

## **REVISITING MALAMPAYA SOUND IN PALAWAN AS THE PHILIPPINES' FISH BOWL: INTERVENTIONS FOR SUSTAINABLE MANAGEMENT**

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### **ABSTRACT**

This social study revisits the crucial issue of low and declining catch in Malampaya Sound, a 245 km<sup>2</sup> estuary located along the northwestern part of the Municipality of Taytay, Province of Palawan. The Malampaya Sound, often dubbed as the "fish bowl of the Philippines," houses three important ecosystems -mangroves, seagrass beds, and coral reefs - that serve as spawning and nursery grounds for fish and other aquatic life. These ecosystems are assessed in the study area. The methods used in the assessment include field observations, focused group discussions, key informant interviews, and household interviews. Results indicate that the overall perceived condition of its 802-hectare (ha) mangrove forest is fair due to on-going wood harvesting for charcoal making and house repair. Generally, its 211 ha seagrass bed is disturbed while around 1,632 ha of coral reefs are in poor condition. The rampant use of illegal and destructive fishing methods by non-resident fishers were perceived by respondents as the main cause of habitat destruction. While majority of local fishers use hook and line, fishing pressure in Malampaya Sound is critically high with a density of 23 fishers/km<sup>2</sup>. In effect, fishers are experiencing a 60-80% decrease in catch during the last three years. The challenge is to reverse the declining trend in fisheries productivity of the Sound's rich ecosystems. Sustainable harvesting of fishery resources and protection of coastal habitats are seen as critical programs along with countryside enterprise development involving support fund from government and private institutions.

**Keywords:** Malampaya Sound, Fish Bowl, Protected Seascape

### **1. INTRODUCTION**

Malampaya Sound has been dubbed as the "fish bowl of the Philippines." It is a 245-km<sup>2</sup> delta type estuary, with salinity ranging from brackish to marine, located along the northwestern part of the Municipality of Taytay, Province of Palawan. Until the early 1990s, this body of water was one of the most productive fishing grounds in the country. However, due to unsustainable resource use, its major ecosystems that support fisheries such as mangroves, seagrass beds and coral reefs have been degraded. To address the threats on habitat degradation, Presidential Proclamation No. 342 was signed on 12 July 2000 creating the 2,001 km<sup>2</sup> Malampaya Sound Protected Landscape and Seascape or MSPLS (DENR Region 4B - MIMAROPA 2013). Under the National Integrated Protected Areas System Act of 1992 (Republic Act No. 7586), overall management of MSPLS is under the Protected Area Management Board (PAMB).

The embayment in Malampaya Sound is characterized by an Outer Sound of sandy substrates and corals and an Inner Sound distinguished by muddy substrates and mangroves. The Inner Malampaya Sound is the first of three places in the Philippines where the globally endangered Irrawaddy dolphin (*Orcaella brevirostris*) can be found (UNEP/GEF 2005, UNEP/CMS 2009, Matillano 2013), in which its population is estimated to be only at 77 (PCSDDS 2006b). According to UNEP/GEF (2005), the biomass from the Sound's 2,513 ha (25.13 km<sup>2</sup>) mangrove areas support more than 150 fish species, of which at least 60 species are commercially important.

The Sound provides livelihood support for the local coastal fisheries involving at least ten *barangays* (villages) of the Municipality of Taytay, which have direct access to the Sound's resources. Based on the 2010 Census of Population and Housing, about 26,629 people are living in ten coastal *barangays* (NSO 2012), in which its population is rapidly increasing due to in-migration. On the average, about 20% of the population in MSPLS *barangays* are fishers (PSU-CSPG 2013). Being regarded as the Philippines' fish bowl and protected area, Malampaya Sound is vital to the country's food security program. As such, key aspects of a successful marine protected area as outlined by White, Aliño, and Meneses (2006) are essential for its sustainability. Previous reports indicated that marine products derived from the Sound are sold in Metro Manila while some are exported to Hongkong, Taiwan, and Japan. Thus, resource management issues such as the continuing degradation of its coastal habitats as well as low and declining catch have to be addressed to reverse this declining trend in fisheries productivity.

### **1.1 Objectives of the Study**

This study examines the local people's perceptions on the continuing habitat degradation as well as low and declining catch in Malampaya Sound despite being a protected seascape and its recognition as the Philippines' fish bowl. Specifically, it aimed to:

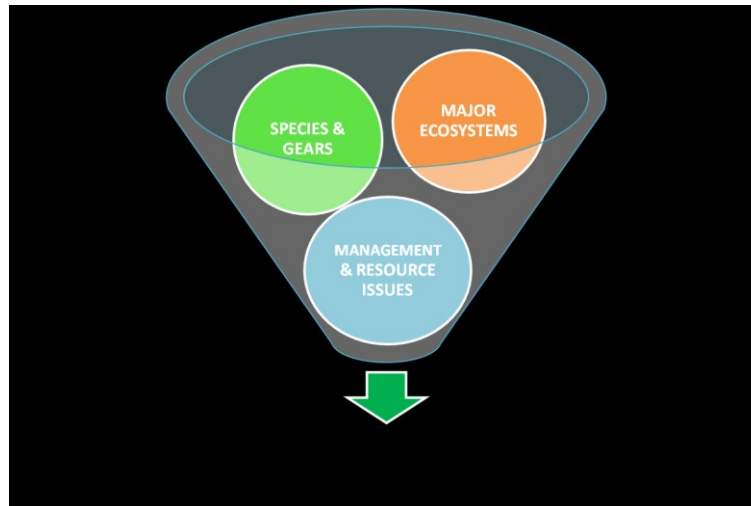
1. identify the areal extent and condition of its three major ecosystems (mangroves, seagrass beds and coral reefs);
2. describe the uses and perceived threats to its ecosystems;
3. identify the dominant species, major fishing gears and trends in catch;
4. discuss resource management bodies and issues in the locality; and
5. relate fishers' identified interventions towards sustainable management.

### **1.2 Significance of the Study**

This study is part of the rapid rural assessment of selected coastal *barangays* in five municipalities of Northern Palawan and the Calamianes Group of Islands spearheaded by the Palawan State University Center for Strategic Policy and Governance (PSU-CSPG). The findings of this research will be used to craft sustainable management interventions for Malampaya Sound as well as projects that could bring long term benefits to its surrounding fishing communities. In addition, lessons learned from this study may be useful to other fishing communities in the Brunei Darussalam-Indonesia-Malaysia-Philippines East ASEAN Growth Area (BIMP-EAGA) due to the reason that these countries have similar natural, social, and political realities.

### 1.3 Theoretical and Conceptual Framework

This study is anchored on key aspects of successful marine protected areas (MPAs) in the Philippines as mentioned by White, Aliño, and Meneses (2006). To address the crucial issue of low and declining fish catch in Malampaya Sound, the present researchers propose that sustainability themes such as major ecosystems, species and gears, and management and resource issues shall be its inputs (Figure 1).



**Figure 1. Fish bowl approach towards sustainability of Malampaya Sound, Taytay, Palawan, Philippines**

## 2. METHODOLOGY

In revisiting Malampaya Sound in Palawan as the Philippines' fish bowl, the researchers followed the rapid rural appraisal (RRA) method as described by Pido et al. (1996, 1997) and the WorldFish Center (2010). Secondary data analysis, reconnaissance, fieldwork, and community/stakeholders' validation are involved in the RRA process. Permission to conduct the RRA was sought from concerned offices of the local government unit (LGU) of Taytay, Palawan.

### 2.1 Research Instruments

The research instruments were guide questions for focused group discussion (FGD) and structured questionnaires for both key informant interview (KII) and household interview (HHI). These instruments were designed following the socioeconomic guidelines for coastal managers as described by Bunce and Pomeroy (2000). In addition, a field guide on major coastal habitats in Palawan was developed and used during the fieldwork. These research materials were pre-tested and improved prior to data gathering.

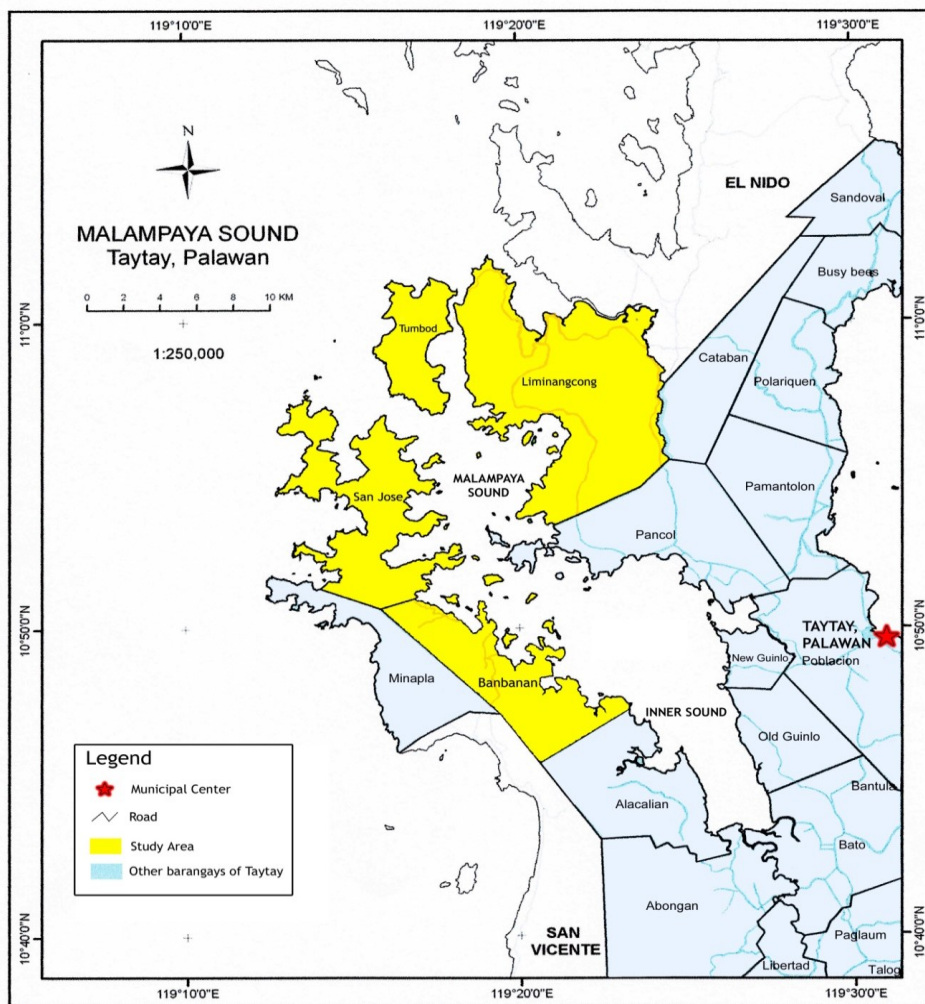
### 2.2 Respondents

Participants of the FGDs were mostly fishers, wives of fishers, and fishers' association leaders. Forty-seven fishers and fishers' association leaders using major gears were selected as key informants. They were presumed to possess personal knowledge about the barangay's coastal

habitats and fishery-related resources. In addition, structured interviews were conducted from a random sample of 113 households. With prior informed consent, the interviewer and respondent met face-to-face, in which the latter is asked closed and open-ended questions about the following: household profile, socioeconomic characteristics, present condition of habitats, resource issues and concerns, perceptions, plans and aspirations. The interviewee also informed the respondent that he/she could end the interview or decline answering any sensitive questions at any time during the interview.

### 2.3 Fieldwork

Prior to the fieldwork, FGD facilitators and enumerators were trained at PSU-CSPG to ensure professionalism in their social interactions with respondents as well as for quality assurance of data. The fieldwork was conducted from 21-24 January 2013 in four MSPLS barangays, namely: Liminangcong, Tumbod, San Jose, and Banbanan (Figure 2).



**Figure 2. Location of the four selected MSPLS barangays in Malampaya Sound, Taytay, Palawan, Philippines**

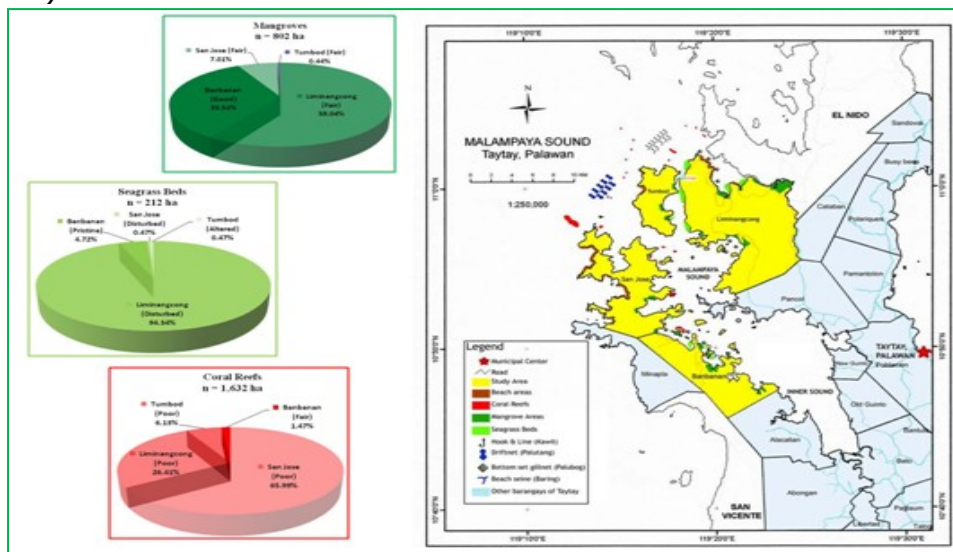
## 2.4 Stakeholders' Validation

Initial findings were validated in a municipal level stakeholders' meeting on 22 April 2013. Officials from four MSPLS barangays, concerned LGU officials of the Municipality of Taytay, and selected members of various interest groups were invited to a workshop to discuss initial findings of the study. Feedbacks from participants were sought as to the accuracy of the data presented.

## 3. RESULTS AND DISCUSSION

### 3.1 Status of the Three Major Ecosystems

The total mangrove area of about 802 ha in the study site, of which only about 46% is in healthy condition, has fisheries value and direct economic revenue estimated at PhP 7.378 Million (US\$ 184,460) and PhP 14.756 Million (US\$ 368,920), respectively. Liminangcong has the highest mangrove forest cover at 473.75 ha among the four barangays. However, along with the other two barangays, its perceived condition is fair. Only Banbanan has good mangrove forest cover (Figure 3).



**Figure 3. Status of three major ecosystems in four selected MSPLS barangays in Malampaya Sound, Taytay, Palawan, Philippines**

It was reported that the growth of seagrass is sparse in Malampaya Sound and less diverse, particularly in the Inner Malampaya Sound (PCS DS 2006b). However, Barangay Banbanan is located in the inner sound but its seagrass was described as pristine by FGD participants and key informants. The seagrass bed of Sitio Bucal in Barangay Liminangcong was said to be diverse and well-developed as it covers a wide area of the sandy substratum (PCS DS 2006a). However, the seagrass beds of Barangay Liminangcong as a whole is currently characterized as disturbed by its fishers. On the other hand, the villages of San Jose and Tumbod have seagrass beds that are less than one hectare that are in a disturbed and altered condition, respectively.

Among the four selected MSPLS *barangays*, only Banbanan’s coral reef area, which also happens to be the smallest in size at about 24 ha, has fair coral cover. Located at Noble Hump Island, the reefs are said to be protected by the island’s owner. The use of beach seine (*baring*) and turbid waters in Inner Malampaya Sound have generally contributed to the deteriorating coral reef condition of Banbanan. Meanwhile, Liminangcong and Tumbod’s poor coral reef cover is due to rampant use of Danish seine (*hulbot-hulbot*), sodium cyanide, and dynamite in fishing. In San Jose, *baring* is said to be used in addition to *hulbot-hulbot* along Worcester Strait and dynamite fishing in Bolalo Bay. These fishing methods that tend to destroy coral reefs may have primarily contributed to the deterioration of coral reefs in these areas. Generally, the reportedly present poor coral reef conditions in four selected MSPLS *barangays* are worse than their previous fair to good conditions as reported by PCSDS (2006a).

### 3.2 Ecosystem Uses

Even as the entire province of Palawan has been declared as a national mangrove reserve, weak enforcement of the ban on mangrove cutting was cited by FGD participants as the main reason why *Barangays* Liminangcong, San Jose, and Tumbod have fair mangrove condition. Household residents also consider charcoal production as the top threat to mangrove forests, confirming an earlier report (PCSDS 2006b) that cutting and charcoal making are rampant in six villages of Taytay, Palawan including Liminangcong. It was also reported during the validation workshop that members of the Philippine National Police Maritime Unit are planting 100 seedlings of mangroves in Tumbod every month since October 2012, an indication of on-going reforestation efforts. Fishing and gleaning, which are both extractive, were identified by fishers as uses for their seagrass beds and coral reefs (Table 1).

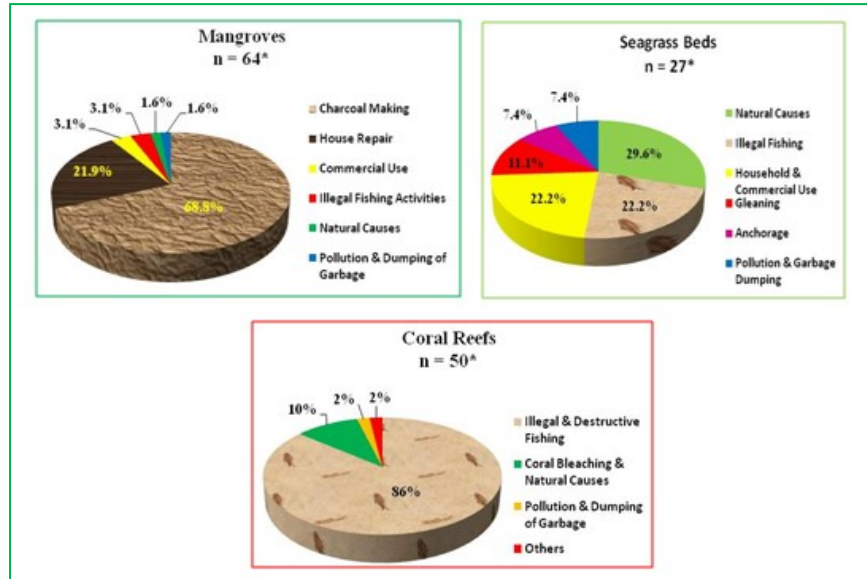
**Table 1. Type of use by major ecosystem in Malampaya Sound, Taytay, Palawan, Philippines**

Type of Use	Mangrove	Sea grass	Coral Reef
1. Boat landing	√		
2. Crab habitat	√		
3. Fishing	√	√	√
4. Gleaning	√	√	√
5. Wood harvesting (charcoal making & house repair)	√		

### 3.3 Perceived Threats

Of the 64 validated responses from 113 household respondents interviewed, the biggest perceived threat to mangroves in the study site is wood harvesting for charcoal making (68.8%). At least 90% of the respondents consider mangrove harvesting for charcoal making and house repair as primary threats. This is confirmed by the finding that 93.8% of 113 households interviewed use wood and charcoal as fuel for cooking. Natural causes and pollution are the least perceived threats to mangrove habitat. Destructive fishing method such as the use of dynamite, sodium cyanide, and Danish seine (*hulbot-hulbot*) have generally caused the poor condition of coral reefs in the four selected MSPLS *barangays* in Taytay, Palawan. These illegal and destructive fishing methods have been in existence for a long time and still continue today. This is confirmed by 86% of household respondents who indicated that the primary threat to

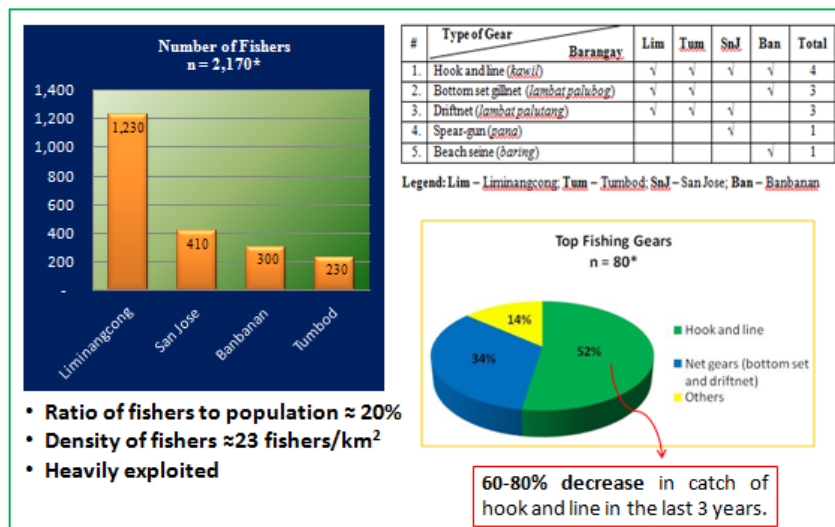
their coral reefs is illegal and destructive fishing methods. No single huge threat is evident for seagrass beds (Figure 4).



**Figure 4. Perceived threats to three major ecosystems in four selected MSPLS barangays in Malampaya Sound, Taytay, Palawan, Philippines**

### 3.4 Number of Fishers and Major Gears

According to the 2000 National Statistics Office survey as cited by the United Nations Environment Programme Global Environment Facility (2005), there are a total of 28,425 individuals in 5,384 households residing around the sound, 70% of which depends on the all year-round fishing activity. However, results of this study estimate the average ratio of fishers to MSPLS barangay population at 20% (Figure 5).



**Figure 5. Number of fishers and major gears used in four selected MSPLS barangays in Malampaya Sound, Taytay, Palawan, Philippines**



Given the above data, the density of fishers in the Sound is at about 23 fishers/km<sup>2</sup>. Thus, it is categorized as heavily exploited (Edralin et al. 1987 as cited by USAID/FISH/DA-BFAR, n.d.). The top three fishing gears used are hook and line (*kawil*), bottom set gillnet (*lambat palubog*), and driftnet (*lambat palutang*). The first two are passive gears with hook and line as the most eco-friendly. On the other hand, the use of "huge" driftnet is prohibited by law in municipal waters. Generally, the trend in catch of all gears is decreasing with hook and line experiencing remarkable 60-80% decrease in the last three years.

### 3.5 Dominant Species and Trend in Catch

The dominant species caught by top three gear such as hook and line, bottom set gillnet, and driftnet are mostly reef-associated and neritic or nearshore pelagics (Table 2). Reef-associated species refer to fishes that are living and feeding on or near coral reefs while nearshore pelagic fishes are living and feeding mostly on planktons near the sea surface.

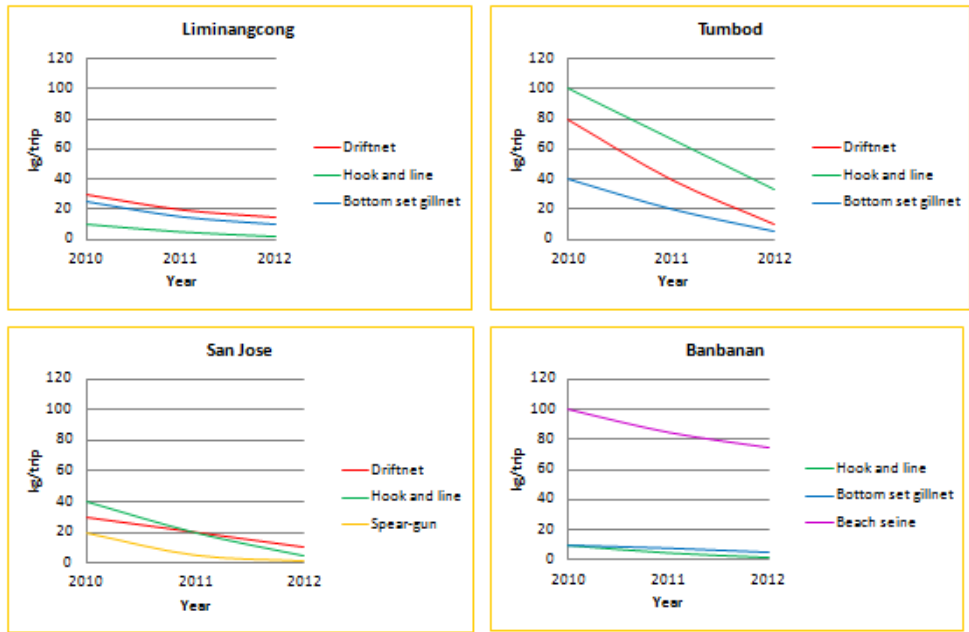
**Table 2. Dominant species caught by top three gears in Malampaya Sound, Taytay, Palawan, Philippines**

Fishing Gear Used	Local Name	Common Name	Scientific Name	Habitat
Hook and line	Tanigue	Spanish mackerel	<i>Scomberomorous commerson</i>	NP
	Asugon	Pickhandle barracuda	<i>Sphyraena jello</i>	RA
	Bisugo	Threadfin bream	<i>Nemipterus sp.</i>	DM
	Maya-maya	Snapper	<i>Lutjanus sp.</i>	RA
	Lapu-lapu	Grouper	<i>Epinephelus sp.</i>	RA
Bottom set gillnet	Alumahan	Mackerel	<i>Rastelliger sp.</i>	NP
	Sapsap	Ponyfish	<i>Leiognathus sp.</i>	DM
	Bisugo	Threadfin bream	<i>Nemipterus sp.</i>	DM
	Banak	Greenback mullet	<i>Liza subviridis</i>	DM
	Torsilyo	Obtuse barracuda	<i>Sphyraena obtusata</i>	RA
Driftnet	Tulingan	Skipjack tuna	<i>Katsuwonus pelamis</i>	OP
	Tanigue	Spanish mackerel	<i>Scomberomorous commerson</i>	NP
	Borador	Flying fish	<i>Cypselurus oligolepis</i>	NP
	Pak-an	Torpedo scad	<i>Megalaspis cordyla</i>	RA
	Alumahan	Mackerel	<i>Rastrelliger sp.</i>	NP

Legend: DM – Demersal; RA – Reef-associated; OP – Oceanic pelagic; NP – Neritic pelagic

In the case of Tumbod, most of their hook and line fishers are fishing offshore, in which the average fishing trip is three days. As such, their catch is higher compared to fishers from the other three MSPLS villages. The average catch of a hook and line fisher in Tumbod was about 100 kg/trip in 2010 but this was reduced to one-third (33 kg/trip) in 2012. This translates to two-thirds (67%) decrease in catch over a three-year period. Hook and line fishers within the vicinity of Malampaya Sound are also experiencing reduced catch from an average of 10 kg/trip in 2010 to only about 2 kg/trip in 2012 (Figure 6). The income of fisher-families is badly affected by this decreasing trend in catch.





**Figure 5. Trend in fish catch of major gears used in four selected MSPLS barangays in Malampaya Sound, Taytay, Palawan, Philippines**

### 3.6 Resource Management Bodies and Issues

As posted in the website of PCSDS (2013), PAMB is responsible for the overall management of MSPLS. This was confirmed during the stakeholders' validation workshop. The Board is a multi-sectoral body composed of about 47 representations from BFAR, DENR, PCSDS, LGU, NGO's, IP's and PO's. It is co-chaired by the Executive Director of the PCSDS and the Regional Executive Director of DENR. Despite being a managed resource protected area, several fishery-related resource management issues still exist in Malampaya Sound. These issues, if not properly addressed, would aggravate the problem of habitat degradation and fishery resource depletion in the study areas. Table 3 summarizes these issues.

**Table 3. Summary of fishery-related resource management issues in Malampaya Sound, Taytay, Palawan, Philippines**

Category of Issues	Mangrove	Seagrass	Corals
<b>Resource Use</b>	<ul style="list-style-type: none"> <li>• Cutting of mangroves for charcoal, and repair of house</li> <li>• Presence of plastic garbage</li> </ul>	Presence of plastic garbage	<ul style="list-style-type: none"> <li>• Except in Banbanan, the use of dynamite, sodium cyanide, and Danish seine (<i>hulbot-hulbot</i>) are present in three MSPLS barangays</li> <li>• In Liminangcong, scarelines of Danish seine (<i>hulbot-hulbot</i>) are reportedly left in coral reefs</li> </ul>
<b>Resource Access</b>			<ul style="list-style-type: none"> <li>• Non-resident fishers (Manila, Batangas, and Cebu) of Danish seine (<i>hulbot-hulbot</i>) have caused huge damage to corals reefs in Liminangcong, Tumbod, and San Jose</li> <li>• These Danish seine(<i>hulbot-hulbot</i>) are reportedly operators having local partners</li> </ul>

#### 4. CONCLUSION

There is low and declining fish catch in Malampaya Sound brought about mainly by virtually open-access and unsustainable resource extraction practices such as cutting of mangroves for charcoal-making and destructive fishing methods on coral reefs. Generally, there is no clear resource management regime implemented in the protected area.

#### 5. RECOMMENDATIONS

The challenge to all stakeholders is to reverse the declining trend in fisheries productivity of Malampaya Sound, a resource-rich ecosystem. The fishers are well aware of this problem and have the following suggestions for the resource managers: (1) strictly enforce the law, arrest violators, and confiscate all illegal fishing paraphernalia including the fishing boat; (2) implement a sustainable management plan through the PAMB so that local fishers' major problems on the operation of Danish seine (*hulbot-hulbot*) along Worcester Strait and dynamite fishing in Bolalo Bay would be addressed and these destructive fishing methods will be stopped; (3) tap universities to train fishers on resource conservation and sustainable management; and (4) the LGU should issue "fisher's license" to qualified individuals and only those with licenses are to be allowed to fish. Additionally, the fishers also suggested that a fishery resource management body, similar to a development authority with 60-40 percent private-government participation be created to ensure sustainable management of the Malampaya Sound.

#### ACKNOWLEDGMENT

With funding support from Malampaya Foundation, Incorporated (MFI), this study was spearheaded by the Palawan State University Center for Strategic Policy and Governance (PSU-CSPG). Special thanks are accorded to CSPG Executive Officer Maria Rosario Aynon A Gonzales,

Prof. Marissa S Pontillas, Engr. Agustin R Miraflores, Dr. Daphne T Mallari, Ms. Eva Mari C Ponce de Leon, Prof. Rosario del Rosario, Ms. Marie Gianina Concepcion S Decano, Ms. Mary Aileen M de las Alas, and MFI Executive Director Karen Agabin.

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