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Viewpoint

State of the marine environment reports—a need to evaluate their role in marine environmental protection and conservation

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Abstract

This paper discusses the rationale behind the preparation of state of the marine environment (SOME) reports, and the need to evaluate their role in marine environmental protection and conservation. Many SOME reports exist, and are being planned or prepared, but are the intended audiences known, are the reports recognized for their many value-added benefits during preparation, and are they being used effectively when completed? It is proposed that a detailed evaluation is needed of SOME reporting and reports, covering audience(s), role(s), influence, and lessons learned or overall benefits.

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Most practitioners in the field of “marine pollution”, as broadly defined by topics covered in the *Marine Pollution Bulletin*, would agree that human pressures on the sea and its resources, especially along coastlines, continue to be intensive; they threaten habitats, biodiversity and marine ecosystem health. This view is based on considerable research and the monitoring of impacts of specific stressors on the oceans. It is also based on the fact that for more than 30 years, governments, inter-governmental groups (e.g. the United Nations and its agencies, ICES, OECD, European Union Institutions) and non-governmental groups around the world have reported periodically on the overall condition or state of the marine environment (SOME).

The central argument of this essay is that the value of the process of preparing SOME reports may be under-appreciated and many excellent SOME products have been *under-used*. Their value in coastal and ocean management may not be fully realized, as a process during preparation, or as ecologically based perspectives and products. The preparation of SOME reports involves data acquisition, data integration and interpretation, education, communication, and networking

amongst the groups engaged in each project. Collaborative work on such reports encourages holistic thinking about marine ecosystems, conflicting uses, the future of living resources, and indicators (and indexes) of marine ecosystem health. Such perspectives to environmental and resource management are much needed at present in the context of fisheries (Zabel et al., 2003) and the function of large marine ecosystems or LMEs (Sherman, 1994; Sherman et al., 1996; Sherman and Skjoldal, in press; Longhurst, 2003). The fact remains, however, that most SOME reports are written and published, receiving considerable attention for a short while, but often shelved and seldom used other than as reference works. Given their costs and benefits, the multiple role(s) and value of such reports should be emphasized.

Internationally, SOME reporting visibly started with the 1971 *Pacem in Maribus* Conference of 1971 and Stockholm Conference on the Human Environment of 1972 (Ward and Dubos, 1972). United Nations agencies since the mid-1970's have completed many regional seas assessment reports, largely under the guidance of UNEP (Tolba et al., 1992; GESAMP, 1994a, 2001b). The United Nations marine environmental protection advisory group GESAMP has reported regularly on the “SOME” (Goldberg, 1976; Kullenberg, 1982; GESAMP, 1990; GESAMP, 2001a,b), and advises on the process (GESAMP, 1994a,b; GESAMP, 1996). Many

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government agencies globally have produced reports over the past three decades, e.g. EPA and state agencies, USA (e.g. Konrad et al., 1989; EPA, 1999; MWRA, 2003; and many others); Canada (Wilson and Addison, 1984; Bird and Rapport, 1986; Kay, 1989; Wells and Rolston, 1991; Government of Canada, 1991, 1996; White and Johns, 1997; Percy et al., 1997; Pierce et al., 1998); and in the United Kingdom and countries surrounding the North Sea (Van Duin and de Kaste, 1989), countries around the Baltic Sea (e.g. Jansson, 1972), Ireland, South Africa, Australia and Japan (many annual JEPA reports). Specific international projects have prepared reports, such as by the Ecoplata project in Uruguay (Wells and Daborn, 1997) and by coastal harbour projects in Hong Kong (R. Wu, pers. comm.). Intergovernmental organizations such as the Arctic Monitoring and Assessment Program (AMAP) have produced cornerstone volumes (AMAP, 1997). Many individuals and non-government organizations, such as Jacques Cousteau and colleagues, Greenpeace and International Union for the Conservation of Nature (IUCN), have made outstanding contributions to the public awareness of the oceans and their condition for many years (e.g. Cousteau and Dumas, 1965; Greenpeace, 1998; Soares, 1998).

Many scientific institutes and non-government organizations have chapters (e.g. Weber, 1994), books (e.g. Backus and Bourne, 1987; McGinn, 1999; Greenpeace, 1998; Sherman, 2000; Sherman et al., 1996; Sherman and Skjoldal, in press; AAAS, 2000) or technical reports (HEED, 1998; Harvey et al., 1998) on the SOME. Some are true classics and are very well used, such as the landmark book on Georges Bank (Backus and Bourne, 1987; J. Pearce, pers. comm.). Summaries of some reports have appeared in the primary literature (Huber et al., 1999; Sheppard and Pearce, 2000). Many current reports are of course available on-line, for most users (e.g. GESAMP at www.imo.org; government agencies such as Environment Canada, EPA and NOAA). Individuals have written and/or edited technical monographs (e.g. Gourlay, 1988; Sindermann, 1996), recently capped by the ground-breaking, three-volume tome of Sheppard (2000). Individuals also continue to write popular accounts of the threatened sea, aimed at the general reader, the public, politicians and policy makers (recent examples are Earle, 1995; Berrill, 1997; Harris, 1998; Mann Borgese, 1998; Marx, 1999; Woodard, 2000; Cramer, 2001; Helvarg, 2001). Finally, small local symposia often produce valuable overviews of water bodies (e.g. the recent meeting in Massachusetts, Natural and Anthropogenic Influences on the Mt. Hope Bay ecosystem, to be published in *The Northeastern Naturalist*, J. Pearce, pers. comm.), which collectively may contribute to larger regional SOME reports and data bases.

Clearly, there has been no shortage of SOME technical reports (often called marine environmental as-

sessments), and popular accounts, and more are in preparation through agencies such as the USEPA, NOAA, UNEP and GIWA (Global Inland Waters Assessment). The available reports vary greatly in scope, length, detail, frequency of issue, and intended audience(s). Most are aimed at “the public” and the “decision maker”, and are semi-technical. Often, however, the audience is considered “general” and is not well identified or identified at all at the outset of the process. The reports describe the issues confronting the global oceans or its parts, its condition measured using various indicators and indices, and sometimes courses of action for remediation, prevention, protection and conservation of living resources. What they include, in what detail, and with what analysis depends greatly upon the intended audience. As well, most reports are expensive, one-time productions, and not part of a series. None-the-less, they offer valuable ‘snap-shots’ of ocean health for any interested reader (see Rapport et al., 1998; Knap et al., 2002; Strain and Macdonald, 2002; Wells, in press) and discussions of ecosystem health and ocean health crucial to an analytical SOME.

The SOME reports and preparatory process collectively bear some scrutiny, perhaps in a manner similar to Longhurst’s critical evaluation of large marine ecosystems (LMEs) and their multi-authored, overview volumes (Longhurst, 2003). Do the SOME reports do what they are intended to do? Many costly reports have been produced in various ways and are on library shelves and web sites. Some questions are: What have been the overall benefits of these reports? Who uses such reports (i.e. who are the audiences)? Are many of the reports being used effectively to assist marine protection and conservation? Do such reports have long-term value? How do we measure this? Do we need to find ways to strengthen the role(s) of SOME reporting and reports in programs of coordinated ocean monitoring, coastal management and constituency building? Do we need to renew the system or role of such reporting in protecting and conserving our ocean spaces and their inhabitants? While all of the questions (also see Table 1) cannot be addressed in this article, I focus strongly on the need to recognize the many tangible and intangible values of SOME reporting, and for a formal evaluation to be considered and a better way ahead developed.

Consider the purpose or role of SOME reports. Reporting is a value-added activity. Program activities in the Gulf of Maine and Bay of Fundy, in northeastern North America, i.e. the Northwest Atlantic, are used as a case study. Their coastal habitats are well studied, intensely used and populated (for the most part, in the USA) and much stressed areas of ocean, often affected by development, fisheries, chemicals, and the scourge of land-based activities. The Gulf of Maine Council on the Marine Environment (GOMCME), dating from 1987 to 1989, has stated its intention to produce a State of the

Table 1
Some questions useful to an evaluation of the role of state of the marine environment (SOME) reports

Evaluation of report	Questions
Audience(s)	1. Who are the intended audiences (i.e. to whom are the reports directed)?
Role(s)	2. Who uses such reports? How well documented is the use, such as through citation analysis? 3. Do such reports have long-term value? How do we measure this? 4. How do we strengthen the role(s) of SOME reporting? 5. Does the system of regular reporting need to be renewed, at national, regional or international levels?
Influence	6. What have been the overall benefits of these reports? 7. Are many of the reports being used effectively to assist marine protection and conservation? 8. Are the reports valuable at influencing coastal and ocean policy and management? 9. How is this “value” measured?
Lessons learned	10. How have the reports contributed to knowledge of the sea, choice of common indicators of ecosystem health, selection of standard methods of assessment, knowledge of status and trends? 11. Is there a template or guide for SOME reports, such as by GESAMP (1994a,b), that has universal application? 12. What are the best formats to fit the target audience(s)?

Gulf of Maine report in its third, 5-year, plan of action (GOMCME, 2002). Such a report is considered part of the output of its program on human health and ecosystem integrity, involving networks of monitoring programs and identifying common indicators. A guiding framework for monitoring, with an information component, is completed (Jones and Wells, 2002), and a US-Canada workshop “Northeast Atlantic Coastal Monitoring Summit” was held in December 2002. The workshop priorities were to advance the networking and coordination of coastal monitoring programs in the Gulf of Maine and the Northwest Atlantic, and to identify suitable indicators and opportunities for reporting on ocean health in this part of North America (see www.gulfofmaine.org, and www.atlantic-ne-monitoring.net). Such organizing prior to SOME report preparation brings a lot of players, involved in research, monitoring, assessment, communication and management, into the project, facilitating its start-up.

Likewise, for the Bay of Fundy (in the north-eastern sector of the Gulf of Maine), SOME reports are considered an essential part of a guiding framework for evaluating marine environmental quality or MEQ (Chang, 1999; DFO, 2000; Chang and Wells, 2001; Wells, in press). In Canada, SOMEs were formally part of the suggested MEQ package of research and indicators, monitoring, and assessment i.e. reporting, mandated under the new Oceans Act (DFO, 2000). Thus, it is clear that such reports act as an important product of research and monitoring, and they initiate a deliberation about marine issues. They also are a stimulus for further focused research and monitoring. And they are a way by which people from all sectors inform themselves about the condition of the oceans, and urge governments, responsible agencies, and industries to reverse the present trends of over-exploitation and general degradation.

As coastal populations soar worldwide, and problems worsen in the ocean, particularly along coasts, future

SOME reports should have real and measurable value(s) for many sectors of coastal populations. These range from scientists conducting research and monitoring, and managers making timely decisions to control and prevent threats of pollution and coastal development; to educators training the next generation of practitioners, especially future coastal and ocean policy makers; and most of all, to the people living in coastal communities. Past reports have had value and use, from the immediate identification of issues to longer-term baseline knowledge against which to judge issues and gauge progress. This use is not yet documented. Hence, questions must now include (see Table 1): (a) To whom are the reports directed; (b) How do they serve a purpose and, if so, how well documented are these? (c) Are the reports individually or collectively valuable at influencing marine, coastal, and ocean policy and management concerns and activity? (d) How is this measured? (e) Is the reporting format or mode suitable for intended audiences, i.e. full report versus brief fact sheet, hard copy versus digital format? And (f) What are the lessons learned from this collective work, in terms of knowledge of the sea and the coast, choice of suitable/practical indicators of ocean health, selection of standard methods of assessment, and the usefulness to coastal/resource managers of knowing the status of problems such as chemical contamination and habitat loss?

There is a real need for a considered, scholarly analysis of SOME reports to address these and other questions. While senior environmental managers have explicitly indicated some value through the inclusion of SOMEs in their action plans (e.g. GOMCME, 2002), in legislation (e.g. the Oceans Act in Canada), and in routine regulatory programs (e.g. USA, Japan), no one (to my knowledge) has yet objectively and comprehensively measured the value of SOME reports in networking the players, in translating community concerns directly to politicians (in democracies), in policy making

and in critical decision making. Such value has many facets. The process of preparing the reports acts as a focal point for information exchange, program coordination and collaboration, and cooperation of all kinds. And the educational and archiving values i.e. their use as references, are real although difficult to document. One could argue that strong coastal and ocean programs of protection and conservation start and end with SOME reports. Do they? What is the readers view? How can we address the other questions (Table 1)? A report such as GESAMP's, 1990 report has been cited 165 times (GESAMP, 1990; Cordes, 2002), but how is its use and influence accurately assessed? Did the report "make a difference" to the condition of the seas? Have we at least slowed the rate of degradation? Given the cost of such reporting, and the intended value to society, determining its role and appraising its influence surely is worth doing.

As countries, regions and intergovernmental agencies globally are preparing further SOME reports, some measures of their role, audience(s), long-term value and use should be made. Such "market-surveys", perhaps by a UN agency such as UNEP, would maximize the benefits and justify the costs of such reports. It will then ensure that they are used fully to identify new issues, prevent new problems and solve existing ones in all parts of the sea, an increasingly urgent task in the new millennium.

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