Current Management, Conservation, and Research Imperatives for Philippine Coral Reefs

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The recent nationwide assessment of 206 fringing reefs in the Philippines revealed the loss of one-third of their hard-coral cover such that none qualified to be in excellent status. These findings, taken in the light of recently published studies showing that marine protected areas (MPAs) by themselves are not sufficient to protect corals and coral reefs against climate change impacts, indicate the need for urgent management and conservation action. We must implement statistically robust, methodologically-sound monitoring of reefs coupled with local and national government action to manage and protect reefs from the direct impacts of human activities. Laws and regulations must also be reviewed and updated. We must also identify and map the well-developed reefs in the country. These reefs tend to have higher coral cover and diversity and have endured the environmental challenges over thousands of years. With our help, they may serve as Noah’s ark reefs of the future.

Keywords: climate change, coral cover, coral reefs, diversity, monitoring

Coral reefs are significant to the Philippines, not just in terms of their contribution to the economy (Tamayo et al. 2018) but to food security (Cabral and Geronimo 2018) and shoreline protection (Villanoy et al. 2012). The outstanding biodiversity that local reefs harbor is also globally significant (Sanciangco et al. 2013). Sadly, the results of a recent nationwide assessment (Figure 1) indicate the loss of about a third of the corals in these reefs such that none of the 206 stations surveyed qualified to be in “excellent” status (AM Licuanan et al. 2017; WY Licuanan et al. 2019a). As this loss occurred, management and conservation action had been limited to a ban on the collection and export of reef-building corals (a policy that is currently being reconsidered) and the establishment of MPAs. But MPA establishment in the country is mostly aimed at fishery enhancement. Yet, most MPAs are too small to offer appreciable protection to reef fish stocks (median diameter of 387 m in Philippine MPAs vs. 2 km worldwide; Krueck et al. 2018; see also Muallil et al. 2019). Most MPAs in the Philippines are hampered by significant social, economic, and even political constraints of the local governments involved (Muallil et al. 2019). Hence, more recent efforts involve MPA networks, protected seascapes, fisheries management areas, and a greater emphasis on ecosystem-based approaches to fisheries (see WY Licuanan et al. 2019b). MPAs, even if embedded within networks, would still have to be far larger if they are to have conservation benefits and if there is little or no regulation of fisheries exploitation rates in adjacent areas (Gaines et al. 2010; Muallil et al. 2019). The loss in 2016 of 30% of
coral cover of the Great Barrier Reef, the most extensive and best-managed reef system in the world, demonstrates that area management does not protect against climate change and the consequent mass bleaching events (Hughes et al. 2018; see also Darling et al. 2013). However, MPAs remain indispensable in reducing overfishing and for hastening recovery and reassembly of coral communities and the fish and invertebrates that depend on them (but see Bruno et al. 2019). We must do more to ensure the survival of coral reefs in the Philippines.

As a country, we must undertake sustained, regular monitoring of reefs (Gomez et al. 1994; Licuanan and Aliño 2014). More importantly, this monitoring must be linked to management actions (Licuanan and Aliño 2014), both at the local (e.g. restrictions on anchoring, restriction of access to bleached reefs) and the national level (e.g. enhanced regulation of road construction on slopes leading to the sea and rivers that open into the sea). Assessments only reveal what we have lost, but proper monitoring can generate timely management-actionable information. Laws and regulations must also be reviewed and updated, beginning with those that define environmentally critical areas (see AM Licuanan et al. 2017) and consequent limitations on government infrastructure programs (especially coastal reclamation and port building) that impinge on these critical areas.

Scientists must update their reef assessment and monitoring methods to collect statistically robust data on the abundance and sizes of corals and their diversity (Licuanan and Aliño 2014). The measurement of coral cover alone must be de-emphasized (for example, see Boco et al. 2020). Reefs classified under Category A for hard coral cover and diversity (Figure 1) have a greater variety of life histories available to resist and quickly recover from future challenges (see Table 2 of WY Licuanan et al. 2019a). These updated methods must be image-based, and the images and data generated by these methods must be integrated at the national level (Licuanan and Aliño 2014).

Scientists must also mount a multi-disciplinary effort to find, explore, and map the boundaries of well-developed...
reefs (Licuanan and Aliño 2014). These reefs – with a reef slope distinct from a reef flat – are larger, geologically older, and generally support a higher number and diversity of corals (WY Licuanan et al. 2019a). These Holocene reefs were built over thousands of years by coral growth (see Shen et al. 2010) while enduring warming events and changes in sea level (Maeda et al. 2004; Montaggioni 2005). Other studies have also identified reef areas that recently experienced less severe environmental stresses or, conversely, experience environmental extremes that allow their corals to be pre-conditioned to some stressors (Beyer et al. 2018; Camp et al. 2018; Sully and van Woestik 2020). With our help, these reefs may better endure the climate challenges of the future.

Other criteria, such as the presence of rare species, must also be used in identifying reefs to be prioritized for conservation. The abundances of these species must be tracked when monitoring reefs. There is already evidence that the ranges of at least two globally endangered coral species in Philippine waters have contracted (WY Licuanan et al. 2019a). These species may have to be recategorized to Critically Endangered status based on the criteria of the International Union for the Conservation of Nature. Their habitats have to be protected and managed.

The COVID-19 pandemic teaches us that monitoring, early warning, and timely and strategic action are vital. So is the development of scientific personnel, infrastructure, and institutions to support management interventions. Since the recent nationwide assessment, several individuals from regional higher education institutions, local governments, and national agencies have been trained to undertake more detailed assessments and the monitoring of reefs (see Luzon et al. 2019 for protocols). Protocols for citizen science monitoring of reefs are also being introduced to coastal communities to reduce the constraints imposed by the shortage of expertise and equipment. Hopefully, these would complement efforts to quantify management effectiveness and incentivize best practices. The Great Barrier Reef was tested by ocean warming again this year; hence, mass coral bleaching may be upon us again soon. We must do better to identify, map, monitor, and protect the Noah’s ark reefs of the Philippines.

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