Chapter 5

Conclusions and Discussions

In this chapter we concluded and discussed the results of our study. In addition, we also included limitations and suggestions for further study.

5.1 Conclusions

The monthly data of blue swimming crab catch from 2003 to 2006 classified by three gear types used were analyzed and reported using descriptive statistics and graphs of the catch by gear, month and year. The catches weight was transformed using natural logarithm to reduce the skewness.

The catches of blue swimming crab from 2003 to 2006 were 17,898.09 kilogram. The annual catches were 63% in 2005, 13% in 2004, and 12% in 2003 and 2006. The three major fishing gear types were used. The catch weights were 82.4% from set bag net, 9.2% from gill net and 8.4% from trap.

The time series plot of monthly catch showed similar seasonal pattern in each year with high value in March. The catches were extremely high value in every month in 2005. The maximum monthly catch was 31,989.9 kilogram observed on March 2005 and the minimum was 121.6 kilogram observed on December 2006.

The time series plots of monthly catch classified by gear showed that catch weight from set bag net was higher than those from gill net and trap and was high in March but the catches from trap and gill net were high in June to August. Again the catch weights were high in the year 2005 for all three gear types.

The relationships between the catch weight and environmental factors were investigated using scatter plot, correlation coefficients and simple linear regression. The environmental factors comprised average air temperature, morning air temperature, relative humidity, water level and rainfall.

The correlation coefficients were 0.846 for humidity and rainfall, and -0.709 for humidity and average temperature. The correlation between average air temperature and morning air temperature was 0.751. Therefore we use only morning air temperature, water level and rainfall for further analysis. From the scatter plots the catch weights had positive relation with morning air temperature but it had negative relations with water level and rainfall.

The model of logarithm of catch weight and morning air temperature, water level and rainfall was fitted using multiple regression. Morning air temperature, water level and rainfall were significant with p-values <0.001, <0.001 and 0.014, respectively. The r-squared was 34.6%. The estimated values based on this model were compared with actual values for each gear but they do not fit well with the actual values.

The model of logarithm of catch weight and month, year and gear was fitted using multiple regression with sum contrasts for comparing the adjusted catch weights by each factor with the overall mean. The r-squared was 88.8%. The estimated values based on this model were compared with actual values for each gear but again they do not fit well with the actual values.

The three separated models for each gear types were fitted to the logarithm of catch weight and month, year and gear were fitted using multiple regression with sum contrasts. The r-squared were 96.1% for trap and set bag net and 93.9% for gill net. The estimated values of catches based on the models classified by gear types were compared with actual values and they fit quite well with the actual values.

5.2 Discussion

The present study has revealed seasonality in the catch of blue swimming crab similar to other studies. For example, Potter et al (1983) found that blue swimming crab fishery in Peel- Harvey estuarine, Western Australia was year round with peak period from January and April. Chande et al (2003) reported high crab catches between January and July in the coastal of Dar es Salaam, Tanzania. The result from this study contrast with Trisak et al (2009) that shown the highest average catch per unit effort (CPUE) in the eastern gulf of Thailand was obtained in the cool season (October to February) and the lowest CPUE was obtained in rainy season (May to October). In this study maximum peak of crab catches occurred in March, coinciding with the peak crab catches in Spancer gulf and gulf St. Vincent, South Australia (Svane and Hooper, 2004).

Our study found that the catch of blue swimming crab varied between difference types of gears. The maximum catches were from set bag net, followed by gill net and trap. This result agrees with the study by Choonhapran (1996). It can be explained that the set bag net was placed in deep channel with a strong current and it generally has a small mesh size especially at the end of the bag net. The smaller crabs can be caught more easily by set bag net whereas the trap relies on the crab moving in. The catches usually depend on the soak duration therefore the harvested per unit is low (Chesoh and Lim, 2008). Actually, the characteristics of the gears influence the quantity of the catch. The blue swimming crab can be caught with high catchability by set bag nets especially at adjacent the mount of the Lake connecting to the open sea.

Our study found the low amount of catch during October to December. This may be because it is high rainfall or monsoon effect and then reduced water salinity in the Lake in this period. Most of blue swimming crabs will migrate to open sea (Chesoh and Lim, 2008). The catch may be also affected by characteristics and life cycle of the blue swimming crab. Most female swimming crabs released eggs during the hot season and increased small crabs in subsequent early on rainy season. In Thailand during October to December, the fishermen always caught female crabs with eggs outside the shell; actually it is prohibited by the law (Trisak et al, 2009). This may explain the low catch around October, November and December.

Our study also found that morning air temperature, water level and rainfall influence the catch of blue swimming crab. The difference in catch affected by temperature and salinity has been reported (Kangas, 2000). Our results showed the higher water level, the lower the catch weights.

A high number of catch in every month of the year 2005 were inconclusive. However, there were releasing a massive number of blue swimming crabs into the Lake under the Songkhla Lake Sea Farming Project, and community collaboration to conserve the Lake's resources by establishing of fish sanctuary for fishing regulation about 20 zones covering around 26 square kilometres in the Lake (NICA, 2009). This might affect the huge expansion of blue swimming crab population in the Lake and then the fishermen can catch high weights of crabs.

5.3 Limitations and future study

Our study expressed several limitations. First, our data were only four year period and it was not long enough to investigate explicit trend of the catch. Second, catch weight in the previous month may affect the catch weight in the successive month and we did not taken this correlation into account. Third, the environmental data that we used, it may not cover up entire aquatic environment around the Lake since Songkhla Lake is located in three provinces from Songkla, Phatthalung and Nakhon Si Thammarat. Moreover, other aquatic environmental factors such as water temperature, water quality particularly salinity and suspension solid in the water need to be investigated with the crab catch. The methods that we used were more appropriate for several species. Further investigation, we recommend that should concentrate on life cycle and size distribution of blue swimming crabs on the catch in each fishing ground of the Lake and the Songkhla Lake Sea Farming Project together with local people participation of Lake management should be continued implementation to rehabilitate and to sustain the blue swimming crab population in the Lake.