

The Census of Marine Life

Remarks to the Executive Council International Oceanographic Commission (IOC)

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Thanks to the Chair and the Executive Director of the IOC for this opportunity to share with the Executive Council and its guests news of progress toward the implementation of a scientific program to carry out a worldwide census of marine life.

First, let me introduce myself. I am Jesse Ausubel, program director for the Alfred P. Sloan Foundation, a private philanthropic foundation located in New York City. The Sloan Foundation works with different parts of the scientific community to try to bring to fruition important scientific programs. About three years ago, several leading oceanographers approached the Foundation. They wanted to begin a new international scientific program to assess and to explain the diversity, distribution, and abundance of marine life. In brief, they want to organize a worldwide Census of Marine Life (CoML). I speak to you on behalf of the distinguished international Scientific Steering Committee (SSC) that is now planning the program (see <http://www.coml.org> for more information).

Three main reasons motivate the Census of Marine Life. The first is simply the chance for exciting discoveries about the world in which we live. Much remains to be discovered about life in the oceans. For example, ichthyologists have so far identified about 15,000 species of marine fishes. They also believe about 5,000 species of marine fishes remain to be discovered. The age of discovery in the oceans is not over.

The second reason for a Census is improved management of marine resources. In the IOC I do not need to explain the urgent needs and big opportunities to improve management of fisheries and other human uses of the oceans.

The third compelling reason for the CoML is the International Convention on Biodiversity. For this Convention to become useful, good baseline information on ecology is required. The present baseline information on marine ecosystems for most of the world's oceans is weak. The CoML can help greatly to create the needed baseline information.

The SSC is now preparing a scientific plan for the CoML. This plan will be available for wide review in the autumn of the year 2000. But let me anticipate what the program is likely to be and I will welcome your reactions. The program will tentatively address three grand challenges or questions:

1. What did live in the oceans?
2. What does live in the oceans?
3. What will live in the oceans?

The historical component of the program, addressing the history of marine animal populations (HMAP), will try to create a picture of what lived in the oceans before fishing become important, say 500 years ago, and how these populations have changed. HMAP will try to create and make accessible time series on marine animal populations. It will try to rescue and put in electronic form historical data that could otherwise be lost.

The present component of the program, addressing what now lives in the oceans, involves new field programs. We expect that there will be 5-6 pilot programs to demonstrate that new technologies can make synoptic and synchronous measures of large ocean areas. Eventually, there may be about 30 field programs in diverse parts of the world oceans. The selection of the field programs must rely on an improved biogeography or stratification of the oceans on which scientists are now working.

The prospective portion of the program, addressing what will live in the oceans, requires improved models of ecosystems dynamics, attentive both to trophic levels and questions at the species level.

A requirement for the CoML is an improved system for absorbing, integrating, and accessing data about life in the oceans. Already we are working to create an Ocean Biogeographical Information System (OBIS). The idea of OBIS is that anyone anywhere at a computer can click on an area on a map of the oceans and bring up information on what has been reported to live there.

The CoML may be said to have begun in a formal sense with the announcement three weeks ago (26 May) of eight grants totaling about 4 million US\$ to create the OBIS, as reported in *Science* magazine, 2 June (pp. 1575-1576). The grants, made by the Sloan Foundation in partnership with the US National Science Foundation, Office of Naval Research, and other organizations belonging to the US National Ocean Partnership Program involve researchers in more than 60 institutions in 15 countries. The idea is to begin to evolve OBIS cooperatively, worldwide. OBIS will be a distributed system, a system of systems, integrating Fishbase, and linking to georeferenced databases for ocean optics and other physical, chemical, and geological parameters. The initial OBIS grants address overall system architecture as well as 5 species groups: fishes, cephalopods, gelatinous zooplankton, mollusks, and corals and anemones. OBIS aims to include all species groups.

We believe the Census as a whole will require 10 years and a total of about \$1 billion US\$. While Sloan and other private funders can catalyze the Census, most of the support will need to come from government agencies concerned with science, with fisheries, and with environment, as well as organizations such as the World Bank dedicated to capacity building in developing countries as well as with implementation of agreements such as the Convention on Biodiversity.

We believe planning and development for the Census will require about two more years. Pilot field projects should take place in 2002-2004. The main field projects should occur in 2005-2007. Analysis and integration of information should culminate in 2008-2010.

The CoML does not require the creation of new institutions. In contrast, the success of the CoML depends on continuing, strong partnerships with organizations such as SCOR, ICES, PICES, DIVERSITAS, FAO, and IOC. It requires close partnership between national fisheries agencies and oceanographic institutions and marine labs and the participation of natural history museums and aquaria. The Census can build on GLOBEC and other major oceanographic programs. A potentially important partner in the Census is the Global Biodiversity Information Facility (GBIF). The GBIF was created 1 year ago here in Paris by 29 ministers of science or similar governmental leaders meeting in the Global Science Forum affiliated with OECD. The GBIF is expected to begin its operations early in 2001. Most preparatory activities for GBIF concerned terrestrial ecosystems. We believe the CoML can form an important marine component of the GBIF.

The initial goals of CoML are to create the historical data base on marine animal populations and a much more complete present picture. However, a census is most valuable when it is repeated. In this regard, the CoML must be considered in relation to the Global Ocean Observing System (GOOS) that IOC has done much to advance. We believe the CoML can help bring the living marine resources (LMR) component of GOOS into existence. The Census can help determine the design specifications for GOOS-LMR and demonstrate its value.

Let me close by repeating that the CoML is a young program. It can succeed only if organizations such as the IOC help to shape its development and support it. I am grateful for the opportunity to introduce the program today. I hope this session begins a discussion in IOC how to make the CoML the most valuable program it can be and that during the next 1-2 years IOC will consider specific institutional mechanisms and actions to advance the Census of Marine Life.

Thank you.