

Edited by SS and VAG 26-04-02

**BACKGROUND DOCUMENT FOR A WORKSHOP ON**

**BIODIVERSITY IN THE OCEANS AROUND SOUTH AMERICA: THE KNOWN  
AND THE UNKNOWN**

**ORGANIZED BY**

**POGO, CoML AND COPAS (UDEP)**

**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 the Chilean Government, through the National Commission for Scientific and Technological Research, has recently funded the first National Center for Oceanography. 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. It is indeed posited that most probably, few scientists in the region have yet heard of 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 on these subjects 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 presentations.

The dual strategies of the 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 their 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 on 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<sup>1</sup>. 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.

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<sup>1</sup> Alan Longhurst, 1998. Ecological Geography of the Sea. Academic Press.

At this point it is worth recalling some of the objectives of the US national research agenda on marine biodiversity<sup>2</sup> 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.

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<sup>2</sup> 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.

### **EXPECTED OUTPUTS**

As main expected outputs from the workshop the following can be mentioned:

- 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

**Members:**

Dr. Ron O'Dor (CoML)

Dr. Shubha Sathyendranath (POGO)

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

**Brasil:** Dr. Erminda da C. Guerreiro Couto

**Colombia:** Dr. Juan Manuel Díaz

**Chile:** Dr. Rubén Escribano

**Ecuador:** Dr. Manuel Cruz

**French Guyana:** Dr. Felipe Artigas

**Peru:** Dr. Juan Tarazona

**Uruguay:** Dr. Danilo Calliari

**Venezuela:** Dr. Patricia Miloslavich

### **POTENTIAL 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 Annex). This list will be enhanced based on discussions with scientists in S. America. Dr. Gallardo is also planning to visit key centers in S. America to identify suitable participants from some of the regions where suitable contacts do not exist already. The final list of invitees will be prepared from this list. Note that the final list of invitees will be significantly shorter than the longer list in the Annex.

### **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 – 09:00 Welcome of participants by the Chair of the Organizing Committee, CoML Representative, and POGO Representative.
- 09:00 – 10:30: Why Study Marine Biodiversity: Ron O'Dor  
Links between Biodiversity and Ecosystem Functions:  
Shubha Sathyendranath  
The South American Context: Victor Ariel Gallardo
- 10:30 – 11:00 Coffee Break
- 11:00 – 12:30 CoML (1)
- 12:30 – 14:00 Lunch
- 14:00 – 15:30 CoML (2)
- 15:30 – 14:00 Coffee Break
- 14:00 – 17:30 National Perspectives  
Chile  
Peru  
Ecuador  
Colombia  
Venezuela  
French Guyana

### Day 2 (Tuesday, 29 Oct. 2002)

- 09:00 – 10:30: National Perspectives (Continued)  
Brazil  
Uruguay  
Argentina
- 10:30 – 11:00 Coffee Break
- 11:00 – 12:30 Presentation and discussion of particular South American biomes as potential target regions for biodiversity study  
Identification of Working Groups to discuss follow-up Actions
- 12:30 – 14:00 Lunch
- 14:00 – 15:30 Working Group Discussions
- 15:30 – 16:00 Coffee Break
- 16:00 – 17:30 Working Group Discussions

### Day 3 (Wednesday, 30 Oct. 2002)

- 09:00 – 10:30: Presentation of Discussions of recommendations from the working groups  
Writing Assignments
- 10:30 – 11:00 Coffee Break
- 11:00 – 12:30 Writing of Recommendations
- 12:30 – 14:00 Lunch
- 14:00 – 15:30 Writing of Recommendations
- 15:30 – 14:00 Coffee
- 14:00 – 17:30 Compile the recommendations  
Outline the next course of action; closing