AZORES SCIENTIFIC CRITERIA AND GUIDANCE

for identifying ecologically or biologically significant marine areas and designing representative networks of marine protected areas in open ocean waters and deep sea habitats

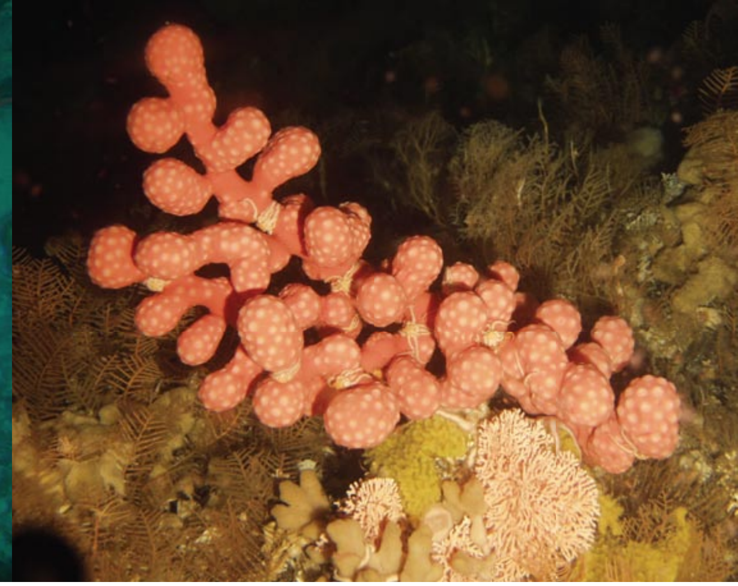
UNEP

Convention on Biological Diversity

Ministério do Ambiente,
do Ordenamento do Território e
do Desenvolvimento Regional

Governo dos Açores

IUCN

The oceans cover 70% of our planet's surface and represent over 95% of the living biosphere.

They contain a vast diversity of different habitat types and spectacular seascapes, hosting 32 of the 34 Animalia phyla of the planet, of which around 13 are exclusively or mostly marine.

Knowing less about the deep sea habitats than the surface of the moon

Most scientific studies have focused on easily accessible coastal waters and surface ocean. Only a small percentage of the deep seafloor has been subject to biological investigation.

Revealing the natural beauty and ecological value of deep sea habitats

With the technological advances of the past few decades, much has been added to our knowledge of deep sea habitats, and people have begun to realize the value and importance of this large and remote habitat to life on Earth.

Deep seabed habitats, long perceived to be a biological desert, host a wealth of species. Current estimates for species diversity in the deep sea range between 500,000 and 10 million species. Recent scientific results highlighted that higher biodiversity can enhance the functioning and efficiency of deep sea ecosystems. Without deep sea life, life on Earth would be compromised because of the fundamental role of the deep sea in global biogeochemical cycles including nutrient regeneration and oxygen itself. As such, the sustainability of our biosphere significantly relies on the goods and services provided by deep sea ecosystems.

HYDROTHERMAL VENTS were the first ecosystem on Earth found to be basically independent from the sun as an original source of energy, relying instead on chemosynthesis. Deep sea hydrothermal vent organisms tolerate great extremes in water temperature and survive toxic concentrations of heavy metals. They are therefore of particular interest because of their adaptation to a high pressure, high temperature, high acidity and high toxicity environment. Despite these extreme conditions, the biomass of organisms around vents is very high, and made up of endemic species.

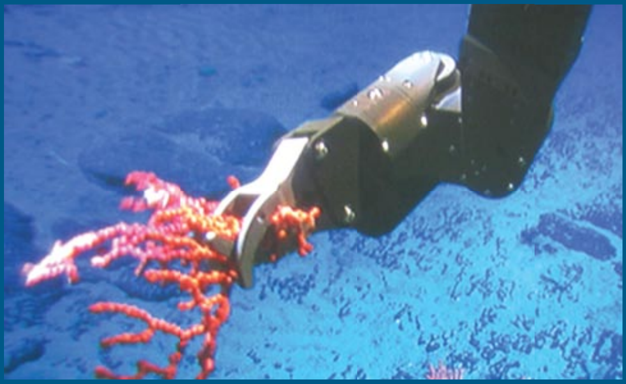
SEAMOUNTS and the water column above them serve as important habitats, feeding grounds, and reproduction sites for many open ocean and deep sea species of fish, sharks, sea turtles, marine mammals, seabirds, and benthic organisms. Seamounts thus form biological hotspots with a distinct, abundant and diverse fauna, and sometimes reveal many species new to science.

COLD-WATER CORAL REEFS may be many hundred to thousands of years old. Because of their age and slow growth rates, reefs contain high-resolution records of long-term climate change and may also serve as important speciation centres in the deep sea. Recent research in paleo-climatology has discovered the enormous potential of climate records in the skeletons of cold-water corals, since they are found in all oceans and at all bathymetries, from sea level to at least 4 km below the surface.

"How inappropriate to call this planet

Increasing threats from various human activities

The open ocean and deep sea are under increasing threat from various human activities. The most pressing threats come from overfishing, destructive fishing practices, and illegal, unreported and unregulated fishing activities. Other emerging problems include marine debris, ship-based marine pollution, transfer of alien invasive species, illegal dumping and the legacy of historical dumping, seabed mineral extraction, and noise pollution. The discovery of the enormous potential value of genetic resources associated with deep seabed habitats to various sectors, particularly the health and food sectors, has highlighted the value of deep sea biodiversity but also puts it at further risk from poorly controlled research and bioprospecting with adverse impacts. Another emerging concern that calls for proper management is ocean fertilization and other activities proposed for storing or sequestering carbon dioxide in the deep sea. The combined impacts of these threats as well as the potential impacts of climate change and ocean acidification have placed thousands of species at risk of extinction, and have impaired the structure, function, productivity and resilience of marine ecosystems.

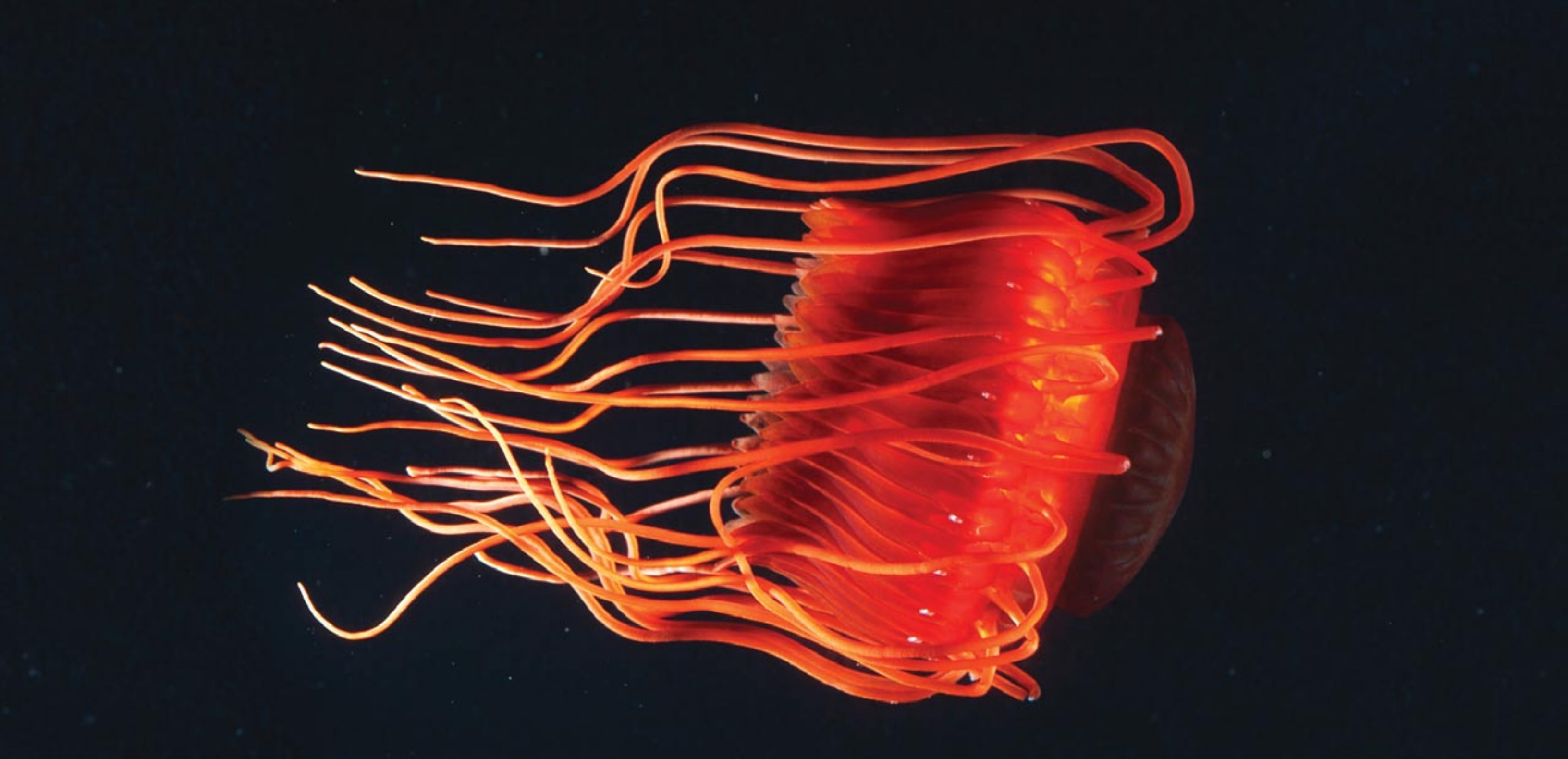


World oceans are seriously under-protected

At the present time, the world's oceans are seriously under-protected, with only approximately 0.8% of the oceans and 6% of territorial seas being within protected area systems. In response to rising concerns regarding the health of open ocean and deep sea ecosystems, the 2002 World Summit on Sustainable Development, in its Plan of Implementation, called for countries to develop and facilitate the use of diverse approaches and tools, including the ecosystem approach, the elimination of destructive fishing practices, and the establishment of marine protected areas consistent with international law and based on scientific information, including representative networks by 2012.

Earth when it is quite clearly Ocean"

—Sir Arthur C. Clarke



Common and shared goal

To maintain, protect and conserve global marine biodiversity through conservation and protection of its components in a biogeographically representative network of ecologically coherent sites.

Historic step taken by COP 9

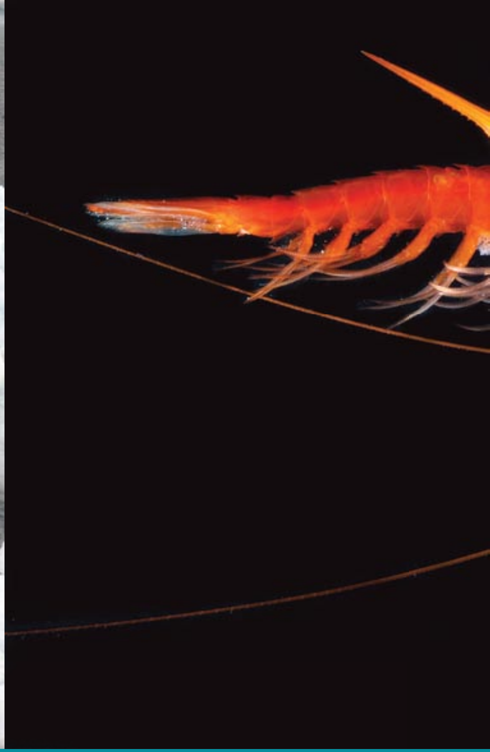
The Conference of the Parties to the Convention on Biological Diversity (COP), in its ninth meeting, adopted the scientific criteria for identifying ecologically or biologically significant marine areas in need of protection (Table 1), and the scientific guidance for designing representative networks of marine protected areas (Table 2). These scientific criteria and guidance were consolidated by the Expert Workshop on Ecological Criteria and Biogeographic Classification Systems for Marine Areas in Need of Protection held in the Azores, Portugal, from 2–4 October 2007.

Identifying ecologically or biologically significant and/or vulnerable marine areas in need of protection

COP 9 urged Parties and invited other Governments and relevant organizations to apply, as appropriate, the scientific criteria (Table 1) and the scientific guidance (Table 2) to identify ecologically or biologically significant and/or vulnerable marine areas in need of protection. The application of the scientific criteria and guidance, based on the best available scientific information and applying the precautionary approach and the ecosystem approach, can enable Parties, other Governments and relevant organizations to help halt the rapid loss of marine biodiversity in open ocean waters and deep sea habitats.

Future steps

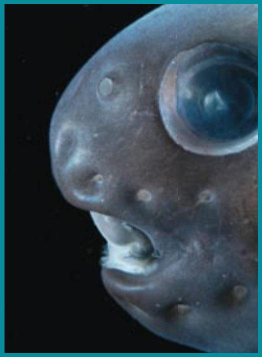
The Secretariat of the Convention on Biological Diversity is convening an expert workshop on scientific and technical guidance on the use of biogeographic classification systems and identification of marine areas beyond national jurisdiction in need of protection, in Ottawa, Canada from 29 September to 2 October 2009. This workshop was called for by COP 9 (Decision IX/20, paragraph 19) to help Parties in their efforts of applying the scientific criteria (Table 1). This expert workshop will review and synthesize progress on the identification of areas beyond national jurisdiction which meet the scientific criteria and experience with the use of the biogeographic classification systems. It will also provide scientific and technical guidance on the identification of areas beyond national jurisdiction that meet the CBD scientific criteria, and guidance on the use and further development of biogeographic classification systems. The results of this workshop will be transmitted to the 14th meeting of the Subsidiary Body on Scientific, Technical and Technological Advice, scheduled for May 2010, for its consideration prior to the tenth meeting of the Conference of Parties with a view to assisting the United Nations General Assembly.



Scientific criteria for identifying ecologically of protection in open ocean waters

Criteria	Definition	Rationale
Uniqueness or rarity	Area contains either (i) unique ("the only one of its kind"), rare (occurs only in few locations) or endemic species, populations or communities, and/or (ii) unique, rare or distinct, habitats or ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features	• Irreplaceable • Loss would mean the probable permanent disappearance of diversity or a feature, or reduction of the diversity at any level
Special importance for life-history stages of species	Areas that are required for a population to survive and thrive	Various biotic and abiotic conditions coupled with species-specific physiological constraints and preferences tend to make some parts of marine regions more suitable to particular life-stages and functions than other parts.
Importance for threatened, endangered or declining species and/or habitats	Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species	To ensure the restoration and recovery of such species and habitats

or biologically significant marine areas in need and deep sea habitats (Annex I of CBD Decision IX/20)

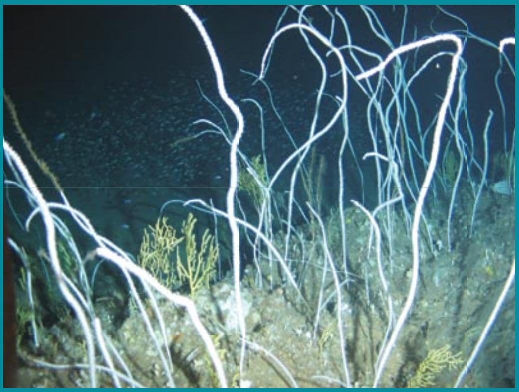
Examples	Consideration in application
Open ocean waters • Sargasso Sea, Taylor column, persistent polynyas *Deep sea habitats* • endemic communities around submerged atolls; hydrothermal vents; seamounts; pseudo-abyssal depression	• Risk of biased-view of the perceived uniqueness depending on the information availability • Scale dependency of features such that unique features at one scale may be typical at another, thus a global and regional perspective must be taken
Area containing: (i) breeding grounds, spawning areas, nursery areas, juvenile habitat or other areas important for life history stages of species; or (ii) habitats of migratory species (feeding, wintering or resting areas, breeding, moulting, migratory routes) 	• Connectivity between life-history stages and linkages between areas: trophic interactions, physical transport, physical oceanography, life history of species • Sources for information include: e.g. remote sensing, satellite tracking, historical catch and by-catch data, vessel monitoring system (VMS) data • Spatial and temporal distribution and/or aggregation of the species
Areas critical for threatened, endangered or declining species and/or habitats, containing (i) breeding grounds, spawning areas, nursery areas, juvenile habitat or other areas important for life history stages of species; or (ii) habitats of migratory species (feeding, wintering or resting areas, breeding, moulting, migratory routes)	• Includes species with very large geographic ranges • In many cases recovery will require reestablishment of the species in areas of its historic range • Sources for information include: e.g. remote sensing, satellite tracking, historical catch and by-catch data, vessel monitoring system (VMS) data

Scientific criteria for identifying ecologically
of protection in open ocean waters

Criteria	Definition	Rationale
Vulnerability, fragility, sensitivity, or slow recovery	Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery	The criteria indicate the degree of risk that will be incurred if human activities or natural events in the area or component cannot be managed effectively, or are pursued at an unsustainable rate.

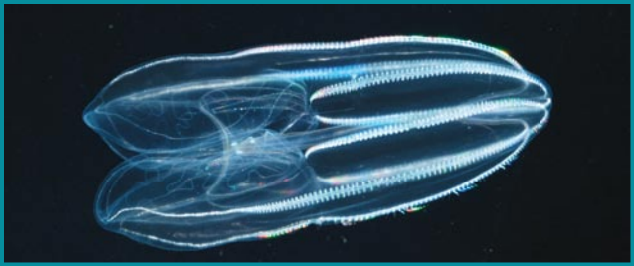
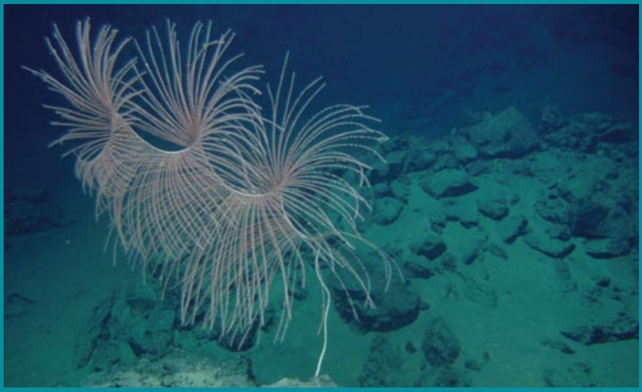


Criteria	Definition	Rationale
Biological productivity	Area containing species, populations or communities with comparatively higher natural biological productivity	Important role in fuelling ecosystems and increasing the growth rates of organisms and their capacity for reproduction




Criteria	Definition	Rationale
Biological diversity	Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity	Important for evolution and maintaining the resilience of marine species and ecosystems
Naturalness	Area with a comparatively higher degree of naturalness as a result of the lack of or low level of human-induced disturbance or degradation	• To protect areas with near natural structure, processes and functions • To maintain these areas as reference sites • To safeguard and enhance ecosystem resilience

or biologically significant marine areas in need and deep sea habitats (Annex I of CBD Decision IX/20) *Continued*

Examples	Consideration in application
Vulnerability of species • Inferred from the history of how species or populations in other similar areas responded to perturbations • Species of low fecundity, slow growth, long time to sexual maturity, longevity (e.g. sharks, etc) • Species with structures providing biogenic habitats, such as deepwater corals, sponges and bryozoans; deep-water species *Vulnerability of habitats* • Ice-covered areas susceptible to ship-based pollution. • Ocean acidification can make deep sea habitats more vulnerable to others, and increase susceptibility to human-induced changes	• Interactions between vulnerability to human impacts and natural events • Existing definition emphasizes site specific ideas and requires consideration for highly mobile species • Criteria can be used both in its own right and in conjunction with other criteria 
• Frontal areas • Upwellings • Hydrothermal vents • Seamounts polynyas 	• Can be measured as the rate of growth of marine organisms and their populations, either through the fixation of inorganic carbon by photosynthesis, chemosynthesis, or through the ingestion of prey, dissolved organic matter or particulate organic matter • Can be inferred from remote-sensed products, e.g., ocean colour or process-based models • Time-series fisheries data can be used, but caution is required
• Seamounts • Fronts and convergence zones • Cold coral communities • Deep-water sponge communities	• Diversity needs to be seen in relation to the surrounding environment • Diversity indices are indifferent to species substitutions • Diversity indices are indifferent to which species may be contributing to the value of the index, and hence would not pick up areas important to species of special concern, such as endangered species • Can be inferred from habitat heterogeneity or diversity as a surrogate for species diversity in areas where biodiversity has not been sampled intensively
Most ecosystems and habitats have examples with varying levels of naturalness, and the intent is that the more natural examples should be selected. 	• Priority should be given to areas having a low level of disturbance relative to their surroundings. • In areas where no natural areas remain, areas that have successfully recovered, including reestablishment of species, should be considered. • Criteria can be used both in their own right and in conjunction with other criteria.

Scientific guidance for selecting areas to establish a representative network of marine protected areas, including in open ocean waters and deep sea habitats

(Annex II of CBD Decision IX/20)

Required network properties and components	Definition	Applicable site-specific considerations *(inter alia)*
Ecologically and biologically significant areas	Ecologically and biologically significant areas are geographically or oceanographically discrete areas that provide important services to one or more species/populations of an ecosystem or to the ecosystem as a whole, compared to other surrounding areas or areas of similar ecological characteristics, or otherwise meet the criteria as identified in annex I to decision IX/20.	• Uniqueness or rarity • Special importance for life history stages of species • Importance for threatened, endangered or declining species and/or habitats • Vulnerability, fragility, sensitivity or slow recovery • Biological productivity • Biological diversity • Naturalness
Representativity	Representativity is captured in a network when it consists of areas representing the different biogeographical subdivisions of the global oceans and regional seas that reasonably reflect the full range of ecosystems, including the biotic and habitat diversity of those marine ecosystems.	A full range of examples across a biogeographic habitat, or community classification; relative health of species and communities; relative intactness of habitat(s); naturalness
Connectivity	Connectivity in the design of a network allows for linkages whereby protected sites benefit from larval and/or species exchanges, and functional linkages from other network sites. In a connected network individual sites benefit one another.	Currents; gyres; physical bottlenecks; migration routes; species dispersal; detritus; functional linkages. Isolated sites, such as isolated seamount communities, may also be included.
Replicated ecological features	Replication of ecological features means that more than one site shall contain examples of a given feature in the given biogeographic area. The term "features" means "species, habitats and ecological processes" that naturally occur in the given biogeographic area.	Accounting for uncertainty, natural variation and the possibility of catastrophic events. Features that exhibit less natural variation or are precisely defined may require less replication than features that are inherently highly variable or are only very generally defined.
Adequate and viable sites	Adequate and viable sites indicate that all sites within a network should have size and protection sufficient to ensure the ecological viability and integrity of the feature(s) for which they were selected.	Adequacy and viability will depend on size; shape; buffers; persistence of features; threats; surrounding environment (context); physical constraints; scale of features/processes; spillover/compactness

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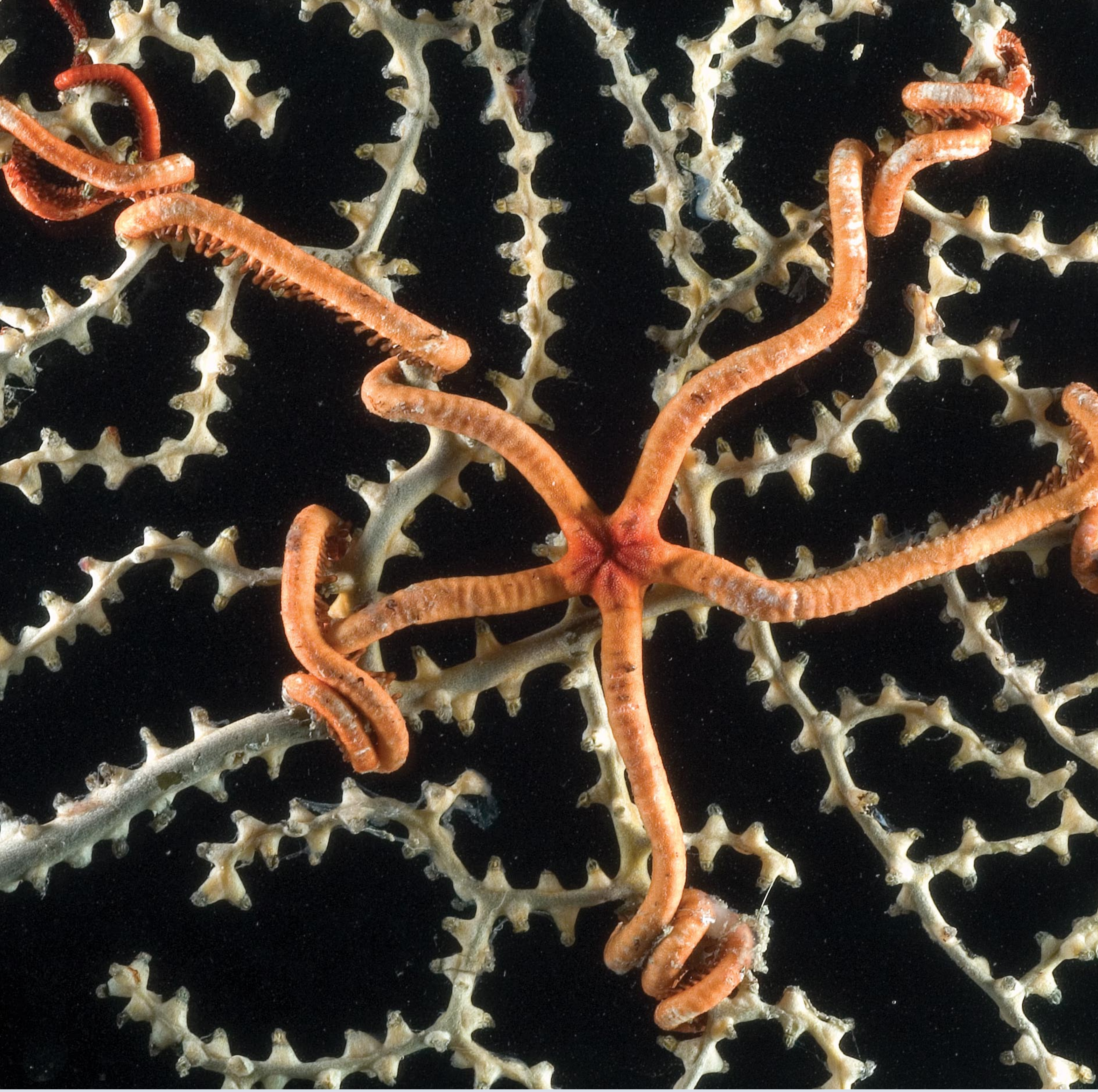

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