Vulnerable Marine Ecosystem (VME)

DEFINITION

Marine ecosystems which are easily damaged because of their physical and functional fragility.

DESCRIPTION

In 2006, the UN General Assembly invited the Food and Agriculture Organization of the United Nations (FAO) to consider creating a global database of information on Vulnerable Marine Ecosystems (VME) in marine Areas Beyond National Jurisdiction (ABNJ), to assist States in assessing any impacts of bottom fisheries on these benthic ecosystems. Paragraph 90 of the resolution invited States and Regional Fisheries Management Organizations or Arrangements (RFMO/As) to submit information to the database on all VMEs identified. [1]

In August 2008, the International Guidelines for the Management of Deep-sea Fisheries in the High Seas, developed through FAO [2], were adopted by FAO Members at a Technical Consultation in Rome, where they defined detailed criteria for identifying VMEs. The main objective of these Guidelines is to focus on the sustainable management of deep sea fisheries, so as to promote responsible fisheries that provide economic opportunities, while ensuring the conservation of marine living resources and the protection of marine biodiversity [2]. The Guidelines are a voluntary tool through which to achieve this objective of better managed fisheries and protected VMEs.

Deep-sea fisheries commonly target species which may be particularly sensitive to exploitation because they exhibit life history traits such as slow growth, low reproductive output and long life expectancy [2]. Deep sea ecosystems more generally present these traits and may hence be particularly vulnerable to the impacts of fishing gear. In response to the threats faced by these habitats, the United Nations General Assembly (UNGA) took a Resolution requesting that RFMO/As and States regulate deep-sea bottom fisheries and address significant adverse impacts on VMEs. [1]

Vulnerability as defined in the Guidelines is “related to the likelihood that a population, community, or habitat will experience substantial alteration from short-term or chronic disturbance, and to the likelihood that it would recover and in what time frame” [2]. Under European law, VMEs are defined as “any marine ecosystem whose integrity (i.e. ecosystem structure or function) is, according to the best scientific information available and to the precautionary principle, threatened by significant adverse impacts resulting from physical contact with bottom gears in the normal course of fishing operations, including, inter alia, reefs, seamounts, hydrothermal vents, cold water corals or cold water sponge beds. The most vulnerable ecosystems are those that are easily disturbed and in addition are very slow to recover, or may never recover". [3]

Detailed criteria for the identification of VMEs can be found in Paragraph 42 of the Guidelines. [2] There is considerable overlap in criteria between VMEs and Ecologically or Biologically Significant Areas (EBSAs), which are identified through the Convention on Biological Diversity. However, the VME criteria differ in having an internationally agreed process for their identification and a management response. [4] VMEs are applied primarily as a management response to issues in deep-sea fisheries and are often embedded in the management process of RFMOs. In contrast and as the name infers, EBSAs are used to identify areas of biological or ecological importance, which are not directly associated with threats, a specific zone of the oceans or a specific management systems.

FAO is currently in the process of building a ‘VME database’ to facilitate information exchange on these sensitive ecosystems. It is created in collaboration with other Regional bodies; for example, the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) records the locations and characteristics of VMEs and associated areas in the Convention Area in a 'CCAMLR VME registry', [5] which is fed into the VME database. The potential users of the database are those wishing to access information on the work that is, and that has been, undertaken by RFMOs on VMEs in marine ABNJ. This database includes information on specific VMEs, Regional Fisheries Bodies (or State), management measures, and management and scientific meeting reports that are connected with VMEs and that are often widely dispersed through various documents that are difficult and time consuming to locate.

SUPPORTED BY

Food and Agriculture Organization of the United Nations (FAO).

YEAR OF CREATION

2008

COVERAGE

Global in extent.

CRITERIA

A marine ecosystem should be classified as vulnerable based on the characteristics that it possesses:[2]

1. Uniqueness or rarity – an area or ecosystem that is unique or that contains rare species whose loss could not be compensated for by similar areas or ecosystems. These include:

- habitats that contain endemic species;
- habitats of rare, threatened or endangered species that occur only in discrete areas; or
- nurseries or discrete feeding, breeding, or spawning areas.

2. Functional significance of the habitat – discrete areas or habitats that are necessary for the survival, function, spawning/reproduction or recovery of fish stocks, particular life-history stages (e.g. nursery grounds or rearing areas), or of rare, threatened or endangered marine species.

3. Fragility – an ecosystem that is highly susceptible to degradation by anthropogenic activities.

4. Life-history traits of component species that make recovery difficult – ecosystems that are characterised by populations or assemblages of species with one or more of the following characteristics:

- slow growth rates;
- late age of maturity;
- low or unpredictable recruitment; or

- long-lived.

5. Structural complexity – an ecosystem that is characterised by complex physical structures created by significant concentrations of biotic and abiotic features. In these ecosystems, ecological processes are usually highly dependent on these structured systems. Further, such ecosystems often have high diversity, which is dependent on the structuring organisms.

Examples of potentially vulnerable species groups, communities and habitats, as well as features that potentially support them are listed in an annex to the Guidelines [2] and include cold-water corals, sponges, as well as biological communities associated with seamounts, cold seeps and hydrothermal vents. The criteria can be adapted and additional criteria may be developed as experience and knowledge accumulate, or to address particular local or regional needs. [2] A ten-step framework was recently published, aiming at providing guidelines on the process to follow from initial identification through to the protection of VMEs. [6]

MANAGEMENT

Management and conservation steps are included in the Guidelines[2] under the following headings:

- data, reporting and assessment;
- identifying VMEs and assessing significant adverse impacts;
- enforcement and compliance; management and conservation tools; and
- assessment and review of effectiveness of measures.

The Guidelines apply to fisheries that occur in areas beyond the limits of national jurisdiction, [2] specifically deep sea fisheries where:

- the total catch (everything brought up by the gear) includes species that can only sustain low exploitation rates; and
- the fishing gear is likely to make contact with the seafloor during the normal course of fishing operations.

BUSINESS RELEVANCE

Legal and compliance - The output from Rio +20 was entitled 'The Future We Want'. [7] It made a commitment to enhance actions to protect VMEs, including through the effective use of impact assessments.

A number of resolutions from the United Nations General Assembly (UNGA) highlight the importance of addressing the adverse impacts of bottom fishing and to consider the long-term sustainability of deep sea fish stocks (e.g. Resolutions 61/105, 64/72 and 66/68) [8]. These Resolutions call for the sustainable management of bottom fisheries.

In relation to ABNJ, the United Nations Convention on Law of the Sea provides that the high seas are open to all States, under the regime of the freedom of the high seas, including freedom to lay submarine cables and pipelines and freedom of fishing. Flag States have hence exclusive jurisdiction over vessels flying their flag on the high seas. The Guidance [2] is a voluntary instrument, which is provided to States as a reference for formulating and implementing appropriate measures for the management of deep-sea fisheries in the high seas. The FAO considers their adoption as a major step forward in addressing both fisheries management and marine biodiversity conservation in an integrated manner, and contributes to the development and strengthening of the applicable legal and institutional framework. [9]

In Europe, legislation has been enacted to support the sustainable management of deep sea fisheries. [3]

Biodiversity importance - The marine benthic environment is extremely biodiverse. It has been estimated that approximately 98% of known marine species live in benthic environments and that more species live in benthic environments than in all other environments on Earth combined. [10] The United Nations General Assembly has identified a number of habitats which could be considered vulnerable ecosystem features, such as those found in coastal areas (i.e. warm-water coral reefs, wetlands, seagrass beds, coastal lagoons, mangroves and estuaries). Also included are those found in areas within and beyond national jurisdiction, such as spawning and nursery grounds, cold-water corals, seamounts, various features associated with polar regions, hydrothermal vents, deep-sea trenches and submarine canyons, and oceanic ridges. [10]

Socio-cultural values - The value of VMEs to society is through the services that they provide. Given the location of some of these features in the deep sea, they are not a visible element of the natural environment except through nature documentary film-making. Filming deep sea habitats is indeed becoming popular, with technological advances allowing access to these areas. Fisheries also bring the animals of the deep sea to people's tables worldwide. There are also considerable possibilities for bio-prospecting (i.e. seabed mining for minerals) in some of these areas, [11] and they possibly hold potentially valuable marine genetic resources. For example sponges, which are often found on seamounts, have in the past been a source of medically active compounds. [12]

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Fishing trawler, Japan. VMEs aim to promote sustainable fishing. papa1266/Shutterstock.com

Category:

Biodiversity designations

Marine biodiversity features

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