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## Tundi's Take: Are we too preoccupied with scale?

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Mismatch of scale is the thorn in the side of marine managers. Can we do what we need to do to achieve EBM at the scale required? Or will we always fall short?

The scale problem complicates scientific understanding of marine ecosystems: mesocosm experiments (i.e., studying a small part of the natural environment under controlled conditions) and over-simplified models cannot tell the full story of how natural ecosystems that are larger in scale and more complex work. The scale problem is the bane of conservationists trying to mitigate pressures on rare or highly threatened species. For many of these species, the extents of their home ranges force consideration of human activities far afield.

Getting the scale right is a daunting task for those looking to integrate management across all the sectors of human activity that affect an ecosystem. The enormity of the challenge confounds planners and strains the administrative structures of governance. And scale is a big constraint to engaging as many stakeholder groups as good EBM practices require.

The scale problem is ever-present, not only in general ocean management, but also in targeted management that aims to protect or recover single stocks or species at risk. Highly mobile marine organisms, for instance, know no boundaries, and effective management may require interventions across the largest possible physical scale - the global ocean. Getting the scale right with highly migratory species means identifying all the habitats that are necessary for the species' survival and addressing risks that affect critical habitat as well as links in the chain of necessary habitats. Even today, most conservation plans are drawn up at a small scale and focus on only a link or two in the chain. The scale of conservation planning and management is thus not appropriate to the scale of the management needs.

One notable exception is the Southern Ocean where scientific research, monitoring, and fisheries management are all undertaken at scales appropriate to what appear to be the logical bounds of the marine system. The multinational body that oversees management, the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), is fortunate in that no one permanently resides in Antarctica. In this case, land use and watershed management do not push the boundaries of the management area upland as they do in other parts of the world.

This brings us to another dimension of the scale problem - how our actions, and the institutions that direct our actions, can align with the physically large and all-encompassing scale that EBM requires. Understanding ecosystem dynamics and linkages - between species, across biomes, and between humans and the rest of nature - is one step toward EBM, but certainly not the only one. Scoping the management problem may lead to a need for management that spans nations, institutions, and user groups of all kinds.

### Which is better: large centralized projects or letting a thousand flowers bloom?

But now I will suggest something heretical. Maybe we are too preoccupied with scale, and with getting uniform regulations of uses across geographical vast areas. Maybe, just maybe, baby steps toward EBM - taken over and over, replicated time and again - are enough to "get us to scale". Indeed, as I have observed decades of failure in global and regional scale negotiations and policy agreements, I can't help but think that maybe multiple small-scale efforts, spread across the globe, are our only hope for a sustainable future.

Years ago I was involved in evaluating the program of a major donor in environment and population. A debate raged among the board members, the program officers, and the grantees about which was better: investing in a few large projects that were carefully planned according to an articulated theory of change, or letting a thousand flowers bloom. We didn't settle on a definitive answer, but the considerations are similar to those having to do with the question of scale in EBM. Overthink it and plan too big and you could close the door on unanticipated opportunity and inadvertently restrict innovation. But let a thousand flowers bloom and you may never reach the scale needed for true EBM.

Perhaps this is where the coming together of top-down and bottom-up is most needed. We need to take chances, and attempt all kinds of management, at small scales and over very wide areas. The trick is letting the thousand flowers bloom into the garden one wants and needs.

So, in addition to needing an army of planners working with communities to sow seeds of effective management, we need leadership with global and long-term vision and a way to make national, regional, and global policies align harmoniously. Instead of creating very large-scale EBM initiatives, we might be better served by nurturing leadership to guide a multitude of small-scale EBM efforts.

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