Windowpane Oysters (Placuna Placenta) in Siit Bay

Marine Conservation Philippines
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WHERE ARE WINDOWPANE OYSTERS MOST ABUNDANT IN THE BAY? WHERE WOULD BE THE MOST BENEFICIAL ZONE TO SET UP A MARINE PROTECTED AREA TO HELP REPOPULATE WINDOWPANE OYSTERS?
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INTRODUCTION

The Windowpane Oyster, *Placuna Placenta*, commonly known as Kapis is among one of the Philippines most important fishery exports. Between the years of 1986 and 1991 the shell products from the windowpane oysters generated 36 million USD (Philippine Fisheries Profile, 1991). Empty windowpane shells were once a popular and accessible alternative to glass. Today they are used in the production of handicrafts such as lampshades, wind chimes, and jewelry. The handicrafts are exported worldwide; the United States, Japan, West Germany and other European countries are the largest buyers (Gallardo, W. G., Siar, S. V. & Encena II, V., 1994). The harvesting of windowpane oysters provides local fishermen with food for their families and additional income from selling shells and pearls as raw material for pharmaceutical and commercial purposes.

The Philippines was once home to an abundance of windowpane oysters. Due largely to unregulated harvesting, destructive harvesting methods and high market demands the population of windowpane oysters in major bays are rapidly declining (Gallardo, W. G., Siar, S. V. & Encena II, V., 1994).

Marine Conservation Philippines (MCP) was approached by the Environment and Natural Resources Division and Local Government Unit of Siaton for help in surveying Siit Bay to determine where the windowpane oysters are most abundant. From the surveys conducted Siaton hopes to be able to create a MPA for the oysters in the most crucial area. According to local fisherman, the oyster population in the bay has greatly declined compared to the population in the past.
Survey Site

Siit Bay is located between the municipality of Siaton and Zambounguita. The bay is sheltered and a large portion is protected from natural disturbances such as typhoons. Siit Bay substrata varies widely from the mouth to the inner part of the bay. Along the south west area of the coastline close to Siaton border, there is a reef between 3 and 11 meters depth. The reef runs from the start of the bay and continues for approximately 1 kilometer into the bay. There is sand and reef patches from the south east headland continuing north into the bay. This area is not as protected as the inner part of the bay, therefore there is evidence of degradation on the reef possibly due to typhoons. The seagrass bed starts 100 meters from the point of the headland and continues for approximately 200 meters when it meets a shallow sandy shore. Mangrove forests start 400 meters from the tip of the headland heading north into the inner part of the bay and curves along the inside shoreline of the bay, ending just past the Siaton border on the southeast side. Substrata along the mangrove coast is muddy with poor visibility (Figure 1).

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Figure 1: Map of Siit Bay in relation to the substrata found while surveying.
- Purple area represents the reef
- Yellow area represents mangrove forests shoreline
- Black area represents seagrass and sand (headland)
Biology, Habitat and Reproduction

The windowpane oyster is a bivalve marine mollusk with thin mica-like translucent shells. It can be found along the sandy or muddy coasts of India, Malaysia, parts of China and the Philippines (Yonge, 1977). The preferred habitat for the oysters is brackish water (fresh and salt water) along the muddy bottoms near mangrove forests, but the oysters can also adapt to survive in full salinity (Hornell, 1909: 46). Window pane oysters differ from other bivalves in that they are not able to anchor themselves to substrate, instead they rest on the sea floor (Yonge, 1977: 503).

Windowpane oysters are dioecious (reproduce sexually), and a small number are hermaphrodites. The oysters release sperm and eggs allowing fertilization to happen externally in open water. Oyster larvae gradually develop translucent shells and float with the current for approximately 14 days before settling on the bottom. Currents allow the species to disperse and repopulate other areas (Madrones-Ladja, 2002: 412). The oysters are predominantly immobile once they have settled on the sea floor, being at the mercy of the currents and waves.
MATERIALS AND METHOD

Materials
- 100 meters measuring reel
- Blank slate and pencil (one for each diver counting oysters)
- 2 Surface Marker Buoy (SMB) and reel per team
- Extra weights and weight belt to keep reel and SMB stationary at the start of transect line
- GPS recorder
- Depth gauge
- Compass

Survey Method

The goal of the survey is to cumulate the population density of windowpane oysters along the coast of Siit Bay. The coast was divided into sections of 100 meters using a reel.

A survey team consists of 3 divers. Diver 1 reels along the chosen survey depth. Diver 2 and 3 count all windowpane oysters observed. Diver 1 will deploy an SMB to mark the start of the reel. A GPS coordinate is recorded by the bantay dagat above where the SMB was deployed. At the end of the 100 meter reel diver 1 will deploy a second SMB to mark the ending point where another GPS coordinate is taken.

This process is repeated along the coastline of the bay at multiple depths; with the most consistent depths between 5-6 meters and 8-9 meters. Some variations may apply due to weather impacts and poor visibility, which prevented the survey team from continuing with the data collection (Figure 2).

Figure 2: Image representing the survey line under
RESULTS

The most populated area of windowpane oysters were found along the coast of the mangrove forests (Figure 3).

<table>
<thead>
<tr>
<th>#</th>
<th>GPS Coordinate</th>
<th>Depth (meter)</th>
<th>Number of Oyster found</th>
<th>Bottom Substrate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>09.07012, 123.15070 - 09.06978, 123.14990</td>
<td>8.5 - 9.5</td>
<td>60</td>
<td>Sandy - Muddy</td>
</tr>
<tr>
<td>2</td>
<td>09.07006, 123.15066 - 09.06978, 123.14981</td>
<td>6.5 - 7.5</td>
<td>12</td>
<td>Sandy - Muddy</td>
</tr>
<tr>
<td>3</td>
<td>09.06990, 123.14986 - 09.06981, 123.14999</td>
<td>7.6 - 8.5</td>
<td>15</td>
<td>Sandy</td>
</tr>
<tr>
<td>4</td>
<td>09.06879, 123.14769 - 09.06879, 123.14769</td>
<td>9 - 9.7</td>
<td>27</td>
<td>Sandy - Some Seagrass</td>
</tr>
<tr>
<td>5</td>
<td>09.07144, 123.15160 - 09.07207, 123.15204</td>
<td>8 - 9</td>
<td>11</td>
<td>Muddy</td>
</tr>
<tr>
<td>6</td>
<td>09.07134, 123.15172 - 09.07197, 123.15216</td>
<td>5.5 - 6.5</td>
<td>23</td>
<td>Muddy</td>
</tr>
<tr>
<td>7</td>
<td>09.07366, 123.15324 - 09.07433, 123.15318</td>
<td>5 - 6</td>
<td>27</td>
<td>Muddy</td>
</tr>
<tr>
<td>8</td>
<td>09.07301, 123.15022 - 09.07169, 123.14953</td>
<td>6.8 - 8</td>
<td>20</td>
<td>Muddy</td>
</tr>
</tbody>
</table>
DISCUSSION

The study shows that the highest abundance of windowpane oysters was at a depth between 5 to 10 meter along the coast of the mangrove forests and seagrass. This is a sandy and muddy area which corresponds with the oysters’ preferred habitat, as stated by Hornell (1909).

Figure 3: Map of oysters found along the coast of Siit Bay. The yellow line represents the most abundant area.
The number of windowpane oysters found along the reef side of the bay ranges from 0 to 3 oysters per 100 meter transect. This corresponds with Yonge’s study concluding that windowpane oysters do not prefer coral reefs as their habitat due to the inability to anchor themselves onto hard substrates (1977).

The survey was replicated on GPS coordinate #1 to conclude that this was the area with the highest oyster abundance. After the repeated dive, only 5 oysters were found along the transect line. The decline in numbers could be the result of the oysters being over harvested in the three week gap between the replicas or error in data collection.

From the data collected and previous studies, it is hypothesized that there are more oysters close to the mangrove coasts. However, poor visibility from silt and muddy substrate prevented the survey team from collecting more data (Figure 1).

RECOMMENDATION FOR MPA/WINDOWPANE OYSTERS SANCTUARY PLACEMENT

The best location for a sanctuary is the coastline from the mangrove forests to the start of the seagrass between 4 to 12 meters. This location provides suitable habitat for oysters. According to Madrones-Ladja’s study, oysters will have better chance of reproducing in higher populated areas since fertilization happens in open water (2002). An establishment of a windowpane oyster sanctuary will protect and allow oysters to reach sexual maturity and reproduce during spawning seasons.

There are limited studies in the spawning behavior of windowpane oysters. Dharmaraj, S., Shanmugasundaram, K., Suja, C.P.’s study suggested that the spawning seasons coincide with monsoon seasons (2004). In order to ensure the maximum effectiveness of the sanctuary, it is recommended that the spawning behavior of the windowpane oyster is conducted.
REFERENCES


