

CHANGES IN FISHING ACTIVITIES AFTER THE COASTAL ZONE MANAGEMENT PROJECT

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I. INTRODUCTION

This paper aims to evaluate the changes in the fishing activities of local fishermen after the implementation of the coastal zone management (CZM) project at Pakklong subdistrict, Pathew District, Chumphon Province by monitoring the CPUE (catch per unit effort), and the fishing season and fishing ground. The five observed fishing gears in the study site (Arnupapboon, 2004), which include one type of prevailing fishing gear (collapsible crab trap) and four types of seasonal fishing gears (squid cast net, Indo-Pacific mackerel gill net, crab gill net and shrimp trammel net), were monitored and their CPUE data were recorded.

II. MONITORING METHODS

1. CPUE

Landing survey was conducted nearly every month from six (6) landing sites covering Pakklong subdistrict, Chumphon Province. Catch effort data were monitored by observing the total catch per fishing trip. The CPUE is calculated using the following formula:

$$CPUE_t = C/N_t$$

t = Type of fishing gear

C = Total catch of each fishing boat per trip

N = Number of fishing boats

2. Fishing season and fishing ground

Interview of local fishermen was conducted at the approach of the fishing season, while information on the fishing ground affected by the CZM project was also gathered. Monthly interview of the fishermen was done during the first and last years of the CZM project's implementation period. The questionnaire used during the survey is shown in Appendix .

III. SUMMARY OF STOCK ENHANCEMENT ACTIVITIES

Stock enhancement activities were conducted in the study site starting in 2002 during the first year of implementation of the CZM project, in order to firstly, improve the fisheries environment by constructing or restoring the habitats, i.e., mangrove reforestation, installation of fish enhancing device and artificial reefs; and secondly, to restock the fisheries resource by releasing aquatic marine species, implementing a crab bank, and replacing the mesh size of the collapsible crab trap. The details of the each activity are explained in this paper. The summary of the stock enhancement activities is shown in Table 1.



Table 1 Summary of the five-year (2002-2006) stock enhancement activities

Activities	Description	Month
A	Initiating a crab bank for mature size swimming crab	June 2002
B	Mesh size replacement: from 1.2 to 2.5 in at the bottom of collapsible crab trap	August 2003
C	Releasing of shrimps : 1,000,000 pcs	August 2002
C	Releasing of shrimps: 1,000,000 pcs giant sea perch: 20,000 pcs swimming crab: 300 (mature size)	June 2003
C	Releasing of shrimps: 1,200,000 pcs giant sea perch: 20,000 pcs mud crab: 300 (mature size)	December 2003
C	Releasing of giant sea perch : 20,000 pcs swimming crab: 20,000 pcs	March 2004
C	Releasing of giant sea perch : 20,000 pcs swimming crab: 20,000 pcs	August 2004
C	Releasing of shrimps : 1,000,000 pcs	December 2004
C	Releasing of shrimps: 600,000 pcs giant sea perch : 24,000 pcs swimming crab: 3,700 pcs	May 2005
C	Releasing of shrimps: 1,000,000 pcs giant sea perch : 50,000 pcs	August 2005
C	Releasing of shrimps: 1,500,000 pcs	March 2006
D	Installation of artificial reefs (8 units)	March 2004
E	Installation of fish enhancing devices	June 2006
F	Reforestation of Thung Maha Bay	August 2006

Remark: A: Crab bank

B: Mesh size Replacement

C: Releasing post larvae

D: Installing artificial reef

E: Installing fish enhancing devices

F: Reforestation

IV. OBSERVED CHANGES IN FISHING ACTIVITIES AFTER THE IMPLEMENTATION OF THE COASTAL ZONE MANAGEMENT PROJECT

1. Fishing season and CPUE

Results from monitoring the fishing season and CPUE indicated that the fishing season of squid cast net, Indo-Pacific mackerel gill net, crab gill net, collapsible crab trap and shrimp trammel was not different during the first and last years of the project implementation. There was however, a clear change in the CPUE of some fishing gears.

Fishing season

Squid cast net is operated nearly throughout the year except when strong current occurs because it could cause damage to the fishing boat. Strong current normally occurs when the northeast monsoon starts to affect the study site. Indo-Pacific mackerel gill net and swimming crab bottom gill net are operated throughout the year, and highly operated even during the restricted season from July to September. The fishing season for Indo-Pacific mackerel gill net is in accordance with the migration behavior of the mackerel while that of the swimming crab bottom gill net is still not clear. Collapsible crab trap is operated the whole year with one to two operations per day. Shrimp trammel net is operated when the northeast monsoon occurs, i.e. from November to January. The fishing season of the fishing gears is shown in Table 2.

Table 2 Summary of fishing season in Pakklong subdistrict, Chumphon Province

Fishing Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
A	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
B	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
C	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
D	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
E	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal

A: Squid cast net
B: Indo-Pacific mackerel gill net
C: Swimming crab bottom gill net
D: Collapsible crab trap
E: Shrimp trammel net

Seasonal fishing gear (A, B, C, D, E)
 Prevailing fishing gear (D)

Legend:
 Light grey: Low season
 Medium grey: Normal season
 Dark grey: High season

CPUE

The CPUE data monitored during the implementation of the stock enhancement activities showed that the abundance of swimming crab and shrimps obviously increased while the abundance of squid increased only slightly. However, the abundance of the Indo-Pacific mackerel seemed not to have any change as shown in CPUE fluctuation.

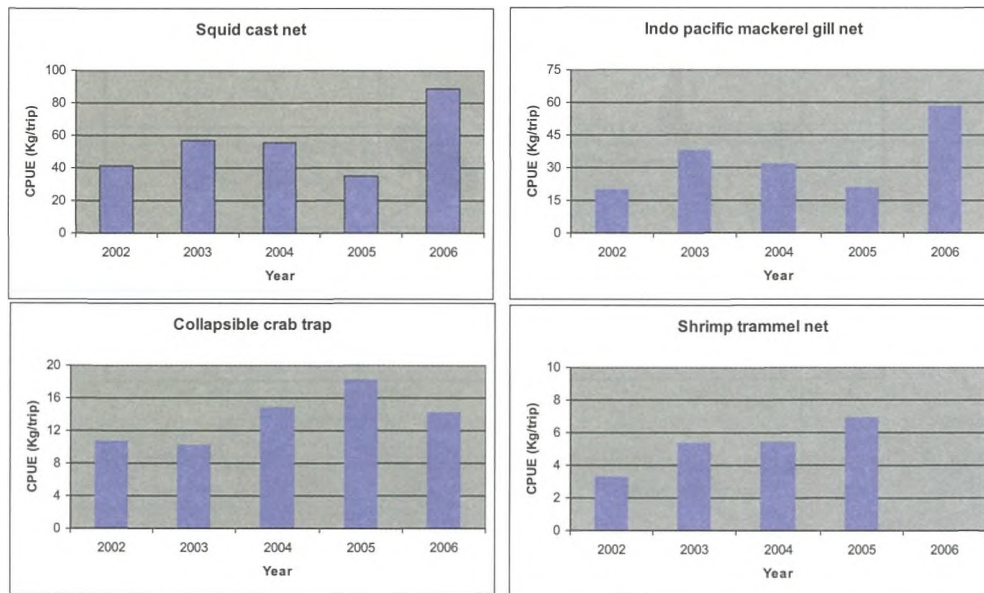


Fig. 1 CPUE of each fishing gear, 2002-2006

The CPUE data of each fishing gear (Fig. 1) indicate that the fishery resource of non-migrating species like crabs and shrimps could be restored in the study site through coastal management such as stock enhancement in order to rejuvenate the fishing community and enhance the existing population. However, stock enhancement may not be applicable for migrating fish species such as the Indo-Pacific mackerel as shown in Fig. 1. The CPUE of swimming crab bottom gill net is not included in this paper due to insufficient data.

2. Fishing ground

Most of the fishermen believed that fisheries resource has been restored in the study site after the implementation of the coastal zone management project. About 11.2% of fishermen who responded to our questionnaire had already changed their fishing ground, because of the installation of the artificial reefs (ARs) and fish enhancement device (FADs) in the casting area. Fig. 2 shows the casting area and Fig. 3 shows the fishing ground of each fishing gear.

Squid cast net and Indo-Pacific gill net operations

These fishing gears are still operated in the study site as was the practice before the implementation of the project. It was also observed that operations are mostly concentrated in the casting area because most of fishermen are convinced that there are more fishes and other marine organisms gathering and living around this area. In fact, some fishermen had intended to shoot their nets near the casting area.

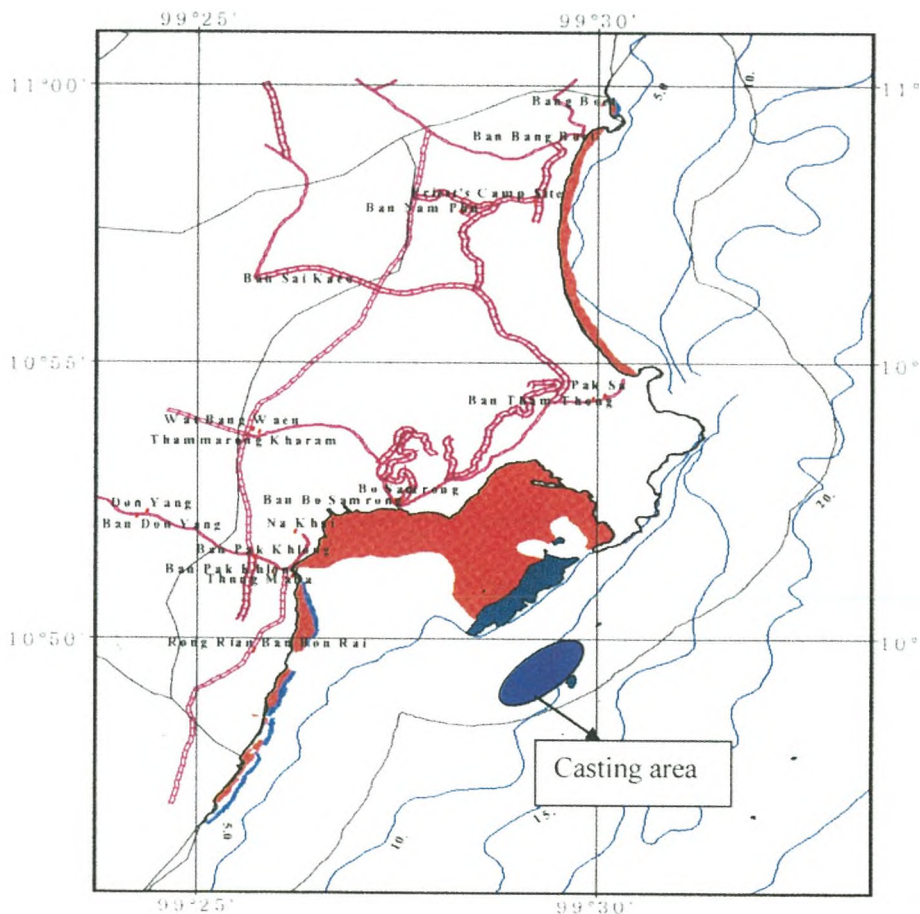


Fig. 2. The casting area of the artificial reefs and fish enhancement (aggregating) device

Shrimp trammel net operation

The stock enhancement activity has affected the shrimp trammel net operations apparently diminishing the fishing ground. Before the installation of the artificial reefs and fish enhancement device, the fishermen used to shoot their nets across the tide and allowed the nets to drift with the current for about three to four hours. Presently, the fishermen have to reduce the drifting time and haul their nets as early as possible in order to avoid entangling these with the new obstruction, i.e., the artificial reefs and the fish enhancement device.

Crab gill net and collapsible crab trap

The stock enhancement activity was observed to have no effect on the fishing ground of these two fishing gears. The collapsible crab trap is only operated in Thung Maha Bay because the fishermen could not operate far from the shore (i.e. in the casting area) as it is too dangerous for small fishing boats. Crab gill net, on the other hand, is operated with long net and long soaking time (i.e. three to four days), thus, the fishermen have to operate farther than two km from the shore line which beyond the casting area.

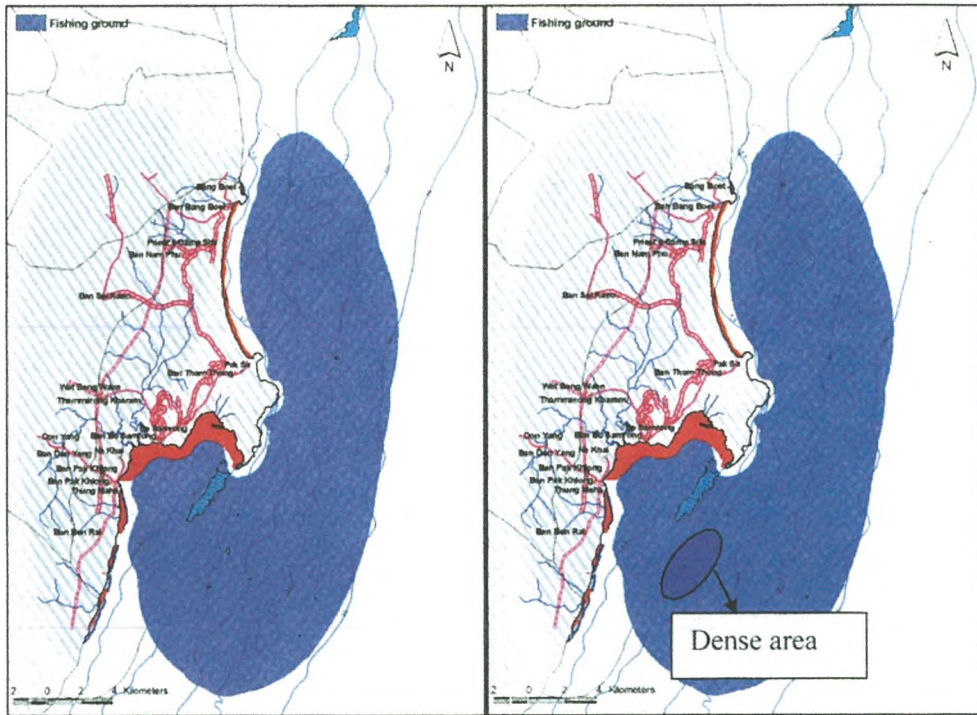


Fig. 3.1 Fishing ground of squid cast net before and after the implementation of the project

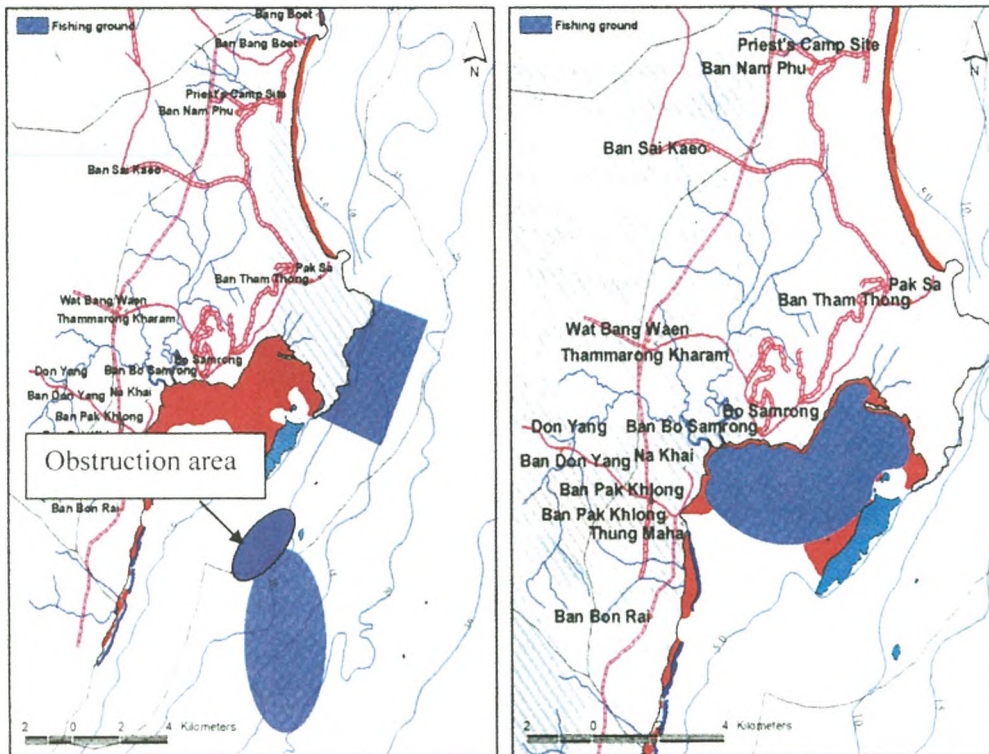


Fig. 3.2 Fishing ground of Indo-Pacific mackerel gill net before and after the implementation of the project

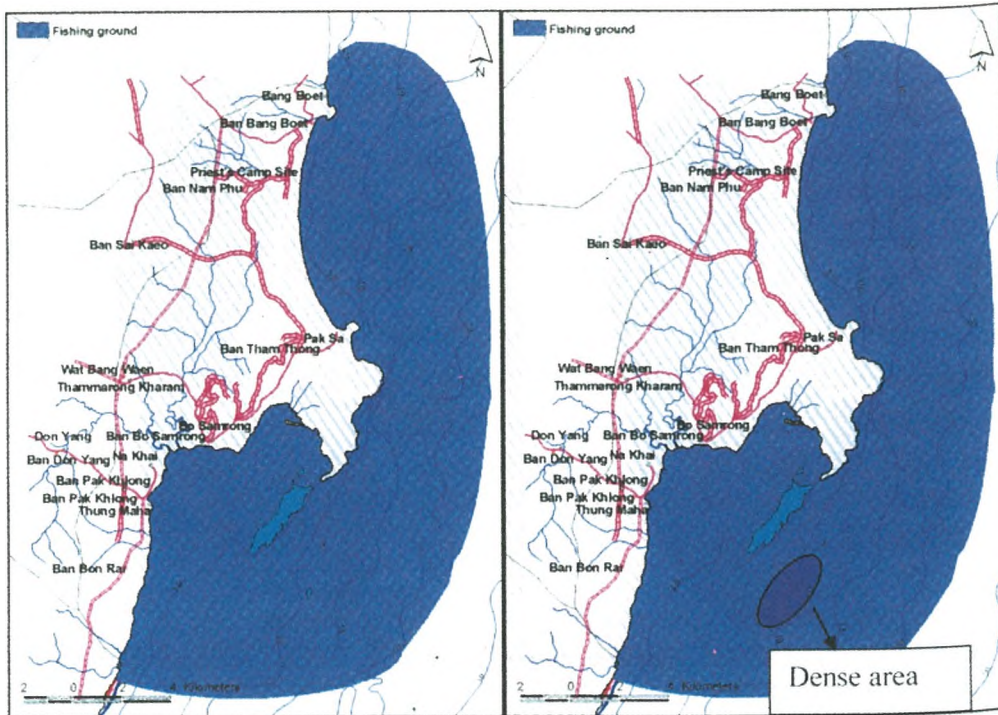


Fig. 3.3 Fishing ground of Shrimp trammel net (left) and Collapsible crab trap (right)



Fig. 3.4 Fishing ground of crab gill net

Appendix

Questionnaire: Fishing Ground of Each Season

Date/...../.....(dd/mm/yy)

Interviewer.....

Interviewee.....

Address.....

.....

.....

Vessel name..... Vessel size.....meter

Engine Power.....hp Engine type.....

Type of gear are owner.....

Type of using gear..... Size of gear*.....(.....:.....)*

Depth Fisher.....Meter Far from shore.....Kilometer

Fishing time Start.....Finish..... Duration of trip.....

No.of Haul per trip.....

Remark.....

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.....

**Size of Gear should be separate type*

Gill net: Net length, Net width (No. of net)

Trap: Trap width, Trap high (No. of trap)

Cast net, Falling net: Circumference of net (don't input)

Purse seine: Net length, Net width (don't input)

Catch data

Catch (species,Quantity)

1).....Kg

2).....Kg

3).....Kg

Estimated total catch.....Kg