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An ecological framework for coral reef restoration

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Coral reefs are degraded worldwide by natural and anthropogenic stressors that cause loss of habitat, increased coral mortality, and reduced reproduction and recruitment. Loss of coral populations can also lead to dramatic shifts in reef community composition, trophic structure, and biodiversity. How do we restore degraded reef ecosystems? What ecological (and socio-econ) theories and tools should we apply? How can we advance ecological science through restoration research? I will not answer these questions in full but instead will provide a number of examples and approaches to understanding restoration bottlenecks and demographic processes that can be used in the science and application called ecological restoration. Certainly the solution is not simply to protect reefs with marine reserves as the removal of (some) human stressors has not led to reef recovery in key cases. Moorea, French Polynesia is a good model system in which to explore coral population dynamics of corals the abiotic and biotic factors that underlie reef persistence, resistance, and resilience.