ICRS 2022 Fox et al. Abstract - due Feb 23

Title: Can the Allen Coral Atlas indicate adaptive capacity of coral reefs?

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Scientific evidence is mounting to indicate that corals can adapt to the effects of climate change if emissions are brought under control and corals have sufficiently high genetic variability. In addition, marine practitioners have highlighted a critical need for guidance on how to integrate climate resilience into MPA design and management. However, methods to identify proxies for adaptive capacity at scales that can inform conservation efforts and match local management systems do not currently exist. The emergence of the Allen Coral Atlas, a new mapping initiative, provides high-resolution maps of shallow water (<10-15 m) geomorphic reef zones, benthic habitats, and bathymetry that can be used for reef conservation and planning. We explore the extent to which habitat complexity, as detected by the Atlas, can inform adaptive capacity. Beta-diversity is a common index used to assess environmental heterogeneity within natural systems, indicating the change in species/habitat composition across a landscape. We calculated beta-diversity from benthic and geomorphic classes and also examined other remotely-sensed data sources that provide potential key indicators of resilience, e.g. depth, slope, aspect, and connectivity, to model how these indicators are linked to ecological metrics related to reef resilience and adaptive potential. To assess correlations between the Atlas beta-diversity metrics and thermal diversity, we measured diversity and habitat structure in the field, and we also installed in-situ temperature monitors (TidBits and real-time Aqualink smart buoys) in the Bay Islands of Honduras. If, as we hypothesize, the Atlas can identify locations of greater habitat and thermal diversity, these metrics can be scaled up and used to better incorporate the principles of adaptive capacity and reef resilience into marine spatial planning processes.

Planning to submit to:

Session: 7D - Scaling up: what lessons can we learn across larger scales for understanding coral reefs?

(Emma Kennedy, Chris R, Sarah Hamylton, Greg A)

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