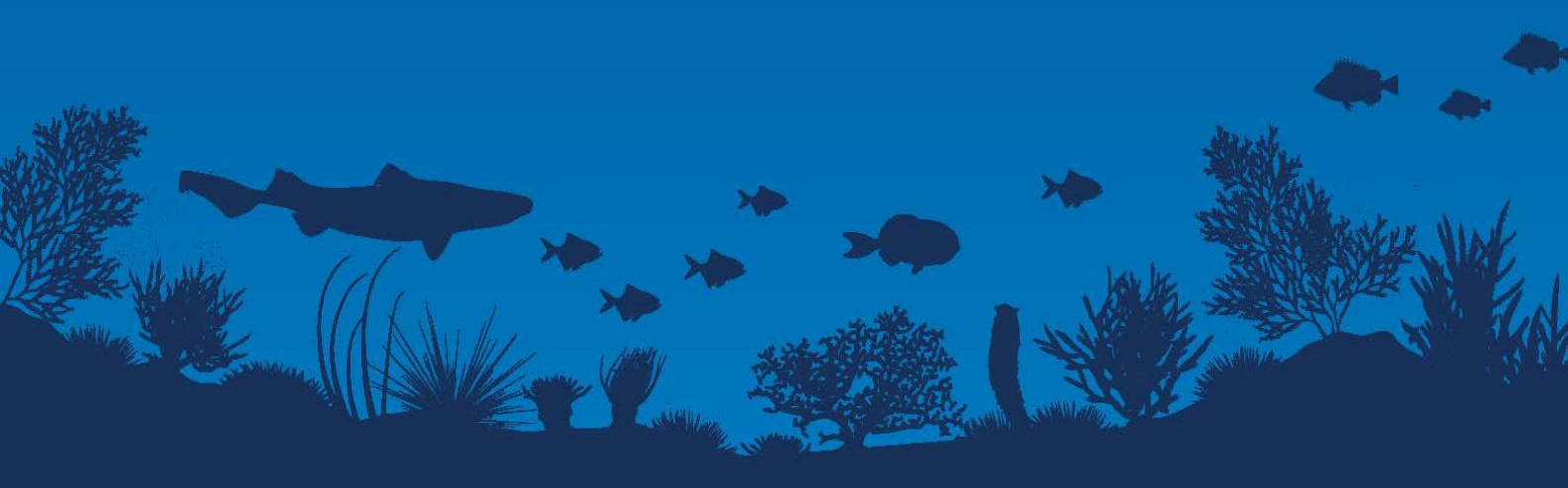




Introduction to global marine
datasets of biodiversity
importance in the
Western Indian Ocean



Introduction to marine datasets of biodiversity importance in the Western Indian Ocean

Authors

Lauren Weatherdon, Juliette Martin, Ruth Fletcher, Corinne Martin, Simon Blyth, Steve Fletcher

Acknowledgements

The authors are grateful to the Global Environment Facility (GEF) who financed this work under the 5-year project jointly managed by FAO and UN Environment, entitled “Sustainable fisheries management and biodiversity conservation of deep-sea living marine resources and ecosystems in the Areas Beyond National Jurisdiction (ABNJ).” The authors would also like to thank the Proteus Partnership, who partly financed work that contributed to this document.

Suggested citation

Weatherdon LV, Martin JCG, Fletcher R, Martin CS, Blyth S, Fletcher S (2016). Introduction to marine datasets of biodiversity importance in the Western Indian Ocean. Cambridge (UK): UN Environment World Conservation Monitoring Centre. 17 pp. (+ 3 annexes)



© 2016 United Nations Environment Programme World Conservation Monitoring Centre

The United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) is the specialist biodiversity assessment centre of the United Nations Environment Programme (UN Environment), the world’s foremost intergovernmental environmental organisation. The Centre has been in operation for over 30 years, combining scientific research with practical policy advice.

Distribution: This publication may be reproduced for educational or non-profit purposes without special permission, provided acknowledgement to the source is made. Reuse of any figures is subject to permission from the original rights holders. No use of this publication may be made for resale or any other commercial purpose without permission in writing from UN Environment. Applications for permission, with a statement of purpose and extent of reproduction, should be sent to the Director, UNEP-WCMC, 219 Huntingdon Road, Cambridge, UK.

Disclaimer: The contents of this report do not necessarily reflect the views or policies of UN Environment, contributory organisations or editors. The designations employed and the presentations of material in this report do not imply the expression of any opinion whatsoever on the part of UN Environment or contributory organisations, editors or publishers concerning the legal status of any country, territory, city area or its authorities, or concerning the delimitation of its frontiers or boundaries or the designation of its name, frontiers or boundaries. The mention of a commercial entity or product in this publication does not imply endorsement by UN Environment.



Contents

1. Introduction.....	4
ABNJ Deep Seas Project.....	4
Introduction to the Western Indian Ocean	5
2. Aim and scope of this manual.....	5
3. Key marine and coastal datasets	6
Biogenic habitats	6
Species habitat	8
Species distributions.....	8
Biodiversity areas	9
Biogeographic classification.....	10
Environmental descriptors	13
Ecosystem services and natural capital.....	13
Ecological status and impact.....	14
Databases and data portals	15
Administrative regions	16
References.....	18
Annex 1. Dataset summary table.....	29
Annex 2. Interactive maps	37
Annex 3. Detailed dataset-specific metadata	38





Zanzibar mangroves.

© Steve Lutz, GRID-Arendal, 2015
(CC BY-NC-ND 2.0)

1. Introduction

ABNJ Deep Seas Project

This work has been done as part of a 5-year GEF funded project jointly managed by FAO and UN Environment, entitled “*Sustainable fisheries management and biodiversity conservation of deep-sea living marine resources and ecosystems in the Areas Beyond National Jurisdiction (ABNJ)*.” UNEP-WCMC is executing component 4 of this project, which focuses on the development and testing of a methodology for area-based planning in ABNJ deep sea areas¹.

The Western Indian Ocean is one two pilot regions for the testing of area based planning within the ABNJ Deep Seas Project. UNEP-WCMC is working the Nairobi Convention and other project partners in the Western Indian Ocean pilot region.

Data form the basis of informed decision-making. However, knowledge of marine datasets tends to be fragmented and difficult to access for non-expert users, particularly in marine ABNJ. As a first step within this project, global datasets relevant to the pilot region have been identified and presented in this regional data manual. This non-exhaustive review will be used as a foundation on which to build further understanding of global and regional data that are relevant to the project’s objectives.

¹ For more information, please visit the ‘Common Oceans’ website (<http://www.commonoceans.org/deep-seas-biodiversity/en/>).

Introduction to the Western Indian Ocean

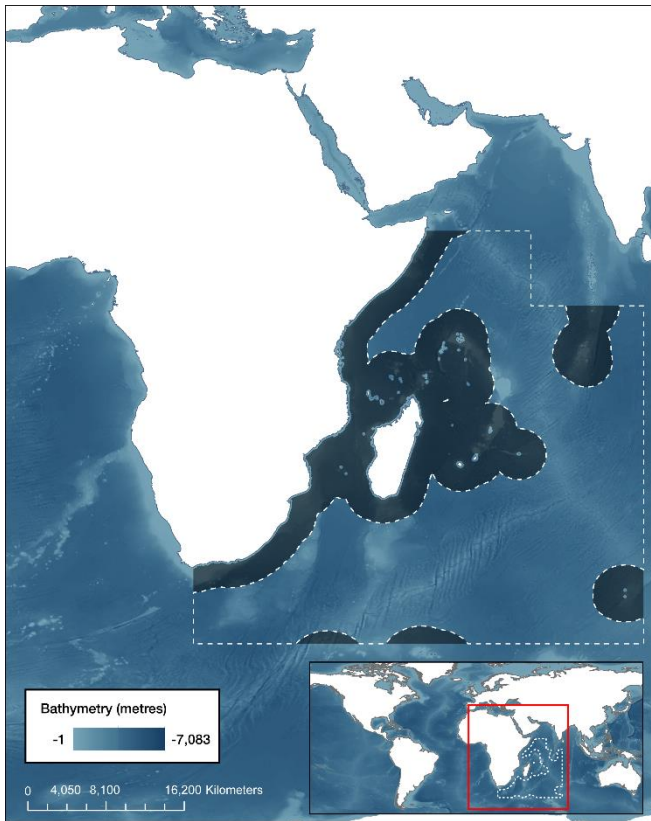
The Western Indian Ocean spans the offshore waters from Somalia to South Africa, and extends beyond Madagascar to include many Small Island Developing States (SIDS). This expanse of water encompasses a diverse range of ecologically and nutritionally rich ecosystems such as hydrothermal vents and seamounts, with depths of up to 7,000 metres.

Thirty-five Ecologically or Biologically Significant Marine Areas (EBSAs) have been identified in this region, including the Agulhas Front, the Mozambique Channel, the Walters Shoal, and the Mahe, Alphonse and Amirantes Plateau (Secretariat of the Convention on Biological Diversity, 2015). Three major tectonic plates merge within ABNJ in the Western Indian Ocean, forming seamount ridges and hydrothermal vents that support the biodiversity found in these regions. Four ecoregions (The Nature Conservancy, 2012) have been described within the territorial waters of East African countries, off the west coast of Madagascar, at the Maldives-Chagos-Lakshadweep Atolls, and along the Agulhas Current, while over 180 marine protected areas are located within this region.

The region is also home to marine protected areas (MPAs) such as the British Indian Ocean Territory MPA in the Chagos Archipelago and the Mayotte National Marine Park. Key ecoregions include the Maldives-Chagos-Lakshadweep Atolls and those situated along West Africa and West Madagascar (for examples, please see Figure 2).

2. Aim and scope of this manual

This technical document identifies global datasets that cover regional features within the Western Indian Ocean project pilot region (Figure 1), offering a high-level introduction to datasets of relevance to ABNJ in this location. This non-exhaustive review identifies 103 global datasets that reflect various characteristics of biodiversity within this pilot region, which are listed in Annex 1. Interactive maps are also available for selected dataset categories to facilitate exploration of some of these layers (Annex 2). The document is also accompanied by standardised 'metadata' sheets for 49 of these datasets (Annex 3). The described datasets are global in breadth, but include data coverage for the Western Indian Ocean pilot region. This inventory will be expanded further in subsequent efforts to identify additional global and regional datasets of relevance to the region, and also to highlight gaps in knowledge. It is estimated that 95% of the ocean remains unexplored, with a strong bias in sampling effort and data availability towards temperate regions in the Northern hemisphere and within exclusive economic zones (Mora et al. 2008). Data availability within geographic regions varies considerably depending on the location considered. For example, while many records have been collected from the continental shelves and coastal waters due to better accessibility, the deep sea and ABNJ remain comparatively unexplored due to logistical challenges and costs associated with sampling remote areas (Mora et al. 2008). In particular, deep sea habitats such as hydrothermal vents and cold seeps are presently under-studied, as are the plethora of endemic species currently unknown to science that these habitats host (Mora et al. 2008).



The boundaries and names shown, and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Figure 1. Western Indian Ocean project pilot region (dashed line), falling within Areas Beyond National Jurisdiction. This represents an indicative boundary of the area that the project will examine, and is not reflective of existing mandates.

Another consideration regarding data accuracy and uncertainty is consistency across temporal and spatial scales. Data must be available at an appropriate scale to answer a particular question, as patterns observed at one scale (e.g., global, monthly) may not be detectable at another (e.g., local, annual). Although global datasets such as those identified in this manual can provide useful information and insight into large-scale trends and features, regional or local datasets are often necessary to make better informed, regional-level decisions.

For more information regarding data limitations within the marine environment, please see Weatherdon et al. (2015)².

3. Key marine and coastal datasets

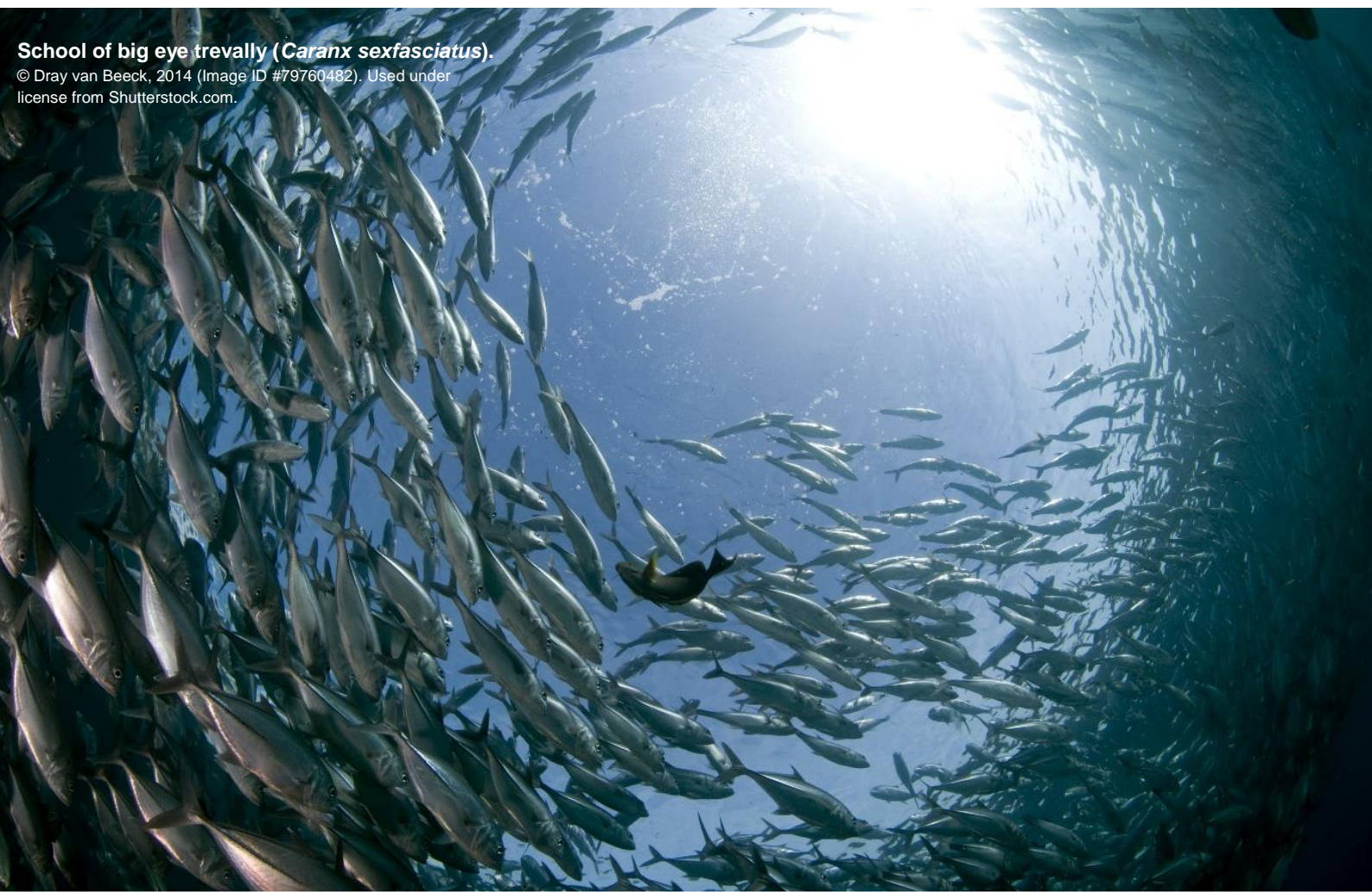
Biogenic habitats

‘Biogenic’ habitats are those created by plants or animals, and that grow to provide a unique environment and physical structure for other organisms to live (Tyrrell 2005). Examples of marine and coastal biogenic habitats include warm- and cold-water corals, mangroves, saltmarshes, seagrass meadows, and kelp beds. While many of these habitats fall within Exclusive Economic Zones (EEZs), they offer environments that support the migration, spawning, and other life history stages of economically, culturally, or nutritionally important species that are found in ABNJ (table 1).

² Available at <http://wcmc.io/MarineDataManual>.

Table 1: Marine biogenic habitat datasets, that have features in the Western Indian Ocean, and their source. Tick marks indicate that UNEP-WCMC has metadata sheets of a given dataset.

RESOURCE	SOURCE	METADATA
Global Distribution of Coral Reefs (2010)	UNEP-WCMC et al. (2010)	✓
Global Distribution of Cold-water Corals	Freiwald et al. (2005)	✓
Global Distribution of Habitat Suitability for Stony Corals on Seamounts (2009)	Tittensor et al. (2009)	
Global Distributions of Habitat Suitability for Cold-Water Octocorals (2012)	Yesson et al. (2012)	✓
Global Distribution of Seagrasses	UNEP-WCMC and Short (2005)	✓
Global Distribution of Modelled Mangrove Biomass (2014)	The Nature Conservancy	✓
Global Distribution of Mangroves USGS (2011)	Giri et al. (2011)	✓
Global Spatiotemporal Database of Mangrove Forest Cover (2014)	Hamilton and Casey (2016)	
Global Distribution of Modelled Mangrove Biomass (2014)	Hutchison et al. (2014)	✓
World Atlas of Mangroves (2010)	Spalding et al. (2010)	✓
World Mangrove Atlas (1997)	Spalding et al. (1997)	✓
Mangrove Tree Height in Africa (2013)	Fatoyinbo and Simard (2013)	
Global Distribution of Saltmarsh (2013)	UNEP-WCMC	✓



Species habitat

The Convention on Biological Diversity (CBD; 1992) defines habitat as the place or type of site where an organism or population naturally occurs. In this document, the term habitat is understood in the sense of 'biotope,' which comprises the abiotic³ characteristics of a site and the associated biological community. In simple terms, a habitat is where an animal or plant species lives (including migratory routes), feeds (e.g., foraging sites) and reproduces (e.g., breeding, spawning, nesting and nursery sites). The habitat of a species may change throughout its life cycle: for instance, fish eggs and larvae are found in very different habitats to juvenile and adult fish. Similarly, female marine turtles lay eggs on nesting beaches, but spend the rest of their lives (e.g., foraging, migrating) at sea. Marine species distribution datasets are listed in table 2.

Table 2: Marine species habitat datasets, that have features in the Western Indian Ocean, and their source. Tick marks indicate that UNEP-WCMC has metadata sheets of a given dataset.

RESOURCE	SOURCE	METADATA
Global Distributions of Habitat Suitability for Sea Turtle Nesting Sites (2012)	State of the World's Sea Turtles (SWOT) and Kot et al. (2012)	
Global Distribution of Sea Turtle Nesting Sites (1999)	Ocean Data Viewer	✓
Global Distribution of Sea Turtle Feeding Sites (1999)	Ocean Data Viewer	✓
Global Spawning Aggregations Database	Science and Conservation of Fish Aggregations (SCRFA Database)	

Species distributions

The distribution of species is defined here as the geographical spaces where a species may be found. Species distributions may be obtained through records of occurrence, expert-derived or predicted by numerical models, the latter often providing information on the relative probability of occurrence at given locations. Resources for occurrence data globally include the Global Biodiversity Information Facility (GBIF), the Ocean Biogeographic Information System (OBIS), and the distributions that accompany the IUCN Red List of Threatened Species. For specific taxa, there is the Global Shark Distribution Database and modelling initiatives, such as AquaMaps, which provide predicted range maps for aquatic species. Increasingly, tagging efforts have yielded databases on the movement of marine taxa (e.g., Marine Animal Tracking; Movebank; Tagging of Pacific Predators in the Pacific Ocean) (table 3).

³ i.e., non-living, applied to the physical and chemical aspects of an organism's environment (<http://terms.biodiversitya-z.org/terms/5>).

Table 3: Species distribution datasets, that have features in the Western Indian Ocean, and their source. Tick marks indicate that UNEP-WCMC has metadata sheets of a given dataset.

RESOURCE	SOURCE	METADATA
Data Portal of the Global Biodiversity Information Facility	Global Biodiversity Information Facility	
Ocean Biogeographic Information System (OBIS)	OBIS Secretariat , Intergovernmental Oceanographic Commission (UNESCO)	✓
Ocean Biogeographic Information System Spatial Ecological Analysis of Megavertebrate Populations	Marine Geospatial Ecology Lab, Duke University (OBIS-SEAMAP)	
Spatial Data for the Red List of Threatened Species	International Union for Conservation of Nature (IUCN)	
Corrected and Refined Mangrove Species Ranges	UNEP-WCMC (2014)	✓
Global Register of Migratory Species (GROMS)	Zoologisches Forschungsinstitut und Museum Alexander Koenig (GROMS)	
AquaMaps: Predicted Range Maps for Aquatic Species (2013)	AquaMaps , a joint project of FishBase and SeaLifeBase	✓
Global Distribution of Sperm Whales (2013)	Albert-Ludwigs-University of Freiburg (Contact UNEP-WCMC)	✓
Global Distribution of Sei Whales (2013)	Albert-Ludwigs-University of Freiburg (Contact UNEP-WCMC)	✓
Global Distribution of Melon-headed Whales (2013)	Albert-Ludwigs-University of Freiburg (Contact UNEP-WCMC)	✓
Global Shark Distribution Database	Lucifora et al. (2009)	
Ocean Tracking Network	Dalhousie University	
Wildlife Tracking	www.wildlifetracking.org	
Movebank	Max Planck Institute for Ornithology (Movebank)	

Biodiversity areas

Areas relevant to biodiversity include a range of nationally and internationally protected areas as well as areas described according to their biodiversity conservation interest (e.g., Key Biodiversity Areas, Ecologically or Biologically Significant Marine Areas [EBSAs], Critical Habitat). The Western Indian Ocean encompasses 35 EBSAs, which include large areas such as the Agulhas Front, the Mozambique Channel, the Walters Shoal, and the Mahe, Alphonse and Amirantes Plateau, among others (see table 4 and Figure 2).

Table 4: Biodiversity area datasets, that have features in the Western Indian Ocean, and their source. Tick marks indicate that UNEP-WCMC has metadata sheets of a given dataset.

RESOURCE	SOURCE	METADATA
World Database on Protected Areas	IUCN and UNEP-WCMC (2016)	✓
Global Distribution of KBAs, IBAs, and AZEs	BirdLife International (2016)	✓
Ecologically or Biologically Significant Marine Areas	Secretariat of the Convention on Biological Diversity (2015)	
The Global 200 Ecoregions	Olson and Dinerstein (2002)	
Global Map of Marine Critical Habitat (2015)	Martin et al. (2015)	✓

Biogeographic classification

Biogeographic classifications are used to understand how and where species are distributed, and to mark the boundaries between oceanographic regimes. They help to assess which habitats, communities and species could be subject to disproportionate impact due to concentration of human activities, rarity or limited extent of distribution.

For ABNJ in the Western Indian Ocean, key biogeographic classifications include hydrothermal vents fields, seamounts and knolls (table 5). Three major tectonic plate boundaries—the Southwest Indian Ridge (SWIR), Central Indian Ridge (CIR), and Southeast Indian Ridge (SEIR)—merge at the ‘Indian Ocean Triple Junction,’ represented on Figure 3 by the formation of seamounts (in blue) and hydrothermal vents (in light green).

Table 5: Marine biogeographic classification datasets, that have features in the Western Indian Ocean, and their source. Tick marks indicate that UNEP-WCMC has metadata sheets of a given dataset.

RESOURCE	SOURCE	METADATA
Marine Ecoregions and Pelagic Provinces of the World (2007; 2012)	The Nature Conservancy	✓
A Proposed Biogeography of the Deep Oceans (2013)	Watling et al. (2013)	
Large Marine Ecosystems (LMEs) of the World (2002)	NOAA's LME Portal	✓
Geomorphology of the Oceans (2014)	Harris et al. (2014)	
Global Distribution of Seamounts and Knolls	Yesson et al. (2011)	✓
Global Seamount Database	Kim and Wessel (2011)	
Global Distribution of Hydrothermal Vents	Baker et al. (2010)	✓
Global Distribution of Hydrothermal Vent Fields	Beaulieu (2013)	✓
Global Distribution of Cold Seeps	Baker et al. (2010)	✓
Global Estuary Database	Alder (2003), Sea Around Us	✓

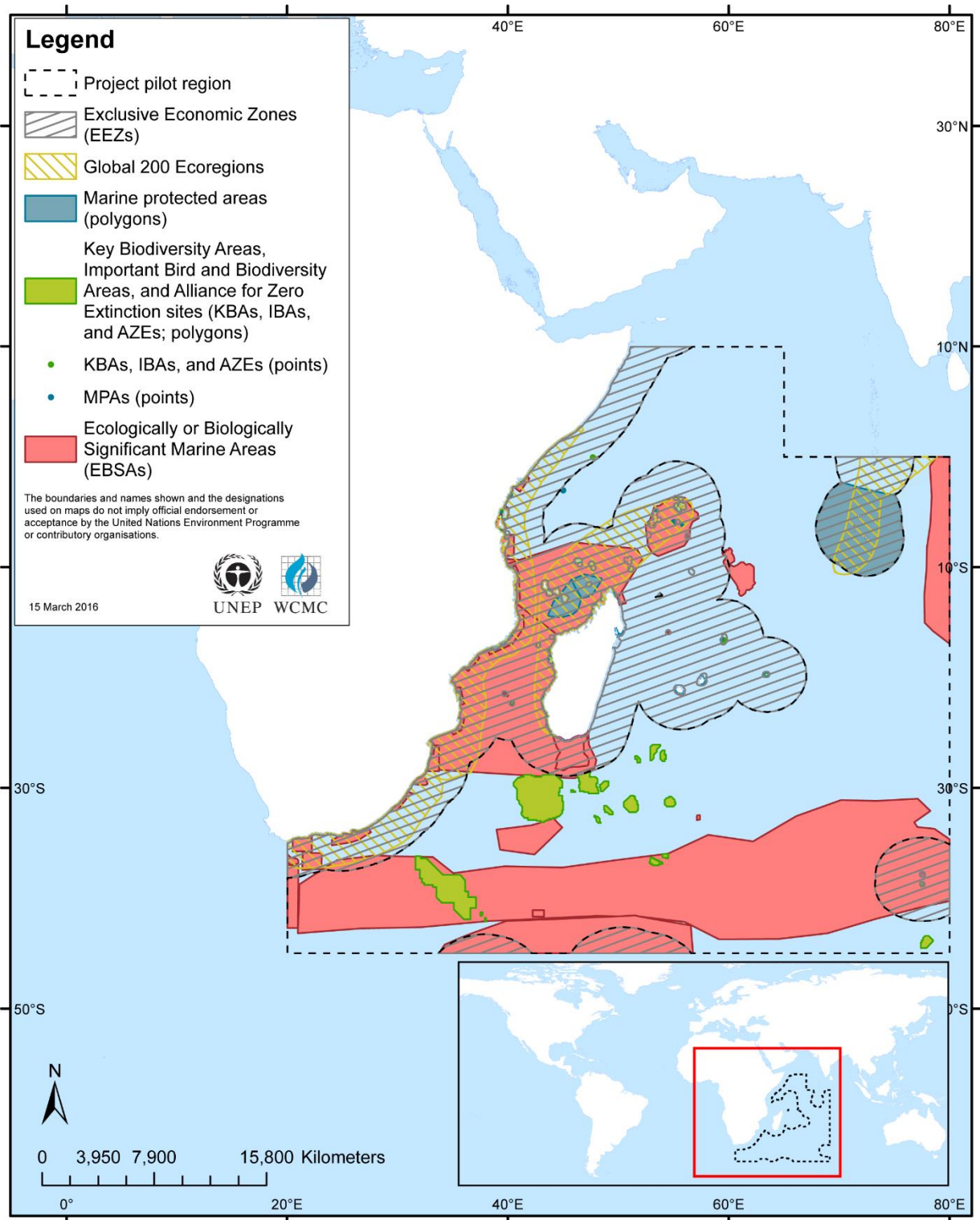


Figure 2. Examples of sites in the Western Indian Ocean pilot region, including Ecologically or Biologically Significant Marine Areas (EBSAs; Secretariat of the Convention on Biological Diversity, 2015), Key Biodiversity Areas, Important Bird and Biodiversity Areas, and Alliance for Zero Extinction sites (KBAs, IBAs, and AZEs; BirdLife International, 2016), Global 200 Ecoregions (Olson DM and Dinerstein E, 2002), and marine protected areas (MPAs; IUCN and UNEP-WCMC, 2016). For an interactive PDF of features, see Annex 2.

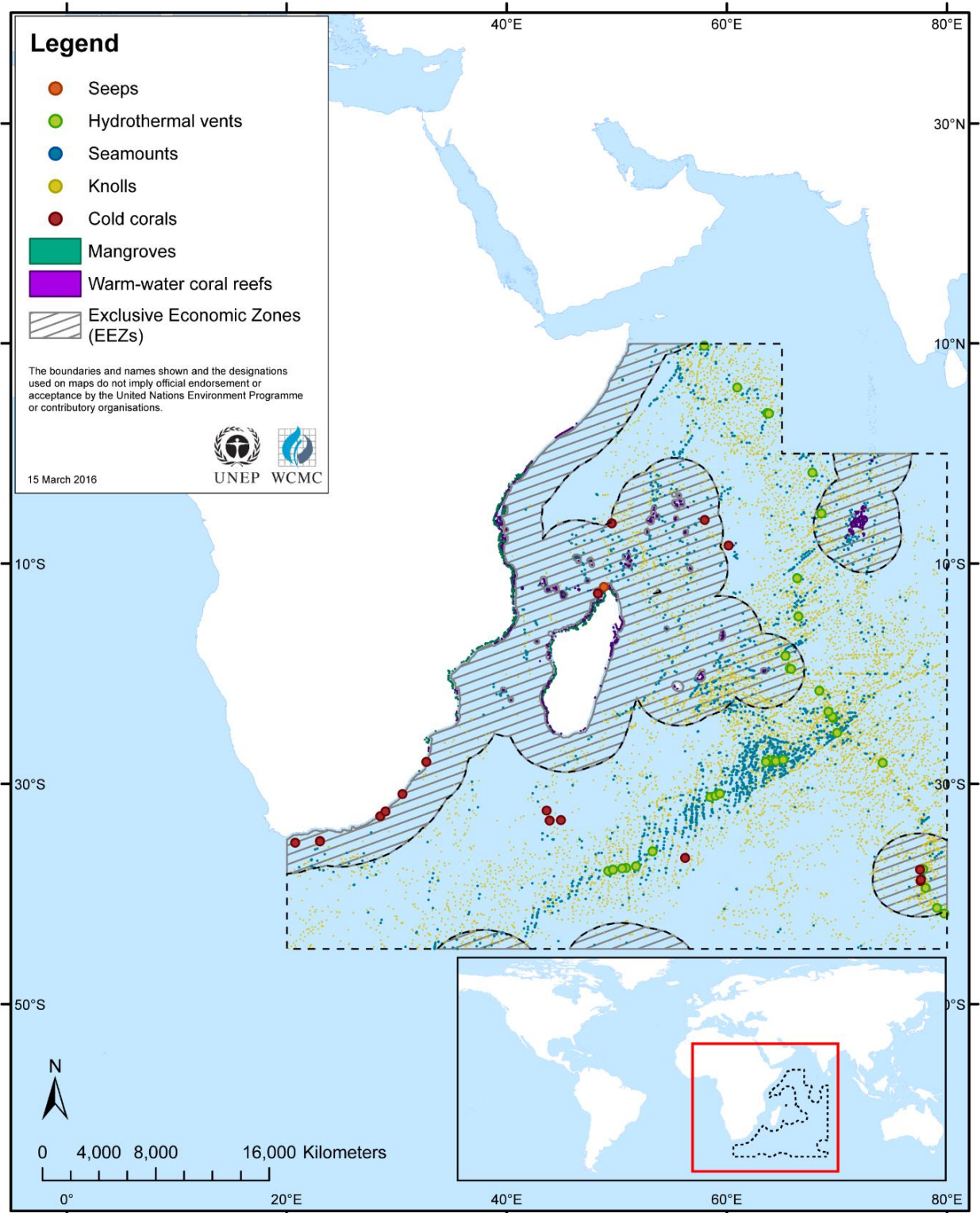


Figure 3. Examples of biogeographic classifications (hydrothermal vents, Beaulieu et al., 2013; cold seeps, Baker et al., 2010; seamounts and knolls, Yesson et al., 2011) and biogenic habitats (cold corals, Freiwald et al., 2005; warm-water coral reefs, UNEP-WCMC et al., 2010; mangroves, Giri et al., 2011) in the Western Indian Ocean pilot region. For an interactive PDF of features, see Annex 2.

Environmental descriptors

Environmental descriptors are defined here as variables that can be used to depict the environment. These include physical (e.g., bathymetry, seabed sediment type) and environmental (e.g., temperature, salinity) variables, as well as biological variables such as productivity (table 6). Environmental descriptors can be used to monitor environmental changes through space and time, and as predictors for use in species distribution modelling.

Table 6: Marine environmental descriptor datasets, that have features in the Western Indian Ocean, and their source. Tick marks indicate that UNEP-WCMC has metadata sheets of a given dataset.

RESOURCE	SOURCE	METADATA
General Bathymetric Chart of the Oceans	British Oceanographic Data Centre	
Global Sediment Map (marine realm)	Service Hydrographique et Océanographique de la Marine	
Global Marine Environmental Dataset	Institute of Marine Science, University of Auckland	
Bio-ORACLE : a Global Environmental Dataset for Marine Species Distribution Modelling	Phycology Research Group, Ghent University	
Mean Sea Surface Productivity in June and December 2003-2007 (2008)	Ocean Data Viewer	✓
Mean Annual Sea Surface Chlorophyll-a Concentration 2009-2013 (2015)	Ocean Data Viewer	✓
Mean Annual Sea Surface Temperature 2003-2007 (2008)	Ocean Data Viewer	✓
Mean Annual Sea Surface Temperature 2009-2013 (2015)	Ocean Data Viewer	✓

Ecosystem services and natural capital

Ecosystem services are the benefits people obtain from ecosystems. These include *provisioning services* such as food and water, *regulating services* such as regulations of floods, drought, land degradation, and disease, *supporting services* such as soil formation and nutrient cycling, and *cultural services* such as recreational, spiritual, religious, and other non-material benefits (DEFRA 2007) (table 7).

Table 7: Ecosystem services and natural capital datasets, that have features in the Western Indian Ocean, and their source. Tick marks indicate that UNEP-WCMC has metadata sheets of a given dataset.

RESOURCE	SOURCE	METADATA
Mapping Ocean Wealth	The Nature Conservancy	✓
A Global Map of Natural Capital	Dickson et al. (2014)	✓
Marine Ecosystem Services Partnership	Nicholas Institute for Environmental Policy Solutions, Duke University	✓
A Global Map of Coastal Recreation Values	Ghermandi and Nunes 2013	
Sea Around Us	Sea Around Us, University of British Columbia	✓
Ocean Past Initiative	Maritime Historical Studies Centre, University of Hull	

Ecological status and impact

Ecological status describes the degree to which human uses of the environment have altered the structure and functioning of plant and animal communities. A geographical area can be assigned an ecological status class (e.g., high, good, moderate, poor or bad) depending on the degree of alteration to the environment in that location. For instance, a *high* ecological status corresponds to areas relatively undisturbed by man, and *good* ecological status to areas where human activities have had only slight impacts on the ecological characteristics of local plants and animals communities. Impact here is understood in the broadest sense of the term, encompassing disease affecting ecosystems to human impact through diving. Indicators created from measurements of these impacts are used to track changes in ecological status over time. Table 8 lists global datasets of natural capital and ecosystem services.

Table 8: Ecological status and impact datasets, that have features in the Western Indian Ocean, and their source. Tick marks indicate that UNEP-WCMC has metadata sheets of a given dataset.

RESOURCE	SOURCE	METADATA
A Global Map of Human Impacts to Marine Ecosystems	Halpern et al. (2008)	
Spatial and temporal changes in cumulative human impacts on the world's ocean	Halpern et al. (2015)	
Global Data for the Ocean Health Index	Ocean Health Index (2015)	
Environmental Performance Index	Hsu et al. (2016)	✓
Living Planet Index	Zoological Society of London and WWF (2014)	✓
Reefs at Risk	Burke et al. (1998)	
Reefs at Risk Revisited	Burke et al. (2011)	
Coral Reef Watch	NOAA Coral Reef Watch (2013)	
Global Coral Disease Database	UNEP-WCMC and NOAA (2010)	
Fishing Gear Associated with Global Marine Catches	Watson et al. (2004)	
Global and Regional Assessments of the Marine Environment Database (GRAMED)	UNEP-WCMC (2008)	
Plastic Debris in the Open Ocean	Cózar et al. (2014)	
Global Restoration Network Database	Society for Ecological Restoration (2017)	
Undersea Cables	ICPC 2014	

Databases and data portals

The databases and data portals listed here offer collections of available data and tools of relevance to marine and coastal biodiversity globally. These include taxonomic databases that curate classifications and nomenclature for marine and coastal species, and thereby support awareness and management of global marine biodiversity (table 9).

Table 9: Databases and data portals, that have features in the Western Indian Ocean, and their source. Tick marks indicate that UNEP-WCMC has metadata sheets of a given dataset.

RESOURCE	SOURCE	METADATA
Ocean Data Viewer	UNEP-WCMC	✓
Knowledge Network for Biocomplexity (KNB)	NCEAS, University of California	✓
PANGAEA	Alfred Wegener Institute, Helmholtz Center for Polar and Marine Research	✓
FishBase	FishBase Consortium	✓
ReefBase	The WorldFish Center	
Map of Life	Yale University	
Global Distribution of Sea Turtles	Kot et al. (2015) (State of the World's Sea Turtles, SWOT)	
Environmental Data Explorer	United Nations Environment Programme (2016)	
UNEP Live	United Nations Environment Programme (2017)	
Atlas of Global Conservation	Hoekstra et al. (2010)	✓
Catalogue of Life	Species 2000 Secretariat, Naturalis Biodiversity Center and Roskov et al. (2015)	✓
World Porifera Database (sponges)	Van Soest et al. (2017)	
Mangrove Reference Database and Herbarium	Massó i Alemán et al. (2010)	
Species+	UNEP-WCMC	

Administrative regions

Administrative datasets are essential tools to support spatial analyses of marine and coastal biodiversity, whether for impact assessment, research, or conservation. Table 10 and Figure 4 provide examples of these datasets.

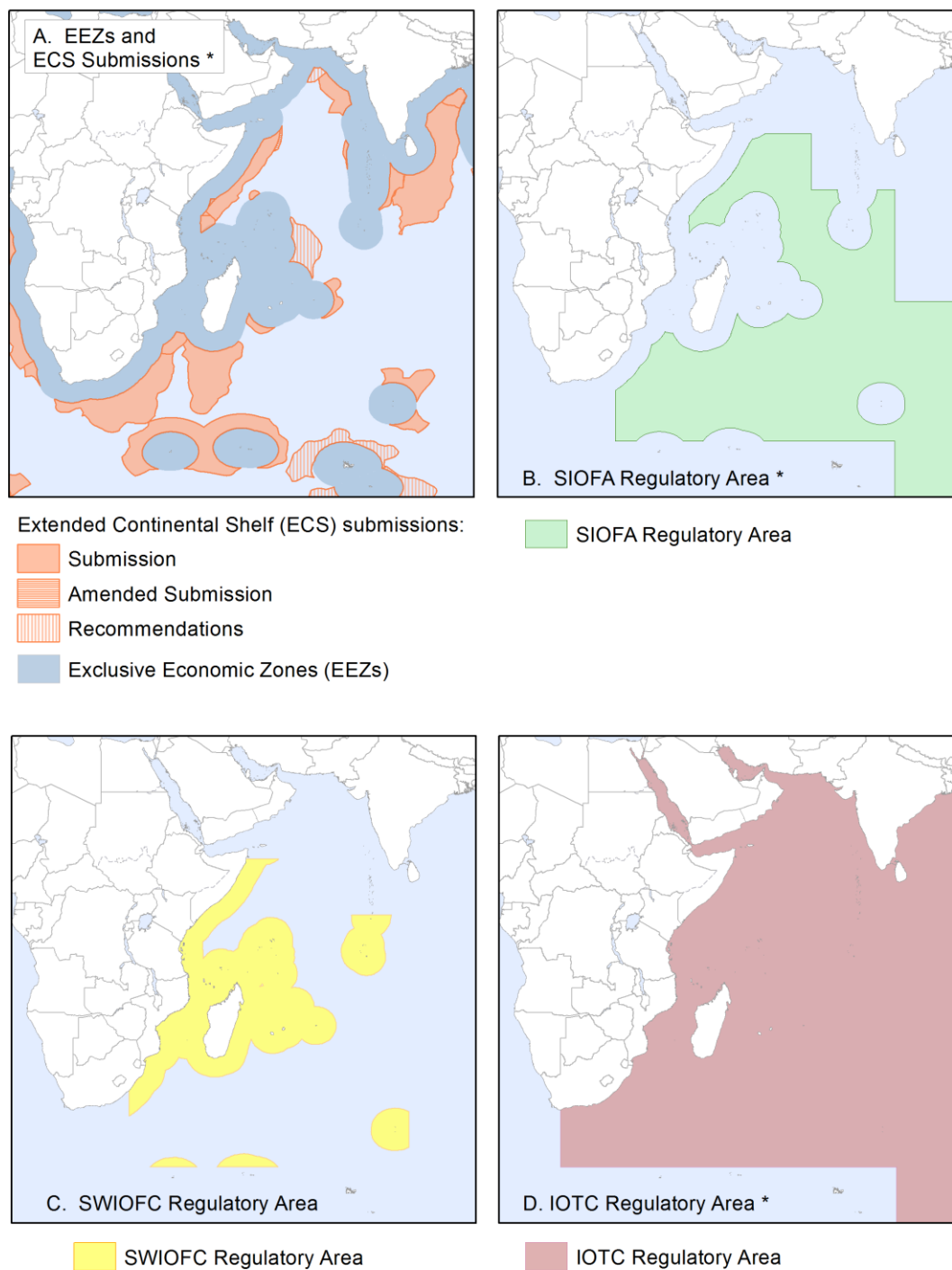
Table 10: Marine administrative regions datasets, that have features in the Western Indian Ocean, and their source. Tick marks indicate that UNEP-WCMC has metadata sheets of a given dataset.

RESOURCE	SOURCE	METADATA
Global Self-consistent, Hierarchical, High-resolution Geography Database	School of Ocean and Earth Science and Technology, University of Hawaii	✓
Global Maritime Boundaries Database	General Dynamics Advanced Information Systems, Inc.	
Global Administrative Areas	Global Administrative Areas (2015)	
Global Distribution of Islands IBPoW	UNEP-WCMC (2010)	✓
Global Distribution of Islands OSM	UNEP-WCMC (2015)	✓
Marine Regions Data Portal	Claus et al. (2017)	
Exclusive Economic Zone Boundaries	Claus et al. (2017)	✓
Boundaries of the Global International Waters Assessment	Division of Early Warning and Assessment, United Nations Environment Programme	✓
Global Distribution of Regional Fishery Bodies (2010)	FAO GeoNetwork	✓
Statistical Areas for Fishery Purposes (2016)	FAO GeoNetwork	
Global Distribution of Dive Centres (2001)	Ocean Data Viewer	✓
Global Distribution of Ports: World Port Index (2011)	National Geospatial - Intelligence Agency	
Continental Shelf Programme (2014)	GRID-Arendal	



Sperm whale off of Sri Lanka.

© Shane Gross, 2014 (Image ID: 103313360).
Used under license from Shutterstock.com



National Boundary lines
 UNGIWG, 2016

* NOTE: This regulatory area extends beyond the area shown in the map.

The boundaries and names shown, and the designations used on this map do not imply official endorsement or acceptance by the United Nations

Figure 4. Examples of Administrative Regions in the Western Indian Ocean pilot region, including A) Extended Continental Shelf submissions (ECS; GRID-Arendal, 2014) and Exclusive Economic Zones (EEZs; VLIZ, 2014), and the Regulatory Area of B) the South Indian Ocean Fisheries Agreement, C) Southwest Indian Ocean Fisheries Commission and D) Indian Ocean Tuna Commission (SIOFA, SWIOFC, IOTC; FAO, 2010).

References

Alder J (2003). Putting the coast in the "Sea Around Us". The Sea Around Us Newsletter 15: 1-2. URL: <http://searoundsus.org/newsletter/Issue15.pdf>; <http://data.unep-wcmc.org/datasets/23> (version 2.0)

Baker MC, Ramirez-Llodra E, Perry D (2010). ChEssBase: an online information system on species distribution from deep-sea chemosynthetic ecosystems. Version 3. Chemosynthetic Ecosystem Science (ChEss) project. Southampton (UK): National Oceanography Centre. URL: www.noc.soton.ac.uk/chess

Beaulieu SE. (2013). InterRidge Global Database of Active Submarine Hydrothermal Vent Fields: prepared for InterRidge, Version 3.1. World Wide Web electronic publication. Version 3.3, <http://vents-data.interridge.org>.

Birdlife International, Conservation International (2016). Global distribution of Key Biodiversity Areas (KBA), Important Bird Areas (IBA) and Alliance for Zero Extinction (AZE) sites. Cambridge (UK): Birdlife International. URL: www.birdlife.org

Burke L, Bryant D, McManus J, Spalding M. (1998). Reefs At Risk: A Map-based indicator of threats to the world's coral reefs. Washington (USA): World Resources Institute. 60 pp. URL: <http://www.wri.org/sites/default/files/pdf/reefs.pdf>.

Burke L, Reynter K, Spalding M and Perry A (2011). Reefs At Risk Revisited. Washington (USA): World Resources Institute. 130 pp. URL: <http://www.wri.org/publication/reefs-risk-revisited>.

British Oceanographic Data Centre (2017). General Bathymetric Chart of the Oceans. URL: <http://www.gebco.net/>

Claus S, De Hauwere N, Vanhoorne B, Souza Dias F, Oset García P, Hernandez F, and Mees J (Flanders Marine Institute) (2017). URL: <http://www.marineregions.org>

Cózar A, Echevarría F, González-Gordillo JI, Irigoien X, Úbeda B, Hernández-León S, Palma ÁT, Navarro S, García-de-Lomas J, Ruiz A, Fernández-de-Puelles ML, Duarte CM. (2014). Plastic debris in the open ocean. *PNAS* 111(28): 10239-10244. doi: [10.1073/pnas.1314705111](https://doi.org/10.1073/pnas.1314705111).

Dalhousie University (2017). Ocean Tracking Network. URL: www.oceantrackingnetwork.org

Dickson B, Blaney R, Miles L, Regan E, van Soesbergen A, Väänänen E, Blyth S, Harfoot M, Martin CS, McOwen C, Newbold T, van Bochove J (2014). Towards a global map of natural capital: key ecosystem assets. Nairobi (Kenya): United Nations Environment Programme. URL: <http://www.unep-wcmc.org/resources-and-data/towards-a-global-map-of-natural-capital>

Duke Nicholas Institute for Environmental Policy Solutions. Marine Ecosystem Services Partnership. URL: <http://www.marineecosystemservices.org/explore>.

FAO (Food and Agriculture Organization of the United Nations) (2001-2013). Regional Fishery Bodies. Fishery Governance Fact Sheets. Rome (Italy): FAO Fisheries and Aquaculture Department. URL: www.fao.org/fishery/rfb/en

FAO (Food and Agriculture Organization of the United Nations) (2010). Boundary data for Regional Fishery Bodies. In Supplement: FAO (2001-2013). Rome (Italy): FAO Fisheries and Aquaculture Department. URL: www.fao.org/8o/geonetwork?uuid=cc7dbf20-1b8b-11dd-8bbb-0017f293bd28

FAO (Food and Agriculture Organization of the United Nations) (2016). FAO Major Fishing Areas for Statistical Purposes. In: FAO Fisheries and Aquaculture Department (FI) [online]. Rome. Updated 2016-07-01, URL: <http://www.fao.org/geonetwork/srv/en/main.home?uuid=aco2a460-da52-11dc-9d70-0017f293bd28>

Fatoyinbo T, Simard M (2013) Height and biomass of mangroves in Africa from ICESat/GLAS and SRTM, International Journal of Remote Sensing, 34:2, 668-681. DOI: 10.1080/01431161.2012.712224

Freiwald A, Rogers A, Hall-Spencer J. (2005). Global distribution of cold-water corals (version 2). Update of the dataset in Freiwald et al. (2004). Cambridge (UK): UNEP World Conservation Monitoring Centre. URL: <http://data.unep-wcmc.org/datasets/3>.

Froese R and Pauly D (eds.) (2016) FishBase. World Wide Web electronic publication. URL: www.fishbase.org, version (10/2016).

General Dynamics Advanced Information Systems, Inc. (2008) Global Maritime Boundaries Database. URL: <http://www.globalgisdata.com/10974.html>

Ghermandi A and Nunes PALD (2013). A global map of coastal recreation values: Results from a spatially explicit meta-analysis. *Ecological Economics* 86: 1-15. doi: [10.1016/j.ecolecon.2012.11.006](https://doi.org/10.1016/j.ecolecon.2012.11.006).

Giri C, Ochieng E, Tieszen LL, Zhu Z, Singh A, Loveland T, Masek J, Duke N. (2011). Status and distribution of mangrove forests of the world using earth observation satellite data (version 1.3, updated by UNEP-WCMC). *Global Ecology and Biogeography* 20: 154-159. doi: [10.1111/j.1466-8238.2010.00584.x](https://doi.org/10.1111/j.1466-8238.2010.00584.x). Data URL: <http://data.unep-wcmc.org/datasets/4>.

Global Administrative Areas (2015). GADM database of Global Administrative Areas, version 2.8 URL: www.gadm.org

Global Biodiversity Information Facility (GBIF) (2017). Data Portal of the Global Biodiversity Information Facility. Data portal URL: <http://www.gbif.org/>

GRID-Arendal (2014) Continental Shelf Programme, Extended Continental Shelf Submissions. URL: <http://www.continentalsshelf.org/>

Halpern BS, Walbridge S, Selkoe KA, Kappel CV, Micheli F, D'Agrosa C, Bruno JF, Casey KS, Ebert C, Fox HE, Fujita R, Heinemann D, Lenihan HS, Madin EMP, Perry MT, Selig ER, Spalding M, Steneck R, Watson R. (2008). A global map of human impact on marine ecosystems. *Science* 319(5865): 948-952. doi: [10.1126/science.1149345](https://doi.org/10.1126/science.1149345).

Halpern BS, Frazier M, Potapenko J, Casey KS, Koenig K, Longo C, Lowndes JS, Rockwood RC, Selig ER, Selkoe KA, Walbridge S. (2015). Spatial and temporal changes in cumulative human impacts on the world's ocean. *Nature Communications* 6(7615). doi: [10.1038/ncomms8615](https://doi.org/10.1038/ncomms8615).

Halpin PN, Read AJ, Fujioka E, Best BD, Donnelly B, Hazen LJ, Kot C, Urian K, LaBrecque E, Dimatteo A, Cleary J, Good C, Crowder LB, Hyrenbach KD (2009). OBIS-SEAMAP: The world data center for marine mammal, sea bird, and sea turtle distributions. *Oceanography* 22(2):104-115.

Hamilton S and Casey D (2016). Creation of a high spatiotemporal resolution global database of continuous mangrove forest cover for the 21st Century (CGMFC-21). Version 3. URL: [arXiv:1412.0722v3](https://arxiv.org/abs/1412.0722v3).

Harris PT, Macmillan-Lawler M, Rupp J, Baker EK. (2014). Geomorphology of the oceans. *Marine Geology* 352: 4-24. doi: [10.1016/j.margeo.2014.01.011](https://doi.org/10.1016/j.margeo.2014.01.011).

Hoekstra JM, Molnar JL, Jennings M, Revenga C, Spalding MD, Boucher TM, Robertson JC, Heibel TJ, Ellison K (2010) *The Atlas of Global Conservation: Changes, Challenges, and Opportunities to Make a Difference* (ed. Molnar JL). Berkeley: University of California Press. URL: <http://maps.tnc.org/globalmaps.html>

Hsu et al. (2016). 2016 Environmental Performance Index. New Haven, CT: Yale University. URL: www.epi.yale.edu

Hutchison J, Manica A, Swetnam R, Balmford A, Spalding M (2014). Predicting global patterns in mangrove forest biomass. *Conservation Letters* 7(3): 233-240. doi: [10.1111/conl.12060](https://doi.org/10.1111/conl.12060); <http://data.unep-wcmc.org/datasets/39>.

IMaRS-USF (Institute for Marine Remote Sensing-University of South Florida) (2005). Millennium Coral Reef Mapping Project. Unvalidated maps. These maps are unendorsed by IRD, but were further interpreted by UNEP World Conservation Monitoring Centre. Cambridge (UK): UNEP World Conservation Monitoring Centre.

IMaRS-USF, IRD (Institut de Recherche pour le Developpement) (2005). Millennium Coral Reef Mapping Project. Validated maps. Cambridge (UK): UNEP World Conservation Monitoring Centre.

Institute of Marine Science, University of Auckland (2014). Global Marine Environmental Dataset. URL: <http://gmed.auckland.ac.nz/index.html>

International Cable Protection Committee (ICPC) (2014). Submarine cable data. URL: <https://www.iscpc.org/cable-data/>

Intergovernmental Oceanographic Commission (IOC) of UNESCO. (2014). Ocean Biogeographic Information System (OBIS). URL: www.iobis.org

International Maritime Organisation (2014). Global distribution of Particularly Sensitive Sea Areas (PSSA). URL: <http://pssa.imo.org>; <http://www.maritimemaps.co.uk>

IUCN and UNEP-WCMC. (2016). World Database on Protected Areas (WDPA) [On-line], March 2016, Cambridge (UK): UNEP-WCMC. Available at: <http://protectedplanet.net>.

IUCN and UNEP-WCMC (2014). Corrected and refined IUCN mangrove species ranges, based on known areas of mangrove occurrence (as per Giri et al., 2011). Version 1.0. Cambridge (UK): IUCN and UNEP World Conservation Monitoring Centre

IUCN (2014). IUCN Red List of Threatened Species. Version 2014.2. URL: www.iucnredlist.org

Kaschner K, Rius-Barile J, Kesner-Reyes K, Garilao C, Kullander SO, Rees T, Froese R (2014). AquaMaps: Predicted range maps for aquatic species. Version 08/2013. URL: www.aquamaps.org

Kershaw F (2008). Mean sea surface productivity in June and December, for the period 2003-2007. Using data from Oregon State University's Ocean Productivity database. In: Integrating highly migratory species into high seas marine protected area planning: a global gap analysis (Oxford University, Centre for the Environment), 113 pp. Cambridge (UK): UNEP World Conservation Monitoring Centre. URL: <http://data.unep-wcmc.org/datasets/18> (June), <http://data.unep-wcmc.org/datasets/19> (December).

Kershaw F (2008). Mean annual sea surface temperature, for the period 2003-2007. Using data from NASA's Ocean Color database. In: Integrating highly migratory species into high seas marine protected area planning: a global gap analysis (Oxford University, Centre for the Environment), 113 pp. Cambridge (UK): UNEP World Conservation Monitoring Centre. URL: <http://data.unep-wcmc.org/datasets/20>

Kim SS and Wessel P (2011), New global seamount census from the altimetry-derived gravity data, *Geophys. J. Int.*, 186, 615-631

Kot CY., E. Fujioka, A.D. DiMatteo, B.P. Wallace, B.J. Hutchinson, J. Cleary, P.N. Halpin and R.B. Mast. (2012). Global Distributions of Habitat Suitability for Sea Turtle Nesting Sites. Data provided by the SWOT Team and hosted on OBIS-SEAMAP. Oceanic Society, Conservation International, IUCN Marine Turtle Specialist Group (MTSG), and Marine Geospatial Ecology Lab, Duke University. URL: <http://seamap.env.duke.edu/swot>

Kot CY, Fujioka E, DiMatteo AD, Wallace BP, Hutchinson BJ, Cleary J, Halpin PN and Mast RB (2015). The State of the World's Sea Turtles Online Database: Data provided by the SWOT Team and hosted on OBIS-SEAMAP. Oceanic Society, Conservation International, IUCN Marine Turtle Specialist Group (MTSG), and Marine Geospatial Ecology Lab, Duke University. URL: <http://seamap.env.duke.edu/swot>

Lucifora LO, García VB, Worm B (2011). Global diversity hotspots and conservation priorities for sharks. *PLOS ONE* 6(5): e19356. doi: [10.1371/journal.pone.0019356](https://doi.org/10.1371/journal.pone.0019356).

Maritime Historical Studies Centre, University of Hull (2016). Ocean Past Initiative. URL: <https://www.tcd.ie/history/opi/hmap.php>

Martin CS, Tolley MJ, Farmer E, Mcowen CJ, Geffert JL, Scharlemann JPW, Thomas HL, van Bochove JH, Stanwell-Smith D, Hutton JM, Lascelles B, Pilgrim JD, Ekstrom JMM, Tittensor DP. (2015). A global map to aid the identification and screening of critical habitat for marine industries. *Marine Policy* 53: 45-53. doi: [10.1016/j.marpol.2014.11.007](https://doi.org/10.1016/j.marpol.2014.11.007).

Massó i Alemán, S, Bourgeois C, Appeltans, W, Vanhoorne B, De Hauwere N, Stoffelen P, Heaghebaert A, Dahdouh-Guebas F (2010). The 'Mangrove Reference Database and Herbarium'. URL: <http://www.vliz.be/vmdcdata/mangroves>

Max Planck Institute for Ornithology (2017). Movebank Data Repository. URL: <https://www.movebank.org/>

Mora C, Tittensor DP, Myers RA. (2008). The completeness of taxonomic inventories for describing the global diversity and distribution of marine fishes. *Proceedings of the Royal Society B* 275: 149-155. doi: [10.1098/rspb.2007.1315](https://doi.org/10.1098/rspb.2007.1315)

National Center for Ecological Analysis and Synthesis (NCEAS). The Knowledge Network for Biocomplexity. URL: <https://knb.ecoinformatics.org/>.

NASA Ocean Biology (OB.DAAC) (2014). Mean annual sea surface chlorophyll-a concentration for the period 2009-2013 (composite dataset created by UNEP-WCMC). Data obtained from the Moderate Resolution Imaging Spectroradiometer (MODIS) Aqua Ocean Colour website (NASA OB.DAAC, Greenbelt, MD, USA). URL: <http://oceancolor.gsfc.nasa.gov/cgi/l3>. Cambridge (UK): UNEP World Conservation Monitoring Centre. URL: <http://data.unep-wcmc.org/datasets/37>.

NASA Ocean Biology (OB.DAAC). (2014). Mean annual sea surface temperature for the period 2009-2013 (composite dataset created by UNEP-WCMC). Data obtained from the Moderate Resolution Imaging Spectroradiometer (MODIS) Aqua Ocean Colour website (NASA OB.DAAC, Greenbelt, MD, USA). URL: <http://oceancolor.gsfc.nasa.gov/cgi/l3>. Cambridge (UK): UNEP World Conservation Monitoring Centre. URL: <http://data.unep-wcmc.org/datasets/36>.

National Geospatial Intelligence Agency (NGIA) (2011). Global Distribution of Ports: World Port Index. URL: http://msi.nga.mil/NGAPortal/MSI.portal?nfpb=true&pageLabel=msi_portal_page_62&pubCode=0015

NOAA National Marine Fisheries Service, UNEP-WCMC (2010). Global Coral Disease Database (ver. 1.0, 2010). Cambridge (UK): UN Environment World Conservation Monitoring Centre.

NOAA Fisheries (2013). Large Marine Ecosystems (LMEs) of the World (66). Large Marine Ecosystem Program, Narragansett Laboratory, Rhode Island (USA). URL: <http://www.lme.noaa.gov>

NOAA Coral Reef Watch (2013). NOAA Coral Reef Watch. College Park, Maryland, USA: NOAA Coral Reef Watch. Data URL: <http://coralreefwatch.noaa.gov/vs/index.php>

Ocean Health Index (2015). Global Data for the Ocean Health Index . URL: <http://www.oceanhealthindex.org/>

Olson DM and Dinerstein E. (2002). The Global 200: Priority ecoregions for global conservation. *Annals of the Missouri Botanical Garden* 89(2): 199-224.

PANGAEA® - Data Publisher for Earth & Environmental Science. doi: 10.1594/PANGAEA. URL: <http://www.pangaea.de/>

Pauly D, Zeller D (Eds). (2015). Sea Around Us Concepts, Design and Data. URL: <http://searoundus.org>.

Polidoro BA, Carpenter KE, Collins L, Duke NC, Ellison AM, et al. (2010) The Loss of Species: Mangrove Extinction Risk and Geographic Areas of Global Concern. *PLoS ONE* 5(4): e10095. doi:10.1371/journal.pone.0010095

Roskov Y, Abucay L, Orrell T, Nicolson D, Kunze T, Flann C, Bailly N, Kirk P, Bourgoin T, DeWalt RE, Decock W, De Wever A, eds. (2015). Species 2000 & ITIS Catalogue of Life, 30th July 2015. Digital resource at www.catalogueoflife.org/col. Species 2000: Naturalis, Leiden, the Netherlands. ISSN 2405-8858.

SCRFA Fish Aggregation Database (2013). Spawning aggregation database by Science and Conservation of Fish Aggregations. World Wide Web electronic publication.
<http://www.scrfa.org>.

Secretariat of the Convention on Biological Diversity (CBD) (2015). Areas Meeting the EBSA (Ecologically or Biologically Significant Marine Areas) Criteria (Annex I of Conference of the Parties (COP) 9 Decision IX/20). Compiled by the Marine Geospatial Ecology Laboratory (MGEL), Duke University. URL: <https://www.cbd.int/ebsa/>

Service Hydrographique et Océanographique de la Marine (SHOM) (2017). Global Sediment Map (marine realm). URL : <http://data.shom.fr/>

Society for Ecological Restoration (2017). Global Restoration Network Database. URL: <http://www.globalrestorationnetwork.org/database/>

Spalding MD, Blasco F, Field CD (Eds.). (1997). World mangrove atlas. Okinawa (Japan): International Society for Mangrove Ecosystems. 178 pp. Compiled by UNEP-WCMC, in collaboration with the International Society for Mangrove Ecosystems (ISME). Version 3. URL: <https://archive.org/details/worldmangroveat197spal>. Data URL: <http://data.unep-wcmc.org/datasets/6>.

Spalding MD, Kainuma M, Collins L. (2010). World atlas of mangroves. A collaborative project of ITTO, ISME, FAO, UNEP-WCMC, UNESCO-MAB, UNU-INWEH, and TNC. London (UK): Earthscan, London. 319 pp. URL: <http://data.unep-wcmc.org/datasets/5>.

Spalding MD, Ravilious C, Green EP (2001). World Atlas of Coral Reefs. Berkeley (California, USA): The University of California Press. 436 pp. URL: <https://archive.org/details/worldatlasofcorao1spal>

The Nature Conservancy (2015) Mapping Ocean Wealth. URL: <http://oceanwealth.org/>

The Nature Conservancy (2012). Marine Ecoregions and Pelagic Provinces of the World. GIS layers developed by The Nature Conservancy with multiple partners, combined from Spalding et al. (2007) and Spalding et al. (2012). Cambridge (UK): The Nature Conservancy. DOIs: 10.1641/B570707; 10.1016/j.ocecoaman.2011.12.016. Data URL: <http://data.unep-wcmc.org/datasets/38>

The WorldFish Center (2017) ReefBase: A Global Information System for Coral Reefs. URL: <http://www.reefbase.org>

Tittensor DP, Baco AR, Brewin PE, Clark MR, Consalvey M, Hall-Spencer J, Rowden AA, Schlacher T, Stocks KI, Rogers AD. (2009). Predicting global habitat suitability for stony corals on seamounts. *J. Biogeography*, 36: 1111-1128.

Tyberghein, L, Verbruggen, H, Pauly, K, Troupin, C, Mineur, F, & De Clerck, O (2012). Bio-ORACLE: a global environmental dataset for marine species distribution modelling. *Global Ecology and Biogeography*, 21: 272–281. <http://doi.org/10.1111/j.1466-8238.2011.00656.x>

Tyrrell MC (2005). Gulf of Maine Marine Habitat Primer. Gulf of Maine Council on the Marine Environment. 54 pp.

United Nations (UN) (1992). The Convention on Biological Diversity. Concluded at Rio de Janeiro on 5 June 1992. United Nations Treaty Series. Retrieved from <http://www.cbd.int/doc/legal/cbd-un-en.pdf>

UN Environment World Conservation Monitoring Centre (UNEP-WCMC), WorldFish Centre, WRI, TNC. (2010). Global distribution of warm-water coral reefs, compiled from multiple sources including the Millennium Coral Reef Mapping Project. Version 1.3. Includes contributions from IMaRS-USF and IRD (2005), IMaRS-USF (2005), and Spalding et al. (2001). Cambridge (UK): UNEP World Conservation Monitoring Centre. URL: <http://data.unep-wcmc.org/datasets/1>.

UN Environment World Conservation Monitoring Centre (UNEP-WCMC) (2013). Global distribution of saltmarsh (ver. 1.0). Unpublished dataset. Cambridge (UK): UNEP World Conservation Monitoring Centre.

UN Environment World Conservation Monitoring Centre (UNEP-WCMC) (2017). Ocean Data Viewer. URL: http://wcmc.io/ODV_data

UN Environment World Conservation Monitoring Centre (UNEP-WCMC) (2001). Global Distribution of Dive Centres (ver 1.2). In supplement to: Spalding et al. (2001). Cambridge (UK): UNEP World Conservation Monitoring Centre. URL: <http://data.unep-wcmc.org/datasets/27>

UN Environment World Conservation Monitoring Centre (UNEP-WCMC) (2003). Global Marine Aquarium Database. Cambridge (UK): UNEP World Conservation Monitoring Centre.

UN Environment World Conservation Monitoring Centre (UNEP-WCMC), Conservation International, and The Nature Conservancy. (2016). Global distribution of saltmarsh (ver. 4.0). Cambridge (UK): UNEP World Conservation Monitoring Centre. URL: <http://data.unep-wcmc.org/>

UN Environment World Conservation Monitoring Centre (UNEP-WCMC) (1999). Global distribution of sea turtle nesting sites (version 1.1, updated by UNEP-WCMC). Cambridge (UK): UNEP World Conservation Monitoring Centre. URL: <http://data.unep-wcmc.org/datasets/22>

UN Environment World Conservation Monitoring Centre (UNEP-WCMC) (2015). Global distribution of islands. Global Island Database (version 2.1, November 2015). Based on Open Street Map data (© OpenStreetMap contributors). Cambridge (UK): UNEP World Conservation Monitoring Centre

UN Environment World Conservation Monitoring Centre (UNEP-WCMC), Depraetere C, Dahl AL (2010). Global distribution of islands. Global Island Database (version 1). Based on Wessel and Smith (1996). Full technical documentation is in Depraetere (2007). Cambridge (UK): UNEP World Conservation Monitoring Centre.

UN Environment World Conservation Monitoring Centre (UNEP-WCMC). Regional Seas boundaries. Unpublished dataset. Cambridge (UK): UNEP World Conservation Monitoring Centre.

UN Environment World Conservation Monitoring Centre (UNEP-WCMC) (2008). Global and Regional Assessments of the Marine Environment Database (GRAMED). URL: <http://www.unep-wcmc-apps.org/GRAMED/index.cfm>

UN Environment (United Nations Environment Programme) (2015). The Species+ Website. Nairobi, Kenya. Compiled by UNEP-WCMC, Cambridge, UK. URL: www.speciesplus.net

UN Environment (United Nations Environment Programme) (2003a). Global marine assessments: a survey of global and regional marine environmental assessments and related scientific activities. UNEP-WCMC, UNEP, UNESCO-IOC. Cambridge (UK): UNEP World Conservation Monitoring Centre. 132 pp.

UN Environment (United Nations Environment Programme) (2003b). Boundaries of the Global International Waters Assessment. In Supplement to UNEP (2003a). Nairobi (Kenya): United Nations Environment Programme.

UN Environment (United Nations Environment Programme) (2016). Environmental Data Explorer. URL: <http://geodata.grid.unep.ch/#>

UN Environment (United Nations Environment Programme) (2017). UNEP Live, URL : <https://uneplive.unep.org/>

Van Soest RWM, Boury-Esnault N, Hooper JNA, Rützler K, de Voogd NJ, Alvarez de Glasby B., Hajdu E, Pisera AB, Manconi R, Schoenberg C, Klautau M, Picton B, Kelly M, Vacelet J, Dohrmann M, Díaz M-C, Cárdenas P, Carbal (2017). WoRMS Porifera: World Porifera database (version 2016-12-01). In: Species 2000 & ITIS Catalogue of Life, 23rd December 2016 (Roskov Y, Abucay L, Orrell T, Nicolson D, Bailly N, Kirk P, Bourgoin T, DeWalt RE, Decock W, De Wever A, Nieukerken E van, eds). Digital resource at www.catalogueoflife.org/col. Species 2000: Naturalis, Leiden, the Netherlands. ISSN 2405-8858. URL: <http://www.marinespecies.org/porifera>

Veron JEN, Devantier LM, Turak E, Green AL, Kininmonth S, Stafford-Smith M, Peterson N (2009). Delineating the coral triangle. *Journal of Coral Reef Studies* 11(2): 91-100. URL: https://www.jstage.jst.go.jp/article/galaxea/11/2/11_2_91/_pdf

VLIZ (2014). Maritime Boundaries Geodatabase. Version 8. Ostend (Belgium): Flanders Marine Institute. URL: <http://www.marineregions.org>

Watling L, Guinotte J, Clark MR, Smith CR. (2013). A proposed biogeography of the deep seas ocean floor. *Progress in Oceanography* 111: 91 -112. doi: [10.1016/j.pocean.2012.11.003](https://doi.org/10.1016/j.pocean.2012.11.003).

Watson R, Hoshino E, Beblow J, Revenga C, Kura Y, Kitchingman A. (2004). Fishing gear associated with global marine catches. *Fisheries Centre Research Reports* 12(6). Vancouver, Canada: The Fisheries Centre. 32 pp. URL: <http://www.searoundus.org/doc/publications/books-and-reports/2004/Watson-et-al-fishing-gear.pdf>.

Weatherdon LV, Fletcher R, Jones MC, Kaschner K, Sullivan E, Tittensor DP, Mcowen C, Geffert JL, van Bochove JW, Thomas H, Blyth S, Ravillious C, Tolley M, Stanwell-Smith D, Fletcher S, Martin CS. (2015). Manual of marine and coastal datasets of biodiversity importance. December 2015 edition. Cambridge (UK): UNEP World Conservation Monitoring Centre. 30 pp. (+ 4 annexes totalling 221 pp. and one e-supplement). doi: [10.13140/RG.2.1.4785.5125](https://doi.org/10.13140/RG.2.1.4785.5125).

Wessel P, Smith WHF (2015). Data layers of the Global, Self-consistent, Hierarchical, High-resolution Shoreline Geography (GSHHG) database (version 2.3.4). The methodology used to create the shoreline subset is described in Wessel and Smith (1996). Manoa (Hawaii, USA): University of Hawaii (SOEST). URL: www.soest.hawaii.edu

Wildlife tracking (2017). Wildlife tracking data. URL: www.wildlifetracking.org

Yale University (2015). Map of Life. URL: <https://mol.org/>

Yesson C, Clark MR, Taylor M, Rogers AD. (2011). The global distribution of seamounts based on 30-second bathymetry data. *Deep Sea Research Part I: Oceanographic Research Papers* 58(4): 442-453. doi: [10.1016/j.dsr.2011.02.004](https://doi.org/10.1016/j.dsr.2011.02.004). Data URL: <http://data.unep-wcmc.org/datasets/41>.

Yesson C, Taylor ML, Tittensor DP, Davies AJ, Guinotte J, Baco A, Black J, Hall-Spencer JM, Rogers AD. (2012). Global habitat suitability of cold-water octocorals. *Journal of Biogeography* 39: 1278-1292. Paper DOI: [10.1111/j.1365-2699.2011.02681.x](https://doi.org/10.1111/j.1365-2699.2011.02681.x). Data DOI: <http://doi.pangaea.de/10.1594/PANGAEA.775081>.

Zoological Society of London and WWF. (2014). Living Planet Database. URL: http://www.livingplanetindex.org/data_portal

Zoologisches Forschungsinstitut und Museum Alexander Koenig (2017). Global Register of Migratory Species (GROMS). Data URL: <http://www.groms.de/>

Annex 1. Dataset summary table

This annex lists global datasets of relevance to the Western Indian Ocean, identifying 103 datasets, databases, and data portals. Detailed metadata are available for 49 of these records (compiled in Annex 3). Coloured shading in the table below are used to indicate that:

- the dataset can be viewed and/or downloaded from UNEP-WCMC's *Ocean Data Viewer*⁴,
- more information about dataset access can be sought directly from UNEP-WCMC⁵.

For all other datasets, information about data layer access can be found in the metadata (if available) or should be sought from the named contact organisation. **UNEP-WCMC does not distribute these datasets and, as conditions may change over time, makes no warranty regarding the accuracy of the information provided in this document.**

Category	Dataset title	Version	Contact organisation	ID ⁶	Metadata ⁷	Access
Biogenic habitats	Global Distribution of Coral Reefs	1.3 (2010)	UNEP-WCMC	WCMC-008	✓	Ocean Data Viewer
	Global Distribution of Cold-water Corals	2.0 (2005)	UNEP-WCMC	WCMC-001	✓	Ocean Data Viewer
	Global Distribution of Habitat Suitability for Stony Corals on Seamounts (2009)	--	UNEP-WCMC	WCMC-024		Contact UNEP-WCMC
	Global Distributions of Habitat Suitability for Cold-Water Octocorals (2012)	1.0 (2012)	Institute of Zoology, Zoological Society of London	ZSL-001	✓	Ocean Data Viewer
	Global Spatiotemporal Database of Mangrove Forest Cover (2014)	--	Salisbury University	UniSal-001		Hamilton and Casey (2014)

⁴ <http://data.unep-wcmc.org>. For commercial use of these datasets, please contact business-support@unep-wcmc.org.

⁵ For non-commercial use, please contact marine@unep-wcmc.org; for commercial use, contact business-support@unep-wcmc.org.

⁶ Internal UNEP-WCMC numbering system within our metadata catalogue.

⁷ Metadata available in Annex 3.

Category	Dataset title	Version	Contact organisation	ID ⁶	Metadata ⁷	Access
Biogenic habitats	Global Distribution of Seagrasses	2005	UNEP-WCMC		✓	Ocean Data Viewer
	Global Distribution of Modelled Mangrove Biomass	2014	The Nature Conservancy	TNC-001	✓	Ocean Data Viewer
	Global Distribution of Mangroves USGS (2011)	1.3	UNEP-WCMC	WCMC-010	✓	Ocean Data Viewer
	World Atlas of Mangroves (2010)	1.0	Spalding et al. (2010)	WCMC-011	✓	Ocean Data Viewer
	World Mangrove Atlas (1997)	1.0	UNEP-WCMC	WCMC-012	✓	Ocean Data Viewer
	Mangrove Tree Height in Africa	1.0 (Sept. 2012)	Fatoyinbo and Simard (2013)	NASA-001		Fatoyinbo and Simard (2013)
	Global Distribution of Saltmarsh (unpublished)	1.0 (Nov. 2013)	UNEP-WCMC	WCMC-027	✓	Contact UNEP-WCMC
Species habitat	Global Distributions of Habitat Suitability for Sea Turtle Nesting Sites (2012)	--	State of the World's Sea Turtles	SWOT-002		Sea Turtle Status
	Global Distribution of Sea Turtle Feeding Sites	1.1 (May 2015)	UNEP-WCMC	WCMC-006	✓	Ocean Data Viewer
	Global Distribution of Sea Turtle Nesting Sites (1999)	1.1 (May 2015)	UNEP-WCMC	WCMC-007	✓	Ocean Data Viewer
	Global Spawning Aggregations Database	--	Science and Conservation of Fish Aggregations	SCRFA-001		Global Spawning Aggregations Database
Species distribution	Data Portal of the Global Biodiversity Information Facility	--	Global Biodiversity Information Facility	GBIF-001		GBIF
	Ocean Biogeographic Information System (OBIS)	--	OBIS Secretariat, Intergovernmental Oceanographic Commission (UNESCO)	OBIS-003	✓	OBIS
	Ocean Biogeographic Information System Spatial Ecological Analysis of Megavertebrate Populations	--	Marine Geospatial Ecology Lab, Duke University	OBIS-004		OBIS-SEAMAP

Category	Dataset title	Version	Contact organisation	ID ⁶	Metadata ⁷	Access
Species distribution	Spatial Data for the Red List of Threatened Species	May 2015	International Union for Conservation of Nature	IUCN-001		IUCN Red List
	Corrected and Refined Mangrove Species Ranges (2014)	1.0 (Dec. 2014)	UNEP-WCMC	IUCN-002	✓	Contact UNEP-WCMC
	Global Register of Migratory Species (GROMS)	2004	Zoologisches Forschungsinstitut und Museum Alexander Koenig	GROMS-001		GROMS
	AquaMaps: Predicted Range Maps for Aquatic Species (2013)	--	AquaMaps, a joint project of FishBase and SeaLifeBase	AquaMaps-001		Contact UNEP-WCMC
	Global Distribution of Sperm Whales (2013)	1.0 (August 2013)	Albert-Ludwigs-University of Freiburg	Kaschner-006	✓	Contact UNEP-WCMC
	Global Distribution of Sei Whales (2013)	1.0 (August 2013)	Albert-Ludwigs-University of Freiburg	Kaschner-009	✓	Contact UNEP-WCMC
	Global Distribution of Melon-Headed Whales (2013)	1.0 (August 2013)	Albert-Ludwigs-University of Freiburg	Kaschner-012	✓	Contact UNEP-WCMC
	Global Shark Distribution Database	2009	Dalhousie University	UniDalh-002		Global Shark Distribution Database
	Ocean Tracking Network	--	Dalhousie University	UniDalh-001		Ocean Tracking Network
	Wildlife Tracking	--		SeaTur-001		Wildlife Tracking
Movebank	--	Max Planck Institute for Ornithology	MovBnk-001		Movebank	
Biodiversity areas	Global Distribution of KBAs, IBAs and AZEs	Released several times per year	Birdlife International	Birdlife-001	✓	Contact UNEP-WCMC
	Global Distribution of Ecologically or Biologically Significant Marine Areas	--	Secretariat for the Convention on Biological Diversity (CBD)	CBD-001		Ecologically or Biologically Significant Marine Areas

Category	Dataset title	Version	Contact organisation	ID ⁶	Metadata ⁷	Access
Biodiversity areas	Global 200 Ecoregions	2002	World Wildlife Fund	WWF-001		Global 200
	A Global Map of Critical Habitat (2015) as per IFC PS6	1.0 (August 2013)	UNEP-WCMC	WCMC-029	✓	Contact UNEP-WCMC
	Global Diversity Hotspots and Conservation Priorities for Sharks	2011	Dalhousie University	Uni-Dahl-003		Lucifora et al. 2011
	World Database on Protected Areas	Released monthly	UNEP-WCMC	WCMC-016	✓	Protected Planet
Biogeographic classification	Marine Ecoregions and Pelagic Provinces of the World (2007; 2012)	1.0 (May 2015)	The Nature Conservancy	WCMC-036	✓	Ocean Data Viewer
	A Proposed Biogeography of the Deep Oceans	2013	University of Hawai'i	UniHaw-002		Contact watling@hawaii.edu
	Global Estuary Database	2003	Sea Around Us	UBC-003	✓	Ocean Data Viewer
	Coral Ecoregions of the World	1.0 (2009)	The Nature Conservancy	TNC-003	✓	Contact j.veron@coralreefresearch.com
	Large Marine Ecosystems of the World	July 2013	Large Marine Ecosystem Program, National Oceanic and Atmospheric Administration - Fisheries	NOAA-001	✓	NOAA's LME Portal
	Longhurst Biogeographical Provinces	2006	Flanders Marine Institute	VLIZ-002		Marine Regions
	Geomorphology of the oceans	2014	GRID-Arendal	GridA-001		Blue Habitats
	Global Distribution of Seamounts and Knolls	1.0 (2011)	Institute of Zoology, Zoological Society of London	ZSL-002	✓	Ocean Data Viewer
	Global Seamount Database	2011	School of Ocean and Earth Science and Technology, University of Hawai'i	UniHaw-003		Global Seamount Database
	Global Distribution of Hydrothermal Vents	3.0 (2010)	University of Southampton, National Oceanography Centre	ChEssBase-002	✓	ChEss Database
Global Distribution of Hydrothermal Vent Fields	3.3 (Oct. 2015)	Woods Hole Oceanographic Institution	IntRid-001	✓	InterRidge Vents Database	

Category	Dataset title	Version	Contact organisation	ID ⁶	Metadata ⁷	Access
Biogeographic classification	Global Distribution of Cold Seeps	3.0 (2010)	University of Southampton, National Oceanography Centre	ChEssBase-001	✓	ChEssBase
	General Bathymetric Chart of the Oceans	2008	British Oceanographic Data Centre	GEBCO-001		GEBCO
	International Bathymetric Chart of the South East Pacific (IBCSEP)	--	NOAA's National Centers for Environmental Information (NCEI)	NOAA-003		IBCSEP
	Global Sediment Map (marine realm)	7.1	Service Hydrographique et Océanographique de la Marine	SHOM-001		SHOM
	Global Marine Environmental Dataset	2014	Institute of Marine Science, University of Auckland	GMED-001		GMED
Environmental descriptor	Bio-ORACLE: a Global Environmental Dataset for Marine Species Distribution Modelling	2012	Phycology Research Group, Ghent University	Ghent-001		Bio-ORACLE
	Mean Sea Surface Productivity in June and December 2003-2007 (2008)	--	UNEP-WCMC	WCMC-020-021	✓	Ocean Data Viewer
	Mean Annual Sea Surface Chlorophyll-a Concentration 2009-2013 (2015)	1.0 (April 2015)	UNEP-WCMC	WCMC-034	✓	Ocean Data Viewer
	Mean Annual Sea Surface Temperature 2003-2007 (2008)	--	UNEP-WCMC	WCMC-022	✓	Ocean Data Viewer
	Mean Annual Sea Surface Temperature 2009-2013 (2015)	1.0 (May 2015)	UNEP-WCMC	WCMC-035	✓	Ocean Data Viewer
	Mapping Ocean Wealth	--	The Nature Conservancy	TNC-004	✓	Mapping Ocean Wealth
Ecosystem services and natural capital	A Global Map of Natural Capital	1.0 (2014)	UNEP-WCMC	WCMC-032	✓	UNEP-WCMC
	Marine Ecosystem Services Partnership	--	Nicholas Institute for Environmental Policy Solutions, Duke University	UniDuke-001	✓	MESP
	A Global Map of Coastal Recreation Values	2013	University of Haifa	UniHaif-001		Ghermandi and Nunes 2013
	Sea Around Us	--	Sea Around Us, University of British Columbia	UBC-009	✓	Sea Around Us

Category	Dataset title	Version	Contact organisation	ID ⁶	Metadata ⁷	Access
Ecosystem services and natural capital	Ocean Past Initiative	--	Maritime Historical Studies Centre, University of Hull	HMAP-001		HMAP
Ecological status and impact	A Global Map of Human Impacts to Marine Ecosystems	2008	NCEAS, University of California	NCEAS-001		NCEAS
	Spatial and temporal changes in cumulative human impacts on the world's ocean	2015	NCEAS, University of California	NCEAS-003		Halpern et al. 2015
	Global Data for the Ocean Health Index	2012	NCEAS, University of California	NCEAS-002		Ocean Health Index
	Environmental Performance Index	2014	Yale University	Yale-002		EPI
	Living Planet Index	2014	Indicators and Assessments Unit, Zoological Society of London; World Wildlife Fund	WWF-002	✓	LPI Data Portal
	Reefs at Risk	1998	World Resources Institute	WRI-001		Reefs at Risk
	Reefs at Risk Revisited	2011	World Resources Institute	WRI-002		Reefs at Risk Revisited
	Coral Reef Watch	--	National Oceanic and Atmospheric Administration – Fisheries	NOAA-002	✓	Coral Reef Watch
	Global Coral Disease Database	1.0 (2010)	UNEP-WCMC	WCMC-004		Contact UNEP-WCMC
	Fishing Gear Associated with Global Marine Catches	2008	Sea Around Us, University of British Columbia	UBC-008		Sea Around Us
	Global and Regional Assessments of the Marine Environment Database	--	UNEP-WCMC	WCMC-038		GRAMED
	Plastic Debris in the Open Ocean	2014	University of Cadiz	UniCadiz-001		Cózar et al. 2014
	Global Restoration Network Database	--	Society for Ecological Restoration	SER-001		GRN Database
Undersea Cables	--	International Cable Protection Committee (ICPC)	ICPC-001		Interactive submarine cable map	

Category	Dataset title	Version	Contact organisation	ID ⁶	Metadata ⁷	Access
Databases and data portals	Ocean Data Viewer	2015	UNEP-WCMC	WCMC-039	✓	Ocean Data Viewer
	Knowledge Network for Biocomplexity (KNB)	--	NCEAS, University of California	NCEAS-004	✓	KNB
	PANGAEA	--	Alfred Wegener Institute, Helmholtz Center for Polar and Marine Research	AWI-001	✓	PANGAEA
	FishBase	04/2015	FishBase Consortium	FishBase-001	✓	FishBase
	ReefBase		The WorldFish Center	WorldFish-001		ReefBase
	Map of Life	--	Yale University	Yale-001		MOL
	Global Distribution of Sea Turtles (2010)	--	State of the World's Sea Turtles	SWOT-003		SWOT
	Environmental Data Explorer	--	United Nations Environment Programme	UNEP-003		Environmental Data Explorer
	UNEP Live	--	United Nations Environment Programme	UNEP-004		UNEP Live
	Atlas of Global Conservation	2014	The Nature Conservancy	TNC-002	✓	Atlas of Global Conservation
	Catalogue of Life	--	Species 2000 Secretariat, Naturalis Biodiversity Center	CoL-001	✓	Catalogue of Life
	World Porifera Database (sponges)	--	Flanders Marine Institute	VLIZ-006		World Porifera Database
	Mangrove Reference Database and Herbarium	--	Flanders Marine Institute	VLIZ-005		Mangrove Reference Database and Herbarium
	Species+	--	UNEP-WCMC	WCMC-037		Species+
Administration	Global Self-consistent, Hierarchical, High-resolution Geography Database	2.3.4 (March 2015)	School of Ocean and Earth Science and Technology, University of Hawaii	UniHaw-001	✓	University of Hawai'i
	Global Maritime Boundaries Database	2008	General Dynamics Advanced Information Systems, Inc.	GMBD-001		Global GIS Data Services

Category	Dataset title	Version	Contact organisation	ID ⁶	Metadata ⁷	Access
Administration	Global Administrative Areas	2.0 (Jan. 2012)	Global Administrative Areas	GADM-001		GADM
	Global Distribution of Islands IBPoW (2010)	1.0	UNEP-WCMC	WCMC-005	✓	Contact UNEP-WCMC
	Global Distribution of Islands OSM (2013)	2.0 (2013)	UNEP-WCMC	WCMC-031	✓	Contact UNEP-WCMC
	Marine Regions Data Portal	--	Flanders Marine Institute	VLIZ-003		Marine Regions
	Exclusive Economic Zone Boundaries	8.0 (2014)	Flanders Marine Institute	VLIZ-001	✓	Marine Regions
	Boundaries of the Global International Waters Assessment	2003	Division of Early Warning and Assessment, United Nations Environment Programme	UNEP-001	✓	GIWA
	Global Distribution of Regional Fishery Bodies (2010)	2010	Food and Agriculture Organization of the United Nations	FAO-001	✓	FAO GeoNetwork
	Statistical Areas for Fishery Purposes	2008	Food and Agriculture Organization of the United Nations	FAO-003		FAO GeoNetwork
	Global Distribution of Dive Centres (2001)	1.2 (June 2015)	UNEP-WCMC	WCMC-030	✓	Ocean Data Viewer
Global Distribution of Ports: World Port Index (2011)	--	National Geospatial - Intelligence Agency	NG-AI-001		National Geospatial - Intelligence Agency	

Annex 2. Interactive maps

This annex (distributed separately and previewed in Figure 5) displays interactive, regional maps in PDF format, enabling users to toggle (turn on/off) the map's layers.

These regional maps, focused on the Western Indian Ocean project pilot region, are illustrative of a selection of datasets identified in this manual, including biodiversity sites (e.g., Key Biodiversity Areas, Important Bird and Biodiversity Areas, Alliance for Zero Extinction Sites, Ecologically or Biologically Significant Marine Areas, etc.), biogenic habitats (e.g., cold corals), and biogeographic classifications (e.g., seamounts, knolls, hydrothermal vents).

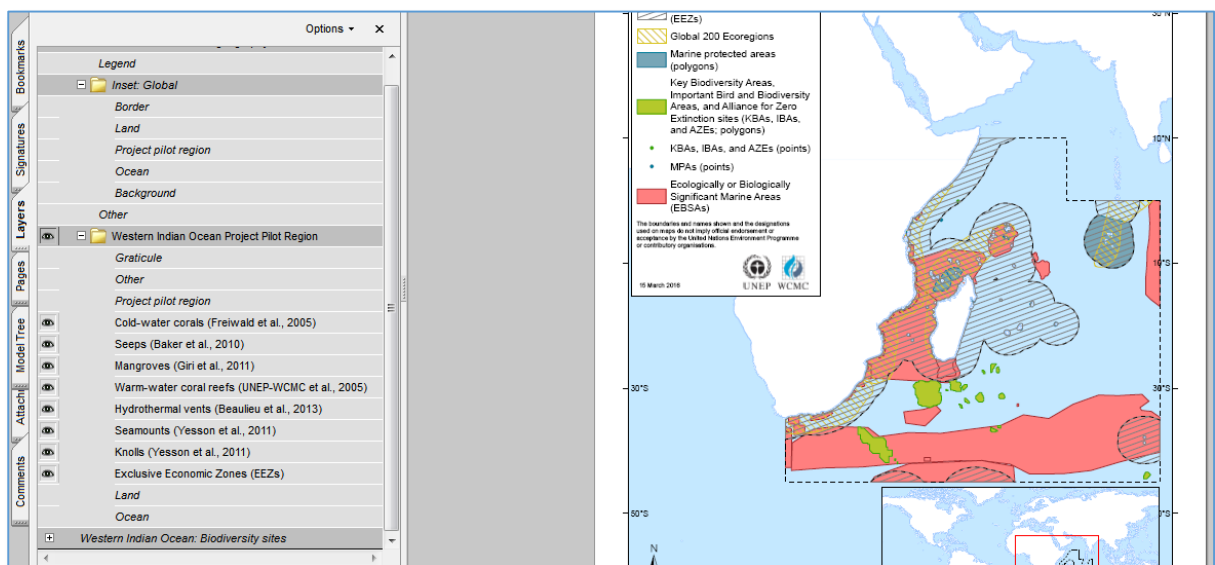


Figure 5. Preview of the separately-distributed Annex 2, which displays interactive maps that allow users to toggle on/off the map layer components.

Annex 3. Detailed dataset-specific metadata

This annex (distributed separately and previewed in Figure 5) compiles the metadata sheets available for 49 of the datasets identified in this manual. Page numbers within Annex 3 are given overleaf.

The metadata format is based on the metadata database used by the British Geological Survey to meet international spatial metadata standards such as the European INSPIRE Directive or ISO 19115⁸.

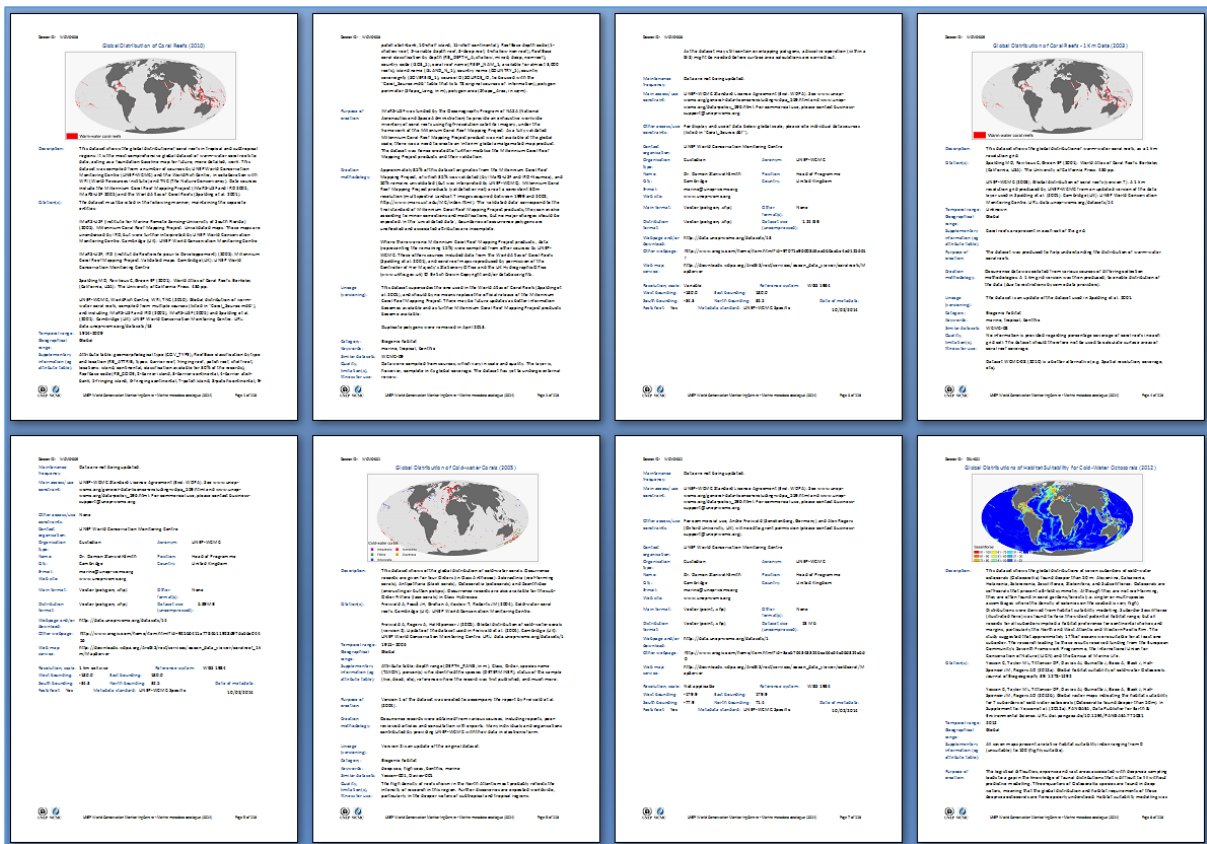


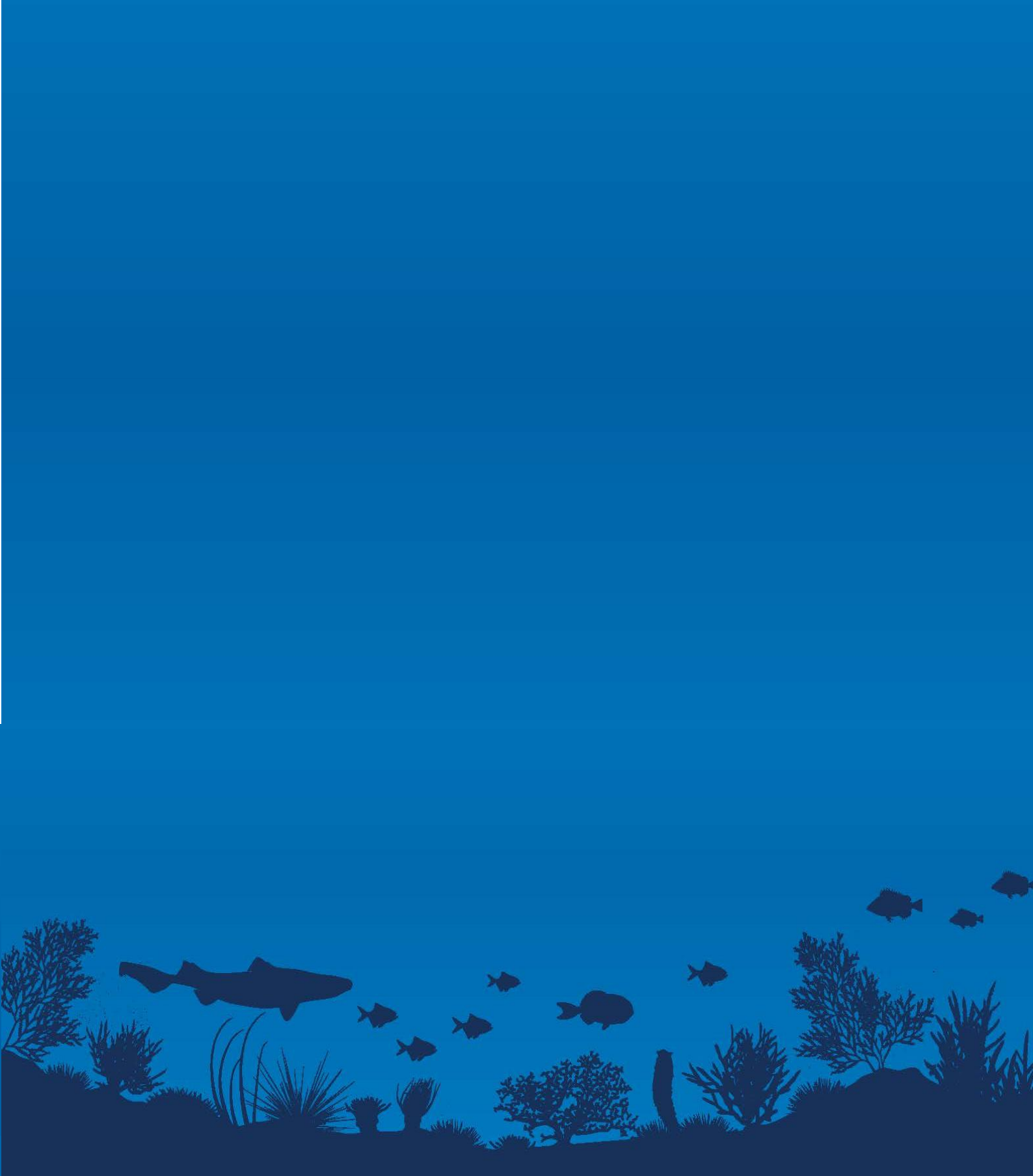
Figure 5. Preview of the separately-distributed Annex 3, which compiles all the dataset-specific metadata available for some of the datasets listed within this manual.

⁸ For further details, see <http://www.bgs.ac.uk/downloads/start.cfm?id=2880>.

RESOURCE	ID ⁹	PAGE
Global Distribution of Coral Reefs (2010)	WCMC-008	1
Global Distribution of Cold-water Corals (2005)	WCMC-001	5
Global Distributions of Habitat Suitability for Cold-Water Octocorals (2012)	ZSL-001	7
Global Distribution of Mangroves USGS (2011)	WCMC-010	10
World Atlas of Mangroves (2010)	WCMC-011	13
World Mangrove Atlas (1997)	WCMC-012	16
Global Distribution of Seagrasses (2005)	WCMC-013-014	18
Global Distribution of Saltmarsh (unpublished)	WCMC-027	22
Global Distribution of Sea Turtle Nesting Sites (1999)	WCMC-007	25
Global Distribution of Sea Turtle Feeding Sites (1999)	WCMC-006	27
Ocean Biogeographic Information System (OBIS)	OBIS-003	29
Corrected and Refined Mangrove Species Ranges (2014)	IUCN-002	32
Global Distribution of Sperm Whales (2013)	Kaschner-006	35
Global Distribution of Sei Whales (2013)	Kaschner-009	38
Global Distribution of Melon-Headed Whales (2013)	Kaschner-012	41
World Database on Protected Areas	WCMC-016	44
Global Distribution of KBAs, IBAs and AZEs	Birdlife-001	48
A Global Map of Marine Critical Habitat (2015) as per IFC PS6	WCMC-029	51
Marine Ecoregions and Pelagic Provinces of the World (2007; 2012)	WCMC-036	54
Coral Ecoregions of the World (2009)	TNC-003	57
Large Marine Ecosystems of the World (2013)	NOAA-001	59
Global Distribution of Seamounts and Knolls (2011)	ZSL-002	61
Global Distribution of Hydrothermal Vents (2010)	ChEssBase-002	64
Global Distribution of Hydrothermal Vent Fields	IntRid-001	67
Global Distribution of Cold Seeps (2010)	ChEssBase-001	70
Mean Sea Surface Productivity in June and December 2003-2007 (2008)	WCMC-020-021	73
Mean Annual Sea Surface Chlorophyll-a Concentration 2009-2013 (2015)	WCMC-034	75
Mean Annual Sea Surface Temperature 2003-2007 (2008)	WCMC-022	78
Mean Annual Sea Surface Temperature 2009-2013 (2015)	WCMC-035	80
Mapping Ocean Wealth	TNC-004	82
A Global Map of Natural Capital (2014)	WCMC-032	85
Marine Ecosystem Services Partnership	UniDuke-001	87
Sea Around Us	UBC-009	89
Living Planet Database (LPD)	WWF-002	92
Ocean Data Viewer (ODV)	WCMC-039	95
Knowledge Network for Biocomplexity (KNB)	NCEAS-004	98
PANGAEA	AWI-001	101
FishBase	FishBase-001	104
Atlas of Global Conservation	TNC-002	106
Catalogue Of Life	CoL-001	108
Global Self-consistent, Hierarchical, High-resolution Geography Database	UniHaw-001	112
Global Distribution of Islands "IBPoW" (2010)	WCMC-005	115
Global Distribution of Islands "OSM" (2015)	WCMC-031	118

⁹ Internal UNEP-WCMC numbering system as part of our metadata cataloguing.

RESOURCE	ID ⁹	PAGE
Exclusive Economic Zone Boundaries	VLIZ-001	121
Regional Seas Boundaries (unofficial)	UNEP-002	124
Boundaries of the Global International Waters Assessment (2003)	UNEP-001	126
Global Distribution of Regional Fishery Bodies (2010)	FAO-001	128
Global Distribution of Dive Centres (2001)	WCMC-030	131
Global Marine Aquarium Database (2003)	WCMC-023	133



www.unep.org

United Nations Environment Programme
P.O. Box 30552 - 00100 Nairobi, Kenya
Tel.: +254 20 762 1234
Fax: +254 20 762 3927
e-mail: publications@unep.org
www.unep.org



UNEP



WCMC

ISBN: 978-92-807-3589-5
DEP/2024/CA