

BACKGROUND DOCUMENT FOR A WORKSHOP ON BIODIVERSITY IN THE OCEANS AROUND SOUTH AMERICA: THE KNOWN AND THE UNKNOWN

ORGANIZED BY

POGO, CoML AND COPAS (UDEC)

CONCEPCION (CHILE), 28-30 OCTOBER, 2002

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INTRODUCTION

The idea of a South American Biodiversity Meeting originated this year following a Biology Workshop held by POGO (Dartington Report). The goal of the Workshop was to have a small group of experts advise POGO Directors on what could be done by POGO to enhance biological observations (long-term, large-scale), ensuring that the proposed observations would benefit the goals of long-term monitoring, as well as help address the pressing scientific issues of the day. The recommendations from the workshop were presented at the general meeting, POGO-3, in the end of November 2001. Further, during the previous POGO-2 meeting (Brazil) the need to enhance oceanographic observations in the Southern Hemisphere was also discussed. Putting these two priorities together, it becomes clear that it would be desirable to hold a workshop to explore what could be done to enhance biological oceanographic observations in the Southern Hemisphere. At the General meeting of POGO in November, it was recommended that this idea be carried forward.

It was further observed that the goals of POGO expressed above coincided with the goals of Census of Marine Life (CoML) in promoting studies of marine biodiversity in the Southern Hemisphere and that it would be desirable to prepare a proposal to obtain funds to finance a South American gathering to foster the above mentioned goals. The Sloan Foundation was identified as the addressee of the proposal.

THE SOUTH AMERICAN CONNECTION

Two of the POGO oceanographic institutions, SIO and WHOI, have strong ties with Chile and in particular with the University of Concepción, where recently the first National Center for Oceanography has been funded by the Chilean Government, through the National Commission for Scientific and Technological Research. It was thus felt that an appropriate venue for the proposed workshop was the University of Concepción, which has, furthermore, a long tradition in the area of marine biodiversity and strong ties with other universities, both national and regional.

RATIONALE OF THE WORKSHOP

The applicants discussed these issues during their participation in the Biodiversity Symposium of the IAPSO/IABO 2001: **An Ocean Odyssey** (Mar del Plata, 26 October 2001). The enormous scientific and societal value of the actions already taken by CoML was noted during these discussions. It was further noted that, whereas most South American countries maintain traditional initiatives in the area of marine biodiversity, very few countries were represented in the Mar del Plata meeting to benefit from the presentations and discussions on modern techniques and approaches to the theme. So far, few scientists in the region are familiar with CoML as an emerging but most emblematic modern international program on biodiversity and related oceanographic processes.

This situation makes it thus highly desirable to hold a regional workshop in order to foster the goals, initiatives, ideas, technologies of both CoML and POGO, and to explore possibilities for local and north-south cooperation in the South American region.

OBJECTIVES OF THE WORKSHOP

From the point of view of interested scientists of the region, one of the main objectives of the South-American Marine Biodiversity Workshop would be to learn both about CoML and POGO, their actions, advances, application of novel techniques, and of the opportunities for international cooperation in new projects relating biodiversity and ocean observations. This will entail the participation of some of the major present actors within CoML and POGO. Another major objective of the workshop will be to learn about the activities of South American countries in these areas and their national priorities. To accomplish this, a suite of key South American experts will be invited to offer overview presentations. Additionally, non-South American scientists with considerable expertise and experience in the SA marine realm will be eligible for this type of presentation. The dual strategies of CoML to attain its goals are to develop key projects that explore unique marine habitats in particular regions and to create regional committees to support these projects and encourage CoML approaches to other habitat zones. So far, the only CoML activities in the Southern Hemisphere are in the Western Pacific. This leads us to the final objective: to identify possible new projects addressing problems of either regional (such as the Humboldt biome, and the Sub-Antarctic biome) or global (for example marine mammal migrations and South Pacific jack-mackerel migrations) relevance.

THE KNOWN, THE UNKNOWN AND THE UNKNOWABLE OF SOUTH AMERICAN MARINE BIODIVERSITY

Biodiversity is defined as the collection of genomes, species, and ecosystems occurring in a geographically defined region. There is a global agreement today that the diversity of life in the ocean is being altered increasingly by human activities and that the effects are potentially irreversible. The South American region is no exception to this trend. Among others, in this geographical region, the most critical (current or potential) ways in which marine biodiversity is or may be impacted, are: extraction of life from the seas; introduction of exotic species; chemical pollution; localized eutrophication and alteration of coastal habitats; and global climate change, including increased UV radiation and potentially rising temperatures, resulting in possible changes in the secular regional ocean cycles. These stresses may be affecting or may as yet affect life in the oceans from the intertidal zone to the deep sea.

This is a very large marine region, for the most part still unexplored. Therefore, a regional biodiversity effort appears to be most timely, to: (1) gain a precise insight into what is known and what is unknown, what is at present being done, and what is the potential for further activity regionally on the subject of biodiversity; and (2) explore how the present effort could be enhanced through both regional coordination and the participation of scientists from the developed world. New approaches have to be integrated with scientific effort and financial resources already in place.

From the standpoint of South American marine biodiversity, Longhurst's classification of biomes and provinces seems to be useful.¹ In this system the South American region encompasses large and important coastal and oceanic biomes each with one or more provinces. (1) Within the Pacific Coastal Biome the Humboldt Current Coastal Province extends along most of the west coast of South America and is in direct contact with the oceanic South Pacific Subtropical Gyre Province; (2) On the east coast of South America the Atlantic Coastal Biome consists of the (a) Guianas Coastal Province, (b) the Brazil Current Coastal Province and (c) the Malvinas Current Coastal Province. The latter are in turn in contact with the oceanic Caribbean, the South Atlantic Gyral, the South Subtropical Convergence, and the Sub-Antarctic Water Ring Provinces, respectively. This diverse ecological geography suggests a most unique opportunity for a concerted study on functional marine biodiversity under very different and contrasting biogeographical, evolutionary, and ecological settings.

At this point it is worth recalling some of the objectives of the US national research agenda on marine biodiversity² which might be applicable in the South American region:

- to understand the patterns, processes, and consequences of changing biodiversity by focusing on critical environmental issues and their threshold effects, and to address

these effects at spatial scales from local to regional and at appropriate temporal scales;

- to improve linkages between marine ecological and oceanographic sciences by increasing understanding of the connectivity between local, smaller-scale biodiversity patterns and processes and regional, larger-scale oceanographic patterns and processes that may directly impact local phenomena;
- to strengthen and expand the field of marine taxonomy through training, the development of new methodologies, and enhanced information dissemination, and to raise the standard of taxonomic competence in all marine ecological research;
- to facilitate and encourage the incorporation of (1) new technological advances in sampling and sensing instrumentation, experimental techniques, and molecular genetic methods; (2) predictive models for hypothesis development, testing, and extrapolation; and (3) historical perspectives (geological, paleontological, archaeological, and historical records of early explorations) in investigations of the patterns, processes, and consequences of marine biodiversity; and
- to use the new understanding of the patterns, and consequences of marine biodiversity derived from this regional-scale research approach to improve predictions of the impacts of human activities on the marine environment.

WORKSHOP STRUCTURE

The workshop structure is consistent with the above outlined major objectives. Thus, a first element will be a section where POGO- and CoML-associated scientists will present the status of their respective programs. Given the theme of the workshop, the progress, achievements and ideals of CoML will be emphasized. This element will require inviting presentations by leading scientists in charge of major present CoML pilot projects and at least one representative from POGO.

A second element will be a section where senior/leading South American scientists will report on the activities of their countries in the area of marine biodiversity. Traditionally, studies of biodiversity have been one of the strengths of the South American scientific community. However, many of these studies tend to be carried out in relative isolation, and it is at present very difficult to collect information on what is already known about the marine diversity of the region. The planned national and regional presentations will serve the purpose of compiling and disseminating information on what is known about the region. This will also form the basis on which plans for future studies to unveil the unknown can be founded. The known, the unknown and the essentials should emerge mainly from these presentations. This element might also require inviting presentations by non-South American scientists involved in marine biodiversity research in the South American region.

The third element of the workshop will be group/collective discussions whereby one or several potential South American initial/field projects could be identified. The emergence of an organization to foster these activities is envisioned. It is also foreseen that simple linkages with the ongoing projects of CoML may be identified and established through this type of activity.

EXPECTED OUTCOMES

The following items represent the main expected outcomes from the workshop:

1. The development of concepts and priorities for new initial/field projects in the South American Region
2. Formation of a South American Committee for the Census of Marine Life/POGO initiative
3. Publication of Workshop Proceedings (preferably both in English and Spanish) hopefully as special issue of the *Revista Chilena de Historia Natural*

ORGANIZING COMMITTEE

The initial constitution of the Organizing Committee will be as follows:

Chair:

Dr. Victor Ariel Gallardo

Director, Center for Oceanographic Research in the South-Eastern Pacific (COPAS),
Universidad de Concepción
Casilla 160-C
Concepción
Chile
Phone/Fax: 56 41 204520
e-mail: vagallar@udec.cl

Members:

Dr. Ron O'Dor

Senior Scientist, Census of Marine Life (CoML)
CORE, Suite 800,
1755 Massachusetts Ave. NW
Washington, DC 20036-2102
U.S.A.
Phone: 1-202-332-0063 x239
Fax: 1-202-332-9751
e-mail: rodor@coreocean.org

Dr. Shubha Sathyendranath

Executive Director, POGO
Bedford Institute of Oceanography
1 Challenger Drive
Dartmouth
Nova Scotia B2Y 4A2
CANADA
Phone: 1 902-426-8044
Fax: 1 902-426-9388
e-mail: shubha@is.dal.ca
web: www.oceanpartners.org

The organizing committee will work together with the country coordinators to decide on the invited attendees at the meeting, to plan the agenda, and to assign speaking and writing tasks to the participants. The Chair of the Organizing Committee will also be the Chair of the proposed Biodiversity Meeting.

COUNTRY COORDINATORS

ARGENTINA:

Dr. Vivian Lutz

INIDEP (Instituto Nacional de Investigacion y Desarrollo Pesquero)
Paseo Victoria Ocampo 1
7600 Mar del Plata
Phone: +54 (223) 4862586
Fax: +54 (223) 4861830
e-mail: vlutz@inidep.edu.ar

BRASIL:

Dr. Erminda da C. Guerreiro Couto

Departamento de Ciências Biológicas
Núcleo de Estudos Oceanográficos
Rodovia Ilhéus - Itabuna km 16,
45650-000, Ilhéus
Phones: 73 680-5270 / 680 - 5268
e-mail: minda@uol.com.br

COLOMBIA:

Dr. Juan Manuel Día, Dr.rer.nat.

Head of the Marine Biodiversity and Ecosystems Program

Instituto de Investigaciones Marinas y Costeras, INVEMAR.
Guest Professor of the Universidad Nacional de Colombia
Postgraduate Program in Marine Biology
Cerro Punta de Betín, Apartado 1016
Santa Marta
Phone: 57-5-4214413, FAX 57-5-4211377
e-mail: jmdiaz@invemar.org.co

CHILE:

Dr. Rubén Escribano

Associate Researcher, Center for Oceanographic Research in the South-Eastern Pacific
Estación de Biología Marina de Dichato
Universidad de Concepción
Casilla 160-C
Concepción
Phone: 56 41 683033
FAX: 56 41 683902
e-mail: rescriban@uantof.cl

ECUADOR:

Manuel Cruz

Instituto Oceanográfico
Guayaquil
Phones: 59 34 481300, FAX: 59 34 485166
e-mail: manuelcruzp47@hotmail.com

FRENCH GUYANA:

Dr. Felipe Artigas

L.A.B.E.L. / UPRES-A CNRS 8013 ELICO
Université du Littoral Cote d'Opale
Maison de la Recherche en Environnement Naturel
32, avenue Foch
62930 Wimereux
FRANCE

PERU:

Dr. Juan Tarazona B.

Director
Dirección General de Programas
Consejo Nacional de Ciencia y Tecnología (CONCYTEC)
Calle El Comercio 197, San Borja
Lima
e-mail: jtarazona@concytec.gob.pe

URUGUAY:

Dr. Danilo Calliari

Sección Oceanología
Departamento de Ecología
Facultad de Ciencias
Universidad de la República
Iguá 4225, CP 11400
Casilla Postal 11400
Montevideo
Teléfono +598 2 5258618 (anexo 150)
FAX: +598 2 5258632
e-mail: dcalliar@fcien.edu.uy

VENEZUELA:

Dr. Patricia Miloslavich

Laboratorio de Biología Marina

Departamento de Estudios Ambientales
Universidad Simón Bolívar
Caracas
e-mail: pmilos@usb.ve

INVITEES

The invited participants will be selected primarily from South American countries. Those with broad perspectives of relevant national activities and priorities will be identified and given preference. Some bright and upcoming scientists will also be selected to complement the more senior and experienced scientists in the field. A few participants from other regions may also be invited, to complement the regional representation, and to provide cross-fertilization with activities elsewhere. A preliminary list has been prepared (see below). This list will be enhanced based on discussions with scientists in S. America. The final list of invitees will be prepared from the list below which is being proposed by the Country Coordinators.

ARGENTINA:

Mirtha Lewis

Investigadora Adjunta
Consejo Nacional de Investigaciones Científicas y Tecnológicas (CONICET)
Centro Nacional Patagónico (CENPAT)
Puerto Madryn
e-mail: lewis@cenpat.edu.ar

Pablo Penschaszadeh

Investigador Principal
Consejo Nacional de Investigaciones Científicas y Tecnológicas (CONICET)
Universidad de Buenos Aires (UBA)
Buenos Aires
e-mail: pablop@mail.retina.ar

BRASIL:

Fábio Lang da Silveira

Taxonomía de Cnidaria / Hydrozoa
Instituto de Biociências
Departamento de Zoología
Rua do Matão, Travessa 14, no. 101 - CP 11461
Cidade Universitária, 05422-970
Universidad de São Paulo
São Paulo
Phone: 0xx11 3091-7619/ 3091-7575
Fax: 0xx11 3091-7802/ 3091-7513/ 3091-7416
e-mail: fldsilve@usp.br

COLOMBIA:

Arturo Acero, M. Sc.

Universidad Nacional de Colombia
Faculty of Sciences, INVEMAR
Cerro Punta de Betín
Apartado 1016
Santa Marta
e-mail: aacero@invemar.org.co
Phone/FAX: 57-5-4312977

CHILE:

Dra. Miriam Fernández

Center for Advanced Studies in Ecology and Biodiversity
Facultad de Ciencias Biológicas
Pontificia Universidad Católica de Chile

Santiago
Phones: Santiago (56-2-686-1626), Las Cruces (56-35-431574)
e-mail: mfernand@genes.bios.puc.cl

ECUADOR:

Nick Gabor, M. Sc.

Sub-Director
Instituto Nacional de Pesca (INP)
Letamendi 102 y La Ría
P.O. Box 09-04-15131
Guayaquil
Phones: (593-4) 2401773
Fax: (593-4) 2402304
e-mail: nickgc_2000@yahoo.com

PERU:

Dimitri Gutiérrez

Instituto del Mar del Perú (IMARPE)
Dirección de Oceanografía
Esquina de Gamarra y General Valle S/N
Chucuito
Apartado postal 22
Callao
Phone: 51-4-202000
e-mail: dgutierrez@imarpe.gob.pe

URUGUAY:

Dr. Omar Defeo

Unidad en Desarrollo de Ciencias del Mar (UNDECIMAR)
Facultad de Ciencias
Universidad de la República
Iguá 4225, CP 11400
Montevideo
e-mail: odefeo@dinara.gub.uy

VENEZUELA:

Eduardo Klein, M. Sc.

Director
Instituto de Tecnología y Ciencias Marinas (INTECMAR)
Departamento de Estudios Ambientales
Universidad Simón Bolívar
e-mail: eklein@usb.ve
Caracas 1062

GERMANY:

Julian Gutt

Foundation Alfred Wegener Institute for Polar and Marine Research
Columbusstrasse
D - 27568 Bremerhaven
Germany
Phone: +49 (0)471 4831 1333
Fax: +49 (0)471 4831 1149
e-mail: jgutt@awi-bremerhaven.de

THE NETHERLANDS:

Dr. Annelies C. Pierrot-Bults

Institute for Biodiversity and Ecosystem Dynamics
Zoological Museum
University of Amsterdam
P.O. Box 94766

1090 GT Amsterdam
Phone: +31.20.525 7194
Fax: +31.20.525 5402
e-mail: pierrot@science.uva.nl

THE WORKSHOP REPORT

It is planned to publish the proceedings of the workshop as a special issue of a Chilean Journal devoted to natural marine sciences. The contents will include the background paper as the editorial, the invited presentations that outline what is known about marine biodiversity in S. American waters, what is important to know, and what the national priorities are in this area. It will also include recommendations that emerge from the workshop. The chapters will be in either English or Spanish. The report will therefore target the wider scientific community of S. America interested in marine biodiversity and biological oceanography. The Chair of the organizing committee (Victor A. Gallardo) will act as the Chief Editor for the Proceedings. He will be assisted in his task by a sub-editor, who will be hired for a period of six months (two months leading up to the meeting, and four afterwards).

TIME LINE

March - April 2002

1. Dr. Gallardo visits other S. American countries. One visit to N. America is also envisaged
2. The Organizing Committee Prepares the Background Paper
3. Formal invitations are sent to the invited participants, along with the background paper

May - June 2002

4. Invited participants collect information for their papers
5. The organizing committee works on details of local organization

July - August 2002

6. Participants prepare their written contributions and submit the first draft to the Chair of the Organizing Committee

September - October 2002

7. The submitted contributions are reviewed by the Editor and sub-editor
8. The organizing committee finalizes the Agenda for the meeting
9. Copies of handouts to participants are prepared
10. Meeting is held end of October

November 2002 - January 2003

11. The articles in the workshop report are revised by the authors, based on feedback from the Editor, and from the meeting
12. Final versions of the articles are submitted to the Editorial Office

February 2003

13. The Report goes to the printers.

STRAW MAN AGENDA

Day 1 (Monday 28 Oct. 2002)

08:30 - 08:45 Welcome of participants by the Chair of the Organizing Committee, CoML Representative, and POGO Representative

08:45 - 09:00 Overview and Update of CoML: Ron O'Dor
09:00 - 09:15 Links between Biodiversity and Ecosystem Functions: Shubha Sathyendranath, POGO
09:15 - 09:30 The South American Context: Victor Ariel Gallardo
09:30 - 10:00 A Demonstration of EASy Access to OBIS: Dale Kiefer, CoML
10:00 - 10:30 Coffee Break
10:30 - 11:00 Building the ChEss Data Matrix in the South Atlantic: Eva Ramírez-Llodra, CoML
11:00 - 11:30 Extending TOPP Technology to the Galapagos-Cocos Island Conservation Corridor: Barbara Block (or alternate), CoML
11:30 - 12:00 Extending NaGISA to South America: Brenda Konar (??), CoML
12:00 - 12:30 Discussion/Comments
12:30 - 14:30 Lunch
14:30 - 15:00 Colombia
15:00 - 15:30 Venezuela
15:30 - 16:00 French Guyana
16:00 - 16:30 Coffee Break
16:30 - 17:00 Brasil
17:00 - 17:30 Uruguay
17:30 - 18:00 Argentina
18:00 - 18:30 Germany

Day 2 (Tuesday, 29 Oct. 2002)

09:00 - 09:30 Chile
09:30 - 10:00 Perú
10:00 - 10:30 Ecuador
10:30 - 11:00 Coffee Break
11:00 - 11:30 The Netherlands
11:30 - 13:00 Presentation and discussion of particular South American biomes as potential target regions for biodiversity study
13:00 - 15:00 Lunch
15:00 - 16:00 Identification of Working Groups to discuss follow-up Actions
16:30 - 17:00 Coffee Break
17:00 - 19:00 Working Group Discussions

Day 3 (Wednesday, 30 Oct. 2002)

09:00 - 10:30: Presentation of recommendations from the Working Groups; Writing Assignments
10:30 - 11:00 Coffee Break
11:00 - 12:30 Writing of Recommendations
12:30 - 14:30 Lunch
14:30 - 16:30 Writing of Recommendations
16:30 - 17:00 Coffee
17:00 - 18:30 Compile the recommendations. Outline the next course of action; closing.

NOTES

1. Alan Longhurst, 1998. Ecological Geography of the Sea. Academic Press.
2. Understanding Marine Biodiversity: A Research Agenda for the Nation. Comm. Biol. Div. Mar. Syst., OSB, Comm. Geosci. Envir. & Res., Bd. Biol., Comm. Life Sci., Nat. Res. Council. Nat. Acad. Press, Wash., D. C., 1995.