

## CHAPTER 6

### CONCLUSION AND RECOMMENDATIONS

#### 6.1 Conclusion

From the result, it demonstrated that the different coastal land use along the both sides of 3 mangrove canals at Trat Bay caused the different environmental condition of 3 canals and reflected in different species composition of fish found in term of species number and species diversity.

Comparing of 3 canals, Bangphra Canal, which runs through the natural recovery mangrove, without shrimp farming on both sides and the structure of the canal was in natural condition, had the best environment basing on the most abundance of fish found in terms of species number and species diversity. All 95 species of fish were found from Bangphra Canal, of which 52 species were found in wet season and 65 species were found in dry season. The index value of species diversity of fish found from this canal was 2.54 in wet season and 3.10 in dry season.

The lower abundance of fish was found at Thaprik and Thaleuan Canal, which had the improper environment. At Thaprik Canal, major area on the both sides covered by deteriorated mangrove and almost all of shrimp farm. This canal was as the dumping sites of the effluence of sediment and chemical substances from shrimp farms. Seventy-five species of fish were found from Thaprik Canal, consisting of 41 species in wet season and 58 species in dry season. The index value of species diversity of fish found from this canal was 2.41 in wet season and 3.02 in dry season.

At Thaleuan Canal, although both sides was covered with the most abundance of natural mangrove and without shrimp farming but its structure was not in natural condition with water gate installing at inner part of the canal. The water gate will be closed in dry season and caused the salinity of water in Thaleuan Canal to be the highest. In wet season, the water gate will be opened to discharge the freshwater from the reservoir into the canal. A total of 80 species were found from Thaleuan Canal, comprising 39 species in wet season and 64 species in dry season. The lowest number of species found from Thaleuan Canal in wet season might due to the opening

of water gate at inner part of the canal and affected the distribution of fish in the same season. At the same time, the index value of species diversity of fish was found the lowest from Thaleuan Canal. The value of diversity index of fish found from this canal was 2.24 in wet season and 2.83 in dry season.

The results of the regression and correlation coefficient analysis showed that species numbers of fish had relationship with the some environmental parameters of the canals including surface and bottom salinity, bottom DO, surface pH, concentration of surface  $\text{PO}_4^{3-}$  and zooplankton volume. Meanwhile, total weight of fish collected by push net in both seasons of 3 canals was not different but total weight of fish collected by drift gill net in both seasons of 3 canals was significantly different ( $P < 0.05$ ). In addition, the maximum CPUE by drift gill net was 0.12 kg/hr. from Bangphra Canal. The latter was 0.09 kg/hr. from Thaprik Canal and the lowest was 0.06 kg/hr. from Thaleuan Canal.

Overall fish species found throughout the study period were 111 species from 47 families. Fish species were found the most at downstream (the mouth of canal), the latter at midstream and the least at upstream of each canal. They also were found greater in dry season, at night and during spring tide than in wet season, during the day and neap tide. The 62 species were found in wet season and 80 species were found in dry season. The 97 species of fish were collected at night while 79 species were collected during the day. All 94 species of fish were collected during spring tide while 84 species were collected during neap tide.

Based on fishing gears used, the 94 species of fish were caught by push net, of which 60 and 79 species were caught in wet and dry season, respectively. Only 25 species were caught by drift gill net, of which 22 and 18 species were caught in wet and dry season, respectively. In wet season, sixteen species of all were caught by both fishing gears while two species of all were caught only by drift gill net. In dry season, thirteen species of all were caught by both fishing gears while one species of all was caught only by drift gill net.

All fish species were classified into 7 groups based on their feeding behaviour. They were herbivore (7.2 %), carnivore (69.4 %), omnivore (16.2 %), scavenger (0.9 %), mixed between herbivore-detritivore (3.6 %), mixed between carnivore-detritivore (0.9 %) and mixed between omnivore-detritivore (1.8 %). Major families of fish found were Cyprinidae, Gobiidae, Siganidae,

Engraulidae, Hemiramphidae, Carangidae, Leiognathidae, Lutjanidae, Clupeidae, Mugilidae, Chandidae, Eleotridae and Ariidae.

According to the coastal fishery in 3 canals and around Trat Bay, major fishing gears used were 29.7 % of bottom gill net (crab net), 28.6 % of push net, 23.1 % of fish and crab trap, 14.3 % of trawl, 8.8 % of drift gill net and 13.2 % of others. At the same time, push net and trawl could catch the most aquatic animals in terms of the quantity and the species number. Catch per day by push net usually composed of 6-30 kg of shrimp, 1-5 kg of crabmeat after taken out of the shells, 1-30 kg of fish. Trawl could catch more than 30 kg of fish, 6-15 kg of shrimp, and 1-15 of flesh crab per day.

From the interview, 27.5 % of the local fisherfolks in 7 sub-districts of Trat Bay, who used push net and trawl as fishing gears, earned more than 10,000 baht/month from fishing. In contrast, 40.6 % whose fishing gears used were bottom gill net, fish and crab trap, drift gill net and etc. earned 1,000-5,000 baht/ month from fishing. The income from fishing not only depended on fishing gears used but also depended on the abundance of aquatic animals in the fishery source.

The 96 % of fisherfolks pointed out the decrease of the catch at Trat Bay was due to various causes. The 18.7 % of local fisherfolks thought that the increasing in numbers of fisherfolks was the main cause of decreasing of the catch, while 15.4 % believed that it was due to the operation of trawl and push net. The 12.1 % indicated that it was the results from the increasing of fisherfolks, the trawl and push net. Another 12.1 % pointed out that the decrease of the catch was a result of an increasing of fisherfolks and wastewater discharged from coastal shrimp farms.

Meanwhile, 75 % of coastal fisherfolks believed that mangrove were useful for the coastal fishery. However, 93 % of them pointed out the present condition of mangrove at Trat Bay was poorer than in the past. They, 59 %, indicated that shrimp farming was the main cause of mangrove deforestation and brought about the lack of nursery, residential, breeding, food and shelter area for aquatic animals. At the same time, 20 % though the shrimp farming and the woodcutting were the causes of mangrove deterioration.

Finally, it could conclude that the abundance of fish at Trat Bay depended on the coastal land use, the environmental condition of habitat of fish, types of fishing gear used in local area and the fertility of mangrove nearby.

## **6.2 Recommendations**

The study on species composition of fish for using as the indicator to reflect the environment condition influenced from coastal land use needs more supporting data to indicate those relationships. Particularly, the history and life cycle of various groups of fish, which can be found in estuarine zone and have different tolerance on environmental condition, should be further studied to predict their behaviour and distribution. In addition, the study on the effects of coastal land use, such as the impact of the effluent of chemical substances from shrimp farms into the surrounding area should be carried out.

Furthermore, the abundance of fish species not only depended on the environmental condition affected from land use activities but also depended on fishing gears used by the local fishermen. Push net and trawl were the fishing gears that destroy many aquatic animals in the young stage. Therefore, the study on fishing efficiency by using small scale fishing gears that were not disturb the coastal environment and aquatic animals should be conducted to use as one of the alternatives on local fishery management by the local communities.

At the same time, the action plan to manage and preserve the mangrove canals to be as the nursery grounds of coastal aquatic animals should be improved urgently and effectively to recover the deteriorate mangrove to be in suitable environmental condition. In addition, the negative effects of coastal activities to the social and ecological status of the locals such as the polluted water drained from shrimp farming and other coastal developments must be studied seriously to forecast, evaluate and control those activities to be within acceptable limit. For further sustainable coastal development plan, the governmental policy should be drawn clearly and carefully to assess the coastal resources and socio-economic status of the locals as parallel.