**Management and Policy Recommendations for the Improvement of MPA Management in Miagao, Iloilo Philippines**

**Executive summary**

Marine Protected Areas (MPAs) are widely used tools in managing coastal resources and regulating anthropogenic activity that may potentially negatively affect the resources. In 2015, the Miagao LGU established three MPAs as a response to declining fish catches in the nearshore fishing grounds. However, it is difficult to determine whether the MPAs have been effectively managed and are performing in line with the local government’s resource management goals due to several gaps in important aspects of MPA management. It is important to identify and address these gaps to maximize the conservation of the coral reef resources and the economic benefits that the stakeholders can obtain. It is recommended that the MPA management body should prioritize the establishment of a management plan for each MPA. The plan should include detailed financial plans, regular coral reef monitoring protocols, IEC activities, and other programs that can enhance the effectiveness of the MPA. It is also recommended that the socio-economic benefits derived from MPAs be examined.

**Establishment of Marine Protected Areas in Miagao, Iloilo**

Establishing a marine protected area (MPA) is a coastal management tool widely used in the Philippines to protect coral reefs from various stressors and overfishing. An MPA is defined as “the area of the sea established and set aside by law, administrative regulation, or any other effective means, in order to conserve and protect a part of or the entire enclosed environment, through the establishment of management guidelines” (White et al. 2014). They are classified based on governance levels as nationally managed MPAs (established through the Republic Act 7586 or National Integrated Protected Area System (NIPAS) Act of 1992) and locally managed MPAs (established through the Republic Act 8550 or the Fisheries Code of 1998). At least 1,800 MPAs are established in the Philippines, most of which are locally managed (Muallil et al. 2019; Cabral et al. 2014).

The municipality of Miagao,in the province of Iloilo, is a coastal municipality located south of Panay Island. Fishing is one of the important livelihoods of locals especially those living in the coastal areas. Fishers have reported, however, that catches have been dwindling for past decades due to unregulated fishing and overfishing particularly in the nearshore areas.

To help address this decline in fishery resources, the local government of Miagao legislated the Municipal Marine Sanctuaries Ordinance of 2015 (Ordinance No. 2015-26). This ordinance established three pilot coral reef marine protected areas (MPAs), described the composition and responsibilities of the members of each MPA’s management board, and set guidelines on what are allowed and prohibited activities within the MPA. The three pilot MPAs were the Damilisan Marine Sanctuary (DMS), Lanutan Marine Sanctuary (LMS), and Gines-Calampitao Marine Sanctuary (GCMS).

The extent of the area covered by the MPAs were based on recommendations by Gubralson (2014) after a volunteer survey team examined the coastal habitats of Miagao in 2014. A baseline assessment of the coral diversity and abundance and a visual census of the coral reef fishes was conducted for the reefs in Barangays Lanutan, Gines, and Calampitao which became the basis for the establishment of the Lanutan Marine Sanctuary (LMS) and Gines-Calampitao Marine Sanctuary (GCMS). The Damilisan Marine Sanctuary (DMS), however, was established without any baseline survey on its coral and reef fish abundance and diversity. It was not until 2019 that an initial survey of its coral and reef fish composition was conducted (Regalado et al. 2024). Activities supporting the MPAs were mostly led by the Municipal Agriculture Office, which are mostly focused on informing fisherfolks about the regulations in activities in the MPA and its vicinity.

**Gaps in MPA Management**

The MPAs of Miagao have been established for almost a decade now. However, there are still many aspects in the management of these MPAs that can be improved. Without adequate information about the health of the coral reef and the management effectiveness of the MPA, it is difficult to determine whether MPAs are “performing” as it is intended to. It is therefore important that specific gaps in MPA management be identified and necessary steps for its improvement be implemented.

Based on the Management Focus Criteria listed in the MPA Management Effectiveness Assessment Tool (MEAT) of the Department of Environment and Natural Resources (DENR), many aspects of effective MPA management are still absent in the MPAs of Miagao. A study conducted by Legaspi (2022) using the MPA Management Effectiveness Assessment Tool (MEAT) which examined management effectiveness of the DMS found major gaps in effective MPA management which include lack of an existing MPA Management Plan, no consistent budget allocation, lack of information, education, and communications plan and activities, limited infrastructure development, and lack of activities led by the MPA management boards. Furthermore, after the baseline assessments conducted in 2014 in LMS and GCMS, and in 2019 in the DMS, there were no other coral reef and fish census surveys ever conducted in these MPAs and management effectiveness of these two MPAs were not assessed.

**Policy Recommendation**

To improve management effectiveness of the MPAs of Miagao, Iloilo we advocate the **Establishment of an MPA Management Plan for each MPA.** As of this writing, there is no MPA Management Plan for all the three MPAs of Miagao. An MPA Management Plan should contain current information about the MPA and serves as a guide for managers which activities should be conducted and prioritized for effective and sustained management of the MPA. Among others, the MPA management plan should include the following:

* **Clear budget and financial plan for activities of the MPA.** It is important to ensure that there is annual budget allotted for supporting activities in managing the MPA. Most of the financial support coming the LGU is focused on law enforcement and should also expand to activities aligned with the MPA Management Plan. The plan should allocate adequate amounts for regular coral reef monitoring, support for regular law enforcement patrolling, IEC activities, and incentives or support during regular meetings of the MPA management boards of each MPA.
* **Regular monitoring of MPA Effectiveness.** MPA effectiveness should be examined regularly to help inform managers which areas of ideal MPA management they can improve on. Ideally, the coral reef areas and the environment within its vicinity is surveyed every year to allow monitoring of annual and interannual changes in key reef health indicators. Additionally, tools such as the MPA Effectiveness Assessment Tool can be used to assess management performance annually.
  + **Updated coral reef surveys.** It should be prioritized that the MPAs be surveyed again to compare baseline information with recent information on coral and reef fish abundance and diversity. A regular monitoring plan should also be put in place to track the condition of the hard coral and the reef fish abundance and diversity as these are important indicators of various changes in the coral reef condition. Ideally, the coral reef areas and the environment within its vicinity is surveyed annually.
  + **Adopting participatory and recent survey methods.** Recent coral reef survey methods described by Licuanan et al. (2019) and citizen science methods (Licuanan et al. 2020) were both adopted by the DENR and are recommended when conducting monitoring surveys on the reefs to enable the information to be compared to other studies in the Philippines. These methods use letter “grades” and are not “value-laden” compared to previous methodologies (e.g., assigning status of coral reefs as “poor” or “fair”). Methodologies that don’t require highly technical skills and expertise and is participatory in nature when examining coral reef fish abundance and composition can also be adopted such as the methods described in MPA-FishMApp ([MPA-FishMApp - USACFI](https://www.usacfi.net/mpa-fishmapp.html)). The MPA-FishMApp has integrated web-based tools to help analyze and visualize the data collected during surveys.
  + **Incorporate data-science methods in future studies.** Examination of coral reefs and the changes while implementing an MPA is requires a variety of data. Trends in coral reef abundance and reef fish composition may happen in long-term time scales (multiple years to decades) with various disturbances such as climate phenomena (El Nino, La Nina), typhoons, and anthropogenic activity all interacting making the study of changes in the reefs very complex. Participatory approaches and data-limited approaches have been the go-to solution for examining coral reefs and MPAs due to the limited data most of the reefs and MPAs in the country have. However, adapting data-science methodologies and approaches may be key when it comes to incorporating various data streams and analyzing them to see interacting factors that impact the health of coral reefs and the ecosystem services that locals benefit from. An alternative to manual coral reef fish survey is the FISH-I service ([FISH-I | DOST Technology Transfer](https://tapitechtransfer.dost.gov.ph/technologies/it-development/fish-i) <https://tapitechtransfer.dost.gov.ph/technologies/it-development/fish-i>) which uses artificial intelligence to identify and quantify reef fishes. The local government may consider investing on these technologies or contracting the services of FISH-I to conduct reef fish assessments on the coral reefs. Additionally, visualizing and mapping the various coral reefs and coastal resources using Geographic Information Systems (GIS) can aid in the analysis of information regarding their status. GIS outputs can also be used to map and visualize threats and hazards that can affect the health of the coral reefs in the MPAs.
* **Examine other aspects such as socio-economic benefits from MPAs.** It is important that the MPAs be also examined based on their effectiveness in providing socio-economic benefits to the local community which directly utilize the coastal resources from fishing. It is recommended that the MPA managers use an assessment tool such as the Socio-Economic Assessment Tool (SEAT) (Rosales 2018).

The MPAs of Miagao may have the policy and management recommendations

may have important benefit to the fishing community of Miagao. The highlight its biodiversity, as well as important , potential for coastal tourism and other income-generating programs. MPAs provide long-term benefits to the community.

**Conclusion**

This brief identified gaps in the management of MPAs in Miagao, Iloilo and provided recommendations in order to improve management effectiveness of these MPAs. The management of MPAs should be data-driven and evidence-based based to ensure that the implementation of planned programs and activities are appropriate for the effective management of each MPA.

**Link to original research /analysis**

The contents of this policy brief was mainly based on the study “Initial Assessment of the Benthic Profile and Reef Fish Composition of the Damilisan Marine Sanctuary, Miagao, Iloilo, Philippines” ( <https://nfrdi.da.gov.ph/tpjf/vol31/research_article_regalado_et_al_31120230039>) and unpublished undergraduate student theses from BS Fisheries students of the College of Fisheries and Ocean Sciences.

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