NATIONAL CORAL REEF RESTORATION POLICY

What is coral reef restoration?

Active coral restoration is an increasingly cited tool for coral reef management especially with the ever increasing impacts of climate change. Restoration can be approached from two angles: physical and ecological. Physical restoration refers to the use of artificial reefs/structures (reef balls, Biorock, sunken ships, etc.). While any underwater structure will provide fish habitat, these methods may or may not promote stony coral growth, and their use is not addressed in this policy as in many instances, artificial reefs are placed where there were no pre-existing reefs-either to take pressure off an existing reef site, create a new recreational dive site (underwater statues in Mexico), or prevent shoreline erosion. The use, purpose and benefits of artificial reefs are still controversial and debated whereas active coral propagation and replanting is more widely accepted. Even in the case of large ship groundings, such as the *MV Westerhaven*, where the natural reef structures were flattened, no funds or expertise were directed from the fines towards physical reef restoration. Until an adequate reef restoration funding source is identified, reef managers in Belize are currently unable to address physical restoration on any large scale.

Ecological restoration as defined by the Society for Ecological Restoration International is "the process of *assisting* the recovery of an ecosystem that has been degraded, damaged or destroyed." For the purpose of coral reef management, ecological restoration is the priority target in Belize, and this is the definition used throughout this policy document.

Restoration efforts are usually designed to assist natural recovery processes. Where reef processes are severely impaired other management measures will be needed before restoration can have a chance at success. Assistance to natural recovery can be either passive or active. Passive measures involve indirect actions such as addressing anthropogenic threats that are hindering natural recovery such as nutrient pollution and overfishing. Active restoration measures may include transplantation/reattaching or re-righting of stony corals after a storm event or ship grounding, active *in situ* coral propagation for the purposes of re-planting and restoring other biota such as gorgonians, sponges, urchins, etc. ~~and~~ to aid in the rehabilitation of ecological processes~~)~~ to degraded areas.

Specifically restoration is the act of bringing a degraded ecosystem back, as close as possible, to its original structure and function. Rehabilitation is the act of partially or fully replacing structural or functional characteristics of an ecosystem that have been lost or reduced, or substituting alternative characteristics than those originally present, that may have more social, economic or ecological value than the degraded state. Often we aim for restoration but may only be able to achieve some form of rehabilitation. In restoration the main attributes that are considered are biodiversity and complexity on one hand and biomass and productivity on the other.

The goals of any restoration project must be clearly stated with suggested strategies for achieving them presented in the context of integrated coastal management. Targets or measurable indicators must also

be set to allow both the assessment of progress towards goals and adaptive management of the restoration project.

Any restoration effort or program must be combined with improved management of reef areas, active restoration is not a "magic bullet" and has only been carried out with some success at scales of a few hectares while reef degradation has occurred and is occurring at scales of tens to thousands of square kilometers. Active coral reef restoration does not include relocating corals to allow for dredging or development, nor does it include creating a new reef site where no reef previously existed.

Policy Statement

Restoration of Belize's coral reefs will follow ecological restoration principles and must occur with the aim of assisting recovery of an impacted coral reef to an improved state prior to the restoration efforts. Emphasis should be on keystone, endangered or rare species, with a focus on required genetic diversity for any restored species.

Any restoration efforts for tourism or mitigation purposes must be carefully screened through a rigorous process involving the Fisheries Department, Department of the Environment and local coral reef experts, before any approval is given, and requires permits from the Fisheries Department.

Goal

The goal of the national coral reef restoration strategy is to assist Belize's coral reefs to recover to their natural state using both passive and active restoration measures.

Objectives

1. **Map and prioritize coral reefs in need of restoration based on current health assessments**
2. **Identify passive restoration measures that would aid in recovery of these reefs**
3. **Identify active restoration measures to be used for recovery of the reefs**
4. **Develop a system for the selection of active restoration measures based on the reef status**
5. **Implement coral reef restoration in the priority areas identified**

What types of restoration projects are allowed?

- *Coral transplantation to increase natural coral cover and recruitment; using either natural fragments or in situ nursery grown corals*
- *Transplantation of biota to restore ecological processes such as herbivory i.e urchins*
- *Note: artificial reefs are not considered restoration.*

Criteria for approving restoration projects:

Priority areas are effectively managed conservation (no-take) zones.

- Sites that supported a natural coral community prior to disturbance.
- Sites that have sufficient conditions (water quality, etc.) to promote coral recovery
- Sites that have economic and/or ecological significance or priority
- Sites that are logistically accessible for regular maintenance and monitoring
- Stakeholder buy-in and participation (fishermen, tour guides, community members)

References:

Edwards, Alasdair (ed.) (2010) Reef Rehabilitation Manual. Coral Reef Targeted Research & Capacity Building for Management Program: St. Lucia, Australia.

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Johnson M.E., Lustic, C., Bartels, E. et al (2011) Caribbean *Acropora* Restoration Guide: Best Practices for propagation and population enhancement. The Nature Conservancy, Arlington, VA.