

CENSUS OF MARINE LIFE: Addressing Challenges in Biodiversity

ABSTRACT

The **Census of Marine Life** is an international research program that seeks to assess and explain changes in diversity, distribution and abundance of life in the oceans. This program is managed by an international Scientific Steering Committee (SSC) and a Secretariat, which is located at the Consortium for Oceanographic Research and Education (CORE) in Washington, DC. The SSC will distribute a draft scientific strategy for review by the scientific community in late 2001; the overall program will be developed in cooperation with marine scientists and funding agencies from around the world. Regional assessments of marine life will address specific questions related to ocean biogeography. Ecosystems supporting intensive fishing, mid-ocean ridges, seamounts, & open ocean pelagic environments are being considered. Other areas of interest are the Ocean Biogeographical Information System (OBIS), the History of Marine Animal Populations (HMAP), and novel sampling technologies for marine populations.

THE PROGRAM

The Census of Marine Life (CoML) program was conceived in 1997 by scientists and other ocean stakeholders to promote and fund research that would locate and quantify organisms in the sea.

Overall Objective:

To assess and explain the diversity, distribution, and abundance of organisms in the world oceans.

Approach:

1. Creation of an information system to manage and explore the vast array of data on marine life;

2. Application of novel approaches to quantify marine life, past and present, including retrospective studies and new technologies applied to previously difficult-to-quantify marine biota;

3. Development and application of integrative methods and models that provide insights into patterns of abundance and diversity, interrelationships with the physical environment and among species, and variability and change.

A SCIENTIFIC STRATEGY

The Scientific Steering Committee is finalizing a scientific strategy which will define and focus the research program. This strategy, to be completed in draft form in late 2001, will be distributed for review by the oceanographic community. The SSC will rely on input from scientists and other constituents to help refine the strategy and ensure that the most important questions about the diversity, distribution, and abundance of marine life are addressed. The SSC and Secretariat will use the revised strategy to shape the global implementation plan.

PUBLIC INTEREST

The Census of Marine Life will involve natural history museums, aquaria, and marine laboratories as well as universities, national and international organizations with interests in living marine resources, fishing organizations, environmental groups and the general public. The CoML is reaching out to involve many stakeholders and audiences in the effort, from soliciting input for an overall scientific strategy to encouraging active participation in specific research projects.

THE SCIENTIFIC STEERING COMMITTEE and SECRETARIAT

In order to realize and guide this complex, global research program, an international Scientific Steering Committee of marine scientists was formed to work with the Secretariat, established at the Consortium for Oceanographic Research and Education (CORE), Washington D.C.

Current members of the SSC are:

J. Frederick Grassle (Chair)—USA
Rutgers University
Vera Alexander—USA
University of Alaska
Patricio Bernal—France
Intergovernmental Oceanographic Commission,
Donald Boesch—USA
University of Maryland
David Farmer—Canada
Institute for Ocean Sciences
Olav Rune Godoe—Norway
Institute of Marine Research
Carlo Heip—The Netherlands
Netherlands Institute of Ecology
Poul Holm—Denmark
Southern Denmark University
Yoshihisa Shirayama—Japan
Kyoto University
Andrew Solow—USA
Woods Hole Oceanographic Institution

NEXT STEPS

As an emerging research program, the Census of Marine Life concept of studying marine biodiversity on a worldwide scale is coalescing into a concrete set of topics and projects. OBIS, HMAP and the pilot research projects are moving forward to become significant parts of the effort. National and Regional Committees are forming to focus local efforts, evaluate pilot project technologies and integrate with the global CoML. A Modeling workshop is being convened to consider appropriate mathematical approaches for sampling and predictions on a global scale. The SSC and the Secretariat will continue to develop sound strategies to implement a detailed plan for research in biodiversity with the collaboration of the ocean science community, the participation of many nations and organizations, and the cooperation of all people who care about life in the oceans.

PROJECTS UNDERWAY

History of Marine Animal Populations (HMAP)

Led by **Poul Holm**, Southern Denmark University, the History of Marine Animal Populations is a unique, new, interdisciplinary project drawing on historical and environmental archives that reflect marine animal populations over the last several hundred years. It will increase our understanding of marine ecosystem dynamics through historical studies, particularly:

- the ecological impact of large-scale harvesting
- the long-term changes in stock abundance
- the role of marine resources in historical development

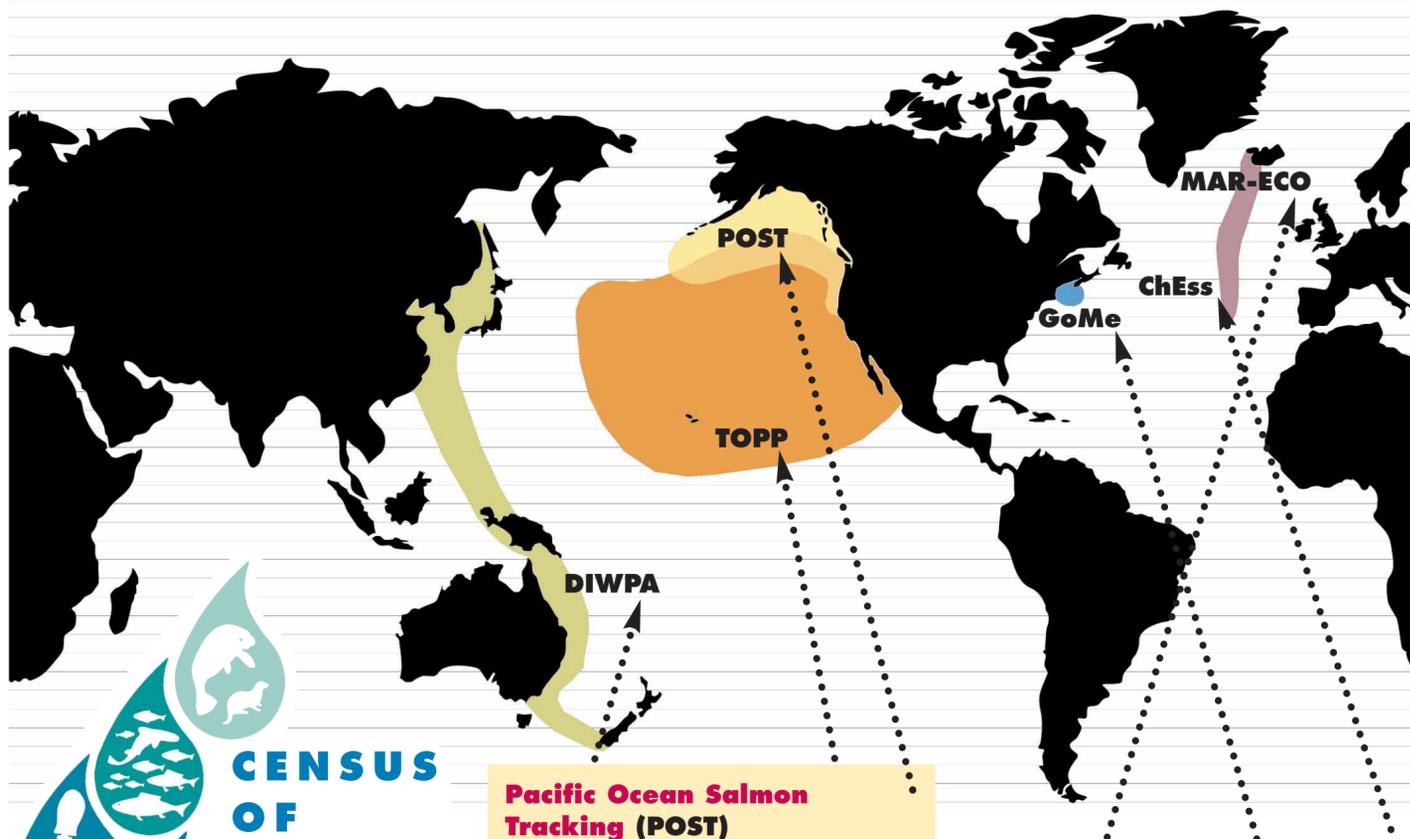
In 2000, seven projects around the world were funded for US\$1.2 million over two years.

Ocean Biogeographical Information System (OBIS)

Currently led by **Fred Grassle**, Rutgers University, USA, an important goal of the CoML is to establish a functioning, standardized data management system for marine species to ensure that the information it collects is available to all interested parties. OBIS will provide an accessible data system based on international standards, that will be maintained long after the program is completed. The Global Biodiversity Information Facility, under development by the

Global Science Forum of the Organization for Economic Cooperation and Development (OECD), may ultimately maintain OBIS. An international steering committee for OBIS has just been formed under the CoML SSC and will develop over the next 6-9 months an overall strategy for the system.

Initial funding for OBIS consists of US\$3.7 million for eight projects involving 63 institutions in 15 countries over two years. This funding came through the U.S. National Oceanographic Partnership Program (NOPP), involving the National Science Foundation, the Office of Naval Research (ONR), and the Alfred P. Sloan Foundation.



PILOT RESEARCH PROJECTS

Six demonstration projects are exploring a variety of innovative approaches to study marine biodiversity within a 2-3 year time frame. Most are proof of concepts for advanced sampling technologies.

Coastal Survey of the Western Pacific (DIWPA)

Yoshihisa Shirayama, Seto Marine Biological Laboratory, Kyoto University, Japan. Standardized benthic and pelagic sampling from the intertidal zone to 20 m depth at selected sites from 45°N to 45°S along the western Pacific rim.

Pacific Ocean Salmon Tracking (POST)

David Welch, Fisheries & Oceans, Canada and **George Boehlert**, National Marine Fisheries Service, USA. A test of a moored telemetry system to monitor fish distributions along the continental shelf into the open ocean.

Tagging of Pacific Pelagics (TOPP)

Barbara A. Block, Stanford University, USA. A multi-trophic level study of large pelagic fauna using satellite telemetry tags to determine the distribution of these organisms in relation to physical oceanographic features.

Patterns and Processes of Ecosystems in the Northern Mid-Atlantic (MAR-ECO)

Odd Aksel Bergstad, Institute of Marine Research, Norway. An integrated survey of poorly known biota of a mid-ocean ridge area.

Chemosynthetic Ecosystems in the Arctic and Northern Atlantic Oceans (ChEss)

Cindy Lee Van Dover, College of William and Mary, USA. A latitudinal comparison of deep-sea vent ecosystems from the Arctic to the equator.

Pilot Census of Marine Life in the Gulf of Maine (GoMe)

Kenneth G. Foote, Woods Hole Oceanographic Institution, USA. A synoptic benthic and pelagic survey of a well-studied area using new technologies.

AUTHORS

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