THE OFFICIAL MAGAZINE OF THE OCEANOGRAPHY SOCIETY

Oceanography

CITATION

Abbott, M.R. 2013. From the President—Science and society: Broadening our outlook. *Oceanography* 26(2):7, http://dx.doi.org/10.5670/oceanog.2013.22.

DOI

http://dx.doi.org/10.5670/oceanog.2013.22

Science and Society: Broadening Our Outlook

In the last issue of *Oceanography*, I discussed some of the forces for change in our science and in our institutions. Along with shifts in funding, technology, and organizational structure, there are also more profound forces that seek a deeper engagement between oceanography and the issues of human values and public policy.

For decades, the scientific enterprise in the United States has operated under the notion that there is a simple pipeline from basic research to applications, and that this pipeline is an engine of economic growth. This thinking was encapsulated in the familiar Department of Defense research and development "6.1/6.2/6.3" process (which actually goes through 6.7). However, it is extremely difficult (and sometimes impossible) to demonstrate specific outcomes from basic research. Despite these difficulties, the science community and its funding agencies regularly cite this model when advocating increased funding. While there is a certain amount of intuitive appeal to this model, it does not recognize that fundamental science is essentially unbounded in its scope (there is really no limit to the questions than can be posed) and that the evolution from fundamental research to economic growth is messy and complex.

As scientists, we prefer to address questions that are of interest to us, but this curiosity must be balanced with the broader impacts of our research. Even the National Science Foundation considers "intellectual merit" and "broader impacts" as coequal criteria. Thus, we often find ourselves in the uneasy space between transformative science and use-inspired science. It is difficult to meet these two broad objectives.

Along with this dilemma, there is a more fundamental challenge facing us as oceanographers. Sarewitz and Pielke (2009) discuss the mismatch between science supply and science demand. The broader society needs a continuing supply of science knowledge to develop adaptive strategies to manage risk, such as those associated with climate change, and this is not always aligned with the interests of the science community. For example, will the patterns of coastal inundation shift in substantive ways that may make rebuilding in certain areas too costly in the long run? This question does not have a simple "science-led" answer. It must engage the broad range of social sciences (such as economics and political science) as well as the economic and political values of diverse communities. Moreover, physical scientists cannot provide definitive knowledge regarding the frequency and intensity of inundation events; they can only present a range of plausible scenarios along with their levels of uncertainty.

Andy Rowe of ARCeconomics and Kai Lee of the Packard Foundation describe the tension between science and its search for truth, and decision making that is guided by both responsibility and values. In a Packard Foundation white paper (http://www.packard.org/wp-content/uploads/2013/05/LinkingKnowledgewithAction_ScienceCS2013.pdf), Rowe and Lee note that scientists pursue reliable knowledge through peer-reviewed publications while policy decisions are made "under deadlines and amid controversy" where the knowledge needed to support a policy or decision is often just "good enough." In the area of complex environmental dilemmas, such as the societal response to coastal inundation, Rowe and Lee argue for an approach based on collaborative decision making between scientists and decision makers. Moreover, the science community needs to engage the broader community of social scientists as well as natural scientists. These collaborative partnerships will require a deeper level of dialog and more than the traditional science-led approach where we assume that we can determine social and political agendas (Weible et al., 2010).

The future world ocean will be far different than what are experiencing. Society will need our knowledge and expertise to develop adaptive strategies and approaches to cope with uncertainty and the unexpected. Let's begin the conversation!

Sincerely,

Mark R. Abbott, TOS President

REFERENCES

Sarewitz, D., and R.A. Pielke Jr. 2007. The neglected heart of science policy: Reconciling supply of and demand for science. *Environmental Science and Policy* 10:5–16, http://dx.doi.org/10.1016/j.envsci.2006.10.001.

Weible, C.M., A. Pattison, and P.A. Sabatier. 2010. Harnessing expert-based information for learning and the sustainable management of complex socio-ecological systems. *Environmental Science and Policy* 12:522–534, http://dx.doi.org/10.1016/j.envsci.2010.05.005.