



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

New York, 27 June 2007

Presented by Harlan Cohen  
Advisor, Ocean Governance  
Global Marine Programme



# 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 .



# 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%



# Current Challenge



- 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



- 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 (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 use 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
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# 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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