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Conservation and Sustainable Use of Marine Genetic Resources: Current and Future Challenges

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Background

- Genetic resources are “genetic material of actual or potential value”
- Genetic material is “any material of plant, animal, microbial or other origin containing functional units of heredity”
- Secretary General’s report: “resources” refer also to organisms that are of indirect value through the regulating services that they provide
- Thus, concept of marine genetic resources includes genetic material from all living organisms in the oceans, including mammals, fish, invertebrate, plants, fungi, bacteria, archaea and viruses .

Legal Instruments

- United Nations Convention on the Law of the Sea (UNCLOS) provides an international framework for the regulation of human activities with respect to the sea
- Convention on Biological Diversity applies to areas within national jurisdiction and to processes and activities undertaken by carried out under the jurisdiction or control of parties

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What Has Changed

- There are newly recognized or novel marine genetic resources, that is from organisms not previously targets of investigation or capture, for example marine microbes.
- There had been little or no knowledge of these marine genetic resources and their values
- No ability to explore or exploit them, not even aware that most of them existed
- Modern molecular assay techniques have revealed that marine microbes make up 90% of total mass of life in the seas
- Archaea, a type of microbe so different from other life forms that it comprises its own domain, may comprise up to 50% of mass of life in the oceans[1].

[1] *Brian D. Hoyle and Richard Robinson* Microbes in the Ocean http://www.waterencyclopedia.com/Mi-Oc/Microbes-in-the-Ocean.html

What Has Changed (2)

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- At the time in which the UNCLOS was under negotiation, little knowledge of deep ocean ecosystems
- Just learning of hydrothermal vents, cold water seep habitats, sunken whale bone communities
- The deep ocean was thought of – if thought of at all – as a lifeless expanse
- New technologies have opened these once-inaccessible areas to exploration and exploitation
- New technologies allow for exploration of the DNA of the rich array of previously-unknown microbes found in the water column

Current Challenge

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- How to ensure use of genetic material from marine living resources is sustainable and equitable to all
- Further pressures from growing human activities and from climate change
- Need to provide life in the oceans with the resilience to survive and adapt: precautionary approach
- From a conservation perspective, whether marine genetic resources are recovered as marine scientific research, harvesting, or bioprospecting not necessarily germane
- Most interested in the potential and actual effects on marine species and ecosystems, noting cumulative impacts from combination of uses and stresses

Some Issues to Consider

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- Effects on an ecosystem?
- To involve dredging or otherwise collecting materials from the seafloor?
- Measures to avoid or minimize effects on the natural habitat, including the physical habitat, the distribution of living organisms, predator/prey and other symbiotic or parasitic relationships?
- To involve filtering of microbes from seawater?
- Scale that would affect the natural habitat?
- Effect on the distribution and relationships among the various microbes and other living organisms in the seawater?

Examples from national jurisdiction (1)

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Australia

- Environment Protection and Biodiversity Conservation Regulations of 2000
- Regulates access to biological resources in areas subject to national jurisdiction
- Provides for the control of access to biological resources through a permitting system
- Promotes conservation and ecologically sustainable use of these resources
- Ensures equitable sharing of benefits
- Provides certainty and to minimize administrative costs for those seeking access

Examples from national jurisdiction (2)

- Ensures social, economic and environmental benefits accrue to the country
- Distinction between collection for commercial purposes or for non-commercial purposes
- For commercial purposes, applicant must enter into benefit-sharing agreement, to include proposals to benefit biodiversity conservation in the proposed area
- For access for non-commercial purposes, applicant must provide a declaration
- Environmental impact assessments if likely to have more than negligible environmental impacts, permitting scheme, record keeping

Examples from national jurisdiction (3)

Philippines

- Administrative Order for Implementing Rules and Regulations on the Prospecting of Biological and Genetic Resources
- For scientific, commercial, other purposes
- Agreement between researcher and government
- Distinction between commercial and academic purposes
- Both require a representative deposition of samples in a designated governmental entity
- Equitable benefit-sharing in the event of commercial applications
- Applicant must submit bond to cover, *inter alia*, ecological rehabilitation, as necessary.

Obligations under UNCLOS

- For areas beyond national jurisdiction, conservation and sustainable as important, though more complicated
- Under UNCLOS states have duty to adopt with respect to their nationals measures for the conservation of the living resources of the high seas
- States to cooperate to conserve and manage the living resources of the high seas
- States to protect and preserve the marine environment

Some Lessons

- Some common-sense practices to assist states in conservation and sustainable use of marine genetic resources consistent UNCLOS obligations:
- Advance Notification
- Prior Assessment
- Sharing of Information
- Capacity Building

Advance Notification

As appropriate:

- Details of the operator, name, contact information
- Details of proposed itinerary or route
- Resources planned for collection and quantity
- Description of likely impact of collection
- Purpose of the collection (whether commercial or not)
- Proposed means to label collected materials
- Information on disposition, including transfer to others
- Details of related proposals to benefit biodiversity
- Plans to share data, scientific information through publication or full and open exchange
- If commercial use is foreseen, plans to share benefits

Antarctic Example

- Antarctic Treaty and 1991 Protocol on Environmental Protection also cover marine areas beyond national jurisdiction
- Advance notification on part of its ships or nationals and of expeditions organized in or proceeding from its territory
- Exchange of information on scientific investigations and results
- Prior Environmental Impact Assessment Procedure

Antarctica: Prior Environmental Impact Assessment

- Less than minor or transitory
- Minor or transitory
- More than minor or transitory

Lessons (Repeated)

- Some common-sense practices to assist states in conservation and sustainable use of marine genetic resources consistent UNCLOS obligations:
- Advance Notification
- Prior Assessment
- Sharing of Information
- Capacity Building

Conclusion

- We must act now to ensure the conservation and sustainable and equitable use of marine genetic resources

- We can draw from a variety of current examples, including from what states are doing now within national jurisdiction, for common-sense approaches to regulation

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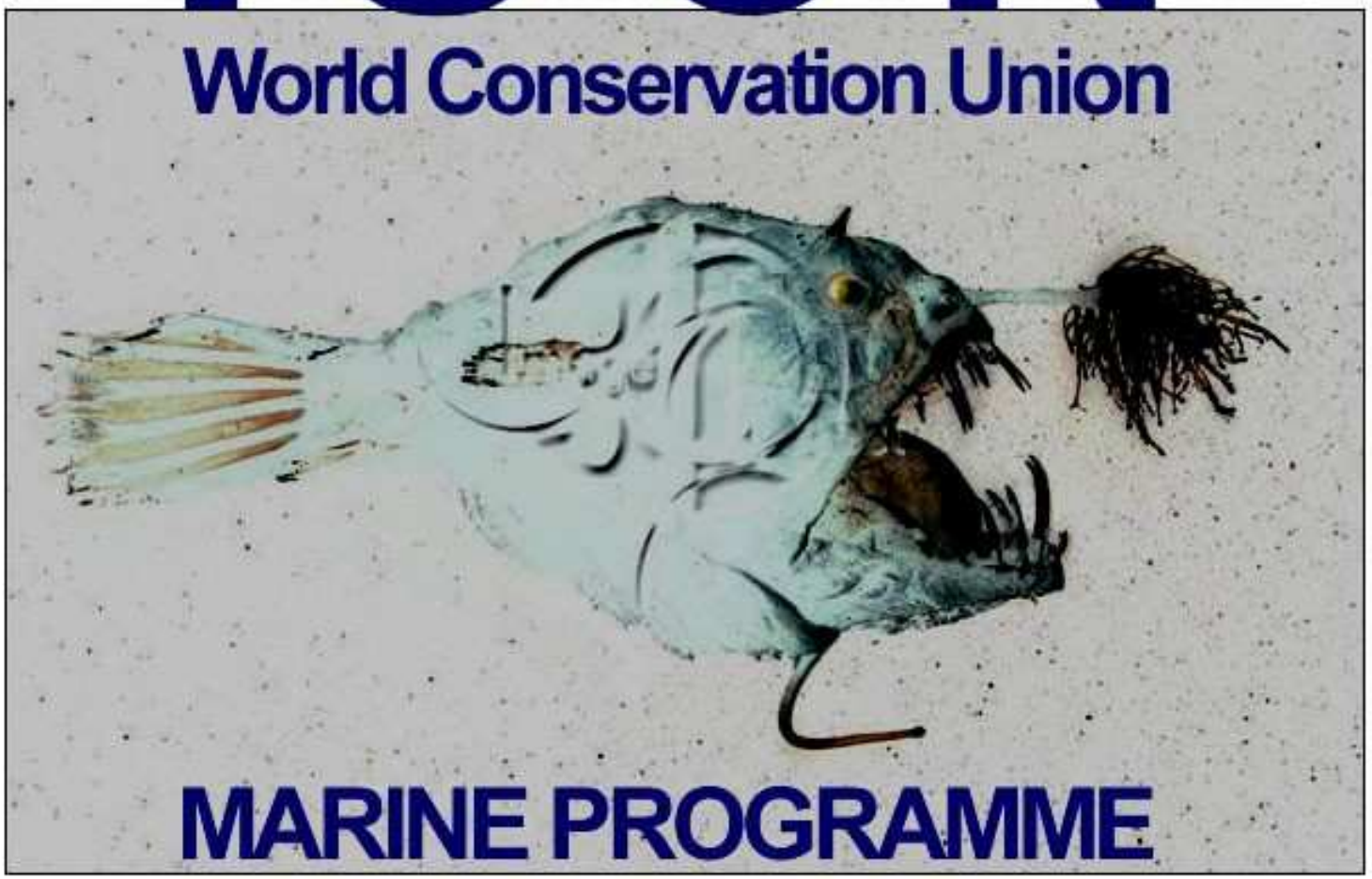

MARINE PROGRAMME

The Marine Programme contributes to conservation of marine biodiversity by promoting, influencing and catalyzing sustainable uses and equitable sharing of resources while protecting ecosystems.