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Catch performance of the purse seines for the neritic tuna fishing in the Strait of Malacca.

Samsudin Basir*
Sallehudin Jamon*

Capture Fisheries Division, FRI Kg Acheh, Department of Fisheries, 32000 Sitiawan, Perak, MALAYSIA.

Abstract

Purse seines contribute about 95% of the neritic tuna catch in the Malacca Straits followed by trawlers, 3.5% and the rest from other traditional fishing gears. The main neritic tuna species caught by the purse seines are longtail (*Thunnus tonggol*) and kawakawa (*Euthynnus affinis*) with the ratio 3 to 1. For frigate tuna (*Auxis thazard*), even though the species occur along the longtail and kawakawa stocks, they are rarely caught by the larger purse seines (> 70GRT) with a very small number. The monthly catch of the purse seines varied by percentage 8 – 32% from the average and there is no apparent landing pattern that may indicate a strong seasonal tuna fishery in the Malacca Straits. The bigger purse seines (>70GRT) give higher cpue (mt/vessel) compared to the small vessels. The trend of annual cpue from the purse seines fishery showed that the neritic tuna resources in the Malacca Straits still at the sustainable level. Since the neritic tuna is a migratory species, the resources are shared by several bordering countries. The practical management of the neritic tuna is to have a systematic cooperation among the countries involved particularly area where all the relevant countries share the same catch and effort data collection system.

INTRODUCTION.

Marine fishing areas in Malaysia can be divided into several sub-areas, west and east coast of Peninsular Malaysia, Sarawak and Sabah waters which include Sulu and Celebes Seas in the east coast. The Straits of Malacca is in the west coast of Peninsular Malaysia which form part of the IOTC area of competence. The areas which fall under the IOTC area of competence include the state of Perlis, Kedah, Penang, Perak and Selangor. The Malaysian ZEE in the Straits of Malacca is bordering with the Indonesia toward the west and toward the north it is bordering with the Thailand (Andaman Sea) (Figure 1).

During early 1980, small tuna were only caught as by-catch by the gill nets and purse seines. Only in 1987, when tuna purse seines were first introduced, thus boosting the tuna landings. The neritic tuna become more important and as a target species when the demand for that species were increasing from the cannery processing plants form domestic and other countries such as Thailand. Gradually after operating by searching a wild tuna school, the purse seiners started to use spotlights to aggregate fish (Chee, 1996). There was a tagging experiments on neritic tuna carried out in the South china Sea. The results showed that 50% of the recaptured tuna came from the purse seine operators (Raja Bidin, 1990).

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Figure 1: Malaysian fishing areas including the Straits of Malacca.

Annual catches of neritic tuna

Annual catch of the neritic tuna in the Malacca Straits (west coast of Peninsular Malaysia) is shown in Figure 2. Generally the annual catch of neritic tuna in the Malacca Straits shows an increasing trend starting from 1970 with only 2,542 mt to reach 21,764 mt in 2011. During the period of 1970 to 1984, the annual catch seemed to be constant below 5,000mt and only showed a modest increase after that period until 1996. From 1994, the annual catch showed a steep increased with a several small interval fluctuations. The highest annual catch was recorded in 2006 with 22,733 mt. A sudden and drastic increase in the annual catch after 1996 probably as a result of change to a new fisheries policy introduced at that time by the Department of Fisheries. The policy which boosting the annual catch was to encourage the local fishermen to explore and operate in the offshore fishing areas. This is in conjunction to the new expansion Malaysia EEZ waters which covers up to 200 nm from the shoreline. The Department of Malaysia has issued a large number of licenses for the deep sea fishing. In 1998, the catch of neritic tuna increased drastically when the purse seine fishery started to efficiently use of the FADs in their fishing operations.

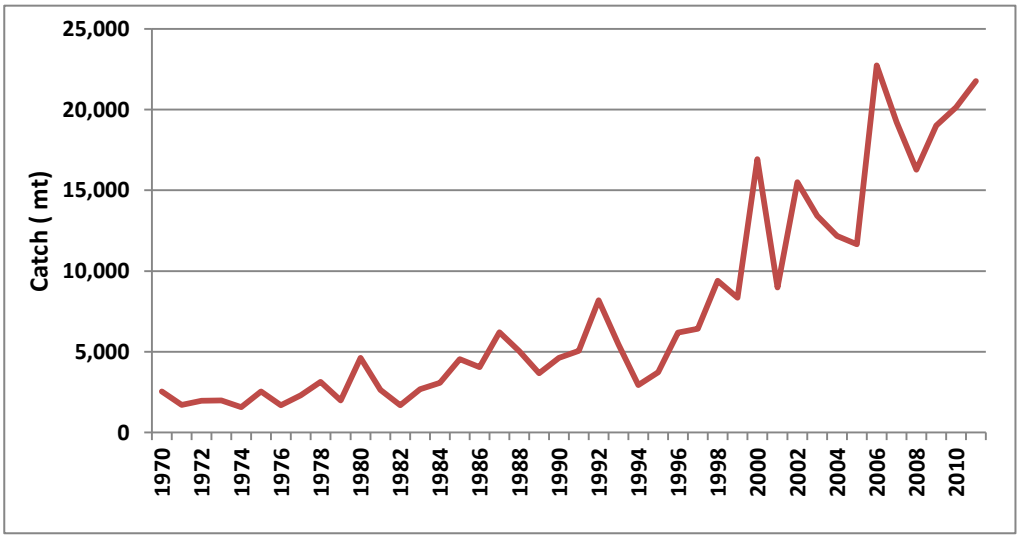

Figure 2: Annual catches of neritic tuna in the Malacca Straits

In contrast, the annual catch of neritic tuna in the South China Sea showed a decreasing trend from 2000 to 2004 before it stabilized within the range of 15,000 mt. from 2004 to 2007. The highest annual catch was in 2008 at 25,000 mt. (Figure

3). In the South China Sea, (east coast of Peninsular Malaysia) 57% of the neritic tuna catch was contributed by the purse seines vessels and other fishing gears that contribute to the catch of neritic tuna are trolling, drift nets, gill nets hook and line and trawlers. Prior to year 2000, the annual catch of the neritic tuna in the South China Sea were higher than the annual catch from the Straits of Malacca.

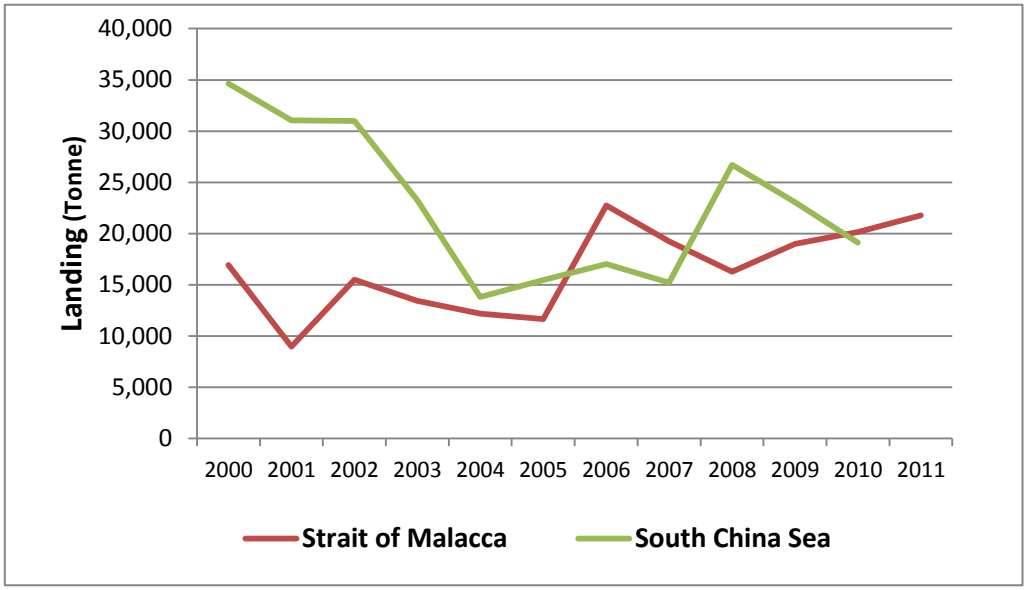

Figure 3 : Landing of neritic tuna in the west coast(Malacca Straits) and the east coast (South China Sea) of Peninsula Malaysia

Purse Seines Fishing

Prior to the introduction of trawlers, purse seines were the major commercial fishing gear that catch pelagic fishes and contributed significantly to the total landing of marine fish in Malaysia. The species that form a bulk of the catch by the purse seines are mainly scombrids (*Rastrelliber kanagurta, R. brachysoma, R. fauhnii, Thunnus tonggol, Euthynnus affinis, Auxis thazard*) and carangids (*Decapterus spp,, Selar spp, Megalopis cordyla*).

At present, purse seines are the second most efficient fishing gear to trawlers in term of commercial catch. Like trawlers, the purse seine vessel were categorized based on their gross tonnage. For each tonnage, the vessel are allowed to operate within a specified fishing areas such as for the tonnage groups of 25 – 39.9 GRT (above 5 nm off shore) , 40 – 70 GRT (12 nm off shore) and above 70 GRT (above 30 offshore) .

The purse seine fishermen normally operate using two methods; lamps and FADs. For the vessels above 70 GRT, they normally use FADs as this method can reduce the operation cost in term of saving time from searching wild schools. Number of fishing days per trip depend on the size of vessel and catch. In normal condition, for larger vessels the number of day per trip is 5 – 10 days. To improve the efficiency of the fishing operation, most of the larger purse seine vessels are equipped with navigational equipment.

The most common fishing ports in the west coast Peninsular Malaysia are Kuala Perlis at the northern most, near the Malaysia Thailand border, Kuala Kedah in Kedah, Batu Maung, Penang and Pangkor, in Perak. Kuala Perlis is the most preferable fishing port and the state of Perlis have the highest number of purse seines, 58% out of the total purse seines in the west coast and for the vessels above 70 GRT, 87% are from the state of Perlis.

Catch Composition

The purse seines contribute 30% of the total catch in the Strait of Malacca. The main target species were short-body mackerel (*Rastrelliger brachysoma – 29%*) sound scad (*Decapterus spp*. – 22%), neritic tuna (9%) and Indian mackerel (*Ratrelliger kanagurta-7%*). For neritic catch in the Malacca Strait, purse seines contribute 95% of total neritic tuna landings and trawlers only 3.5%. **Figure 4** shows the catch composition by the purse seines fishing in the Strait of Malacca. The neritic tuna form only 9% of the total bulk of catch of the purse seines, The target species are short-bodied mackerel and round scads were made up over 50% of the landings by the purse seines. In the past, neritic tuna is only considered as by-catch. Since the market value of the neritic tuna increase due to the demand from cannery processing plants domestically and from Thailand, the species have become among the target species by the purse seiners.

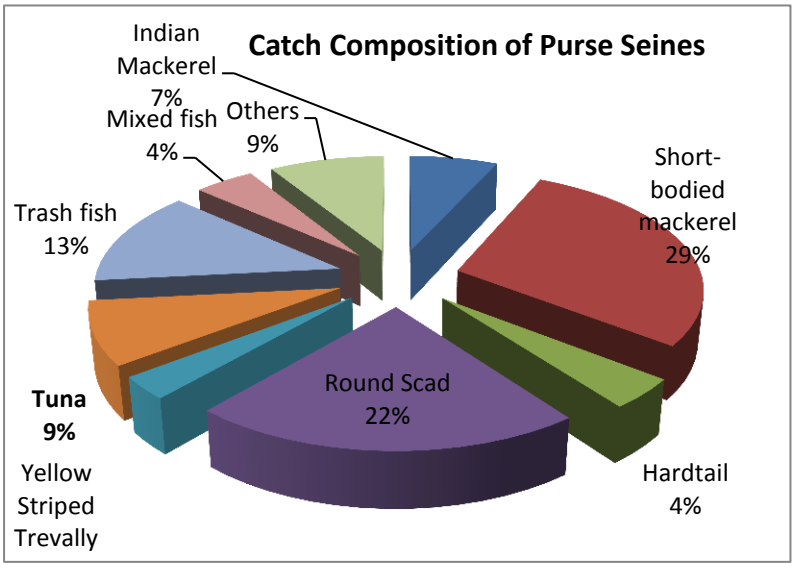

Figure 4: Fish catch composition by the purse seines in the Malacca Straits.

Monthly Catch of Neritic Tuna by Purse Seines

Almost 95% of the neritic tuna catch in the Malacca Straits are caught by the purse seine. In 2011, the catch of longtail tuna (*Thunnus tonggol*) dominated the landing on neritic tuna which formed 58% of the total neritic tuna landings, kawakawa (*Euthynnus affinis*) 41% and frigate (*Auxis thazard*) 1%. For frigate, they are commonly rarely caught only by the purse seines of >70 GRT. Figure 5 shows the historical monthly landing of neritic tuna in the Malacca Straits. Landing curves of longtail and kawakawa show disproportionately pattern which indicate that the catch ratios of these two species vary every month. The average ratio between longtail and kawakawa taken from the previous 6 years landings was 3:1. The overall catch trends of longtail and kawakawa show no definite monthly landing pattern which possibly conclude that the catch of neritic tuna in the Malacca Straits is not a seasonal fishery.

During certain months, the catch ratio of lot to kawakawa reduced to 1:1 which may also reflect the relative abundance of these two species in the Malaysia fishing areas.

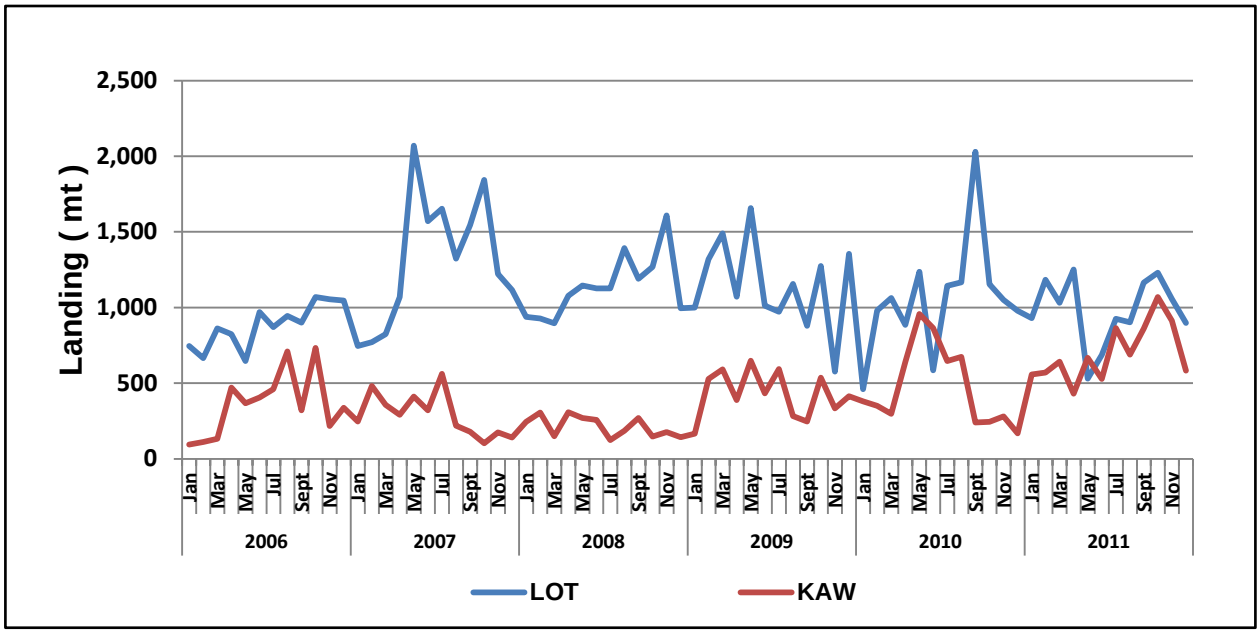

Figure 5: Monthly landing of longtail and kawakawa in the Strait of Malacca.

Average Monthly Catch

Looking at a more possible indication of seasonal catch pattern in neritic tuna fishery in the Malacca Strait, the monthly catches from the previous 5 year were averaged and the average curve obtained is as shown in Figure 6. The curve also shows the monthly catch variations of neritic tuna in the Malacca Strait and the variations vary from 8 – 32 % from the average catch. General, the average catches were within the range of 1,500 mt each month. However, there is a moderate increase of average curve during pre-northeast monsoon (August – October) which probably show a weak fishing season during this period. There is a gradual decrease in average catch during the northeast monsoon (until the following January) . It is not clear whether the decrease in landings during the northeast monsoon was a result from low catch or due to less number of vessels fishing during this period. Effort data (number of vessel going out for fishing) for every month was not well recorded.

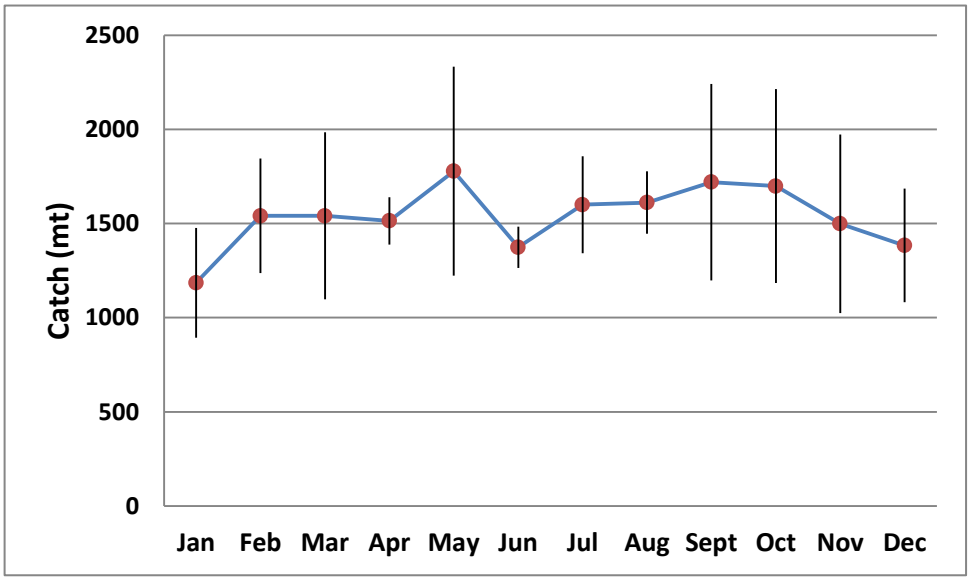

Figure 6: Monthly ranges of the purse seines catch.

Status of Fishing Effort of the Purse Seines

Figure 7 shows the curves of fishing efforts from different tonnages. There was a drastic increase in fishing effort for the vessel > 70 GRT, from 402 units in 2000 up to 1863 units in 2011. However, the fishing effort of the vessels 40 – 69.9 GRT,

there was only a moderate increase from 1414 in 2000 to the 1863 in 2011. For the small vessel, 25 – 40 GRT, there was no significant change in the level of fishing efforts and number remained below 400 units. The reason behind the sudden increase in fishing efforts for the vessels >70 GRT, is the introduction of new fisheries policy by the Department of Fisheries to encourage fishermen to venture into the offshore fishing areas (beyond 30nm offshore). Beside the objective to increase the annual catch of the marine finfish, it also aimed to reduce the coastal fisheries from the fishing pressure due to over-capacity and over-exploitation. The increase in the marine finfish catch from the offshore fishing areas is also mean to meet the demand of domestic fresh market and at the same time to reduce the foreign exchange deficit caused by the import of fish from other countries.

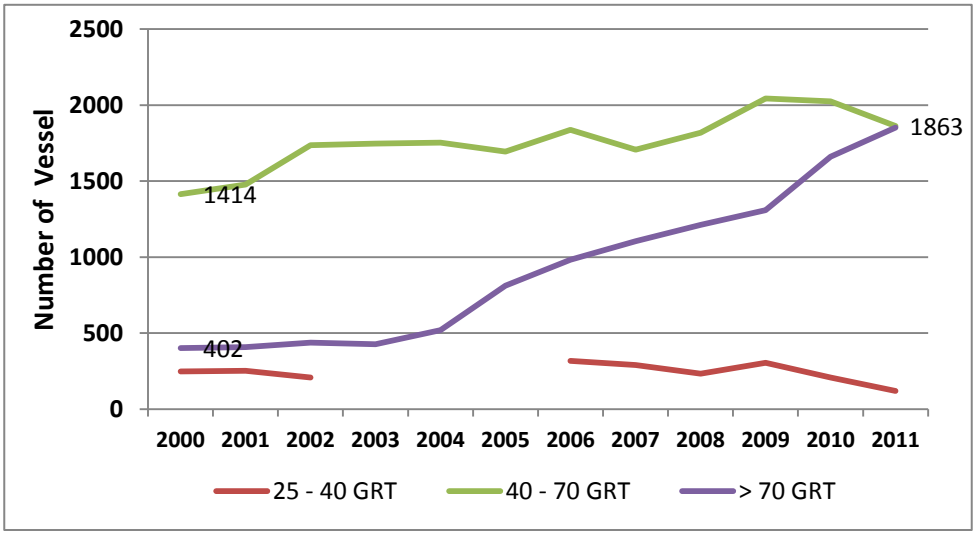

Figure 7: Unit number of vessels (effort) of purse seine from different tonnage group.

Catch Per Unit Effort

Annual catch per unit effort were calculated using catch and effort data from the annual statistic, Department of Fisheries (Annual Statistic Report 2000 – 2011) and the number of vessels were used as a fishing effort unit. The curves in Figure 10 show the catch per unit efforts of the two different tonnage group; 40 – 69.9GRT and > 70 GRT. For the vessel > 70 GRT, the annual cpue from 2000 to 2011 range between 6 – 10 mt/vessel, much higher than the small tonnage vessels (40 – 69.9 GRT). For the vessels tonnage of 40 – 70 GRT, the average annual cpue was 4 mt/vessel except for 2002 to 2003 where the cpue surpassed 5 mt/vessel (Figure 8).

The annual cpue curves in figure 8 show that the cpue increases propositionally to vessel size (tonnage). The bigger the vessel, the higher the cpue. Though the fishing effort increased significantly since the past 10 year for vessels > 70 GRT, the cpues show little change. This indicate that the neritic tuna resources in the Malacca Straits remain unaffected by the increase in the fishing efforts. This is expected as the amount of resource depleted by the fishing mortality, they were replaced by the new schools, immigrate from the adjacent waters.

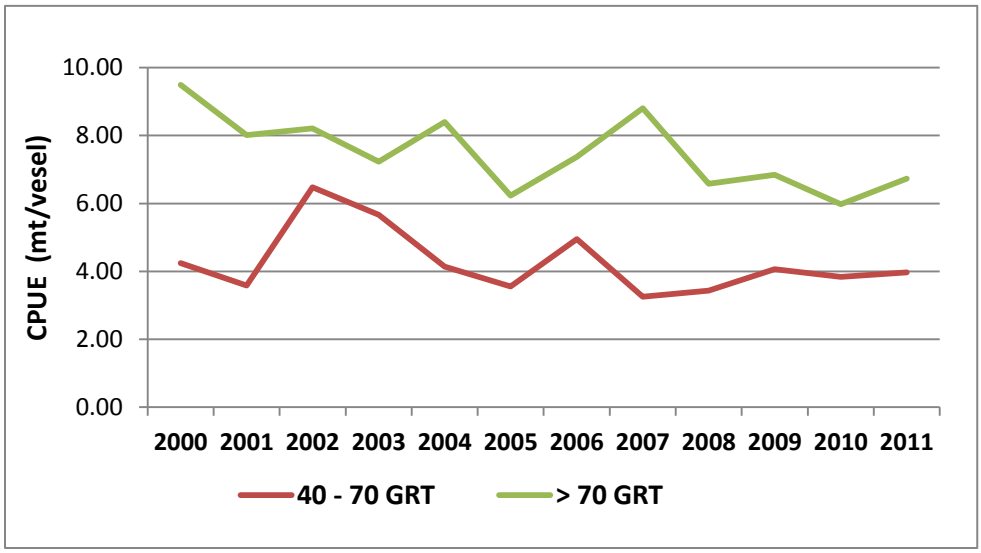

Figure 8: Estimate of catch rates of different tonnage using number of vessel as effort unit with standardization.

DISCUSSION AND CONCLUSION

The neritic tuna fishery in the Malacca Straits is very much related to the purse seine fishing gears. In term of catch performance, the vessels of large tonnage have higher cpue than the smaller vessels. Using the cpue result, the status of the neritic tuna resources in the Malacca Strait seemed unaffected by the increasing fishing efforts over the past 11 years. There is a question of harvesting small pelagic fish in the Malacca Straits including neritic tuna, to what level of the fishing efforts that the present neritic tuna can sustain the exploitation rate. There should be a level of exploitation rate set the by the fisheries manager as to ensure that the present resources are exploited at a sustainable level and with a responsible manner. The shared stock need shared management among the bordering countries. To implement

an effective shared stock management, it needs systematic cooperation and coordination between the countries such as Malaysia, Thailand and Indonesia.

For Malaysia, there is still room to improve the quality of catch and efforts data. With a good data quality, it will provide a good input for scientist to estimate the status of small pelagic fish stocks and at the end it will also assist the fisheries manager in planning and sustainable development of the purse seine fishery.

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