

Session 9: From Science to Policy

Paper 1: No Net Loss of Biodiversity and Ecosystem Services; Applying the Mitigation Hierarchy and Biodiversity Offsets as tools to achieve sustainable development in the WIO
Wildlife Conservation Society, Madagascar & Western Indian Ocean Program

Introduction

The Western Indian Ocean (WIO) is one of the richest regions of the world for biodiversity. It comprises diverse ecosystems both in terms of biodiversity and the ecosystem services provided, as is the case of coral reefs and mangroves. These areas are important for both wildlife and human populations; offering breeding and foraging areas for flagship marine and migratory species and providing protection for communities and property against storms, sea level rise and coastal erosion. The coastal population of the region is largely dependent on the health and productivity of these and other ecosystems through fishing, coastal agriculture, and tourism.

The WIO critical ecosystems are in decline from the combined impacts of local use, national and international investment, and global threats, including growing pressures from coastal infrastructure development, extractive industries (in particular recently discovered natural gas and oil), population growth and climate change.

Article 11.1 of the Nairobi Convention (NC) determines that “The Contracting Parties shall, individually or jointly, take appropriate measures to conserve biological diversity and protect and preserve rare or fragile ecosystems as well as rare, endangered or threatened species of fauna and flora and their habitats in the Convention area”. The Aichi Targets under the Convention on Biological Diversity (CBD), in particular targets 6, 8, 10, 11, 12 and 14, are dependent on reconciling economic development and biodiversity. Complementary to these, the achievement of the Sustainable Development Goals, in particular Goal 14 on Oceans, is dependent on the development of approaches that foster sustainable development, based on the preservation of the health of marine ecosystems as a foundation for future prosperity.

Article 14.1 of NC states that “As part of their environmental management policies, the Contracting Parties shall, in co-operation with competent regional and international organizations if necessary, develop technical and other guidelines to assist in the planning of their major development projects in such a way as to prevent or minimize harmful impacts on the Convention area”. As such, the consideration of practical, cost-effective approaches is essential for the Contracting Parties to achieve these goals. The mitigation hierarchy and biodiversity offsets are relatively new tools that can allow countries to effectively reduce the impacts from development on biodiversity and ecosystem services.

The CBD has recommended the adoption of the mitigation hierarchy (MH) and ‘no net loss’ (NNL) approaches as effective ways of promoting the avoidance of negative impacts. The CBD recommends examining mitigation alternatives in a logical sequence or hierarchy, prioritizing actions to avoid and minimize impacts, and then exploring the use of biodiversity offsets as the last step in the sequence. The ‘no net loss’ approach seeks to achieve positive outcomes for biodiversity and ecosystem services through implementation of biodiversity offsets that deliver long-term conservation results for impacts that cannot be avoided or otherwise mitigated.

The NNL approach, employing the mitigation hierarchy including biodiversity offsets, as a tool to reduce impacts has been in constant development, in particular since 2012. In many countries the approach is now used as best practice for managing impacts on biodiversity and is included in policy and regulations. Therefore, promoting its use by the Contracting Parties, including providing them with effective tools to maximize success, is important. We urge the Conference of Parties to adopt a no net loss approach that involves adherence to the mitigation hierarchy and the use of biodiversity offsets, to reduce impacts from development and contribute to sustainable investment in the conservation of biodiversity and ecosystem services.

i) How critical are these issues in the WIO region (the papers should discuss the issues in the WIO context by highlighting what is known, seriousness of the issues and future projections)?

The coastal population of the WIO is largely dependent on healthy and productive ecosystems for fishing, coastal agriculture, tourism and other similar activities. Poverty levels in the coastal populations of several of the WIO countries are extremely high. For example, 92% of Madagascar's population lives on less than \$2 per day, with remote coastal regions being among the poorest on the island.

Marine resources account for approximately 5% of the GDP of the WIO Island States, but support large numbers of primarily small-scale fisheries. In Madagascar for example, small-scale artisanal and subsistence fishers accounted for 72% of total catches. Industrial fisheries are large, with the value of tuna fisheries in the WIO rated at over 2 billion US Dollars per year (roughly 15% of the world tuna catches). Coastal tourism is a sector with great potential in the region, well developed in some countries, poorly developed in others.

The annual output of economic value from living resources and ecosystem services of the WIO has been calculated at US\$ 20.8 billion annually, provided by a total ocean asset base of the region of at least US\$ 333.8 billion.

Both fisheries and tourism are dependent on healthy ecosystems, however unsustainable development is threatening these sectors as it is promoting the degradation and reduction of important biodiversity and ecosystem services, with direct and indirect negative consequences to those dependent on these for their livelihoods. Changing economic patterns and industrial development may vastly increase migration to the coastal zone, adding to the already high population growth rate, and putting further pressure on marine ecosystems and resources.

Oil & Gas is one of the sectors with the greatest potential to influence local biodiversity, ecosystems and compromise the livelihoods of the WIO coastal population. Recently in Mozambique, hydrocarbon discoveries total 130 Tcf (trillion cubic feet) of natural gas, which is among the largest gas fields in the world, presenting 40-50 years of production. Further discoveries are anticipated in other countries of the WIO. Although O&G is frequently seen as the solution to reduce poverty levels due to the revenues it generates for the countries, the reality for several African countries is quite different. Local populations often remain in poverty as their livelihoods are compromised by the reduction and degradation of the ecosystems on which they depend.

Coastal mining is also a significant problem in many countries as there is considerable demand for heavy sands. Mining is well known as a sector with great impacts on biodiversity and ecosystem services. It is likely that some coastal areas of the WIO countries will be at risk compromising the livelihoods of many people.

Both mining and O&G are known for the indirect impacts associated with the construction of linear infrastructure such as road, rail, pipelines, electricity corridors, and shipping routes for these development activities. The impacts of roads and rail linking mines to markets can be as large as greater than the direct impacts, such as project footprint from the associated mines (Runge et al 2017).

Additionally, in sub-Saharan Africa, dozens of major "development corridors" have been proposed or are being created to increase agricultural production, mineral exports, and economic integration. These are, in many cases, also connected with the Oil & Gas projects. The development corridors involve large-scale expansion of infrastructure such as roads, railroads, pipelines, and port facilities and will open up extensive areas of land to new environmental pressures. This generates increased, unsustainable demand for natural resources by immigrants and local communities who are attracted by job creation around these areas (Laurence et al 2015). These developments also open up sensitive areas to impacts that have the potential to impact species and habitats of concern.

All these human induced impacts are further compromised by climate change, which is severely impacting the coral reefs and mangroves, as well as other ecosystems including river catchments, of the WIO.

ii) What are the potential benefits for taking actions or costs for not addressing these issues? Guaranteeing that the impacts from regulated development projects are adequately mitigated is therefore essential for sustainability, livelihoods and conservation of biodiversity. Only by developing adequate mitigation mechanisms for development projects will it be possible to reduce both the direct

and indirect impacts which, as previously mentioned, result from project activities. This means aligning national and regional environmental policies and obligations associated with development projects with national targets for biodiversity and Sustainable Development Goals. In other words, a No Net Loss policy for development projects should be aligned with the national biodiversity targets to which countries have committed.

A national commitment to the application of the mitigation hierarchy is essential to achieve that and policies that institutionalize its application are necessary if countries in the region are going to begin to attain a balance between meeting their sustainable development objectives and conserving biodiversity and ecosystem services.

Adequate spatial planning must be mainstreamed within the WIO countries to guarantee that the most important areas for biodiversity and ecosystem services are safeguarded from project impacts that may compromise their viability. It is particularly important to demonstrate how early spatial planning before project design can ensure that avoidance actions contribute to prevention of impacts on biodiversity. Once adequate avoidance is implemented, the WIO countries should also be aware of the importance of international best practice minimisation and restoration/rehabilitation of impacts on habitats, populations and ecosystem services. As a final step of the mitigation hierarchy to compensate for the residual impacts after other mitigation steps have been effectively implemented, WIO countries should be aware of how offsets can be developed and also act as a mechanism to finance conservation. Creating processes and procedures to identify potential offset areas is something that the WIO countries can consider for rapid development.

If WIO countries do not follow such an approach development projects will result in unsustainable impacts compromising the international targets to which most have signed up (SDGs, Aichi targets, etc.) and the Nairobi Convention objectives.

iii) Have these issues been discussed at the global or continental or regional levels? (What is the status of the discussions? Were countries of the region involved in any of these discussions?) No Net Loss/Net Gain (NNL/NG) and the adequate application of the mitigation hierarchy (including biodiversity offsets) are being discussed at the global, continental, regional and country levels. Several global and sectorial initiatives have been developed. The World Bank and the International Finance Corporation have established lending standards that require application of the mitigation hierarchy with NNL/NG objectives for impacts on biodiversity. The International Finance Corporation Performance Standard 6 (IFC PS6) and its Guidance Notes developed in 2012 and the World Bank Environmental and Social Standard 6 (ESS6) from 2016 define when mitigation should take place and what appropriate biodiversity targets should be. IFC PS6 is used as the standard globally for defining industry standards, including those for mining (ICMM), oil and gas (IPIECA) and the financial industry (Equator Principles). For example more than 90 financial institutions are now members of the Equator Principles Association while an increasing number of countries are adopting green banking protocols through their banking sectors to embrace these best practices.

In addition to adopting these standards the private sector is exploring ways to make them operational by developing more detailed guidance on their application. Notable guidance comes from the “Cross-sector guide for implementing the Mitigation Hierarchy” by the Cross-sector Biodiversity Initiative

(CSBI). The document developed by CSBI provides high-level guidance, with pointers to further information, for applying the mitigation hierarchy effectively to manage the potential impacts of extractive activities on BES, at a landscape scale, throughout project lifespans. It aims to reflect state-of-the-art good practice of operationalizing the mitigation hierarchy for biodiversity impact management for extractive industries.

These principles have also been embraced at an international level by governments and NGOs. IUCN's Policy on Biodiversity Offsets, which was adopted by the Members' Assembly of the World Conservation Congress, which took place in September 2016 in Hawaii. This provides a framework to guide the design, implementation and governance of biodiversity offset schemes and projects. It also provides guidance as to where offsets are, and are not, an appropriate conservation tool to ensure that, when offset schemes are used they lead to positive conservation outcomes.

One of the best known global initiatives is "The Business and Biodiversity Offsets Program (BBOP)", which is a collaboration between companies, governments, conservation experts and financial institutions that aim to explore whether, in the right circumstances, biodiversity offsets can help achieve better and more cost effective conservation outcomes than normally occur in infrastructure development, while at the same time helping companies manage their risks, liabilities and costs. This is aligned with and expands on IFC PS6. BBOP has been researching and developing best practice on biodiversity offsets and beginning to test it through a portfolio of pilot projects in a range of contexts and industry sectors, aiming to demonstrate improved and additional conservation and business outcomes. BBOP's expectation is that biodiversity offsets will become a standard part of development processes when projects have a significant residual impact on biodiversity, resulting in long term and globally significant conservation outcomes.

The COMBO Project (Conservation, Impact Mitigation and Biodiversity Offsets) is a continental initiative that has the goal of reconciling economic development and conservation of biodiversity and ecosystem services in Africa by supporting government policies targeting a no net loss of biodiversity that improve mitigation of industry impacts. The project aims at contributing by 2019 to the definition and implementation of the mitigation hierarchy, including biodiversity offsets mechanisms, in Guinea, Madagascar, Mozambique and Uganda in which private and public investments endorse the target of NNL of biodiversity while generating additional funds for conservation.

A regional initiative that is supported by the Nairobi Convention is the Northern Mozambique Channel Initiative (NMCi). Its objective is that "By 2025, the Northern Mozambique Channel's high biodiversity value coral reef and associated ecosystems are maintained and enhanced through effective spatial management of marine uses, in particular the oil and gas sector, to secure a sustainable future for coastal communities and economies". The members of the initiative believe that by building on the foundations of strong regional cooperation and partnerships, the NMC region is well placed to implement the aspirations and commitments made under the UN 2030 Agenda on Sustainable Development Goals (SDG), with particular relevance to SDG 14 on Oceans. Therefore, the NMCi aims to secure the health and productivity of critical ecosystems in the region, with a particular focus on the rich coral reef, seagrass and mangrove habitats in the region. This will be done by building capacity and the stakeholder involvement mechanisms to extend integrated ocean management across all marine waters under national jurisdictions. Integrated approaches to marine management, such as marine spatial planning, and innovative decision-support tools, will be developed ensuring all economic sectors as well as local communities are engaged in assessing stakes, trade-offs and opportunities of future development pathways, with a focus on within-country processes and capacity building. The oil and gas sector will be particularly addressed and NMCi wants to ensure that appropriate policy, legislation, threat response capacity, and best practices are adopted at national levels to mitigate impacts that may affect natural assets and social welfare across all countries of the NMC.

As a global initiative from UNDP, BIOFIN has a strong presence in Africa with a total of seven members (which will grow to 10 during 2018). It supports countries with a methodology that provides innovative steps to measure current biodiversity expenditures, assess financial needs, identify the most suitable finance solutions and provides guidance on how to implement these solutions to achieve their national biodiversity target. Biodiversity Offsets are one of the solutions being analysed by the initiative.

One of the most relevant aspects drawn from these initiatives is that their effective governance and permanence are essential. Therefore, legal, institutional and financial measures must be in place to guarantee the effective design and implementation of mitigation and offset schemes. Safeguarding these requires that the mitigation hierarchy framework is embedded in landscape and seascape level planning and legislation. The Nairobi Convention can play a relevant role by supporting its members on achieving these goals. Endorsement of these standards by WIO countries will facilitate more sustainable investment and will create rules of the game necessary to achieve development that meets the needs of all people, and of nature.

iv) Is there any country in the regional that has addressed these issues within its national structures?

Using two countries of the region as an example, NNL/NG is effectively purely voluntary in Madagascar, while Mozambique has recent legislation requiring compensation aimed at 'zero net loss' and 'net gain' in some circumstances.

Mozambique takes Environmental Impact Assessment seriously and in December 2015 it revised its legislation. Currently, although specific provisions requiring NNL / NG are not included in the EIA Process (Decree 54/2015), the adequate application of the mitigation hierarchy is mandatory. Additionally, the Biodiversity Law (Law 11/2017) is based on the principle of Environmental Responsibility that mentions avoidance and compensation (Article 4, point e) and requires the achievement of NNL inside Protected Areas and its buffer zones (Article 11, point 2). The recent Decree on the regulation of the conservation law (89/2017) defines the concept of No Net Loss of biodiversity and implies the adequate application of the mitigation hierarchy. It also specifies how NNL/NG should be achieved to restore areas impacted by planned, regulated impacts, others that have not been foreseen in the EIA or even others that cannot be attributed to third parties. This is applicable both inside and outside Protected Areas. Although most sectorial law does not specifically require the adequate application of the mitigation hierarchy and NNL/NG it requires an EIA, which in turn requires the MH to be applied.

The National Directorate for Environment (DINAB) of Mozambique, the regulating institution whose principal focus is environmental issues, has created a specific regulation on biodiversity offsets as there is a lack of clarity on how offsets are to be implemented. Such a regulation would allow DINAB and other institutions that deal with the EIA process to applying the MH, including offsets, to achieve NNL in development projects that potentially affect biodiversity.

In Madagascar there is no specific law on the MH on NNL/NG, so in practice there is no requirement to achieve NNL/NG. However, environment texts such as COAP (the Management Code for Protected Areas) and MECIE (Decree for Compatibility of Investments with the Environment – MECIE, Decree 99-954, amended by Decree 2004-167) refer to the MH. In practice, 'avoid' is often neglected but most mitigation measures focus on 'minimize', 'restore' and 'compensate'. Compensation is presently more about social than biodiversity issues and biodiversity is not addressed specifically but included within other environmental issues.

Environmental Impact Assessment (EIA), as provided by the MECIE Decree, is regarded by some respondents as triggering NNL/NG, based on the environmental sensitivity and scale of projects. Plenty of provisions found in a variety of ratified international and national law and sectorial policies on the

environment are relevant to achieve NNL/NG, but there is not yet a specific national policy for NNL/NG in Madagascar.

Despite the lack of specific regulation in Madagascar two mining companies are currently engaged in implementing offsets. Both companies are following IFC guidelines and working to achieve a net gain in biodiversity through implementation of a biodiversity offset management plan and investment in specific conservation actions. These companies' actions provide an important model for other companies as well as for government agencies.

One of the two principal barriers to progress in these two countries is the lack of clarity on whether and how to apply the MH (particularly avoidance, and how to implement offsets/compensation. This stems from gaps in law and accompanying guidelines, especially on the first 'avoidance' and last 'offsets' steps. However, there is considerable room for optimism as the policy framework in these countries has certain enabling provisions. With modest policy reform, NNL could become an explicit policy goal and clarity offered through amended law and guidelines. It is expected that the situation is similar in other WIO countries.

The second major barrier to implementation of NNL is a lack of capacity nationally of many Contracting Parties, as well as gaps in governance. This could be overcome by better coordination between government departments and levels of government and training and capacity building of key personnel from government, the private sector (especially EIA consultants) and civil society (NGOs, universities and community-based organisations). Choosing the most appropriate policy option should

take capacity limitations into account. Improvements in governance needed to facilitate NNL are much broader in scope than the mitigation of impacts, since they concern issues such as impact

assessment, planning procedures, land-use planning, and coordination between government departments.

The Nairobi Convention could play an important role by influencing and supporting its members on developing the adequate frameworks to overcome these barriers.

v) Aside from raising awareness on these issues, what are the policy recommendations that member states should consider during the COP 9?

Mitigation hierarchy and No Net Loss / Net Gain Policy: We encourage the Conference of Parties to support the uptake of policies by Contracting Parties which require application of the mitigation hierarchy for addressing industry and development impacts on biodiversity. The mitigation hierarchy should be applied with a goal of No Net Loss or a Net Gain of biodiversity and ecosystem services impacted by development.

Landscape planning: We encourage the Conference of Parties to support the uptake of a landscape or seascape planning approach for addressing the most complex indirect and cumulative impacts on biodiversity before they arise. We encourage the Nairobi Convention Secretariat to work with Contracting Parties to support this approach which will improve sustainability of development.

Sustainable Financing: We encourage the Conference of Parties to support the development of effective financing mechanisms that will ensure the consistent and permanent funding of biodiversity offsets. As part of this effort it is recommended that the Conference of Parties support the development national or regional biodiversity trust funds to facilitate investment in and third-party management of offset and compensation activities that will support conservation in Contracting Parties.

Multilateral and bilateral financing: We encourage the Conference of Parties and the Nairobi Convention Secretariat to engage with multilateral and bilateral financial institutions (MFIs / BFIs) and other

independent financial institutions to support better application of the mitigation hierarchy by their clients, including alignment with the standards of the World Bank and IFC, and the Equator Principles. **Region-wide coordination:** We encourage the parties to work together to harmonize policies and regulations on mitigation and offsetting to facilitate adoption and implementation by both government and the private sector. This harmonization of policies will also assist in ensuring effective sustainable management of regional habitats and species. It will also facilitate capacity building across all countries.

Draft Decision on No Net Loss and Mitigation Hierarchy (MANAGEMENT RESPONSES)

1. Request the Secretariat and Partners to develop a Concept Paper on No Net Loss and Mitigation Hierarchy with Recommendations for consideration at the next COP
2. To urge the Contracting Parties to, in the meantime, review their respective policy and regulatory frameworks that are relevant for biodiversity loss and mitigation options

Paper 2: Threats posed to Marine Life in the Western Indian Ocean from Anthropogenic Ocean Noise and Shipping, including Ship strikes.

Wildlife Conservation Society, Madagascar & Western Indian Ocean Program

Introduction

Many marine animals are biologically dependent on their ability to hear and communicate using sound (Weilgart, 2007a; Boyd *et al.* 2008; Tyack, 2008; Richardson *et al.* 2013; Williams *et al.* 2015). The vastness of the sea and the reduced utility of visual, chemical, and tactile senses puts a premium on the use of acoustic channels to convey information; sound is of vital importance for a wide range of marine taxa (Williams *et al.* 2015). Many species listen to sounds in the environment to locate predators or prey, to orient themselves and to communicate with one another in social and reproductive contexts. It is of such significance in some marine species that it dominates aspects of their physical and neural anatomy (Harder & Sokoloff 1976; Ketten, 1992; Ladich & Fine, 2006). In particular dolphins and porpoises use high-resolution, high-frequency, underwater biosonar to target

prey and navigate. Breeding baleen whales communicate using complex and stereotypical songs that are transmitted at low-frequency over large (and occasionally huge) distances (Edds-Walton, 1997; Ketten, 2004; Tyack, 2008; Clark *et al.* 2009).

Anthropogenic underwater noise is recognised as a significant pollutant that is increasingly pervasive worldwide (Gordon *et al.*, 2004; McCarthy 2007; Weilgart, 2007b; Boyd *et al.*, 2008; Erbe, 2013; Bittencourt *et al.* 2014; Simmonds *et al.* 2014; IMO 2014; UNEP/WIOMSA, 2015; CBD 2016). Low-frequency ambient noises have increased in the world's oceans since the beginning of mechanized

vessel transportation, but we are now beginning to quantify and understand the extent to which the deliberate use of sound (e.g., sonar, military activities, seismic airgun surveys) and incidental noise (e.g., shipping, pile-driving, construction) contribute to ocean soundscapes over broader scales of time and space (e.g., Weilgart, 2007a; Hildebrand *et al.*, 2009; Richardson *et al.* 2013; Hatch *et al.*, 2016; Nowacek & Southall, 2016). Underwater noise has a wide range of known and suspected consequences for marine ecosystems and species, and its management and mitigation is a major conservation concern (Cerchio *et al.* 2014; Cholewiak *et al.* 2018; Clark *et al.* 2009; Estabrook *et al.* 2016; Hatch *et al.* 2016; Hildebrand 2009; Jensen *et al.* 2009; McDonald *et al.* 2009; MEPC, 2013, 2014; Nowacek *et al.* 2007; Nowacek *et al.* 2015; Radford *et al.* 2014; Simmonds *et al.* 2014; Slabbekoom *et al.* 2010; Tyack, 2008; Weilgart, 2007b).

Questions and concerns about the effects of human introduction of noise into the marine environment on increasingly large scales are well-founded. Major progress has been made in understanding how animals hear and may be impacted by noise. While overall amplitude is clearly relevant in terms of how sounds in the ocean may affect animals, other aspects of sound, such as frequency, directionality, duration, novelty, and other factors can be as or even more important (e.g., Ellison *et al.*, 2012). The more similar in frequency a sound is to the kinds of sounds an animal is tuned to, the more likely it is to have

potential physical effects or to interfere with communication (e.g., Clark *et al.*, 2009; Southall *et al.*, 2013; Estabrook *et al.*, 2016; Hatch *et al.*, 2016). Specifically, issues related to disturbance of animals from important feeding or breeding areas and interference (masking) of communication (e.g., Estabrook *et al.*, 2016; Hatch *et al.*, 2016) and navigational signals have received increasing consideration (Southall *et al.* 2013).

Shipping and ship strikes

Commercial shipping is among the most widespread of industrial activities in the oceans, transporting approximately 80% of the world's goods and energy (UNCTAD 2017). Noise associated with shipping is increasingly recognized as the major contributor of anthropogenic noise in marine ecosystems on a global scale (e.g. Aguilar Soto *et al.* 2006; McDonald *et al.* 2006; Wright *et al.* 2007; Hildebrand, 2009, Clark *et al.* 2009; Bittencourt *et al.* 2014; Williams *et al.* 2015; Hatch *et al.* 2016; Southall *et al.* 2017). Ship traffic tends to be highly concentrated within shipping lanes and near ports, and their operations, both individually and in aggregate, have a range of proven and potential impacts on marine species and ecosystems. Cetaceans (whales and dolphins) are most prominently affected by shipping and impacts include 1) direct injury or mortality from “ship strikes”¹ and 2) sub-lethal behavioural effects (noise can interfere with navigation, communication and foraging, as well as displace animals from preferred habitats). While these two broad issues differ in a number of ways, the relative risk of each increases where higher spatial and temporal overlap occurs between shipping density and the presence of susceptible species engaged in biologically important activities (e.g. Laist *et al.*, 2001; Redfern *et al.*, 2017; Metcalfe *et al.*, 2018). In short, the potential impacts of both are far greater when a high concentration of shipping activity intersects with the migratory routes, or habitats important for feeding and reproduction of vulnerable species.

Ship-strike probability and oceanic noise pollution can be monitored and their impacts reduced by integrating widely available remote-sensing and tracking technologies with scientific knowledge of

animal presence and behaviour (Ward-Geiger *et al.* 2005; Silber *et al.* 2012; Van Parijs *et al.* 2013; Redfern *et al.* 2013; Tounadre, 2014; Simmonds *et al.* 2014; Redfern *et al.* 2017; Cholewiak *et al.* 2018). Noise quieting technologies may effectively mitigate shipping noise pollution at the source (Leaper *et al.* 2014) and ship speed management schemes can greatly reduce the lethality of ship strikes (Silber *et al.* 2012). In some jurisdictions, specific management measures have been adopted to reduce the impacts of noise and ship strikes on marine mammals (e.g. Laist *et al.* 2001; Erbe, 2013; Cholewiak *et al.* 2018). These include ship-routing and speed-control schemes as well as implementation of passive acoustic and ship-monitoring networks. Vessel-quieting guidelines have also been developed by the International Maritime Organization and others (Van Parijs *et al.* 2009; Silber *et al.* 2012; Erbe, 2013; IMO 2014). Guidelines for the reduction of ship strikes have been

developed by the International Whaling Commission (Cates *et al.* 2016). However, additional and sustained efforts are needed to limit and reduce the impacts of vessel operations on marine life.

Underwater noise and ship strikes were highlighted by the Wildlife Conservation Society (WCS), The International Union for Conservation of Nature (IUCN) and the Government of France at the United Nations Oceans Conference (UNOC) held in New York in June 2017. A complete recording of the meeting and all documents related to outcomes and recommendations related to anthropogenic underwater noise can be found [here](#). Specific mention was subsequently made by member states of ocean noise in the final UNOC Call for Action. This event also initiated a collaborative effort that led to the formulation

¹ “Ship strike” is a phrase commonly used to describe collisions between marine animals and vessels.

Most reports involve large whales, but all cetacean species can be affected. Collisions often go unnoticed and unreported. Animals can be injured or killed and vessels can sustain damage.

and registration of United Nations voluntary commitment [#OceanAction18553](#), entitled “A Commitment to reduce Ocean Noise Pollution.” Underwater noise and ship strikes were also a focal topic of the United Nations Open-ended Informal [Consultative Process](#) on Oceans and the Law of the Sea (June 2018).

The need for increased action on oceanic noise and the mitigation of its effects on cetaceans and other migratory species was agreed by Parties to the Convention on Migratory Species at the 12th Conference of the Parties held in Manila in October 2017. Resolution 12.14 ([UNEP/CMS/Resolution 12.14](#)) followed on from previous resolutions (CMS/9.19 and CMS/10.241) and focuses on adverse impacts from anthropogenic marine/ocean noise on cetaceans and other biota. The resolution has particular resonance for the WIO and specifically: “Urges Parties ...to take special care... to control the impact of anthropogenic marine noise pollution in habitats of vulnerable species and in areas where marine species that are vulnerable to the impact of anthropogenic marine noise may be concentrated, to undertake relevant environmental assessments on the introduction of activities that may lead to noise associated risks for CMS-listed marine species and their prey”. The resolution also “*Strongly urges* Parties to develop an appropriate regulatory framework or implement relevant measures to ensure a reduction or mitigation of anthropogenic marine noise...” and to “ensure that Environmental Impact Assessments take full account of the effects of activities on CMS-listed marine species and their prey and consider a more holistic ecological approach at a strategic planning stage.”

A set of EIA guidelines is also provided in CMS Resolution 12.14 (pp 7-31), and addresses underwater noise from a variety of sources. The guidelines were developed to help regulatory agencies entrusted with granting environmental permits with their assessment of the impacts on marine life from noise making activities in the marine environment. The Guidelines are accompanied by a detailed technical support document ([CMS/COP12/Inf.11](#)), which was designed as a tool for improving the assessment and regulation of the impacts of underwater noise on marine life. The document is applicable for national and regional contexts, and includes guidance for transboundary impacts.

Guidelines for the reduction of impacts associated with offshore geophysical (seismic) surveys as well as other forms of environmental imaging have also been developed by IUCN (Nowacek & Southall, 2016). The

guide, entitled *Effective planning strategies for managing environmental risk associated with geophysical and other imaging surveys*, is a practical guide to the responsible and effective planning of offshore geophysical surveys and other forms of environmental imaging and provides extensive detail on the impacts of such surveys as well as providing guidelines for planning future surveys. The guide focuses on marine mammals, but is also relevant and adaptable for other marine species (fishes, sea turtles, seabirds).

The Western Indian Ocean

The threats that noise and shipping pose to marine life in the

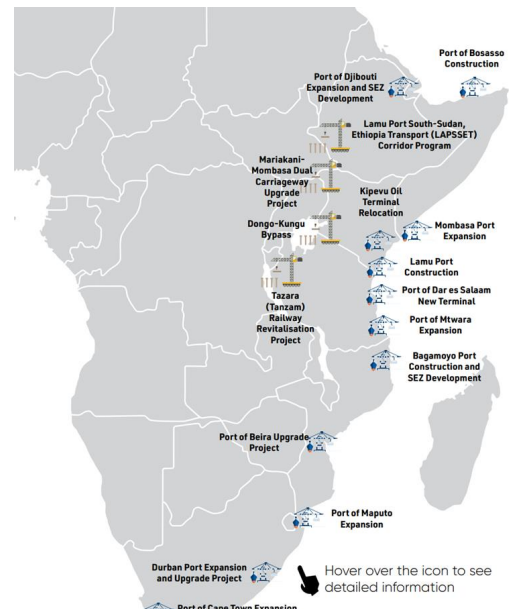


Figure 1: New and expanding ports in the WIO region. Map extracted from the East Africa Ports expansion [website](#)

waters of the Western Indian Ocean (WIO)² are poorly understood and are currently very rarely considered in national or regional management and development plans. This is of significant concern, particularly as the cumulative effects of multiple noise and ship related stressors remain largely unassessed for the region. WIO states are accelerating plans to diversify marine economies (particularly trade) in keeping with the development of the regional “[Blue Economy](#)” (World Bank/UN 2017). The blue economy is central to the African Union Commission 2063 *Strategic Framework for the Transformation of the African Continent*, as well as the Charter of the *Indian Ocean Rim Association* ([IORA](#)).

There are currently 13 commercial ports in the WIO region (see Figure 1) and several others are either planned or under construction (UNEP/WIOMSA, 2015). The region hosts several maritime trade routes, and currently 30% of global tanker traffic passes through the Mozambique Channel (Obura et al. 2015) transporting crude oil from the Persian Gulf and Indonesia to Europe and the Americas (World Bank 2012 - Report No: [72343-ZA](#)). WIO states are actively expanding their own offshore oil and gas production, activities that will further increase shipping and noise. Ambient noise levels in the Indian Ocean are known to be increasing (Miksis-Olds et al. 2013), and shipping in an already busy region has been projected to increase (Kaplan, 2009; Halpern et al. 2015).

Assessments of the threats posed by underwater noise and ship strikes in the WIO region currently fall far short of what is needed, in part because the required scientific work to assess these threats has not been completed, and because general awareness of their importance, scale and significance is poor. National guidance on environmental noise does exist in each WIO state, but is almost exclusively terrestrial, and almost exclusively focused on reducing the impacts of loud and persistent noises on people. Regional management measures that are of broad relevance for the management of underwater noise and shipping impacts are few. Article 5 of the *Convention for the Protection, Management and development of the Marine and Coastal Environment of the Eastern African region* ([UNEP/Nairobi Convention](#)) concerns pollution from ships, but as phrased is currently limited to discharges, although Article 2 correctly includes the release of energy into the marine environment as part of its definition of ‘Pollution’. The absence of specific guidance is also evident in statutory Environmental Impact Assessments (EIA’s) for major ports; we could find no evidence of either the appropriate measurement of underwater sound (a baseline or the predicted change) or the appropriate assessment of threats to marine species associated with increased noise or shipping in the documents we studied for this working paper. For example the most recent [ESIA](#) for the Lamu-LAPPSET Port Development does highlight several cetacean species of concern, but no specific management measures are suggested and the threats posed by increased shipping to marine species are not considered at all. The [EIA](#) for the improvement of Dar es Salaam Port mentions increased noise pollution from shipping but (in a one-line statement) also suggests the increase will be of low magnitude without providing any qualifying evidence (Section 6.7.2.5). The Maputo Port (*Sociedade para o Desenvolvimento do Porto de Maputo*) HSE Principle 1.7 requires that both environmental pollution be prevented as far as possible, and that proactive measures are in place to prevent events that cause significant impacts on the marine environment. However, no further information on the active management or monitoring measures related to noise, shipping and their potential effects on wildlife in Maputo could be sourced, despite ongoing work to increase the number of berths and radically expand cargo handling capacity.

These concerns are inextricably linked to the long-term conservation of the regions rich cetacean diversity (de Boer et al. 2002; Rosenbaum, 2003; Kiszka et al. 2009; REMMOA 2012). Recent sightings include seasonal blue whales (Barber et al. 2016; Branch et al. 2018), Longmans beaked whales (Martin & Nimak-Wood, 2016), coastal dolphins (Perez-Jorge et al. 2016) and seasonally migratory humpback whales (Best et al. 1998; Findlay et al. 2011; Braulik et al. 2018; Mwang’ombe et al. 2015). Recent acoustic work in Madagascar yielded detections of blue whales from three different sub-populations as well as newly discovered Omuras whales, fin whales, humpback whales and minke whales (Cerchio et al. 2018).

² here defined as the region encompassing the EEZ’s of contracting parties to the Nairobi Convention

Work by WCS and others has clarified the ecology of humpback whales (e.g. Best *et al.* 1998; Rosenbaum *et al.* 2009; Cerchio *et al.* 2009; Cerchio *et al.* 2016;

Kershaw *et al.* 2017). Most recently satellite tagging studies revealed movement of humpback whales from Madagascar to Kenyan and Somalian waters, as well as those of Mozambique (Cerchio *et al.* 2016; Dulau *et al.* 2017). These findings reinforce the available evidence of connectivity between these areas and highlights their vulnerability to multiple stressors across the migratory range.

Next steps for the Western Indian Ocean

Forward-thinking measures to monitor potential impacts, including amending current EIA practices, can occur with moderate costs. The process is likely to be more efficient if completed in partnership

with relevant research groups and NGOs, and will be more effective and efficient with explicit data sharing agreements. These sentiments are echoed in Articles 13 and 14 of *Convention for the Protection, Management and development of the Marine and Coastal Environment of the Eastern African region* (UNEP/Nairobi Convention), which deal with EIA's and Scientific and technical cooperation respectively. These issues are often not fully considered until there is a problem, and are typically costlier when the efforts are reactive. Proactive investment in efforts to establish baseline conditions for marine life and ocean noise levels in the short-term may be viewed by some as more costly, unneeded expenditures, or even unnecessary. However, it is our view that if the investment is made strategically, it will only promote best practices for marine life and important habitats in the context of a blue economy and the UNSDG14 2030 targets.

Policy Recommendations

The development of best practice scenarios will require that governments, the shipping industry and civil society work together. Regional guidelines and research can benefit from extensive measures being implemented elsewhere around the globe and should be considered an urgent priority given sustainable development targets linked to 2030. Specific recommendations (which echo those of [UNEP/CMS/Resolution 12.14](#)) include:

- **The urgent implementation of national and regional noise limiting and ship-strike prevention guidelines is considered essential. The development (or adoption) of guidelines should involve all relevant stakeholders. Solutions must be tractable and have real, achievable benchmarks within the framework of SDG 14 and towards 2030.**
 - **Regional guidelines should be in keeping with current global best practice. These include those of CMS, the [IMO](#), the [IWC](#), [CBD](#), [IUCN](#) and the World Bank (see [IFC 2017](#), pp 18-19).**
 - **Voluntary guidelines being adopted and implemented by the International Maritime Organization (IMO) need greater uptake with other industry sectors, which may be improved by effective education, communication and incentive-based systems.**
- **Regional research that actively investigates oceanic noise and its effects on marine life should be encouraged and supported. This should be considered an urgent concern, particularly as marine development proceeds at a rate that far exceeds our ability to reliably assess impacts. Research should include:**
 - **Targeted regional and collaborative research that seeks to improve our understanding of regional ocean noise levels, including establishment of acoustic baselines and the identification and protection of areas of critical biological importance. These areas should include implementing and/or reinforcing Marine Protected Areas (MPA) or Important Marine Mammal Areas (IMMAs).**
 - **Targeted research that highlights the potential impacts to marine mammals from shipping traffic (along with other noise sources) and the effects of expanded regional**

maritime trade. These targets will require developing a clear understanding of cetacean distribution and occurrence,

Draft Decision on Anthropogenic Ocean Noise and Ship Strikes

1. **Request the Secretariat in collaboration with Partners to undertake a Baseline Study on Ocean Noise and Ship Strikes and Their Impact on the Marine and Coastal Environment of the WIO Region and Recommended Actions and report on the same in the next COP**
2. **Request the Secretariat to develop and support priority projects on impacts of anthropogenic ocean noise and shipping activities on marine animals, and to support their implementation**
3. **Request the Secretariat to collaborate with the Secretariats of other International Conventions and International Organizations, including the Convention on Migratory Species, International Maritime Organization, International Whaling Commission, Regional Fisheries Management Organizations in undertaking the mandate on anthropogenic ocean noise and ship strikes**