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## PRELIMINARY INVENTORY OF BOATS AND GEARS IN MANILA BAY

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### ABSTRACT

Recent information about the number and types of boats and gears used in Manila Bay is lacking. Here we discuss the results of the initial boat and gear inventory conducted in Manila Bay from May 2015 to October 2016. The survey was done in the coastal barangays of Cavite, Bataan, Bulacan, Pampanga, and Metro Manila. A total of 3,659 fishing boats were recorded from 84 coastal barangays or about 40% out of the 212 coastal barangays in Manila Bay. About 94.45% of the boats are municipal fishing boats and only 5.55% are commercial boats and the highest number of boats recorded was in Cavite (1,461 boats). 91.04% of the fishing boats are motorized and only 8.96% are non-motorized. The average fisher to boat ratio for the five provinces is 3.0:1, which is higher compared to the 2.4:1 result of MADECOR and National Museum Assessment (1995). There are 25 types of fishing gears recorded during the survey with a total of 4,946 units. Gillnet, specifically bottom gillnet, is the most dominant gear being used in Manila Bay.

*Keywords: Manila bay, fishing boat and fishing gear*

## INTRODUCTION

The country's marine fisheries are conventionally subdivided into municipal (small-scale) sector and commercial sector depending on the vessel gross tonnage. The municipal sector includes capture operations using fishing boats of 3 gross tons or less and they are allowed to fish within the municipal waters or 15 km from the shoreline. The commercial sector includes capture fishing operation using vessels of 3.1 gross tons and above and they are required to fish outside the municipal waters that is beyond the 15 km from the shoreline. The commercial fishing boats are categorized into small (>3.1-20 GRT), medium (20.1-150 GRT), and large (>150 GRT).

Manila Bay is a multi-gear fishery with both commercial and municipal boats operating in the bay. The last known boat and gear survey conducted in Manila Bay was during the resource and ecological assessment study conducted in 1994 (MADECOR and National Museum, 1995). They reported a total of 48,031 fisher folks, 19,966 fishing boats, and 21 types of fishing gears operating in the Bay. Zaragoza *et al.* (1995) recorded 17 types of fishing gears during their 5-month (December 2004 to April 2005) pilot monitoring of the fisheries resources in Manila Bay. The recent stock assessment study conducted in the Bay recorded 22 types of fishing gears operating in the Bay (Lopez *et al.*, 2014 annual report, unpublished). This study only provides a partial result of the boat and gear survey conducted in the different coastal barangays in Manila Bay from May 2015 to October 2016.

## MATERIALS AND METHODS

The fishing boat and gear inventory were conducted in 84 coastal barangays along Manila Bay, in the provinces of Cavite (33), Bataan (23), Bulacan (12), Pampanga (4), and Metro Manila (12) (Figure 5.1). Data on fishing boat and gear and the distribution of fisherfolks in the coastal barangays were taken first from the Office of the Municipal Agriculturist. If such pieces of information are not available, an actual inventory was conducted through interviews and actual boat measurements (i.e. length, width/breadth, and depth). Other information asked are hull type, gross tonnage, horsepower, engine type, and the number of fishermen on board. The boats were classified as either commercial or municipal based on the gross tonnage. For the gear particulars, the type of gear used was asked including the corresponding gear specifications.

## RESULTS AND DISCUSSION

### Fishing boat

A total of 3,659 fishing boats were recorded from 84 coastal barangays or about 40% out of the 212 coastal barangays in Manila Bay in the provinces of Cavite, Bataan, Bulacan, Pampanga and Metro Manila. About 94.45% of the boats are municipal fishing boats and only 5.55% are commercial boats. The highest number of boats recorded was in Cavite (1,461 boats) from 5 municipalities followed by Bataan (1,312 boats) from 7 municipalities. The least number of boats recorded was in Pampanga (85 boats) from only one municipality. More than 90% of the boats in Bataan, Cavite, and Pampanga are municipal

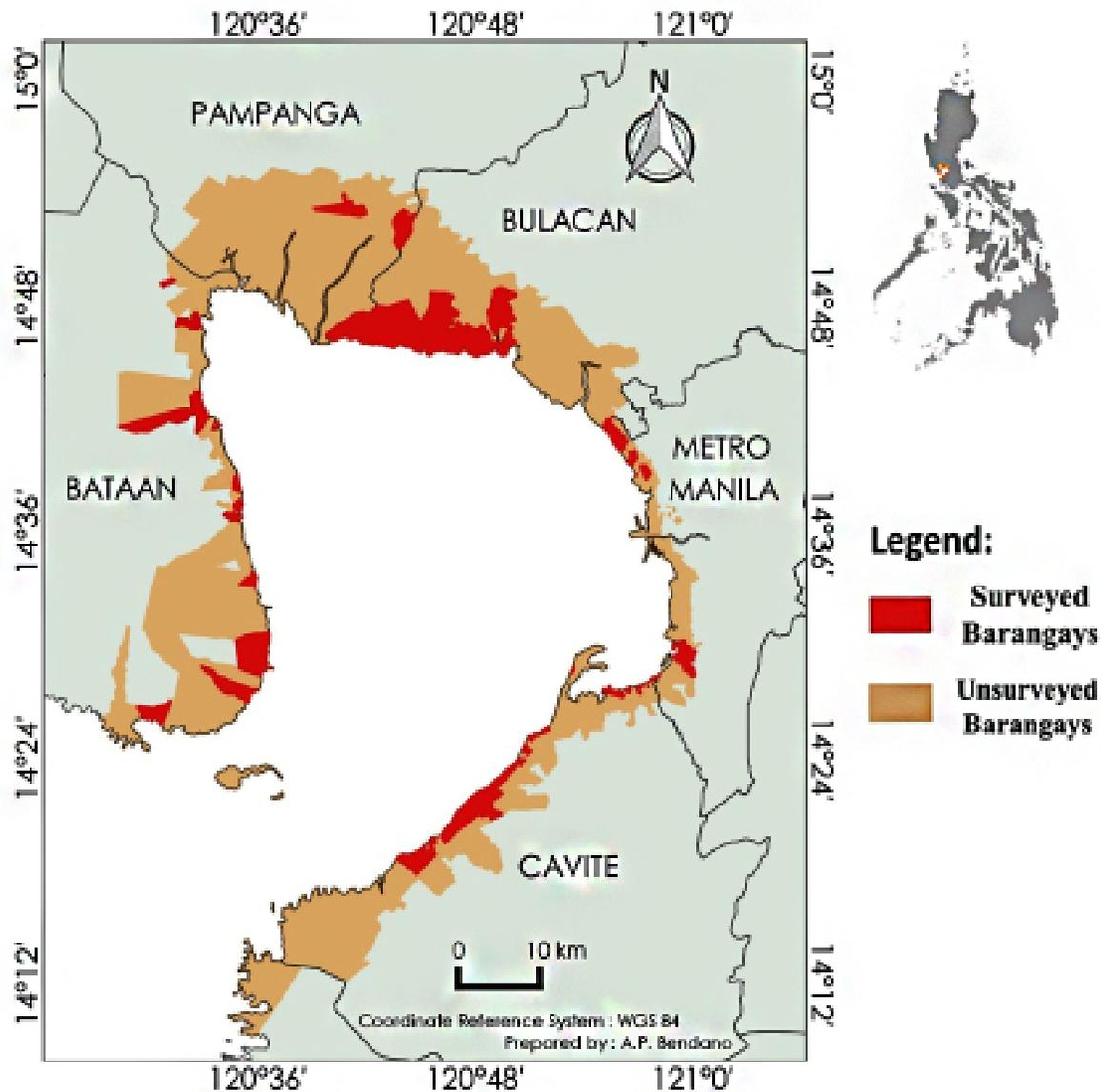


Figure 5.1. Map of Manila bay showing the surveyed coastal barangays around the bay.

boats (Table 5.1). Of these number, 91.04% are motorized while the 8.96% are non-motorized. This shows that majority of the fishing boats in Manila Bay are motorized, particularly in Bulacan, Cavite, and Pampanga (Table 5.2) where more than 90% are motorized boats unlike in some fishing grounds where a high percentage of non-motorized boats were recorded, such as

in Lagonoy Gulf with 74% (Olaño et al., 2009); in Honda Bay with 47% (Ramos et al., 2009); and in Northern Zambales with 20.54% (Rueca et al., 2009).

The average fisher to boat ratio for the five provinces is 3.0:1, which is higher compared to the 2.4:1 result of MADECOR and National Museum (1995). Bulacan has the highest boat

Table 5.1. Distribution of municipal and commercial fishing boats by province/municipality in Manila Bay.

Province/Municipalities	Municipal	Commercial	Total
<b>BATAAN</b>			
Abucay	138	12	150
Balanga	34		34
Hermosa	232		232
Limay	182		182
Mariveles	204		204
Orani	225	8	233
Orion	276	1	277
<b>Sub-Total</b>	<b>1,291</b>	<b>21</b>	<b>1,312</b>
<b>BULACAN</b>			
Hagonoy	141	44	185
Malolos	98	37	135
Paombong	106		106
<b>Sub-Total</b>	<b>345</b>	<b>81</b>	<b>426</b>
<b>CAVITE</b>			
Bacoor	310		310
Cavite City	62		62
Naic	249	10	259
Rosario	395	25	420
Tanza	402	8	410
<b>Sub-Total</b>	<b>1,418</b>	<b>43</b>	<b>1,461</b>
<b>METRO MANILA</b>			
Malabon	35	10	45
Navotas	189	40	229
Parañaque	98	3	101
<b>Sub-Total</b>	<b>322</b>	<b>53</b>	<b>375</b>
<b>PAMPANGA</b>			
Macabebe	80	5	85
<b>Sub-Total</b>	<b>80</b>	<b>5</b>	<b>85</b>
<b>GRAND TOTAL</b>	<b>3456</b>	<b>203</b>	<b>3659</b>
<b>%</b>	<b>94.45</b>	<b>5.55</b>	<b>100</b>

Table 5.2. Distribution of motorized and non-motorized fishing boats by province/municipality in Manila Bay.

Province/Municipalities	Motorized	Non-motorized	Total
<b>BATAAN</b>			
Abucay	142	8	150
Balanga	34		34
Hermosa	186	46	232
Limay	174	8	182
Mariveles	195	9	204
Orani	196	37	233
Orion	251	26	277
<b>Sub-Total</b>	<b>1,178</b>	<b>134</b>	<b>1,312</b>
<b>BULACAN</b>			
Hagonoy	179	6	185
Malolos	124	11	135
Paombong	91	15	106
<b>Sub-Total</b>	<b>394</b>	<b>32</b>	<b>426</b>
<b>CAVITE</b>			
Bacoor	265	45	310
Cavite City	61	1	62
Naic	257	2	259
Rosario	405	15	420
Tanza	387	23	410
<b>Sub-Total</b>	<b>1,375</b>	<b>86</b>	<b>1,461</b>
<b>METRO MANILA</b>			
Malabon	35	10	45
Navotas	195	34	229
Parañaque	75	26	101
<b>Sub-Total</b>	<b>305</b>	<b>70</b>	<b>375</b>
<b>PAMPANGA</b>			
Macabebe	79	6	85
<b>Sub-Total</b>	<b>79</b>	<b>6</b>	<b>85</b>
<b>GRAND TOTAL</b>	<b>3,331</b>	<b>328</b>	<b>3,659</b>
<b>%</b>	<b>91.04</b>	<b>8.96</b>	<b>100</b>

ratio with 6.2:1 while in Cavite, has the lowest with 2.5:1 (Table 5.3). The result of the previous survey, reported Cavite with the highest (3.8:1) while NCR (Metro Manila) was the lowest (1.4:1) (MADECOR and National Museum, 1995). In provinces with high fisher to Banca ratio shows that most of these fishers are either employed or are being utilized in commercial fishing. On the other hand, in provinces with low fisher to banca ratio shows that majority of these fishers have their own boat but, these are only municipal boats that are used primarily for fishing sustenance.

The motorized municipal boats in Manila Bay are equipped with 6.5-16 horsepower gasoline or diesel engines and are usually used by gillnet, handline, traps, and small trawl. The commercial fishing boats with a size range of 4-25 GRT are categorized under small commercial boats. They are equipped with four-piston engines and can accommodate 10-15 fishermen. These types of boat are usually used for the fishing operation of ringnet, encircling gillnet and big trawl. The detailed information of the boats is presented in Table 5.4.

## Fishing Gear

Various types of fishing gears are exploiting the resources of Manila Bay. These gears are either active or passive type depending on the target species. A total of twenty-five types of fishing gears were recorded (totaling to 4,946 units) during the survey in the five provinces of Manila Bay. In every province, different types of fishing gear were recorded specifically 22 types in Cavite, 12 types in Bataan, 7 types in Bulacan, 5 types in Pampanga, and 11 types in Metro Manila. This recorded more types of fishing gears compared to previous reports, which were only 21 (MADECOR and National Museum, 1995) and 18 (Zaragosa et al., 2005).

Based on the 2002 Census of Fisheries, almost 1.19 million gillnets were operating in the Philippines (NSO, 2005). In Manila Bay, gillnet (specifically bottom gillnet) is the most dominant gear, as recorded in this survey and in the landed data (Lopez et al., 2014 annual report, unpublished). Based from this partial survey, fish pot and blast fishing were only recorded in Cavite; barrier net, in Bulacan; fyke net, in Bulacan and Pampanga; danish seine, squid jig and squid trap, in Bataan and Cavite; drive in net, in Bataan and Metro Manila; and stationary liftnet, in Cavite and Metro Manila. The major gears being used in Bataan are bottom gillnet, bottom set longline, crab gillnet, and drift gillnet; in Bulacan, bottom gillnet, encircling gillnet, and fyke net; in Cavite, bottom gillnet, drift gillnet, and spear gun; and bottom gillnet for both Metro Manila and Pampanga, (Table 5.5). The specific distribution of fishing gear by municipality is presented in Table 5.6 and the list of fishing gear with local names by province in Table 5.7. Drawings of the different fishing gears in Manila Bay with measurements are presented in Figure 5.2.

Table 5.3. Fishermen to boat ratio by province/ municipality in Manila Bay.

Province/Municipalities	No. of Fishermen	No. of Boats	Fishermen to Boat Ratio
<b>BATAAN</b>			
Abucay	426	150	2.8 : 1
Balanga	94	34	2.8 : 1
Hermosa	631	232	2.7 : 1
Limay	480	182	2.6 : 1
Mariveles	533	204	2.6 : 1
Orani	701	233	3.0 : 1
Orion	627	277	2.3 : 1
<b>Sub-Total</b>	<b>3,492</b>	<b>1,312</b>	<b>2.7 : 1</b>
<b>BULACAN</b>			
Hagonoy	1,225	185	6.6 : 1
Malolos	1,170	135	8.7 : 1
Paombong	250	106	2.4 : 1
<b>Sub-Total</b>	<b>2,645</b>	<b>426</b>	<b>6.2 : 1</b>
<b>CAVITE</b>			
Bacoor	805	310	2.6 : 1
Cavite City	125	62	2.0 : 1
Naic	750	259	2.9 : 1
Rosario	1,235	420	2.9 : 1
Tanza	709	410	1.7 : 1
<b>Sub-Total</b>	<b>3,624</b>	<b>1,461</b>	<b>2.5 : 1</b>
<b>METRO MANILA</b>			
Malabon	170	45	3.8 : 1
Navotas	667	229	2.9 : 1
Parañaque	197	101	2.0 : 1
<b>Sub-Total</b>	<b>1,034</b>	<b>375</b>	<b>2.8 : 1</b>
<b>PAMPANGA</b>			
Macabebe	230	85	2.7 : 1
<b>Sub-Total</b>	<b>230</b>	<b>85</b>	<b>2.7 : 1</b>
<b>GRAND TOTAL</b>	<b>11,025</b>	<b>3,659</b>	
<b>AVERAGE</b>			<b>3.0 : 1</b>

Table 5.4. Profile of fishing boats in Manila Bay.

Fishing gear	Specification	Description	Fishing gear
	Length (m) 4.36 Width (m) 0.42 Depth (m) 0.38 Gross tonnage 0.17 Engine type N/A Horse power N/A No. of fishermen on board 2	Flot- motorized fishing boat used in Malic, Cavite.	Hook and line
	Length (m) 8.54 Width (m) 0.85 Depth (m) 0.78 Gross tonnage 1.4 Engine type Brigg & Stratton Horse power 18 No. of fishermen on board 4	Medium scale municipal fishing boat used in Rosario, Cavite.	Gill net
	Length (m) 10.15 Width (m) 0.92 Depth (m) 0.81 Gross tonnage 1.87 Engine type Brigg & Stratton Horse power 16 No. of fishermen on board 3	Medium scale municipal fishing boat used in Tanza, Cavite.	Trawl
	Length (m) 10.35 Width (m) 0.97 Depth (m) 0.89 Gross tonnage 2.21 Engine type Fuso Horse power 80 No. of fishermen on board 4	Large scale municipal fishing boat used in Rosario, Cavite.	fish pot
	Length (m) 8.56 Width (m) 0.68 Depth (m) 0.57 Gross tonnage 0.82 Engine type Yanbo Horse power 12 No. of fishermen on board 2	Medium scale municipal fishing boat used in Orion, Batangas.	Gill net
	Length (m) 8.37 Width (m) 0.64 Depth (m) 0.6 Gross tonnage 0.81 Engine type Brigg & Stratton Horse power 10 No. of fishermen on board 2	Small scale municipal fishing boat used in Marikina, Batangas.	Hook and line

(cont.) Table 5.4. Profile of fishing boats in Manila Bay.

Fishing gear	Specification	Description	Fishing gear
	Length (m) 10.21 Width (m) 0.65 Depth (m) 0.46 Gross tonnage 0.76 Engine type King star Horse power 10 No. of fishermen on board 2	Medium scale municipal fishing boat used in Macababe, Rampanga	Barrier net Fyke net gill net
	Length (m) 14.63 Width (m) 1.86 Depth (m) 1.54 Gross tonnage 10.97 Engine type Fiso Horse power 85 No. of fishermen on board 10	Commercial fishing boat used in Hagonoy, Bulacan.	Gillnet Pushnet
	Length (m) 18.8 Width (m) 2.25 Depth (m) 2.1 Gross tonnage 21.97 Engine type 40-82 Horse power 225 No. of fishermen on board 10	Commercial fishing boat used in Hagonoy, Bulacan.	Trawl
	Length (m) 20.5 Width (m) 2.3 Depth (m) 2.2 Gross tonnage 25.41 Engine type Hino Horse power 285 No. of fishermen on board 15	Commercial fishing boat used in Tanza, Cavite.	Ring net
	Length (m) 14.75 Width (m) 2.2 Depth (m) 1.75 Gross tonnage 14.07 Engine type 40-52 Horse power 225 No. of fishermen on board 10	Commercial fishing boat used in Navotas city.	Gillnet
	Length (m) 16.68 Width (m) 2.23 Depth (m) 1.81 Gross tonnage 16.65 Engine type 46-32 Horse power 225 No. of fishermen on board 12	Commercial fishing boat used in Rosario Cavite.	Gillnet

Table 5.5. Distribution of fishing gears by province in Manila Bay.

Fishing Gear	Number of fishing gear					Total
	Bataan	Bulacan	Cavite	Metro Manila	Pampanga	
Barrier net		41			12	53
Blast fishing			94			94
Bottom gillnet	640	146	487	173	55	1,501
Bottom set longline	136		65			201
Crab gillnet	202	6	86	70		364
Crab liftnet		5	27			32
Danish seine	2		3			5
Drift gillnet	481		389	61		931
Drive in net	8			12		20
Encircling gillnet	18	93	70	42	21	244
Fish corral	44		29			73
Fish pot			25			25
Fyke net		110			18	128
Hand pick			22	30		52
Motorized pushnet	27	35	20	12	5	99
Multiple hook and line	18	8	95	30		151
Pushnet			5	49		54
Ring net	12		18	3		33
Speargun	22		144	5		171
Squid jig	38		37			75
Squid trap	11		17			28
Stationary liftnet			43	16		59
Surface gillnet	64	98	49	12	28	251
Trammel net	95		28	11		134
Trawl	8	58	87	10	5	168
<b>Total</b>	<b>1,826</b>	<b>600</b>	<b>1,840</b>	<b>536</b>	<b>144</b>	<b>4,946</b>



Table 5.7. List of fishing gears with corresponding local names by province in Manila Bay.

Fishing Gear	Local Names				
	Bataan	Bulacan	Cavite	Metro manila	Pampanga
1 Barrier net		Palapad			
2 Blast fishing			Dinamita		
3 Bottom gillnet	Panti	Patinga	Palubog		Patinga
4 Bottom set longline	Kitang		Kitang		
5 Crab gillnet	Pang alimasag		Pang alimasag	Pang alimasag	
6 Crab liftnet			Bintol		
7 Danish seine			Hulbot hulbot		
8 Drift gillnet	Paanod		Barangay		
9 Drive in net				Paaboy	
10 Encircling gillnet		Pangulong	Pangulong	Pangulong	
11 Fish corral	Baklad				
12 Fish pot			Bubo		
13 Fyke net		Bukatot			
14 Hand pick			Kapa	Kapa/Sisid	
15 Motorized pushnet	Pang alamang	Galadgad	Pang alamang		
16 Multiple hook and line			kawil		
17 Pushnet			Sud-sud	Sud-sud	
18 Ring net			Pukot	Pukot	
19 Speargun			Pana		
20 Squid jig			Tangkab		
21 Squid trap			Bubo		
22 Stationary liftnet			Sapra	Sapra	
23 Surface gillnet		Pang tilapya	Palutang		
24 Trammel net		Trinet			
25 Trawl	Norway	Norway	Norway	Norway	

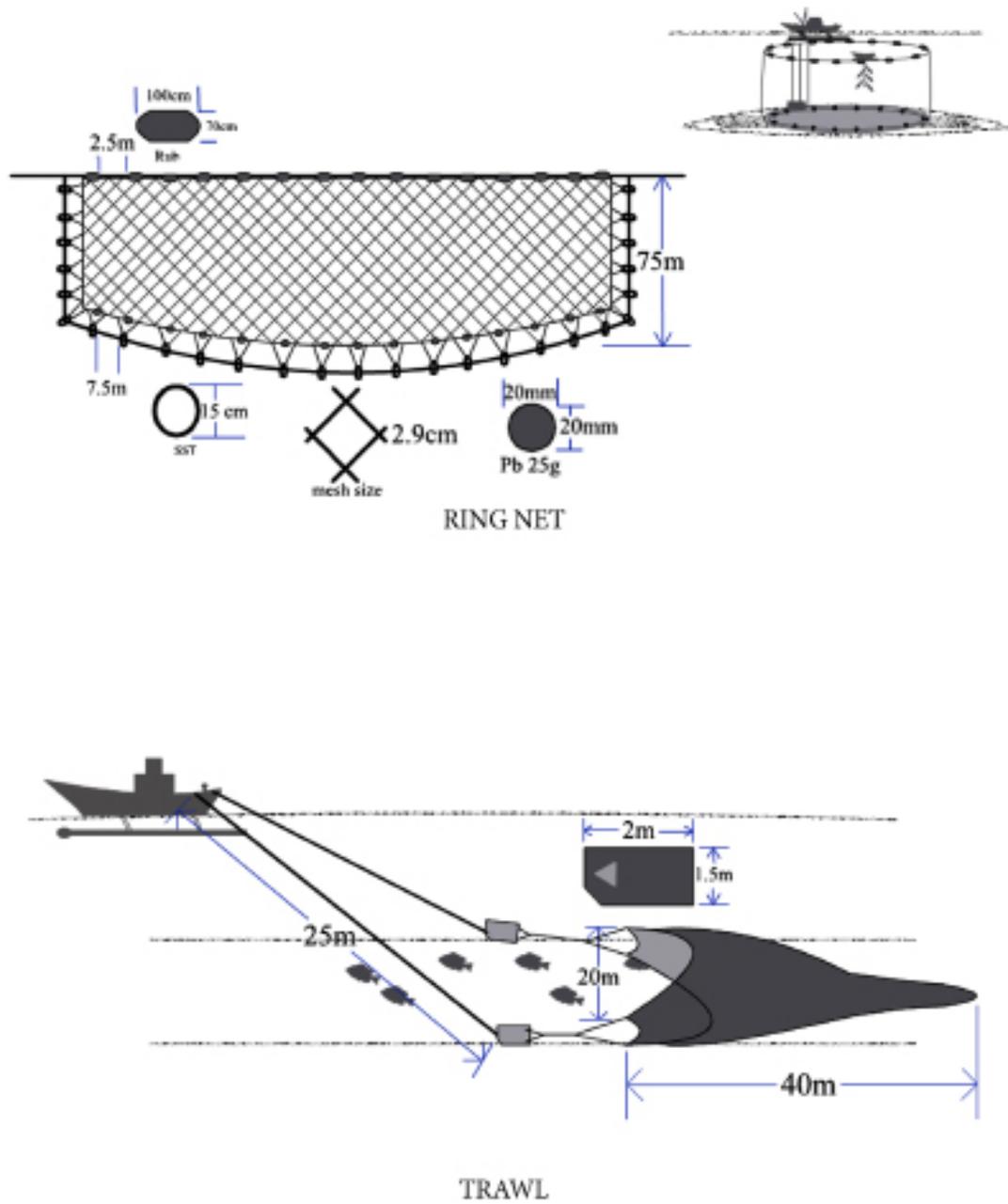
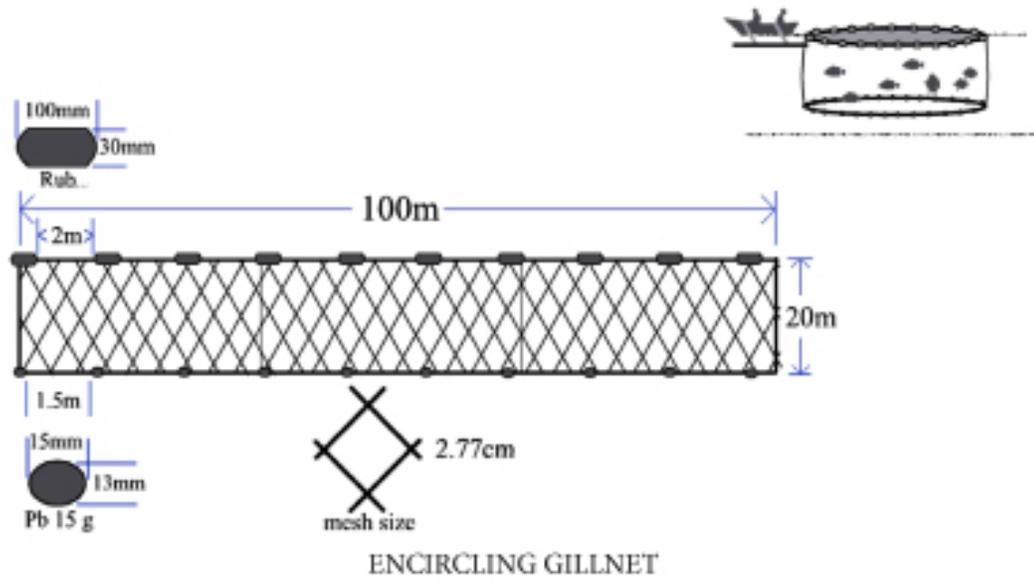
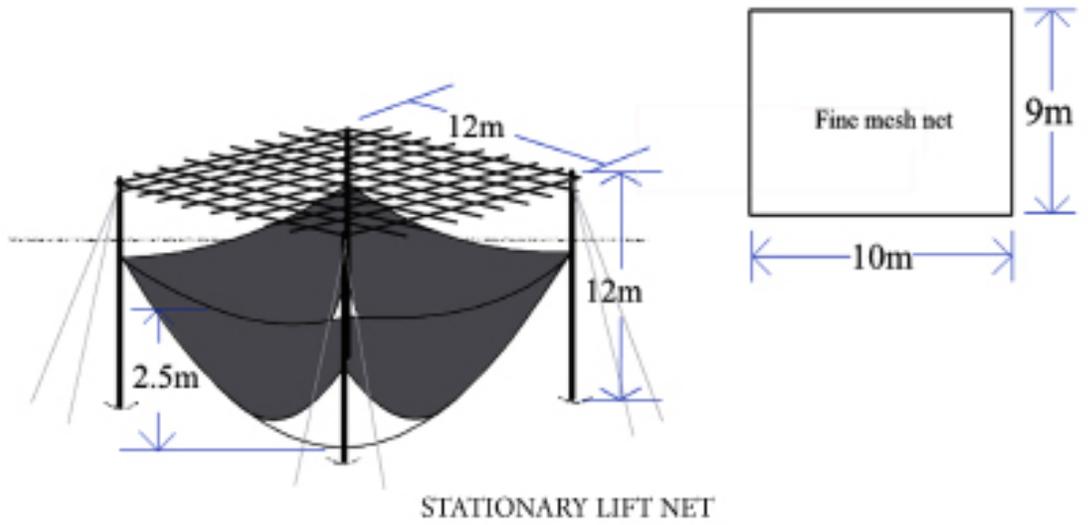
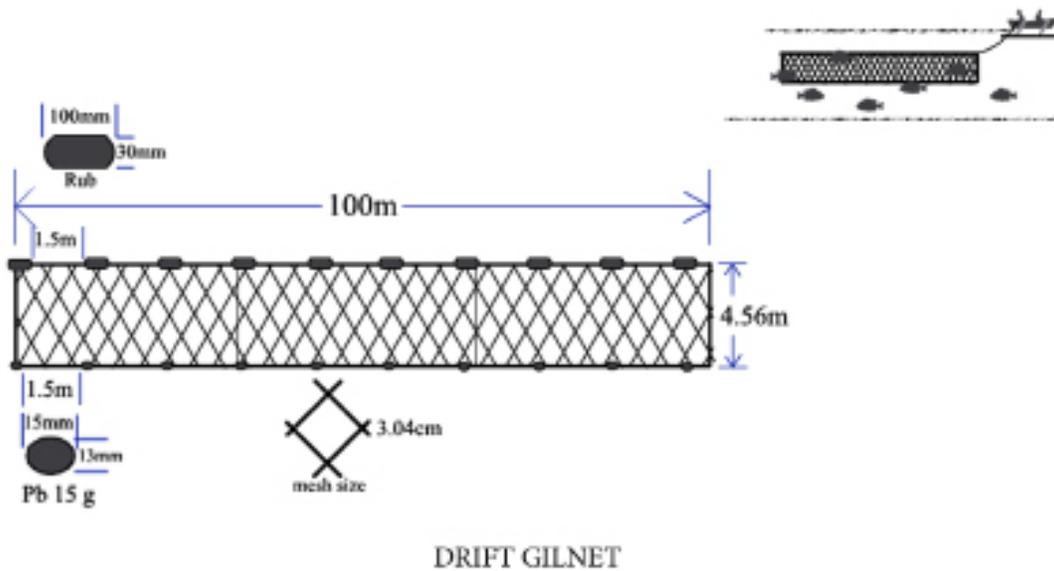
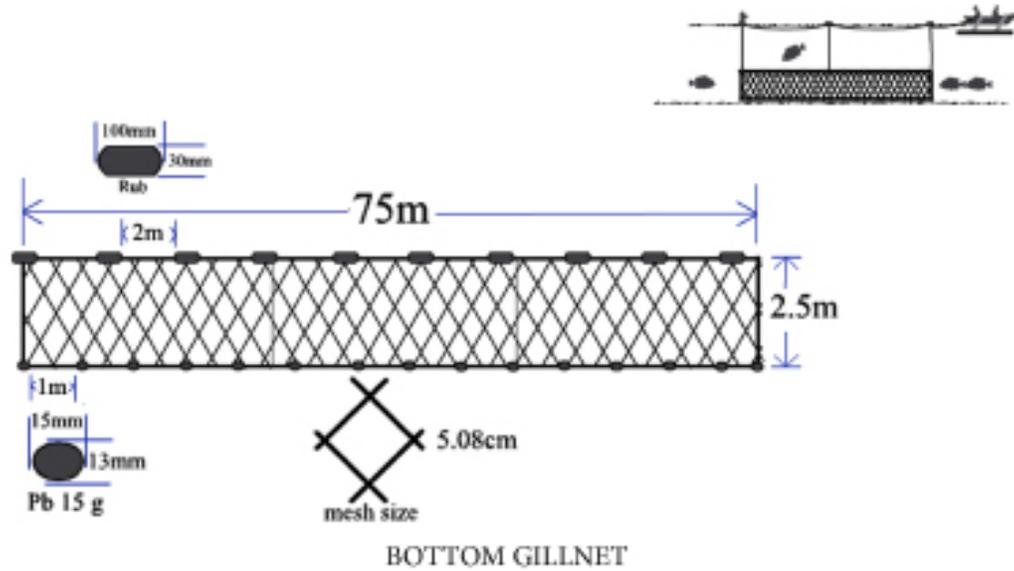


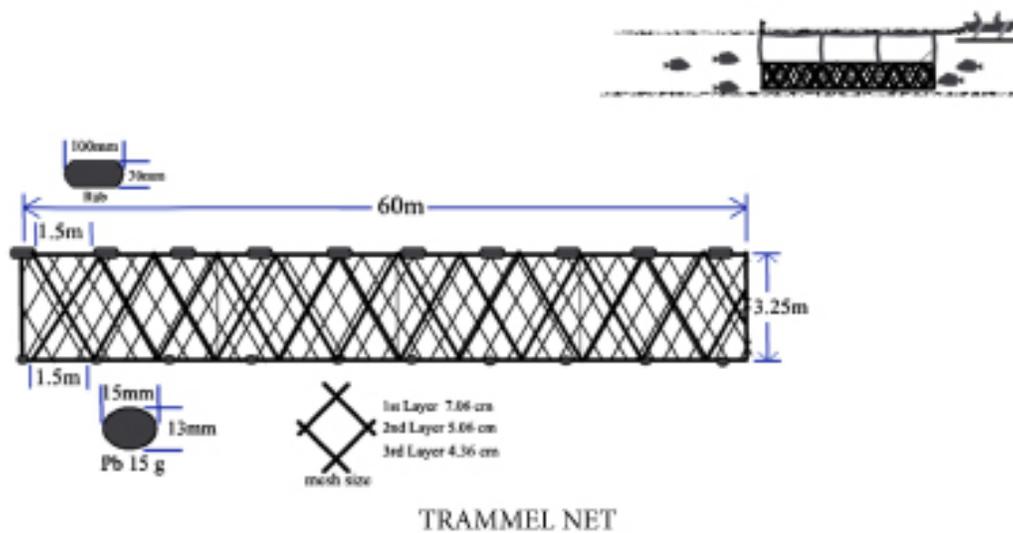
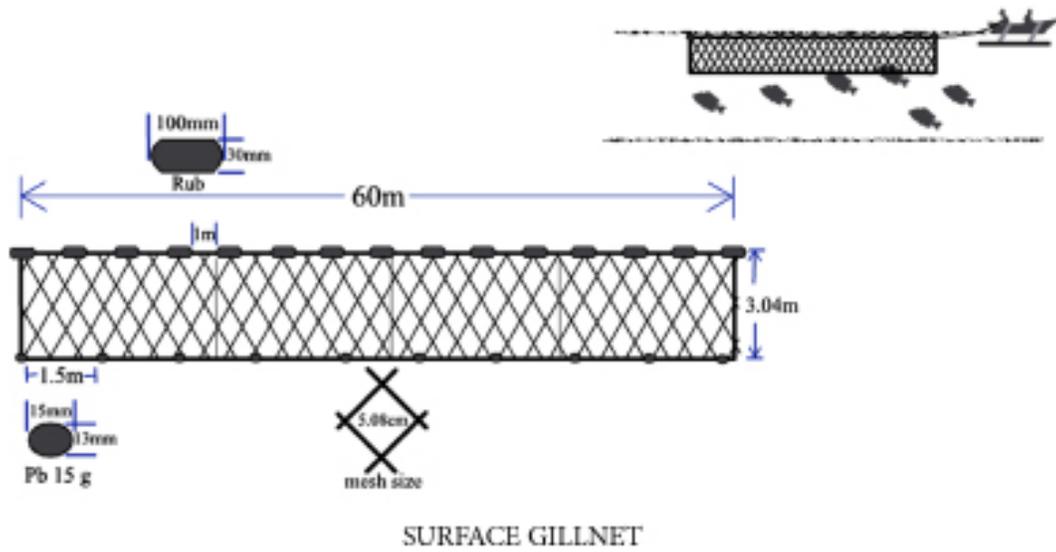
Figure 5.2. Profile of fishing gears in Manila Bay.



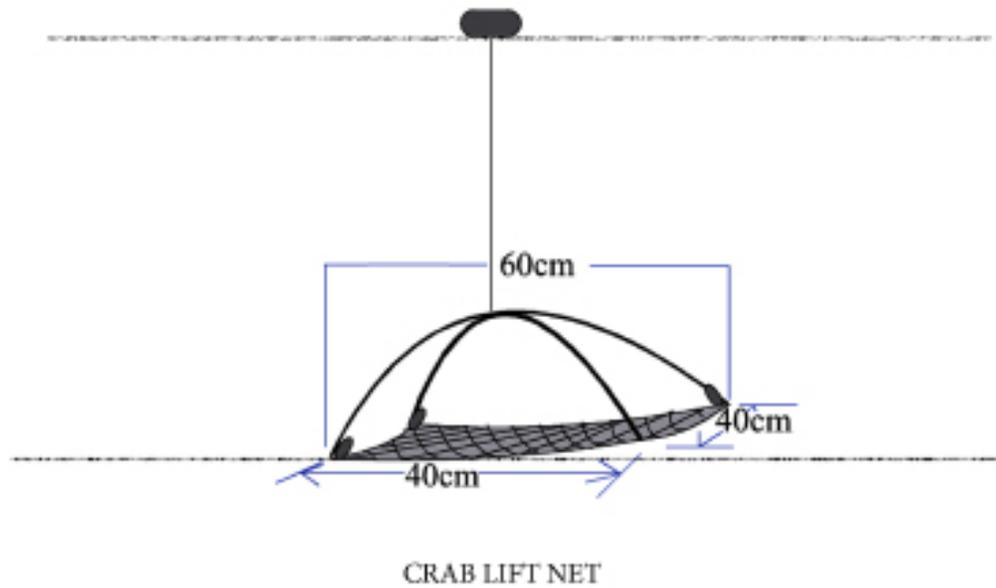
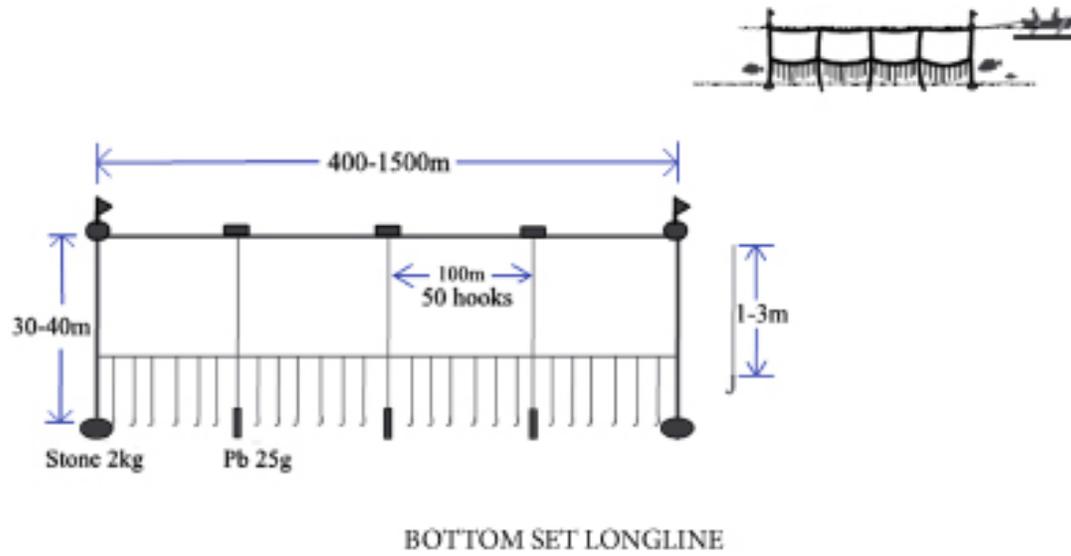
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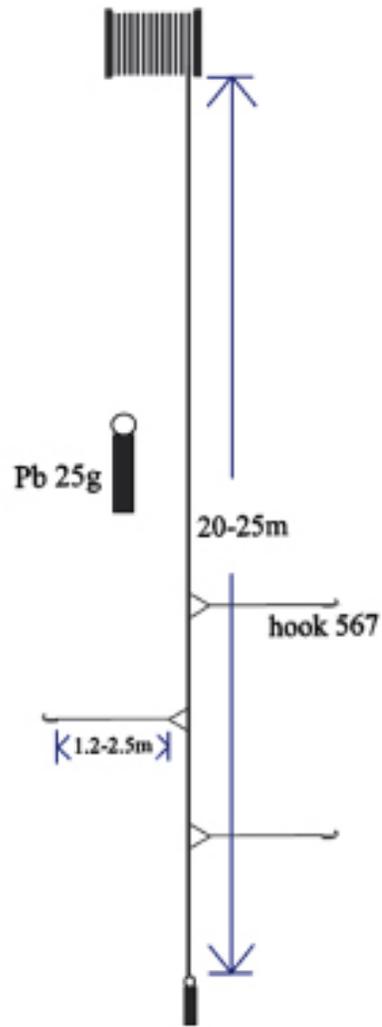
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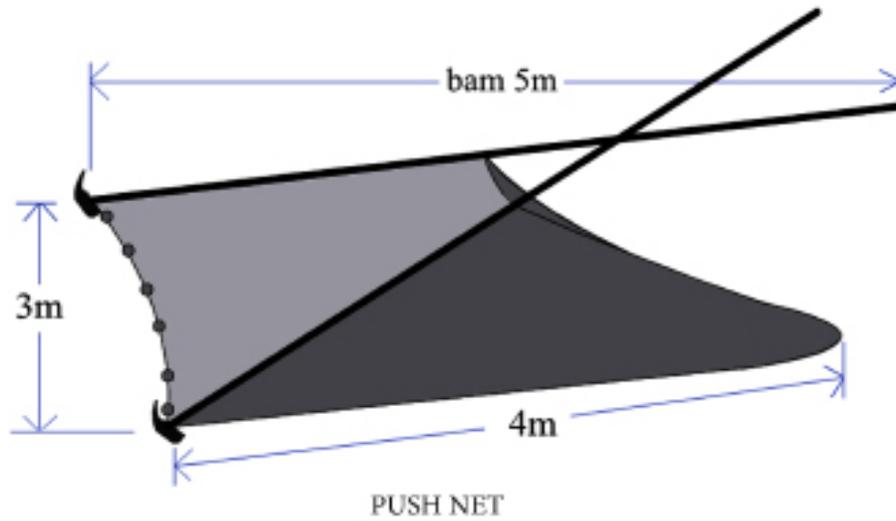
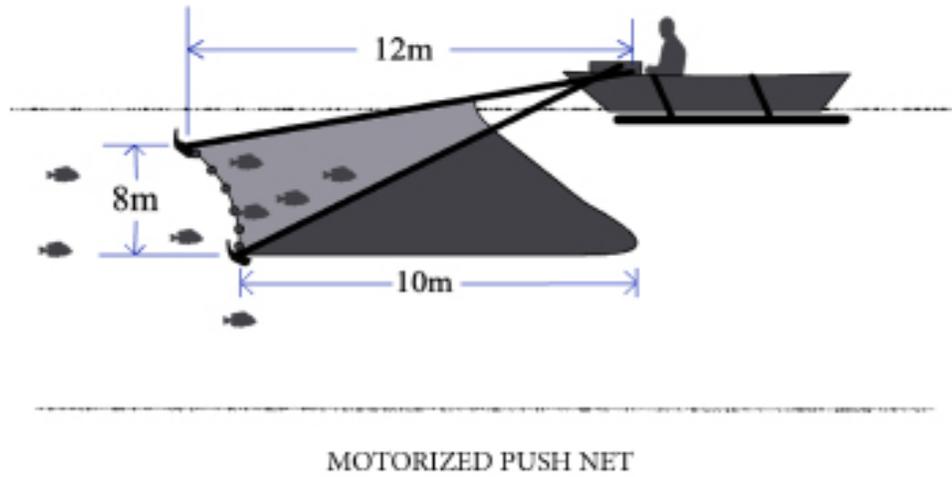


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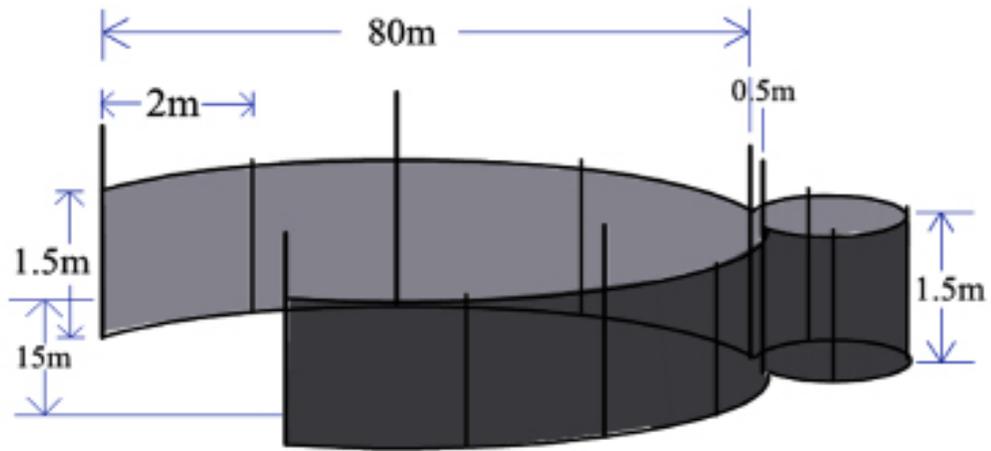


MULTIPLE HOOK AND LINE

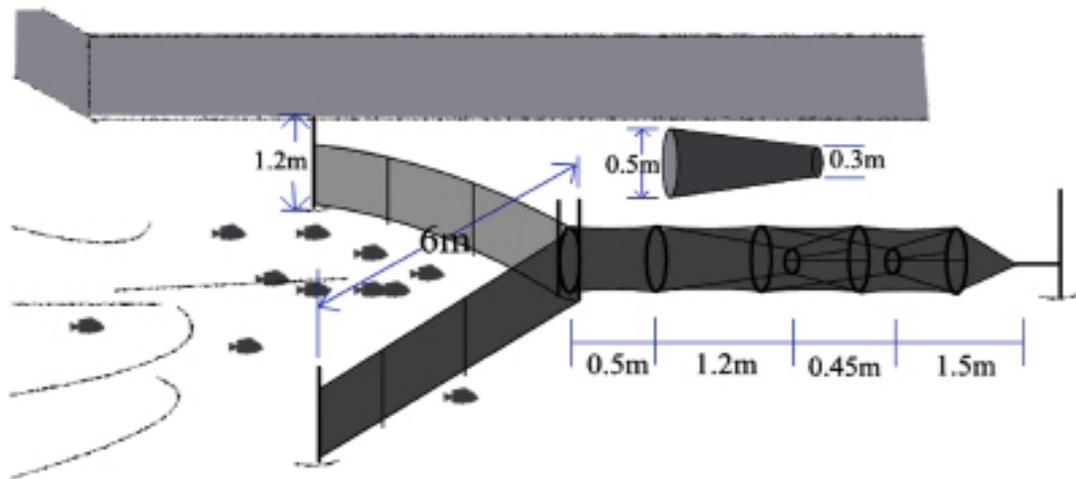
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(cont.) Figure 5.2. Profile of fishing gears in Manila Bay.



BARRIER NET



FYKENET

(cont.) Figure 5.2. Profile of fishing gears in Manila Bay.

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