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From Coast to Coast – Keeping the Ocean Integrity through Articulated Governance Regimes

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Ocean is one but governance regimes are legions and uncoordinated. Any coastal zone management initiative needs to be put into context at the next larger scale and so on as a contribution to the regional seas and global ocean integrity. The other way around, any global vision needs to be rooted into regional, national and local implementation. More than 20 years ago, the first Rio conference on environment and development (1992), then comforted in Johannesburg (2002) and again in Rio (2012), gave us the framework and principles of action towards the construction of new forms of governance including catchment and coastal areas integrated management,together with the ecosystem approach principles of the Convention of Biological Diversity and, a bit later, the Reykjavik Declaration on Responsible Fisheries (2001). Since then, many initiatives, policies or programmes have been launched and carried out all around the world but it seems like these new forms of governance are better achieved at small scale and the closer one gets to shore. There are still few practical examples in offshore systems and even fewer in wider systems that couple nearshore and pelagic areas. These experiences will be reviewed and lessons drawn regarding best practices in scaling up management to scales appropriate to vast, interconnected systems through actual holistic, cross-sectoral, and truly integrated management.

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Causes, Consequences and Mitigation of Hypoxia in Coastal Habitats

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The generally accepted causes of hypoxia (oxygen concentrations < 2 mg/Liter) in the coastal zone are 1. eutrophication resulting from nutrient loading, 2. water column stratification created by a freshwater plume and 3. excess terrestrial organic matter, but the relative importance among these varies between ecosystems and likewise has been the subject of intense debate. The consequences of hypoxia are 1. preservation of organic matter in the sediments, 2. elimination of both sessile and motile megafauna, and 3. a decrease in mean animal size and diversity among sediment dwelling invertebrates. Enhanced production of trace gases from anaerobic metabolism and diminished fisheries production may also be significant but remain open to question. Blooms of sediment-dwelling sulfide-oxidizing bacteria may prevent toxic sulfide from diffusing into the water column. Mitigation strategies include reducing nutrient loading, reducing freshwater flow and altering freshwater flow into wetlands, but there is wide-spread disagreement on which of these is most effective or even tractable. Climate change and human impacts in the coastal zone may increase the frequency and extent of hypoxia by increasing nutrient loading. Sea level rise may exacerbate loss of wetlands. Diminished supplies of freshwater to estuaries may increase salinities in estuaries and shrink the length of the fresh to salt water gradient in estuaries and near-shore, while flooding and sea level rise may extend the fresh-to-salt zonation pattern and increase stratification, thus enlarging areas of hypoxia. Increases in temperature will enhance vertical stratification and metabolic rates, both of which would add to the geographic areal extent of hypoxia and biological stresses. 'Ecosystem services' must be considered when remedial actions are to be considered, but these will differ depending of the ecosystem in question.

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