## Marine ecosystem electrotherapy: Theory and practice

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Global Coral Reef Alliance

The biological effects of electrical currents, although known since 1780, took more than 200 years to be applied to marine habitat restoration. Over the last 25 years, low voltage electrical fields in seawater have been found experimentally to greatly increase growth rates of corals, oysters, sponges, seagrasses, and saltmarsh, and increase settlement of almost all attached and mobile marine organisms, including fish and shellfish. They result in highly diverse ecosystems, unlike conventional artificial reefs, as well as greatly increased survivorship during severe environmental stress. This allows maintenance of coral reef ecosystems under conditions, such as high temperatures, that would normally kill them, quickly restoring them in places where there has been little or no natural recovery, and has many applications in mariculture, in particular a new paradigm of sustainable mariculture based on complex ecosystems rather than monocultures. Unfortunately the practically proven benefits have been underutilized because little work has been done on biophysical mechanisms. All organisms make biochemical energy from the flow of electrical currents across membranes, which organisms must spend a large portion of their energy reserves to maintain. By providing an electrical potential in the right range, organisms are able to produce more biochemical energy, consuming less internal resources, allowing their cells to grow and divide faster, and more rapidly repair physical damage. These results have profound implications for greatly increasing ecosystem restoration, and also for more productive forms of mariculture and agriculture better able to adapt to future stresses caused by global warming.

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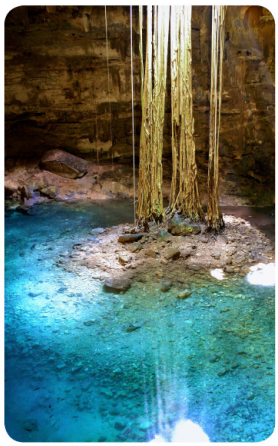
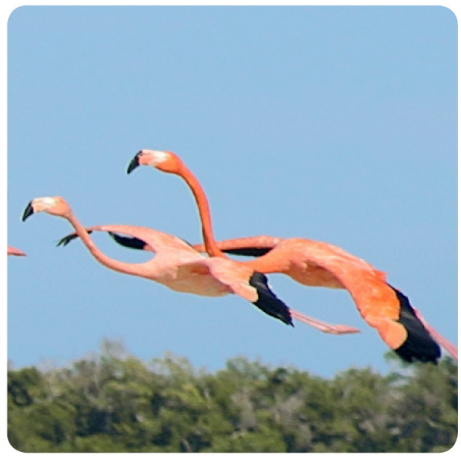
***Re-establishing the Link between Nature and Culture***



# Book of Abstracts

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