

RESTORING CORAL REEFS, OYSTER BANKS, AND FISHERIES BY SEAWATER ELECTROLYSIS: COASTAL ZONE MANAGEMENT AND TOURISM APPLICATIONS

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Coral reefs are the most imperiled ecosystem, with accelerating mortality from globally increasing temperature, disease, and pollution. This threatens fisheries, tourism, shore protection, and biodiversity in over 100 countries. Oyster banks that once filled estuaries have almost vanished from over-harvesting and pollution. Corals and oysters are the only organisms building large wave-resistant frameworks that provide habitat for myriad other economically valuable organisms. We use very low voltage electrical currents to grow corals and oysters at faster rates than normal, even under normally lethal high temperatures and pollution, restoring these ecosystems where natural regeneration is impossible. The Biorock method directly provides energy for growth of skeleton and shells, leaving corals and oysters more energy for growth, reproduction, and resisting environmental stress. Field experiments in all oceans show that electrified corals and oysters grow faster and survive better, and quickly build up large populations of adult and larval fishes. Electric reefs can be constructed in any size or shape, allowing selective enhancement of desired fish and shellfish populations. This allows fishermen to grow reefs and sustainably harvest fish and shellfish instead of destroying wild populations. Hotels and dive shops can grow nearby reefs as beautiful tourism attractions that restore nearby fisheries and reduce pressure on natural reefs. Restoration of ecosystems and fisheries will be the major challenge of the coming century as increasing population and energy use cause global climate change and environmental degradation to accelerate.