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The unintended consequences of simplifying the Sea: Making the case for complexity

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Many over-exploited marine ecosystems worldwide have lost their natural populations of large predatory finfish and have become dominated by crustaceans and other invertebrates. Controversially, some of these simplified ecosystems have gone on to support highly successful invertebrate fisheries capable of generating more economic value than the fisheries they replaced. Such systems have therefore been compared with monocultures created by modern agriculture on land, in that existing ecosystems have been converted into those that maximize the production of target species. It is however, widely recognized that monocultures are ecologically unstable. On land, crops and animals must be treated with a diverse array of chemicals and biological controls to maintain yields in the face of pests, weeds and diseases. Similar methods are also used in aquaculture but in the open sea, no such mechanisms exist. In this study, they explore the consequences of simplifying the sea and whether maintaining low-diversity conditions in the marine environment for our long-term exploitation is viable. By drawing on a number of concepts and case-studies we argue that, in many cases, the loss of large finfish has triggered dramatic ecosystem shifts to states that are both ecologically and economically undesirable and difficult and expensive to reverse. In addition, we find that those stocks left remaining are unusually prone to collapse from disease, invasion, eutrophication and climate change. We therefore conclude that the transition from multispecies fisheries to simplified invertebrate fisheries is causing a global decline in biodiversity and is threatening global food security, rather than promoting it.

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Spatial and seasonal variations of intertidal community in tropical estuarine sandy beaches

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The use of intertidal sandy beaches by fish and macro crustaceans was studied to identify the patterns on habitat use in space and time. With a beach seine net samples were taken between October 2010 and September 2011. Fish assemblage (density, biomass, number of species and trophic guilds) and the biomass of wrack showed significant interactions among all studied factors (shore, season and distance from the river mouth). Differences in the river discharge between shores lead to spatial and temporal patterns in the environmental variables (salinity, water temperature and relative tidal range and $CaCO_3$%) and faunal community (total density, biomass, number of species and trophic guilds). This habitat showed great importance to the early stages of marine and estuarine fishes which dominated this environmental seasonally suggesting an important habitat cycle and increasing the connection among the adjacent habitats (main channel, mangrove forest and coastal waters). This information reinforces the importance of estuarine adjacent coastal habitats for fish and invertebrates assemblages and the necessity to create strategies to management and conservation of these estuarine habitats.

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