

## Science is crucial to ecosystem-based management - but what science is most crucial?

By Tundi Agardy, Contributing Editor, MEAM. Email: [tundiagardy@earthlink.net](mailto:tundiagardy@earthlink.net)

I could hear my voice trembling as I addressed the hundreds of [ICES Annual Science Conference](#) participants gathered to hear my keynote speech in Ft. Lauderdale last month. Public speaking is not my forte, and I routinely feel nervous on stage – but that was not the reason. As I indicated in my introductory remarks, it was a bit unsettling speaking to a group of esteemed scientists about the utility of their work. I was once a scientist myself, and the training and experience only made me realize the depth of my own ignorance, and the distance we needed to go as humans to be able to understand the world. And surely there were many, many scientists with more wisdom about the topic of science for management than me – many of them sitting in this very room.

My premise was this: while all scientific endeavor is laudable for furthering our knowledge, some types of scientific information are more readily taken up by planners and managers attempting to lessen our negative impacts on ocean ecosystems. ICES is perfectly poised to deliver such information – with thematic groups working on applied, multidisciplinary, and timely science. ICES has been offering advice to governments and intergovernmental regional seas and fisheries management organizations for decades, and produces steady streams of publications that advance our collective knowledge and frame new and important research questions in marine biology, oceanography, and ecology (including human ecology).

### Supply of and demand for scientific information both problematic

My talk offered one perspective on why all this good scientific information is sometimes (often) not being put to good use in marine policy and management. I suggested that this is both a supply side and a demand side problem. On the supply side, scientific information may not be presented in a manner useful for planners, managers, and decision-makers. In addition, there are often issues of access – most publications use a vernacular very specific to a particular scientific field, and of course most publications are in English, creating a barrier to that information in non-English-speaking countries. And I recounted many examples where planners and managers discovered that scientific studies that could provide useful information had been done in their waters, only to find the researchers had returned to their home institutions without sharing the data or findings.

Although I did not mention this at ICES, I had some direct experience with good science being supplied but not used. Several years ago, I was tasked with helping the Mediterranean Action Plan (Secretariat for the UNEP Regional Sea/Barcelona Convention) assist countries in achieving an ecosystem approach to management. Working with experts from the 22 riparian nations bordering the Mediterranean, we helped countries articulate a dozen ecological objectives that an ecosystem approach to management could achieve, along with measurable indicators and targets. These objectives were modeled after the EU's Marine Strategy Framework Directive (MSFD)'s eleven Descriptors of Good Environmental Status. A twelfth parameter was added to cover the coastal zone - something the MSFD does not include in its jurisdiction but which Barcelona Convention countries feel is a top priority for an ecosystem approach to management. As many readers will know, EU countries are obliged under the directive to use the descriptors to assess whether their waters are in good condition, and if not, help guide them toward improving the condition. ICES working groups were largely responsible for framing the descriptors, choosing the related indicators, and setting up mechanisms for determining the targets. But the whole system was inherently so complicated, and required such sophisticated research to be able to undertake the assessments, that non-European countries could not begin to evaluate the condition of their waters, nor determine what they needed to do to improve the condition using this scientific framework. The Ecosystem Approach Project (EcAP) of the Mediterranean Action Plan used the same underlying science but presented it differently, to promote uptake in countries with uneven capacities for monitoring and management.

On the demand side, managers sometimes do not know how to pose questions that scientists can answer to provide the basis for effective planning and management. And in much of the Western world today, demand for scientific information is not only waning – it is being cast aside as an old-fashioned and suspect basis for decision-making. Scientists need to be aware of the attitudes towards science that ebb and flow through societies, and in my opinion, they should work hard not only to supply the information but to create demand for it as well. We can do this by providing examples of how science-based ecosystem-based management (EBM) makes management more effective and efficient and by telling (fact-based) narratives about the ecological and social costs of ignoring the science.

### The science we need for EBM

From my point of view, there are two kinds of science that are most important for effective EBM. We should, in my opinion, be supplying this scientific information in a way readily usable, and we should be encouraging management agencies to demand it. The first is about understanding how the systems we work in operate. Part of this is using scientific research to identify critical areas – i.e., places where ecological processes are crucially important to maintaining productivity and ecosystem dynamics. Natural and social science is needed to locate these places, understand their significance, and determine what pressures need to be alleviated to keep them functioning. The second broad category of scientific information that, in my opinion, is needed for effective management concerns diagnostics: understanding the nature of the problem before attempting to impose a management or policy solution. In my estimation, we spend far too little effort on problem-scoping, and the management failures that result are testimony to this.

To get a more well-rounded perspective, though, I've turned to two of my most admired heroes to ask them how they view this problem of science uptake. Dr. Sidney Holt, one of the most esteemed names in fisheries science and marine ecology, kindly put up with the impossibly large and general question I put to him. And Dr. Paul Dayton, who is widely considered an expert in all things marine, from polar regions to tropical coral reefs, publishing about food web dynamics, keystone species, ecological effects of fishing, marine protected areas, shifting the burden of proof, and even desert ecology, similarly took my query in stride.

In Sidney Holt's opinion, basic ecological information should precede any specialized studies, especially those that try and attach economic value to marine systems.

Sidney's view is that we should harness the science to evaluate ecosystems for the values they provide – including support of wider biodiversity, fisheries productivity, opportunities for recreation, but also more intangible values. He and I concur that we often don't get the science right before jumping to economic valuation (read more [here](#) and [here](#)). This is particularly alarming when money talks, and decisions get made on the basis of economic values that may or may not be correctly derived.

Paul Dayton has a very different take, though I very much doubt that he would disagree with Sidney's assertion. To Paul one of the most important scientific endeavors that can support effective conservation and management is to understand the natural history of the species that inhabit the place we wish to manage. For instance, understanding intraspecific and interspecific interactions has highlighted the important role that big old fecund females (in fish, that is) have in maintaining production. This in turn suggests that MPAs that targets these BOFFs will have greater positive effect than catch limits. Simple long-term studies in the field can yield many similarly surprising results. But in the zeal to create complex models of natural systems we have pushed aside field observation and holistic understanding of nature – relegating it to the bins of history of science as quaint and old-fashioned. Yet without understanding the natural world, we cannot prioritize what is important, nor can we understand the problems we are trying to fix – and we most certainly cannot form or maintain the sorts of connections with nature that impel us to change our behavior and become better ocean stewards.

In the end, we need patience and humility to create a solid enough understanding of ecosystems to be able to manage our impacts on them. At the same time, we also need to be thinking of ways we can better transfer the understanding we have to the people whose decisions will ultimately influence whether we succeed or fail at EBM.

---

**Source URL:** <https://meam.openchannels.org/news/skimmer-marine-ecosystems-and-management/science-crucial-ecosystem-based-management-what#comment-0>