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Fisheries Resources in Five Marine Protected Areas (MPAs) in Davao Oriental

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ABSTRACT

Fisheries profiling along with other key bioresources and habitats was conducted in 2012 in five marine protected area (MPA) sites of the coastal corridor of Davao Oriental. This was done to generate information that will aid in the resource management efforts of the local government and mandated line agencies. Daily catch monitoring was made for four consecutive months and market information was examined through an enumerator stationed in each site. From the information gathered, it appears that all the monitored sites were predominantly engaged in municipal fishing and in capture fisheries. Both motorized and nonmotorized boats were utilized. Net and hook-and-line gear were largely used. Specific fishing gear was employed to capture specific species. The fish catch was comprised of reef and offshore species but the latter contributes more to the catch. Catch was largely sold fresh and traded locally. Catch-per-unit-effort (CPUE) during the monitoring months (June — August) for all gear types was low that is less than 1 kg If1 of fishing. Squid, needlefish and round-eyed scad dominated the catch. CPUE is highest in Brgy. San Ignacio, Manay for both hook and line and squid jigger. Gear combination increases the efficiency of fishing effort as can be confirmed from the higher CPUE.

Keywords: Davao Oriental fisheries, fisheries management, Pujada Bay, coastal resources, Davao Oriental MPAs

INTRODUCTION

Davao Oriental is a coastal province located in the eastern part of Mindanao. Eleven of its 16 municipalities are coastal. This location has endowed the province with coastal and marine resources that served its population of 517,618 (as of 2010) from food to livelihood, recreation, and education. The area produces an estimated 19,391 mt of fishery products in 2004, 17,802 mt in 2005 and 17,247 mt in 2006, placing the province second in fish production in the region.1

Because it provides an important life-support system, it is imperative that the province's coastal corridor be managed properly to be sustained. It has already exhibited degraded habitats and dwindling resources. In the conduct of participatory coastal resource assessment (PCRA) along the coastal areas of Mati City in 2003 to 2004 during the coastal resource management (CRM) project implementation in the area, fishers agreed that fish catch has been de creasing over the years and that their present catch in the reef area averaged only 2 kg / operation.2,3

Resource assessment is an important aid in creating management measures that are appropriate and effective. There is limited information of what resources are available in this environment; their status, abundance, relationships, and how they are affected by terrigenous processes. Among the few researches conducted in the area was that made by the University of the Philippines-Marine Science Institute (UP-MSI) during the conduct of their Pacific Seaboard R&D Program (PACSEA). This project investigated taxonomic basis for major marine taxa as well as examined potential marine protected areas on the basis of biodiversity, risk, habitat condition, and fishing pressure data, On the other hand, researches of the Davao Oriental (DOSCST) basically centered on composition and distribution of coral benthos, macro benthos (particularly molluscs), fishes (reef fish and capture fishes), mangroves, sea grasses, and algae particularly in Pujada Bay area.5,6

The present research was conducted to address the limited database on marine resources particularly on fisheries resources. Such information is needed in coming up with sensible resource management program in the area.

MATERIALS AND METHODS

Fisheries profiling was focused on five sites in the province. These areas had established MPA or had considered establishment of an MPA. Field enumerators were stationed at the landing site of each study area to record the daily catch of the fishermen who landed their catch at the site. Information's obtained include kinds of fishes caught, gear/s used, time spent on fishing, number of fishers involved in the operation, and fishing area. Market activities (i.e., how much of the catch and where the catch is sold, if processing of the catch is done) were also noted.7

Catch-per-unit effort (CPUE) for each gear type per fishing operation was computed following the formula:

$$CPUE = \frac{\text{Total catch}}{\text{Total effort}}$$

where,

Total catch = sum of the total catch per gear per fishing operation

Total effort = sum of the product of number of fishers and time spent fishing (# of fishers x time spent fishing) per gear per fishing operation

RESULTS AND DISCUSSION

Fisheries in the assessed sites are basically municipal and capture fishery. Both motorized and non-motorized boats were utilized (Figure I). Gillnet and hook and line are the major fishing gears employed in the area. Some gears are specific to certain sites. For example, beach seine (baling) is reported only in San Ignacio, Manay, scoop net (sikpaw) only in Jovellar, Tarragona while long line (bira-bira) is employed only in Luban (Table 1). Figure 2 shows pictures of some of these fishing gears in the area. Figure 1. Docked fishing boats in Manay.

Figure 1. Docked fishing boats in Manay.

Table 1. Composition of fishing gear in the surveyed sites

Fishing Gear	San Ignacio, Manay	Jovellar, Tarragona	Lawigan, Mati	Lanca, Mati	Luban, Mati
Gillnet	✓	✓	✓	✓	
Beach seine	✓				
Multiple Hook & Line (*palangre, undak, istambre, subid*)	✓	✓	✓		✓
Squid jigger (*saranggat*)	✓	✓	✓		
Single Hook & Line (*pasol, bingwit, latak, pataw, palubog,*)	✓	✓	✓	✓	✓
Fish pot *(bobo)*		✓	✓		✓
Scoop Net (*sikpaw*)		✓			
Spear (*pana*)		✓		✓	✓
Long line (*Bira-bira*)					✓

The catch was comprised of reef and offshore fish species and mollusks. A specific fishing gear was employed to capture certain species, for example, jigger for the squid (pusit), and hook and line (various variants subid, pataw) for needlefish (balo) and big-eye scad (matambaka). On the other hand, gillnets and fish pot captured diverse reef species. In Lawigan, fishers employ a combination of fishing gears.

Offshore species contributed more to the catch than reef species. This is due either to their weight (example, needlefish and tuna species which are large or long) or number (example, big-eye scad, flying fish and squid). During the monitoring months (May — August 2012), squid, needlefish, big-eye scad, flying fish (barongoy), and skipjack tuna (tulingan) dominated the catch (Figures 3-9).

While the decreased dependence on demersal fisheries lessens the pressure on the reef ecosystem, this also indicates depleting reef fisheries. This positive correlation between adult stocks to their habitat integrity was well documented across places and time. In a recent evaluation of the performance of 13 marine

protected areas in the Philippines, this parallel relationship between juvenile recruits and adult standing stocks were once again confirmed.8, 9 Data analysis between herbivores and the benthic algal cover also supported similar findings.10

Figure 2. Common fishing gears (clockwise from top left): fish net, baited squid jigger and multiple hook and line.

Figure 3. Documentation of some of the dominant catch, needlefish (top photo) and squids (bottom photo).

On the other hand, the increased dependence on pelagic fisheries means that the municipal fishers were subjected to the seasonal variation and fluctuation in stock that characterize most deep sea and migratory species.11 in the assessed sites which are facing the Pacific Ocean, this means difficult times as calm waters of these fishing ground sharpen only on a few months of the year.

CPUE values for all gear types were generally low - less than 1 kg h I of fishing. This is especially true for fishing gears operated along the coral reef area, such as palangre, bobo, spear (Table 2). For gears operated offshore, there were months were CPUE values were over 1 kg h-1 of fishing, depending on the fishing gear (Table 3). For example, in Manay, higher CPUE was observed for single hook and line and trawl. The catch were largely big-eye scad and squid (for single hook and line) and skipjack tuna (for trawl).

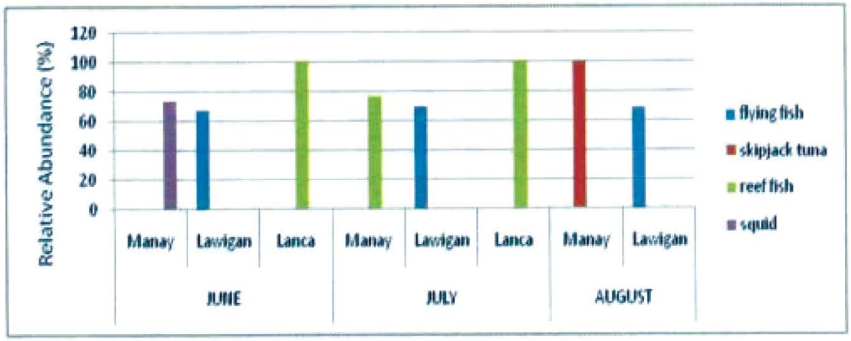

Figure 4. Major fish catch of gillnet in the sampling sites.

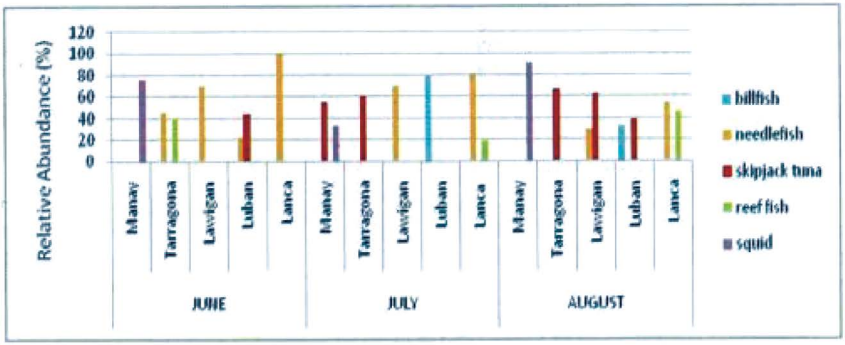

Figure 5. Major fish catch of single hook & line in the sampling sites.

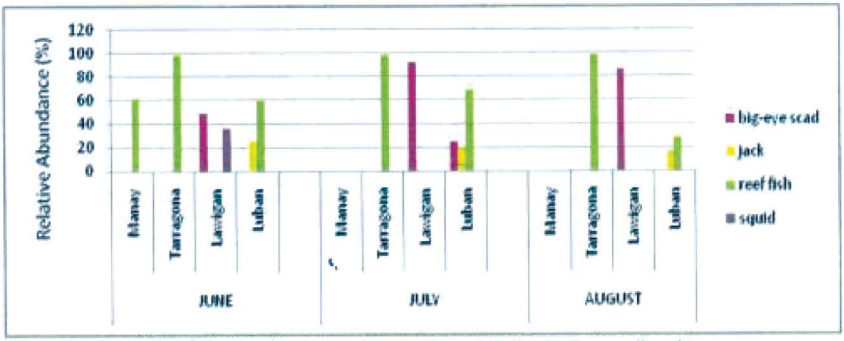

Figure 6. Major fish catch of multiple hook & line in the sampling sites.

In Tarragona, higher CPUE was observed for pataw (single hook and line), subid (single hook and line), and sikpaw (scoop net), The catch were largely needlefish, skipjack tuna, barracuda (for pataw and subid), and anchovy (for sikpaw). In Lawigan, higher CPUE was observed for net and squid jigger. The catch was flying fish, big-eye scad (for the net) and squid (for the squid jigger). In

Luban, higher CPUE was observed for subid (multiple hook and line). The catch was skipjack tuna, banacuda, and sailfish. CPUE value in Lanca was less than 1 kg h-l of fishing for all gear.

Table 2. CPUE (kg h^{-1} fishing) of fishing gears operated along the coral reef (catch largely reef fishes)

	Manay	Tarragona	Lawigan	Luban	Lanca
Gillnet					
May	-	-	-	-	0.17
June	-	-	-	-	0.002[a]
July	-	-	-	-	0.40[a]
Single hook & line					
May	-	0.33	-	-	-
June	-	0.18	0.89	-	-
July	-	0.21[a]	0.52	-	-
Multiple hook & line					
May		0.31[a]			
June	0.49[a]	0.55		Undak:0.12[a] Palangre: 0.63	
July		1.05[a]		Undak: 0.51[a] Palangre: 0.78	
August		0.0003[a]		Undak: 0.39[a] Palangre: 0.81	
Fish pot					
June		0.02[a]	0.02	0.02[a]	
July		0.04[a]	0.001[a]	0.02[a]	
August					
Spear					
May		0.39[a]			0.23[a]
June		0.38[a]		0.42[a]	0.40[a]
July		0.76[a]		0.36	0.28[a]
August				0.22[a]	0.60[a]

[a]data less than 5 observations / recording

In the assessed sites, there were no fish culture activities because of the strong current and big wave in the area. There was also no post-harvest processing of the catch. When abundant, fish catch was sold to a trader (comprador) in the local area and the trader brought this to other fish traders in Mati City. However; when the catch was meager, this was just sold in the local area after setting aside some for-household consumption. The market price was usually dictated by the

fish trader. The kind and abundance of the species also influence the prevailing market price. Prices were cheaper when there was plenty of specific catch.

Table 3. CPUE (kg h^{-1} fishing) of fishing gears operated offshore

	Manay	Tarragona	Lawigan	Luban	Lanca
Mesh Net					
May	0.68^{ab}				
June			1.81^{b}		
July			1.06^{b}		
Single hook & line					
May	0.37^{bc}	1.53^{ab}			
June	0.51^{c}	0.31^{b}	0.47^{b}	0.49^{b}	0.13^{ab}
July	1.37^{bc}	0.47^{b}	0.35^{b}	0.63^{ab}	0.89^{ab}
August	1.13^{bc}	0.27^{b}	0.23^{b}	0.30^{ab}	0.67^{b}
Multiple hook & line					
June				0.74^{bc}	1.07^{b}
July			0.16^{b}	0.52^{b}	3.09^{b}
August			1.54^{b}	0.44^{b}	1.74^{b}
Squid jigger					
May			0.73^{ac}		
June	0.70^{c}		0.51^{c}	0.43^{ac}	
July	0.82^{c}		0.84^{c}	1.29^{c}	
August	0.78^{c}		0.78^{ac}	1.33^{ac}	
Trawl					
August	1.94^{ab}				
Scoop net					
July			1.30^{b}		

[a]data less than 5 observations / recording, [b]catch largely offshore fishes, [c]catch largely squid

The catch was basically bartered or sold fresh. Some processed the squid into dried form (Figure 8). However, this was not popular as the locals claimed because the weight of the commodity (s smaller when dried, thus not profitable. This was only done when there were orders.

The current state of fishing and of fisheries in the assessed sites is similar to what has also been seen and documented in other sites, locally and globally. 12 Catch data at hand do not support the spill-over effects espoused to of the

MPA. 12,13 While MPAs were _pursued under the CRM and ICRM projects because of the felt benefits in other sites that imposed them, there is a need to examine their functionality in the sites under study. On one hand, there is a need to evaluate the appropriateness of the site. There is also a need to look at the kind of governance that the local officials are doing relative to their fisheries resources.

Figure 8. Squid hung to dry in San Ignacio, Manay.

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