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A presentation entitled: *The marine scientific research and marine environmental protection provisions of UNCLOS: implications for experimental activities that intentionally perturb the marine environment*

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The 1982 United Nations Convention on the Law of the Sea (UNCLOS) sets out extensive provisions for conducting marine scientific research (MSR) and for protecting the marine environment (MEP) which are applicable both within and outside areas of national jurisdiction. The obligation imposed by UNCLOS on states for MEP applies to all activities which may affect the marine environment, regardless of where they are conducted, including on the high seas, and regardless of whether they fall within the concept of MSR - undefined as such in UNCLOS - under UNCLOS.

Other international instruments further complement, enhance and implement the MEP provisions of UNCLOS. These include: the 1992 Convention on Biological Diversity (CBD), the conventions concluded under the auspices of, respectively, the International Maritime Organization (IMO) for environmentally sound shipping and the United Nations Environment Program (UNEP) for regional seas, and the two agreements (for deep seabed mining and certain fish stocks) later specifically promulgated under UNCLOS itself, as well as the Large Marine Ecosystem Programs being developed under the aegis of the Global Environment Facility (GEF). This extensive network of marine environmental obligations is continually evolving in response to our growing understanding of the ocean and the effects of our activities on it. These obligations now include application of precautionary, 'polluter pays' and ecosystem-based principles to international marine environmental management. International marine environmental governance mechanisms permit a variety of measures to address activities of marine environmental concern, ranging from requiring changes to make these activities environmentally more sustainable to their outright prohibition.

The MSR regime under UNCLOS has not seen a similarly productive evolution. To ensure that the right to obtain potentially commercially valuable information on resources within its marine jurisdiction remains with the coastal state, the MSR regime and state practice effectively remove a significant proportion of the ocean from scientific scrutiny. This hampers the global community's ability to identify, investigate and assess the effects of activities by its members on the global marine environment, and to develop scientifically robust policies for its conservation and the sustainable use of its resources.

One disjunction between the MSR and MEP regimes that is becoming increasingly evident is in the case of experimental activities that intentionally introduce perturbations into the marine environment. These activities are multiplying both within and outside areas of national jurisdiction, both in terms of their location and the extent of their effects. Examples include:

- Periodic underwater release, for several years, of low-frequency acoustic signals that can be received at distances of 18,000 km from their source, and thus across entire ocean basins, to investigate whether global ocean temperatures are increasing.
- Seeding of up to one hundred (so far) square kilometres in the equatorial and sub-Arctic Pacific and the Southern Ocean with iron, an essential micronutrient, to determine whether the low level of phytoplankton productivity observed in these regions is related to its insufficient availability.
- Experimental mining of ferromanganese nodules over up to tens of square kilometres of the deep seabed to assess potential environmental impacts of such mining, and in particular the effects on the benthic community of removing the hard, and disturbing the soft, substrata, and of associated sedimentation.
- Catching of up to (as proposed for 2006) 800 minke and an as yet unspecified number of humpback and fin whales in large numbers to analyze the ecosystem of the Antarctic Ocean and develop methods to manage whale resources.

It must be borne in mind that accurate environmental assessment and appropriate policy development for the sustainable use of marine resources and the conservation of the marine environment are particularly challenging objectives to achieve for the ocean. The complex, extensive, and finely balanced interconnectedness of the marine environment is repeatedly reconfirmed by research, which also often shows this interconnectedness not only to exist in new and unexpected ways and locations but also to be even more intricate than had been previously thought. Therefore, experimental work conducted in the ocean at appropriate temporal, spatial and extractive (sampling) scales is essential to obtain data that can be interpreted, extrapolated and practically applied with confidence. Such work enhances our knowledge of the ocean and contributes valuable information on marine and global environmental concerns. For example, with regard to climate change, the sound and iron experiments respectively aim to ascertain whether global warming is occurring by showing an increase in ocean water temperature, and whether phytoplankton, with increased iron fertilization, would augment their productivity sufficiently to significantly increase atmospheric carbon dioxide absorption. In addition to the information on the effects of deep seabed mining itself, experimental mining could offer insights on environmental effects of bottom trawling, which also removes benthos and disturbs the deep seabed.

However, such activities may also have significant environmental effects, which may even become synergistic or additive, with unknown consequences for the marine and perhaps even the global environment. The transboundary nature, increasing number and

scope, need for, and uncertain environmental effects of experimental projects involving perturbations of the marine environment raise new ocean management issues. These include the relationship between these activities and marine protected areas and ecosystem-based management, the practical environmental utility of conducting environmental impact assessments for proposed activities (including non-experimental projects) in the poorly known marine environment, and the role of the precautionary and 'polluter pays' principles in this context.

This growing use of the ocean as a laboratory has global scientific, environmental, legal and policy implications. Consideration of the legal and institutional mechanisms available to the international community shows the current international ocean governance structure to be rather poorly equipped to address the "ocean as laboratory" and its implications appropriately. For example, there is no consistent, internationally agreed mechanism for prior review of and response to a *proposed* experimental project that introduces perturbations into the marine environment with unknown consequences. Furthermore, in developing a response, it must be borne in mind that the global necessity to understand the ocean is too great to simply prohibit such experimental projects, although a conservative application of the MEP provisions of UNCLOS, together with the precautionary principle, might well support such a response. Thus, it is essential that the need, as well as the legal obligation under UNCLOS, to protect the marine environment is balanced with the need to understand it, ideally without unduly inhibiting the achievement of either its protection or understanding.

In this context, it is useful to consider the consequences, if any, of the absence of a definition of MSR under UNCLOS. On the one hand, although undefined, MSR under UNCLOS is not considered to encompass all investigations involving the ocean. On the other hand, all activities affecting the marine environment, whether they are deemed to be MSR or not, must comply with the MEP provisions of UNCLOS. It is therefore submitted that the overarching and unqualified responsibility of states under UNCLOS to protect and preserve the marine environment should serve as the first criterion against which to evaluate all activities affecting the marine environment.

One constructive approach could therefore be to develop an internationally agreed approval process for proposed experimental projects that includes a requirement that the design of such projects maximize the marine environmental knowledge to be obtained from the project. If an activity, regardless of how it is characterized, is proposed to introduce perturbations into the marine environment, one of the conditions attaching to the eventual grant of permission for the activity should be the simultaneous undertaking of research on the effects of the activity. The extent to which the activity originally proposed itself makes the design and conduct of a properly controlled parallel activity on its effects (im)possible could serve as a useful indicator of the type and level of the unknown environmental effects of the original activity, and suggest further work to examine those effects. Conversely, just because an activity is classified as MSR does not mean that it should not be required to examine its own environmental effects. Such an approach could also assist in developing improved mechanisms and targeted research for assessing the environmental sustainability of new and emerging non-experimental

activities that introduce perturbations into the marine environment with unknown or poorly understood environmental consequences.

The development of improved, internationally agreed ocean governance structures for such projects provides an opportunity to examine from a fresh perspective another long-standing and related quandary for MEP that is posed by the governance regime for MSR set out in UNCLOS. To ensure that the right to obtain potentially commercially valuable information on resources within its marine jurisdiction remains with the coastal state, the MSR regime applicable to areas within national jurisdiction, exacerbated by restrictive state practice, has effectively removed a significant proportion of the ocean from our efforts to understand it. In addition to its substantial limitation of opportunities to extend our fragmentary knowledge of the ocean, the MSR regime hampers our ability to identify, investigate and assess the effects of our activities on the global marine environment, and develop scientifically robust policies for its conservation and sustainable use, even as our need to do so in the interest of the health of our planet becomes greater and more urgent. These restrictions on MSR are applicable only within areas of national jurisdiction, and exist essentially for reasons of equity. However, the MSR regime operates to the overall detriment of the MEP regime. A revised MSR process that addresses the fundamental issues of equity underlying the current restrictive interpretation and application of UNCLOS's MSR provisions within areas of national jurisdiction is long overdue and would benefit UNCLOS's MEP regime.

The MEP and MSR provisions of UNCLOS provide ample scope for and indeed actively encourage the development of a constructive international ocean governance mechanism that would implement the two sets of provisions together. Their joint implementation in this context would benefit from the application of internationally agreed environmental assessment and management principles to proposals for activities that introduce perturbations into the marine environment, and increase support for more marine research leading to increased understanding of the marine environment through well-constructed projects that also take their own environmental effects into account by asking and investigating the environmental questions posed by the proposed activity. It is suggested that a first step in the further exploration of this issue should be the active solicitation of the input of the marine scientific community, first on this issue as such and second on what should be included in developing these principles and the mechanisms for their implementation.