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Tundi's Take: Engagement of citizens in research may be a pain for scientists, but citizen science holds many benefits

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1. There are certain undeniable facts about effective marine management:
2. We know enough to recognize we should adopt an EBM approach and manage more comprehensively; Despite this knowledge, we often need more science (natural and social) to detail how to improve management;
3. Additionally, we need to harness science to monitor progress in order to make sure our management measures are succeeding (and if not, to know how to amend them); No amount of public sector funding is likely to create enough capacity to get 1-3 done; and
4. Enthusiastic citizens can help fill the capacity gap - but only if they are well-trained to be systematic in observations and reporting, and motivated to participate consistently.

This sort of cooperative arrangement can have its perils. Citizen science is notoriously hard to achieve: it is different from having citizens volunteer to help with management tasks. For science to be scientific, it must be robust - not only in the framing of questions, but also in the acquisition of data to support or refute hypotheses. When data are collected by many different individuals, inconsistencies in collection can cause all sorts of errors. This is true even when those many individuals are trained scientists.... Citizens, with their wide spectrum of education, training, experience, and motivations, can introduce so much variability that the robustness can evaporate if not managed well.

How can we ensure that citizen science is good science? Training is obviously key. So, too, are the communications that go into marketing opportunities to get involved, to engage these citizens. People may be motivated to participate for a wide variety of reasons: they may want to contribute to a cause, and have time and energy to devote to it; they may want to collect first-hand information to support a preconceived notion or stance; they may desire praise or need fodder for a resume; or they may want to live out a fantasy of being a marine biologist (fact is, nearly everyone I have ever met wanted to be a marine biologist at some point in their lives; most quickly recognized that it was not a very lucrative way to earn a living, and went on to do other things...). How one engages citizens in citizen science will affect outcomes. Understanding what motivates participation in science, and getting citizens engaged for all the right reasons, is essential for harnessing their energy effectively and for having confidence in the information they acquire. This takes time and effort.

Yet it can be done, with good results. My first exposure to really great citizen science came from my time in the US state of Rhode Island, when an organization - the Salt Pond Watchers - rallied to get consistent, defensible, long-term information on the condition of coastal ponds and the pressures affecting them. It could be said that this citizen science laid the foundation for Rhode Island's pioneering initiatives on coastal zone management and marine spatial planning. Enough data were generated by Salt Pond Watchers to perform robust statistical analyses on coastal issues, building a solid case for what needed to be done to improve the condition of the adored coastal habitats of the Ocean State.

Getting citizens engaged, trained, and participating is well worth the effort. And perhaps the greatest benefit of citizen science is not in the acquisition of data or the generation of information - it is in the building of a highly informed constituency in favor of good science and, ultimately, the sound resource management that science supports.

Someone once said, "We cannot love what we do not know." The more people can learn about the oceans, the more they will care - and the greater the chance that EBM has a hope of delivering effective management.

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