

Status of protected areas in tablas island romblon, philippines

Abstract

Status of protected areas located at Barangay Budiong, Odiongan and Bunsuran, Ferrol, in Tablas Island, Romblon, Philippines were assessed last February 22 and 23, 2012. The average live hard coral cover (HC) inside Budiong-Odiongan MPA was lower (32%) than that of the outside (45%) but both were categorized into fair condition. For Bunsuran-Ferrol MPA, HC were the same (30%) and in fair condition. The fish density outside of the Budiong MPA was less than inside, but the biomass of the outside was higher than that of the inside. This suggests that the fishes outside MPA might have larger sizes than those inside Budiong MPA. This maybe brought about by the relatively higher live coral cover outside MPA. Bunsuran-Ferrol MPA has also better fish assemblage status both outside and inside of MPA than the Budiong-Odiongan MPA. As for livelihood potential, the number of commercial Families of fish species was seven in the inside of Budiong-Odiongan MPA, while six Families in the outside. The results indicate that the two reefs studied in Tablas Island have undergone high fishing pressures in the past so that it needs immediate nourishment, protection, and management. The low biomass of fish in MPA could be solved by means of restocking of relevant species on the reef. By improving the fish and macro-invertebrates, livelihood of fishers is expected to improve.

Keywords: Marine Protected Area, Corals, Fish Assemblage

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Abbreviations: MPA, Marine Protected Area; LGU, Local Government Unit; DENR, Department of Environment and National Resources; WWF, World Wide Fund; SCUBA, Self-Contained Underwater Breathing Apparatus

Introduction

Primary concern of our country today is the prevalent poverty in the coastal areas and the continuous degradation of our natural resources. This complex and interconnected problems have existed for many decades yet solutions still face uncertainties.¹ Well managed MPA can help sustain and enhance the populations of target species within and outside the protected areas^{2,3} thus can help in improving the life of local community.

Establishment of MPA is one of the strategies for coastal resource management. It is an intervention to resolve the open access status of coastal fishing ground that often creates complicated problems and issues in coastal waters. Jointly implementing MPA and coast watch system is the most popular coastal management intervention in the Philippine LGUs today.⁴

Success of several community-based MPAs in the Philippines were reported by.^{5,6} However, there is a concern that the majority of the MPAs are not effectively managed^{7,6} and are mostly not achieving marine biodiversity conservation,⁸ fisheries enhancement or other objectives.⁹

Improved habitat conditions in terms of coral cover and fishery yields associated with MPAs are associated with management success of the area. Thus this study aims to gather baseline information of the resources within and outside MPAs where inside MPA is protected, while outside MPA is not protected. Thus, the main objective of this survey is to assess the live coral cover and coral reef fish assemblage at the inside and outside of the MPAs of Ferrol and Odiongan, Romblon

to serve as baseline information for future impact evaluation of these MPAs.

Materials and methods

Diver researchers from Municipal LGU of Zambales, DENR-Region 2, Provincial Government of Romblon, and Project Management Consultants formed a team to conduct the MPA resource survey in Odiongan and Ferrol, Romblon. The survey was carried out in February 22 and 23, 2012 at Barangay Budiong, Odiongan and Bunsuran, Ferrol, respectively.

Self-Contained Underwater Breathing Apparatus (SCUBA), Line Intercept Transect (LIT) Method following¹⁰ was used to conduct live coral cover survey and Fish Visual Census (FVS) in and outside MPA. Three 50-meter transects were laid inside and another three transects outside of the MPAs at water depths between 6-10 m (20-30 ft). Temporary markers made of twine and empty plastic bottles were temporarily used to mark the beginning of the replicate transects. Locations of MPA surveyed are shown in Figure 1. Coordinates were recorded (Table 1) using GPS MAP Garmin 76S.

Benthic life forms were classified according to¹⁰ (Tables 2&3). Counts at family and species levels of the fishes were made. All fishes encountered within 5m on either side, and 5m above the transect line were identified and recorded. The total length of fish was estimated in centimeters, which was later used to estimate the individual fish biomass.

Fish biomass were computed using combined a and b values from WWF (used in Tubbataha Reefs),^{11,12} The a and b values of Palla et al.¹² was used because these were derived from fish samples gathered within Philippine waters, unlike values being used which was gathered based on samples outside the country. References used for fish identification were.¹³⁻¹⁶ A matrix on the above a and b values was

compiled for use in succeeding surveys as standard reference for line agencies and LGUs. Some divers from LGUs were taught to compute

biomass during the transcription of data for sustainable use in other sites and capacity building.

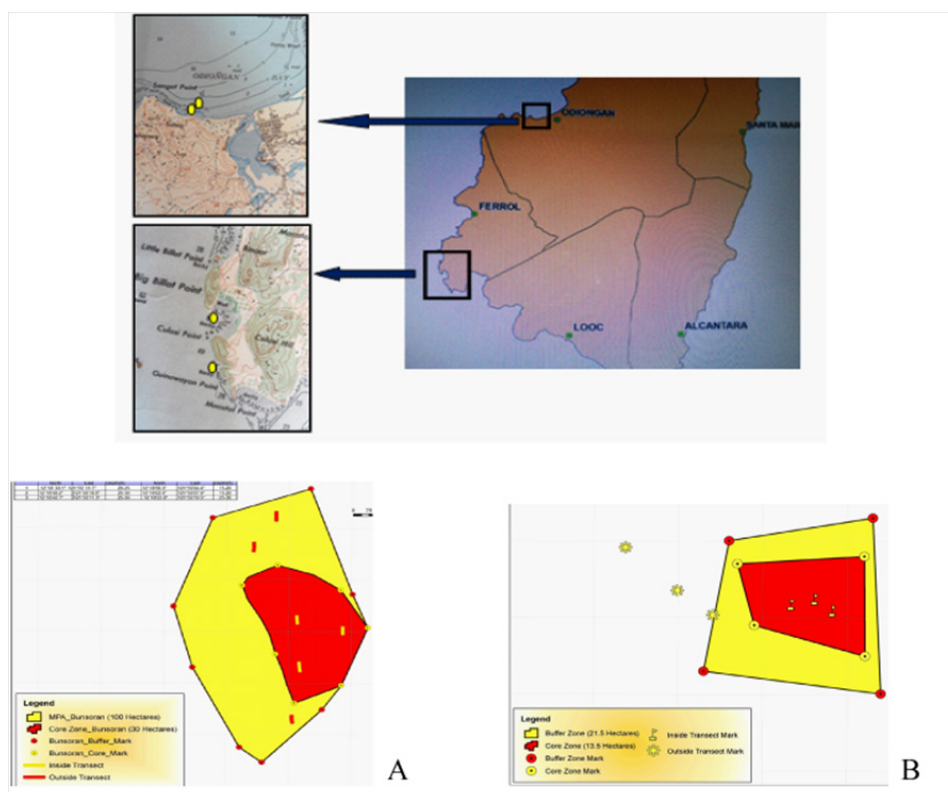


Figure 1 Map of the province of Romblon, showing the estimated locations of inside and outside MPA sites (in yellow dots) surveyed in Odiongan and Ferrol; (A) showing location of transect lines laid inside (yellow bar) and outside (red bar) of Bunsuran-Ferrol MPA; (B) showing location of transect lines laid inside (flaglet) and outside (asterisk) of Budiong-Odiongan MPA.

Table 1 Longitude and latitude of area surveyed with their corresponding depth

T. No.	Inside budiong MPA			Outside budiong MPA		
	North	East	Depth(ft)	North	East	Depth(ft)
1	12°24'20.9"	121°58'08.3"	15-20	12°24'20.3"	121°57'54.1"	20-25
2	12°24'22.4"	121°58'06.2"	15-20	12°24' 23.5"	121°57' 49.9"	15-20
3	12°24' 21.7"	121°58'03.4"	15-20	12°24' 29.1"	121°57' 43.7"	15-20

T. No.	Inside Bunsuran MPA			Outside Bunsuran MPA		
	North	East	Depth(ft)	North	East	Depth(ft)
1	12°18' 33.1"	121°55'11.7"	20-25	12°18'56.3"	121°55'04.4"	15-20
2	12°18'40.2"	121°55'18.6"	25-30	12°19'02.4"	121°55'07.9"	15-20
3	12°18'42.1"	121°55'11.3"	25-30	12°18'23.0"	121°55'10.5"	25-30

Results and discussion

Live Coral Cover-Budiong MPA, Odiongan

Percent hard coral (HC) cover in Odiongan MPA ranged between 17-46% (Table 2). The live hard coral cover at the inside of the Odiongan MPA ranged from 16-31%, while 44-46% at the outside. The highest was recorded in Transect 2 (T2) at the inside of the MPA (47.4%), followed by T1 at the outside of the MPA (46.2%).

The average live hard coral cover inside (32%) and outside (45%) of Budiong-Odiongan MPA are both categorized as in fair condition. The percent HC cover outside the MPA was higher than the inside MPA.

According to the *Bantay Dagat*, the MPA in Budiong was established in 2002, meaning it is already 20 years old. However, the trend in coral growth and status can't be inferred upon since they have no data base to compare with. Thus, this newly acquired baseline data should be kept for future monitoring and evaluation.

The findings that the corals outside the MPA have higher live cover than the inside, maybe accounted to inadequate implementation of coastal law or frequent monitoring and surveillance of the MPA. With the presence of many fishing activities within the immediate vicinities of MPA, it is likely that live coral cover outside MPA will be lower than that of the inside.¹⁷ As such, it is very critical to conduct monitoring of coral cover to verify and confirm the above notion. MPA area may be expanded to include areas with better coral cover.

The coral reefs of Budiong were dominated by hard massive corals. Coral reefs in Budiong-Odiongan MPA were silted having high turbidity due to its proximity to Bungoy and Bangon Rivers of Odiongan. The siltation in the area might also be aggravated by the extensive beach seine fishing in the vicinity, where these net gears were being dragged towards the shoreline, disturbing the sea bottom. This causes problems since coral won't thrive long or cannot grow fast in silted areas.¹⁸ Unsustainable or damaging fishing practices could damage the coral reef and as an effect could degrade fish catch of fishermen.¹⁹

Base on observation, there was a space gap between the coral reef of the MPA and the adjacent thick mangrove communities. This space gap contained a coral reef with 44% live coral cover, T2-outside. This space can serve as a medium to connect and relate the coral reefs and the mangrove ecosystems, thus must be included as part of the MPA. The MPA must also be expanded to nearby areas which are not silted.

Live Coral Cover-Bunsuran MPA, Ferrol

Percent hard coral (HC) cover in Ferrol MPA ranged between 22-36% (Table 3). The live hard coral cover at the inside of the Ferrol

MPA ranged from 27-34%, while 22-38% at the outside. The highest was recorded in Transect 2 (T2) at the outside of the MPA (37.6%), followed by T3 at the inside of the MPA (33.8 %).

The average live hard coral cover inside (30%) and outside (30%) of Bunsuran-Ferrol MPA are both categorized as in fair condition. The percent HC cover outside the MPA was the same as that of the inside MPA.

The Bunsuran-Ferrol MPA has a more organized Bantay-Dagat with a bunkhouse for the members right in front of the MPA compared to Budiong-Odiongan MPA. However, the same with Budiong-Odiongan MPA, it has no baseline data for coral reefs, thus trend in coral growth and status can't be inferred upon. Hence, this newly acquired baseline data will be very useful to future monitoring and evaluation.

One of the outside transects, T2 has detected relatively high coral cover. This area has a potential for good coral growth and fish abundance. This area should be included in the expansion of the MPA as a regulated activity zone.

Table 2 Percentage live cover of benthic life forms inside and outside of Budiong MPA, Odiongan, Tablas Island, Romblon

INSIDE	INSIDE				OUTSIDE			
	T1	T2	T3	AVE	T1	T2	T3	AVE
HC	31.32	47.4	16.96	31.89	46.2	44	46	45.4
SC	0	2.7	2.36	1.68	0.8	1.14	0	0.64
OT	29.06	0.2	0.86	10.04	0	0	1.68	0.56
SP	1.04	0.3	0.12	0.48	0.5	0	1.2	0.56
	0	0	0	0	0	0	0	0
DC	0	0	0.34	0.11	0	0	0.6	0.2
DCA	26.42	3.9	24.14	18.15	31.9	39.72	46.8	39.47
AL	0.1	2.5	0	0.86	1.4	0.8	1.72	1.30
	0	0	0	0	0	0	0	0
RCK	0	0	0	0	0	0	0	0
SLT	4.1	22.9	55.22	27.40	8.4	0	0	2.8
S	7.76	19.3	0	9.02	10.8	14.34	2	9.04
other AB	0.2	0.8	0	0.33	0	0	0	0
TOTAL	100	100	100	100	100	100	100	100

*Adjectival rating on coral reef condition was used to assess the health of coral community: <25% - poor; >25% but <50% - fair; >50% but <75 - good and >75 - excellent. Gomez et al.²²

Table 3 Percentage live cover of benthic life forms inside and outside of Bunsuran MPA, Ferrol, Tablas Island, Romblon

INSIDE	INSIDE				OUTSIDE			
	T1	T2	T3	AVE	T1	T2	T3	AVE
HC	26.8	29.6	33.76	30.05	21.94	37.56	29.6	29.7
SC	1.8	2.1	0.32	1.40	0.94	17.34	7.3	8.52
OT	6.8	3.4	9.26	6.48	5.7	5.86	4.1	5.22
SP	3.6	8.8	13.62	8.67	13.08	7	0.6	6.89
	0	0	0	0	0	0	0	0
DC	0.4	29.6	12.14	14.04	28.94	2.08	0.3	10.44
DCA	39.4	0	0	13.13	0.5	9.5	37.1	15.7
AL	1	1.4	0	0.8	0.34	0	2.8	1.04
	0	0	0	0	0	0	0	0
RCK	1.8	11.6	14.62	9.34	21.66	14.7	11.5	15.95
S	14.7	12.6	15.98	14.42	4.5	5.36	0	3.28
RUB	3.7	0.9	0.3	1.63	2.4	0.6	5.3	2.76
TOT	100	100	100	100	100	100	100	100

*Adjectival rating on coral reef condition was used to assess the health of coral community: <25% - poor; >25% but <50% - fair; >50% but <75 - good and >75 - excellent. Gomez et al.²²

Table 4 Profile of reef associated fish species and some ecological indicators of reef fish conditions in Budiong-Odiongan and Bunsuran-Ferrol MPAs

	MPA	Families Diversity (No. species/750m ²)	Density*Biomass (individual/750m ²)(mt/ha)
Budiong			
Inside	7	44	316 2.05
Outside	6	45	275 2.31
Bunsuran			
Inside	6	69	919 6.27
Outside	6	63	477 4.24

*mt/ha = metric tons/hectare.

Reef Fish Communities-Budiong MPA, Ferrol

Fish assemblage inside Budiong-Odiongan MPA has higher number of families and fish density than the outside (Table 4). However, outside MPA was more diverse and has higher biomass than the inside. The density outside of the Budiong MPA was less than inside, but the biomass of the outside was higher than that of the inside. This suggests that the fishes outside MPA might have larger sizes than those inside Budiong MPA. This maybe brought about by the relatively higher live coral cover outside MPA.

However, the indistinctiveness of the status of fishes inside and outside of Budiong-Odiongan MPA may manifest problems in proper implementation of MPA protocols. Using the classification

of Hilomen20], the reef fishes of Budiong MPA can be classified as having very low biomass (wt), poor diversity (no. of species), and low in density (no. of individual/unit area).

Reef Fish Communities-Bunsuran MPA, Ferrol

Although outside and inside MPA have the same live coral cover, the fish assemblage inside Bunsuran-Ferrol MPA was more diverse, more dense and larger in volume (biomass) than the fish communities found outside MPA (Table 4). This could be attributed to relatively stringent enforcement of the MPA laws by LGU.

Bunsuran-Ferrol MPA has also better fish assemblage status in terms of fish species diversity, fish density and fish biomass in both outside and inside of MPA than the Budiong-Odiongan MPA.

Table 5 List of target/commercial fish families and number of individuals recorded in Budiong (A) and Bunsuran (B) MPAs

Inside	Indv	Outside	Indv
Lutjanidae	41	Caesionidae	16
Acanthuridae	14	Lutjanidae	5
Caesionidae	11	Mullidae	5
Siganidae	6	Serranidae	2
Mullidae	5	Acanthuridae	1
Pomacanthidae	4	Siganidae	1
Serranidae	1		
Total	82		30

Inside	Indv	Outside	Indv
Caesionidae	82	Mullidae	20
Acanthuridae	19	Pomacanthidae	18
Pomacanthidae	13	Acanthuridae	14
Nemipteridae	10	Nemipteridae	3
Mullidae	9	Haemulidae	2
Serranidae	4	Monacanthidae	1
Total	137		58

A: Budiong-Odiongan

B: Bunsuran-Ferrol

Information on target or commercially valuable species of fishes are critical as indicator of changes and impact of the sanctuary since it serves as direct source of livelihood to fishers and members of the coastal community. Thus has become necessary to include it as an indicator for monitoring and evaluation.

The names of the Families are listed in (Table 5). The number of commercial families of fish species was seven with 82 individuals recorded inside of Budiong MPA and six families with only 30 individuals in the outside. The result indicates that commercial fishes inside Budiong MPA are more diverse and abundant than outside of MPA.

On the other hand, results in Bunsuran MPA showed that although of different composition, both outside and inside of the MPA have

the same numbers of target fish families, but in terms of number of individuals recorded, that of the inside (137) was far more than that of the outside (58). This implicates that commercial fishes at the inside and outside of Bunsuran MPA are equally diverse, but that of the inside is far more abundant than that of the outside.

Conclusion

Both MPAs have fair condition live coral cover (30-45%). There were patches of seagrass beds in both MPAs. It was believed to have four seagrass species in the Bunsuran area. Very few, less than 10, commercially valuable macro invertebrates were observed along transect lines in both MPAs. This need more detailed survey to apply possible stock enhancement initiative in order to fast track recovery

of commercially valuable macro-invertebrates, which could be useful to livelihood of the fishers.

Based on the category of,²⁰ the average fish biomass of all survey stations except inside Bunsuran MPA are categorized as very low, compared to St. Paul Bay (29.26 mt/km²),¹⁶ Honda Bay (27.11 mt/km²) and Tabuyo Fish Sanctuary in Caramay, Roxas, Palawan (22.94 mt/km²),²¹ which are all moderate in terms of fish biomass. The high category ranged from 2268 to 7592 indiv/1000 m² density according to.²⁰ However some authors say that a healthy Philippine reef produces 5-37 mt/km² of fish per year.²²⁻²⁴ Basing from this, the inside fish biomass of Bunsuran-Ferrol MPA is considered to have a healthy reef.

This result indicates that these two reefs under study in Tablas Island have undergone high fishing pressures in the past so that it needs immediate nourishment, protection, and management. Very low fish biomass condition of MPA will take relatively long time to restore its original state resources, and restocking of relevant species in the reef may be a plausible solution to this situation.

Both MPAs have few fish and macro-invertebrates target species, which are important to support the livelihood of fishes and to keep the ecological balance of the coral reef in the area.

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Conflicts of interest

None.

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