episodic temperature stress results in stepwise increases in the abundance of thermotolerant symbionts and that this process is accelerated under gradually warming recovery temperatures. Replicate cores from three colonies of the Caribbean coral *Montastraea cavernosa* were distributed randomly into treatments in a crossed factorial design, experiencing either constant temperature (26°C) or gradual warming (1°C every 6 weeks), and either short-term thermal stress (32°C, target ~25% symbiont community loss) or no bleaching. Symbiont community function was tracked using chlorophyll fluorometry, and tissue samples taken periodically were analyzed using actin-based qPCR assays to determine symbiont community composition. All cores were subjected to a final bleaching stress at 32°C to assess thermotolerance. This experiment will elucidate how gradual warming and punctuated bleaching stress affect symbiont community composition and drive changes in coral thermotolerance, and has implications for the response of reef corals to real-world warming scenarios.

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PRIORITIZING SUITABLE CORAL RESTORATION SITES THROUGH ASSESSMENT OF EXISTING CORAL MONITORING DATA (Abstract ID: 28793 | Poster ID: 535)

In the face of large scale coral reef decline, restoration efforts are increasing throughout the Florida Reef Tract. The general focus of these efforts is restoring Acropora cervicornis populations. Currently, there is little to no spatially explicit information regarding site prioritization for coral restoration efforts in Florida, where most restoration sites are selected using expert opinion alone. This study is the first step towards using spatially explicit information to guide restoration site selection in Florida. A species distribution modeling approach was taken to spatially prioritize restoration efforts along the Florida Reef Tract. A series of non-parametric species distribution models (SDMs) were constructed using species richness, coral cover, and A. cervicornis data. These SDMs were combined with other spatial data in the conservation software "Zonation" to prioritize restoration sites based on connectivity, species interactions, and health. The results of this work is an interactive tool that can be adjusted to support the unique goals of individual restoration projects.

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ASYMMETRIC, LARGE SCALE COMMUNITY RESPONSES TO CLIMATE OSCILLATIONS IN GALAPAGOS SUBTIDAL ECOSYSTEMS (Abstract ID: 29048)

Climate events such as El Nino Southern Oscillations (ENSOs) can drive ecosystems to a tipping point as thresholds are exceeded and a sudden transition to a different state (regime) occurs. We monitored benthic communities and oceanography in Galapagos rocky subtidal ecosystems at 12 sites for 14 to 17 years to test the hypothesis that ENSO's create non-linear effects leading to a regime change. Extensive bleaching of massive (Porites, Pavona) and branching (Pocilloporid) corals occurred during the La Nina phase of the 2006-2008 ENSO and again, during the 2010 to 2011 La Nina in response to unusually large temperature variability (30.0 -14.0 degrees C). Surprisingly, large increases in barnacle (Megabalanus) abundance coincided with coral bleaching during both La Ninas, suggesting higher barnacle recruitment during these productive periods. The asymmetric yin yang of ENSO effects was apparent in the negative impacts on corals via bleaching but positive, bottom-up effects on benthic food webs dependent on the large barnacles. Barnacle abundance on rock walls attained maximum abundances of 60 to 80 % cover at some sites in recent years concomitant with a greater proportion of corals overgrown by barnacles, suggesting a shift to a regime characterized by declining coral populations and increasing barnacles and their predators. Community responses of the most recent 2016 ENSO will be analyzed in the context of these hypotheses.
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EVALUATING THE QUALITY OF A LONG TERM CULTIVATION EXPERIMENT OF *OPERCULINA COMPLANATA* BY COMPARISON WITH THE NATURAL LABORATORY APPROACH (Abstract ID: 28635 | Poster ID: 290)

Larger benthic foraminifera contribute largely to the carbonate reef budget and are great tools in biostratigraphy. During the last decades they also got importance as indicator species for ecological monitoring. Even before their advancement as bioindicators, laboratory experiments have been conducted to investigate their biology, ecology and reproduction. While recent studies have focused on the effects of single ecological parameters mostly in short term culture experiments (few days to some weeks), the majority of results still shows growth abnormalities and truncated lifespans even in control groups, indicating some imperfections in the culturing systems, which hardly represent open water conditions. Therefore, to fully understand growth and life span of different species and to improve their use in various fields, long term cultivations attempts must be conducted trying to get the perfect equilibrium between cells and environment. This study presents theoretical growth models of *Operculina complanata* based on a 15 month cultivation experiment with 186 specimens and compares them to first results of the equally long Natural Laboratory Approach both conducted at Sesoko station (Okinawa, Japan). Culturing parameters such as temperature, light intensities, salinity and pH and light-dark duration were continuously adapted according to the measurements in the field. The average cell life time in culture was 77days, 13 Individuals lived more than 200 days, 3 reproduced asexually and one sexually, 14% of the individuals were lost and 22% died within the first month.

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FISHING ENDANGERS THE TROPHIC STRUCTURE OF THE CORAL AND SHARK DOMINATED SYSTEM OF THE WOLF AND DARWIN ISLETS (GALAPAGOS): INSIGHTS FROM MODEL SIMULATION (Abstract ID: 27815)

The Galapagos archipelago is known for its great diversity in marine species distributed over distinct biogeographic regions. We hypothesized that these regions not only differ in species and/or their relative abundances, but also in overall biomass and resource productivity with implications for fisheries management and conservation. We thus modeled and compared the trophic structure of the south western Bolivar Channel (BC) upwelling system and the coral dominated northern system of the Darwin and Wolf (DW) islets using the Ecopath with Ecosim approach. Results indicate that the BC very much resembles classical upwelling systems off the coast of Peru with high primary production, low level of maturity, high biomass at lower trophic levels, high energy flow, and sea lions as dominating top predators. The coral reef dominated system (DW), to the contrary, showed a more complex food web structure, a higher degree of system maturity and a concentration of fish biomass in large predators (55%) that were identified as keystone species largely controlling intermediate predators. By using the reference models of both systems to explore the effect of increased fishing pressure, a negative impact was pronounced in the coral DW system, where the increased removal by herbivore controlling fish, would eventually lead to an alternative system state with sea urchins dominating the benthic biomass. We argue that an increase in fishing pressure in the presently still semi-pristine coral and shark dominated northern area of the archipelago (DW), would easily lead to loss of one of the most unique ecosystems of Galapagos and propose strong conservation enforcement for the DW region.

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VULNERABILITY OF THE GREAT BARRIER REEF TO GLOBAL AND LOCAL PRESSURES: IMPLICATIONS FOR EFFECTIVE MANAGEMENT AND POLICY DECISIONS IN A WARMING OCEAN (Abstract ID: 29087)

The Great Barrier Reef (GBR) has lost half of its coral cover during the past thirty years, attributed predominantly to storms, crown-of-thorns starfish (COTS) and, to a lesser extent, bleaching. Two questions at the core of GBR management plans are: how vulnerable and resilient will the GBR be to future environmental scenarios, and what will the relative importance be of different local or global disturbances? To answer these questions we use a spatially explicit model of coral cover dynamics (mortality and growth) parameterized by four input functions: warming, storms, water quality and COTS. Using a series of 8 scenarios representing combinations of climate change (based on three AR5 global circulation models) and local stressors, we analyse spatial and temporal trends and uncertainties associated with future impacts. Our results demonstrate that coral resilience will decline in pace with climate change under all three RCPs. Local and regional management actions (land-use management, COTS control, spatial planning) can compensate for this resilience loss on some reefs in the near-term (10 – 20 years), but by 2050 these actions can no longer mitigate the loss imposed by climate change. The implications of these results for management and policy decision problems are discussed, particularly the need to better acknowledge and account for the limits of local scale action when dealing with the global problem of climate change.