

BIOPROSPECTING IN THE DEEP SEA

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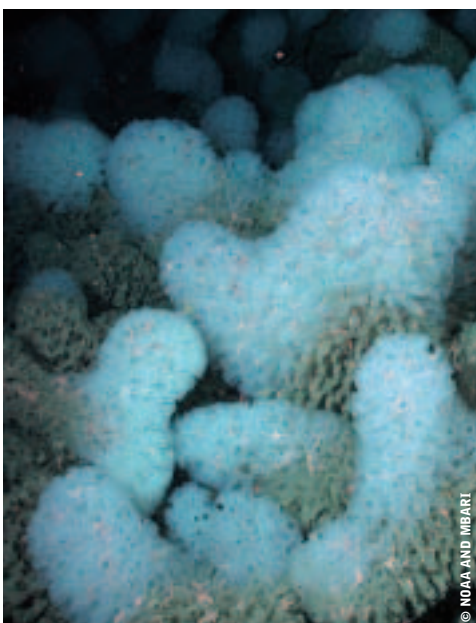


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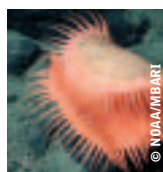
Executive Summary

The expanding exploration of deep-sea marine biodiversity for scientific, as well as commercial purposes (also known as “bioprospecting”) has drawn increasing attention to the question of access to and benefits from marine genetic resources in areas beyond national jurisdiction. The absence of any legal regime to regulate these activities means that bioprospecting on the high seas is an unregulated industry. As such, it poses a threat to deep-sea ecosystems, which due to their unique biological characteristics are particularly vulnerable to habitat disturbance. The current uncertain legal status surrounding deep-sea genetic resources, the rise in patents on marine life and the need for an equitable access and benefit-sharing regime regarding bioprospecting, underscores the lack of a comprehensive high seas oceans governance regime to protect and conserve marine biodiversity.

A new United Nations Convention on the Law of the Sea (UNCLOS) implementing agreement is necessary to fill this gap in oceans governance in order to promote an integrated, precautionary and ecosystem-based management approach to high seas biodiversity protection, which includes the regulation of bioprospecting. Only concerted international action by states to put such a legal framework into place, will ensure the conservation and sustainable management of the planet’s final frontier- the high seas – and will help to mitigate one of the biggest unseen and potentially irreversible environmental disasters of our time.



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What is Bioprospecting?

Bioprospecting is the exploration of biodiversity for both scientific and commercial purposes. There is no internationally accepted definition of bioprospecting. However, bioprospecting can be summarised as the investigation of an area’s biodiversity, and sampling of biological organisms for scientific research or commercial purposes. It is often difficult to differentiate between research on genetic resources for purely scientific purposes, and that for commercial activities.

Generally, such resources are collected and analysed as part of a scientific research project, often as partnerships with scientific institutions and industry. At a later stage these resources and findings can enter the commercial arena as products derived from information discovered during these scientific endeavours. The main difference, therefore, seems to lie in the use of knowledge rather than the practical nature of how this research and harvesting is carried out.

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Threats and Concerns

With advances in technology, bioprospecting has started to take off in the marine context. There is a realisation that many of the properties found in marine plants, animals and micro-organisms contain unique biochemicals which could be integral to developing new products for use in the health, pharmacology, environmental and chemicals sectors.

Compounds that have been removed from various marine species such as sponges, corals and sea slugs are now being sold commercially. There are huge commercial opportunities in the exploration of these areas. There have been estimates of profits of anti-cancer agents from micro-organisms of up to US\$1 billion per year¹.

To date, most bioprospecting in the marine environment has taken place in shallower waters, however, scientists are beginning to appreciate the valuable resources that are housed in the depths of the high seas. Many of these deep-sea species have developed unique biological and physiological properties in which to survive in these extreme environments. These include slow growth, late sexual maturity, the ability to withstand cold, dark and highly pressurised environments, as well as a high level of endemism in many ecosystems. It is these rare properties which are attracting the interest of scientific and commercial sectors. Yet these same properties make them highly susceptible to disturbance and change.

At the moment bioprospecting in the deep-sea is still restricted to a very select sector - either commercially based or academic - that has both the technical and financial capital to exploit these resources. However, with ever-developing advances in technology, the opportunity to exploit these little-known resources is increasing. There are clearly enormous potentials for scientific discovery in these areas. Continued scientific research to extend our knowledge of deep-sea ecosystems is important, but there are potential detrimental impacts of this exploration, including physical disturbance or disruption of ecosystems, potential pollution and contamination, as well as problems of over-harvesting.

Legal Voids in deep ocean space

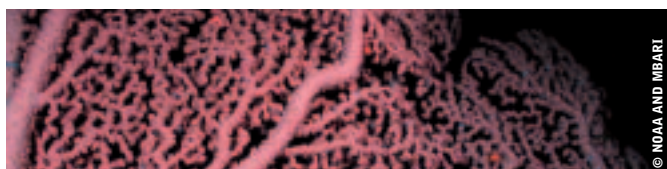
Currently there is no legal management regime to regulate these activities on the high seas. This is an almost totally unregulated industry, which by the very nature of where it takes place, is very difficult to monitor. The lack of an

international management regime for marine scientific research and bioprospecting in areas beyond national jurisdiction is a clear example of one of the many legal voids that threatens high seas biodiversity. This gap illustrates the need for stronger oceans governance on the high seas, especially in the face of the ever-increasing movement of these exploitative activities into these areas.

A recent study by the United Nations University (UNU) and the Institute of Advanced Studies (IAS) highlighted the uncertain legal status surrounding the access to genetic resources on the high seas. Within a country's Exclusive Economic Zone (EEZ), bioprospecting in the seabed is governed by a much clearer legal regime.

The United Nations Convention on the Law of the Sea (UNCLOS) determines states' jurisdiction, rights and obligations and the Convention on Biological Diversity (CBD) has also developed regulations regarding access to genetic resources, transfer of technologies and benefit-sharing. On the continental shelves, sedentary species² are excluded from Part V which deals with the EEZ, and coastal states have sovereign rights to explore and exploit living organisms belonging to sedentary species³. In areas beyond national jurisdiction, the CBD's scope is limited to "processes and activities regardless of where their effects occur, carried out under its jurisdiction or control"⁴. Also in these areas, UNCLOS draws a distinction between mineral resources that are found under the seabed and ocean floor and sedentary species and living biological non-sedentary resources such as fish. Generally, mineral resources and sedentary species which are found outside states' continental shelves (in what is known as the "Area") are viewed by the Convention as belonging to everybody - they are part of the common heritage of humankind⁵. This regime is administered by the International Seabed Authority, which was set up in 1994 to ensure that a portion of the proceeds from the exploitation of these resources would be channelled into aid or other help for developing countries. It also ensures the prevention of damage to marine flora and fauna from extractive activities.

Non-sedentary marine biological resources such as fish currently belong to whomever catches them - the principle of the "freedom to fish" the high seas applies. This principle is balanced by the duty to conserve and protect the marine environment. However, there are no direct provisions relating to how to manage the genetic resources of the high seas⁶. Whether such genetic resources fall into the general realm of biology subject to the articles of Part VII of UNCLOS and thus available to whoever is able to haul them out of the sea, or subject to Part XI and viewed as part of the common heritage of humankind, depends in the first case, on whether the species are sedentary or not, and then on the provisions of the CBD.



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5 | UNCLOS, Part XI, as modified by the 1994 Agreement on the Implementation of Part XI of UNCLOS

6 | UNCLOS, Part VII

3 | UNCLOS article 77(4)

4 | Convention on Biological Diversity (CBD), article 4

1 | From UNU-IAS, 2005, p.27

2 | Sedentary species are defined in article 77 of UNCLOS to mean organisms which, at the harvestable stage, either are immobile on or under the seabed or are unable to move except in constant physical contact with the seabed or the subsoil.

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What is clear is the irrefutable evidence that current high seas oceans management is creating one of the biggest unseen and potentially irreversible environmental disasters of our time. Marine resources are not exhaustible and a strict management regime must be put in place to ensure the sustained existence of high seas biodiversity. Greenpeace believes that marine biodiversity forms part of the global commons and must be managed in a way that ensures their long-term sustainability. In addition, those countries that do not have the financial and technical capacity to harvest genetic resources should benefit equitably from such genetic research.

No Patents on life

There are a number of patents involving genetic resources from the deep seabed, and these are rising. However, there is concern that genetic resources are being patented on the basis of their unique physical, chemical or biological properties, rather than from inventions derived from the source material.

Greenpeace is opposed to such patents on life for three key reasons:

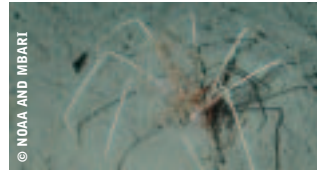
- 1. Ethical reasons** – living organisms are not and should not be viewed on the same level as technical innovations;
- 2. Scientific Reasons** – a gene sequence is an information code with many different functions, therefore a patent holder that describes one chemical use should not receive a monopoly on all possible functions;
- 3. Social and economic reasons** – patents make genetic resources more difficult to access and sometimes block access altogether; and may result in very high costs for access.

UNCLOS provides that medical scientific research shall not constitute the legal basis for any claim to any part of the marine environment or its resources⁷. The question remains as to how this applies to bioprospecting. Patents are a method of asserting intellectual property rights over an invention, and generally mean that third parties need the consent of the holder of the intellectual property in order to access the invention. Due to the very high costs related to bioprospecting, patenting is becoming one of the main avenues for securing economic benefits on the return of the very high investment needed to undertake the research in the first place.

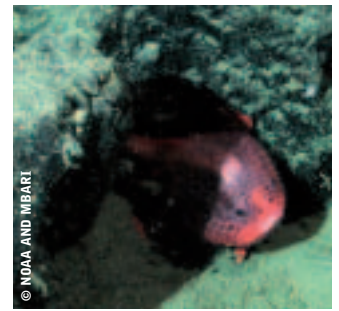
Article 27 of the Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement of the World Trade Organisation states that “patents shall be available for any inventions, whether products or processes in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application”. States are, however, able to exclude patents on biological material where the prevention of exploitation of the patent within their



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territory is necessary to protect public order or morality, *including to protect human, animal or plant life or health or to avoid serious prejudice to the environment* (article 27 (2)). States must use these provisions to protect our biodiversity from piracy and other unauthorised exploitation.

Equitable sharing of benefits

Scientific research and bioprospecting offer enormous opportunities in terms of medical breakthroughs – from cancer fighting compounds to anti-ageing creams. Given the development and ethical issues surrounding the benefits of this research in relation to the health or food sector, the legitimacy of asserting intellectual property rights over resources that are considered of public interest must be questioned.

UNCLOS has a number of provisions addressing the development and transfer of marine technology, which act as a means to facilitate benefit sharing⁸. It also has general provisions regarding marine scientific research that states that these activities shall not constitute the legal basis for any claim to any part of the marine environment or its resources⁹. The CBD also has provisions regarding the access to genetic resources, transfer of technologies, technical and scientific cooperation, funding and handling of biotechnology. However, according to the jurisdictional scope of the CBD these provisions are limited to genetic resources falling within national jurisdiction¹⁰. In areas beyond national jurisdiction, although there are a number of relevant provisions on technology transfer and access and benefit sharing, the rules remain vague in relation to bioprospecting.

Greenpeace believes that it is essential to ensure that the genetic resources or organisms have been legitimately accessed, and that the benefits and information arising out of the use of the source of genetic resources are equitably shared.

Filling this Legal Void: a new UNCLOS Implementing Agreement

The lack of a regulatory mechanism regarding access to and sharing of genetic resources in areas beyond national jurisdiction, especially in relation to marine scientific research and bioprospecting, highlights one of a number of examples of current gaps in international oceans governance. Bioprospecting must be managed in a way which would minimise the potential impact and disruption to deep-sea ecosystems. This requires clear international regulations, which currently do not exist. **Therefore, what is needed is an integrated, precautionary and ecosystem-based management approach to promote the conservation and sustainable management of the marine environment in areas beyond national jurisdiction, including equitable access and benefit sharing of these resources.**

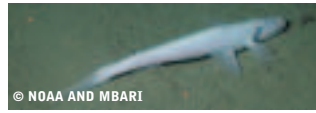
91 UNCLOS Part XIII, article 241

101 At the 6th Conference of Parties to the CBD, parties adopted the voluntary “Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits arising out of their Utilisation”. These have come under some criticism for not emphasising the issue of equity, but facilitating access to genetic resources by companies.

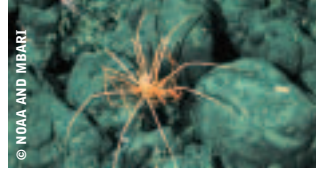
71 UNCLOS, article 241

81 UNCLOS Part XIV, articles 266 & 267

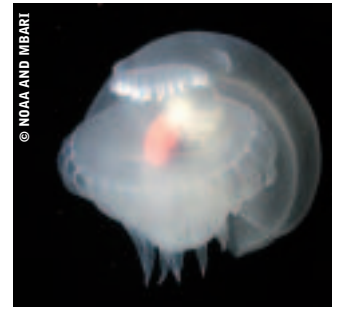
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A new UNCLOS implementing agreement could fill the gaping void in the current regime for the protection of marine life in areas beyond national jurisdiction by establishing a strong institutional framework for high seas biodiversity protection. Building on existing structures and, where necessary, reforming or creating new bodies, co-ordination, co-operation and compliance with existing provisions must be improved. Such a system must also be flexible enough to allow for potential future activities to be brought under the ambit of the regulatory framework.

In particular such an implementing agreement should:

- * recognise the high seas as an area of scientific value for peaceful purposes, as well as a natural reserve that is part of the common heritage of humankind;
- * lay down the general principles of the precautionary and ecosystem approach as the core components for the conservation of marine biodiversity on the high seas;
- * prohibit highly destructive practices in areas beyond the limits of national jurisdiction;
- * give a clear mandate for the identification, selection, establishment and management of high seas marine reserves. This includes identifying ecological and practical criteria and guidelines for the establishment of high seas marine reserves;
- * require states to establish regional environmental management organisations in high seas areas to ensure that human activities are responsible, sustainable and based on the ecosystem approach and precautionary principle;
- * require prior environmental impact assessment (EIA) before approval of any bioprospecting activities planned to occur on the ocean floor or in the high seas;
- * encourage information and knowledge sharing on high seas biodiversity through the creation of a central list of high seas species available to all;
- * establish a regime for benefit sharing;
- * establish a secretariat and a scientific committee in order to carry out the terms of the agreement¹¹.

Under this regime it will be important to develop a clear international definition of bioprospecting as well as of marine scientific research. As part of the implementing agreement, it will be important that a body be established which has the mandate to adopt conservation measures, authorise or receive notification of access to deep seabed genetic resources, act as a focal point for technology transfer and information exchange, negotiate benefit sharing arrangements, as well as supervise a system of inspections. It could also establish an international fund from the benefits

of activities carried out in these areas to be used to help conserve and sustainably manage biodiversity in these high seas areas.

The provisions and guidelines on the fair and equitable distribution of benefits which have been developed by the CBD¹², as well as other guidelines that have been developed to monitor access to genetic resources for both scientific and commercial purposes could form a framework for the regulation of access to marine genetic resources in areas beyond national jurisdiction.

Conclusion

The biotechnology sector has been recognised in the UN Secretary General's Report on Oceans as one of the most dynamic research areas with increasing prospects for growth and profitability¹³. In the immediate short-term, governments, corporations and institutions must act responsibly by developing and implementing agreed guidelines until a binding regime is in place. A number of non-governmental initiatives¹⁴ have begun to set up codes of conduct to address the impacts of marine scientific research as well as bioprospecting. However, as this industry develops, voluntary measures will not be sufficient to ensure the protection of biodiversity in international waters. As such, clear targets and timelines must be set for negotiations over the longer-term to establish legally binding measures to regulate marine scientific research and bioprospecting in areas beyond national jurisdiction. Included in such targets must be a cut-off date at which time bioprospecting activities in areas beyond national jurisdiction would be frozen pending the adoption of such legally binding measures.

Unless the international community agrees to act on its commitments to protect the marine environment, future generations will be denied the chance to experience or enjoy the benefits of this last remaining global commons. If states are serious about protecting the marine biodiversity of the high seas, then negotiations must start now for a new UNCLOS implementing agreement that can ensure that the duties to protect and conserve high seas biodiversity are spelled out for all states, and that the pressures being faced by this final frontier that is the common heritage of all humankind, can be sustainably and equitably managed for now and for the future.

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United Nations Report of the Secretary-General, Sixtieth session, Oceans and the law of the sea

¹¹ See Greenpeace's report "Black holes in deep ocean space" 2005 for more details (<http://www.greenpeace.org>)
¹² CBD Bonn Guidelines on Access and Benefit sharing
¹³ Para 77
¹⁴ UNU-IAS, 2005, pages 47-48