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## Tundi's Take: Science uptake requires good delivery AND a receptive audience

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

Scientists are rightfully exasperated by how hard it is to get science-based management in place. Whether it is providing historical data on what has led to the present-day condition of marine systems; providing recommendations on things like catch limits, pollution controls, and critical habitat to be protected; or predicting the outcomes of management interventions based on empirical models - scientists sometimes feel they are dishing up information that languishes on the table.

But communicating science is hard. The language is inherently technical, and the information is couched in nuance. Despite the mythology of scientific "truths", scientific information is more often than not probabilistic, and predictions rest as much on the veracity of assumptions as on the quality of the models. Scientists complain that the bar is set higher for evidence-based action in management of the environment or natural resources than it is for management of human systems such as societies or corporations. Thus, even with strong bases for science-based actions - like temporarily closing a fishery to allow a stock to rebound, installing sewage treatment to reduce nutrient inputs, denying a dam construction permit to maintain water flows to an estuary, or taking action to actively restore a degraded wetland - the unavoidable uncertainties are often used to prevent action and allow business-as-usual.

It is in the scope of EBM that these frustrations may be the greatest. Good, integrated management based on a foundation of social and ecological science is a complex endeavor. It is complicated to describe what needs to be done. There are a lot of moving parts, and a cumulative assortment of uncertainties that can be quickly used against the management agency by those who doubt the science, disagree with the investment of funds to carry out the management, or have vested interests in keeping things as they are. And this is when there is full agreement on management measures that need to be taken. When there are controversies - and especially when the media play up on the possible disagreements - then embracing the science and using it to steer decision-making is darn near impossible.

### Ecosystem services communication needs to improve

Some of the blame can be placed squarely on us in the scientific community. We need to be better communicators - both among ourselves so we can come to consensus and with the wider world that doesn't speak our language or always share our worldview. Most prominent in my mind is how poorly we've done communicating how an ecosystem services perspective can help attain EBM by demonstrating how the values of natural systems should figure into decision-making. We've done a horrendous job of describing nature's benefits and the risks that unsustainable use poses. We've created our own tangled and awkward vernacular to describe nature's benefits (*provisioning, regulating, supporting, and cultural services* - could there be any less sexy terms than these?). We've also used dubious techniques to attach values to those benefits, and we occasionally exaggerate claims about the costs of losing those benefits.

But not all fault lies in the message. Receivers of scientific information have to be listening to hear.

As practitioners of EBM and as providers of scientific information to support more effective marine management, we have to work not only to present our information in a way that is understandable and useful and compelling but also to create the demand for such information. Only if people want the science will they listen to what natural and social scientists have to say.

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