

Census of Marine Life
Annual
National/Regional Implementation Committee Reports
for the Year 2005

Prepared for

The International Scientific Steering Committee



Census of Marine Life International Secretariat
Consortium for Oceanographic Research and Education (CORE)
1201 New York Avenue NW, Suite 420
Washington, DC 20008 USA

NRIC Annual Report 2005

Australian National Committee

Ian Cresswell

National Oceans Office, Department of Environment and Heritage

GPO Box 2139, Hobart, Tasmania, Australia 7001

Phone: (+61 3) 6221 5026 FAX: (+61 3) 6221 5050 E-mail: ian.cresswell@oceans.gov.au

<http://www.coml.org.au>

1. LONG-TERM GOALS

The goal of CoML International is to assess and explain the diversity, distribution and abundance of marine organisms throughout the world's oceans. The Australian CoML Committee will contribute to this goal by providing a national focus for exploring and better coordinating marine biodiversity and bioinformatics issues. The Australian CoML Committee also has a strong role in promoting biodiversity research through engaging in appropriate outreach activities.

2. OBJECTIVES

The Australian Committee aims to:

- Provide a national focus for exploring, and better coordinating national marine biodiversity and bioinformatics issues,
- Play a role in promoting biodiversity research through engaging in appropriate outreach activities, and
- Assist existing national Census science programs to feed their data into the international Census network in a manner that benefits both Australian and international marine biodiversity agenda.

3. APPROACH

The main focus of CoML Australia in 2005 has been the development of the 'Voyage of Discovery', a dedicated biodiversity research cruise to augment Australia's contribution to CoML International.

4. WORK COMPLETED

CoML Australia held two meetings during the year:

25 November 2004

4 February 2005

A workshop was held at AMSA 2005 in Darwin to plan the 'Voyage of Discovery', a dedicated biodiversity research cruise(s) anticipated for 2007-08.

The CoML Australia website was completed and went live February 2005

5. WORK PLANNED

The main focus of the CoML Australia committee has been the coordination for, and the hosting of a workshop in Darwin in July 2005. This workshop was the first opportunity for the Australian CoML committee to look at assisting the Australian marine science community to coordinate its approach to CoML.

The main outcomes of the workshop were:

- Identifying gaps in our knowledge of biodiversity in the marine environment;
- Identifying priority areas on which to focus the planning the Voyage of Discovery;
- Building linkages between marine research organisations and facilitating collaboration and data sharing across organisations.

6. RESULTS

Australia has recently been granted funds from the Sloan foundation to establish a regional OBIS node for the Australian region. CSIRO Marine and Atmospheric Research and the National Oceans Office are joint Node coordinators for Australia.

7. IMPACT AND APPLICATIONS

CoML Australia has facilitated cooperation between the Australian marine science community to collaborate and share marine species information.

8. PUBLICATIONS

Voyage of Discovery workshop outcomes will be available by the end of August 2005

9. EDUCATION & OUTREACH

Voyage of Discovery workshop, target – Australian marine science community. Attendance: >50 people representing museums, universities, government research organizations.

PARTICIPANTS

Surname	First Name	Organization	Address	Email	Role in project
Cresswell	Ian	National Oceans Office	GPO Box 2139, Hobart TAS 7001	ian.cresswell@oceans.gov.au	Chair
Campbell	Emma	National Oceans Office	GPO Box 2139, Hobart TAS 7001	emma.campbell@oceans.gov.au	Scientific Participant
Blake	Steve	ANZLIC (national peak spatial data co-ordinating forum)	Level 1, 115 Canberra Avenue	steve.blake@anzlic.org.au	Data and Information participant
Colreavy	Mary	Australian Biodiversity Research Study	Dept of Environment & Heritage GPO Box 787, Canberra ACT 2601	mary.colreavy@deh.gov.au	Manager, Australian GBIF Node
Rees	Tony	CSIRO Marine Research	GPO Box 1538, Hobart TAS 7001	Tony.Rees@csiro.au	OBIS International Steering Committee
Poiner	Ian	AIMS	PMB 3, Townsville MC	i.poiner@aims.gov.au	CoML International Steering Committee
Ashby	Crispian	Fisheries Research & Development Corporation	PO Box 222 Deakin West, ACT 2600	crispian.ashby@frdc.com.au	Scientific Participant
Robertson	Don	NIWA	Private Bag 14901	d.robertson@niwa.co.nz	Manager NZ OBIS Regional Node
Newton	Gina	AMSA	GPO Box 2154, Canberra ACT 2601	gn@science.org.au	Scientific Participant
Carver	Miranda	National Oceans Office	GPO Box 2139, Hobart TAS 7001	miranda.carver@oceans.gov.au	Secretariat
Mosbauer	Alicja	National Oceans Office	GPO Box 2139, Hobart TAS 7001	alicja.mosbauer@oceans.gov.au	Manager, Australian OBIS Regional Node
Kalish	John	Bureau of Rural Science	PO Box E11, Kingston ACT 2604	John.Kalish@brs.gov.au	Scientific Participant
Gowans	Rod	Victorian Department of Sustainability & Environment	PO Box 500 This Melbourne VIC 3002	Rod.Gowans@dse.vic.gov.au	Scientific Participant
Simpson	Chris	WA Conservation & Land Management	C/- 47 Henry St, Fremantle WA 6160	chriss@calm.wa.gov.au	Scientific Participant
Keesing	John	WA Strategic Research Fund for the Marine Environment	Level 2, 197 St Georges Terrace	john.keesing@csiro.au	Scientific Participant
Stoddart	Michael	Australian Antarctic Division	Channel Highway Kingston, TAS 7050	michael.stoddart@aad.gov.au	CAML Project Principle Investigator
Klaer	Neil	CSIRO Marine Research	GPO Box 1538, Hobart TAS 7001	neil.klaer@csiro.au	HMAP project, Principle
Bainbridge	Scott	Chair, Australian Ocean Data Centre Joint Facility	PMB 3, Townsville MC	s.bainbridge@aims.gov.au	Chair, Australian Ocean Data Centre Joint Facility
Wallis	Ely	Australian Museums	PO Box 666E, Melbourne VIC 3000	EWallis@museum.vic.gov.au	OZCAM Project Manager

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Canadian National Committee

Chairperson: Dr. Paul Snelgrove

Mailing Address: Ocean Sciences Centre, Memorial University of Newfoundland,
St. John's, NL A1C 5S7 Canada

Phone: (709) 737-3440 FAX: (709) 737-3220 E-mail: psnelgro@mun.ca

Vice Chairperson (To be determined)

Relevant web site: <http://www.marinebiodiversity.ca/coml/>

1. LONG-TERM GOALS

In October 2004, a workshop was held to organize Canadian scientists interested in the Census of Marine Life and establish a steering committee that would develop a program that would: 1) characterize factors influencing biological diversity and (2) understand the role biodiversity plays in the functioning of marine ecosystems. These goals will be addressed by building on ongoing initiatives, primarily spearheaded through the Canadian Department of Fisheries and Oceans (DFO), that will (1) Complete and maintain a national Marine Biodiversity Registry with metadata compiled by region and taxon and following international standards, (2) Document the marine species of Canada including their distribution with a particular emphasis on Arctic marine species, species living below 300 m depth, and microfauna, and (3) Apply developing technologies and sampling designs to identify, collect, measure and enumerate marine biodiversity. For technology, the involvement of key POST (Pacific Ocean Shelf Tracking) leaders with the Canada CoML workshops and steering committee has led to the development of strong partnerships between the projects.

2. OBJECTIVES

The Canadian Census of Marine Life proposes to develop a major research initiative within the next 12 months that we will organize around the theme of *scientific criteria for conservation of marine biodiversity in Canada's three oceans (Atlantic, Pacific, Arctic)*. The discipline of marine conservation has lagged substantially behind the terrestrial realm, and concepts such as habitat fragmentation, corridors, edge effects, and ex situ conservation have little scientific realization in the oceans. The theoretical and experimental literature on conservation that has developed for terrestrial ecosystems is not easily applicable to marine environments because life on land and in the oceans is fundamentally different. This issue is particularly topical in Canada with the signing of the Convention on Biological Diversity, ratification of the Law of the Sea, and new federal legislation called the Oceans Act that promises to conserve marine biodiversity and develop a system of marine protected areas.

3. APPROACH

We will use the broad umbrella topic of conservation strategies to develop a major research initiative and/or several smaller projects that will involve a census of marine life in Canada's three oceans. At a recent workshop (see below) representatives of key funding agencies in Canada were present, and

offered advice on potential programs. Most of the appropriate research programs are currently in funding hiatus, however, within the next few months the status of those programs should be clarified. During the interim we will develop a summary report from the workshop that we will use as a starting point in developing interest in a Canadian census initiative.

4. WORK COMPLETED

To date, two key workshops have taken place. The first was organized by Dr. Ellen Kenchington and the Centre for Marine Biodiversity at Bedford Institute of Oceanography, and was held in January 2004 in White Point, Nova Scotia. The workshop involved ~70 participants from academic, government, and NGOs from across Canada but especially eastern Canada. The major output from this workshop was the document "*Three Oceans of Biodiversity: A Canadian National Plan 2004-2009*", which was circulated to meeting participants and is now available on line (www.marinebiodiversity.ca). That document has helped to develop efforts in inventorying that are already underway under the auspices of Census of Marine Life (e.g. Barcoding of Life, Gulf of Maine Biogeographic Information System) and also formed the background for the development of a second workshop, "*Canadian Census of Marine Life: Three Oceans of Biodiversity*" which assembled ~55 scientists from across Canada in Ottawa, Oct. 29-31, 2004. The workshop, which was co-sponsored by the Sloan Foundation, Department of Fisheries and Oceans Canada, and the Natural Sciences and Engineering Research Council of Canada, was co-chaired by Drs. Paul Snelgrove and Mike Sinclair. It attracted many of the top marine ecologists from across Canada, particularly scientists from academic institutions who are expected to lead the major co-ordinated initiative for Canada. We have also developed a website (www.marinebiodiversity.ca/coml). The website is currently linked from the Centre for Marine Biodiversity website (Bedford Institute of Oceanography) and includes a French translation. POST, which is a linked project, has also recently updated their web site (www.postcoml.org).

In terms of the third objective of enumerating diversity, formalized plans have been established for benthic mapping of habitats in Canada's waters. Specifically, a Centre for Habitat Mapping is now being created at Bedford Institute of Oceanography, with V. Kostylev and S. Smith as leading players. This is already a collaborative effort between Department of Fisheries and Oceans and Natural Resources Canada, and an expansion to include academic participants is anticipated, perhaps through the Discovery Corridor project outlined below.

Our efforts to advance a major new initiative have been stymied by funding moratoria in Canadian science that make it near-impossible to launch a new project, however the Discovery Corridor looks very promising. There is also a significant effort underway, lead by Ron O'Dor, to expand the POST project into the Arctic. Both of these efforts are described in greater detail below.

5. WORK PLANNED

A group of Canadian scientists from multiple government departments and universities has been developing the concept of a "Discovery Corridor" for the Gulf of Maine. The Discovery Corridor has received endorsement from that committee and indeed represents one of the most promising new Canadian initiatives for the Census. We have also received enthusiastic endorsement from Dr. Lew Incze, who heads the Gulf of Maine Census of Marine Life. The idea of this initiative is to focus biodiversity-related research on a geographic locale that is of interest from an ecological and human

perspective, but that is also likely to yield significant new discoveries relating to biodiversity, mapping ocean biodiversity, and understanding the variables that contribute to biodiversity pattern. Clearly this fits in very well with two of the central themes of Ocean Exploration program – namely marine life inventory that will contribute to the Census of Marine Life and mapping. We see this as a particularly exciting opportunity for joint Canada-US research because the geographic area spans Canada/US jurisdictional waters in an area that is strategically important to both countries.

In terms of specific assets, the research plan continues to evolve iteratively, but there are already some clear indications in support of this initiative.

- Our federal Department of Fisheries and Oceans (Mike Sinclair, Regional Director Science, Maritimes Region) has given us strong indications that there will be ship time made available in 2006 and 2007 in support of this initiative. We expect that the CCGS Hudson, an expedition class research vessel valued at \$15,000 Can/day, will be dedicated for two weeks per year to this research. This translates into **CDN\$210,000 p.a. in ship time costs**.
- Canadian academic scientists who are involved in this project are also planning to apply for a grant to NSERC (Natural Sciences and Engineering Research Council of Canada) to cover the costs of two weeks of ROPOS, a deepwater remotely operated vehicle (2000m operational depth), ROPOS can operate from a range of research vessels, including the Hudson, providing a major tool with extensive in situ sampling and observational capacity. The per day rate for ROPOS is ~ CDN\$20,000. If the NSERC proposal is successful, it would provide an additional **CDN\$280,000 p.a in ROV support**.
- The Canadian team includes Drs. Peter Lawton, Ellen Kenchington and Mike Sinclair (Department of Fisheries and Oceans Canada), Vlad Kostylev and Brian Todd (Natural Resources Canada), Anna Metaxas (Dalhousie University) and Paul Snelgrove (Memorial University of Newfoundland). Involvement of this team adds value to your proposal that is difficult to calculate. The salaries of all team members will be covered by other sources and at no cost to the project, and they would be in the order of **tens of thousands for sea time alone**.
- Collaborators from Natural Resources Canada will collaborate using previously-acquired and interpreted seabed maps of the northern Gulf of Maine. The value of these mapping products is in the **millions of dollars in mapping and data processing**. They will enhance the project tremendously and provide a vital element in achieving some of the biodiversity mapping and prediction goals that are at the core of the initiative.
- Canadian team members will be providing instrumentation (e.g. corers, imaging systems) at no cost to the project valued in the **tens to hundreds of thousands of dollars**.

As part of this initiative, the Canadian CoMI Chair (Paul Snelgrove) has written separate support letters to accompany Letters of Intent led by R. Etter (U.Mass, Boston) and M. Sieracki (Bigelow) to the U.S. Ocean Explorations research funding opportunity. Their Letters of Intent, if approved, would lead to proposals are seeking additional ship time as well as support funds to participate in the Discovery Corridor work.

POST is currently focusing on the establishment of a permanent acoustic telemetry system on the Pacific coast of North America. Its vision of a long term monitoring capability for all appropriate coastal regions in Canada and around the world converges with the Canadian CoML's interest in conservation of marine biodiversity in Canada's three oceans. As a partner of the Canadian CoML

and one of the on-going CoML supported projects, POST intends to contribute fully to Canadian CoML programs and its technological needs in acoustic telemetry.

On a related note, Ron O'Dor has submitted funding requests to support an extension of POST to the Arctic region. In his proposal the sites include: Hudson Strait, Fury and Hecla Strait, Lancaster Sound, Bering Strait, Point Barrow. Others would like to add M'Clure Strait, James Bay and Roes Welcome Sound.

6. RESULTS

The two main results achieved in the last year (and previous year) were the completion of the report from the first workshop entitled "*Three Oceans of Biodiversity: A Canadian National Plan 2004-2009*" and the successful completion of the second workshop "*Canadian Census of Marine Life: Three Oceans of Biodiversity*". The summary report from that workshop is now available online at www.marinebiodiversity.ca, and represents a key document as we approach funding agencies for support to develop a major national initiative. One other result was a workshop on the Gulf of Maine Biodiversity Discovery Corridor, held in St. Andrews in January 2004; this workshop links to a DFO initiative to create a study focal area in the Gulf of Maine (see "Work Planned" above).

7. IMPACT AND APPLICATIONS

CoML is already extremely active in Canada with the involvement of many Canadian scientists. Key projects, and Canadian contacts include Pacific Ocean Shelf Tracking (David Welch and Peggy Tsang), Future of Marine Animal Populations (Ram Myers), Gulf of Maine Biodiversity Corridor (Peter Lawton), Barcoding of Life (Paul Hebert), and Gulf of Maine Biogeographic Information or GMBIS (Bob Branton). Some of these projects (e.g. GMBIS) receive significant funding from Canadian sources (e.g. DFO) and could be considered as a major part of the Canadian CoML effort, even though they pre-date the steering committee.

The new initiative described above will be uniquely Canadian and will focus on inventory, conservation and management of biodiversity. We will also take advantage of some major ocean observing systems that are either active (Bonne Bay, Newfoundland, www.bonnebay.mun.ca) or to be deployed within the next year (VENUS, Victoria Experimental Network Under the Sea, www.venus.uvic.ca) or several years (Neptune Canada, north-east Pacific Time Series Undersea Networked Experiments, www.neptune.uvic.ca). One key area in which we expect to focus is the Canadian Arctic, where there is considerable political interest and which represents a poorly known area of Canada's oceans. We also expect there to be considerable interest in education outreach with our large new initiative, which is still in its formative stages.

a. Ocean Observing Systems

Those who are involved in the Canadian Census of Marine Life recognize that the expansion/development of ocean observing systems could provide a very important and useful tool for attaining Census objectives such as understanding spatial variability in biodiversity patterns. Cabled observatories are currently being developed in Bonne Bay, Newfoundland, Vancouver Island (VENUS), and the Juan de Fuca plate (NEPTUNE). Biodiversity-related research has played a key role in the funding of these proposals and as they come on line in 2005-2007 we expect they will be an excellent asset.

The permanent acoustic telemetry array along the Pacific Coast of North America being deployed by the POST project will not only track the movement of marine animals, but will also host physical oceanographic sensors as plug-in modules. Candidate sensors in addition to fish tracking sensors would include the temperature-salinity module used in ARGO CTD floats. The addition of an upward looking ADCP, although more power hungry, would result in a complete seabed grid of water properties, describing how temperature, salinity, and bottom current speed and direction change over time. This physical oceanographic information can be collected simultaneously with fish detection data. {Ron O’Dor has prepared a proposal “Ocean Shelf Tracking and Physical Array – OSTAPA” which include this potential contribution of POST to GOOS.}

b. Capacity Building and Training

At present there is no training specific to CoML but we anticipate this would change if the Discovery Corridor project moves ahead.

8. GEOGRAPHIC EXPANSION

The Discover Corridor project, which is gaining momentum, is focusing on the shelf and upper slope of the Gulf of Maine. A preliminary cruise (E. Kenchington, P. Lawton and others) in June 2005 was successful and has helped in the development of proposals for research in 2006.

POST’s strategy for installing the skeletal array along the Pacific coast of North America is to engage stakeholder organizations on a regional basis, using local scientists as champions to mobilize governments and environmental advocates. We have more or less on track for the central and northern BC region. We are now working on setting up the Alaskan chapter. Our next target is a similar body in the Puget Sound area.

Project Name	Local Project Lead(s)	Geographic Locale
Discovery Corridor	P. Lawton/P. Snelgrove	Gulf of Maine
POST	P. Tsang	Alaska, Puget Sound

9. NEW PROJECTS & RELATED EFFORTS

a. New CoML Projects

Please identify new CoML projects initiated under the auspices of your national or regional committee.

Project Name	Principal Investigator(s)	Scope of Project
Discovery Corridor	P. Lawton	Gulf of Maine

10. PUBLICATIONS

Three Oceans of Biodiversity: A Canadian National Plan 2004-2009” (online at www.marinebiodiversity.ca/mbw)

Zwanenburg, K.C.T, K. Querbach, **E. Kenchington** and K. Frank. 2003. Three Oceans of Biodiversity. Development of a Science Plan for Marine Biodiversity in Canada. *Can. Tech. Rep. Fish. Aquat. Sci.* 2432, viii + 72pp.

Canadian Census of Marine Life: Three Oceans of Biodiversity (posted on www.marinebiodiversity.ca).

11. EDUCATION & OUTREACH

A significant element of the conceptual design for the Discovery Corridor is to provide **opportunities for education and public outreach**. This was evidenced in the first Canadian discovery cruise in the corridor in June 2005 on the CCGS Hudson where berths were reserved for a high school teacher, marine aquarium outreach coordinator, and an artist. The links to CoML and their outreach team will further add to this effort, and we expect to continue this effort as the Discovery Corridor project evolves.

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Caribbean Regional Implementation Committee (CRIC)

Chairperson

Patricia Miloslavich

Universidad Simón Bolívar

Departamento de Estudios Ambientales

Caracas, Venezuela

Mailing address: CCS 90861 P.O. Box 025323 Miami, Fl. 33102-5323

Phone: (58-212) 9063052 E-mail: pmilos@usb.ve

<http://www.intecmar.usb.ve/CoMLCaribbean>

1. LONG-TERM GOALS

The CRIC will aim for a better management, knowledge and understanding of marine biodiversity in a coordinated and integrated way for the Caribbean region within the umbrella of the Census of Marine Life. The Census International Secretariat has initiated an effort to obtain significant long-term funding for capacity building in the region on the basis of Centers of Excellence. The main goals of the CRIC will be to build support of this initiative as well as to become acquainted with the structure, function, and outputs and to establish links and an active communication for coordination, with the official national government biodiversity system associated with the Convention of Biological Diversity including the designated Political and Operational Focal Points of the GEF (Global Environmental Facility).

2. OBJECTIVES

The CRIC will act as an umbrella under which regional initiatives might be developed. The duties and responsibilities of this CRIC will be:

- To coordinate the individual CoML projects
- To support the Secretariat funding drive initiatives, i.e., GEF
- To link the Caribbean projects with the international CoML projects and committees
- To link the CRIC with other organizations and programs of relevance
- To participate in the raising of funds for regional activities, meetings and workshops and sponsor initiatives to access funds to develop the field projects.

3. APPROACH

During 2005, we have been working in expanding some of the CoML projects to the region. These are:

- NaGISA: This effort is under the direct coordination of Dr. Paula Spiniello, Universidad Central de Venezuela.

- HMAP: Dr. Andrzej Antczak, Universidad Simón Bolívar, is working on a proposal to carry out a workshop on the early human impact on mollusk populations in the world through comparative historical studies of mega mollusk exploitation in seven regions of the world: (1) Caribbean region (*Strombus gigas*), (2) Chile (*Concholepas concholepas*), (3) Brazil (the case of the pre-Hispanic 'sambaquies'), (4) Denmark (the case of the mesolithic shell middens), (5) South Africa (*Haliotis* spp.), (6) South Pacific region (*Tridacna gigas*) and (7) Japan (the case of Jomon culture shell middens). The workshop is planned to take place during the period September-December 2005 at Isla de Margarita, Venezuela.
- OBIS: The marine biodiversity database of INVEMAR was identified as to be easily ready to be incorporated to OBIS. A small budget to carry out this action has been included in the CRIC's proposal for continuity to the Alfred P. Sloan Foundation. This task would be under the responsibility of Jaime Garzón, INVEMAR.
- Work with the Census International Secretariat in the effort to obtain significant long-term funding for capacity building in the region on the basis of Centers of Excellence. The CRIC will build support of this initiative and become acquainted with the structure, function, and outputs and to establish links and an active communication for coordination, with the official national government biodiversity system associated with the Convention of Biological Diversity including the designated Political and Operational Focal Points of the GEF.
- Coral Reefs: Dr. Ernesto Weil, Universidad de Puerto Rico and Dr. Jorge Cortés, Universidad de Costa Rica have acted as consultants to the Coral Reef Project of the CoML. We aim to include the Caribbean at long term in the larger proposal.

4. WORK COMPLETED

- All reports and updates to the Census International Secretariat, and providing all requested information to build up the GEF Block A proposal.
- Edition of the book: Caribbean Marine Biodiversity: The Known and the Unknown, edited by Patricia Miloslavich and Eduardo Klein. In press at DEStech Publications, Inc.
- Proposal to the Alfred P. Sloan Foundation requesting funds for the continuity of the CRIC

5. WORK PLANNED

The most significant result achieved is to have kept the continuity of a NRIC in the Caribbean, which has recently submitted a proposal to the Alfred P. Sloan Foundation for its support. The committee has come together to formally address common goals as well as to identify the scientific/research needs and priorities that are most meaningful across a regional Caribbean scale. Other major result is the publication of the book Caribbean Marine Biodiversity: The Known and the Unknown, which may serve as a platform to raise interest, awareness and collaboration among this diverse community. The CoML Caribbean web page (www.intecmar.usb.ve/CoMLCaribbean) contains news about the ongoing projects at these very initial stages and will make all chapters of the book available through PDF files.

6. RESULTS

The most relevant result of the CRIC this year is the publication of the book: "Caribbean Marine Biodiversity: The known and the unknown", edited by Patricia Miloslavich and Eduardo Klein,

currently in press by DEStech Publications. This book intends to provide an overview of what has been done in marine biodiversity research in 10 countries of the Caribbean and, at the same, it summarizes the major initiatives carried out in research and conservation of this incredibly beautiful and complex ecosystem. Another contribution of the book is that it incorporates, in one single publication, a significant amount of scientific and gray literature. The references cited surpass 800 in number and include classic taxonomic papers from the 1800s and early 1900s, scientific papers published in both international and local journals, technical reports, undergraduate theses, dissertations, and so on. The reference list itself is a noteworthy product and an extremely useful tool for anyone wishing to pursue research in the Caribbean. Some of this literature was almost completely unknown, except very locally, thus, we believe that the benefit of this compendium to the scientific community will be far-reaching.

7. IMPACT AND APPLICATIONS

The CRIC has interacted so far with 17 countries, 13 universities, 4 research institutions, 4 research programs, 2 museums, 2 conservation organizations and 3 oil companies, all of which have significant weight in decisions regarding education, research initiatives, conservation policies and management strategies in the Caribbean region. We hope that the established network will improve communication and establish a broader collaboration in the region. The major needs identified in the Caribbean are: taxonomic expertise, new inventories of species, exploration of unstudied habitats, coordination of field studies, management of specimen collections, production of electronic databases, and establishment of a regional network of collaboration, information exchange and fund raising. The CoML - GEF initiative based on Centers of Excellence is particularly important since it will provide the opportunity for capacity building and training, which at this moment is vital for marine ecosystem and resource management.

8. GEOGRAPHIC EXPANSION

Project Name	Principal Investigator	Geographic Locale	Funding (USD)
NaGISA	Dr. Paula Spiniello	Incorporate the Caribbean in the International proposal	From NaGISA International
HMAP: Early human impact on mollusk populations	Dr. Andrzej Antczak	Caribbean and worldwide	From University of Southern Denmark

9. NEW PROJECTS & RELATED EFFORTS

a. New CoML Projects

Project Name	Principal Investigator(s)	Scope of Project
OBIS	Jaime Garzón, INVEMAR	To include the INVEMAR marine biodiversity database into OBIS (fished, mollusks, echinoderms and cnidarians)

b. Partnerships

Please identify any organizations, government agencies, science programs, and non-CoML projects with which your CoML committee has an affiliation and briefly describe the nature of each relationship.

Organization Name	Point-of-Contact	Nature of Relationship
The Nature Conservancy	Anthony Chatwin	Potential partners in a regional research and conservation initiative in the Caribbean
Conservation International	Luis Solórzano	Potential partners in a regional research and conservation initiative in the Caribbean

10. PUBLICATIONS

Miloslavich, P. and E. Klein (eds). Caribbean Marine Biodiversity: The Known and the Unknown

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11. EDUCATION & OUTREACH

Formally none, however, the CoML program is being publicized at the universities, among students and colleagues. We hope that the launching of the book (Caribbean Marine Biodiversity) will help to further disclosure the CoML in the region at all levels.

NRIC Annual Report 2005

Chinese National Committee

Song SUN

Institute of Oceanology, Chinese Academy of Sciences

7 Nanhai Road, Qingdao, 266071, China

Phone: +86 532 82898598 Fax: +86 532 82868008

email: sunsong@ms.qdio.ac.cn

1. LONG-TERM GOALS

By cooperation with the International Program of the Census of Marine Life, to understand the history of Chinese marine biodiversity, to investigate the biodiversity, distribution, abundance of marine species and key environmental factors in Chinese typical sea area, and to predict the pattern of marine biodiversity in the future. To develop a Chinese Ocean Biogeographic Information System, seeking for a mutual development and improvement with the international CoML.

2. OBJECTIVES

China CoML emphasizes on: (a) the development of Chinese regional node of OBIS, in order to compile, integrate and synthesize biodiversity datasets, to provide an Internet accessible, species level, geo-referenced biodiversity data in relation to Chinese ocean habitats; (b) Ocean realm field project emphasizes on plankton research, and encourages to develop and calibrate quantitative biological technologies, to compare the traditional and new methodology, to develop new technique for species identification and the study of new species; (c) HMAP of Chinese species will focus on the documentation of the marine biodiversity of the specific and typical marine species in Chinese history by synthesis of historical and biological research.

3. APPROACH AND WORK PLAN

Chinese CoML aims to study the biodiversity, distribution and abundance of marine species in Chinese typical sea area. In the initial phase, Chinese CoML emphasizes on the establishment of the marine biodiversity database and information system considering the abundant specimen and information resource collected in Marine Biological Museum, Chinese Academy of Sciences and the urgency to develop a Chinese Regional OBIS node. The ultimate goal is to connect Chinese RON with the International OBIS Portal, so as to provide data service online.

The Ocean realm field project of Chinese typical sea area will be conducted by combining with related Chinese national projects. New technique and methodology are encouraged to use and to compare with the old ones. The data will be held in Chinese OBIS .

4. WORK COMPLETED

(1) Formation of the Chinese National Implementation Committee

In April 2004, a workshop was held in conjunction with a national working conference "The strategic development of Marine Biology in China" in Qingdao in order to further raise awareness of Census of Marine Life in the community of scientists and policy makers in China, to assess the current status of marine biodiversity research and knowledge in China and identify Chinese scientists as key research partners in CoML research projects, to identify taxonomists in active research; identify existing datasets, databases, and information systems; identify geographical and taxonomic gaps, and to discuss and formalize development strategies for CoML China. A Chinese National Implementation Committee for CoML was formed as a result of this workshop. The Institute of Oceanology, Chinese Academy of Sciences became one of the Regional OBIS Nodes at the same time.

(2) Development of Chinese OBIS

The Chinese RON has started its work of developing content for the marine biodiversity database. The hardware facilities have been equipped, the coml.org.cn, and jobis.org.cn websites are in construction and the taxonomy information recording is underway. Highlights are as follows:

- **The species database** was established mainly by extracting species records from a wide range of source, such as from the literature, the survey data, and so on, which facilitates the preparation of species profiles and summaries of species locality data. We initially estimated that the database would include approximately 20000 species in China. Now it contains more than 10000 species, which includes macroalgae 1086 species, protozoa 1016 species, invertebrates 5981 species, vertebrates 2406 species.
- **The specimen database** was established based on the specimen resource stored in Marine Biological Museum, Chinese Academy of Sciences. Now the specimen number in the Museum is about 700000, which were collected from various surveys since 1889. About 50000 specimens have been recorded now. In order to manage the specimen efficiently, we are developing a barcode technique and related programs in cooperating with University of Science and Technology of China. The barcode management technique provides a convenient tool for the record and search of specimen, specimen information statistics, combination with

GIS, system maintain, and so on.

- **The holotype database** contains more than 1100 holotypes of marine organisms stored in Marine Biological Museum, Chinese Academy of Sciences. The information of each specimen includes Scientific name, Latin name, Catalog number, Scientific name authors, Source, Citation, Kingdom, Phylum, Class, Order, Family, Genera, Collecting information, Domestic distribution, World distribution, etc. This database laid a solid foundation for the research and education on the taxonomy of marine organisms.
- **Image library** collected pictures of marine organisms in China and specimens in Marine Biological Museum, Chinese Academy of Sciences. More than 2000 pictures have been taken now, and the number will increase gradually with the development of those above databases.

5. RELATED PROJECTS

- **Zooplankton research in Chinese coastal area**

Zooplankton community structure in Chinese Bohai Sea, the Yellow sea, the East China Sea and the South China Sea were studied. A long-term zooplankton monitoring project were conducted in Jiaozhou Bay. The research provides the biodiversity, abundance and distribution of zooplankton in Chinese coastal area. Time-series data were also obtained from the long-term monitoring project.

New technique and methodology, such as Optical Plankton Counter used for *in-situ* continuous observation were studied. Progress was also made in the use of Image Analysis System.

- **Antarctic research**

The community structure and annual change of plankton in the Southern Ocean were studied during Oct. 2004-Apr.2005. A large number of plankton samples were collected from China to Antarctica and surround Antarctic waters, which enriched the information of Chinese OBIS.

- **South China Sea marine biodiversity project (2005-2012)**

South China Sea marine biodiversity project is an international project funded by Global Environmental Foundation and implemented by State Ocean Administration. Four demonstration areas were set up along five coastal provinces. The implementation of the project will help to resolve the problems on marine biodiversity protection in South China Sea, to improve the capability to manage and protect the marine environment and ecology along southeast coast, and to promote the long-term

protection of the biodiversity and the sustainable utilization in South China Sea.

- **Chinese coastal comprehensive survey and assessment (2004-2009)**

Chinese coastal comprehensive survey and assessment is a program organized by State Ocean Administration, which includes three missions: comprehensive survey of Chinese coastal area, comprehensive assessment of Chinese coastal area, establishment of information infrastructure of Chinese “digital ocean”. Research focuses on coastal baseline investigation, key coastal area investigation, and special investigation.

6. EDUCATION AND OUTREACH

OBISChina is developing a section of marine biodiversity education. The introduction of CoML and OBIS will be available on the OBISChina website. The contents of CoML and OBIS were also presented on workshops of Chinese biodiversity system and related meetings for some times. In the exhibition hall of Marine Biological Museum, Chinese Academy of Sciences, multi-media touching systems have been installed to display and exhibit this program and related information, which provides a good way for outreach considering the large number of visitors to Marine Biological Museum each year.

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European Regional Implementation Committee (EuroCoML)

Chairperson

Professor Graham B. Shimmield

Scottish Association for Marine Science, Dunstaffnage Marine Laboratory, Oban, Argyll, PA37 1QA,
Scotland, UK

Phone: +44 (0)1631 559270 FAX: +44 (0)1631 559008 E-mail: gbs@sams.ac.uk

Project Officer

Dr Bhavani E. Narayanaswamy

Scottish Association for Marine Science, Dunstaffnage Marine Laboratory, Oban, Argyll, PA37 1QA,
Scotland, UK

Phone: +44 (0)1631 559305 FAX: +44 (0)1631 559001 E-mail: bn-t@sams.ac.uk

<http://www.eurocoml.org>

<http://www.noc.soton.ac.uk/chess/home.html>

<http://www.mar-eco.no/>

<http://www.cedamar.org/>

Address of the sites most closely related to this effort

1. LONG-TERM GOALS

Goals for the next three years are:

- 1) To expand partnerships and coordination with relevant European programmes and organisations also in tandem with the general growth of the CoML;
- 2) To increase European participation in several particular CoML projects where untapped potential remains;
- 3) To improve marine taxonomy and species data in the European region;
- 4) To improve biodiversity and ecosystem information for applied resource management in waters where European nations hold major influence.

2. OBJECTIVES

EuroCoML are determined to meet these goals through:

- 1) Rousing interest within the European scientific and sponsorship community;
- 2) Organising workshops and a workshop pro-forma;
- 3) Providing advice and supporting fundraising efforts;
- 4) Improving awareness of CoML activity with national funding agencies and the wider public.

3. APPROACH

In the first instance, EuroCoML is co-hosting a Symposium with the Senckenberg Museum in Frankfurt (November 2005) to raise awareness among European scientists, policy makers and public that the Census of Marine Life exists and particularly the EuroCoML.

A website is currently being developed where scientists and the general public can access information. There will be a section on workshops, explaining how EuroCoML can provide funds to help cover the costs of hosting a workshop, from which it is expected that a proposal will arise which the organizers will submit to their funding agencies.

Within Europe, the sixth framework programme (FP6) has contributed widely to biodiversity programmes including Marine Biodiversity and Ecosystem Functioning (MARBEF) and also Marine Genomics. EuroCoML will improve additionality and partnerships with existing European programmes e.g. MarBEF. The following links have already been established; 1) Carlo Heip is on the Executive committee for EuroCoML and is also the Coordinator for MarBEF, 2) the European part of OBIS is being coordinated through MarBEF. Dr Bhavani Narayanaswamy, the EuroCoML project officer, is initiating links with other project officers from other EU programmes such as HERMES looking at Biodiversity hotspots on the European margin as well as the ESF EUROCEANS – Oceans Ecosystems Analysis proposal.

Bhavani Narayanaswamy is also initiating strong links with existing CoML programmes that have a number of European scientists leading the project such as ChEss, CeDAMar, MAR-ECO and the more recently, CoMargE.

4. WORK COMPLETED

Circum-Antarctic Steering Group meeting – Bremerhaven 9-10 October 2004 (now known as the Census of Antarctic Marine Life - CAML).

EuroCoML Executive committee meeting – Amsterdam 12 – 13 October 2004.

EuroCoML Executive committee meeting – Amsterdam 15 – 16 February 2005.

EuroCoML and Senckenberg Museum planning meeting for the European Census of Marine Life Symposium, November 2005. Meeting held Frankfurt 27 June 2005.

EuroCoML Executive committee meeting – Paris 11 July 2005.

The website, hosted at the Scottish Association for Marine Science is online as a holding page at present, more information will be placed on the website shortly.

A logo has been designed to represent EuroCoML.

A pro-forma has been developed for applicants to apply for funding to host a workshop.

5. WORK PLANNED

Now that EuroCoML has been funded (earlier this year) the Project Office is now officially running with a project officer, Dr Bhavani Narayanaswamy, being appointed and starting work in June 2005.

Contact has been made with several interested groups of scientists to highlight the availability of funds to host workshops. The leaders of the following projects have expressed an interest: Shallow water biodiversity – *EuroNAGISA*; EUTOPIA European Tagging of Predators in the Atlantic; Invasive species.

It has also been highlighted that some projects may not need funds for workshops but may require some pump priming money and assistance in fundraising. This is particularly important where there is existing scientific capability and data e.g. samples from the Sir Alistair Hardy Foundation for Ocean

Science (SAHFOS) Plankton Recorder work in the Mediterranean. Support will be given to help promote this project in order to obtain advanced funding from elsewhere e.g. the Nippon Foundation.

Other public sector support has been achieved as part of the wider public interest. For instance, Argyll and Island Enterprise have awarded funding the EuroCoML Project Office hosted by SAMS to develop the EuroCoML website and promote EuroCoML to the wider public.

Greater communication with the wider scientific community, funding agencies and public is sought. With the appointment of Dr Bhavani Narayanaswamy, this will be fulfilled.

Individual and institutional representation across Europe is also being sought. It is recognised that the time to develop initiatives across Europe is quite long, and EuroCoML will work hard to ensure momentum is maintained.

6. RESULTS

As EuroCoML has only just started, there are few significant results to report. However, EuroCoML and the Senckenberg Museum – Frankfurt, are hosting “*Into the Deep Blue: Europe in the Census of Marine Life*” on the 3 November 2005. A number of presentations will be given, with those already established projects giving longer talks. Proposed new projects will give slightly shorter ones, but we also aim to promote those projects that are currently being developed through posters.

The CoML programme already has significant European input from CeDAMar, ChEss, MAR-ECO and the newer CoMargE. Therefore these programmes have representatives on the EuroCoML steering committee.

7. IMPACT AND APPLICATIONS

a. Ocean Observing Systems

What applicability does this initiative have for ocean observing systems?

1) COBO – Coastal Ocean Benthic Observatory, an EU FP6 programme

“Coastal ecosystems are particularly vulnerable to anthropogenic perturbation, affecting biodiversity and ecosystem stability and resilience. Shallow water sediments and their associated biota represent a reservoir for biodiversity, hosting resting and reproductive stages of planktonic organisms, and regulating carbon and nutrient biogeochemical cycles. However, the relationship between tightly coupled biological and geochemical processes in this environment is poorly defined with respect to their temporal and spatial variability. The overall objective of COBO is to integrate emerging and innovative technologies from different disciplines (physics, chemistry, biology, imagery) to provide in situ monitoring of sediment habitats, a key component of coastal marine ecosystems, in order to understand complex interactions between the biota (function and diversity) and their chemical environment. Existing technologies have limited spatial and temporal sampling resolutions which has hampered progress in determining key parameters and, in explaining biogeochemical patterns / processes and in modelling ecosystem dynamics. Improved in situ technologies are required to provide rigorous scientific information on processes regulating this unique and fragile habitat and for assessing, controlling and minimising human impact on European coastal waters thus addressing societal need.

Organism-sediment processes, with both enhancing and mediating effects, are still poorly understood in shallow water sediments that receive the bulk of anthropogenic disturbance. The combination of innovative instruments from different scientific disciplines will provide powerful tools to significantly advance our understanding of organism-sediment relations under dynamic coastal conditions and enhance predictive capability. COBO represents a major step towards the development of permanently operating benthic observatories for coastal management.”

2) ESONET – The European Seafloor Observatory Network, an EU FP5 and FP6 programme

“The aim of ESONET is to establish the basis for a marine component of GMES (Global Monitoring for Environment and Security) comprising a network of long-term, sea floor, multi-disciplinary observatories at key provinces around the European margin providing continuous vigilance in relation to geophysical, biogeochemical, oceanographic and biological phenomena. ESONET will be focussed beyond the continental shelf edge in the ocean margin areas down to 4000m depth, which are less well known than the shelf itself and generally beyond the reach of existing ocean data systems. The European Ocean Margin region extends approximately 15,000km from the Arctic Ocean to the Black Sea with an area of ca. 3 million km² this great submarine terrain is comparable with the total land mass of Europe. Only a small fraction has been explored and new features, and communities of animals are discovered every year. It is important that monitoring of Biodiversity and Global change be established in this realm.

Monitoring of the sub sea environment presents unique difficulties since there are little or no historical data based on human observation as for the terrestrial environment and furthermore, the sea beyond a few centimetres below the surface is inaccessible to optical remote sensing from aircraft or space. Establishment of an in situ observatory network is an important first step in management and conservation of this realm. The observatories should include geophysical monitoring of the sea floor, water column measurements and biological sensors, thus logging everything from earthquakes to whale sounds. They will extend their scope of observation to the following-up of anthropogenic intrusions such as dangerous wreck or industrial exploitation.”

b. Marine Ecosystem-based Resource Management

What is the potential future impact on Ecosystem-based resource management?

1) MARBEF – Marine Biodiversity and Ecosystem Functioning, EU FP6 Network of Excellence

“a) Creating a virtual centre for durable integration, b) Creating and improving access to resources, c) Providing specialist training, d) Developing an integrated data and information management system and e) The transformation of MARBEF's long-term, strategic approach into policy.

Socio-economic research in the field of marine biodiversity is currently of a very fragmented nature, but it is rapidly developing. The establishment of MARBEF will ensure that future research into the socio-economic importance of marine biodiversity is undertaken in a cohesive manner, and will put Europe at the forefront of this discipline. The theoretical base of socio-economic research in Europe is very strong and by linking research activity and developing a strong marine focus, Europe will become a world-leader in this emerging field.

Few natural marine scientists have collaborations with socio-economists, so few natural scientists are fully aware of the potential benefits of cross-disciplinary research. In many cases they simply do not know where to find socio-economists with whom to collaborate. A critical role of MARBEF will be to

enable and facilitate two-way communication between these groups. The network will promote consideration of management and societal needs as a guide to the direction of all marine biodiversity research by increasing understanding and awareness of the socio-economic importance of marine biodiversity. MARBEF aims to bring about a fundamental shift in the overall mentality of social and natural scientists by improving mutual understanding and by becoming more inclusive. One target is to develop enduring collaborations and submit collaborative proposals for joint research between natural and socio-economic scientists. The training of PhD students at two or more institutes is particularly promising as a way of promoting a strong interdisciplinary outlook and the development of accompanying skills.

MARBEF will promote increased dialogue between natural scientists and marine ecosystem managers, fisheries managers and policy makers. This process can be facilitated and mediated by environmental socio-economists. MARBEF will explore mechanisms to achieve this and to ensure that the results of such dialogue are fed back into the development of research within MARBEF to maintain its relevance to the formulation of European policy and the development of marine ecosystem management.”

2) ECASA – Ecosystem Approach for Sustainable Aquaculture, EU FP6 programme from DG Fisheries

“We propose an ecosystem approach to the aquaculture sector. We will address this by 1) identifying plausible quantitative indicators of the effects of aquaculture on ecosystems through a process of expert working groups, workshops and meetings, 2) similarly, identifying indicators of the main drivers of ecosystem change affecting aquaculture, including natural and environmental pressures, 3) assessing both sets of indicators using existing datasets (the partners collectively have extensive data archives), considering each in the context of appropriate selection criteria, 4) developing a range of tools, particularly models, that encapsulate best process understanding at a wide range of scales, 5) testing these models and indicators in a wide variety of field locations across Europe (~10) encompassing major culture species and technologies, and covering a wide spectrum of environment types, selected according to criteria developed during the project, and 6) using this data to test and select the final “toolpack” of models and indicators, including appropriate decision support tools to guide users to effective implementation. National annual meetings with stakeholders will be held to allow 2-way interaction ensuring the practical relevance of the work and that the “user community” achieves ownership of the project’s outputs. We will organise a final international conference and workshop where the “toolpack” of indicators and tools for effective environmental impact assessment and site selection will be demonstrated.”

c. Capacity Building and Training (Delete this section if there are none)

What is the potential future impact on Capacity Building and Training?

1) MARBEF – Marine Biodiversity and Ecosystem Functioning (see notes above)

8. GEOGRAPHIC EXPANSION

Describe the current CoML projects in which your committee has engaged local scientists who are performing research that increases the geographic scope of the CoML project. Please include both ongoing and planned activities.

Project Name	Local Project Lead(s)	Geographic Locale
European Natural Geography in Shore Areas	Lisandro Benedetti-Cecchi	Mediterranean
Mediterranean Plankton Recorder	Martin Edwards	Mediterranean
CeDAMar	Pedro Martinez Arbizu	Southern Hemisphere including Angola Basin through to the Antarctic
Arctic biodiversity as part of International Polar Year (with contribution from the SAMS Northern Seas Programme)	IPY Project office (Cynan Ellis-Evans at BAS, and G Shimmield, SAMS)	Eurasian Arctic

9. NEW PROJECTS & RELATED EFFORTS

a. New CoML Projects

Please identify new CoML projects initiated under the auspices of your national or regional committee. The following projects are currently under discussion

Project Name	Principal Investigator(s)	Scope of Project
EUTOPIA	Dr David Sims	To look at European Tagging of Predators in the Atlantic
EuroNaGISA	Dr A Benedetti-Cecchi	European Natural Geography in Shore Areas
Invasive Species	Dr Henn Ojaveer	To look at invasive species within European Waters

b. Affiliated Projects

Please complete the table below to list projects affiliated to CoML by way of your Committee. Include level of funding (if the project does not complete a separate project report, which you can submit as an appendix to this document).

Project Name	Principal Investigator(s)	Geographic Locale	Funding (USD)
MARBEF	Professor Carlo Heip	Europe	ca. 12,782,644
HERMES	Professor Phil Weaver	Europe	EU = ca.18,330,752 Partners = ca.61,102,509
Marine Genomics	Momme Christian Velmede	Europe	ca. 12,220,501

c. Partnerships

Please identify any organizations, government agencies, science programs, and non-CoML projects with which your CoML committee has an affiliation and briefly describe the nature of each relationship.

Organization Name	Point-of-Contact	Nature of Relationship
ENVINET: European network of marine, terrestrial and atmospheric laboratories	Graham Shimmield	Chairman of EuroCoML
UK-SCOR:Scientific Committee on Oceanographic Research Working Group	Graham Shimmield	Chairman of EuroCoML
European Federation of Marine Science and Technology Societies	Roberto Danovaro & Graham Shimmield	President, Scientific Steering Committee & Chairman of EuroCoML
MARBEF	Carlo Heip	EuroCoML Executive committee
DIVERSITAS	Carlo Heip	EuroCoML Executive committee
State program on Climatic and Human Impact on the Structure and Functioning of the Baltic Sea Ecosystem.	Henn Ojaveer	EuroCoML Executive committee
Nordic Council Study on Management of Baltic Coastal Fish Resources	Henn Ojaveer	EuroCoML Executive committee
IUCN Commission on Ecology	Alasdair McIntyre	EuroCoML Executive committee
Atlantic Frontier Environmental Forum	Alasdair McIntyre	EuroCoML Executive committee
International Council for the Scientific Exploration of the Mediterranean Sea	Anastasios Eleftheriou	EuroCoML Executive committee
EU Committee MEDMARIS-marine sciences in the Mediterranean	Anastasios Eleftheriou	EuroCoML Executive committee

10. PUBLICATIONS

Please list references for Submitted, In Press, or Published; books, chapters, or significant papers (since August 2004). Please also include papers in preparation or development with an estimated date of submission or publication.

As EuroCoML has only recently started we do not have any publications. However, we are developing outcomes for this area.

11. EDUCATION & OUTREACH

Please list substantial Education & Outreach activities associated with this effort (since August 2004) and indicate the target audience for each. Please indicate the success of each effort, if known.

The Website is up and is being further developed with Education and Outreach in mind. The website is targeted to the Scientific community, funding agencies and the public.

PARTICIPANTS

Surname	First Name	Organization	Address	Email	Role in project
Shimmiel	Graham	Scottish Association for Marine Science	Dunstaffnage Marine Laboratory, Oban, Argyll, PA37 1QA, Scotland, UK	gbs@sams.ac.uk	Chairman of EuroCoML
McIntyre	Alasdair	University of Aberdeen	63, Hamilton Place, Aberdeen, AB15 5BW, Scotland, UK	a.d.mcintyre@abdn.ac.uk	Executive Committee member
Heip	Carlo	NIOO	POB 140, 4400 AC Yerseke, The Netherlands	c.heip@nioo.knaw.nl	Executive Committee member
Ojaveer	Henn	Estonian Marine Institute	Parnu Field Station, University of Tartu, Vana-Sauga 28, Estonia	Henn.Ojaveer@ut.ee	Executive Committee member
Eleftheriou	Anastasios	Institute of Marine Biology, Crete	PO Box 2214, 71003 Heraklion, Crete, Greece	telef@imbc.gr	Executive Committee member
Narayanaswamy	Bhavani	Scottish Association for Marine Science	Dunstaffnage Marine Laboratory, Oban, Argyll, PA37 1QA, Scotland, UK	bn-t@sams.ac.uk	Project Officer
Sousa-Pinta	Isabel	Centre for Marine and Environmental Research	R. dos Bragas, 177, 4050-123 Porto, Portugal	ispinto@cimar.org	* Scientific Steering Committee member
Sibuet	Myriam	Département Environnement Profond	Ifremer Centre de Brest, France	Myriam.Sibuet@ifremer.fr	*
Danovaro	Roberto	Polytechnic University of Marche	Via Brece Bianche, Ancona, Italy	danovaro@univpm.it	* Scientific Steering Committee member
Kideys	Ahmet	Institute of Marine Sciences	Erdenti, Mersin, Turkey	kideys@ims.metu.edu.tr	Scientific Steering Committee member
Gebruk	Andrey	P.P. Shirshov Institute of Oceanology	Russian Academy of Sciences, Nakhimousky Pr., 36, Moscow 119851, Russia	agebruk@sio.rssi.ru	Scientific Steering Committee member
Starkey	David	Department of History	University of Hull, Hull, HU6 7RX, UK	D.J.Starkey@hull.ac.uk	Scientific Steering Committee member
Féral	Jean-Pierre	Centre d'Océanologie de Marseille	UMR CARS 6540- DIMAR, Rue de la Batterie des Lions, 13007 Marseille, France	feral@com.univ-mrs.fr	Scientific Steering Committee member
Surugiu	Victor	Universitatea "Al.I.Cuza" Iași	Facultatea de Biologie, B-dul Carol I, nr 20 A, 6600 Iași, România	vsurugiu@uaic.ro	Scientific Steering Committee member
Tuomisto	Piia	European Commission	DG Research Biodiversity & Marine Ecosystems European Commission LX46 02/135-B-1049 Brussels, Belgium	piia.tuomisto@cec.eu.int	Scientific Steering Committee member
Connolly	Niamh	ESF Marine Board	1 quai Lezay-Marnésia, France	nconnolly@esf.org	Scientific Steering Committee member
Martinez Arbizu	Pedro	DZMB- Forschungsinstitut	Senckenberg, Südstrand 44 26382 Wilhelmshaven, Germany	pmartinez@senckenberg.de	Scientific Steering Committee member
Nilsson	Per	Department of Marine Ecology / Göteborg University	Tjärnö Marine Biological Laboratory, SE-452 96 Strömstad, Sweden	per.nilsson@tmbl.gu.se	Scientific Steering Committee member
Kellerman	Adi	ICES Secretariat	H.C. Andersens Boulevard 44-46, DK-1553, Copenhagen V, Denmark	adi@ices.dk	# Scientific Steering Committee member
Pullen	Sian	WWF - UK	Head of Marine and Coastal Policy, WWF - UK, Panda House, Weyside Park, Godalming,		# Scientific Steering Committee member
Gjerdes	Kristina	IUCN	High Seas Policy Advisor, IUCN Global Marine Program, Konstancin-Chylice, 05-510, Poland	kgjerde@it.com.pl	# Scientific Steering Committee member
Campbell	John	Oil industry	Technical Director, International Association for Oil and Gas Producers 209-215 Blackfriars	john.campbell@ogp.org.uk	# Scientific Steering Committee member

Footnote * These people have been invited to sit on the Executive Committee - we are waiting a response

Footnote # These people have been invited to sit on the Scientific Steering Committee - we are waiting a response

NRIC Annual Report 2005

Indian Ocean Regional Committee (IO-CoML)

Chairperson: Dr. Mohideen Wafar
National Institute of Oceanography,
Dona Paula P.O. Goa 403 004 India
Phone: 0091-832-2450252 FAX: 0091-832-2450606, 2450602 E-mail: wafar@darya.nio.org

Secretary: Dr. P.A. Loka Bharathi
National Institute of Oceanography,
Dona Paula P.O. Goa 403 004 India
Phone: 0091-832-2450281 FAX: 0091-832-2450606,2450602 E-mail: loka@darya.nio.org

1. LONG-TERM GOALS

Develop and strengthen activities related to the objectives of the Census of Marine Life in the Indian Ocean region.

2. OBJECTIVES

1. Maintain and strengthen the linkages established among marine scientists within and without the Indian Ocean region
2. Contribute to research projects supported by CoML in the Indian ocean region
3. Develop new initiatives to achieve the scientific objectives of the CoML

3. APPROACH AND WORK PLAN

The approach of IO-CoML committee would be to generate good communication and understanding between all participants and capitalize on this to achieve the expected ends. The Committee would have to act as a facilitator, “enticing” the countries to get involved. This would also require adoption of a balance between “desired results” and “achievable results”.

The key individuals in our committee are those who are already SSC members and/or regional project leaders. The committee would place reliance on their experience and involvement to improve the output.

The immediate plan for next year is to hold the first meeting and assess how we could get the counties of the region get involved in the CoML projects that are evolving in the region.

4. WORK COMPLETED AND RESULTS

A report of the events connected to IO-CoML, NIO, Goa

No	Meeting /Events/and other Contributions	Venue	Date	Members from NIO/IO-CoML
1	CeDAMAr (Census of the Diversity of Abyssal Marine Life) Steering Group meeting	IFREMER, Brest, France	22 and 23 July, 2005	Dr.Nagendernath, (Scientist, NIO (Geology), member, Steering Committee CeDAMAr
2	CMarZ Steering (Census of Marine Zooplankton Group meeting)	Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany	June 29- July 1, 2005	Vijayalakshmi R. Nair (Consultant, Biology-National Institute of Oceanography, Regional Centre)
3.	IndObis initiation	NIO, Dona Paula, Goa	21 –22 June 2005	Dr. S. Krishnan, Sc. G & Head, Information Division, NCL and Mr. Vishwas Chavan , (Scientist, NCL & Co- PI, IndOBIS) Dr. C.T. Achuthankutty (Co-PI, Ind OBIS, NIO), Dr. M.V. M. Wafar, Dr. M.P. Tapaswi, Dr. B. Ingole and P.A. Loka Bharathi
4	(SEATOS) Sumatra Earthquake and Tsunami Offshore Survey. Cruise participation	Cruise on M.V. Performer	8-27 May 2005	Dr.Baban Ingole, Scientist, NIO-Biology Member, International Steering Committee for CenSeam Program (Biodiversity of the Seamounts)
5.	SCOR Panel on New Technologies for Observing Marine Life	Dona Paula, Goa	14-16 Feb 2005	Dr Elgar de Sa (Scientist,NIO-Instrumentation) Chair, Scor Panel, Dr. D. Chandramohan, Member, International Scientific Steering Committee, CoML and P.A. Loka Bharathi, (scientist-Biology-IO-CoML secretariat)
6	International Scientific Steering Committee of Census of Marine Life	IOC, UNESCO Paris, France	1-3 Dec 2004	Dr. D. Chandramohan (Member, ISSC, CoML) Dr. M.V.M. Wafar (Chairman, RIC, Member IndOBIS), Dr. C.T. Achuthankutty (Co-PI, IndOBIS) and Dr. P.A. Loka Bharathi (secretary, IOCoML)
7	Workshop in Ocean Biodiversity Informatics	Hamburg, Germany	29-30 Nov 04	Dr. M.V.M. Wafar (Chairman, RIC, IO-CoML & Member, IndOBIS) and Dr. C.T. Achuthankutty (Co-PI IndOBIS)

8.	CMarZ Indian Ocean	Data base on Zooplankton of IIOE Feb-June 2005	Dr. Vijayalakshmi R. Nair (Consultant, Biology-National Institute of Oceanography, Regional Centre)
9	Post Tsunami initiative In the Indian Ocean	Correspondance with Dr. S.C Jayamane, DG, NARA (National Aquatic Resource and Development Agency) Vide fax dated 23/3/2004	Mr. R.A. Sreepada, TO, Aquaculture Lab, NIO, and P.A. Loka Bharathi

a. CeDAMAr (Census of the Diversity of Abyssal Marine Life)

Dr Nagendernath, attended the 2nd annual meeting of Scientific steering committee of CeDAMAr field project of CoML at IFREMER, Brest, France from 22 and 23 July, 2005. He presented the status of the ongoing deep-sea environmental work in the Central Indian Basin. He emphasized the need for filling up large gaps in the Indian Ocean abyssal areas, which has some areas of good scientific potential for benthic environmental and biogeochemical studies. Further, he also proposed to the PI of CeDAMAr to have a workshop on the modern tools for determining the benthic mixing rates and bio-turbation. This would be relevant to biodiversity studies of deep-sea benthic regions or even other regions. The members were serious about developing further studies in the deep-sea abyssal areas and Dr Nagendernath apprised the members of Benthic ecological group led by Dr Baban Ingole. There were possibilities for initiating future collaborative work in the field.

b. CMarZ (Census of Marine Zooplankton)

Steering Group meeting, Germany from June 29-July1, 2005:

Dr (Mrs) Vijayalakshmi R. Nair (Consultant, National Institute of Oceanography, Regional Centre, Kochi, India) has been invited to be a Member of the steering Group of CMarZ.. As a CMarZ Steering Group Member Dr Nair attended the meeting at Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany. The major goal of this meeting was the preparation of an implementation plan for the CMarZ globally synoptic and taxonomically - comprehensive biodiversity survey during 2005-2006. The agenda included small group meetings for discussion and planning by geographic region and taxonomic group. The summary written by each group would be incorporated in the implementation plan. Dr Nair was in the group on Pacific Ocean, Indian Ocean and Asia. She made a presentation on perspectives and updates on CMarZ

c. IndOBIS

“IndOBIS, establishment of the Indian Ocean OBIS regional node” was initiated formally with an initial funding of 19.56 lakh INR (US\$47708) from Alfred P. Sloan Foundation, USA through Rutgers University. This is an inter-institutional collaboration between the National Chemical Laboratory (NCL, Pune) and the National Institute of Oceanography (NIO, Goa). Dr. S. Krishnan, Sc. G & Head, Information Division, NCL and Mr. Vishwas Chavan, Sc. NCL and Co-PI had a detailed discussion with IndOBIS team of NIO on 21 and 22nd June 2005 on the implementation of the project. NIO side was lead by Dr.C.T. Achuthankutty, Co-PI, IndOBIS. The other members present were Dr M.V. M. Wafar, Dr M.P. Tapawi, Dr. B.S. Ingole and P.A. Loka Bharathi. The webportal of IndOBIS (<http://www.indobis.org>) has already been uploaded and will be completed in the next couple of months time.

d. SEATOS

Dr. Baban Ingole, a deep-sea benthic biologist of the National Institute of Oceanography, Dona Paula, Goa, India was one of the members of the Sumatra Earthquake and Tsunami Offshore Survey (SEATOS) team that investigated the main cause of the 26th December tsunami. The SEATOS team comprised 22 scientists from six countries, combining a variety of scientific disciplines, including biologists, tsunami wave model experts, geophysicists, seismologists, engineers, geologists, and visualizations experts. This unique range of experts enabled a fully integrated approach to the expedition. The seafloor was mapped and photographed with high-resolution seismic reflection techniques. It was very helpful in identifying, evaluating and interpreting the size and character of the seafloor displacements that occurred during the 9.3 m earthquake.

The ground truthing of the seafloor displacement was done to confirm that they occurred on 26th December. The morphology and structure as well as any associated seafloor megafauna were examined using ORV imagery and sampling. They have revealed dramatic photographic evidence of seafloor ruptures that contributed to the deadly December 26 tsunami. The observed seafloor fault surface is referred to by geologists as striated because it is smoothed by rocks moving against each other, as seafloor is ripped open. This violent action also left the benthic area apparently devoid of sea life. In fact, it was surprising to find absolutely no evidence of deep-sea animals at one of the site during a 14 hours dive with the ROV submersible. Dr. Ingole is working on the megafauna and meiofauna from the deep-sea environment, which was impacted by the tsunami.

The project is being filmed on location exclusively for the BBC ONE, Discovery US, ProSieben in Germany and Discovery international. This documentary, by award winning ULC production company Daxlow Smithson productions will be broadcast in September 2005.

Dr. Ingole's participation was fully funded by the Alfred P. Sloan Foundation for the Census of Marine Life Program. Dr. Baban Ingole is also serving as a member of the International Steering Committee for CenSeam Program (Biodiversity of the Seamounts) funded by Alfred P. Sloan Foundation (CoML), which is coordinated by Dr Malcolm Clark, Principal Scientist, Deepwater fisheries, NIWA, Private Bag 14-901, Kilbirnie, Wellington, New Zealand.

e. SCOR Panel on New technologies for Observing Marine Life 14-16 Feb 2005

Dr Elgar Desa, Chair, SCOR Panel, conducted the first meeting of the panel at Cidade de Goa, Goa, India. Dr. D. Chandramohan, and P.A. Loka Bharathi attended the first meeting of the Panel on New Technologies for Observing Marine Life Of the Scientific Committee on Ocean Research SCOR from 14-16 February 2005. It was interesting to learn about bar coding and their application in food testing among others. Dr Alex Rogers visited the biology Lab and requests have been made to him for opportunities for training in bar coding and other new molecular technologies for youngsters.

f. Steering committee meeting at Paris, 1-3/12/2004

Paris meeting was attended by Dr. M.V.M. Wafar (Chairman, RIC, Member IndOBIS), Dr. C.T. Achuthankutty (Co-PI, IndOBIS) Dr. P.A. Loka Bharathi (Secretary, IOCoML) and Dr. D. Chandramohan (Member, ISSC, CoML). This gave an opportunity for the Indian delegation to meet members of the ISSC from different parts of the world and interact with them to understand the various activities of CoML and to listen to the activities undertaken by various regional nodes. This was also an occasion to discuss with ISSC members the scope for India in participating in many activities initiated by other regional nodes.

g. Workshop in Ocean Biodiversity Informatics, Hamburg 29-30/11/04

Dr. M.V.M Wafar (Chairman, RIC, Member IndOBIS) and Dr. C.T. Achuthankutty (Co-PI, IndOBIS) participated in the International Workshop in Ocean Biodiversity Informatics. Dr. Achuthankutty made a poster providing details on IndOBIS and the potentials and challenges in the Indian Ocean. Dr. Achuthankutty and Dr. Wafar also had interactions with the OBIS project management team during this workshop.

h. Post –TSUNAMI Initiative

The follow-up actions were taken regarding the possibility of a new project related to potential post-tsunami initiatives from the Indian Ocean region related to marine bio-diversity. After discussion with Dr Shubha Satyendernath, POGO Executive Director, it was understood that the funds would be best spent on a targeted project from Sri Lanka, and for the initiative to be most effective, the project details could be developed by the scientists from NARA. Letters have been mailed to scientists of Sri Lanka, outlining the possibilities and requesting them to respond with a concrete proposal. We are still awaiting their response. We have also expressed our consent to oversee the execution of the project if and when approved. Dr. Wafar has been in touch with most of the participants of the CoML workshop at Goa, and that to his knowledge, none of the other IO-rim have countries have suffered any substantial damage other than Thailand and India. But he had not been able to get in touch with Somchai Bussarawit from Phuket (Thailand). Since Phuket was badly hit, there was some concern there, and Dr. Wafar has been trying and to get information from Somchai..

i. CMarZ (Census of Marine Zooplankton)

Dr (Mrs V. R. Nair has helped launch a project work (February 2005) with Dr Ann Bucklin. The CMarZ cooperating project on "Database for zooplankton collected during the International Indian Ocean Expedition (IIOE, 1960-65)" is almost completed. The work involved collecting, collating and digitizing a part of the published information/data on zooplankton collected during IIOE from Indian Ocean.

5. IMPACT AND APPLICATIONS

In terms of scientific and socio-economic contexts of the countries concerned, the ranking of priority areas on which CoML will potentially have significant impact in our region are:

- Marine Ecosystem-based Management
- Science Education and Communication
- Research and Development
- Ocean Observing Systems

6. AFFILIATED PROJECTS

Please complete the table below to list projects affiliated to CoML by way of your Committee. Include level of funding if the project does not complete a separate report, which you can submit as an appendix to this document.

Project Name	Principal Investigator	Geographic Locale	Funding (USD)
IndOBIS	Dr. Vishwas Chavan and Dr. Achuthankutty	Indian Ocean	~150,000 US\$

7. COMMITTEE MEMBERS

Please list current members, including contact information and their role within the committee.

Surname	First Name	Organization	Address	Email	Role
Keesing	John	CSIRO	CSIRO, Private Bag No. 5 Wembley 6913 Australia	John.Keesing@csiro.au	Member
Griffiths	Charles	University of Cape Town	Rondebosch 7700 South Africa	clgriff@pop.uct.ac.za	Member
Sopaheluwakan	Jan		Gedung Sasana Widya Sarwono, Lantai 3 (Third Floor), Jl. Jendral Gatot Subroto No. 10 JAKARTA SELATAN 12710	jan@indo.net.id	Member
Ghaffar	Mazlan	School of Environmental Studies and Natural Resource Sciences	Marine Science Programme, Faculty of Sciences and Technology, 43600 UKM Bangi, Selangor D. E. Malaysia	mag@pkriscc.ukm.my	Member
Shirayama	Yoshihisa	Kyoto University	Seto Marine Biological Laboratory, 459 Shirahama, Wakayama 649-2211 Japan	yshira@seto.kyoto-u.ac.jp	Member
Bhikajee	Mitra	Mauritius Oceanography Institute	France Centre, Victoria Avenue, Quatre Bornes, Mauritius	bhikajee@moi.intnet.mu	Member
Chavan	Vishwas	National Chemical Laboratory	Dr. Homi Bhabha Road, Pune 411008 India	vishwas@ems.ncl.res.in	Member
Ponnapakkam	Loka Bharathi	National Institute of Oceanography	Dona-Paula, Goa 403 004 India	loka@darya.nio.org	Secretary

NRIC Annual Report 2005

Sub-Saharan Africa Regional Steering Committee

Chairperson: Prof Charles Griffiths
Marine Biology Research Institute, Zoology Department, University of Cape Town
Rondebosch 7700, South Africa
Phone: (27) 21-6503610 FAX: (27) 21-6503301 E-mail: clgriff@pop.uct.ac.za

Vice-Chairperson: none appointed

OBIS node maintained by Dr Marten Grundlingh
Phone: (27) 21 888 2520 Fax (27) 21 888 2693 Email: mgrundli@csir.co.za

<http://fred.csir.co.za/ematek/sadco/index.htm>

1. LONG-TERM GOALS

- Establish a functioning OBIS node for the sub-Saharan African region. Negotiate with museums and research institutes in the region in order to acquire, digitize and enter as much regional data as possible into this system.
- Improve regional co-operation, specifically in respect of sharing of marine survey data and collaborative systematic research, but also in terms of academic exchange and student training supporting these activities.
- Develop ECOPATH models of the pristine Benguela system and document how system structure and function has been impacted by human activities over the past 300 years.

2. OBJECTIVES

This small group is involved in activities within the OBIS, HMAP and 'core' sections of the CoML programme. The objectives within each for these sub-programs are:

OBIS: A suitable host capable of maintaining a regional OBIS node (SADCO – the South African Data Center for Oceanography) has now been established and a contract signed between SADCO (or in fact its parent body CSIR). The objective now are to identify regional data sets, negotiate permission for these to be loaded onto the OBIS system; secure funding for digitization of much of this data and actually supervise the entering of the data onto the system.

HMAP: A review of historical impacts of human activities on the Benguela system had just been published by the team (see publication list); the next objective here is to develop ECOPATH models of the system in various historical epochs in the past in order to ascertain how human activities have impacted on trophic structure and energy flows with the Benguela system.

CoML core programme: We have now held two regional work-shops in order to establish regional contacts and obtain national status reports; to document what regional data sources exist and to

establish relationships with other regional initiatives and programs. The objectives now are to maintain contact between Regional Steering Committee members and relevant regional marine initiatives (such as the BCLME and ASLME programmes), to ensure that these operate collaboratively and that data from these programmes is lodged in the OBIS system. A subsidiary aim is to maintain links between the African and Indian Ocean regional COML committees, which have overlapping areas of geographical interest, and to maintain communication between the regional committee and the central SSC.

3. APPROACH

Much of this has already been stated above, but in summary the approaches are:

OBIS: Establish OBIS node within existing SADCO center, ensure this has long term funding; track down regional data sources; employ data loaders, load data.

HMAP: Secure graduate student with suitable skills to undertake ECOPATH model in 2005-6, supervise and facilitate acquisition of necessary data etc.

CoML: Maintain links with regional committee members and with other regional initiatives, maintain links and ensure collaboration between African and Indian Ocean NRIC's, publicize COML at regional conferences and forums, report back to core SSC.

4. WORK COMPLETED

OBIS:

Agreement has been reached for the South African Data Center for Oceanography (SADCO) to host the regional OBIS node for Africa and a contract to this effect was finalized in about April 2005, after some administrative delays. SADCO already has 20 years experience as a regional data center and has the advantages of an existing staff and assured long-term funding from a number of state departments in both South Africa and Namibia. The SADCO manager, Dr Marten Grundlingh and Prof Griffiths have already been in negotiation with regional museums, universities and other data centers re data acquisition and to date we have firm agreement from the three main data holders in South Africa to load their data. These are the South African Museum (= Iziko Museum), the Natal Museum and the South African Institute for Aquatic Biodiversity (SAIAB). SAIAB, formerly the JLB Smith Institute of Ichthyology, is the primary holder of fish data (circa 50 000 lots and 550 000 specimens), the Natal Museum the primary holder of mollusk collections (700 000 specimens), and the SA Museum holder of some 75 000 invertebrate and 30 000 fish records. The collections of all three institutes extend well beyond the boundaries of South Africa itself. We are starting with these institutes both because their collections are by far the most comprehensive in the region and also as the records are at least partially digitized already. We are currently in the process of appointing two technical assistants to help enter remaining SAM data and check existing digital records. Once these are loaded we will explore collections in other African countries, although it is known that these are both far less comprehensive and require more work to convert them to electronic format.

HMAP:

The Benguela region is one of the case studies being funded by HPAP. An initial phase, under the leadership of Lance van Sittert, was tasked with compiling a comprehensive review of the impact of human activities on the Benguela, from the pre-historic era until present. This report has now been published (Griffiths *et al.* 2004) bringing this phase to completion.

A second phase under the leadership of Charles Griffiths is now underway and aims to develop ECOPATH models of energy and materials flow in the Benguela, both in its pristine state, and at various stages during its subsequent exploitation. Due to loss of a student (and delays in transfer of funds) this project failed to materialize in 2004 (although no funds were spent either!). The project did, however get properly underway in January 2005 with the appointment of a well-qualified masters student, Kate Watermeyer, who already has ECOPATH experience. The services of Dr Lynne Shannon, who has extensive ECOPATH modeling experience in this region, have also been obtained as co-supervisor for this project. Kate is now making good progress, presented her work at a South African Marine Sciences conference in July 2005 and will be attending and presenting a poster at the Oceans Past Conference in Denmark in October 2005.

CoML Regional Committee:

Only one tranche of funding has been requested for these activities and was provided in 2003, specifically to fund a regional biodiversity workshop and to establish a regional steering committee. The project has been running at a low intensity and on left-over funding from that meeting since. The original regional meeting was successfully held in Cape Town in September 2003 and attended by some 40 delegates, including representatives of 16 coastal states from the region. A comprehensive proceedings document, which is also available on CD and from the CoML website, was completed in late 2003 and includes both country reports and submissions from taxon specialists and other interest groups. A Regional Steering Committee was elected at the meeting, with Charles Griffiths as chair. Charles also attended the Indian Ocean regional meeting in Goa in December 2003 and now sits on that steering committee, ensuring collaboration between these two groups, which have considerable geographic overlap.

No further meetings of the African Regional Steering Committee have taken place. This is partly for logistic reasons (an attempt to hold a meeting in Seychelles floundered partly because South African exchange regulations prohibit the purchase of air tickets that do not pass through South Africa), but also because no pressing need has been identified for further meetings at this stage (once the OBIS node starts actively seeking data from outside southern Africa another meeting may be justified).

In April 2004 Charles Griffiths participated in and made an COML presentation at a meeting of the BCLME in Swakopmund, Namibia. As a result excellent relationships with BCLME have been established and COML is now intimately involved in future survey work in the region and will have access to these data for OBIS. In October 2004 a joint meeting on 'Information sharing between programs and countries in the Western Indian Ocean' was held in Grahamstown, South Africa. This meeting, organized primarily by the African Coelacanth Ecosystem Program (ACEP) and the Agulhas-Somali Large Marine Ecosystem Program (ASLME), was jointly sponsored by the COML Africa group and was attended by delegations from all countries in the region. Charles Griffiths gave a presentation on CoML and Marten Grundlingh, the manager of the regional OBIS node, another on the node. Excellent contacts and undertakings re information sharing were made and a CD and proceedings document have been produced from this meeting. We hope these will lead shortly to submission of African data to the OBIS node.

The only other specific activities have been the publication of a paper by Charles Griffiths on estimation of marine biodiversity in the East African region (Indian J. mar Sci. 2005) and his presentation on COML Africa activities at the 13th South African Marine Sciences Symposium in Durban in July 2005.

5. WORK PLANNED

During the remainder of 2005 Charles Griffiths will be making presentation on COML Africa activities at the Dynamic Planet conference (Cairns, Australia, August 2005) and will be an invited speaker at the Diversitas Conference in Mexico (November 2005). He will also give the JLB Smith Memorial lecture on this topic in Grahamstown, South Africa in September 2005.

Further work planned over the next year includes compilation of a publication on 'assessing the unexplored marine biodiversity of South Africa' (paralleling that mentioned above on the East African fauna). Taxonomic work is also underway to describe and name a number of new species recently discovered in the region, including several new sea anemones and ascidians and a nemertine and holothurian.

6. RESULTS

It is clear from the analyses undertaken to date that less than 50% of the marine biodiversity in Africa is in fact described and that the state of knowledge on the west coast is far poorer than that on the east (South Africa having by far the best researched biota in the region). There is also a very rapid drop-off in sampling effort with depth, with very few invertebrate (but many fish) samples collected from depth exceeding just a few 100m. The region is also extremely poorly resourced in terms of invertebrate taxonomists (there are in fact only 2 full-time professional marine invertebrate taxonomists active in the entire region!).

In terms of HMAP activities we have shown that human exploitation levels in the region remained very low (with the exception of impacts on a few large species such as whales, seals and seabirds) until the 1950's. There was then an explosive increase in take, peaking at an unsustainable take of over 1.5 million tones in the 1960's, following which there has been a significant decline to under 1m tones at present. Due to an emphasis on low-technology coastal exploitation coastal stocks remain severely over-exploited, while open water stocks are now sustainably managed in the Benguela region.

7. IMPACT AND APPLICATIONS

- Improved marine taxonomic and distributional data submitted to and utilized by South African National Biodiversity Initiative and Spatial Biodiversity Assessment (already available on CD)
- Marine input to South African 'State of the Environment Report for 2005' by CLG as marine consultant
- Ecopath models used for ecosystem approach to fisheries (see special issue African J Mar Sci. 2004)
- Biodiversity and distributional data being used in planning of MPA network in South Africa

8. GEOGRAPHIC EXPANSION

In reality the Africa CoML group consists only of Charles Griffiths (and his students) and the OBIS management group, who are all based in Cape Town. The emphasis has thus been in the South. We are forging collaboration mainly with BCLME and ASLME groups, contact details of whom are given below. There are few other active groups in Africa

Project Name	Local Project Lead(s)	Geographic Locale
BCLME	Dr Neville Sweijd	Namibia
ASLME	Dr David La Roche	East Africa

9. NEW PROJECTS & RELATED EFFORTS

a. New CoML Projects

No new project in 2005

b. Affiliated Projects

Please complete the table below to list projects affiliated to CoML by way of your Committee. Include level of funding (if the project does not complete a separate project report, which you can submit as an appendix to this document).

Project Name	Principal Investigator(s)	Geographic Locale	Funding (USD)
BCLME	Dr Neville Sweijd	Namibia/Angola	Unlknown
ASLME	Dr David la Roche	East africa	unknown

c. Partnerships

Please identify any organizations, government agencies, science programs, and non-CoML projects with which your CoML committee has an affiliation and briefly describe the nature of each relationship.

Organization Name	Point-of-Contact	Nature of Relationship
National Research Foundation (RSA)	Ms Renee le Roux Renee@NRF.ac.za	Funding biodiversity research

10. PUBLICATIONS

Griffiths, C.L. et al. 2004 (17 authors). Human impacts on marine animal life in the Benguela – a historical overview. *Oceanogr. Mar Biol. Annu. Rev.* 42:303-392.

Acuna, F.H. & Griffiths, C.L. 2004. Species richness, endemism and distribution patterns of sea anemones (Cnidaria: Actinaria & Coralliomopharia) in South Africa. *Afr. Zool.* 39:193-200

Griffiths, C. L. 2005 Marine and coastal biodiversity in East Africa. *Indian J. Mar. Sci.* 33:35-41

Kruger, N. Branch, G.M., Griffiths, C.L. & Field, J.G. 2005. Changes in the benthos of Saldanha Bay (1960-2001): an analysis based on dredge samples. *Afr. J. Mar. Sci.* (in press)

Melville – Smith, R. & van Sittert, L. 2005. Historical commercial west coast rock lobster (*Jasus lalandii*) landings in South African waters *Afr. J. Mar. Sci.* 27 (in press)

Van Sittert, L. & Crawford, R. 2005. Historical reconstruction of guano production on the Namibian coast. *Afr. J. Mar. Sci.* 27 (in press)

11. EDUCATION & OUTREACH

Only conference presentations relevant here as listed below:

Coastal and marine Biodiversity in the Indian Ocean, Goa India, Dec. 2003

- Griffiths, C.L. Coastal and marine biodiversity of East Africa

12th South African Marine Science symposium, Durban July 2005

- Griffiths, CL. The Census of Marine Life Programme in South Africa
- Medd, HB and Griffiths, CL. Predicting true South African marine biodiversity – a comparison of methods
- Watermeyer, KE, Shannon, LJ and Griffiths CL. Reconstructing the Benguela Ecosystem for a time before man

12. COMMITTEE MEMBERS

Charles Griffiths (*Chair*), Marine Biology Research Institute, University of Cape Town, South Africa

Jude Bijoux, Seychelles Centre for Marine Research and Technology Marine Parks Authority (representing W Indian Ocean island states)

Yunus Mghaya, University of Dar-Es-Sala, Tanzania (representing East Africa)

AK Armah, University of Ghana (representing West Africa)

Maria Sardinha, Benguela Current Large Marine Ecosystem Programme, Angola (representing Southern Africa)

Marten Grundlingh, Southern African Data Centre for Oceanography, South Africa (representing OBIS)

US National Committee

Chairperson
Daphne G. Fautin
Department of Ecology and Evolutionary Biology
University of Kansas
1200 Sunnyside Drive
Lawrence, KS 66045

Phone: (785) 864-3062 FAX: (785) 864-5317 E-mail: fautin@ku.edu

Project Coordinator
Peter B. Fippinger
Consortium for Oceanographic Research and Education
1201 New York Avenue, NW, Suite 420
Washington, DC 20005 USA

Phone: (202) 448-1244 FAX: (202) 332-9751 E-mail: pfippinger@COREOcean.org

<http://www.coml.us>

1. LONG-TERM GOALS

Under the guidance of the U.S. National Committee, the program seeks to provide policy-relevant information regarding marine biodiversity to a broad ocean community through activities in three principal areas: I) research and assessment, II) predictive capacity, and III) education and outreach.

Research and Assessment

Goal: Establish effective research programs, technologies, and collaborations that provide genetic-, species-, and community-level information to support ecosystem-based management.

Predictive Capacity for Projecting Ecosystem Change

Goal: Improve capacity for ecosystem-based management and predicting ecosystem change through retrospective analyses, the development of improved tools, and the establishment of a data management system for marine biodiversity information.

Education and Outreach

Goal: Establish within the United States, effective long-term mechanisms for the dissemination of information about marine biodiversity and public engagement in ocean issues.

2. OBJECTIVES

Research and Assessment

- Objective A: To undertake selected U.S. regional or topical marine studies to create baselines for assessing genetic-, species-, and community-level biodiversity, and investigate the functional role of this diversity to maintaining ecosystem services.

(Corresponds to projects ArcOD,CAML, CmarZ, Creefs, IcoMM, GoMA, GoMex, NaGISA)

- Objective B: To foster the adaptation, development, and application of existing or new biosensor technologies for assessing the abundance, movements, ranges, and diversity of marine species, and the incorporation of standardized biological measurements into emerging ocean observing systems and other monitoring networks. (Corresponds to projects OBIS, POST, TOPP, DNA, SCOR)
- Objective C: To encourage support for a national program of ocean exploration that uses all available technological means and collaborative opportunities to document new marine species and their distributions, with a focus on the exploration of under-sampled ocean realms and lesser-known taxa. (Corresponds to projects CenSeam, ChEss, CoMargE, MAR-ECO)

Predictive Capacity for Projecting Ecosystem Change

- Objective A: Promote the establishment and maintenance of a comprehensive management system of taxonomically-resolved marine biodiversity information, which is geo-referenced, time-referenced, interoperable among datasets and systems, internet-accessible, and globally compatible, and that can serve a broad U.S. ocean community. (Corresponds to projects OBIS)
- Objective B: Extend temporal baseline information on biodiversity and clarify long-term change in marine ecosystems by using retrospective analysis based on historical records. (Corresponds to projects OBIS, HMAP)
- Objective C: Develop improved tools for projecting future marine populations and predicting ecosystem change. (Corresponds to projects OBIS, FMAP)

Education and Outreach

- Objective A: Promote the incorporation of marine biodiversity information into K-12 education programs. (Applying outcomes of all projects)
- Objective B: Promote the incorporation of marine biodiversity information into informal education to the general public. (Applying outcomes of all projects)
- Objective C: Broaden participation in Census of Marine Life by developing and improving mechanisms to communicate and engage the U.S. scientific community. (Outreach for all projects)

3. APPROACH

Because the USNC does not directly fund activities, members undertake activities that:

- Identify and advocate for directed support of CoML activities in the areas of research, technology, and education
- Build collaborations among the U.S. ocean community for participating in CoML activities

- Raise awareness of CoML with Congress, federal ocean agencies, research institutions, industry, non-governmental organization, and other U.S. ocean stakeholders
- Improve cooperation between the U.S. ocean community participating in CoML activities and international partners
- Coordinate scientific planning for a U.S. program of research to assess and explain marine biodiversity, distribution and abundance

4. WORK COMPLETED

Some examples of the work completed in the previous year include:

- Performed extensive outreach and awareness building directed at Congress, federal ocean agencies, industry groups, non-governmental organizations, and other cross-sectored initiatives. For example, members organized luncheon panel at annual Capitol Hill Oceans Week 2005, resulting in three CoML speakers having an opportunity to showcase activities to hundreds of policy makers, scientists, and interested public on Capitol Hill. The USNC also organized a session on the biological information in ocean observing systems at the recent MTS/IEEE Ocean 2005 conference where several speakers were able to highlight CoML projects. The USNC also issued several letters to promote directed funding to issues of interest to CoML, such as the ocean exploration, priorities for underwater research, and priorities for the upcoming International Polar Year.
- Organized workshop to identify research priorities for coral reef ecosystems, which resulted in an outreach brochure for U.S. federal funding organizations and the establishment of the CoML project (Creefs).
- Executed two pilot projects, in collaboration with a federal agency partner, to test the feasibility of, and evaluate the financial costs associated with, operating a U.S. Regional OBIS Node (RON).
- Established and enhanced long-term relationships with federal ocean agencies to require deposit into OBIS of appropriate data from federally funded grants and contracts. For example, a recent contract announced by the Minerals Management Service for a four-year study of chemosynthetic communities in the Gulf of Mexico requires the Principal Investigators to deposit appropriate data into OBIS, via ChemBASE. In another example, NOAA's Ocean Exploration Program identified "the exploration of marine life inventories contributing to Census of Marine Life" as one of its thematic priorities for fiscal year 2006 funding. CoML-focused proposals are being encouraged that describe and quantify species populations, diversity, distribution, and life history at site-specific to regional scales and that include a plan for archiving collected data in OBIS.
- Secured representation of the USNC OBIS subcommittee on the Data Management and Communications (DMAC) Steering Team of the Integrated Ocean Observing System (IOOS). Through the DMAC, the USNC hopes to: 1) raise awareness of the need for integration of biological information into observing systems, 2) address barriers to interoperability, and 3) discover IOOS operational user requirements for the system. IOOS will be a major contributor to the international Global Ocean Observing System

of Systems (GOOS), as well as to the U.S. Integrated Earth Observation System (IEOS), both of which are substantive components of the international Global Earth Observation System of Systems (GEOSS).

5. WORK PLANNED

For the 2006 year, the USNC plans to undertake a number of specific activities that promote expanded participation in the program and growth of U.S. funding into CoML projects. Activities will vary, however, priority focus will be placed on in three areas:

- 1) Establishment of, and sustained funding for, a U.S. Regional OBIS Node
- 2) Continued growth in U.S. funding sources and amounts
- 3) Continued growth in number of collaborations with public and private partners from the U.S. ocean community

One activity of particular interest to the USNC is a workshop being organized for 2006 on the role of biodiversity in maintaining ecosystem services, to discuss a standardized process for assessing this information in a variety of habitats and systems. The USNC continues to find workshops an effective mechanism for expanding participation and financial support for CoML activities in the U.S., particularly when focused around issues of policy relevance.

6. RESULTS

The program office now maintains a tracking system of CoML research funded by U.S. sources. The first analysis, completed in July 2004, reflected a U.S. investment in CoML activities of \$29 million. As of August 2005, U.S. cumulative investments were estimated at \$76 million representing a one-year growth of 163%. These totals do not include in-kind contributions, estimated by the CoML Secretariat to be an additional 35%. U.S. investments include over 30 funding sources, seven federal agencies, multiple offices and programs of individual agencies, and a distribution of both public and private funds – \$28 million in public funds and \$15 million in private funds.

USNC retains seat on the Data Management and Communications Steering Team of the Integrated Ocean Observing System.

USNC retains representation on the Ocean Research Advisory Panel, the federal advisory committee for fourteen federal ocean agencies.

USNC workshop leads to establishment of new international CoML project Creefs, and continues advocating for further funding.

USNC secures agreement (and pilot funding) with National Biodiversity Information Infrastructure of the U.S. Geological Service to trial a U.S. Regional OBIS Node.

USNC redesigns website for broad U.S. ocean community (www.coml.us).

USNC secure 65% of necessary funding to host a workshop in 2006 on the role of biodiversity in maintaining ecosystem functions. The USNC sees this intellectual connection as critical to sustained funding from federal agencies focused on tools for ecosystem-based management.

USNC receives new members: Dr. Andy Rosenberg, University of New Hampshire; Dr. JoAnn Leong, University of Hawaii.

USNC builds strong collaborations with three federal offices: NOAA's Office of Ocean Exploration, USGS, National Biodiversity Information Infrastructure, and Environmental Sciences Branch of the Minerals Management Service.

The program office for the USNC obtained a grant from a federal agency for three years of additional funding, as partial support USNC activities

7. IMPACT AND APPLICATIONS

a. Ocean Observing Systems

OBIS could provide an important input to the Global Ocean Observing System as a source of biodiversity information into the system, as an authority on data (and metadata) standards, and a long-term global system for biodiversity data management. However, serving each of these roles depends on OBIS identifying and subscribing to the appropriate requirements of its intended user groups. Some potential user groups (such as U.S. ocean agencies) have significant existing requirements (and regulations) over data management used for operational purposes. Changes in OBIS may be necessary to meet those requirements in order to qualify for long-term support from U.S. federal agencies.

In the U.S., federal ocean agency partners are developing the Integrated Ocean Observing System (IOOS), and federal requirements for IOOS through inter-agency planning groups. Fautin and Fippinger are member and alternate, respectively, of the Data Management and Communications Steering Team (DMAC) of Ocean.US, the U.S. coordinating body of the IOOS. Through the DMAC, the USNC hopes to: 1) raise awareness of the need for integration of biological information into observing systems, 2) address barriers to interoperability, and 3) discover IOOS operational user requirements for the system. IOOS will be a major contributor to the international Global Ocean Observing System of Systems (GOOS), as well as to the U.S. Integrated Earth Observation System (IEOS), both of which are substantive components of the international Global Earth Observation System of Systems (GEOSS).

b. Marine Ecosystem-based Resource Management

The USNC is planning a workshop on the role of biodiversity in maintaining ecosystem services to discuss a standardized process for assessing this information in a variety of habitats and systems. The USNC views this intellectual connection as critical to sustained funding from federal agencies focused on tools for ecosystem-based management.

In addition, the USNC and program office continue to build collaborations with office of federal agencies with potential operational applications of CoML outcomes, with regard to developing tools for ecosystem-based management. Currently, the USNC and program office have growing relationships with several federal offices addressing biodiversity information and its application to

marine resource management: 1) NOAA Research Service, Office of Ocean Exploration, seeking to apply their discovery role to understanding diverse ecosystems; 2) NOAA Fisheries Service, Office of Science and Technology, seeking to understand relationships between biodiversity, prosecuted stocks, and ecosystem function, 3) U.S. Department of State, seeking to maximize the use of unbiased biodiversity information in measuring performance under the Millennium Development Goals, 4) NOAA Office of International Affairs, seeking high quality information to be used in developing and amending recommendations and decisions of the Parties to the Convention on Biological Diversity, and 5) NOAA National Centers Ocean Coastal Science, seeking greater understanding of the relationship between oceans and human health.

In order to garner support of governments and to maximize application of CoML outcomes, the SSC may wish to present CoML activities and outcomes in a manner consistent with societal benefits. Potential applications exist beyond ecosystem-based management in many areas and for many user groups if CoML science is of high quality and is presented in an unbiased manner. Some of the potential applications for information include: improving quality of life, enhancing human health, mitigating effects of natural hazards, sustaining living and non-living resources, improving ecosystem health, predicting impacts of climate change, promoting safe and environmentally sound marine operations, and advancing our understanding of oceans and coasts.

8. NEW PROJECTS & RELATED EFFORTS

a. New CoML Projects

Please identify new CoML projects initiated under the auspices of your national or regional committee.

Project Name	Principal Investigator(s)	Scope of Project
US Regional OBIS Node	Doug Beard	Provide data from US sources to OBIS

b. Affiliated Projects

Please complete the table below to list projects affiliated to CoML by way of your Committee. Include level of funding (if the project does not complete a separate project report, which you can submit as an appendix to this document).

Project Name	Principal Investigator(s)	Geographic Locale	Funding (USD)
Gulf of Mexico	Wes Tunnell	Gulf of Mexico	

c. Partnerships

Please identify any organizations, government agencies, science programs, and non-CoML projects with which your CoML committee has an affiliation and briefly describe the nature of each relationship.

Organization Name	Point-of-Contact	Nature of Relationship
National Biological Information	Doug Beard, Mark Fornwall	NBII has established a pilot US

Infrastructure		RON

9. PUBLICATIONS

Fautin, Daphne G. and Peter Fippinger. 2005. Organism occurrences in an ocean observing system. Oceans 2005 CD (proceedings of the annual conference of the annual meeting of MTS/IEEE)

Rack, F., Milne, P., Fippinger, P.B., and Jahnke, R. (2005). Emerging needs and existing links in distributed ocean science research data sets. Conference Paper: IEEE/CS International Symposium Global Data Interoperability - Challenges and Technologies. June 20-24, 2005, Sardinia, Italy.

Fippinger, P.B. (Editor) 2004. Coral Reef Biodiversity Research Priorities for Coral Reef Ecosystems—Results of a workshop of the U.S. National Committee of the Census of Marine Life, August 16-18, 2004, Kane'ohe Bay, Oahu, Hawai'i.