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## Social behavior in a research society

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As this issue was in its final assembly stages, a topic being debated on the coral list-server was “Are coral reefs doomed?” – a fairly basic question, and one that is unlikely to go away in the near future. As we see it, the scientific answer is a definite “Maybe,” depending, of course, on what you mean by “coral reef” (see Overview, this issue; Kleypas et al. 2001) and by “doomed” (evolutionary extinction or loss of tourist attraction).

We suggest that the questions about the viability of reef communities apply to both the benthic marine communities and the reef research community. In both, there is a common issue – is there some critical level of exchange and interaction that defines each as a functional community as opposed to an assemblage of co-occurring individual entities? The research community often behaves as an assemblage of independent individuals, while assuming that a reef community is a highly interactive system. The survival of both may depend on the degree to which the behavior can be modified and the assumption is wrong.

Behavioral modification seems like a logical response, given the apparent agreement that the potential urgency of the situation requires actions – and interactions – with coherency and on time scales much tighter than is common in academic research, and with perspectives far broader than normally encompassed by agency missions or even national interests. However, it presently appears that the “coral reef (research) community” will reproduce at a smaller scale the deadlock that has been reached among those who address climate change, with

truly effective action postponed indefinitely because of uncertainty about the detailed outcomes of what is generally recognized as a serious problem.

As a group of (mostly) technically trained individuals, we should be able to recognize the asymmetry of risk in this situation. If reefs are seriously endangered but not inevitably doomed, the ultimate cost of ineffective action (or none at all) will be very high. On the other hand, whether reefs are doomed, endangered, or just temporarily discomfited, the cost of taking effective action need not be high. Actions can be forged from existing resources and can target goals that will provide positive outcomes even if it should turn out that the future of reefs is not as bleak as it looks. This “no regrets” strategy is one advocated (largely unsuccessfully, at least in the US) as a response to global change. It points out that actions such as human population limitation and energy conservation are logical and potentially beneficial even without positive effects resulting from reduction of (for example) the anthropogenic greenhouse effect. How might the “community” of reef researchers and managers identify some analogous dual-track strategies of research, conservation, and management related to coral reef health and survival?

The more extreme measures associated with research and conservation triage have been discussed elsewhere (Buddemeier 2001), and are beginning to attract attention. Here we focus on the middle ground of communication- and information-oriented approaches that can move the conduct, dissemination, and application of research into the information age of the twenty-first century, while significantly improving our chances of preserving reef habitats and organisms.

We propose two actions that might quickly be effective: (1) effectively sharing a critical, widely available but poorly accessible resource – data and information. We tend to treat data as a single-use resource, whereas, in fact, data can be reused and augmented indefinitely – and the more they are used, the more valuable they (and their derivative products) become; and (2) developing the discipline and community mechanisms to integrate

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and focus our collective expertise onto core questions of fundamental concern. This would go beyond ad hoc collaborations, occasional workshops, and even special journal issues, to facilitate community-scale brainstorming – a targeting, expansion, and cultivation of the best of the list-server discussions, for example.

It would improve communication, collaboration, and our efficiency in utilizing the limited research resources available if there were more opportunities and incentives for applying comparable analyses and interpretations to different data sets, and different analyses to the same data set. This requires complete and easy access to primary research data. One of the original goals of scientific publication was to permit replication of the experiments or analyses reported, which requires availability of data and methods in adequate detail. As journal pages expanded in number and cost, data sets grew larger, and experiments and analyses became more complicated, the pressure for conciseness led to a situation in which the goal of replicability was sacrificed by presenting only summarized data or derived results.

Information technology can relieve us of the absolute limitation imposed by the cost of printed pages – we need printed publications, and we need access to primary data, but we do not need everything in the same place or form. If credible data sets exist, there should be no need to re-do the research; this would save funds to gather truly novel data, and enable those without funds to carry out significant, primary research that might otherwise be impossible for them. If more data of a sort already collected are collected again, the new data set will represent either real replication of the first, or an opportunity for making temporal comparisons.

Integrating human expertise is an even more challenging goal than assembling shared data sets – “turf,” egos, and the institutional pressures that reward competition over cooperation all have to be modified or overcome. In particular, interdisciplinary problems almost by definition mean that nobody will have expertise or leadership in all aspects. The role, even if part-time, of beginner or journeyman is not a comfortable one for many researchers. To ease the transition into more broadly shared, cooperative efforts, we suggest that multiple pathways are needed: formal and informal; print, electronic, and face-to-face; multidisciplinary and interdisciplinary; and even cooperative and adversarial – but the “adversarial” mode needs to be disciplined, principled disagreement for the purpose of scientific falsification, and not simply posturing or argument for the sake of scoring debating points.

As possible steps toward reaching some of these goals, we suggest the following concrete actions that could be undertaken by the International Society for Reef Studies or some broader consortium of organizations:

1. Affiliate with or establish a publicly accessible database repository so that the primary data on which a paper is based can be posted for public download. Springer, the publisher of *Coral Reefs*, has an acces-

sible Internet Archive facility, and we suggest that it should be editorial policy to give publication priority to papers that post or submit electronic data files, and perhaps to make that a requirement for certain types of papers. However, this option provides the electronic equivalent of print documents, while what is ultimately needed is access to the data in electronic form. Pioneers in providing such reef-related data have been ReefBase (<http://www.reefbase.org/>) and the Coral Health and Monitoring Program (CHAMP) (<http://coral.aoml.noaa.gov/index.html>); more recently, funding agencies and programs have been supporting “informatics” projects designed to assemble and disseminate research-quality electronic data, e.g., Neogene Marine Biota of Tropical America (NMITA: <http://porites.geology.uiowa.edu/>) and the Biogeography of the Hexacorallia (<http://www.kgs.ukans.edu/Hexacorallia>). Linked networks of electronic data and information sources are both possible and necessary, but the human organization has not yet caught up with the technological capability.

2. Provide “issue overviews” by one or more of the *Coral Reefs* editors (topical or advisory) for every issue, not just special issues – these would have the objective of pointing out interactions, relationships, and extended relevance of papers not necessarily noted by the authors, and of highlighting needs for information, publications, and research.
3. Encourage/solicit co-authored cross-disciplinary reviews for *Coral Reefs*, and make a greater effort to attract authors and viewpoints from outside the narrowly defined “reef research” community (goal – to bring in alternative approaches and to rise above the competitive interactions within the research community). As examples, both symbioses and biomineralization have extensive research communities that extend well beyond the specific coral reef manifestations and that could provide broader perspectives on the field.
4. Identify a limited number of theme questions for moderated, structured discussion in stages – first via a list server such as the CHAMP facility or a WWW discussion board, followed (or accompanied) by print summaries or key excerpts published in *Reef Encounter*, followed by a review for *Coral Reefs* solicited from a subset of the key contributors. The existing editorial panel could either identify or respond to community input to develop and prioritize questions.

We consider all of the above to be feasible, positive steps that can be initiated with no resources other than the level of professional volunteerism that we currently rely on to maintain a status quo of steadily diminishing relevance. The one caveat that we offer is that the motivation and objectives must be scientific understanding; the efforts may draw support from public relations campaigns or funding initiatives, but must not be sub-

servient to the perceived imperatives of local, short-term politics and economics.

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## References

- Buddemeier RW (2001) Is it time to give up? *Bull Mar Sci* 69:20–29  
Kleypas JA, Buddemeier RW, Gattuso J-P (2001) The future of coral reefs in an age of global change. *Int J Earth Sci* 90:426–437