

## Proposal for a SCOR Working Group to coordinate the availability of a world register of marine species (WoRMS)

### **Background and rationale**

An authoritative checklist of all marine species is urgently required to facilitate biological data exchange, marine biological data management, integration of biological with other ocean data, and to allow taxonomists to focus on describing new species instead of overlooking recently described species and correcting past nomenclatural confusion (Costello et al. 2006). The production of such a list has added benefits in fostering collaboration between experts at a global scale. Easy access to the list allows ecologists and local experts to correct their use of taxonomic names, and encourages submissions of overlooked species to the list. In turn, this stimulates biogeographic and evolutionary research.

Local and regional species checklists are also in demand for conservation and fisheries management, ecological surveys, and training in marine ecology and environmental management. However, these lists are inevitably compromised by either not being updated by experts, inheriting past misuse of names, using the same name for different species in different locations, using different names for the same species in different regions, or combinations of these problems. The solution is a single world checklist easily accessible on the World Wide Web, and updated by experts.

The absence of such a world list reflects the local and regional focus of marine biology in the past. Now, biodiversity informatics enables collaboration and data management to be fast at low cost (Costello and Vanden Berghe 2006). It is critical that the list is authoritative, freely accessible on the World Wide Web, and easily maintained and updated. However, there is no obvious existing coordinating body for such a world checklist.

This proposal is for establishment of a SCOR Working Group to develop a sustainable world register of marine species (WoRMS), including (a) a board of taxonomic editors who will maintain it, (b) a central data portal, and (c) a funding and management plan beyond the life of the working group.

The role of the Census of Marine Life (CoML), the International Association of Biological Oceanography (IABO), the Ocean Biogeographic Information System (OBIS), Catalogue of Life (and its partners Species 2000 and the Integrated Taxonomic Information System), Global Biodiversity Information Facility (GBIF), and other organisations and initiatives in providing a long-term structure for the management of WoRMS will be explored. At present, these initiatives have different or broader goals, not focused on producing a checklist of marine species. We are confident that we can coordinate and obtain funding for the creation of WoRMS during the tenure of this SCOR WG, and thereby ensure that a key component of marine data management is available to the scientific community and other end users. Without the focus of a SCOR WG, it is unlikely that this will happen within the next few years. The results of this working group would contribute to other SCOR WGs, including those on plankton (WGs 115 and 125) and new technologies (WG 115). Progress will be reported to SCOR as required, and presented at the SCOR-supported conference on Ocean Biodiversity Informatics (OBI 2007) in Halifax, Canada, November 2007.

The WoRMS portal will be interoperable with existing Global Species Databases (GSD) containing marine species, including FishBase, Hexacorallians of

the World, AlgaeBase, CephBase, UNESCO Register of Marine Species (URMO, contains list of several smaller marine phyla extracted from the literature), and others. We estimate that at least half of the estimated 200,000 described marine species are not included in existing registers of marine species and GSD. WoRMS will contribute to the Catalogue of Life, presently including almost 50% of all world species, and used by OBIS ([www.iobis.org](http://www.iobis.org)) and GBIF ([www.gbif.org](http://www.gbif.org)) as their master lists of species names. Rather than duplicate existing efforts, WoRMS would build on existing databases and focus on facilitating the filling of gaps by supporting funding applications.

WG members will directly apply for funding to create the authoritative lists and support their data management. Such proposals are planned for 2006 and will be assisted by the support of a SCOR WG. Potential funding sources include foundations, CoML, OBIS, the European Commission, the U.S. National Science Foundation, and national agencies. Proposed members have experience in marine biological data management, the coordination of the creation of European Register of Marine Species (ERMS) and its subsequent development, and expertise in particular taxonomic groups.

### Terms of reference

The primary term of reference of this SCOR Working Group would be to develop a sustainable world register of marine species (WoRMS). The subsidiary tasks would be to create:

- (a) a board of taxonomic editors who will maintain it,
- (b) a central data portal, and
- (c) a funding and management plan.

The results of the SCOR WG will be freely accessible on the Internet. This may be through an existing initiative or as a stand-alone portal, depending on the best strategy agreed by the WG. The timetable will include review of gaps in global registers of marine species, funding applications, online drafts, and plans for WoRMS sustainability (see Table 1).

The SCOR WG will meet annually at venues that are cost and time effective for participants. For example, one meeting may be in association with OBI 2007. Group work would start by email as soon as SCOR approval was received.

Table 1. Timetable for the WG.

| Year quarter                                 | 2007 |   |   |   | 2008 |   |   |   | 2009 |   |   |   |
|--|------|---|---|---|------|---|---|---|------|---|---|---|
|  | 4    | 1 | 2 | 3 | 4    | 1 | 2 | 3 | 4    | 1 | 2 | 3 |
| Review sources, identify gaps                |      | x |   |   |      |   |   |   |      |   |   |   |
| Funding for gaps                             | x    | x | x |   |      |   |   |   |      |   |   |   |
| Agree data exchange with existing sources    |      |   | x |   |      |   |   |   |      |   |   |   |
| Start filling gaps                           |      |   |   | x |      |   |   |   |      |   |   |   |
| First draft of WoRMS online                  |      |   |   |   | x    |   |   |   |      |   |   |   |
| Draft strategy for WoRMS maintenance         |      |   |   |   |      |   | x |   |      |   |   |   |
| Second draft of WoRMS                        |      |   |   |   |      |   |   |   | x    |   |   |   |
| Mechanisms for WoRMS maintenance implemented |      |   |   |   |      |   |   |   |      |   | x |   |
| WoRMS completed                              |      |   |   |   |      |   |   |   |      |   |   | x |

### **Proposed Members**

The proposed WG Members have expertise in international coordination of registers of marine species for Europe (Costello, Vanden Berghe) and southern Africa (Griffiths), data management (Vanden Berghe, Patterson, Palomares), and taxa which are highly rich in species, but lack global lists. The Crustacea (Lowry, Poore, Boxshall) and Mollusca (Rosenberg, Bouchet) comprise at least half of all marine species, but no global lists exist, except for smaller sub-groups such as Cumacea, Isopoda, Mysidacea, Euphausacea, and Aplacophora. The protists (Patterson) are a complex group of unicellular animals and plants whose classification is being rapidly re-organised with new molecular data. A major parallel activity aims to create Web pages for all marine species through a synergy of several projects, including FishBase, SeaLifeBase, AllFish, AlgaeBase, Hexacorallians of the world, and one proposed member (Palomares) is directly involved with the first three. WoRMS will use biodiversity informatics tools to automate interactions with such projects. Full WG Members will use their existing involvement in related initiatives to maximise synergy of effort, e.g. Costello for OBIS, CoML, GBIF, ERMS, IABO; Vanden Berghe for IODE, IOC, OceanTeacher; and Lowry for Crustacea.Net.

Associate Members will work largely by correspondence and will include custodians of existing registers of marine taxa at global and regional scales. Potential contributors to the working group, beyond the Full Members, are available upon request. Some of these individuals will be identified by the working group later as potential Associate Members, contingent upon approval by SCOR, based on (1) their relevant scientific expertise, (2) global and developing country balance in the WG, (3) gender balance in the WG, and (4) their availability to participate.

### **Proposed Chair**

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### **Other Proposed Full Members**

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## References

- Costello, M.J., Emblow C.S., Bouchet P. and Legakis A. (in press). European marine biodiversity inventory and taxonomic resources: state of the art and gaps in knowledge. *Marine Ecology Progress Series*
- Costello, M.J., Vanden Berghe E. (in press) "Ocean Biodiversity Informatics" enabling a new era in marine biology research and management. *Marine Ecology Progress Series*
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