through the **UNDP-GEF Project "*Strengthening Seychelles' Protected Area System through NGO management modalities*"** (hereafter referred to simply as the Protected Areas project) implemented by the GoS through the Environment Department (ED) and UNDP. The Protected Areas projects development goal is *to facilitate working partnerships between diverse government and non-government partners in the planning and management of the protected area system in Seychelles*. Further iterations will be completed under the remit of others projects supported by UNDP/GEF and other implementing partners, which are collectively being referred to as the **Seychelles Planning Consortium**.

The remainder of this document explains the guiding principles that the Seychelles Planning Consortium will adopt with regards data ownership, data and knowledge use, data management.

GUIDING PRINCIPLES FOR DATA SHARING AND CUSTODIANSHIP

DATA SOURCING

Access to data is fundamental to the success of any systematic planning process. It will not be possible to identify potential new priority protected areas in the Seychelles or to minimize the potential socio-economic impacts of these on different resource user groups without the collective sharing of knowledge and data on the marine and terrestrial environment, its value in ecological and economic terms, and its importance.

The Seychelles Planning Consortium of partners will collect, handle and process data from a number of different sources, including national government institutions and non-government partners, and individuals and organisations both nationally and internationally. Internationally accepted standards and best-practices for data collection and management and archiving (of metadata) will be used wherever possible.

Cognizance of large number of different institutions in the country and region that are actively collecting, managing, archiving and disseminating terrestrial and marine data, the Seychelles Planning Consortium of partners will aim to avoid the duplication of existing activities where possible.

The Seychelles Planning Consortium of partners will aim to actively involve the institutions with the mandate for certain data-related activities (management or policy) in the planning process.

The Seychelles Planning Consortium of partners will also seek to repatriate data to the Seychelles and establish collaboration with other parallel initiatives that have a complimentary mandate.

DATA TYPES

Systematic planning processes involve use of three broad types of data namely, raw data, processed data and Marxan ready files as follows:

- **Raw dataset**: A *'raw dataset'* is the data that is provided from a Data Owner/Provider, bearing in mind these may be shared in different formats (e.g. as a hardcopy map, a database and the contents thereof, Excel spreadsheets, ESRI shapefile, text files etc.).

Raw or source data supplied by Data Owners / Providers, will be processed, and used to create derived layers, and these derived layers will be used to prepare Marxan ready files.

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- **Processed dataset**: A *'processed dataset'*, is data that has been processed and summarized used to create a more comprehensive or derived data set within the Seychelles EEZ for a particular theme (e.g. turtle-nesting beaches). Processed or derived data may contain data from many Data Owners/Providers, which may include government, and other institutions and sources; and
- **Marxan ready file**: A *'Marxan-ready file'* is a file prepared by the Data Manager or Data Processors for input into the decision-support tool Marxan. These files summarize the amount of each feature (e.g. turtle-nesting beaches) in a particular area.

DATA MANAGER

The Data Manager for Seychelles Planning Consortium of partners will be the Government of Seychelles Environment Department (GoS-ED), who will act as the repository for all data shared and processed, and will manage the Data Sharing Agreements and metadata catalogue.

DATA OWNERSHIP

- 'Raw data' ownership rests with the 'Data Owner' (originator) and/ or 'Data Provider' (holder).
- 'Data Owners / Providers' determine the terms of the use of the data (raw, processed, Marxan ready);
- Citation requirements as supplied by 'Data Owners/ Providers' in the metadata will be respected and followed without exception. If the data shared is as yet unpublished then an appropriate citation will be agreed for use in the metadata;

Raw data may be submitted by either 'Data Owners' or 'Data Providers'. We advise 'Data Providers' ensure they have the permission to supply the data they hold to the Seychelles Planning Consortium.

Data sharing with Seychelles Planning Consortium does not affect the copyright title of Data Owners / Providers to their records and collations nor their right to use and share them with others.

The Seychelles Planning Consortium and authorized Data Processors will handle the datasets received and create processed datasets for the purposes of systematic conservation planning, according to the terms and conditions set by Data Owners / Providers.

Data Owners / Providers will be asked to state the terms and conditions on the '*Data Request and Metadata Form*' when delivering the data to ensure that all parties involved in the transfer and use of the data understand and agree the terms and condition of data use (see below).

DATA SHARING AGREEMENT

A Data Sharing Agreement (DSA) is a formal agreement between a Data Owner / Provider and a Data Receiver (Data Manager) for the terms and conditions of use and access. A DSA helps to ensure that everyone engaging in the planning process has a clear understanding of the basis upon which they have provided the data and upon which the data can be held, used and disseminated.

Whilst a DSA is *formal* and has legal standing, the format can range from a simple statement in an email, a Data Request and Metadata form (as provided), or it can take the form of a detailed document using full legal terminology. The Data Owner/Provider can decide which type of DSA best meets their requirements.

An important part of any DSA relates to the longer term use and availability of the material beyond the end of the process for which the data were shared. If the data supplied are restricted for use during the planning process only then the data will be destroyed by the Data Manager at the end of the planning process.

If some data are subsequently deemed essential to the designation of a new protected area, these may need to remain available beyond the end of the planning process (e.g data that justifies the boundary of a new

UNDP-GEF Project "Strengthening Seychelles' Protected Area System through NGO management modalities"

protected area). If this occurs the GoS-ED will establish a revised data agreement with the Data Owner / Provider setting out terms and conditions for its future storage, viewing and use (if required).

TERMS OF USE

- Data Owner/Provider sets the terms of use of their data using a Data Sharing Agreement;
- Derived data products will acknowledge / cite the raw data; and

The Seychelles Planning Consortium would like to encourage openness and transparency in the use of data and information on the basis that it will help develop an improved understanding of the marine and terrestrial environment across society and should reduce the risk of damage to the environment.

The Seychelles Planning Consortium would also like to be able to share the derived outputs with all data contributors, such that the resulting analyses are open-access (e.g. intermediate derived layers, threat and protection assessments, spatial prioritizations and the final conservation assessment).

The Seychelles Planning Consortium however also fully recognise that some data may be either too sensitive and/or confidential and/or commercially value. Data Owner/Provider chose the terms of use of their data in the *Data Request and Metadata Form,* which accompanies the DSA (see below).

There are other ways to control access to data relating to particularly sensitive or endangered species or habitats (e.g. by reducing the spatial resolution at which the data is made accessible).

If there are data that really cannot be shared, the Seychelles Planning Consortium would at a minimum request that owners of sensitive data at least make the existence of this data known via a metadata record.

CLASSES OF TERMS OF USE

There are three main classes of restrictions that may be placed on any raw, processed and Marxan input datasets, and Data Owners/Provides can select these using Data Request and Metadata form:

i. **Unrestricted use- Citation- Non-commercial (SEY-01):** These data are open access for non-commercial use by anyone, including the public, as long as the original authors and source are cited. Data Providers grant anyone a non-exclusive license to handle and process the dataset content as long as the original authors and source are cited.

ii. **Restricted use- Citation- Non-commercial (SEY-02):** Data Providers grant the Data Manager and authorised Data Processors a non-exclusive license to handle and process the dataset for any purpose without notification, as long as the original authors and source are cited.

iii. **Restricted use- Seychelles planning process exclusively- Citation- Non-commercial (SEY-03) (default):** Data Providers grant the Data Manager and authorised Data Processors a non-exclusive license to handle and process the dataset for the planning process exclusively, as long as the original authors and source are cited. Any other future use of the data would require the Data Owners/Providers to be notified.

There are two more classes of data restrictions that may be related to 'processed' and Marxan inputs files:

iv. **Restricted use- Data Providers- Citation- Non-commercial (SEY-04):** Data Owners/Providers grant the Data Manager and authorised Data Processors permission to redistribute a processed dataset to other Data Owners/Providers that contributed to the dataset, as long the original authors and source are cited. This might be an appropriate category where raw data from more than one contributor have been combined by a Data Processor to generate a combined processed data product (e.g. shapefile showing the distribution of seagrass beds or turtle nesting beaches).



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v. **Restricted use- Seychelles planning process exclusively- Review- Citation- Non-commercial (SEY-05)**: Data Owners/Providers grant the Data Manager and authorised Data Processors a non-exclusive license to handle and process the processed dataset if the Data Providers are allowed to review the data and original authors and source are cited. This might be an appropriate category to use where raw data from more than one contributor have been combined to create a processed dataset and a Marxan input file, and the original Data Providers may wish to review the file before the data is used in the Marxan analysis.

CUSTODIANSHIP

- Metadata will be completed for all data types and archived by the Data Manager (GoS-ED);
- Data will be archived by the Data Manager and only used according to the terms of use;

Data will be housed by the Data Manager (GoS-ED) until the end of the planning process and the Data Manager will be responsible for controlling / managing data access.

Metadata records will be completed for all raw data provided to the Data Manager by individuals or organisations and for each processed dataset.

At the close of the project the metadata data cataloguing and archiving will be completed as part of the close-down of the planning process. Data will only be retained after the planning process has closed with the permission of the Data Owner/Provider.

All raw data that have been restricted for use within the planning process by the Data Owners/Providers will be destroyed. If data are subsequently deemed essential to support the designation of a site, the GoS-ED will establish a revised data agreement with the Data Owners/Providers setting out terms and conditions for its future storage, terms of use (if required).

COMMERCIAL GAIN

Information and data, as well as products developed from these data under the Seychelles planning initiative shall under no circumstances be sold, either during or after the planning process.

DISCLOSURE

- High level information on the data (e.g. metadata) will be made publicly available, even if access to the data themselves are severely restricted.

Data collected and created by the Seychelles Planning Consortium, whether from historical or new data sources, shall be described in metadata and the metadata shall be made available in the public domain as soon as practically possible, with reference to the appropriate contacts for obtaining the actual data sets provided. Anyone wishing to gain access to any of the datasets listed in the metadata catalogue will have to make a request to the relevant Data Owners/Providers.

BACKGROUND & DATA REQUIREMENTS FOR THE SEYCHELLES PLANNING INITIATIVE



UNDP-GEF Project "Strengthening Seychelles' Protected Area System through NGO management modalities"

CONTENTS

UNDP-GEF Project "Strengthening Seychelles' Protected Area System through NGO management modalities"

BACKGROUND

Seychelles has a system of 21 formal protected areas (PAs) covering a total area of 54,813ha, of which 24,978ha is terrestrial and 29,836ha marine. There are a number of other sites that are also managed as *de facto* wildlife sanctuaries and/or nature-based tourism destinations, including several privately owned/managed islands (e.g. Denis Island and North Island) and government-owned islets in the Outer islands (e.g. Farquhar Atoll). At present, the majority of formal protected areas in Seychelles are still owned and exclusively managed by the government with little or no participation from other stakeholders in their planning and management.

The Government of Seychelles (GoS) recognizes the need to review and assess the adequacy of the existing marine and terrestrial protected area network, to enable the identification of priority gaps for the future expansion of the national network. The GoS wishes to establish a transparent, scientifically robust and evidence-based participatory process by which to identify these priority areas, working in partnership with both government and non-government stakeholders, harnessing local knowledge and expertise and in full recognition of the important contribution of non-state actors in the conservation of Seychelles biodiversity.

The goal and objectives for the Seychelles protected area network and the specific targets, indicating how much of each ecosystem, habitat, and/or species is to be protected needs to be discussed and agreed. Having set protected area targets, the next step will be to determine which geographic areas in Seychelles are the highest priorities for protection in terms of both importance and urgency. Once the most important and urgent areas for protected area expansion have been identified it will then be necessary to identify the most cost-effective solution for their designation and protection that minimizes the impact to resource users.

The GoS will adopt a systematic planning approach and employ the use of decision-support tools such as MARXAN[1,2,3] to help identify the priority areas for protection. Systematic planning is a data demanding step-wise process that can be thought about as a series of inter-linked activities. Each individual activity consists of a number of iterative steps, which may involve adaptive feedback loops, and the input of local experts is integral to the success of the process. In anticipation of this fact, the GoS has adopted a phased approach and integrated systematic planning into a number of different projects to facilitate the sequential progression of the process and to allow time for the refinement of planning outcomes.

The initial phase of the Seychelles planning process will be implemented through the **UNDP-GEF Project "*Strengthening Seychelles' Protected Area System through NGO management modalities*"** (hereafter referred to simply as the Protected Areas project) implemented by the GoS through the Environment Department (ED) and UNDP. This is appropriate given that the Protected Areas project development goal is *to facilitate working partnerships between diverse government and non-government partners in the planning and management of the protected area system in Seychelles*. Further iterations will be completed under the remit of others projects supported by UNDP/GEF and other implementing partners, which will hereafter be referred to as the **Seychelles Planning Consortium**.

The remainder of this document explains the data requirements for the Seychelles planning process and how you can help.

[1] http://www.uq.edu.au/marxan/ freeware available from the University of Queensland
[2] http://www.kent.ac.uk/dice/cluz/index.html for a review of Marxan.
[3] Ball et al 2009

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SEYCHELLES SYSTEMATIC PLANNING PROCESS

Systematic planning processes, such as employed in **Marine Spatial Planning (MSP)** and **Systematic Conservation Planning (SCP)**, are used to identify geographic areas of biodiversity importance, which can then be used by decision-makers to help them to determine how and where to best allocate limited conservation resources to minimize the loss of biodiversity and other ecosystem services, while also minimizing the cost to other resource users and stakeholder groups. The benefits of these robust evidence-based planning approach have been demonstrated in both marine and terrestrial realms across local, national and regional scales, and represent current 'best practice'.

Systematic planning processes emphasise the need to conserve a representative sample of ecosystems and their species, but also consider the ecological processes that permit these conservation 'features' to persist over time, and the potential 'costs' to human resource user groups. Quantitative targets are defined and used to express how much of each 'feature' should be included within a Protected Areas or placed under some other form of spatial management. The decision support tools (e.g. MARXAN) are then used to identify the most spatially efficient and cost-effective way to achieve the desired targets.

A systematic planning process can be thought of as a series of inter-linked activities, as illustrated in Figure 1. Each individual activity involves a number of iterative steps which are often repeated to refine and improve the data inputs that are fed into the spatial prioritisation. The process depends upon two key inputs: First the input of 'best available' geospatial data, which may be obtained from existing geospatial data (vector or raster) or derived from other spatial datasets (proxies or surrogates). Second, the input of 'expert knowledge'.

The involvement of local or international taxonomic experts is integral to the planning process, especially in data-deficient areas where the process is more dependent on expert knowledge. Knowledge gathered from consultations with individuals or during expert workshops can be used to validate existing datasets and to create or infill data gaps. These consultations and workshops can also provide the opportunity for experts to review the quantitative targets for each key conservation features.

Figure 1: Steps in a standard systematic planning process

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DATA REQUIREMENTS

DATA CATEGORIES

There are various different types of data that are needed for the planning process, which are listed in Annex 1. The types of data can be categorized into three broad types of environmental data (habitats, species and processes) and three broad types of socio-economic data (pressures, protection status and opportunities / constraints). The six key data types are:

HABITATS

Terrestrial and marine areas need to be mapped and an integrated habitat map created for the entire planning area. Conservation targets are set against the original extent of each habitat type (i.e. the baseline is the extent of each habitat prior to anthropogenic impacts). Often these types of data are not available for the whole planning area and the integrated habitat map has to be constructed from the 'best available data' or derived from different sources.

SPECIES

Data on the distribution of key species, derived from direct field observations, satellite tracking studies or other means, and information on the distribution of key sites, provide an important means of refining the spatial prioritization. These types of data identify discrete areas within a habitat where species are confined and reliant for their long term survival. IUCN Red Listed species are often used as the priority species for inclusion in any planning process, along with any national or locally threatened and/or culturally important species.

ECOLOGICAL PROCESSES

The presence of species and even habitats is not always sufficient to ensure the long term persistence of biodiversity. Important ecological processes that support the persistence of species can also be included in the planning process. As the direct mapping of ecological processes is challenging, proxies or surrogates are often used.

PRESSURE / CONDITION

Data will be required on the current status of habitats and/or other biodiversity features. In the terrestrial realm this will typically involve the use of maps showing land use patterns. In the marine realm this may be represented by the main patterns of resource uses (e.g. fishing effort and shipping), but it can also include transformed habitats (e.g. reclaimed land, harbours).

PROTECTION STATUS

Seychelles has a range of different types of protected areas with different designations, and all of these different types of protected area will need to be included.

OPPORTUNITIES / CONSTRAINTS

Opportunities might include areas such as existing conservation initiatives, that have been identified but not protected priority areas or areas that are protected for other reasons (e.g. cultural sites, security exclusion zones). Constraints might include areas flagged for development and infrastructure projects, or oil and gas concessions.



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DATA CRITERIA

The key criteria for data inputs into the planning process are set out below.

GEOSPATIAL DATA

All data inputs into the systematic models need to be geospatial whether in hard copy or soft copy. If the data has x and y coordinates or a location name it can be used; if it does not (e.g. a species lists without coordinates or location or island name), then these data cannot be used as an input for the planning process.

SPATIAL RESOLUTION

For this project, the planning area is the Seychelles EEZ. The Seychelles EEZ will be divided into equal-area planning units so that quantitative targets for each feature can be applied. The size of the planning units has yet to be decided, but these and resolution of the datasets, need to be appropriate for the planning area.

SPATIAL COVERAGE

The coverage or geographical completeness of the data is an important consideration for these types of planning processes, and ideally the dataset would cover the entire planning area. This however is often not the case and it may be necessary to interpolate the data to complete the data distributions. This can be achieved by consulting with individual experts or through expert workshops during which the spatial gaps can be in-filled using local knowledge.

SPECIES EQUALITY

Data inputs for all the features of conservation interest should ideally be available for the whole planning area. It is unlikely that this will be achievable for all taxa. Systematic planning support tools can make use of surrogate metrics and models outputs for missing data and poorly known taxa (e.g. Maxent model outputs).

HABITAT EXTENT

There is a requirement to have a habitat layer that illustrates the extent of all marine and terrestrial habitats. As habitat targets are set against the original extent, ideally this integrated habitat layer should illustrate the original extent of the habitat.

DENSITY OR PRESENCE/ABSENCE

Detailed distribution maps of key species (e.g. timed counts within randomly selected, grid squares) are a particularly useful input for systematic planning decision support tools. If however these data are not available, presence / absence data can be used instead of density.

JUSTIFICATION

The inclusion of any particular conservation feature (e.g. species, habitat etc.) needs to be justifiable and this justification should be clearly documented. For example, the justification of whether or not to include a species is often determined by the listing of the species on the IUCN Red List.

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DATA FORMATS

The preferred data formats are listed below, along with alternative formats:

PREFERRED DATA FORMATS

- ESRI geodatabase
- ESRI's shapefile (*.shp).
- ESRI ArcINFO export (*.e00).
- Drawing Exchange File (.dxf).
- Raster data (*img, geotiff, MrSID, TIN)
- Geospatial PDF

ALTERNATIVE DATA FORMATS

If the datasets are not available in the above format the following can also be accepted:

- Google Map files (*kml or *kmz).
- CAD format.
- Excel spreadsheet (with coordinates and projection).
- Text files / CSV (with coordinates and projection).
- Hard copy paper maps.

ATTRIBUTES AND CITATION

If you have a dataset that you can share we would like you to use the Data Request and Metadata form to complete some basic attribute information:

- Name or description of the feature(s).
- Source of data (author)
- An official citation if the dataset has already been published or a provisional citation for the purposes of the project / reporting.

HOW CAN YOU HELP?

We would appreciate it if you could review the data types listed in Annex 1 and consider whether you or your organization holds and can share these types of data.

If you have datasets that you could share for use in the Seychelles Planning Initiative process you can list these datasets in the "*Data Request and Metadata Form*".

Once you have completed the **Data Request and Metadata Form** please send it together with your **dataset** to:
Justin Prosper (j.prosper@env.gov.sc / justinpnp@gmail.com)

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ANNEX 1: EXAMPLE DATA INPUTS INTO A SYSTEMATIC PLANNING PROCESS

Category	Realm	Data type	Sub-types
Habitat	Terrestrial	Terrestrial habitat classification	Topography Geology / soil type Vegetation
	Marine	Marine habitat classification	Bathymetry Geology / habitat type Benthic biotopes Mangroves and other coastal wetlands
Species	Terrestrial	Mammals Birds Reptiles Amphibians Invertebrates Plants	Species distribution / records / tracks Breeding sites Foraging areas Nesting sites Aggregation sites Migration routes
	Marine	Mammals Birds Reptiles Fish and Elasmobranchs Invertebrates (corals + others) Seagrass Algae Mangroves	Species distribution / records / records / tracks Breeding sites Foraging areas Nesting sites Aggregation sites Migration routes
Processes	Terrestrial	Hydrological features Topological features Productivity (NDVI) Forests Rainfall erosivity	Surface water features (rivers, streams etc) Escarpments gradients Planted and natural
	Marine	Productivity (chl-a, net pp) Sea water temperature Sea surface height anomalies Fronts / Eddies Turbidity / Light Seagrass Coral reefs Mangroves Coastal wetlands	
Pressures / Uses	Terrestrial	Land-use Built-infrastructure Grazed areas Ground-water impacts	Poultry / pig farms, farmed areas, plantations Residential, hospitals, schools, roads, car parks, pavements, runways, utility areas, waste sites, power stations
	Marine	Fishing catch / effort Fish landing sites Fish Aggregating Devices (FADs) Recreational fishing grounds Dive sites Coastal infrastructure Marine structures Shipping activity Reclaimed areas Coastal outfalls	By fishery (e.g. large pelagics, artisanal, sea cucumber etc) Fixed and distribution of drifting FADS Harbours, marinas, petroleum ports, jetties, breakwaters Moorings, sub-sea pipelines / cables, mariculture
Protection status	Terrestrial	National Protected Areas Special Reserves RAMSAR World Heritage Private Protected Areas	
	Marine	National Protected Areas Shells Reserves RAMSAR World Heritage Private Protected Areas FAD exclusion zones	
Opportunities /	Terrestrial	Development and infrastructure	

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Category	Realm	Data type	Sub-types
constraints		projects Existing conservation areas Important Bird Areas (IBAs) Green space and amenity areas	
	Marine	Mariculture Development and infrastructure projects Important Bird Areas (IBAs) Existing protected areas Oil and gas fields	

ANNEX 2 Species List and Priority Species identified at the 2nd SEY-SCP Workshop

CLASS	ORDER	FAMILY	SPECIES	SpAuthority	Common	Origin	IUCNRL	Rarity	EDGE	CITES	Priority	Target
Mammalia	Chiroptera	Emballonuridae	*Coleura seychellensis*	Peters, 1868	Sheath-tail bat	end	CR	R	Y		3	0.9
Mammalia	Chiroptera	Pteropodidae	*Pteropus seychellensis*	Milne-Edwards, 1877	Seychelles Flying Fox	end	LC	C			3	0.3
Mammalia	Cetartiodactyla	Balaenopteridae	*Balaenoptera acutorostrata*	Lacépède, 1804	Common Minke Whale						3	0.3
Mammalia	Cetartiodactyla	Balaenopteridae	*Balaenoptera borealis*	Lesson, 1828	Sei Whale		EN				3	0.9
Mammalia	Cetartiodactyla	Balaenopteridae	*Balaenoptera brydei*	Anderson, 1879	Bryde's Whale		DD				3	0.3
Mammalia	Cetartiodactyla	Balaenopteridae	*Balaenoptera musculus*	Linnaeus, 1758	Blue Whale		EN				3	0.9
Mammalia	Cetartiodactyla	Balaenopteridae	*Balaenoptera physalus*	Linnaeus, 1758	Fin Whale		EN				3	0.9
Mammalia	Cetartiodactyla	Balaenidae	*Eubalaena australis*	Desmoulins, 1822	Southern Right Whale						1	0.3
Mammalia	Cetartiodactyla	Delphinidae	*Feresa attenuata*	Gray, 1875	Pygmy Killer Whale		DD				3	0.3
Mammalia	Cetartiodactyla	Delphinidae	*Globicephala macrorhynchus*	Gray, 1846	Short-finned Pilot Whale						3	0.3
Mammalia	Cetartiodactyla	Delphinidae	*Grampus griseus*	G. Cuvier, 1812	Grey Dolphin, Risso's Dolphin						3	0.3
Mammalia	Cetartiodactyla	Kogiidae	*Kogia breviceps*	Blainville, 1838	Pygmy Sperm Whale						3	0.3
Mammalia	Cetartiodactyla	Kogiidae	*Kogia sima*	Owen, 1866	Dwarf Sperm Whale		DD				3	0.3
Mammalia	Cetartiodactyla	Delphinidae	*Lagenodelphis hosei*	Fraser, 1956	Fraser's Dolphin		LC				2	0.3
Mammalia	Cetartiodactyla	Ziphiidae	*Indopacetus pacificus*	Longman, 1926	Longman's Beaked Whale						3	0.3
Mammalia	Cetartiodactyla	Balaenopteridae	*Megaptera novaeangliae*	Borowski, 1781	Humpback Whale		LC				3	0.3
Mammalia	Cetartiodactyla	Ziphiidae	*Mesoplodon densirostris*	Blainville, 1817	Blainville's Beaked Whale						3	0.3
Mammalia	Cetartiodactyla	Delphinidae	*Orcinus orca*	Linnaeus, 1758	Killer Whale		DD				3	0.3
Mammalia	Cetartiodactyla	Delphinidae	*Peponocephala electra*	Gray, 1846	Melon-headed Whale						2	0.3
Mammalia	Cetartiodactyla	Physeteridae	*Physeter macrocephalus*	Linnaeus, 1758	Sperm Whale		VU				3	0.6
Mammalia	Cetartiodactyla	Delphinidae	*Pseudorca crassidens*	Owen, 1846	False Killer Whale		DD				3	0.3
Mammalia	Cetartiodactyla	Delphinidae	*Stenella attenuata*	Gray, 1846	Pantropical Spotted Dolphin						3	0.3
Mammalia	Cetartiodactyla	Delphinidae	*Stenella coeruleoalba*	Meyen, 1833	Striped Dolphin		LC				2	0.3
Mammalia	Cetartiodactyla	Delphinidae	*Stenella longirostris*	Gray, 1828	Spinner Dolphin		DD				2	0.3
Mammalia	Cetartiodactyla	Delphinidae	*Steno bredanensis*	G. Cuvier in Lesson, 1828	Rough-toothed Dolphin						3	0.3
Mammalia	Cetartiodactyla	Delphinidae	*Tursiops aduncus*	Ehrenberg, 1833	Indo-Pacific Bottlenose Dolphin						3	0.3
Mammalia	Cetartiodactyla	Delphinidae	*Tursiops truncatus*	Montagu, 1821	Common Bottlenose Dolphin						2	0.3
Mammalia	Cetartiodactyla	Ziphiidae	*Ziphius cavirostris*	G. Cuvier, 1823	Cuvier's Beaked Whale						3	0.3
Mammalia	Sirenia	Dugonidae	*Dugong dugon*	Müller, 1776	Dugong		VU				3	0.6
Aves	Passeriformes	Sylviidae	*Acrocephalus sechellensis*	Oustalet, 1877	Seychelles Warbler	end	VU	R			3	0.6
Aves	Caprimulgiformes	Apodidae	*Aerodramus elaphrus*	Oberholser, 1906	Seychelles Swiftlet	end	VU	R			3	0.6
Aves	Columbiformes	Columbidae	*Alectroenas pulcherrima*	Scopoli, 1786	Seychelles Blue Pigeon	end	LC	C			1	0.3
Aves	Charadriiformes	Sternidae	*Anous stolidus*	Linnaeus, 1758	Brown Noddy		LC	C			1	0.3
Aves	Charadriiformes	Sternidae	*Anous tenuirostris*	Temminck, 1823	Lesser Noddy		LC	C			2	0.3
Aves	Ciconiiformes	Ardeidae	*Ardea cinerea*	Linnaeus, 1758	Grey Heron	ind	LC	C			1	0.3

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Aves	Ciconiiformes	Ardeidae	*Ardeola idae*	Hartlaub, 1860	Madagascar Pond-heron, Madagascar Pond-Heron, Madagascar Squacco Heron, Malagasy Pond Heron						3	0.9
Aves	Ciconiiformes	Ardeidae	*Bubulcus ibis ibis*	Linnaeus, 1758	Western Cattle Egret	ind	LC	C			1	0.3
Aves	Ciconiiformes	Ardeidae	*Bubulcus ibis seychellarum*	Salomonsen, 1934	Western Cattle Egret	end	LC	A			2	0.3
Aves	Ciconiiformes	Ardeidae	*Butorides striatus degens*	Hartert, E, 1920	Striated Heron	end	LC	C			1	0.3
Aves	Passeriformes	Muscicapidae	*Copsychus sechellarum*	Newton, 1865	Seychelles Magpie-robin	end	EN	R			3	0.9
Aves	Psittaciformes	Psittacidae	*Coracopsis (nigra) barklyi*	E.Newton, 1867	Seychelles Black Parrot	end	VU	R			3	0.6
Aves	Gruiformes	Rallidae	*Dryolimnas cuvieri*	Pucheran, 1845	White-throated Rail		LC				1	0.3
Aves	Falconiformes	Falconidae	*Falco araeus*	Oberholser, 1917	Seychelles Kestrel	end	VU	O			2	0.6
Aves	Passeriformes	Ploceidae	*Foudia sechellarum*	Newton, 1865	Seychelles Fody	end	NT	O			3	0.6
Aves	Pelecaniformes	Fregatidae	*Fregata ariel*	Gray, 1845	Lesser Frigatebird		LC	C			3	0.3
Aves	Pelecaniformes	Fregatidae	*Fregata minor*	Gmelin, 1789	Greater Frigatebird, Great Frigatebird		LC	C			3	0.3
Aves	Gruiformes	Rallidae	*Gallinula chloropus*	Linnaeus, 1758	Common Moorhen	ind	LC	C			1	0.3
Aves	Charadriiformes	Sternidae	*Gygis alba*	Sparrman, 1786	Fairy Tern		LC	C			1	0.3
Aves	Passeriformes	Pycnonotidae	*Hypsipetes crassirostris*	E.Newton, 1867	Seychelles Bulbul	end	LC	C			1	0.3
Aves	Ciconiiformes	Ardeidae	*Ixobrychus sinensis*	Gmelin, 1789	Yellow Bittern	ind	LC	R			3	0.3
Aves	Passeriformes	Nectariniidae	*Nectarinia dussumieri*	Hartlaub, 1860	Seychelles Sunbird	end	LC	C			1	0.3
Aves	Charadriiformes	Scolopacidae	*Numenius arquata*	Linnaeus, 1758	Eurasian Curlew		NT				3	
Aves	Ciconiiformes	Ardeidae	*Nycticorax nycticorax*	Linnaeus, 1758	Black-crowned Night Heron		LC	R			1	0.3
Aves	Strigiformes	Strigidae	*Otus insularis*	Tristram, 1880	Seychelles Scops Owl	end	EN	R			3	0.9
Aves	Suliformes	Sulidae	*Papasula abbotti*	Ridgway, 1893	Abbott's Booby		EN				3	0.9
Aves	Phaethontiformes	Phaethontidae	*Phaethon lepturus*	Daudin, 1802	White-tailed Tropicbird		LC	F			1	0.3
Aves	Phaethontiformes	Phaethontidae	*Phaethon rubricauda*	Boddaert, 1783	Red-tailed Tropicbird		LC	O			3	0.3
Aves	Procellariiformes	Procellariidae	*Puffinus lherminieri*	Lesson, 1839	Audubon's Shearwater		LC	C			2	0.3
Aves	Procellariiformes	Procellariidae	*Puffinus pacificus*	Gmelin, 1789	Wedge-tailed Shearwater		LC	C			2	0.3
Aves	Charadriiformes	Sternidae	*Sterna anaethetus*	Linnaeus, 1766	Bridled Tern		LC	F			3	0.3
Aves	Charadriiformes	Sternidae	*Sterna dougallii*	Montagu, 1813	Roseate Tern		LC				3	0.3
Aves	Charadriiformes	Sternidae	*Sterna fuscata*	Linnaeus, 1766	Sooty Tern		LC	C			1	0.3
Aves	Charadriiformes	Sternidae	*Sterna sumatrana*	Raffles, 1822	Black-naped Tern		LC				3	0.3
Aves	Columbiformes	Columbidae	*Streptopelia picturata*	Temminck, 1813		exo	LC	C			3	0.3
Aves	Columbiformes	Columbidae	*Streptopelia picturata rostrata*	Bonaparte, 1855	Madagascar Turtle Dove	end	LC	C			3	0.3
Aves	Suliformes	Sulidae	*Sula dactylatra*	Lesson, 1831	Masked Booby		LC				3	0.3
Aves	Suliformes	Sulidae	*Sula leucogaster*	Boddaert, 1783	Brown Booby		LC				3	0.3
Aves	Suliformes	Sulidae	*Sula sula*	Linnaeus, 1766	Red-footed Booby		LC				3	0.3
Aves	Passeriformes	Monarchidae	*Terpsiphone corvina*	Newton, 1867	Seychelles Paradise-	end	CR	R			3	0.9

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					flycatcher							
Aves	Charadriiformes	Sternidae	*Thalasseus bengalensis*	Lesson, 1831	Lesser Crested Tern		LC	F			2	0.3
Aves	Ciconiiformes	Thresiornithidae	*Threskiornis bernieri*	Bonaparte, 1855	Madagascar Sacred Ibis						3	0.9
Aves	Passeriformes	Zosteropidae	*Zosterops modestus*	Newton, 1867	Seychelles White-eye	end	EN	R			3	0.9
Reptilia	Squamata	Chamaeleonidae	*Archaius seychellensis*	Kuhl, 1820	Seychelles tiger chameleon	end	EN	R		Y	2	0.9
Reptilia	Squamata	Colubridae	*Lamprophis geometricus*	Schlegel, 1837	Seychelles house snake	end	EN	R			3	0.9
Reptilia	Squamata	Colubridae	*Lycognathophis seychellensis*	Schlegel, 1837	Seychelles wolf snake	end	EN	R			2	0.9
Reptilia	Squamata	Gekkonidae	*Ailuronyx seychellensis*	Duméril & Bibron, 1834	Bronze eye gecko	end	LC	A			2	0.3
Reptilia	Squamata	Gekkonidae	*Ailuronyx tachyscopaeus*	Gerlach & Canning, 1996	Dwarf bronze gecko	end	NT	R			3	0.6
Reptilia	Squamata	Gekkonidae	*Ailuronyx trachygaster*	Duméril & Bibron, 1851	Giant bronze gecko	end	VU	R			3	0.6
Reptilia	Squamata	Gekkonidae	*Phelsuma abbotti*	Stejneger, 1893	Abbott's Day Gecko, Aldabra Gecko	end	LC	O		Y	3	0.3
Reptilia	Squamata	Gekkonidae	*Phelsuma astriata astriata*	Tornier, 1901	Seychelles Small Day Gecko	end	LC	A		Y	1	0.3
Reptilia	Squamata	Gekkonidae	*Phelsuma sundbergi*	Rendahl, 1939	Seychelles Giant Day Gecko	end	LC	A		Y	2	0.3
Reptilia	Squamata	Gekkonidae	*Phelsuma sundbergi longinsulae*	Rendahl, 1939	Mahé Day Gecko	end	VU	A		Y	2	0.6
Reptilia	Squamata	Gekkonidae	*Phelsuma sundbergi ladiguensis*	Rendahl, 1939	La Digue Day Gecko	end	VU	A		Y	2	0.6
Reptilia	Squamata	Gekkonidae	*Phelsuma laticauda laticauda*				VU					
Reptilia	Squamata	Gekkonidae	*Urocotyledon inexpectata*	Steiner, 1893	Seychelles Sucker-tailed Gecko	end	LC	A			3	0.3
Reptilia	Squamata	Scincidae	*Trachylepis sechellensis*	Dumeril & Bibron, 1836	Seychelles Skink	end	LC	A			1	0.3
Reptilia	Squamata	Scincidae	*Trachylepis wrightii*	Boulenger 1887	Wright's Mabuya	end	LC	A			3	0.3
Reptilia	Squamata	Scincidae	*Pamelaescincus gardineri*	Boulenger, 1909	Gardiner's Burrowing Skink	end	LC	R			3	0.3
Reptilia	Squamata	Scincidae	*Janetaescincus braueri*								1	0.3
Reptilia	Squamata	Scincidae	*Janetaescincus veseyfitzgeraldi*	Parker, 1947							1	0.3
Reptilia	Testudines	Pelomedusidae	*Pelusios castanoides ssp. Intergularis*	Bour, 1983	Seychelles Chestnut-bellied Mud Turtle	end	CR	R			1	0.9
Reptilia	Testudines	Pelomedusidae	*Pelusios subniger ssp. parietalis*	Bour, 1983	Seychelles Black Mud Turtle	end	CR	R			1	0.9
Reptilia	Testudines	Testudinidae	*Aldabrachelys gigantea*	Schweigger, 1812		end	VU	A			1	0.6
Reptilia	Squamata	Elapidae	*Pelamis platura*	Linnaeus, 1766	Pelagic Sea Snake, Yellow-bellied Sea Snake							0.3
Reptilia	Testudines	Cheloniidae	*Chelonia mydas*	Linnaeus, 1758	Green Turtle		EN			Y	3	0.9
Reptilia	Testudines	Cheloniidae	*Eretmochelys imbricata*	Linnaeus, 1766	Hawksbill Turtle		CR			Y	3	0.9
Amphibia	Anura	Hyperoliidae	*Tachynenis seychellensis*	Duméril & Bibron, 1841	Seychelles island frog	end		F			2	0.3
Amphibia	Anura	Ranidae	*Ptychadaena mascareniensis*	Duméril & Bibron, 1841	Mascarene grass frog						1	0.3
Amphibia	Anura	Sooglossidae	*Nesomantis thomasseti*	Boulenger, 1909	Thomasset's Frog	end		R		Y	3	0.6
Amphibia	Anura	Sooglossidae	*Sooglossus gardineri*	Boulenger, 1911	Gardiner's Seychelles Frog	end		F		Y	3	0.6
Amphibia	Anura	Sooglossidae	*Sooglossus pipilodryas*	Gerlach & Willi, 2003	Seychelles Palm frog			R		Y	3	0.6
Amphibia	Anura	Sooglossidae	*Sooglossus sechellensis*	Boettger, 1896	Seychelles Frog	end		R		Y	3	0.6

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Amphibia	Anura	Sooglossidae	*Sooglossus* sp. nov.	Undescribed	Undescribed Frog	end		R			3	0.6
Amphibia	Gymnophiona	Caecilidae	***Grandisonia alternans***	Stejneger, 1893	Stejneger's Caecilian	end		F			3	0.6
Amphibia	Gymnophiona	Caecilidae	***Grandisonia brevis***	Boulenger, 1909	Mahe Caecilian	end		R			3	0.6
Amphibia	Gymnophiona	Caecilidae	*Grandisonia diminutiva*	Boulenger, 1909	Seychelles Caecilian	end		R			3	0.6
Amphibia	Gymnophiona	Caecilidae	***Grandisonia larvata***	Ahl, 1934	Indian Ocean Caecilian			F			3	0.6
Amphibia	Gymnophiona	Caecilidae	***Grandisonia sechellensis***	Boulenger, 1909	Seychelles Caecilian	end		R			3	0.6
Amphibia	Gymnophiona	Caecilidae	***Hypogeophis rostratus***	Cuvier, 1829	Sharp-nose Caecilian			F			3	0.6
Amphibia	Gymnophiona	Caecilidae	***Praslinia cooperi***	Boulenger, 1909	Coopers black Caecilian			R		Y	3	0.6
Actinopterygii	Actinopterygii	Aplocheilidae	*Pachypanchax playfairii*	Gunther, 1866		end		A				
Gobioidei	Gobioidei	Ptereleotridae	*Parioglossus multiradiatus*			end		R				
Actinopterygii	Actinopterygii	ALBULIDAE	*Albula glossodonta*	Forsskål, 1775	Shortjaw Bonefish		VU				3	0.6
Actinopterygii	Albuliformes	ALBULIDAE	*Albula oligolepis*	Hidaka, Iwatsuki & Randall, 2008	Smallscale Bonefish		DD				2	0.3
Actinopterygii	Anguilliformes	OPHICHTHIDAE	*Callechelys bitaeniata*	Peters, 1877			LC				1	0.3
Actinopterygii	Anguilliformes	OPHICHTHIDAE	*Lamnostoma orientalis*	McClelland, 1844	Finny Sand-eel, Oriental Sand-eel, Oriental Snake Eel, Oriental Worm-eel, Oriental Worm Eel						1	0.3
Actinopterygii	Anguilliformes	OPHICHTHIDAE	*Pisodonophis boro*	Hamilton, 1822			LC				1	0.3
Actinopterygii	Anguilliformes	OPHICHTHIDAE	*Xestochilus nebulosus*	Smith, 1962			LC				1	0.3
Actinopterygii	Anguilliformes	MURAENIDAE	*Monopenchelys acuta*	Parr, 1930	Redface Eel, Redface Moray						2	0.3
Actinopterygii	Anguilliformes	MURAENIDAE	*Rhinomuraena quaesita*	Garman, 1888	Black Leafnosed Moray Eel, Black Ribbon Eel, Ribbon Eel, Ribbon Moray						2	0.3
Actinopterygii	Beloniformes	EXOCOETIDAE	*Cheilopogon pinnatibarbatus*	Bennett, 1831	Flying Fish		LC				2	0.3
Actinopterygii	Beryciformes	HOLOCENTRIDAE	*Myripristis pralinia*	Cuvier, 1829	Big-eye Soldierfish, Big Eye Soldierfish, Port Praslin Squirrelfish, Reef Soldierfish, Scarlet Soldier, Scarlet Soldierfish, Soldierfish						1	0.3
Actinopterygii	Beryciformes	HOLOCENTRIDAE	*Myripristis seychellensis*	Cuvier, 1829	Seychelles Soldier		LC				1	0.3
Actinopterygii	Elopiformes	MEGALOPIDAE	*Megalops cyprinoides*	Broussonet, 1782	Indo-Pacific Tarpon		DD				3	0.3
Actinopterygii	Mugiliformes	MUGILIDAE	*Chelon macrolepis*	Smith, 1846	Largescale Mullet		LC				2	0.3
Actinopterygii	Mugiliformes	MUGILIDAE	*Chelon melinopterus*	Valenciennes, 1836	Otomebora Mullet		LC				2	0.3
Actinopterygii	Mugiliformes	MUGILIDAE	*Crenimugil crenilabis*	Forsskål, 1775	Fringelip Mullet		LC				2	0.3
Actinopterygii	Mugiliformes	MUGILIDAE	*Mugil cephalus*	Linnaeus, 1758	Black Mullet, Black True Mullet, Bright Mullet, Bully Mullet, Callifaver Mullet, Common Grey Mullet, Common Mullet, Flathead Greymullet, Flathead Grey Mullet, Flathead Mullet, Grey Mullet, Haarder, Hardgut Mullet, Mangrove Mullet, Mullet, River Mullet, Sea Mullet, Springer						2	0.3
Actinopterygii	Myctophiformes	MYCTOPHIDAE	*Hygophum proximum*	Becker, 1965	Firefly Lanternfish, Lantern Fish						2	0.3

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Actinopterygii	Perciformes	ACANTHURIDAE	*Acanthurus auranticavus*	Randall, 1956	Orange-socket Surgeonfish, Ring-tail Surgeon						2	0.3
Actinopterygii	Perciformes	ACANTHURIDAE	*Acanthurus bariene*	Lesson, 1831	Bariene Surgeonfish, Black-spot Surgeonfish, Eye-spot Surgeon, Roundspot Surgeonfish						2	0.3
Actinopterygii	Perciformes	ACANTHURIDAE	*Acanthurus blochii*	Valenciennes, 1835	Blue-banded Pualu, Dark Surgeon, Ringtail Surgeonfish, Tailring Surgeonfish, Whitetail Lancet						2	0.3
Actinopterygii	Perciformes	ACANTHURIDAE	*Acanthurus dussumieri*	Valenciennes, 1835	Dussumier's Surgeonfish, Eyestripe Surgeonfish, Hawaiian Surgeonfish, Ornate Surgeonfish, Palani, Penciled Surgeonfish, Pencilled Surgeon, Pencilled Surgeonfish						2	0.3
Actinopterygii	Perciformes	ACANTHURIDAE	*Acanthurus guttatus*	Forster, 1801	Mustard Surgeonfish, Mustard Tang, Spotband Surgeonfish, Spotted Surgeonfish, Spotted Tang, Whitespotted Surgeonfish						2	0.3
Actinopterygii	Perciformes	ACANTHURIDAE	*Acanthurus leucocheilus*	Herre, 1927	Palelipped Surgeonfish, White-spine Surgeon						2	0.3
Actinopterygii	Perciformes	ACANTHURIDAE	*Acanthurus leucosternon*	Bennett, 1833	Blue Surgeonfish, Powderblue Surgeonfish, Powder Blue Surgeonfish, Powder-blue Tang, Powder Blue Tang						2	0.3
Actinopterygii	Perciformes	ACANTHURIDAE	*Acanthurus lineatus*	Linnaeus, 1758	Blue Banded Surgeonfish, Blue-lined Surgeonfish, Clown Surgeonfish, Lined Surgeonfish, Striped Surgeon, Striped Surgeonfish, Zebra Surgeonfish						2	0.3
Actinopterygii	Perciformes	ACANTHURIDAE	*Acanthurus mata*	Cuvier, 1829	Bleeker's Surgeonfish, Blue-lined Surgeonfish, Elongate Surgeonfish, Mata Surgeonfish, Pale Surgeon, Striped Surgeonfish, White-tail Lancet, Yellowmask Surgeonfish						2	0.3
Actinopterygii	Perciformes	ACANTHURIDAE	*Acanthurus nigricauda*	Duncker & Mohr, 1929	Black-barred Surgeonfish, Blackstreak Surgeonfish, Epaulette Surgeonfish, Shoulderbar Surgeonfish, White-tail Surgeonfish						2	0.3
Actinopterygii	Perciformes	ACANTHURIDAE	*Acanthurus nigrofuscus*	Forsskål, 1775	Blackspot Surgeonfish, Brown Surgeonfish, Dusky Surgeonfish, Lavender Tang, Spot-cheeked Surgeonfish						2	0.3
Actinopterygii	Perciformes	ACANTHURIDAE	*Acanthurus tennentii*	Günther, 1861	Doubleband Surgeonfish, Lieutenant Surgeonfish						2	0.3
Actinopterygii	Perciformes	ACANTHURIDAE	*Acanthurus thompsoni*	Fowler, 1923	Chocolate Surgeonfish, Night Surgeonfish, Thompson's Surgeonfish, Thompson's Tang, Whitetail Surgeonfish						2	0.3
Actinopterygii	Perciformes	ACANTHURIDAE	*Acanthurus triostegus*	Linnaeus, 1758	Convict Surgeonfish, Convict Tang, Fiveband Surgeonfish						2	0.3
Actinopterygii	Perciformes	ACANTHURIDAE	*Acanthurus xanthopterus*	Valenciennes, 1835	Cuvier's Surgeonfish, Purple Surgeonfish, Ring-tailed Surgeonfish, Yellowfin Surgeonfish, Yellow-mask Surgeon						2	0.3

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Actinopterygii	Perciformes	ACANTHURIDAE	*Ctenochaetus binotatus*	Randall, 1955	Two-spot Bristletooth, Twospot Surgeonfish						2	0.3
Actinopterygii	Perciformes	ACANTHURIDAE	*Ctenochaetus striatus*	Quoy & Gaimard, 1825	Bristle-toothed Surgeonfish, Lined Bristletooth, Orange-dotted Bristletooth, Striated Surgeonfish, Striped Bristletooth						2	0.3
Actinopterygii	Perciformes	ACANTHURIDAE	*Ctenochaetus truncatus*	Randall & Clements, 2001	Indian gold-ring bristle-tooth, Squaretail Bristletooth						2	0.3
Actinopterygii	Perciformes	ACANTHURIDAE	*Naso annulatus*	Quoy & Gaimard, 1825	Banded Unicornfish, Long-horn Unicornfish, Nosefish, Ringtailed Unicornfish, Unicornfish, Whitemargin Unicornfish						2	0.3
Actinopterygii	Perciformes	ACANTHURIDAE	*Naso brachycentron*	Valenciennes, 1835	Humpback Unicornfish, Ringtailed Unicornfish						2	0.3
Actinopterygii	Perciformes	ACANTHURIDAE	*Naso brevirostris*	Cuvier, 1829	Brown Unicornfish, Longnose Unicornfish, Palefin Unicornfish, Shortnosed Kala, Short-nosed Unicornfish, Shortnose Unicornfish, Shortsnout Unicornfish, Spotted Unicornfish						2	0.3
Actinopterygii	Perciformes	ACANTHURIDAE	*Naso elegans*	Rüppell, 1829	Elegant Unicornfish, Indian orange-spine Unicorn, Lipstick Surgeonfish, Orangespine Unicornfish, Smoothheaded Unicornfish						2	0.3
Actinopterygii	Perciformes	ACANTHURIDAE	*Naso hexacanthus*	Bleeker, 1855	Blacktongue Unicornfish, Black Unicornfish, Nohorn Unicorn, Sleek Unicornfish, Thorpe's Unicornfish						2	0.3
Actinopterygii	Perciformes	ACANTHURIDAE	*Naso thynnoides*	Cuvier, 1829	Barred Unicornfish, Oneknife Unicornfish, One-spine Unicorn, Singlespine Unicornfish, Thunny Unicornfish						2	0.3
Actinopterygii	Perciformes	ACANTHURIDAE	*Naso tonganus*	Valenciennes, 1835	Bulbnose Unicornfish, Humphead Unicornfish, Humpnose Unicornfish						2	0.3
Actinopterygii	Perciformes	ACANTHURIDAE	*Naso tuberosus*	Lacepède, 1801	Humpnose Unicornfish						2	0.3
Actinopterygii	Perciformes	ACANTHURIDAE	*Naso unicornis*	Forsskål, 1775	Bluespine Unicornfish, Brown Unicornfish, Humphead Unicornfish, Longhorn Unicornfish, Longnose Unicornfish, Long-snouted Unicornfish, Unicorn Tang						2	0.3
Actinopterygii	Perciformes	ACANTHURIDAE	*Naso vlamingii*	Valenciennes, 1835	Big-nose Unicorn, Bignose Unicorn, Bignose Unicornfish, Scibbled Unicornfish, Vlaming's Unicornfish, Zebra Unicornfish						2	0.3
Actinopterygii	Perciformes	CAESIONIDAE	*Caesio caerulaurea*	Lacepède, 1801	Blue and Gold Fusilier, Scissor Tailed Fusilier						2	0.3
Actinopterygii	Perciformes	CARANGIDAE	*Alectis ciliaris*	Bloch, 1787	African Pompano, Ciliated Thread-fish, Cobblerfish, Cordonnier, Crevalle, Cuban Jack, Diamond Trevally, Fiddler, Hairfish, Indian Threadfin Trevally, Jack, Jacks, Pennantfish, Pennant Fish, Pennant Trevally, Pompano, Shoemaker, Sunfish, Threadfin, Threadfin Jack, Thread-fin Jackfish, Threadfin Mirrorfish, Thread-finned Trevally,						1	0.3

CLASS	ORDER	FAMILY	SPECIES	SpAuthority	Common	Origin	IUCNRL	Rarity	EDGE	CITES	Priority	Target
					Threadfinned Trevally, Threadfin Pompano, Threadfin Trevally, Threadfish, Thread Pompano, Trevally							
Actinopterygii	Perciformes	CARANGIDAE	*Caranx sexfasciatus*	Quoy & Gaimard, 1825	Bigeye Jack, Bigeye Kingfish, Big-eye Trevally, Bigeye Trevally, Dusk Jack, Dusky Jack, Giant Trevally, Great Trevally, Horse-eye Jack, Horse Mackerel, Six banded Trevally, Tille Jack, Trevally, Turrum						2	0.3
Actinopterygii	Perciformes	CARANGIDAE	*Decapterus russelli*	Rüppell, 1830	Indian Mackeral Scad, Indian Scad, Mackerel Scad, Northern Mackerel Scad, Round Scad, Russell's Mackerel Scad, Russel's Scad, Scad, Slender Scad, Three-lined Grunter						2	0.3
Actinopterygii	Perciformes	CARANGIDAE	*Caranx ignobilis*		Giant Trevally						3	
Actinopterygii	Perciformes	Lutjanidae	*Aprion virescens*	Valenciennes, 1830	Green jobfish						2	0.3
Actinopterygii	Perciformes	CHAETODONTIDAE	*Chaetodon auriga*	Forsskål, 1775	Cross-stripe Butterfly, Diagonal Butterflyfish, Threadfin, Threadfin Butterfly, Threadfin Butterflyfish, Threadfin Butterflyfish, Threadfin Coralfish, Whip Butterflyfish						3	0.3
Actinopterygii	Perciformes	CHAETODONTIDAE	*Chaetodon bennetti*	Cuvier, 1831	Archer Butterflyfish, Bennett's butterfly, Bennett's Butterflyfish, Bennett's Coralfish, Bluelashed Butterflyfish, Bluelashed Butterflyfish, Eclipse Butterflyfish						3	0.3
Actinopterygii	Perciformes	CHAETODONTIDAE	*Chaetodon falcula*	Bloch, 1795	Blackwedged Butterflyfish, Blackwedged Butterflyfish, Double-saddled Butterflyfish, Indian Double-saddle Butterflyfish, Pigface Coralfish, Saddleback Butterflyfish, Saddled Butterflyfish, Sickle Butterflyfish						3	0.3
Actinopterygii	Perciformes	CHAETODONTIDAE	*Chaetodon guttatissimus*	Bennett, 1833	Gorgeous Gussy, Peppered Butterflyfish, Peppered Butterflyfish, Spotted Butterflyfish						3	0.3
Actinopterygii	Perciformes	CHAETODONTIDAE	*Chaetodon interruptus*	Ahl, 1923	Yellow Teardrop Butterflyfish, Yellow Teardrop Butterflyfish						3	0.3
Actinopterygii	Perciformes	CHAETODONTIDAE	*Chaetodon kleinii*	Bloch, 1790	Blacklip Butterflyfish, Brown Butterflyfish, Klein's Butterfly, Klein's Butterflyfish, Kleins Butterfly Fish, Klein's Coralfish, Sunburst Butterflyfish, Sunburst Butterflyfish , Whitespotted Butterflyfish, Yellowspot Butterflyfish						3	0.3
Actinopterygii	Perciformes	CHAETODONTIDAE	*Chaetodon leucopleura*	Playfair, 1867	Somali Butterflyfish, Somali Butterflyfish						3	0.3
Actinopterygii	Perciformes	CHAETODONTIDAE	*Chaetodon lineolatus*	Cuvier, 1831	Line Butterflyfish, Lined Butterfly, Lined Butterflyfish, Lined Butterflyfish, New-moon Coralfish						3	0.3
Actinopterygii	Perciformes	CHAETODONTIDAE	*Chaetodon lunula*	Lacepède, 1802	Halfmoon Butterflyfish, Moon Butterflyfish, Moon Butterfly fish, Raccoon Butterfly,						3	0.3

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					Raccoon Butterflyfish, Raccoon Butterflyfish , Racoon, Racoon Butterflyfish, Racoon Coralfish, Redstriped Butterflyfish							
Actinopterygii	Perciformes	CHAETODONTIDAE	*Chaetodon madagaskariensis*	Ahl, 1923	Indian Ocean Chevron Butterflyfish, Madagascar Butterflyfish, Pearlscale Butterflyfish, Pearly Butterflyfish, Pearscale Butterflyfish, Seychelles Butterflyfish, Seychelles Butterflyfish						3	0.3
Actinopterygii	Perciformes	CHAETODONTIDAE	*Chaetodon melannotus*	Bloch & Schneider, 1801	Black-back Butterflyfish, Blackback Butterflyfish, Blackback Butterflyfish, Black-backed butterflyfish, Blackbacked Butterflyfish, Black-backed Coralfish						3	0.3
Actinopterygii	Perciformes	CHAETODONTIDAE	*Chaetodon meyeri*	Bloch & Schneider, 1801	Maypole Butterflyfish, Meyer's Butterfly, Meyer's Butterflyfish, Meyer's Coralfish, Scrawled Butterflyfish, Scrawled Butterflyfish						3	0.3
Actinopterygii	Perciformes	CHAETODONTIDAE	*Chaetodon mitratus*	Günther, 1860	Indian Butterflyfish, Indian Butterflyfish						3	0.3
Actinopterygii	Perciformes	CHAETODONTIDAE	*Chaetodon trifascialis*	Quoy & Gaimard, 1825	Acropora Butterfly, Chevron Butterflyfish, Chevron Butterflyfish, Chevroned Butterflyfish, Rightangle Butterflyfish, Triangulate Butterflyfish, V-lined Butterflyfish						3	0.6
Actinopterygii	Perciformes	CHAETODONTIDAE	*Chaetodon trifasciatus*	Park, 1797	Lineated Butterflyfish, Melon Butterflyfish, Melon Butterflyfish, Pinstriped Butterflyfish, Purple Butterflyfish, Rainbow Butterflyfish, Redfin Butterflyfish, Redfin Butterfly Fish, Three-banded Butterfly, Three banded coralfish, Three-banded Coralfish						3	0.3
Actinopterygii	Perciformes	CHAETODONTIDAE	*Chaetodon vagabundus*	Linnaeus, 1758	Butterfly fish, Criss-cross Butterflyfish, Crisscross Butterflyfish, Vagabond Butterflyfish, Vagabond Butterflyfish, Vagabond Coralfish, Vagabond's Butterflyfish						3	0.3
Actinopterygii	Perciformes	CHAETODONTIDAE	*Chaetodon xanthocephalus*	Bennett, 1833	Goldheaded Butterflyfish, Goldring Butterflyfish, Yellow-head Butterflyfish, Yellowhead Butterflyfish, Yellowhead Butterflyfish						3	0.3
Actinopterygii	Perciformes	CHAETODONTIDAE	*Chaetodon zanzibarensis*	Playfair, 1867	Zanzibar Butterflyfish, Zanzibar Butterflyfish						3	0.3
Actinopterygii	Perciformes	CHAETODONTIDAE	*Forcipiger flavissimus*	Jordan & McGregor, 1898	Big long-nosed Butterflyfish, Forcepsfish, Forceps Fish, Long Nose Butterfly, Long-nose Butterflyfish, Longnose Butterflyfish, Longnose Butterflyfish, Longnose Butterfly Fish, Long-nosed Butterflyfish, Longnosed Butterflyfish, Long-nosed coralfish, Longsnouted Butterflyfish, Yellow Long Nose Butterfly						3	0.3

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Actinopterygii	Perciformes	CHAETODONTIDAE	*Forcipiger longirostris*	Broussonet, 1782	Big long-nosed Butterflyfish, Big longnosed Butterflyfish, Black Long-nosed Butterflyfish, Long-beaked butterfly fish, Longnose Butterflyfish, Longnose Butterflyfish, Long-nosed Butterflyfish, Longsnouted Coralfish, Rare Long-nose						3	0.3
Actinopterygii	Perciformes	CHAETODONTIDAE	*Hemitaurichthys zoster*	Bennett, 1831	Black Pyramid Butterflyfish, Brown-and-white Butterflyfish, Brown-and-white Butterflyfish, Brushtooth Butterflyfish, Pyramid Butterflyfish						3	0.3
Actinopterygii	Perciformes	CHAETODONTIDAE	*Heniochus acuminatus*	Linnaeus, 1758	Bannerfish, Coachman, Featherfin Coralfish, Longfin Bannerfish, Pennant Bannerfish, Pennant Coralfish, Pennant Coralfish, Pennant Coral Fish, Reef Bannerfish, Wimple Fish						3	0.3
Actinopterygii	Perciformes	CHAETODONTIDAE	*Heniochus monoceros*	Cuvier, 1831	Bannerfish, Masked Bannerfish, Masked Bannerfish, Masked Coachman, Pennant Coralfish, Unicorn Pennant Coralfish						3	0.3
			Heniochus singularis									
			Heniochus dipreutes									
Actinopterygii	Perciformes	CHAMPSODONTIDAE	*Champsodon capensis*	Regan, 1908	Gaper		LC				1	0.3
Actinopterygii	Perciformes	CORYPHAENIDAE	*Coryphaena equiselis*	Linnaeus, 1758	Mahi Mahi, Pompano Dolphinfish						1	0.3
Actinopterygii	Perciformes	CORYPHAENIDAE	*Coryphaena hippurus*	Linnaeus, 1758	Common Dolphinfish, Common Dolphin Fish, Dolphinfish, Dolphin Fish, Dorado, Green Dolphin, Mahimahi, Mahi-mahi, Mahi Mahi						3	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Aethaloperca rogaa*	Forsskal, 1775	Red-flushed Cod, Red-flushed Rock-cod, Redmouth Groper, Redmouth Grouper, Redmouth Rockcod						2	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Anyperodon leucogrammicus*	Valenciennes, 1828	Slender Grouper, Slender Rockcod, Whitelined Cod, White-lined Grouper, White-lined Rockcod, White-lined Rock-cod, Whiteline Group						2	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Cephalopholis argus*	Bloch & Schneider, 1801	Argus Grouper, Blue-spotted Grouper, Peacock Grouper, Peacock Hind, Peacock Rockcod, Worldwide-peacock Rockcod						2	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Cephalopholis aurantia*	Valenciennes, 1828	Golden Hind, Golden Rockcod, Orange Cod						2	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Cephalopholis boenak*	Bloch, 1790	Bluelined Coralcod, Brown-banded Seabass, Brownbarred Grouper, Brown-barred Rockcod, Brownbarred Rockcod, Brown Coral-cod, Brown Coral Cod, Charcoal Grouper, Cherna Chocolate, Chocolate Hind, Dusty-banded Cod, Overcast Grouper, Rock Cod, Vielle Chocolat						2	0.3

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Actinopterygii	Perciformes	EPINEPHELIDAE	*Cephalopholis leopardus*	Lacepede, 1801	Leopard Hind		LC				2	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Cephalopholis miniata*	Forsskal 1775	Coral Hind		LC				3	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Cephalopholis nigripinnis*	Valenciennes 1828	Banded-tail Coral-cod, Blackfin Rockcod, Darkfin Hind, Duskyfin Rockcod						2	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Cephalopholis sexmaculata*	Ruppell 1830	Freckled Rock-cod, Saddled Rockcod, Six-banded Grouper, Six-blotch Hind, Six-blotch Rockcod, Six-spotted Rockcod						2	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Cephalopholis sonnerati*	Valenciennes, 1828	Red Coral Cod, Red Rockcod, Tomato Grouper, Tomato Hind, Tomato Rockcod, Tomato Rock Cod, Tomato Seabass, Tomato Sea Bass, Vieille Ananas						2	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Cephalopholis spiloparaea*	Valenciennes, 1828	Orange-red Pigmy Grouper, Orange Rock Cod, Strawberry Cod, Strawberry Grouper, Strawberry Hind, Strawberry Rockcod						2	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Dermatolepis striolata*	Playfair, 1867	Smooth Grouper		DD				2	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Epinephelus areolatus*	Forsskal, 1775	Areolated Grouper, Areolate Grouper, Areolate Rock Cod, Flat-tail Cod, Green-spotted Rock Cod, Grouper, Spotted Grouper, Squaretail Rockcod, Squaretail Rock Cod, Yellow-spotted Rockcod, Yellow-spotted Rock-cod						2	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Epinephelus chabaudi*	Castelnau, 1861			DD				3	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Epinephelus chlorostigma*	Valenciennes, 1828	Brown-spotted Grouper, Brownspotted Grouper, Brown-spotted Reef-cod, Brownspotted Rockcod						3	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Epinephelus coeruleopunctatus*	Bloch, 1790	Garrupa, Ocellated Rock-cod, Rock Cod, Small-spotted Rock Cod, Snowy Grouper, Vieille Cuisinier, White-spotted Grouper, Whitespotted Grouper, White-spotted Reef-cod, White-spotted Rockcod, Whitespotted Rockcod						2	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Epinephelus fasciatus*	Forsskal, 1775	Banded Reed Cod, Banded Rock Cod, Blacktip Grouper, Black-tipped Grouper, Black-tipped Rockcod, Black-tipped Rock-cod, Footballer Cod, Golden Grouper, Red Banded Grouper, Red Banned Grouper, Redbarred Roccod, Rock Cod, Striped Grouper						1	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Epinephelus flavocaeruleus*	Lacepede, 1802	Blue-and-yellow Grouper, Blue And Yellow Grouper, Blue And Yellow Reef Cod, Yellotail Reef Cod, Yellowfin Grouper, Yellowtail Rockcod						2	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Epinephelus fuscoguttatus*	Forsskål, 1775	Brown-marbled Grouper						3	0.6

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Actinopterygii	Perciformes	EPINEPHELIDAE	*Epinephelus hexagonatus*	Forster, 1801	Hexagon Grouper, Honeycomb Grouper, Star-spotted Grouper, Starspotted Grouper, White Speckled Rockcod, Wirenetting Cod						2	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Epinephelus lanceolatus*	Bloch, 1790	Brindle Bass, Brindled Grouper, Giant Grouper, Queensland Groper						3	0.6
Actinopterygii	Perciformes	EPINEPHELIDAE	*Epinephelus longispinis*	Kner, 1864	Longspine Grouper, Long-spine Rock Cod, Spotted Grouper, Streaky Spot Rockcod						2	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Epinephelus macrospilos*	Bleeker, 1855	Bigspot Rockcod, Large-spotted Rockcod, Snubnose Grouper, Snubnose Rockcod, Snubnose Rock Cod						2	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Epinephelus malabaricus*	Bloch & Schneider, 1801	Malabar Grouper		NT				3	0.6
Actinopterygii	Perciformes	EPINEPHELIDAE	*Epinephelus merra*	Bloch, 1793	Dwarf-spotted Grouper, Honeycomb Cod, Honeycomb Grouper, Honeycomb Rock Cod, Wire-netted Reefcod, Wire-netting Cod						2	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Epinephelus miliaris*	Valenciennes 1830	Netfin Grouper, Netfin Rockcod						2	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Epinephelus morrhua*	Valenciennes, 1833	Banded-cheek Reef-cod, Blue Groper, Comet Cod, Comet Grouper, Contour Rockcod, Grouper						2	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Epinephelus multinotatus*	Peters, 1876	Rankin's Cod, Rankin's Rock Cod, White-blotched Grouper						2	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Epinephelus ongus*	Bloch, 1790	Speckled-fin Rockcod, Specklefin Grouper, Wavy-lined Grouper, White-speckled Rock Cod, White-streaked Groper, White-streaked Grouper, White-streaked Rockcod						2	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Epinephelus polyphekadion*	Bleeker, 1849	Camouflage Grouper						3	0.6
Actinopterygii	Perciformes	EPINEPHELIDAE	*Epinephelus rivulatus*	Valenciennes, 1830	Chinaman Rockcod, Halfmoon Grouper, Halfmoon Rockcod, White-dotted Grouper						2	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Epinephelus spilotoceps*	Schultz, 1953	Four-saddle Grouper, Foursaddle Grouper, Spotty Cod						2	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Epinephelus tauvina*	Forsskål 1775	Estuary Rock-cod, Giant Grouper, Greasy Grouper, Greasy Rockcod, Green Grouper, Reef Cod, Speckled Rockcod, Spotted Grouper						2	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Epinephelus tukula*	Morgans, 1959	Grouper, Potato Bass, Potato Cod, Potato Grouper						3	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Gracila albomarginata*	Fowler & Bean, 1930	Masked Grouper, Rededged Cod, Red-edged Rockcod, Slenderspine Grouper, Thinspine Grouper, Thinspine Rockcod, White-margined Grouper, White-square Grouper						3	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Plectropomus laevis*	Lacepède, 1801	Blacksaddled Coral Grouper						3	0.6
Actinopterygii	Perciformes	EPINEPHELIDAE	*Plectropomus pessuliferus*	Fowler, 1904	Leopard Grouper, Roving Coralgrouper, Violet Coral Trout						3	0.6

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Actinopterygii	Perciformes	EPINEPHELIDAE	*Plectropomus punctatus*	Quoy & Gairnard, 1824	Marbled Coralgrouper, Marbled Leopardgrouper						3	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Variola albimarginata*	Baissac, 1953	Lunar-tailed Grouper, Lyre-tail Cod, Lyre-tail Trout, Moontail Seabass, Painted Coral Trout, White-edged Lyre Tail, Whitemargin Lyretail Grouper						3	0.3
Actinopterygii	Perciformes	EPINEPHELIDAE	*Variola louti*	Forsskål, 1775	Common Lyre-tail Cod, Coronation Trout, Lunar-tail Cod, Lunartailed Cod, Lunar-tailed Coral-trout, Lunar-tailed Rock-cod, Lyre Tail Coral Trout, Lyretail Grouper, Yellow-edged Lyretail						3	0.3
Actinopterygii	Perciformes	GOBIIDAE	*Amblygobius tekomaji*	Smith, 1959			LC				1	0.3
Actinopterygii	Perciformes	GOBIIDAE	*Barbuligobius boehlkei*	Lachner & McKinney, 1974	Bearded Goby		LC				1	0.3
Actinopterygii	Perciformes	GOBIIDAE	*Bryaninops amplus*	Larson, 1985	Gorgonian Goby, Large Whip Goby, White-line Seawhip Goby						1	0.3
Actinopterygii	Perciformes	GOBIIDAE	*Mugilogobius mertoni*	Weber, 1911	Chequered Mangrove Goby, Merton's mangrove goby						1	0.3
Actinopterygii	Perciformes	GOBIIDAE	*Oligolepis keiensis*	Smith, 1938	Kei Goby		LC				1	0.3
Actinopterygii	Perciformes	GOBIIDAE	*Redigobius bikolanus*	Herre, 1927	Bigmouth Goby, Bug-eyed Goby, Speckled Goby						1	0.3
Actinopterygii	Perciformes	HAEMULIDAE	*Pomadasys maculatus*	Bloch, 1793	Bloched Grunt, Blotched-grunt, Blotched Grunt, Blotched Javelin-fish, Saddlefish, Saddle Grunt, Saddle Grunter, Spotted Grunter						1	0.3
Actinopterygii	Perciformes	ISTIOPHORIDAE	*Istiompax indica*	Cuvier, 1832	Black Marlin		DD				3	0.3
Actinopterygii	Perciformes	ISTIOPHORIDAE	*Istiophorus platypterus*	Shaw, 1792	Sailfish		LC				3	0.3
Actinopterygii	Perciformes	ISTIOPHORIDAE	*Kajikia audax*	Philippi, 1887	Striped Marlin		NT				3	0.6
Actinopterygii	Perciformes	ISTIOPHORIDAE	*Makaira nigricans*	Lacepède, 1802	Blue Marlin		VU				3	0.6
Actinopterygii	Perciformes	ISTIOPHORIDAE	*Tetrapturus angustirostris*	Tanaka, 1915	Shortbill Spearfish		DD				3	0.3
Actinopterygii	Perciformes	KUHLIIDAE	*Kuhlia mugil*	Forster, 1801			LC				1	0.3
Actinopterygii	Perciformes	KUHLIIDAE	*Kuhlia rupestris*	Lacépède, 1802	Buffalo Bream, Jungle Perch, Mountain Trout, Rock Flagtail						1	0.3
Actinopterygii	Perciformes	LABRIDAE	*Anampses caeruleopunctatus*	Rüppell, 1829	Bluespotted Tamarin, Bluespotted Wrasse, Blue Spotted Wrasse, Diamond Wrasse, Spotted Chisel-tooth Wrasse, Spotted Rare Wrasse						1	0.3
Actinopterygii	Perciformes	LABRIDAE	*Anampses lineatus*	Randall, 1972	Deep-sea Wrasse, Leaf Wrasse, Lined Tamarin, Lined Wrasse, White-dashed Wrasse, White-dashes Wrasse						1	0.3
Actinopterygii	Perciformes	LABRIDAE	*Anampses meleagrides*	Valenciennes, 1840	Dotted Wrasse, Marble Wrasse, Speckled Wrasse, Spotted Wrasse, Yellow Tail Tamarin,						1	0.3

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					Yellowtail Wrasse							
Actinopterygii	Perciformes	LABRIDAE	*Anampses twistii*	Bleeker, 1856	Twister wrasse, Yellowbreasted wrasse						1	0.3
Actinopterygii	Perciformes	LABRIDAE	*Bodianus anthioides*	Bennett, 1831	Lyre-tail hogfish, Lyretail hogfish						1	0.3
Actinopterygii	Perciformes	LABRIDAE	*Bodianus axillaris*	Bennett, 1832	Axil hogfish, Axilspot hogfish, Coral hogfish, Panda Hogfish, Polkadot wrasse, Turncoat hogfish						1	0.3
Actinopterygii	Perciformes	LABRIDAE	*Bodianus bilunulatus*	Lacepède, 1801	Blackspot wrasse, Crescent banded hogfish, Hawaiian hogfish, Saddle-back hogfish, Table boss, Tarry hogfish, Tuxedo hogfish						1	0.3
Actinopterygii	Perciformes	LABRIDAE	*Bodianus diana*	Lacepède, 1802	Diana's hogfish, Fourspot hogfish, Indian diana's hogfish, Polkadot grouper, Red hogfish						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Bolbometopon muricatum*	Valenciennes, 1840	Bumphead Parrotfish, Double-headed Parrotfish, Green Humphead Parrotfish, Humphead Parrotfish						3	0.6
Actinopterygii	Perciformes	SCARIDAE	*Calotomus carolinus*	Valenciennes, 1840	Bucktooth, Bucktooth Parrotfish, Carolines Parrotfish, Christmas Parrotfish, Stareye Parrotfish, Starry-eye Parrotfish						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Calotomus spinidens*	Quoy & Gaimard, 1824	Raggedtooth Parrotfish, Spinytooth Parrotfish						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Cheilinus chlorourus*	Bloch, 1791	Floral wrasse, Maori wrasse, Redspotted maori wrasse, White-dotted maori wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Cheilinus fasciatus*	Bloch, 1791	Banded maori wrasse, Floral wrasse, Red-banded wrasse, Redbreasted Maori wrasse, Red-breasted wrasse, Redbreasted wrasse, Redbreast wrasse, Scarlet-breasted maori wrasse, Scarlet-breasted wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Cheilinus oxycephalus*	Bleeker, 1853	Pointed-head wrasse, Point-head maori, Point-head maori wrasse, Red maori wrasse, Snooty Maori wrasse, Snooty wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Cheilinus trilobatus*	Lacepède, 1801	Maori Wrasse, Triple-tail Maori, Triple-tail Maori Wrasse, Tripletail Maori Wrasse, Triple-tail Wrasse, Tripletail Wrasse						1	0.3
Actinopterygii	Perciformes	LABRIDAE	*Cheilinus undulatus*	Rüppell, 1835	Giant Wrasse, Humphead, Humphead Wrasse, Maori Wrasse, Napoleon Wrasse, Truck Wrasse, Undulate Wrasse						3	0.9
Actinopterygii	Perciformes	SCARIDAE	*Cheilio inermis*	Forsskål, 1775	Cigar wrasse, Sharp-nosed rainbowfish						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Chlorurus capistratoides*	Bleeker, 1847	Pink-margined Parrotfish						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Chlorurus enneacanthus*	Lacepède, 1802	Captain Parrotfish, Green Parrotfish						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Chlorurus sordidus*	Forsskål, 1775	Bullethead Parrotfish, Burnt Parrotfish, Daisy Parrotfish, Green-finned Parrotfish, Green Parrotfish, Shabby Parrotfish						1	0.3

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Actinopterygii	Perciformes	SCARIDAE	*Chlorurus strongylocephalus*	Bleeker, 1854	Heavybeak Parrotfish, Indian Ocean Steephead Parrotfish, Purple-headed Parrotfish, Steephead Parrotfish						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Cirrhilabrus exquisitus*	Smith, 1957	Exquisite wrasse		DD				1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Coris aygula*	Lacepède, 1801	Clown coris, Clown wrasse, False clownwrasse, Humphead wrasse, Twinspot wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Coris caudimacula*	Quoy & Gaimard, 1834	Spottail Coris, Tailspot Wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Coris cuvieri*	Bennett, 1831	African coris, African wrasse, False clownwrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Coris formosa*	Bennett, 1830	Queen coris, Red wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Cymolutes praetextatus*	Quoy & Gaimard, 1834	Knife razorfish, Knife wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Cymolutes torquatus*	Valenciennes, 1840	Collared knifefish, Finescale razorfish, Razor wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Epibulus insidiator*	Pallas, 1770	Sling-jaw, Sling-jaw wrasse, Telescopefish						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Gomphosus caeruleus*	Lacepède, 1801	Birdfish, Bird wrasse, Blue green bird wrasse, Checkerboard wrasse, Green birdmouth wrasse, Indian Ocean bird wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Halichoeres cosmetus*	Randall & Smith, 1982	Adorned wrasse		LC				1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Halichoeres hortulanus*	Lacepède, 1801	Checkerboard wrasse, Four-spot wrasse, Rainbowfish, Wall wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Halichoeres iridis*	Randall & Smith, 1982	Rainbow wrasse		LC				1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Halichoeres marginatus*	Rüppell, 1835	Dusky wrasse, Splendid rainbow wrasse, Two-eyed wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Halichoeres nebulosus*	Valenciennes, 1839	Clouded rainbow fish, Clouded wrasse, Nebulosus wrasse, Nebulous wrasse, Picture wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Halichoeres scapularis*	Bennett, 1832	Brownbanded wrasse, Zigzag sandwrasse, Zigzag wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Halichoeres trispilus*	Randall & Smith, 1982	Threespot wrasse, White wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Halichoeres vrolikii*	Bleeker, 1855	Indian Ocean pinstriped wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Halichoeres zeylonicus*	Bennett, 1833	Ceylon wrasse, Goldstripe wrasse, Sri Lankan wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Hemigymnus fasciatus*	Bloch, 1792	Banded thicklip, Barred thicklip, Barred thicklip wrasse, Barred wrasse, Five-banded wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Hemigymnus melapterus*	Bloch, 1791	Blackedge thicklip wrasse, Blackeye thicklip wrasee, Half-and-half thicklip, Half-and-half wrasse, Half-half thicklip, Thick-lipped wrasse, Thicklip wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Hipposcarus harid*	Forsskål, 1775	Candelamoa Parrotfish, Candeloma						2	0.3

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					Parrotfish, Indian Ocean Longnose Parrotfish, Longnose Parrotfish							
Actinopterygii	Perciformes	SCARIDAE	*Hologymnosus annulatus*	Lacepède, 1801	Narrow-banded rainbowfish, Ringed wrasse, Ringwrasse, Ring wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Hologymnosus doliatus*	Lacepède, 1801	Candycane, Candy cane wrasse, Longface wrasse, Narrow-banded wrasse, Pastel ringwrasse, Ringed rainbowfish, Ringed wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Iniistius pavo*	Valenciennes, 1840	Black-barred razorfish, Blue razorfish, Indianfish, Indianfish blue razorfish, Pavo razorfish, Peacock razorfish, Peacock wrasse, Razor wrasse, Red-belly razor wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Labrichthys unilineatus*	Guichenot, 1847	Onelined wrasse, Tubelip wrasse, Tube-mouth wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Labroides bicolor*	Fowler & Bean, 1928	Bicolor cleanerfish, Bicolor cleaner wrasse, Bicolored cleaner wrasse, Bicolour cleaner wrasse, Cleaner wrasse, Two-colour cleaner wrasse, Yellow diesel wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Labroides dimidiatus*	Valenciennes, 1839	Blue diesel wrasse, Bluestreak cleanerfish, Blue-streak cleaner wrasse, Bluestreak cleaner wrasse, Bridled beauty, Cleaner wrasse, Cleaner wrasses, Wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Labropsis xanthonota*	Randall, 1981	Blacklobe wrasse, V-tail wrasse, Wedge-tailed wrasse, Yellowback tubelip						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Leptoscarus vaigiensis*	Quoy & Gaimard, 1824	Marbled Parrotfish, Petroleum Parrotfish, Seagrass Parrotfish, Slender Parrotfish						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Macropharyngodon bipartitus*	Smith, 1957	Diamond wrasse, Divided wrasse, Rare wrasse, Vermiculate wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Novaculichthys macrolepidotus*	Bloch, 1791	Green-banner wrasse, Seagrass nurse, Seagrass razorfish, Seagrass wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Novaculichthys taeniourus*	Lacepède, 1801	Dragon wrasse, Masked wrasse, Olive-scribbled wrasse, Reindeer wrasse, Rockmover wrasse, Tahiti sand wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Oxycheilinus arenatus*	Valenciennes, 1840	Arenatus wrasse, Speckled maori wrasse, Thin-line maori wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Oxycheilinus bimaculatus*	Valenciennes, 1840	Comettailed wrasse, Little maori wrasse, Twospot maori wrasse, Two-spot wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Oxycheilinus digramma*	Lacepède, 1801	Bandcheek wrasse, Cheek-lined Maori wrasse, Cheeklined Maori wrasse, Cheeklined wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Paracheilinus attenuatus*	Randall, 1999			LC				1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Paracheilinus mccoskeri*	Randall & Harmelin-Vivien, 1977	McCosker's flasher, Mccosker's flasher-wrasse						1	0.3

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Actinopterygii	Perciformes	SCARIDAE	*Pseudocheilinus evanidus*	Jordan & Evermann, 1903	Disappearing wrasse, Pin-striped wrasse, Scarlet wrasse, Striated wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Pseudocheilinus hexataenia*	Bleeker, 1857	Six-line wrasse		LC				1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Pseudocheilinus octotaenia*	Jenkins, 1901	Eight-lined wrasse, Eightstripe wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Pseudocoris heteroptera*	Bleeker, 1857	Torpedo wrasse		LC				1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Pseudodax moluccanus*	Valenciennes, 1840	Chisel-tooth wrasse, Chiseltooth wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Pseudojuloides argyreogaster*	Günther, 1867	Ring-cheek slender wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Pseudojuloides erythrops*	Randall & Randall, 1981	Blue-head slender-wrasse, Redeye wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Pteragogus pelycus*	Randall, 1991	Sideburn wrasse		LC				1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Pteragogus taeniops*	Peters, 1855	Cheekbar wrasse		LC				1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Scarus caudofasciatus*	Günther, 1862	Redbarred Parrotfish, Tail-barred Parrotfish						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Scarus falcipinnis*	Playfair, 1868	Greenbelly Parrotfish, Sicklefin Parrotfish						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Scarus festivus*	Valenciennes, 1840	Festive Parrotfish, Happy Parrotfish, Lunate Parrotfish						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Scarus frenatus*	Lacepède, 1802	Bridled Parrotfish, Six-banded Parrotfish, Vermiculate Parrotfish						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Scarus ghobban*	Forsskål, 1775	Blue-barred Parrotfish, Bluechin Parrotfish, Blue Trim Parrotfish, Cream Parrotfish, Globe-headed Parrotfish, Green Blotched Parrotfish, Yellow Scale Parrotfish						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Scarus globiceps*	Valenciennes, 1840	Globehead Parrotfish, Roundhead Parrotfish, Speckled Parrotfish, Violet-lined Parrotfish						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Scarus niger*	Forsskål, 1775	Black Parrotfish, Dusky Parrotfish, Swarthy Parrotfish						2	0.3
Actinopterygii	Perciformes	SCARIDAE	*Scarus prasiognathos*	Valenciennes, 1840	Blue-faced Parrotfish, Dusky Parrotfish, Green-face Parrotfish, Greenthroat Parrotfish, Ocean Parrotfish, Singapore Parrotfish, Singapore Parrotfish						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Scarus psittacus*	Forsskål, 1775	Batavian Parrotfish, Common Parrotfish, Palenosed Parrot, Palenose Parrotfish, Rosy-cheek Parrotfish						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Scarus rubroviolaceus*	Bleeker, 1847	Bicolor Parrotfish, Black-veined Red Parrotfish, Ember Parrotfish, Half & half Parrotfish, Redlip Parrotfish						3	0.3
Actinopterygii	Perciformes	SCARIDAE	*Scarus russelii*	Valenciennes, 1840	Eclipse Parrotfish, Russell's Parrotfish						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Scarus scaber*	Valenciennes, 1840	Dusky-capped Parrotfish, Five-saddle Parrotfish						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Scarus tricolor*	Bleeker, 1847	Three-colour Parrotfish, Tricolour Parrotfish						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Scarus viridifucatus*	Smith, 1956	Greenlip Parrotfish, Green-snout Parrotfish, Roundhead Parrotfish						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Stethojulis albovittata*	Bonnaterre, 1788	Blue-lined wrasse, Rainbowfish						1	0.3

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Actinopterygii	Perciformes	SCARIDAE	*Stethojulis strigiventer*	Bennett, 1833	Silver-streaked rainbowfish, Silver-streaked wrasse, Stripebelly wrasse, Striped-belly wrasse, Three-ribbon rainbowfish, Three-ribbon wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Thalassoma amblycephalum*	Bleeker, 1856	Bluehead wrasse, Bluntheaded wrasse, Parrotfish, Rainbow wrasse, Two-tone wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Thalassoma hardwicke*	Bennett, 1830	Parrotfish, Six-banded wrasse, Sixbar wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Thalassoma hebraicum*	Lacepède, 1801	Goldbar wrasse		LC				1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Thalassoma lunare*	Linnaeus, 1758	Blue wrasse, Crescent-Tail Wrasse, Crescent wrasse, Lyretail wrasse, Moon wrasse, Parrotfish, Rainbow fish, Wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Thalassoma lutescens*	Lay & Bennett, 1839	Green moon wrasse, Parrotfish, Sunset wrasse, Whistling daughter, Yellow-brown wrasse, Yellow wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Thalassoma purpureum*	Forsskål, 1775	Parrotfish, Purple wrasse, Surge wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Thalassoma quinquevittatum*	Lay & Bennett, 1839	Five striped surge wrasse, Fivestripe wrasse, Parrotfish, Red-banded wrasse, Red-ribbon wrasse						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Thalassoma trilobatum*	Lacepède, 1801	Christmas wrasse, Green-barred wrasse, Green-blocked wrasse, Ladder wrasse, Parrotfish						1	0.3
Actinopterygii	Perciformes	SCARIDAE	*Wetmorella nigropinnata*	Seale, 1901	Blackspot pigmy wrasse, Pygmy possum wrasse, Sharpnose wrasse, Yellow-banded possum wrasse						1	0.3
Actinopterygii	Perciformes	LEIOGNATHIDAE	*Gazza minuta*	Bloch, 1795	Toothed Ponyfish		LC				1	0.3
Actinopterygii	Perciformes	LEIOGNATHIDAE	*Leiognathus equulus*	Forsskål, 1775	Common Ponyfish		LC				1	0.3
Actinopterygii	Perciformes	LETHRINIDAE	*Lethrinus conchyliatus*	Smith, 1959	Redaxil Emperor, Red Axil Emperor, Smith's Pigface Bream						1	0.3
Actinopterygii	Perciformes	LETHRINIDAE	*Lethrinus enigmaticus*	Smith, 1959	Blackeye Emperor		LC				1	0.3
Actinopterygii	Perciformes	LUTJANIDAE	*Etelis carbunculus*	Cuvier, 1828	Deepwater Red Snapper, Deepwater Snappers, Jobfish, Queen Snapper, Red Snapper, Ruby-colored Snapper Fish, Ruby Snapper, Snapper, Squirrelfish Snapper						3	0.3
Actinopterygii	Perciformes	LUTJANIDAE	*Lutjanus sebae*	Cuvier, 1816	Emperor Red Snapper						3	0.3
Actinopterygii	Perciformes	LUTJANIDAE	*Lutjanus bohar*	Forsskål, 1775	Two-spot Red Snapper						3	0.3
Actinopterygii	Perciformes	POMACANTHIDAE	*Amphiprion fuscocaudatus*	Allen 1972	Seychelles Anemonefish						3	0.3
Actinopterygii	Perciformes	PINGUIPEDIDAE	*Parapercis signata*	Randall, 1984	Blackflag Sandperch						1	0.3
Actinopterygii	Perciformes	POMACANTHIDAE	*Apolemichthys trimaculatus*	Cuvier, 1831	Flagfish, Three Spot Angel, Three-spot Angelfish, Threespot Angelfish, Three Spot Angelfish						1	0.3
Actinopterygii	Perciformes	POMACANTHIDAE	*Centropyge acanthops*	Norman, 1922	African Cherubfish, African Pygmy Angelfish,						1	0.3

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					Flameback Angelfish, Jumping Bean, Orangeback Angelfish							
Actinopterygii	Perciformes	POMACANTHIDAE	*Centropyge bispinosa*	Günther, 1860	Coral Beauty, Coral Beauty Angel, Dusky Angelfish, Two-spined Angelfish, Twospined Angelfish						1	0.3
Actinopterygii	Perciformes	POMACANTHIDAE	*Centropyge debelius*	Pyle, 1990	Blue Mauritius Angelfish						2	0.3
Actinopterygii	Perciformes	POMACANTHIDAE	*Centropyge multispinis*	Playfair, 1867	Bluefin Dwarf, Brown Pygmy Angelfish, Dusky Angelfish, Dusky Cherub, Many-spined Angelfish, Multispined Angelfish						1	0.3
Actinopterygii	Perciformes	POMACANTHIDAE	*Pomacanthus chrysurus*	Cuvier, 1831	Ear-spot Angelfish, Earspot Angelfish, Goldtail Angelfish						2	0.3
Actinopterygii	Perciformes	POMACANTHIDAE	*Pomacanthus imperator*	Bloch, 1787	Angelfish, Emperor, Emperor Angelfish, Imperial Angelfish						2	0.3
Actinopterygii	Perciformes	SCOMBRIDAE	*Acanthocybium solandri*	Cuvier, 1832	Barracuda, Kingfish, Mackerel, Queen-fish, Wahoo, Wahoo Fish						1	0.3
Actinopterygii	Perciformes	SCOMBRIDAE	*Auxis rochei*	Risso, 1810	Bullet Mackerel, Bullet-tuna, Bullet Tuna, Firgate Tuna, Frigate Mackerel, Frigate Tuna, Long Corseletted Frigate Mackerel						2	0.3
Actinopterygii	Perciformes	SCOMBRIDAE	*Auxis thazard*	Lacepède, 1800	Bullet Mackerel, Frigate Mackerel, Frigate-tuna, Frigate Tuna, Leadenall						2	0.3
Actinopterygii	Perciformes	SCOMBRIDAE	*Euthynnus affinis*	Cantor, 1849	Black Skipjack, Bonito, Eastern Little Tuna, Kawakawa, Mackerel Tuna, Oceanic Bonito						2	0.3
Actinopterygii	Perciformes	SCOMBRIDAE	*Gymnosarda unicolor*	Rüppell, 1836	Dogtooth Tuna		LC				3	0.3
Actinopterygii	Perciformes	SCOMBRIDAE	*Katsuwonus pelamis*	Linnaeus, 1758	Oceanic Bonito, Oceanic Skipjack, Skipjack, Skipjack Tuna, Skipjack Tuna, Stripy						3	0.3
Actinopterygii	Perciformes	SCOMBRIDAE	*Scomberomorus commerson*	Lacepède, 1800	Narrow-barred Spanish Mackerel						3	0.6
Actinopterygii	Perciformes	SCOMBRIDAE	*Thunnus alalunga*	Bonnaterre, 1788	Aáhi Taria, Albacore, Albacore Fish, Albacore Tuna, Bastard Albacore, Bonito, Langvin Tuna, Long-finned Tuna, Longfin Tuna, Long-fin Tunny, Longfin Tunny, Tuna						3	0.6
Actinopterygii	Perciformes	SCOMBRIDAE	*Thunnus albacares*	Bonnaterre, 1788	Allison's Tuna, Pacific Long-tailed Tuna, Yellowfinned Albacore, Yellowfin Tuna						3	0.6
Actinopterygii	Perciformes	SCOMBRIDAE	*Thunnus obesus*	Lowe, 1839	Bigeye Tuna		VU				3	0.6
Actinopterygii	Perciformes	SIGANIDAE	*Siganus rivulatus*	Forsskål, 1775	Marbled Spinefoot, Rivulated rabbitfish						1	0.3
Actinopterygii	Perciformes	XIPHIIDAE	*Xiphias gladius*	Linnaeus, 1758	Broadbill, Broadbill Swordfish, Swordfish						3	0.3
Chondrichthyes	Carcharhiniformes	SCYLIORHINIDAE	*Apristurus longicephalus*	Nakaya, 1975	Longhead Catshark		DD				2	0.3
Chondrichthyes	Carcharhiniformes	PSEUDOTRIAKIDAE	*Pseudotriakis microdon*	Capello, 1868	Atlantic False Catshark, False Catshark, Keel-dorsal Shark						1	0.3
Chondrichthyes	Carcharhiniformes	SPHYRNIDAE	*Sphyrna mokarran*	Rüppell, 1837	Great Hammerhead		EN				3	0.9
Chondrichthyes	Carcharhiniformes	SPHYRNIDAE	*Sphyrna lewini*	Griffith & Smith, 1834	Scalloped Hammerhead						3	0.9
Chondrichthyes	Carcharhiniformes	Carcharhinidae	*Carcharhinus albimarginatus*	Rüppell, 1837	Silvertip Shark		NT				2	0.6

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Chondrichthyes	Carcharhiniformes	Carcharhinidae	*Carcharhinus amblyrhynchos*	Bleeker, 1856	Grey Reef Shark		NT				2	0.6
Chondrichthyes	Carcharhiniformes	Carcharhinidae	*Carcharhinus longimanus*	Poey, 1861	Oceanic Whitetip Shark						3	0.6
Chondrichthyes	Carcharhiniformes	Carcharhinidae	*Carcharhinus melanopterus*	Quoy & Gaimard, 1824	Blacktip Reef Shark		NT				2	0.6
Chondrichthyes	Carcharhiniformes	Carcharhinidae	*Carcharhinus plumbeus*	Nardo, 1827	Sandbar Shark		VU				2	0.6
Chondrichthyes	Carcharhiniformes	Carcharhinidae	*Carcharhinus sealei*	Pietschmann, 1916	Blackspot Shark		NT				2	0.6
Chondrichthyes	Carcharhiniformes	Carcharhinidae	*Carcharhinus sorrah*	Müller & Henle, 1839	Spottail Shark		NT				2	0.6
Chondrichthyes	Carcharhiniformes	Carcharhinidae	*Triaenodon obesus*	Rüppell, 1837	Whitetip Reef Shark		NT				2	
Chondrichthyes	Carcharhiniformes	Carcharhinidae	*Carcharhinus leucas*	Müller & Henle, 1839	Bull shark						3	
Chondrichthyes	Carcharhiniformes	Carcharhinidae	*Galeocerdo cuvier*	Péron & Lesueur, 1822	Tiger shark		NT				2	
Chondrichthyes	Carcharhiniformes	Carcharhinidae	*Carcharhinus falciformis*		Silky shark							
Chondrichthyes	Lamniformes	ALOPIIDAE	*Alopia pelagicus*	Nakamura 1935	Pelagic Thresher Shark							
Chondrichthyes	Lamniformes	ALOPIIDAE	*Alopia superciliosus*	Lowe 1841	Bigeye Thresher Shark						?	
Chondrichthyes	Lamniformes	ALOPIIDAE	*Alopia vulpinus*	Bonnaterre, 1788	Common Thresher Shark							
Chondrichthyes	Lamniformes	LAMNIDAE	*Carcharodon carcharias*	Linnaeus, 1758	Great White Shark		VU				2	0.6
Chondrichthyes	Hexanchiformes	HEXANCHIDAE	*Heptranchias perlo*	Bonnaterre, 1788	One-finned Shark, Perlon Shark, Sevengill Cow Shark, Sharpnose Sevengill Shark, Sharpsnouted Sevengill, Slender Sevengill							
Chondrichthyes	Hexanchiformes	HEXANCHIDAE	*Hexanchus nakamurai*	Teng, 1962	Bigeyed Sixgill Shark							0.3
Chondrichthyes	Orectoloiformes	GINGLYMOSTOMATIDAE	*Nebrius ferrugineus*	Lesson, 1830	Tawny Nurse Shark		VU					0.6
Chondrichthyes	Orectolobiformes	Rhinocodontidae	*Rhinocolon typus*	Smith 1896	Whale shark		VU				3	0.6
Chondrichthyes	Rajiformes	Mobulidae	*Manta alfredi*	Krefft, 1868	Reef Manta Ray		VU				3	0.6
Chondrichthyes	Rajiformes	Mobulidae	*Manta birostris*	Donndorff, 1798	Oceanic Manta Ray		VU				3	0.6
Chondrichthyes	Rajiformes	Mobulidae	*Mobula kuhlii*	Müller & Henle, 1841	Lesser Devilray		DD				1	0.3
Chondrichthyes	Rajiformes	Dasyatidae	*Pastinachus sephen*	Forsskael, 1775	Cowtail Stingray		DD				1	0.3
Chondrichthyes	Rajiformes	Rhinidae	*Rhina ancylostoma*	Bloch & Schneider, 1801	Bowmouth Guitarfish, Mud Skate, Shark Ray						2	0.6
Chondrichthyes	Rajiformes	Rhinobatidae	*Rhinobatos nudidorsalis*	Last, Compagno & Nakaya, 2004	Bareback Shovelnose Ray, Nakedback Guitarfish						2	
Chondrichthyes	Rajiformes	Rhinopteridae	*Rhinoptera javanica*	Müller & Henle, 1841	Flapnose Ray, Javanese Cownose Ray						2	0.6
Chondrichthyes	Rajiformes	Dasyatidae	*Taeniura lymma*	Forsskael, 1775	Bluespotted Ribbontail Ray						1	
Chondrichthyes	Rajiformes	Dasyatidae	*Taeniurops meyeni*	Müller & Henle, 1841	Black-blotched Stingray, Black-spotted Stingray, Blotched Fantail Ray, Fantail Stingray, Giant Reef Ray, Round Ribbontail Ray, Speckled Stingray						2	0.6
Chondrichthyes	Rajiformes	Dasyatidae	*Urogymnus asperrimus*	Bloch & Schneider,1801	Porcupine Ray		VU				2	0.6
Chondrichthyes	Squaliformes	Centrophoridae	*Centrophorus niaukang*	Teng, 1959	Quelvacho Chino, Taiwan Gulper Shark							
Chondrichthyes	Squaliformes	Centrophoridae	*Centrophorus seychellorum*	Baranes, 2003	Seychelles Gulper Shark						2	0.3
Chondrichthyes	Squaliformes	Somniosidae	*Centroselachus crepidater*	Bocage & Capello, 1864	Golden Dogfish, Longnose Velvet Dogfish							0.3
Chondrichthyes	Squaliformes	Squalidae	*Squalus lalannei*	Baranes, 2003	Seychelles Spurdog		DD					0.3

CLASS	ORDER	FAMILY	SPECIES	SpAuthority	Common	Origin	IUCNRL	Rarity	EDGE	CITES	Priority	Target
Anthozoa	Heloporacea	HELIOPORIDAE	*Heliopora coerulea*	Pallas 1766	Blue Coral		VU				3	0.6
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora abrotanoides*	Lamarck 1816			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora aculeus*	Dana 1846			VU				3	0.6
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora acuminata*	Verrill 1864			VU				3	0.6
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora anthocercis*	Brook 1893			VU				3	0.6
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora appressa*	Ehrenberg 1834			NT				3	
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora austera*	Dana 1846			NT				3	
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora bifurcata*	Nemenzo, 1971			DD				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora cerealis*	Dana, 1846			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora clathrata*	Brook, 1891			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora copiosa*	Nemenzo, 1967			DD				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora cytherea*	Dana, 1846			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora digitifera*	Dana, 1846			NT				3	
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora divaricata*	Dana, 1846			NT				3	
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora echinata*	Dana, 1846			VU				3	0.6
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora elseyi*	Brook, 1892			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora florida*	Dana, 1846	Branch Coral		NT				3	
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora formosa*	Dana, 1846	Staghorn Coral		NT				3	
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora forskali*	Ehrenberg, 1834			DD				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora gemmifera*	Brook, 1892			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora grandis*	Brook, 1892			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora granulosa*	Milne Edwards & Haime, 1860			NT				3	
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora hemprichii*	Ehrenberg, 1834			VU				3	0.6
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora horrida*	Dana, 1846			VU				3	0.6
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora humilis*	Dana, 1846	Finger Coral		NT				3	
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora hyacinthus*	Dana, 1846	Brush Coral		NT				3	
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora inermis*	Brook, 1891			DD				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora irregularis*	Brook, 1892			DD				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora lamarcki*	Veron, 2002			DD				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora latistella*	Brook, 1891			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora longicyathus*	Milne Edwards & Haime, 1860			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora loripes*	Brook, 1892			NT				3	
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora lutkeni*	Crossland, 1952			NT				3	
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora macrostoma*	Brook, 1891			DD				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora microphthalma*	Verrill 1859			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora millepora*	Ehrenberg 1834			NT				3	

CLASS	ORDER	FAMILY	SPECIES	SpAuthority	Common	Origin	IUCNRL	Rarity	EDGE	CITES	Priority	Target
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora mirabilis*	Quelch 1886			DD				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora monticulosa*	Brüggemann 1879			NT				3	
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora nana*	Studer 1878			NT				3	
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora nasuta*	Dana 1846			NT				3	
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora natalensis*	Riegl 1995			DD				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora nobilis*	Dana 1846			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora pharaonis*	Milne Edwards and Haime 1860			VU				3	0.6
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora pinguis*	Wells 1950			DD				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora plantaginea*	Lamarck 1816			DD				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora polystoma*	Brook 1891			VU				3	0.6
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora pulchra*	Brook 1891			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora rambleri*	Bassett-Smith 1890			DD				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora retusa*	Dana 1846			VU				3	0.6
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora robusta*	Dana 1846			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora rosaria*	Dana 1846			DD				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora roseni*	Wallace 1999			EN				3	0.9
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora rudis*	Rehberg 1892			EN				3	0.9
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora samoensis*	Brook 1891			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora secale*	Studer 1878			NT				3	
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora solitaryensis*	Veron and Wallace 1984			VU				3	0.6
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora squarrosa*	Ehrenberg 1834			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora stoddarti*	Pillai and Scheer 1976			DD				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora tenuis*	Dana 1846			NT				3	
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora valenciennesi*	Milne Edwards and Haime 1860			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora valida*	Dana 1846			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora variabilis*	Klunzinger 1879			DD				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora vaughani*	Wells 1954			VU				3	0.6
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora vermiculata*	Nemenzo 1967			DD				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora verweyi*	Veron and Wallace 1984			VU				3	0.6
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora willisae*	Veron and Wallace 1984			VU				3	0.6
Anthozoa	Scleractinia	ACROPORIDAE	*Acropora yongei*	Veron and Wallace 1984			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Anacropora forbesi*	Ridley 1884			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Astreopora expansa*	Brüggemann 1877			NT				3	
Anthozoa	Scleractinia	ACROPORIDAE	*Astreopora listeri*	Bernard 1896			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Astreopora myriophthalma*	Lamarck 1816			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Astreopora ocellata*	Bernard 1896			LC				3	0.3

CLASS	ORDER	FAMILY	SPECIES	SpAuthority	Common	Origin	IUCNRL	Rarity	EDGE	CITES	Priority	Target
Anthozoa	Scleractinia	ACROPORIDAE	*Astreopora suggesta*	Wells 1954			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Isopora brueggemanni*	Brook 1893			VU				3	0.6
Anthozoa	Scleractinia	ACROPORIDAE	*Isopora crateriformis*	Gardiner 1898			VU				3	0.6
Anthozoa	Scleractinia	ACROPORIDAE	*Isopora cuneata*	Dana 1846			VU				3	0.6
Anthozoa	Scleractinia	ACROPORIDAE	*Isopora palifera*	Lamarck 1816	Catch Bowl Coral		NT				3	
Anthozoa	Scleractinia	ACROPORIDAE	*Montipora aequituberculata*	Bernard 1897			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Montipora australiensis*	Bernard 1897			VU				3	0.6
Anthozoa	Scleractinia	ACROPORIDAE	*Montipora calcarea*	Bernard 1897			VU				3	0.6
Anthozoa	Scleractinia	ACROPORIDAE	*Montipora danae*	Milne Edwards and Haime 1851			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Montipora digitata*	Dana 1846			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Montipora efflorescens*	Bernard 1897			NT				3	
Anthozoa	Scleractinia	ACROPORIDAE	*Montipora effusa*	Dana 1846			NT				3	
Anthozoa	Scleractinia	ACROPORIDAE	*Montipora floweri*	Wells 1954			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Montipora foliosa*	Pallas 1766			NT				3	
Anthozoa	Scleractinia	ACROPORIDAE	*Montipora friabilis*	Bernard 1897			VU				3	0.6
Anthozoa	Scleractinia	ACROPORIDAE	*Montipora grisea*	Bernard 1897			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Montipora hoffmeisteri*	Wells 1954			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Montipora informis*	Bernard 1897			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Montipora lobulata*	Bernard 1897			VU				3	0.6
Anthozoa	Scleractinia	ACROPORIDAE	*Montipora millepora*	Crossland 1952			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Montipora mollis*	Bernard 1897			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Montipora monasteriata*	Forskäl 1775			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Montipora orientalis*	Nemenzo 1967			VU				3	0.6
Anthozoa	Scleractinia	ACROPORIDAE	*Montipora peltiformis*	Bernard 1897			NT				3	
Anthozoa	Scleractinia	ACROPORIDAE	*Montipora spongodes*	Bernard 1897			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Montipora spumosa*	Lamarck 1816			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Montipora stilosa*	Ehrenberg 1834			VU				3	0.6
Anthozoa	Scleractinia	ACROPORIDAE	*Montipora tuberculosa*	Lamarck 1816			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Montipora turgescens*	Bernard 1897			LC				3	0.3
Anthozoa	Scleractinia	ACROPORIDAE	*Montipora undata*	Bernard 1897			NT				3	
Anthozoa	Scleractinia	ACROPORIDAE	*Montipora venosa*	Ehrenberg 1834			NT				3	
Anthozoa	Scleractinia	ACROPORIDAE	*Montipora verrucosa*	Lamarck 1816			LC				3	0.3
Anthozoa	Scleractinia	AGARICIIDAE	*Coeloseris mayeri*	Vaughan 1918			LC				3	0.3
Anthozoa	Scleractinia	AGARICIIDAE	*Gardineroseris planulata*	Dana 1846			LC				3	0.3
Anthozoa	Scleractinia	AGARICIIDAE	*Leptoseris explanata*	Yabe and Sugiyama 1941			LC				3	0.3
Anthozoa	Scleractinia	AGARICIIDAE	*Leptoseris foliosa*	Dineson 1980			LC				3	0.3

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Anthozoa	Scleractinia	AGARICIIDAE	*Leptoseris hawaiiensis*	Vaughan 1907			LC				3	0.3
Anthozoa	Scleractinia	AGARICIIDAE	*Leptoseris incrustans*	Quelch 1886			VU				3	0.6
Anthozoa	Scleractinia	AGARICIIDAE	*Leptoseris mycetoseroides*	Wells 1954			LC				3	0.3
Anthozoa	Scleractinia	AGARICIIDAE	*Leptoseris papyracea*	Dana 1846			LC				3	0.3
Anthozoa	Scleractinia	AGARICIIDAE	*Leptoseris scabra*	Vaughan 1907			LC				3	0.3
Anthozoa	Scleractinia	AGARICIIDAE	*Leptoseris solida*	Quelch 1886			LC				3	0.3
Anthozoa	Scleractinia	AGARICIIDAE	*Pachyseris rugosa*	Lamarck 1801			VU				3	0.6
Anthozoa	Scleractinia	AGARICIIDAE	*Pachyseris speciosa*	Dana 1846			LC				3	0.3
Anthozoa	Scleractinia	AGARICIIDAE	*Pavona bipartita*	Nemenzo 1980			VU				3	0.6
Anthozoa	Scleractinia	AGARICIIDAE	*Pavona cactus*	Forskål 1775			VU				3	0.6
Anthozoa	Scleractinia	AGARICIIDAE	*Pavona clavus*	Dana 1846			LC				3	0.3
Anthozoa	Scleractinia	AGARICIIDAE	*Pavona decussata*	Dana 1846	Cactus Coral		VU				3	0.6
Anthozoa	Scleractinia	AGARICIIDAE	*Pavona duerdeni*	Vaughan 1907			LC				3	0.3
Anthozoa	Scleractinia	AGARICIIDAE	*Pavona explanulata*	Lamarck 1816			LC				3	0.3
Anthozoa	Scleractinia	AGARICIIDAE	*Pavona frondifera*	Lamarck 1816			LC				3	0.3
Anthozoa	Scleractinia	AGARICIIDAE	*Pavona maldivensis*	Gardiner 1905			LC				3	0.3
Anthozoa	Scleractinia	AGARICIIDAE	*Pavona varians*	Verrill 1864			LC				3	0.3
Anthozoa	Scleractinia	AGARICIIDAE	*Pavona venosa*	Ehrenberg 1834			VU				3	0.6
Anthozoa	Scleractinia	ASTROCOENIIDAE	*Stylocoeniella armata*	Ehrenberg 1834			LC				3	0.3
Anthozoa	Scleractinia	ASTROCOENIIDAE	*Stylocoeniella guentheri*	Bassett-Smith 1890			LC				3	0.3
Anthozoa	Scleractinia	DENDROPHYLLIIDAE	*Heteropsammia cochlea*	Spengler 1781			LC				3	0.3
Anthozoa	Scleractinia	DENDROPHYLLIIDAE	*Turbinaria frondens*	Dana 1846			LC				3	0.3
Anthozoa	Scleractinia	DENDROPHYLLIIDAE	*Turbinaria irregularis*	Bernard 1896			LC				3	0.3
Anthozoa	Scleractinia	DENDROPHYLLIIDAE	*Turbinaria mesenterina*	Lamarck 1816			VU				3	0.6
Anthozoa	Scleractinia	DENDROPHYLLIIDAE	*Turbinaria peltata*	Esper 1794			VU				3	0.6
Anthozoa	Scleractinia	DENDROPHYLLIIDAE	*Turbinaria reniformis*	Bernard 1896			VU				3	0.6
Anthozoa	Scleractinia	DENDROPHYLLIIDAE	*Turbinaria stellulata*	Lamarck 1816			VU				3	0.6
Anthozoa	Scleractinia	EUPHYLLIDAE	*Catalaphyllia jardinei*	Saville-Kent 1893			VU				3	0.6
Anthozoa	Scleractinia	EUPHYLLIDAE	*Euphyllia glabrescens*	Chamisso and Eysenhardt 1821			NT				3	0.6
Anthozoa	Scleractinia	EUPHYLLIDAE	*Physogyra lichtensteini*	Milne Edwards and Haime 1851			VU				3	0.6
Anthozoa	Scleractinia	EUPHYLLIDAE	*Plerogyra sinuosa*	Dana 1846			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Caulastrea connata*	Ortmann 1892			VU				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Caulastrea furcata*	Dana 1846			LC				3	0.3
Anthozoa	Scleractinia	FAVIIDAE	*Caulastrea tumida*	Matthai 1928			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Cyphastrea chalcidicum*	Forskål 1775			LC				3	0.3
Anthozoa	Scleractinia	FAVIIDAE	*Cyphastrea microphthalma*	Lamarck 1816			LC				3	0.3

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Anthozoa	Scleractinia	FAVIIDAE	*Cyphastrea serailia*	Forskål 1775			LC				3	0.3
Anthozoa	Scleractinia	FAVIIDAE	*Diploastrea heliopora*	Lamarck 1816			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Echinopora forskaliana*	Milne Edwards and Haime 1850			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Echinopora fruticulosa*	Ehrenberg 1834			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Echinopora gemmacea*	Lamarck 1816			LC				3	0.3
Anthozoa	Scleractinia	FAVIIDAE	*Echinopora hirsutissima*	Milne Edwards and Haime 1849			LC				3	0.3
Anthozoa	Scleractinia	FAVIIDAE	*Echinopora lamellosa*	Esper 1795			LC				3	0.3
Anthozoa	Scleractinia	FAVIIDAE	*Echinopora mammiformis*	Nemenzo 1959			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Favia favus*	Forskål 1775	Head Coral		LC				3	0.3
Anthozoa	Scleractinia	FAVIIDAE	*Favia helianthoides*	Wells 1954			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Favia lacuna*	Veron Turak and DeVantier 2000			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Favia laxa*	Klunzinger 1879			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Favia lizardensis*	Veron and Pichon 1977			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Favia maritima*	Nemenzo 1971			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Favia matthaii*	Vaughan 1918			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Favia pallida*	Dana 1846			LC				3	0.3
Anthozoa	Scleractinia	FAVIIDAE	*Favia rotumana*	Gardiner 1899			LC				3	0.3
Anthozoa	Scleractinia	FAVIIDAE	*Favia speciosa*	Dana 1846			LC				3	0.3
Anthozoa	Scleractinia	FAVIIDAE	*Favia stelligera*	Dana 1846			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Favia truncatus*	Veron 2002			LC				3	0.3
Anthozoa	Scleractinia	FAVIIDAE	*Favites abdita*	Ellis and Solander 1786			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Favites chinensis*	Verrill 1866			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Favites complanata*	Ehrenberg 1834			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Favites flexuosa*	Dana 1846			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Favites halicora*	Ehrenberg 1834			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Favites micropentagona*	Veron 2002			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Favites paraflexuosa*	Veron 2002			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Favites pentagona*	Esper 1794			LC				3	0.3
Anthozoa	Scleractinia	FAVIIDAE	*Favites russelli*	Wells 1954			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Favites spinosa*	Klunzinger 1879			VU				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Favites vasta*	Klunzinger 1879			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Goniastrea aspera*	Verrill 1905			LC				3	0.3
Anthozoa	Scleractinia	FAVIIDAE	*Goniastrea australensis*	Milne Edwards and Haime 1857			LC				3	0.3
Anthozoa	Scleractinia	FAVIIDAE	*Goniastrea edwardsi*	Chevalier 1971			LC				3	0.3
Anthozoa	Scleractinia	FAVIIDAE	*Goniastrea minuta*	Veron 2002			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Goniastrea palauensis*	Yabe and Sugiyama 1936			NT				3	0.6

CLASS	ORDER	FAMILY	SPECIES	SpAuthority	Common	Origin	IUCNRL	Rarity	EDGE	CITES	Priority	Target
Anthozoa	Scleractinia	FAVIIDAE	*Goniastrea pectinata*	Ehrenberg 1834			LC				3	0.3
Anthozoa	Scleractinia	FAVIIDAE	*Goniastrea peresi*	Faure and Pichon 1978			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Goniastrea retiformis*	Lamarck 1816			LC				3	0.3
Anthozoa	Scleractinia	FAVIIDAE	*Leptastrea bottae*	Milne Edwards and Haime 1849			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Leptastrea inaequalis*	Klunzinger 1879			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Leptastrea purpurea*	Dana 1846			LC				3	0.3
Anthozoa	Scleractinia	FAVIIDAE	*Leptastrea transversa*	Klunzinger 1879			LC				3	0.3
Anthozoa	Scleractinia	FAVIIDAE	*Leptoria irregularis*	Veron 1990			VU				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Leptoria phrygia*	Ellis and Solander 1786			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Montastrea annuligera*	Milne Edwards and Haime 1849			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Montastrea curta*	Dana 1846			LC				3	0.3
Anthozoa	Scleractinia	FAVIIDAE	*Montastrea magnistellata*	Chevalier 1971			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Montastrea serageldini*	Veron 2002			VU				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Montastrea valenciennesi*	Milne Edwards and Haime 1848			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Oulophyllia crispa*	Lamarck 1816			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Platygyra acuta*	Veron 2002			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Platygyra carnosus*	Veron 2002			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Platygyra contorta*	Veron 1990			LC				3	0.3
Anthozoa	Scleractinia	FAVIIDAE	*Platygyra crosslandi*	Matthai 1928			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Platygyra daedalea*	Ellis and Solander 1786	Brain Coral		LC				3	0.3
Anthozoa	Scleractinia	FAVIIDAE	*Platygyra lamellina*	Ehrenberg 1834			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Platygyra pini*	Chevalier 1975			LC				3	0.3
Anthozoa	Scleractinia	FAVIIDAE	*Platygyra ryukyuensis*	Yabe and Sugiyama 1936			NT				3	0.6
Anthozoa	Scleractinia	FAVIIDAE	*Platygyra sinensis*	Milne Edwards and Haime 1849			LC				3	0.3
Anthozoa	Scleractinia	FAVIIDAE	*Plesiastrea versipora*	Lamarck 1816			LC				3	0.3
Anthozoa	Scleractinia	FUNGIIDAE	*Fungia concinna*	Verrill 1864			LC				3	0.3
Anthozoa	Scleractinia	FUNGIIDAE	*Fungia costulata*	Ortmann, 1889			LC				3	0.3
Anthozoa	Scleractinia	FUNGIIDAE	*Fungia curvata*	Hoeksema 1989			VU				3	0.6
Anthozoa	Scleractinia	FUNGIIDAE	*Fungia cyclolites*	Lamarck, 1816			LC				3	0.3
Anthozoa	Scleractinia	FUNGIIDAE	*Fungia fragilis*	Hoeksema 1989			LC				3	0.3
Anthozoa	Scleractinia	FUNGIIDAE	*Fungia fungites*	Linneaus 1758	Common Mushroom Coral						3	0.6
Anthozoa	Scleractinia	FUNGIIDAE	*Fungia granulosa*	Klunzinger 1879			LC				3	0.3
Anthozoa	Scleractinia	FUNGIIDAE	*Fungia horrida*	Dana 1846			LC				3	0.3
Anthozoa	Scleractinia	FUNGIIDAE	*Fungia puishani*	Veron and DeVantier 2000			DD				3	0.3
Anthozoa	Scleractinia	FUNGIIDAE	*Fungia repanda*	Dana 1846			LC				3	0.3
Anthozoa	Scleractinia	FUNGIIDAE	*Fungia scabra*	Döderlein 1901			LC				3	0.3

CLASS	ORDER	FAMILY	SPECIES	SpAuthority	Common	Origin	IUCNRL	Rarity	EDGE	CITES	Priority	Target
Anthozoa	Scleractinia	FUNGIIDAE	*Fungia scruposa*	Klunzinger 1879			LC				3	0.3
Anthozoa	Scleractinia	FUNGIIDAE	*Fungia scutaria*	Lamarck 1801			LC				3	0.3
Anthozoa	Scleractinia	FUNGIIDAE	*Fungia seychellensis*	Hoeksema 1993			VU				3	0.6
Anthozoa	Scleractinia	FUNGIIDAE	*Fungia somervillei*	Gardiner 1909			LC				3	0.3
Anthozoa	Scleractinia	FUNGIIDAE	*Fungia tenuis*	Dana 1846			LC				3	0.3
Anthozoa	Scleractinia	FUNGIIDAE	*Fungia vaughani*	Boschma 1923			LC				3	0.3
Anthozoa	Scleractinia	FUNGIIDAE	*Halomitra pileus*	Linnaeus 1758	Bowl Coral		LC				3	0.3
Anthozoa	Scleractinia	FUNGIIDAE	*Herpolitha limax*	Esper 1797			LC				3	0.3
Anthozoa	Scleractinia	FUNGIIDAE	*Podabacia crustacea*	Pallas 1766			LC				3	0.3
Anthozoa	Scleractinia	FUNGIIDAE	*Podabacia motuporensis*	Veron 1990			NT				3	0.6
Anthozoa	Scleractinia	FUNGIIDAE	*Polyphyllia talpina*	Lamarck 1801	Feather Coral		LC				3	0.3
Anthozoa	Scleractinia	FUNGIIDAE	*Sandalolitha dentata*	Quelch 1884			LC				3	0.3
Anthozoa	Scleractinia	FUNGIIDAE	*Sandalolitha robusta*	Quelch 1886			LC				3	0.3
Anthozoa	Scleractinia	MEANDRINIDAE	*Gyrosmilia interrupta*	Ehrenberg 1834			LC				3	0.3
Anthozoa	Scleractinia	MERULINIDAE	*Hydnophora exesa*	Pallas 1766			NT				3	0.6
Anthozoa	Scleractinia	MERULINIDAE	*Hydnophora microconos*	Lamarck 1816			NT				3	0.6
Anthozoa	Scleractinia	MERULINIDAE	*Hydnophora rigida*	Dana 1846			LC				3	0.3
Anthozoa	Scleractinia	MERULINIDAE	*Merulina ampliata*	Ellis and Solander 1786			LC				3	0.3
Anthozoa	Scleractinia	MERULINIDAE	*Merulina scabricula*	Dana 1846			LC				3	0.3
Anthozoa	Scleractinia	MUSSIDAE	*Acanthastrea brevis*	Milne Edwards & Haime 1849			VU				3	0.6
Anthozoa	Scleractinia	MUSSIDAE	*Acanthastrea echinata*	Dana 1846			LC				3	0.3
Anthozoa	Scleractinia	MUSSIDAE	*Acanthastrea hemprichii*	Ehrenberg 1834			VU				3	0.6
Anthozoa	Scleractinia	MUSSIDAE	*Acanthastrea hillae*	Wells 1955			NT				3	0.6
Anthozoa	Scleractinia	MUSSIDAE	*Acanthastrea ishigakiensis*	Veron 1990			VU				3	0.6
Anthozoa	Scleractinia	MUSSIDAE	*Acanthastrea lordhowensis*	Veron & Pichon 1982			NT				3	0.6
Anthozoa	Scleractinia	MUSSIDAE	*Blastomussa merleti*	Wells 1961			LC				3	0.3
Anthozoa	Scleractinia	MUSSIDAE	*Cynarina lacrymalis*	Milne Edwards and Haime 1848			NT				3	0.6
Anthozoa	Scleractinia	MUSSIDAE	*Lobophyllia corymbosa*	Forskål 1775	Brain Root Coral		LC				3	0.3
Anthozoa	Scleractinia	MUSSIDAE	*Lobophyllia hataii*	Yabe and Sugiyama 1936			LC				3	0.3
Anthozoa	Scleractinia	MUSSIDAE	*Lobophyllia hemprichii*	Ehrenberg 1834	Largebrain Root Coral						3	0.3
Anthozoa	Scleractinia	MUSSIDAE	*Lobophyllia robusta*	Yabe and Sugiyama 1936			LC				3	0.3
Anthozoa	Scleractinia	MUSSIDAE	*Scolymia vitiensis*	Brüggemann 1878			NT				3	0.6
Anthozoa	Scleractinia	MUSSIDAE	*Symphyllia agaricia*	Milne Edwards and Haime 1849			LC				3	0.3
Anthozoa	Scleractinia	MUSSIDAE	*Symphyllia erythraea*	Klunzinger 1879			LC				3	0.3
Anthozoa	Scleractinia	MUSSIDAE	*Symphyllia recta*	Dana 1846			LC				3	0.3
Anthozoa	Scleractinia	MUSSIDAE	*Symphyllia valenciennesii*	Milne Edwards and Haime 1849			LC				3	0.3

CLASS	ORDER	FAMILY	SPECIES	SpAuthority	Common	Origin	IUCNRL	Rarity	EDGE	CITES	Priority	Target
Anthozoa	Scleractinia	OCULINIDAE	*Galaxea astreata*	Lamarck 1816			VU				3	0.6
Anthozoa	Scleractinia	OCULINIDAE	*Galaxea fascicularis*	Linnaeus 1767			NT				3	0.6
Anthozoa	Scleractinia	PECTINIIDAE	*Echinophyllia aspera*	Ellis and Solander 1788			LC				3	0.3
Anthozoa	Scleractinia	PECTINIIDAE	*Echinophyllia echinata*	Saville-Kent 1871			LC				3	0.3
Anthozoa	Scleractinia	PECTINIIDAE	*Echinophyllia orpheensis*	Veron and Pichon 1980			LC				3	0.3
Anthozoa	Scleractinia	PECTINIIDAE	*Mycedium elephantotus*	Pallas 1766			LC				3	0.3
Anthozoa	Scleractinia	PECTINIIDAE	*Mycedium mancaoi*	Nemenzo 1979			LC				3	0.3
Anthozoa	Scleractinia	PECTINIIDAE	*Oxypora lacera*	Verrill 1864			LC				3	0.3
Anthozoa	Scleractinia	PECTINIIDAE	*Pectinia africanus*	Veron 2002			VU				3	0.6
Anthozoa	Scleractinia	PECTINIIDAE	*Pectinia lactuca*	Pallas 1766	Lettuce Coral		VU				3	0.6
Anthozoa	Scleractinia	POCILLOPORIDAE	*Pocillopora damicornis*	Linnaeus 1758	Cauliflower Coral		LC				3	0.3
Anthozoa	Scleractinia	POCILLOPORIDAE	*Pocillopora eydouxi*	Milne Edwards and Haime 1860			NT				3	0.6
Anthozoa	Scleractinia	POCILLOPORIDAE	*Pocillopora indiania*	Veron 2002			VU				3	0.6
Anthozoa	Scleractinia	POCILLOPORIDAE	*Pocillopora verrucosa*	Ellis and Solander 1786	Rasp Coral		LC				3	0.3
Anthozoa	Scleractinia	POCILLOPORIDAE	*Seriatopora caliendrum*	Ehrenberg 1834	Birdsnest Coral		NT				3	0.6
Anthozoa	Scleractinia	POCILLOPORIDAE	*Seriatopora guttatus*	Veron 2002			LC				3	0.3
Anthozoa	Scleractinia	POCILLOPORIDAE	*Seriatopora hystrix*	Dana 1846	Thin Birdsnest Coral						3	0.3
Anthozoa	Scleractinia	POCILLOPORIDAE	*Stylophora pistillata*	Esper 1797	Smooth Cauliflower Coral						3	0.6
Anthozoa	Scleractinia	POCILLOPORIDAE	*Stylophora subseriata*	Ehrenberg 1834			LC				3	0.3
Anthozoa	Scleractinia	PORITIDAE	*Alveopora allingi*	Hoffmeister 1925			VU				3	0.6
Anthozoa	Scleractinia	PORITIDAE	*Alveopora daedalea*	Forskål 1775			VU				3	0.6
Anthozoa	Scleractinia	PORITIDAE	*Alveopora fenestrata*	Lamarck 1816			VU				3	0.6
Anthozoa	Scleractinia	PORITIDAE	*Alveopora spongiosa*	Dana 1846			NT				3	0.6
Anthozoa	Scleractinia	PORITIDAE	*Alveopora tizardi*	Bassett-Smith 1890			LC				3	0.3
Anthozoa	Scleractinia	PORITIDAE	*Goniopora columna*	Dana 1846			NT				3	0.6
Anthozoa	Scleractinia	PORITIDAE	*Goniopora djiboutiensis*	Vaughan 1907			LC				3	0.3
Anthozoa	Scleractinia	PORITIDAE	*Goniopora lobata*	Milne Edwards and Haime 1860			NT				3	0.6
Anthozoa	Scleractinia	PORITIDAE	*Goniopora minor*	Crossland 1952			NT				3	0.6
Anthozoa	Scleractinia	PORITIDAE	*Goniopora planulata*	Ehrenberg 1834			VU				3	0.6
Anthozoa	Scleractinia	PORITIDAE	*Goniopora somaliensis*	Vaughan 1907			LC				3	0.3
Anthozoa	Scleractinia	PORITIDAE	*Goniopora stokesi*	Milne Edwards and Haime 1851			NT				3	0.6
Anthozoa	Scleractinia	PORITIDAE	*Goniopora tenuidens*	Quelch 1886			LC				3	0.3
Anthozoa	Scleractinia	PORITIDAE	*Porites australiensis*	Vaughan 1918			LC				3	0.3
Anthozoa	Scleractinia	PORITIDAE	*Porites cylindrica*	Dana 1846			NT				3	0.6
Anthozoa	Scleractinia	PORITIDAE	*Porites echinulata*	Klunzinger 1879			NT				3	0.6
Anthozoa	Scleractinia	PORITIDAE	*Porites latistella*	Quelch 1886			LC				3	0.3

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Anthozoa	Scleractinia	PORITIDAE	*Porites lichen*	Dana 1846			LC				3	0.3
Anthozoa	Scleractinia	PORITIDAE	*Porites lobata*	Dana 1846			NT				3	0.6
Anthozoa	Scleractinia	PORITIDAE	*Porites lutea*	Milne Edwards and Haime 1851			LC				3	0.3
Anthozoa	Scleractinia	PORITIDAE	*Porites mayeri*	Vaughan 1918			LC				3	0.3
Anthozoa	Scleractinia	PORITIDAE	*Porites monticulosa*	Dana 1846			LC				3	0.3
Anthozoa	Scleractinia	PORITIDAE	*Porites murrayensis*	Vaughan 1918			NT				3	0.6
Anthozoa	Scleractinia	PORITIDAE	*Porites nigrescens*	Dana 1846			VU				3	0.6
Anthozoa	Scleractinia	PORITIDAE	*Porites profundus*	Rehberg 1892			LC				3	0.3
Anthozoa	Scleractinia	PORITIDAE	*Porites rus*	Forskål 1775			LC				3	0.3
Anthozoa	Scleractinia	PORITIDAE	*Porites sillimaniana*	Nemenzo 1976			VU				3	0.6
Anthozoa	Scleractinia	PORITIDAE	*Porites solida*	Forskål 1775			LC				3	0.3
Anthozoa	Scleractinia	PORITIDAE	*Porites somaliensis*	Gravier 1911			NT				3	0.6
Anthozoa	Scleractinia	PORITIDAE	*Poritipora paliformis*	Veron 2002			VU				3	0.6
Anthozoa	Scleractinia	PORITIDAE	*Stylaraea punctata*	Linneaus 1758			DD				3	0.3
Anthozoa	Scleractinia	SIDERASTREIDAE	*Anomastraea irregularis*	Marenzeller 1901			VU				3	0.6
Anthozoa	Scleractinia	SIDERASTREIDAE	*Coscinaraea columna*	Dana 1846			LC				3	0.3
Anthozoa	Scleractinia	SIDERASTREIDAE	*Coscinaraea crassa*	Veron and Pichon 1980			NT				3	0.6
Anthozoa	Scleractinia	SIDERASTREIDAE	*Coscinaraea monile*	Foskål 1775			LC				3	0.3
Anthozoa	Scleractinia	SIDERASTREIDAE	*Coscinaraea wellsi*	Veron and Pichon 1980			LC				3	0.3
Anthozoa	Scleractinia	SIDERASTREIDAE	*Horastrea indica*	Pichon 1971			VU				3	0.6
Anthozoa	Scleractinia	SIDERASTREIDAE	*Psammocora contigua*	Esper 1797			NT				3	0.6
Anthozoa	Scleractinia	SIDERASTREIDAE	*Psammocora digitata*	Milne Edwards and Haime 1851			NT				3	0.6
Anthozoa	Scleractinia	SIDERASTREIDAE	*Psammocora explanulata*	Horst 1922			LC				3	0.3
Anthozoa	Scleractinia	SIDERASTREIDAE	*Psammocora haimeana*	Milne Edwards and Haime 1851			LC				3	0.3
Anthozoa	Scleractinia	SIDERASTREIDAE	*Psammocora nierstraszi*	Horst 1921			LC				3	0.3
Anthozoa	Scleractinia	SIDERASTREIDAE	*Psammocora obtusangula*	Lamarck 1816			NT				3	0.6
Anthozoa	Scleractinia	SIDERASTREIDAE	*Psammocora profundacella*	Gardiner 1898			LC				3	0.3
Anthozoa	Scleractinia	SIDERASTREIDAE	*Psammocora stellata*	Verrill 1868			VU				3	0.6
Anthozoa	Scleractinia	SIDERASTREIDAE	*Psammocora superficialis*	Gardiner 1898			LC				3	0.3
Anthozoa	Scleractinia	SIDERASTREIDAE	*Pseudosiderastrea tayami*	Yabe and Sugiyama 1935			NT				3	0.6
Anthozoa	Scleractinia	SIDERASTREIDAE	*Siderastrea savignyana*	Milne Edwards and Haime 1850			LC				3	0.3
Anthozoa	Scleractinia	TRACHYPHYLLIIDAE	*Trachyphyllia geoffroyi*	Audouin 1826			NT				3	0.6
Anthozoa	**STOLONIFERA**	TUBIPORIDAE	*Tubipora musica*	Linnaeus 1758	Organ Pipe Coral		NT				3	0.6
Anthozoa	**MILLEPORINA**	MILLEPORIDAE	*Millepora platyphylla*	Hemprich and Ehrenberg 1834	Firecoral		LC				3	0.3
Anthozoa	**MILLEPORINA**	MILLEPORIDAE	*Millepora tenera*	Boschma 1949			LC				3	0.3
BIVALVIA	**VENEROIDA**	TRIDACNIDAE	*Tridacna maxima*	Röding, 1798	Small Giant Clam		LR/cd					0.3

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BIVALVIA	**VENEROIDA**	TRIDACNIDAE	*Tridacna squamosa*	Lamarck, 1819	Fluted Clam, Fluted Giant Clam, Scaly Clam							0.3
CEPHALOPODA	**SEPIOLOIDA**	SEPIIDAE	*Sepia mascarensis*	Filippova & Khromov, 1991			DD				1	0.3
CEPHALOPODA	**SEPIOLOIDA**	SEPIIDAE	*Sepia vermiculata*	Quoy & Gaimard, 1832	Patchwork Cuttlefish						1	0.3
CEPHALOPODA	**SEPIOLOIDA**	SEPIIDAE	*Sepia zanzibarica*	Pfeffer, 1884	Zanzibar Cuttlefish		DD				1	0.3
Crustacea		Atyidae	*Cardina longirostris*	Milne-Edwards, 1837		ind		C			1	
Crustacea		Atyidae	*Cardina serratirostris*	De Man, 1892		ind		C			1	
Crustacea		Atyidae	*Cardina typus*	Milne-Edwards, 1837		ind		C			1	
Crustacea		Atyidae	*Caridina similis*	Bouvier, 1904		end		C			2	
Crustacea		Grapsidae	*Sesarmops impressum*	Milne-Edwards, 1837		ind		C			1	
Crustacea		Grapsidae	*Varuna litterata*	Fabricius, 1798		ind		C			1	
Crustacea		Palaemonidae	*Macrobrachium equidens*	Dana, 1852		ind		C			1	
Crustacea		Palaemonidae	*Macrobrachium idae*	Heller, 1862		ind		C			1	
Crustacea		Palaemonidae	*Macrobrachium lar*	Fabricius, 1798		ind		C			2	
Crustacea		Potamonautidae	*Seychellum alluaudi*	A.Milne-Edwards & Bouvier, 1893		end	LC	A			3	0.3
Crustacea			*Scandarma sp.*		New to science						3	Silhouette
Crustacea	Decapoda	COENOBITIDAE	*Birgus latro*	Linnaeus, 1767	Coconut Crab, Palm Thief, Robber Crab						3	0.3
Crustacea	Decapoda	SCYLLARIDAE	*Chelarctus cultrifer*	Ortmann, 1897			LC				3	0.3
Crustacea	Decapoda	SCYLLARIDAE	*Eduarctus martensii*	Pfeffer, 1881	Striated Locust Lobster						3	0.3
Crustacea	Decapoda	SCYLLARIDAE	*Eduarctus pyrrhonotus*	Holthuis, 2002			LC				3	0.3
Crustacea	Decapoda	SCYLLARIDAE	*Eduarctus reticulatus*	Holthuis, 2002			LC				3	0.3
Crustacea	Decapoda	ENOPLOMETOPIDAE	*Enoplometopus occidentalis*	Randall, 1840	Hawaiian Red Lobster, Red Dwarf Reef Lobster, Red Reef Lobster						3	0.3
Crustacea	Decapoda	SCYLLARIDAE	*Gibbularctus gibberosus*	de Man, 1905			LC				3	0.3
Crustacea	Decapoda	SCYLLARIDAE	*Ibacus novemdentatus*	Gibbes, 1850	Smooth Fan Lobster		LC				3	0.3
Crustacea	Decapoda	PALINURIDAE	*Panulirus penicillatus*	Olivier, 1791	Pronghorn Spiny Lobster, Red Spiny Lobster, Taitung Spiny Lobster						3	0.3
Crustacea	Decapoda	SCYLLARIDAE	*Scyllarides squammosus*	H. Milne Edwards, 1837	Blunt Slipper Lobster						3	0.3
Crustacea	Decapoda	SCYLLARIDAE	*Thenus orientalis*	Lund, 1793	Flathead Lobster		LC				3	0.3

ANNEX 2 (continued): Priority vascular plants identified at the 2nd SEY-SCP Workshop

ClName	FaActu	SpActu	SpActuSh	SpID	OrigStat2	Rarity	IUCN	Priority	AbNbSp
Dicotyledon	Lamiaceae	Achyrospermum sechellarum Baker	*Achyrospermum sechellarum*	87	end	Xp	CR	1	13
Fern	Pteridaceae	Afropteris barklyae (Baker) Alston	*Afropteris barklyae*	260	end	R		2	9
Monocotyledon	Orchidaceae	Agrostophyllum occidentale Schltr.	*Agrostophyllum occidentale*	316	ind	F	VU	1	29
Dicotyledon	Sapindaceae	Allophyllus sechellensis Summerh.	*Allophyllus sechellensis*	399	end	O	VU	1	20
Dicotyledon	Rubiaceae	Amaracarpus pubescens Bl. subsp. sechellarum F.Friedmann	*Amaracarpus pubescens subsp. sechellarum*	450	end	Xp	CR	2	13
Fern	Marattiaceae	Angiopteris sp.nov.1 Senterre & Fabre	*Angiopteris sp. nov. 1*	595	end	R		1	20
Monocotyledon	Orchidaceae	Angraecum zeylanicum Lindl.	*Angraecum zeylanicum*	627	ind	R		2	8
Fern	Pteridaceae	Antrophyum boryanum (Willd.) Spreng.	*Antrophyum boryanum*	10912	ind	R		3	1
Fern	Pteridaceae	Antrophyum callifolium Blume	*Antrophyum callifolium*	10906	ind	X		3	1
Fern	Pteridaceae	Antrophyum immersum (Bory ex Willd.) Mett.	*Antrophyum immersum*	743	ind	X		3	2
Fern	Aspleniaceae	Asplenium aethiopicum (Burm.f.) Bech.	*Asplenium aethiopicum*	923	ind	X		2	3
Fern	Aspleniaceae	Asplenium complanatum C.Chr.	*Asplenium complanatum*	935	end	X		2	3
Fern	Aspleniaceae	Asplenium obscurum Bl.	*Asplenium obscurum*	10876	ind	R		2	3
Fern	Aspleniaceae	Asplenium paucijugum F.Ballard	*Asplenium paucijugum*	963	ind	R		3	3
Fern	Aspleniaceae	Asplenium petiolulatum Mett. ex Kuhn	*Asplenium petiolulatum*	10896	ind	R		3	1
Fern	Aspleniaceae	Asplenium unilaterale Lam.	*Asplenium unilaterale*	979	ind	X		2	8
Dicotyledon	Celastraceae	Brexia madagascariensis (Lam.) Ker Gawl. subsp. microcarpa (Tul.) F.Friedmann	*Brexia madagascariensis subsp. microcarpa*	10884	end	O		1	22
Monocotyledon	Orchidaceae	Bulbophyllum humblotti Rolfe	*Bulbophyllum humblotti*	1557	ind	R		3	2
Monocotyledon	Orchidaceae	Bulbophyllum longiflorum Ridley	*Bulbophyllum longiflorum*	1568	ind	R	DD	2	5
Monocotyledon	Orchidaceae	Calanthe triplicata (Willem.) Ames	*Calanthe triplicata*	1664	ind	R	CR	2	4
Dicotyledon	Anacardiaceae	Campnosperma seychellarum March	*Campnosperma seychellarum*	1753	end	F	CR	2	42
Dicotyledon	Apocynaceae	Carissa spinarum L.	*Carissa spinarum*	1884	ind	Xp	CR	1	16
Fern	Hymenophyllaceae	Crepidomanes bipunctatum (Poir.) Copel.	*Crepidomanes bipunctatum*	10755	ind	R		2	9
Fern	Hymenophyllaceae	Crepidomanes minutum (Blume) K.Iwats. var. mascarenensis Pynee & Dubuisson	*Crepidomanes minutum var. mascarenensis*	10939	ind	R		2	12
Fern	Cyatheaceae	Cyathea sechellarum Mett.	*Cyathea sechellarum*	3027	end	O		1	148
Fern	Hymenophyllaceae	Didymoglossum fulgens	*Didymoglossum fulgens*	10756	end	R		1	32
Fern	Hymenophyllaceae	Didymoglossum motleyi (Bosch) Ebihara & K.Iwats.	*Didymoglossum motleyi*	3496	ind	R		1	50
Fern	Hymenophyllaceae	Didymoglossum rotundifolium (Bonap.) J.P.Roux	*Didymoglossum rotundifolium*	3495	ind	R		1	12
Dicotyledon	Euphorbiaceae	Drypetes riseleyi Airy Shaw	*Drypetes riseleyi*	3871	end	O	CR	2	27

ClName	FaActu	SpActu	SpActuSh	SpID	OrigStat2	Rarity	IUCN	Priority	AbNbSp
Fern	Dryopteridaceae	Elaphoglossum lepervanchei (Bory ex Fée) T.Moore	*Elaphoglossum lepervanchei*	3939	ind	R		1	37
Dicotyledon	Euphorbiaceae	Excoecaria benthamiana Hemsley	*Excoecaria benthamiana*	4268	end	O	VU	1	33
Monocotyledon	Poaceae	Garnotia sechellensis Hubb. & Summerhayes	*Garnotia sechellensis*	4625	end	R	EN	2	6
Dicotyledon	Rubiaceae	Glionnetia sericea (Baker) Tirv.	*Glionnetia sericea*	4708	end	O	EN	2	305
Monocotyledon	Orchidaceae	Goodyera sechellarum (S.Moore) Ormerod	*Goodyera sechellarum*	4752	end	O	EN	1	19
Fern	Polypodiaceae	Grammitis pervillei (Mett. ex Kuhn) Tardieu	*Grammitis pervillei*	4761	ind	O		1	26
Fern	Polypodiaceae	Grammitis pygmaea (Mett. ex Kuhn) Copel.	*Grammitis pygmaea*	4762	ind	R		1	13
Dicotyledon	Icacinaceae	Grisollea thomassetii Hemsl.	*Grisollea thomassetii*	4804	end	O	CR	1	38
Fern	Pteridaceae	Haplopteris zosterifolia (Willd.) E.H.Crane	*Haplopteris zosterifolia*	4902	ind	X		1	13
Monocotyledon	Orchidaceae	Hederorkis seychellensis Bosser	*Hederorkis seychellensis*	4915	end	O	EN	2	24
Fern Ally	Lycopodiaceae	Huperzia ophioglossoides (Lam.) Rothm.	*Huperzia ophioglossoides*	5141	ind	R		2	10
Fern	Hymenophyllaceae	Hymenophyllum digitatum (Sw.) Fosberg	*Hymenophyllum digitatum*	5204	ind	R		2	6
Monocotyledon	Hypoxidaceae	Hypoxidia maheensis F.Friedmann	*Hypoxidia maheensis*	5271	end	R	EN	1	23
Dicotyledon	Balsaminaceae	Impatiens gordonii Horne ex Baker	*Impatiens gordonii*	5304	end	R	CR	2	7
Dicotyledon	Rubiaceae	Ixora pudica Baker	*Ixora pudica*	5501	end	F	VU	1	57
Fern	Dryopteridaceae	Lastreopsis hornei (Bak.) Tindale	*Lastreopsis hornei*	5815	end	X		2	8
Dicotyledon	Vitaceae	Leea guineensis G.Don	*Leea guineensis*	5853	exo	R		2	4
Fern	Lindsaeaceae	Lindsaea repens (Bory) Thwaites	*Lindsaea repens*	6034	ind	O		1	14
Monocotyledon	Arecaceae	Lodoicea maldivica (Gmel.)Pers.	*Lodoicea maldivica*	6073	end	O	VU	3	22
Fern	Lomariopsidaceae	Lomariopsis pervillei (Mett.) Kuhn	*Lomariopsis pervillei*	6094	end	Xp		1	31
Monocotyledon	Pandanaceae	Martellidendron hornei (Balf.f.) Callm. & Chassot	*Martellidendron hornei*	6410	end		VU	1	55
Dicotyledon	Medusagynaceae	Medusagyne oppositifolia Baker	*Medusagyne oppositifolia*	6466	end	R	CR	3	115
Dicotyledon	Nepenthaceae	Nepenthes pervillei Bl.	*Nepenthes pervillei*	6947	end	O	VU	2	52
Monocotyledon	Orchidaceae	Oeceoclades pulchra (Thouars) Cribb & M.A.Clements	*Oeceoclades pulchra*	7073	ind	R	EN	2	7
Monocotyledon	Orchidaceae	Oeoniella polystachys (Thouars) Schltr.	*Oeoniella polystachys*	7079	ind	X	CR	3	2
Monocotyledon	Pandanaceae	Pandanus balfourii Martelli	*Pandanus balfourii*	7324	end		VU	1	24
Dicotyledon	Rubiaceae	Peponidium carinatum (Baker) Razafimandimbison	*Peponidium carinatum*	7614	end		VU	1	48
Dicotyledon	Rubiaceae	Peponidium sechellense (Summerh.) Razafimandimbison	*Peponidium sechellense*	7615	end	R	EN	2	49
Dicotyledon	Cucurbitaceae	Peponium vogelii (Hook.f.) Engl.	*Peponium vogelii*	7617	ind		CR	3	3
Monocotyledon	Orchidaceae	Phaius tetragonus (Thouars) Reichb.f.	*Phaius tetragonus*	7640	ind	O	VU	1	24
Dicotyledon	Piperaceae	Piper silhouettanum Gerlach	*Piper silhouettanum*	7785	end	R	CR	3	4
Dicotyledon	Nyctaginaceae	Pisonia sechellarum Friedm.	*Pisonia sechellarum*	7803	ind	R	CR	2	8
Monocotyledon	Orchidaceae	Platylepis occulta (Thouars) Rchb.f.	*Platylepis occulta*	7862	ind	R	VU	1	22

ClName	FaActu	SpActu	SpActuSh	SpID	OrigStat2	Rarity	IUCN	Priority	AbNbSp
Dicotyledon	Araliaceae	Polyscias crassa (Hemsl.) Lowry & G.M.Plunkett	*Polyscias crassa*	7992	end	F	VU	1	92
Dicotyledon	Araliaceae	Polyscias lionnetii (F.Friedmann) Lowry & G.M.Plunkett	*Polyscias lionnetii*	7998	end	R	CR	3	6
Dicotyledon	Araliaceae	Polyscias sechellarum Baker var. contracta (F.Friedmann) unpublished	*Polyscias sechellarum var. contracta*	10750	end	X	CR	3	1
Dicotyledon	Araliaceae	Polyscias sechellarum Baker var. curiosae (F.Friedmann) unpublished	*Polyscias sechellarum var. curiosae*	10751	end	X	CR	3	2
Dicotyledon	Araliaceae	Polyscias sechellarum Baker var. sechellarum	*Polyscias sechellarum var. sechellarum*	10752	end	O	VU	1	51
Dicotyledon	Rubiaceae	Psathura sechellarum Baker	*Psathura sechellarum*	8164	end	R	CR	1	23
Dicotyledon	Acanthaceae	Pseuderanthemum subviscosum (C.B.Clarke) Stapf	*Pseuderanthemum subviscosum*	8178	ind	Xp	CR	2	9
Dicotyledon	Rubiaceae	Psychotria dupontiae Hemsley	*Psychotria dupontiae*	8255	end	R		2	7
Dicotyledon	Rubiaceae	Psychotria silhouettae F.Friedmann	*Psychotria silhouettae*	8335	end	R	CR	3	4
Fern	Pteridaceae	Pteris pseudolonchitis Bory	*Pteris pseudolonchitis*	8385	ind	X		2	2
Dicotyledon	Myrsinaceae	Rapanea seychellarum Mez	*Rapanea seychellarum*	8489	end	R	CR	1	29
Dicotyledon	Rubiaceae	Rothmannia annae (Wright) Keay	*Rothmannia annae*	8711	end	O	CR	2	9
Dicotyledon	Araliaceae	Schefflera procumbens (Hemsl.) F.Friedmann	*Schefflera procumbens*	9034	end	Xp	VU	1	24
Dicotyledon	Apocynaceae	Secamone schimperiana (Hemsl.) Klack.	*Secamone schimperiana*	9157	end	Xp	EN	2	18
Monocotyledon	Triuridaceae	Seychellaria thomassetii Hemsl.	*Seychellaria thomassetii*	9236	end	R	NT	1	23
Fern	Tectariaceae	Tectaria waterlotii (Tardieu) J.P.Roux	*Tectaria waterlotii*	9800	ind	R		2	6
Fern	Polypodiaceae	Terpsichore elastica (Bory ex Willd.) A.R.Sm.	*Terpsichore elastica*	9840	ind	O		1	11
Dicotyledon	Boraginaceae	Tournefortia puberula Baker	*Tournefortia puberula*	9956	ind	R	VU	1	13
Dicotyledon	Moraceae	Trilepisium madagascariense DC.	*Trilepisium madagascariense*	10173	ind	Xp	CR	2	10
Dicotyledon	Dipterocarpaceae	Vateriopsis seychellarum Heim	*Vateriopsis seychellarum*	10423	end	R	CR	2	149
Dicotyledon	Santalaceae	Viscum triflorum DC.	*Viscum triflorum*	10528	ind	R	EN	2	5
Dicotyledon	Euphorbiaceae	Wielandia elegans Baill.	*Wielandia elegans*	10623	ind			2	27

ANNEX 3: Conservation Features included in the final planning unit data layer scenarios and data sources.

FEATUREID	Description	Source
LAND	Land	From L1-L4 of the new integrated classification scheme (Klaus 2015)
SEA	Sea	From L1-L4 of the new integrated classification scheme (Klaus 2015)
SEA_S	Continental shelf <200m	From L1-L4 of the new integrated classification scheme (Klaus 2015)
SEA_D	Deep water >200m	From L1-L4 of the new integrated classification scheme (Klaus 2015)
STRAT01	Stratum 01	Stratum 01
STRAT02	Stratum 02	Stratum 02
STRAT03	Stratum 03	Stratum 03
STRAT04	Stratum 04	Stratum 04
STRAT05	Stratum 05	Stratum 05
GEOMOR01	Abyss_plains	From geomorpholgy dataset by Harris et al (2014)
GEOMOR02	Abyss_hills	From geomorpholgy dataset by Harris et al (2014)
GEOMOR03	Abyss_mountains	From geomorpholgy dataset by Harris et al (2014)
ABYSS	Abyss	From geomorpholgy dataset by Harris et al (2014)
SLOPE	Continental slope	From geomorpholgy dataset by Harris et al (2014)
GEOMOR04	Canyon	From geomorpholgy dataset by Harris et al (2014)
GEOMOR05	Guyot	From geomorpholgy dataset by Harris et al (2014)
GEOMOR06	Seamount	From geomorpholgy dataset by Harris et al (2014)
GEOMOR08	Ridge	From geomorpholgy dataset by Harris et al (2014)
GEOMOR09	Spreading ridge	From geomorpholgy dataset by Harris et al (2014)
GEOMOR10	Rift Valley	From geomorpholgy dataset by Harris et al (2014)
GEOMOR11	Terrace	From geomorpholgy dataset by Harris et al (2014)
GEOMOR12	Trench	From geomorpholgy dataset by Harris et al (2014)
GEOMOR13	Slope	From geomorpholgy dataset by Harris et al (2014)
GEOMOR14	Plateau	From geomorpholgy dataset by Harris et al (2014)
GEOMOR15	Shelf_high relief	From geomorpholgy dataset by Harris et al (2014)
GEOMOR16	Shelf_high relief_Atoll_raised_lagoon	From L1-L4 of the new integrated classification scheme (Klaus 2015)
GEOMOR17	Shelf_high relief_Atoll_raised_rim_shallow	From L1-L4 of the new integrated classification scheme (Klaus 2015)
GEOMOR18	Shelf_high relief_Atoll_sea level_lagoon	From L1-L4 of the new integrated classification scheme (Klaus 2015)
GEOMOR19	Shelf_high relief_Atoll_sea level_rim	From L1-L4 of the new integrated classification scheme (Klaus 2015)
GEOMOR20	Shelf_high relief_Atoll_submerged_lagoon	From L1-L4 of the new integrated classification scheme (Klaus 2015)
GEOMOR21	Shelf_high relief_Atoll_submerged_rim	From L1-L4 of the new integrated classification scheme (Klaus 2015)
GEOMOR22	Shelf_high relief_Bank_barrier complex	From L1-L4 of the new integrated classification scheme (Klaus 2015)
GEOMOR23	Shelf_high relief_Bank_drowned bank	From L1-L4 of the new integrated classification scheme (Klaus 2015)
GEOMOR24	Shelf_high relief_Bank_lagoon	From L1-L4 of the new integrated classification scheme (Klaus 2015)
GEOMOR25	Shelf_high relief_Bank_patch reef complex	From L1-L4 of the new integrated classification scheme (Klaus 2015)
GEOMOR26	Shelf_high relief_Bank_platform reef_atoll like_lagoon	From L1-L4 of the new integrated classification scheme (Klaus 2015)
GEOMOR27	Shelf_high relief_Bank_platform reef_atoll like_rim	From L1-L4 of the new integrated classification scheme (Klaus 2015)
GEOMOR28	Shelf_high relief_Bank_platform reef_infilled_rim	From L1-L4 of the new integrated classification scheme (Klaus 2015)
GEOMOR29	Shelf_high relief_Bank_platform reef_raised_rim	From L1-L4 of the new integrated classification scheme (Klaus 2015)
GEOMOR30	Shelf_high relief_Bank_platform reef_rock base_rim	From L1-L4 of the new integrated classification scheme (Klaus 2015)
GEOMOR31	Shelf_high relief_Bank_platform reef_sand cay_rim	From L1-L4 of the new integrated classification scheme (Klaus 2015)

FEATUREID	Description	Source
GEOMOR32	Shelf_high relief_Island_fringing reef	From L1-L4 of the new integrated classification scheme (Klaus 2015)
GEOMOR33	Shelf_high relief_Island_subtidal	From L1-L4 of the new integrated classification scheme (Klaus 2015)
GEOMOR34	Shelf_high relief_Shelf_barrier complex	From L1-L4 of the new integrated classification scheme (Klaus 2015)
GEOMOR36	Shelf_high relief_Shelf_patch reef complex	From L1-L4 of the new integrated classification scheme (Klaus 2015)
GEOMOR37	Shelf_high relief_Shelf_platform reef_sand cay_rim	From L1-L4 of the new integrated classification scheme (Klaus 2015)
GEOMOR38	Shelf_high relief_Island_subtidal_granitic	From L1-L4 of the new integrated classification scheme (Klaus 2015)
GEOMOR39	Shelf_medium relief_Bank_lagoon	From geomorpholgy dataset by Harris et al (2014)
GEOMOR40	Shelf_medium relief_Shelf_lagoon	From L1-L4 of the new integrated classification scheme (Klaus 2015)
GEOMOR120	Land_Shelf_platform reef_sand cay_land on reef_sand cay with phosphatic sandstone	From L5 of the new integrated classification scheme (Klaus 2015)
GEOMOR130	Land_Atoll_raised_land on reef_raised limestone	From L5 of the new integrated classification scheme (Klaus 2015)
GEOMOR133	Land_Atoll_sea level_land on reef_sand cay	From L5 of the new integrated classification scheme (Klaus 2015)
GEOMOR134	Land_Atoll_sea level_land on reef_sand cay with phosphatic sandstone	From L5 of the new integrated classification scheme (Klaus 2015)
GEOMOR138	Land_Atoll_submerged_land on reef_sand cay with phosphatic sandstone	From L5 of the new integrated classification scheme (Klaus 2015)
GEOMOR140	Land_Bank_platform reef_atoll like_land on reef_sand cay	From L5 of the new integrated classification scheme (Klaus 2015)
GEOMOR141	Land_Bank_platform reef_atoll like_land on reef_sand cay with phosphatic sandstone	From L5 of the new integrated classification scheme (Klaus 2015)
GEOMOR143	Land_Bank_platform reef_infilled_land on reef_sand cay with phosphatic sandstone	From L5 of the new integrated classification scheme (Klaus 2015)
GEOMOR145	Land_Bank_platform reef_raised_land on reef_raised limestone	From L5 of the new integrated classification scheme (Klaus 2015)
GEOMOR147	Land_Bank_platform reef_rock base_land on reef_raised limestone	From L5 of the new integrated classification scheme (Klaus 2015)
GEOMOR148	Land_Bank_platform reef_rock base_land on reef_sand cay with phosphatic sandstone	From L5 of the new integrated classification scheme (Klaus 2015)
GEOMOR150	Land_Bank_platform reef_sand cay_land on reef_sand cay	From L5 of the new integrated classification scheme (Klaus 2015)
GEOMOR151	Land_Bank_platform reef_sand cay_land on reef_sand cay with phosphatic sandstone	From L5 of the new integrated classification scheme (Klaus 2015)
GEOMOR153	Land_Island_land_granitic rock	From L5 of the new integrated classification scheme (Klaus 2015)
GEOMOR160	Land_Island_land_reclaim	From L5 of the new integrated classification scheme (Klaus 2015)
KBAS_ALL	Key biodiversity areas (all 90 KBAs)	Proportion of planning unit KBA (Senterre et al 2013)
VASC_PLANT	Priority vascular plants (84 species)	Number of priority plant species per planning unit
CDM_curieu	Coco de Mer on Curieuse	Distribution of Coco-de-Mer trees on Curieuse provided by SNPA
RIVERS	Rivers	From L5 of the new integrated classification scheme (Klaus 2015)
RIVERINE	Riverine	Riverine habitats from Wagner and Senterre (2014) and additional area on Fregate.
BEACH	Beach	Area of rivers MEE rivers datalayers buffered by 10 m
WETLAND	Wetlands and mangroves	Wetland data from MEE and mangrove areas from L5 of the new integrated classification scheme (Klaus 2015)
Reef	Coral reef structures	From L6 of the new integrated classification scheme (Klaus 2015)
SUBMERGED	Submerged reef flat	From L6 of the new integrated classification scheme (Klaus 2015)
SEAGRASS	Seagrass	From L6 of the new integrated classification scheme (Klaus 2015)
SG_HIGHD	High density seagrass	From L6 of the new integrated classification scheme (Klaus 2015)
SG_MEDD	Medium density seagrass	From L6 of the new integrated classification scheme (Klaus 2015)
SG_LOWD	Low density seagrass and macroalgae	From L6 of the new integrated classification scheme (Klaus 2015)
WIOMER	WIOMER priority areas	Proportion of planning unit WIOMER
IBAs	Important Bird Areas (all land)	Proportion of planning unit IBA
CHLA_MAX	Above average long term maximum chlorophyll-a concentrations	MODIS chlorophyll-a
CHLA_MEAN	Above average long term mean chlorophyll-a concentrations	MODIS chlorophyll-a
CW_ENA	Modeled probability of cold water corals	

FEATUREID	Description	Source
CW_SOL	Modeled probability of cold water corals	
STB_roost	Distribution of sheath-tailed bat roosts	GoS-MEE
dugong	Distribution of Dugong	Aldabra lagoon
marinemamm	Greater than 0.5 probability of 12 species of marine mammals	Aquamaps (2012) *.csv files, re-projected to UTM40S and kridged
bluewhale	Blue whale breeding grounds	Kiszka (2009)
humpback	Humpback whale breeding grounds	Kiszka (2009)
spermwhale	Historical location of sperm whale	Digitised during 2nd SEY-SCP Workshop
WS0104	Greater than 0.5 probability of whale sharks over 4 seasons	
WS_Mahe	Greater than 0.5 probability of whale sharks around Mahe	
sharks	Distribution of landings of sharks	
oceanicwhi	Distribution of landings of oceanic white tip shark	
mako	Distribtion of landings of mako sharks	
threshers	Distribtion of landings of thresher sharks	
hammerhead	Distribution of landings of hammerhead shark	
blueshark	Distribution of landings of blue shark	
dolphinf	Distbribution of landings of dolphinfish	
swordfish	Distribution of landings of swordfish	
marlin	Distribution of landings of marlin	
bluemarlin	Distribution of landings of blue marlin	
strimarlin	Distritbion of landings of stipped marlin	
ipbmarlin	Distribtution of landings of Indo-Pacific Blue Marlin	
SPAG_sigs	Distribution of rabbitfish spawning sites	
SPAG_grou	Distritbution of grouper spawning sites	
frig_forag	Frigate foraging areas	
seabird01	sey_birds_sea_Anous_stolidus_d.shp	SBRC excel data converted into shapefiles
seabird02	sey_birds_sea_Anous_tenuirostris_d.shp	SBRC excel data converted into shapefiles
seabird05	sey_birds_sea_Gigas_alba_d.shp	SBRC excel data converted into shapefiles
seabird06	sey_birds_sea_Numenius_arquata_.shp	SBRC excel data converted into shapefiles
seabird07	sey_birds_sea_Papasula_abbotti_d.shp	SBRC excel data converted into shapefiles
seabird10	sey_birds_sea_Sterna_dougallii_d.shp	SBRC excel data converted into shapefiles
seabird11	sey_birds_sea_Sterna_sumatrana_d.shp	SBRC excel data converted into shapefiles
seabird12	sey_birds_sea_Sula_dactylatra_d.shp	SBRC excel data converted into shapefiles
seabird13	sey_birds_sea_Sula_leucogaster_d.shp	SBRC excel data converted into shapefiles
seabird14	sey_birds_sea_Sula_sula_d.shp	SBRC excel data converted into shapefiles
landbird01	sey_birds_land_Acrocephalus_sechellensis.shp	SBRC excel data converted into shapefiles
landbird02	sey_birds_land_Aerodramus_elaphrus.shp	SBRC excel data converted into shapefiles
landbird03	sey_birds_land_Alectroenas_pulcherrima.shp	SBRC excel data converted into shapefiles
landbird04	sey_birds_land_Ardeola_idae.shp	SBRC excel data converted into shapefiles
landbird05	sey_birds_land_Butorides_striatus.shp	SBRC excel data converted into shapefiles
landbird06	sey_birds_land_Copsychus_sechellarum.shp	SBRC excel data converted into shapefiles
landbird07	sey_birds_land_Coracopsis_barklyi.shp	SBRC excel data converted into shapefiles
landbird08	sey_birds_land_Dryolimnas_cuvieri.shp	SBRC excel data converted into shapefiles

FEATUREID	Description	Source
landbird09	sey_birds_land_Falco_araea.shp	SBRC excel data converted into shapefiles
landbird10	sey_birds_land_Foudia_sechellarum.shp	SBRC excel data converted into shapefiles
landbird11	sey_birds_land_Gallinula_chloropus.shp	SBRC excel data converted into shapefiles
landbird12	sey_birds_land_Hypsipetes_crassirostris.shp	SBRC excel data converted into shapefiles
landbird13	sey_birds_land_Nectarinia_dussumieri.shp	SBRC excel data converted into shapefiles
landbird14	sey_birds_land_Otus_insularis.shp	SBRC excel data converted into shapefiles
landbird15	sey_birds_land_Terpsiphone_corvina.shp	SBRC excel data converted into shapefiles
landbird16	sey_birds_land_Threskiornis_bernieri.shp	SBRC excel data converted into shapefiles
landbird17	sey_birds_land_Zosterops_modestus.shp	SBRC excel data converted into shapefiles
shorebird1	sey_birds_shore_Ardea_cinerea.shp	SBRC excel data converted into shapefiles
shorebird2	sey_birds_shore_Bubulcus_ibis.shp	SBRC excel data converted into shapefiles
shorebird3	sey_birds_shore_Ixobrychus_sinensis.shp	SBRC excel data converted into shapefiles
shorebird4	sey_birds_shore_Nycticorax_nycticorax.shp	SBRC excel data converted into shapefiles
reptile01	sey_reptiles_iucn_nov2013_Ailuronyx_seychellensis.shp	IUCN Red List
reptile02	sey_reptiles_iucn_nov2013_Ailuronyx_tachyscopaeus.shp	IUCN Red List
reptile03	sey_reptiles_iucn_nov2013_Ailuronyx_trachygaster.shp	IUCN Red List
reptile04	sey_reptiles_iucn_nov2013_Archaius_tigris.shp	IUCN Red List
reptile05	sey_reptiles_iucn_nov2013_Hemidactylus_mercatorius.shp	IUCN Red List
reptile06	sey_reptiles_iucn_nov2013_Janetaescincus_braueri.shp	IUCN Red List
reptile07	sey_reptiles_iucn_nov2013_Janetaescincus_veseyfitzgeraldi.shp	IUCN Red List
reptile08	sey_reptiles_iucn_nov2013_Lamprophis_geometricus.shp	IUCN Red List
reptile09	sey_reptiles_iucn_nov2013_Lycognathophis_seychellensis.shp	IUCN Red List
reptile10	sey_reptiles_iucn_nov2013_Pamelaescincus_gardineri.shp	IUCN Red List
reptile11	sey_reptiles_iucn_nov2013_Pelamis_platura.shp	IUCN Red List
reptile12	sey_reptiles_iucn_nov2013_Phelsuma_abbotti.shp	IUCN Red List
reptile13	sey_reptiles_iucn_nov2013_Phelsuma_astriata.shp	IUCN Red List
reptile14	sey_reptiles_iucn_nov2013_Phelsuma_laticauda.shp	IUCN Red List
reptile15	sey_reptiles_iucn_nov2013_Phelsuma_sundbergi.shp	IUCN Red List
reptile16	sey_reptiles_iucn_nov2013_Trachylepis_seychellensis.shp	IUCN Red List
reptile17	sey_reptiles_iucn_nov2013_Urocotyledon_inexpectata.shp	IUCN Red List
reptile18	sey_reptiles_iucn_nov2013_Zonosaurus_madagascariensis.shp	IUCN Red List
CMA_forage	Chelonia mydas adult foraging areas (1 to 4 in terms of importance 1 low 4 high)	Jeanne Mortimer and data from MCSS
CMJ_forage	Green turtle juvenile foraging areas (1 to 4 in terms of importance 1 low 4 high)	Jeanne Mortimer and data from MCSS
EIA_forage	Hawksbill adult foraging areas (1 to 4 in terms of importance 1 low 4 high)	Jeanne Mortimer and data from MCSS
EIJ_forage	Hawksbill juvenile foraging areas (1 to 4 in terms of importance 1 low 4 high)	Jeanne Mortimer and data from MCSS
turtlenest	Turtle nesting beaches (1 low 4 high)	Jeanne Mortimer and data from MCSS
CMA_nest	Green turtle nesting areas (1 low 4 high)	Jeanne Mortimer and data from MCSS
EIA_nest	Hawksbill nesting areas (1 low 4 high)	Jeanne Mortimer and data from MCSS
amphib01	sey_amphibians_iucn_nov2013_Grandisonia_alternans.shp	IUCN Red List
amphib02	sey_amphibians_iucn_nov2013_Grandisonia_brevis.shp	IUCN Red List
amphib03	sey_amphibians_iucn_nov2013_Grandisonia_larvata.shp	IUCN Red List
amphib04	sey_amphibians_iucn_nov2013_Grandisonia_sechellensis.shp	IUCN Red List

FEATUREID	Description	Source
amphib05	sey_amphibians_iucn_nov2013_Hypogeophis_rostratus.shp	IUCN Red List
amphib06	sey_amphibians_iucn_nov2013_Praslinia_cooperi.shp	IUCN Red List
amphib07	sey_amphibians_iucn_nov2013_Ptychadena_mascareniensis.shp	IUCN Red List
amphib08	sey_amphibians_iucn_nov2013_Sechellophryne_gardineri.shp	IUCN Red List
amphib09	sey_amphibians_iucn_nov2013_Sechellophryne_pipilodryas.shp	IUCN Red List
amphib10	sey_amphibians_iucn_nov2013_Sooglossus_sechellensis.shp	IUCN Red List
amphib11	sey_amphibians_iucn_nov2013_Sooglossus_thomasseti.shp	IUCN Red List
amphib12	sey_amphibians_iucn_nov2013_Tachycnemis_seychellensis.shp	IUCN Red List
IBAS	Important Bird Areas (all land)	Digitised from BirdLife website
IBA_SEA	Important Seadird Areas	Draft areas prepared by Ben Lascelles BirdLife International (Lascelles 2014)
WIOMER	WIOMER priority areas	WWF and Indian Ocean Commission
EBSA	Ecologically and Biologically Significant Areas	Convention on Biological Diversity Secretariat (c/o Phil Dustan)