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# Deep-Sea Ecological Restoration Workshop

Séte, France

All images–David Moreno-Mateos, PhD

*Hypothetical deep-sea restoration at hydrothermal vent site*

In the fall of 2012 Biohabitats Principal Keith Bowers, was invited, along with other international, interdisciplinary experts, to participate in a workshop to examine, frame, and prepare a state of the science paper on the effective application of the science of restoration ecology and the practice of ecological restoration to restore deep-sea marine environments.

Oceans form one of the key operating systems of our planet, but they are in trouble. Climate change, overfishing, acidification, habitat destruction, pollution and the introduction of alien species are having a profound effect on ocean ecosystems. Areas of the deep sea floor (oceans beyond the shelf break and greater than 200 meters in depth) have been damaged, degraded, and destroyed by a host of activities including fishing, waste disposal, oil and gas exploration, and telecommunication lines. Further industrialization of the deep sea through bioprospecting and mineral extraction will add to the degradation of the sea floor. Until recently, the notion of restoring the deep-sea environment has not been contemplated. If we choose to continue to expand economic activities to deep-sea ecosystems, ecological restoration must play a prominent role in minimizing and repairing damages to deep sea floor ecosystems.

Led by Dr. Cindy Van Dover, Dr. James Aronson, and Dr. Linwood Pendleton, the group's outcomes were published in Marine Policy, "Ecological restoration in the deep sea: Desiderata." The paper builds upon the dialogue that occurred during the workshop. It offers perspective on planning and implementing ecological restoration projects to mitigate impacts to deep-sea ecosystems.

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*An international team of experts explores the viability of restoring deep-sea ecosystems degraded by human activities and offers guidance on planning and implementing such initiatives.*

The group examined the issues, logistics, practices, and costs associated with the restoration of a saltmarsh in San Francisco Bay as a basis for conceptualizing what it would take to restore two degraded deep-sea ecosystems (deep-sea stony corals on the Darwin Mounds off the west coast of Scotland, deep-sea hydrothermal vents in Manus Basin, Papua New Guinea). The complications, logistics, and uncertainties in deep-sea restoration suggest that costs may be two to three orders of magnitude greater per hectare for hypothetical deep-sea restoration projects than costs for restoration efforts in shallow-water marine systems.

*from top: Hypothetical deep-sea restoration at hydrothermal vent site; Hypothetical deep water coral restoration*

RELATED LINKS AND PUBLICATIONS—

Ecological Restoration in the deep sea: Desiderata

Ecology: Protect the deep sea