

Figure 1 Map showing research location (Source: Google Earth)

Data Collection Methods

Material needed in this study is secondary data which include data on fishing gear cantrang in 2018 and data on catch cantrang vessels starting in 2018. This data was obtained from statistical records of PPP Mayangan landing sites Probolinggo in 2018. The method used in this research is a descriptive method that is used for data collection in the form of catch composition and fishing gear aspects. Data collection is assisted by direct observation in the field to see and document the types of fish caught and conduct literature studies to look for catch data and fish price fluctuations. The sample chosen was all cantrang ship data, both regarding the number of vessels, the number, and types of catches.

Data Analysis Techniques

Data that has been obtained from fish auction sites are processed according to the following analysis needs:

a. Number of Fleets (Ships) operating Cantrang fishing gear

The number of fishing fleets is calculated by listing each ship's name and then recapitulating for the last five years.

b. Catch Fluctuations per Effort Unit for the past five years

CPUE values are calculated by dividing the total catch number with the number of catches per year.

c. Cantrang catch diversity

Diversity catch diversity is calculated by ranking the highest catches of fish species per year for five years.

RESULTS AND DISCUSSION

Cantrang fisheries in Mayangan

The coastal fishing port (PPP) of Mayangan in Probolinggo is one of the ports that have a fleet of fishing vessels with cantrang or trawl fishing gear with high numbers. The number of cantrang vessels from 2014 to 2018 has decreased. This is in line with the enactment of the Minister of Maritime Affairs and Fisheries Regulation concerning the Prohibition of Cantrang, namely Government Regulation No. 02/2015. The fishing gear that is prohibited in the regulation is trawl and trawl and *seine nets*. The decline in the number of ships operating cantrang fishing gear in Probolinggo waters is an effect of the prohibition on cantrang fishing gear regulations. Whereas ships that are still operating in the year after 2015 are fleet that still has licenses to operate, and will stop until their permit expires. This can be seen from the number of fleets decreasing from year to year (Table 1).

Table 1 Number of Cantrang Capture Fleet

Year	Number of Cantrang
2014	172
2015	111
2016	102
2017	111
2018	75

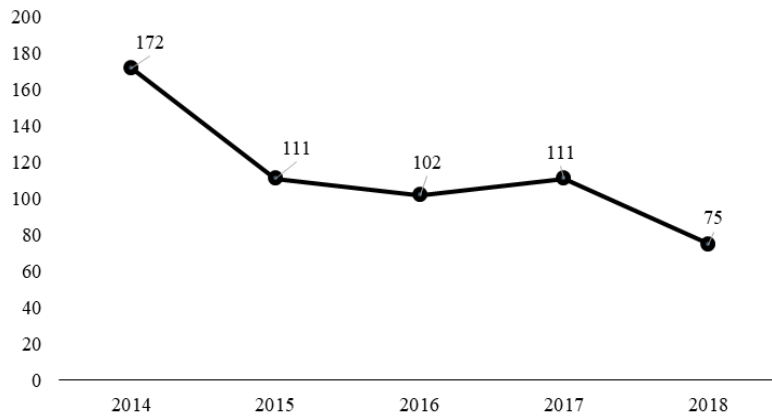


Figure 2 Number of Cantrang Capture Fleetcantrang

Banning fishing gear directly has an economic impact on fishermen who did from the beginning work with the fleet [13]. The impact of prohibition not only makes the income of fishermen (skipper, and crew) cantrang to be reduced but also affects the reduced supply of fish received by brokers and fish traders who have cooperated with the skipper [14,15].

Cantrang Production Trends

The catch of cantrang fishing gear has decreased from 2014 before the enactment of ministerial regulations on the prohibition of cantrang, and continues to decline until the lowest point in 2018. This is possible because it follows the trend of the number of fishing fleets which also decreases from year to year (Figure 4). The factors that influence the catch of the cantrang fleet are the size of the ship, the number of crew members, trip length. If the number of fleets decreases, the number of crew members and the number of ships and the length of time on the trip will decrease [16].

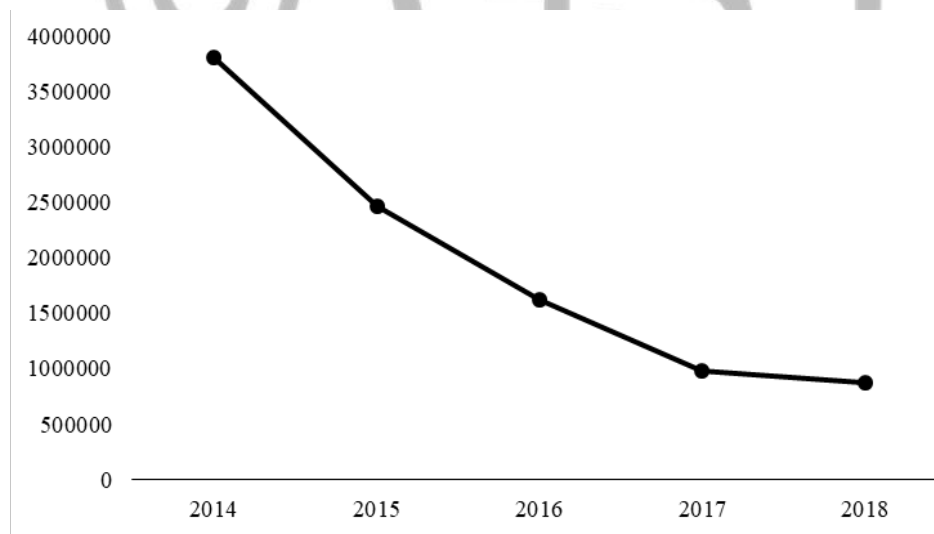


Figure 3 Total Catch per Year from 2014 – 2018

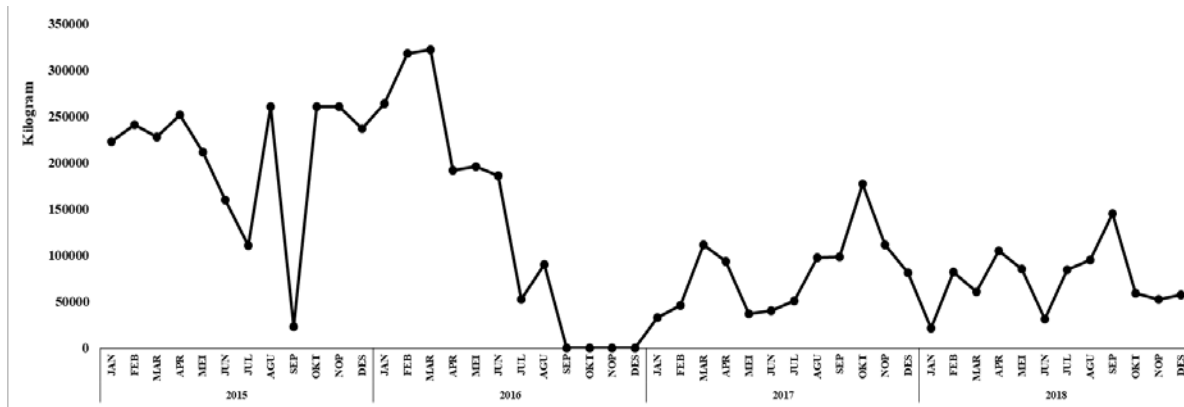


Figure 4 Trends in Total Catches per Month for Five Years

Fishing season in Probolinggo occurs around October to May. Fishermen usually take advantage of this season which lasts for 8 months. Most fish are from October to March [17]. In April, a potential area of many fish in the Coastal region Pasuruan, Probolinggo Coast in the east and west, South Sidoarjo, and West Situbondo [18,19]. During the year from October to March the catch of cantrang fishing gear in Probolinggo increased (Figure 5). This is possible because it coincides with the capture season.

Table 2 Number of Fleets and CPUE Cantrang in Probolinggo

Year	Total Catch(Kg)	Number of Cantrang	CPUE
2014	3805439	172	22124.6
2015	2466735	111	22222.8
2016	1619883	102	15881.2
2017	977873	111	8809.67
2018	878534	75	11713.8

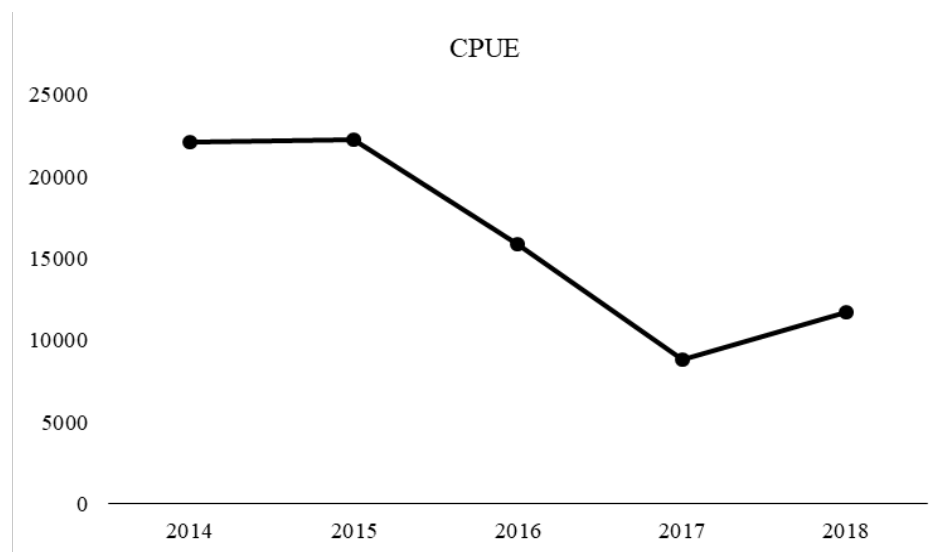


Figure 5 Trends in Total CPUE Annually

The total trend in catches of the fleet (ships) used to operate cantrang decreased from 2014 to 2017, only experiencing an increase in 2018 (Figure 6). This is caused not by an increase in a catch, but rather by a decrease in the number of fishing fleets. From 2017 to 2018 the number of catches did not differ too much, but the number of fishing fleets decreased dramatically from 111 units to 75 units (Table 2). The possibility that could occur is, the decrease in catch per unit effort from year to year is caused by the high number of catching efforts in the previous year so that the amount of resource stocks in the waters remains low [20,21]. In 2018 CPUE has increased due to a drastic decrease in the fleet while stocks in the waters can still grow as in the previous year.

Diversity of Catches

The most dominant types of catches of the cantrang fishing gear landed at the Mayangan fish auction are from the demersal fishes (Table 3). In other coastal areas such as Demak, cantrang catches most dominate there are 5 species of fish namely *Nemipterus Sp*, *Trichiurus sp*, *Leiognathus spp*, *Priacanthus spp*, and *Argyrosomus amoyensis*[22-24] This was also reinforced in the research of Purwangka [25] that cantrang whose capture area was in the Madura Strait and its surroundings found *Nemipterus Sp* as the most dominant catch.

Table 3 List of Fish Which Has Largest Number of Overall Catches

Fish Caught by Cantrang				
2014	2015	2016	2017	2018
<i>Nemipterus Sp</i>	<i>Nemipterus Sp</i>	<i>Nemipterus Sp</i>	<i>Nemipterus Sp</i>	<i>Leiognathus spp</i>
<i>Priacanthus spp</i>	<i>Leiognathus spp</i>	<i>Leiognathus spp</i>	<i>Leiognathus spp</i>	<i>Nemipterus Sp</i>
<i>Leiognathus spp</i>	<i>Priacanthus spp</i>	<i>Priacanthus spp</i>	<i>Priacanthus spp</i>	<i>Priacanthus spp</i>
<i>Saurida spp</i>	<i>Saurida spp</i>	<i>Saurida spp</i>	<i>Saurida spp</i>	<i>Saurida spp</i>
<i>Argyrosomus amoyensis</i>	<i>Argyrosomus amoyensis</i>	<i>Geres punctatus</i>	<i>Geres punctatus</i>	<i>Rhynchobactus sp</i>
<i>Trichiurus sp</i>	<i>Loligo sp</i>	<i>Trichiurus sp</i>	<i>Loligo sp</i>	<i>Argyrosomus amoyensis</i>
<i>Dasyatis sp</i>	<i>Tetraodon spp</i>	<i>Dasyatis sp</i>	<i>Argyrosomus amoyensis</i>	<i>Geres punctatus</i>
<i>Geres punctatus</i>	<i>Geres punctatus</i>	<i>Argyrosomus amoyensis</i>	<i>Trichiurus sp</i>	<i>Trichiurus sp</i>
<i>Loligo sp</i>	<i>Dasyatis sp</i>	<i>Loligo sp</i>	<i>Dasyatis sp</i>	<i>Loligo sp</i>
<i>Tetraodon spp</i>	<i>Trichiurus sp</i>	<i>Tetraodon spp</i>	<i>Manyung</i>	<i>Dasyatis sp</i>
<i>Portunus sp</i>	<i>Portunus sp</i>	<i>Sphyrana barracuda</i>		<i>Pampus argenteus</i>

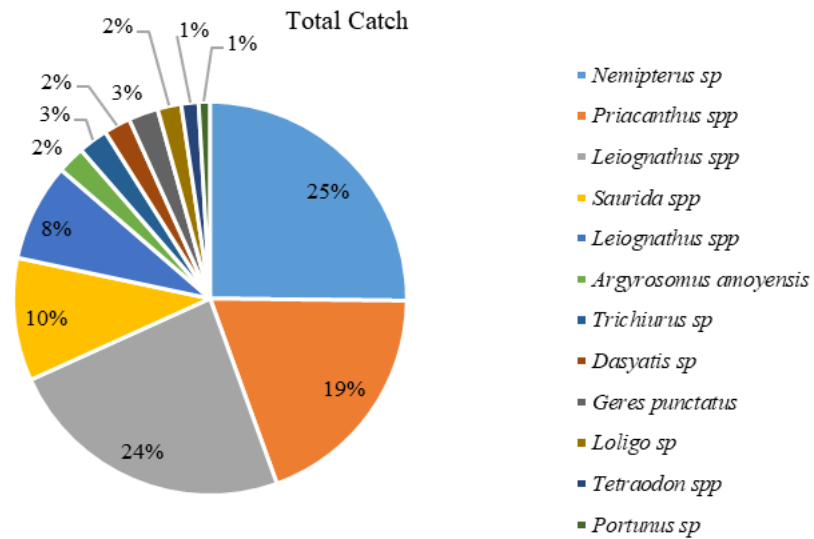


Figure 6 Total catch most over five years

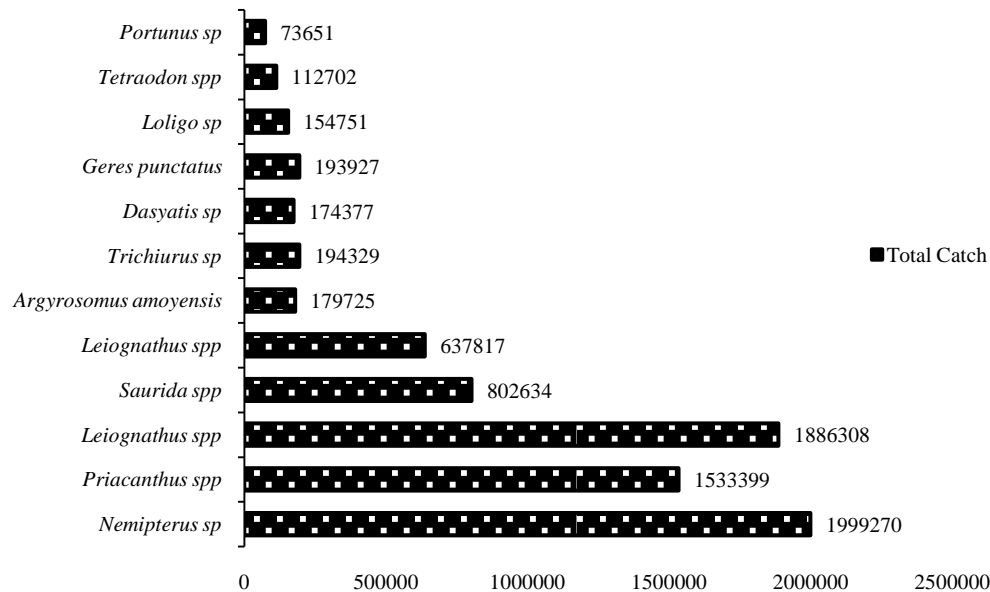


Figure 7 Total Percentage catch most over five years

The total catch over the last five years, the highest of fish *Nemipterus sp* with a total of 1,999, 270 tons, then the fish fish or commonly called *Leiohnathus sp* with a total weight of 1,996,308 tons, *Priacanthus spp* of 1,533,399 tons (Figure 7). *Nemipterus sp* during the last five years dominated with a percentage of 24% of the total catch, *Leiohnathus sp* with a percentage of 23%, *Priacanthus spp* by 19%, *Saurida spp* by 10% (Figure 8). This was also explained in the study of Widjayana *et al*[26] that the main catch of cantrang was *Nemipterus sp*, *Leiohnathus sp*, *Loligo sp*, *Geres punctatus*. Meanwhile Sutjipto *et al*[27] and Taeran *et al*[28] found that *Nemipterus sp* has the largest number of catches.

CONCLUSION

This study found a conclusion that the number of fishing fleets (ships) operating cantrang fishing gear experienced a decline as a result of Government RegulationNo. 02/2015. The value of CPUE and the total number of catch of cantrang fishing gear de-

creased in accordance with declining number of operated cantrang fishing gear. The catch of cantrang fishing gear is dominated by demersal fishes namely *Nemipterus sp*, *Leiognathus sp*, *Priacanthus spp*, *Saurida spp*.

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