Billfish Fisheries In Indonesia

Mahiswara and Budi Iskandar, PS.

Research Center For Marine Fisheries - Indonesia

Abstract

Indonesia has a well-established offshore fishery targeting tuna. Although there is no target fishery for billfish, Indonesia makes considerable contribution to the billfish production in the Indian Ocean. Billfish production in Indonesia is at increasing trend since early 1990's following tuna production. In species composition, swordfish dominated based on statistical data 2003 to 2007. Longline is the dominant fishing gear in all areas, while trolline and handline operates as combination of gears. Majority of the production come from the longline vessel operating offshore fishery. Sailfish is caught as incidental catch in coastal, small-scale fishing targeting surface tuna species. Maximum recorded length of black marlin , blue marlin. and swordfish, are 235 cm ,230 cm and 245 cm respectively. Training of data recording procedure for port sampler is needed to provide accurate catches data of billfish.

Introduction

The total catch of tuna and tuna-like species in Indonesia has increased steadily since the early 1990's, especially the dramatic increase in the catches of tunas and/or tuna-like species unloaded in Jakarta, Cilacap and Benoa. The increase is related to the development of a domestic fleet in Indonesia, which is operating further offshore. The catch of billfish is generally is a by-catch or secondary catch of to the tunas. The catch of billfish is often poorly recorded, being lumped together in to single category, misidentified or the fish is discarded (Campbell *et al.,* 1998). Knowledge of Indian Ocean billfish biology and fisheries, the status of billfish species remains unclear due to lack of a targeted fishery on these stocks and uncertainties in the data available.

Fishery for tuna and tuna-like species is a major component in large pelagic fisheries in Indonesia. Indonesia has a well-established offshore/oceanic large scale tuna fishery (> 30 GT) and small scale tuna fisheries with fleet of locally designed and multi-day boats sailing up to even beyond the edge of the EEZ. Long line is main gear of large scale tuna fisheries whereas the small scale fishery is operating troll line, hand line or its combination. The production of tuna and tuna-like species tend to increase according to the recent statistics. The contribution of billfish to the fishery is significant, and the catch has increased considerably over the years highlighting their importance in the large pelagic/offshore fishery in Indonesia. The catch of billfish from Indonesia vessels has increased to over 400,000 MT in 2007 by all fleets in the Indian Ocean. Yet there is a general paucity of information on billfish, particularly from small-scale fisheries of the coastal states of the Indian Ocean.

Since the Implementation *of a Multilateral Catch Monitoring Program in 2002 involving domestic and foreign institutions,* has been breaking down by species of data record of tuna and billfish since 2003. Earlier, production of billfish are not in details as marlins are categorized in to a single group. Up till now no research has been carried out on billfishes, published information on billfish therefore is very limited. This group billfish includes Marlins, Sailfishes and Swordfishes. This paper inform the catches of billfish landed based on two main fishing port (Cilacap and Pelabuhanratu) in Indonesia and data sampled from a sampling site in Benoa, Bali and Jakarta.

Fisheries Data Collection System

To support the marine fisheries management and also being recognized that the country has a huge coverage of fishing areas, the government improved the area from 9 into 11 fisheries management area (Ministry Regulation, 2/2009). This regulation were decided in order to obtain a better documentation scheme on catch and exploitation

levels based on types of ecosystem and their fisheries. This also include to develop fleet monitoring and controlling system. Based on the new regulation, Indian Ocean waters of Indonesia grouped in two management area *i.e.* western part of Sumatera and soutthern part of Java and Lesser Sunda. The areas is showed in Figure 1.

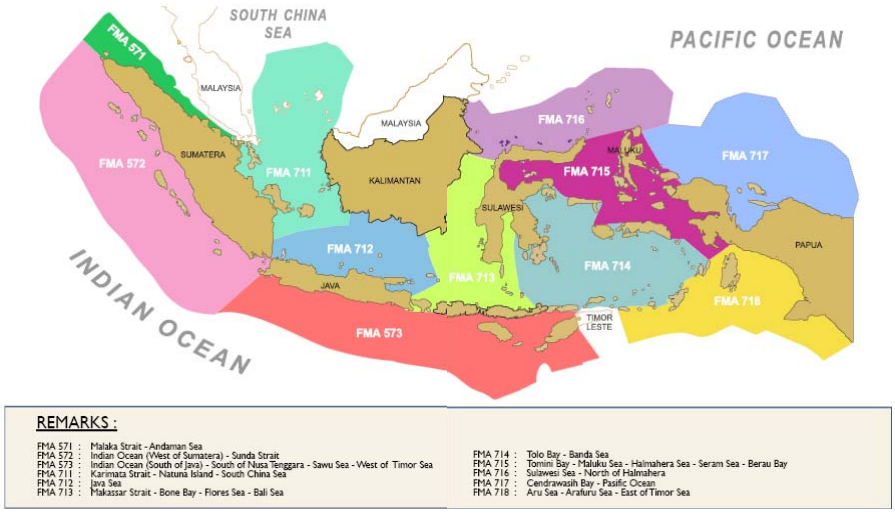


Figure 1. The Fisheries Management Area (Source: DGCF, 2009)

Indonesia has had a National Fisheries Data Collection System for marine fisheries since 1978 – a system that emerged from a collaborative program between the Government of Indonesia, the United Nations Development Programme, and FAO. The design, development and implementation of a standard set of surveys and reporting methods across all of Indonesia's provinces was done by Dr Tadashi Yamamoto, a fisheries statistician employed by FAO, in collaboration with Directorate General of Fisheries (now Directorate General of Capture Fisheries).

With respect to marine fisheries, the system was designed to have two primary outcomes: 1) Nation-wide statistics on annual production for all species groups fished, both at the industrial and artisanal levels of fishing activity, and 2) Nation-wide annual inventories of the number of fishing units (households, companies, operators) and number, size, and gear-type of fishing vessels involved in the fishing activities at both levels in all provinces. These statistics have been and continue to be published by the Directorate General of Fisheries (now DGCF) as the annual report "Statistik Perikanan Tangkap Indonesia" (= Statistics of Capture Fisheries of Indonesia). These reports also include similar statistics for inland "openwater" fisheries. The surveys and censuses were, and still are, coordinated at a national government level by DGCF (in collaboration with the Central Board of Statistics), but involve data collection and reporting by provincial, district, and subdistrict government offices. The fundamental design and procedure of the national system are summarised below in Figure 2.

Similar methodological approach was used to evaluate the whole area of fisheries management. Since there are limited capacities to do independent fisheries data, the existing available data to describe the exploitation status were explored through annual statistical provincial data with assumption all the catch and effort data were regularly recorded by enumerator at sampled landing places.

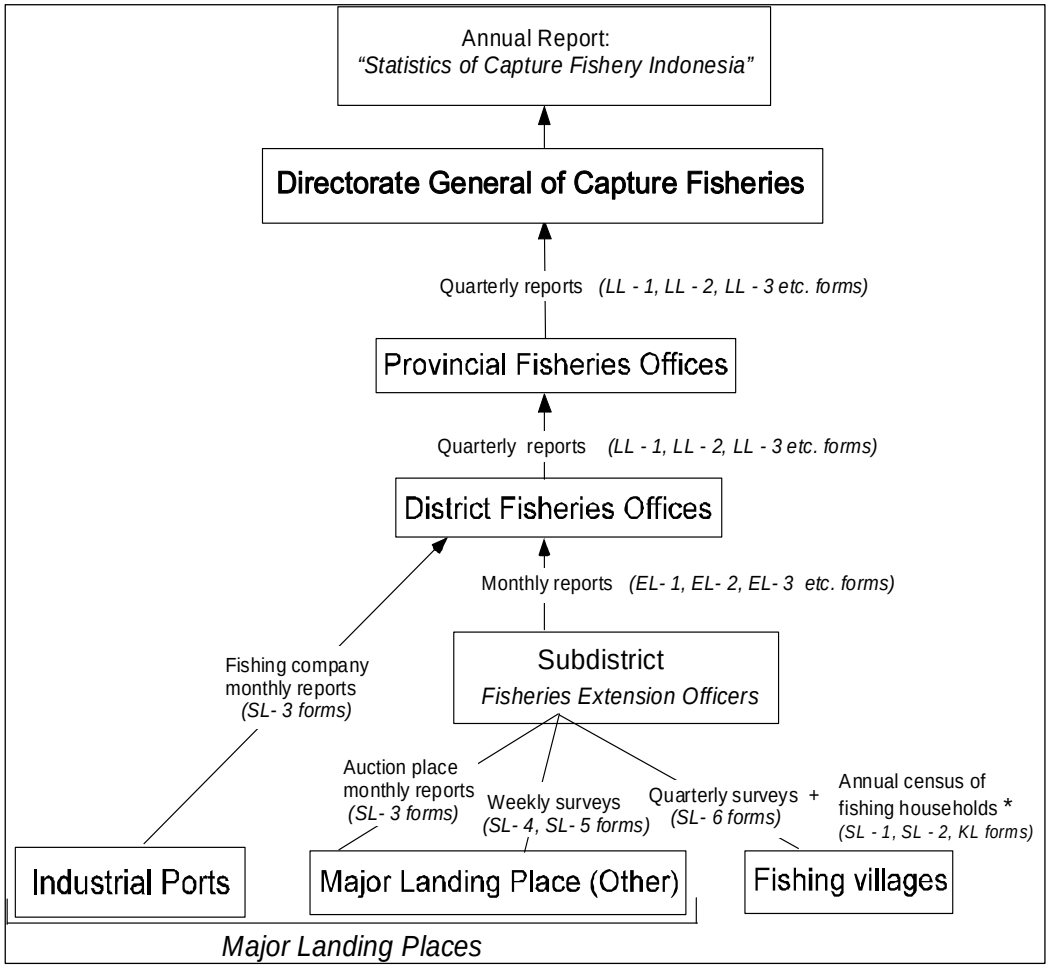


Figure 2. Generalised procedure of the national system of fisheries statistics

Started in 2002 with support from ACIAR, AFFA and IOTC (through OFCF) Indonesia intoduced of the new Catch Monitoring Program tuna fisheries in Jakarta, Benoa and Cilacap. Monitoring the information on the composition of the tuna catch was obtained by the enumerator at the processing lant when the tuna were processed. Enumerators would aggregate the data on individual fish provided by processing plant by species and export status, recording subtotals of weight and number of pieces. Since 2003 activity of tuna fisheries catch monitoring program was extended to cover bycatch of tuna longline.Other tuna catch enumertor were recorded data species, number, weight and length of bycatch especially for billfish. These new added program be implemented in three sampling site, Jakarta, Clacap and Benoa. All data recorded by samplers (tuna and billfish) are input by using the software FINSS. The software, developed at the IOTC Secretariat, was adapted to the needs of the current monitoring and is being used in the three ports to record all data generated regarding vessel record, vessel activity and sampling.

Landing places

Generally, fish landing places in Indonesia are classified into three categories, based on their capacity and facilities available. The first category is the Oceanic Fishing Harbor (Type A fishing harbor), which is able to provide daily shelter for at least 100 fishing vessels of more than 60 GRT each, especially those fishing in the waters of the Indonesian EEZ. Additionally, Type A harbors are able to support annual landings of 18 000 to 120 000 t. The second category is the Nusantara Fishing Harbor (Type B fishing harbor), that are able to provide daily servicing of 75 fishing

vessels of 15–60 GRT each, fishing in Indonesian home waters and the EEZ. The Type B harbors are able to support annual landings of 7 200–18 000 t. The third category is the Coastal Fishing Harbor (Type C fishing harbor), capable of daily harboring 50 fishing vessels of 5–15 GRT and supporting annual landings of 3 000–7 200 t. Harbor types A, B and C are managed by the Ministry of Marine Affairs and Fisheries. In addition, there is a Type D, namely fish landing centers, which are under the management of Provincial governments. Their location is shown in Figure 3. At present main fishing harbor of tuna fisheries in Indonesia are Jakarta, Cilacap, Pelabuhanratu and Benoa-Bali.

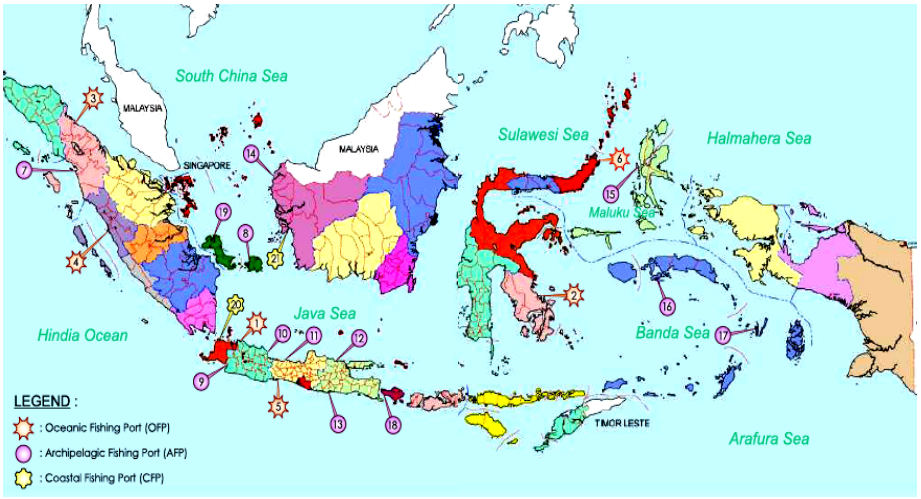


Figure 3. Geographical locations of fishing ports by categories (Nugroho,2009)

Billfish Production

Annual production of billfish in Indian Ocean waters of Indonesia (Westernpart of Sumatera and Southernpart of Jawa and Lesser Sunda) is fluctuated in 2004 to 2007 period. Total catch of swordfish and black marlin shown tend to increase. Among billfish, the most common species in the catches is the swordfish, while striped marlins are caught in small quantities. The billfish production is shown in Figure 4.

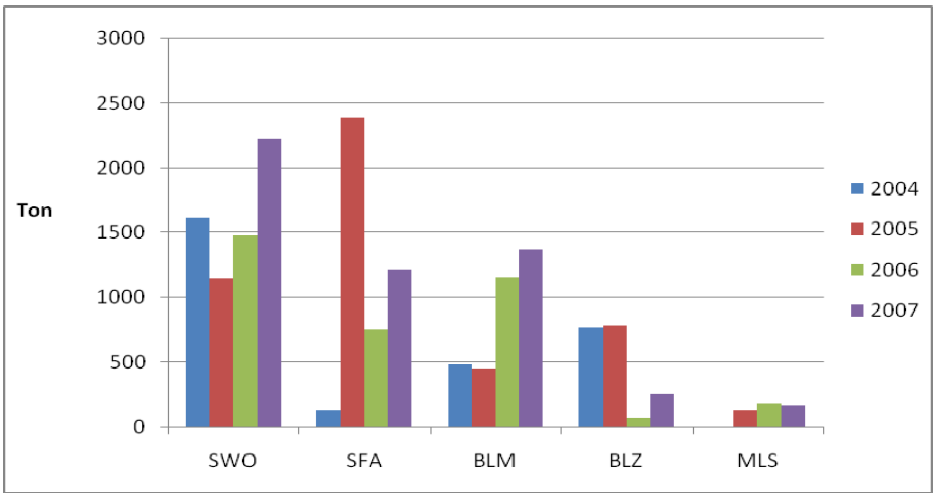


Figure 4. Billfish production from Indian Ocean Waters of indonesia 2004-2007

Figure 5 and 6 shown the annual billfish landed in two main fishing port in western part of Java *i.e.* Cilacap and Pelabuhanratu. Based on port statistic fisheries most of unload vessel in Cilacap was tuna longline. Black marlin dominated production of billfish landed in Cilacap.While in Pelabuhantu, beside longline vessel, since 2005 troll line fishery have been contributed to the billfish production. Similar with Figure 4, the annual production from both fishing port were fluctuated.

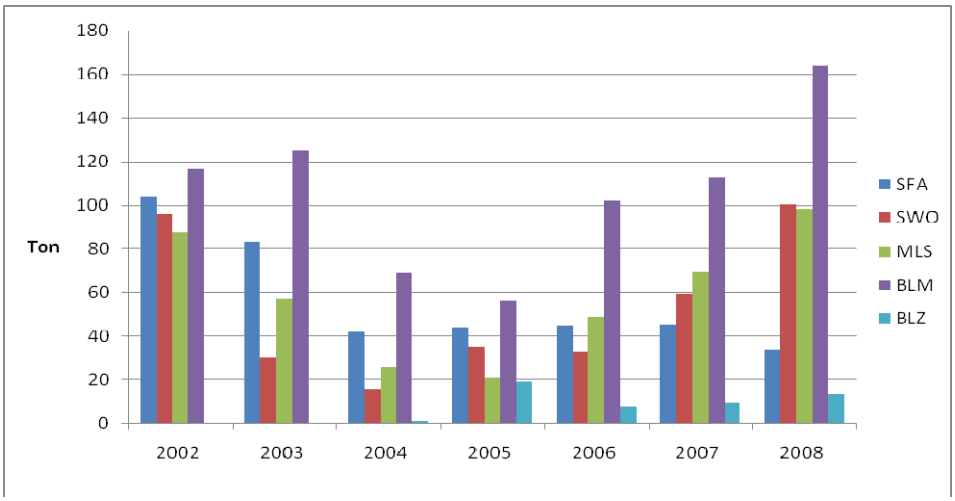


Figure 5. Billfish landed in Cilacap Fishing Port 2002-2008

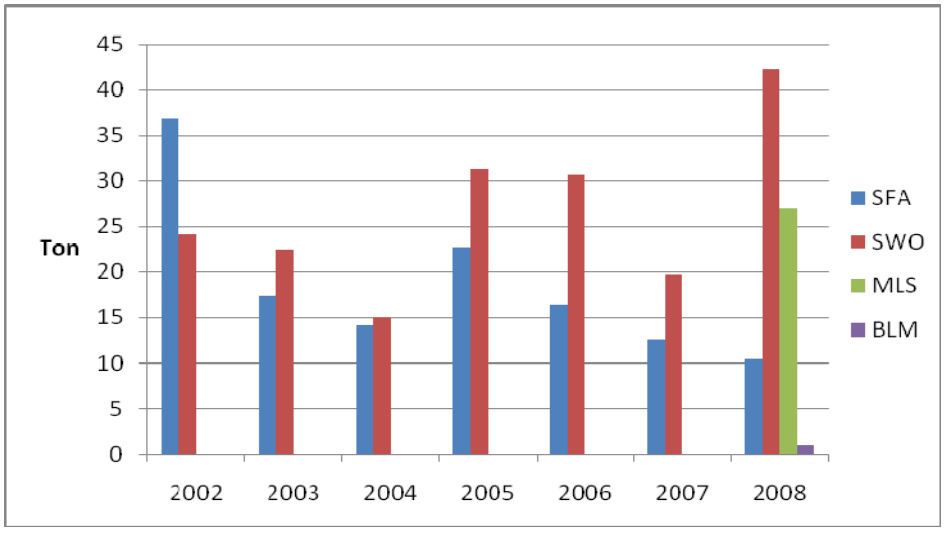


Figure 6. Billfish landed in Pelabuhanratu Fishing Port 2002-2008

Catch Monitoring of Billfish

Five species of billfishes have been identified in landing places. This includes 3 species of marlins; black marlin (BLM) (*Makaira indica*), blue marlin (BLZ) (*Makaira mazara),* striped marlin (MLZ) *(Tetrapturus audax*), two species non-marlin species are the sailfish *(Istiophorus platypterus)* and the swordfish *(Xiphias gladius). C*atch monitoring on billfish fishery conducted by samplers in Jakarta, Cilacap and Benoa as apart of tuna landing sampling program. Samplers record every day the names of the longliners unloading catches and the processing plants through which the catches unloaded go. By-catch fish are not always weighed or not weighed individually. Although the samplers do their best to measure the length of the specimens whose weight is not available. Thus, the total number of specimens

and total weight of the aggregate are recorded. The identification of marlins is in some cases difficult, especially when the fish are frozen and/or processed. Thus, the three species of marlins are usually tailed. These fish are, therefore, recorded using the closest aggregate. Available data record of billfish from two sampling site (Jakarta and Benoa) is present figures below. Figure 7 and 8 shown that swordfish is the dominant fish sample followed by sailfish, blue marlin, and black marlin.

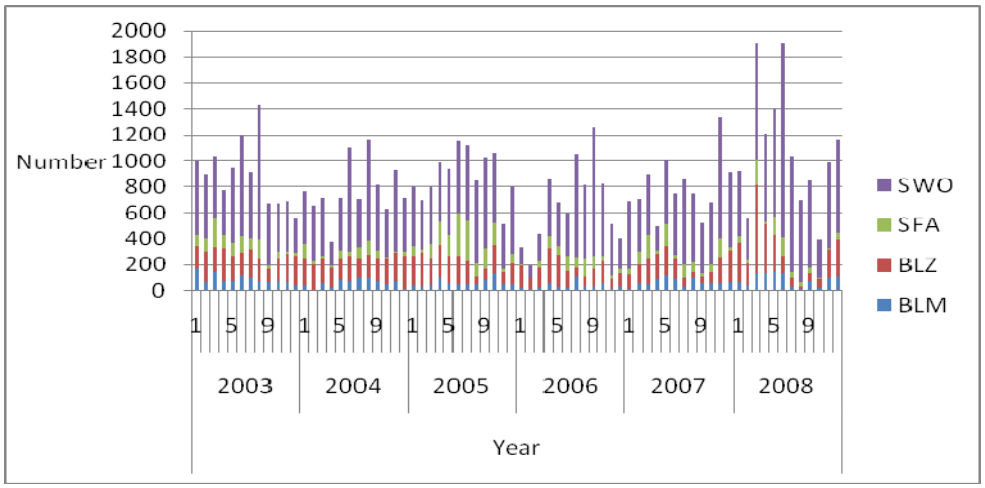


Figure 7. Number of fish sampled by species in Benoa

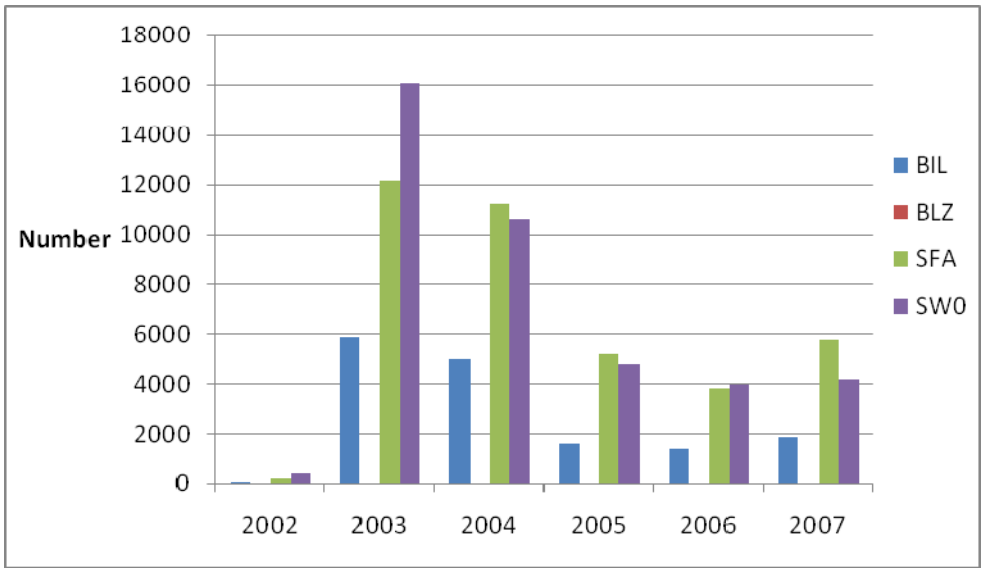
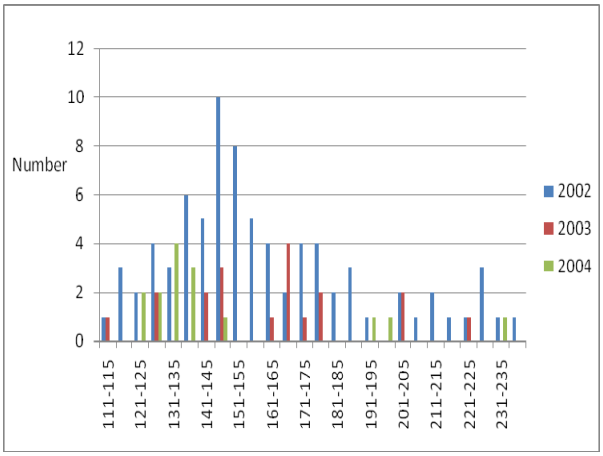
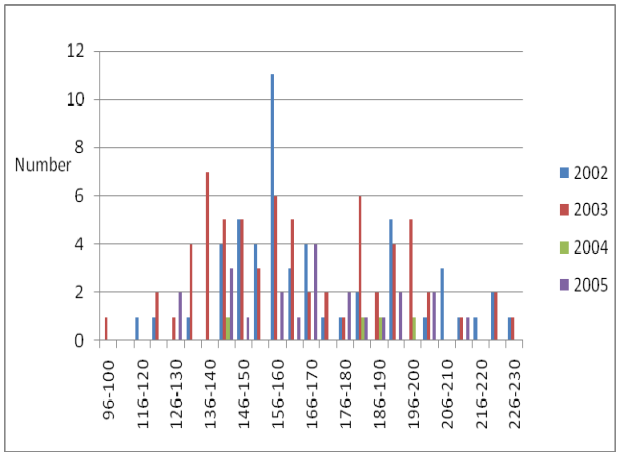


Figure 8. Number of fish sampled by species in Jakarta

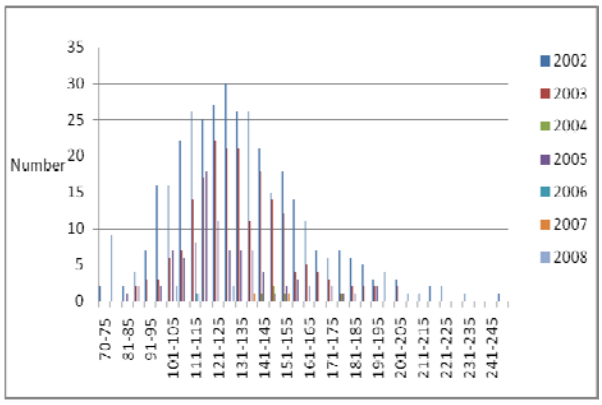
Length frequency data sampled from two fishing port (Benoa and Jakarta) of each species of billfish is presented in Figure 9 – 14 below. Minimum length of black marlin, blue marlin and swordfish sampled in Benoa are 111 cm, 96 cm and 70 cm and maximum length are 235 cm,230 cm and 245 cm respectively. While, minimum length of swordfish, sailfish and billfish sampled in Jakarta are 41 cm, 70 cm and 101 cm, and maximum length are 190 cm, 210 cm and 270 respectively. Leng frequency distribution of billfish present in Figure 9-14.



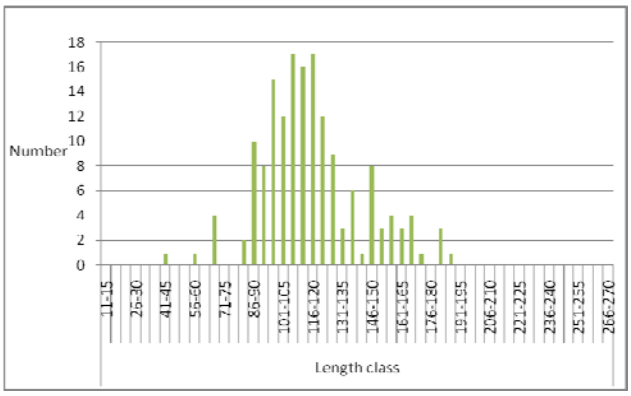
Tabel 9. LF distribution of black marlin sampled in Benoa



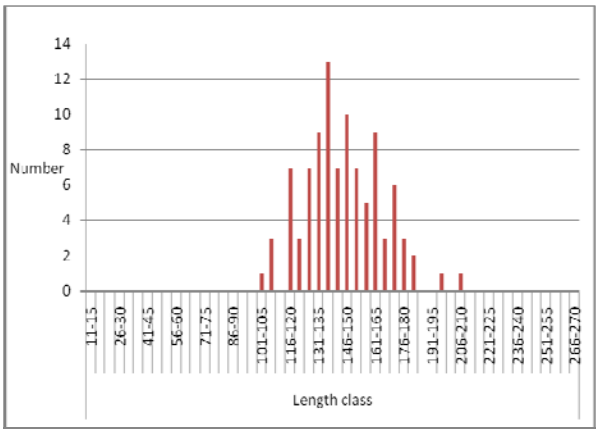
Tabel 10. LF distribution of blue marlin sampled in Benoa



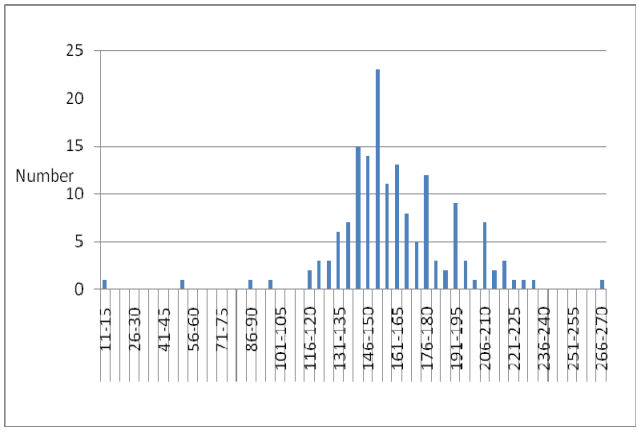
Tabel 11. LF distribution of swordfish sampled in Benoa



Tabel 12. LF distribution of swordfish sampled in Jakarta 2002-2005



Tabel 13. LF distribution of sailfish sampled in Jakarta 2002-2005



Tabel14. LF distribution of billfish sampled in Jakarta 2002 - 2005

Current and Future Activities

Indonesia, aware of the importance of obtaining precise catch estimates for the assessment and management of billfish stocks, due to provide complete estimates of catches new data collection systems introduced since 2002. Undertake trial to implement new system to increase sampling coverage of landing places would be enhance the representative catches data. Training of data recording procedure for port sampler is needed to provide accurate data include to eliminate mis-indentification of billfish.

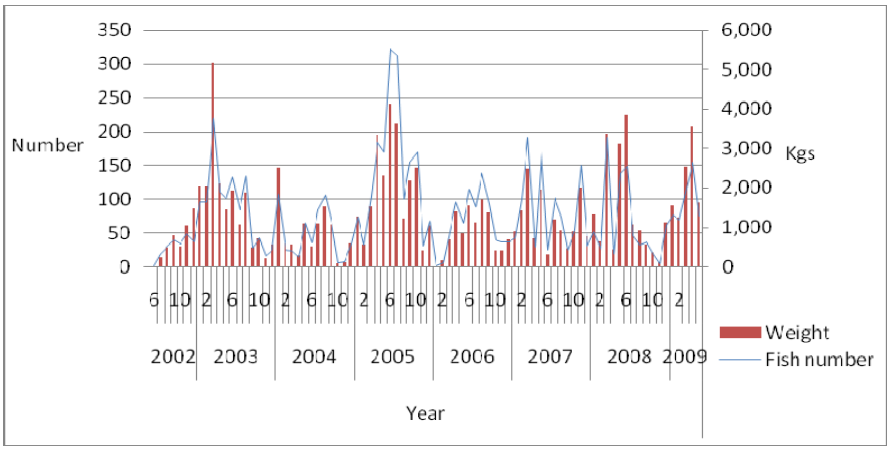
References

Anon, 2008. Indonesian Capture Fisheries Statistic 2007. Directorat General of Capture Fisheries, MOMAF, Indonesia.

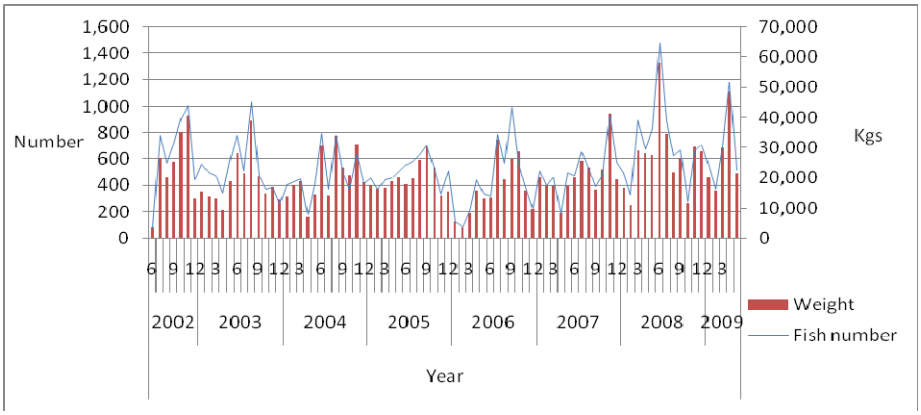
Anon, 2009. Fisheries Statistic of Cilacap Fishing Port 2008

Anon, 2009. Fisheries Statistic of Pelabuhanratu Fishing Port 2008

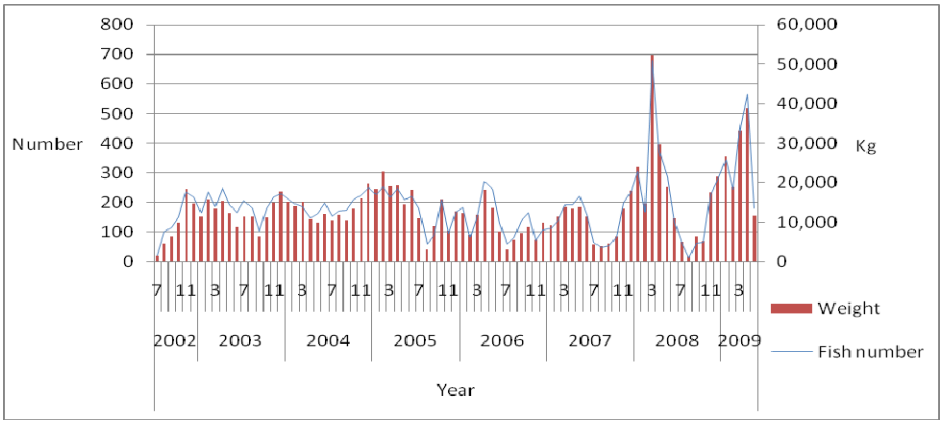
Appendix :



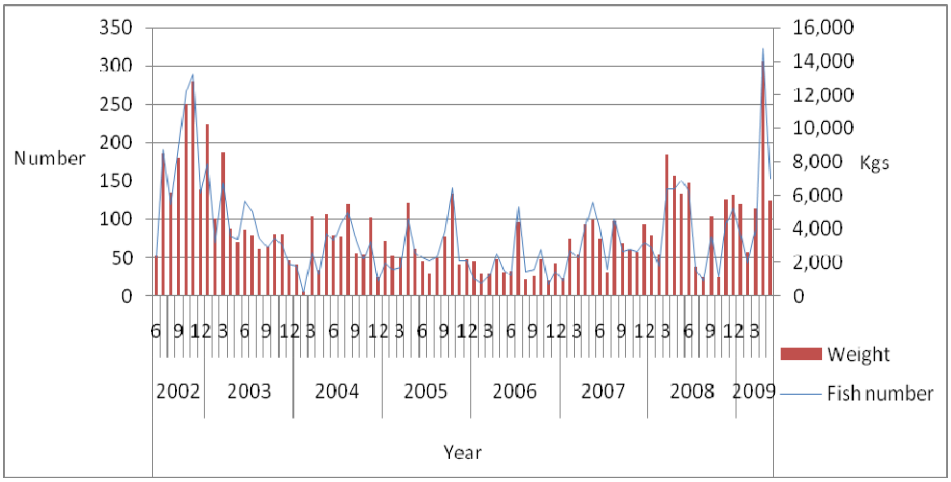
1. Fish number and weight of sailfish (*Istiophorus paltypterus*) sampled in Benoa



2. Fish number and weight of swordfish (*Xiphias gladius*) sampled in Benoa



3. Fish number and weight of marlin (*Makaira mazara*) sampled in Benoa



4. Fish number and weight of black marlin (*Makaira indica*) sampled in Benoa