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Analysis of hairtail (*Trichiurus* sp.) fishing by handlines in Palabuhanratu Bay, West Java

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ABSTRACT

The waters of Palabuhanratu Bay are fertile and rich with fish resources. For a long time, fishermen have used the fish resources in these waters. Hairtail (Trichiurus sp.) was one of the fish resources in Palabuhanratu Bay that caught by fishermen using handlines. Fishery production landed at Palabuhanratu Fishing Port in 2019 was 5,414,240 kg with a total hairtail production of 314,107 kg. The problem raised in this study was knowing the right hairtail fishing season so that it provides optimum benefits for fishermen. In addition, knowing potential fishing areas could assist fishermen in choosing their fishing time and fishing ground. The purpose of this study was to describe the hairtail fishing unit, to analyze the catch composition of handline, to analyze the fishing season patterns of hairtail fish, and to analyze hairtail fishing ground in Palabuhanratu bay. The results of the analysis showed that the fishing season for hairtail (Trichiurus sp.) in the waters of Palabuhanratu Bay lasts for 5 years with the peak in October. However, the reality is that fishing operations can be carried out throughout the year. The average catch per unit effort (CPUE) of hairtail (Trichiurus sp) duringfishing seasons was 11.32 kg/trip in 2019. The potential fishing ground was in the waters of West Ujung Genteng, Southern waters of Sawarna, Southern waters of Karanghawu and the waters of West Ujung Karang Bentang.

Introduction

Sukabumi Regency, West Java is bordered to the south by the Indian Ocean, whereas to the west it is bordered by Lebak Regency, Banten Province, to the east by Cianjur Regency, and to the north by Bogor Regency. The coastal area of Palabuhanratu Bay is geographically located at the position of 6°50'-6°55' south latitude and 106°25'-106°50' east longitude. Administratively, there are 4 (four) districts in the coastal area of Palabuhanratu Bay, namely Simpenan, Palabuhanratu, Cikakak, and Cisolok districts. Palabuhanratu is the southern coastal waters of West Java, which direct with the Indian Ocean so that the oceanographic characteristics of these waters are strongly influenced by the oceanographic characteristics of the Indian Ocean.

The waters of Palabuhanratu Bay are very potential and strategic for fishing, this is evidenced that the catch landed at the Palabuhanratu Fishing Port classified as high economic value fish., for example: hairtail (*Trichiurus sp.*), tuna (*Thunnus sp.*), little tuna (*Euthynnus sp.*), snapper (*Lutjanus sp.*), mackerel (*Scomberromo sp.*), and various other types of fish. The waters of Palabuhanratu Bay are a potential area for capture fisheries, all fishery production landed at Palabuhanratu Fishing Port in 2019 was 5,414,240 kg with hairtail fish production of 314,107 kg (DKP, 2020).

Hairtail fish are widespread in all tropical and subtropical waters in the world (Sari, 2008). This fish in Indonesia is scattered and found in almost all Indonesian coastal waters (Airlangga *et al.*, 2018). According to Ahmad (2008), hairtail fish generally live in subtropical to tropical climates. Hairtail fish habitat includes marine waters, estuaries, coastal

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swamps, mangroves to brackish waters. This fish swims almost completely vertically with its head on top. Hairtail fish in Palabuhanratu can live up to the age of 8 years, with the highest growth rate of fish reaching 13.93 cm per year. This fish can reach a maximum growth of up to 125 cm. According to Vianita *et al.* (2014), the population of hairtail is mostly found in the waters on the coasts of Java and river estuaries in Sumatra. According to Novianingrum *et al.* (2017), hairtail fish (*Trichiurus sp.*) is a fish that has high economic value and is very potential in its utilization.

The hairtail fishing at Palabuhanratu Fishing Port is an export-scale fishery business. Market demand for the hairtail fish tends to increase, causing fishing efforts to increase as well (Ernawati and Butet, 2012). The Hairtail fishing business is a business that is quite profitable based on the fishing community views, even though this business is highly influenced by the uncertain fishing season so that it affects uncertain income and profits. With this assumption, it is necessary to study the pattern of fishing season for hairtail fish in Palabuhanratu. This research is very important to do because it can provide information about the right time to catch hairtail fish, making it easier for fishermen to catch fish effectively and efficiently.

The dominant fishing gear used to catch hairtail fish in Palabuhanratu is handline. This is because more hairtail fish are caught with these gears, besides the uncomplicated structure of the gear makes it easy for fishermen to use. Handline cannot catch a large number of hairtail fish in a short time, so it can be used to realize sustainable hairtail fisheries with environmentally friendly fishing gear (Hargiyatno *et al.*, 2013; Devi *et al.*, 2014; Rahaningmas *et al.*, 2014; Sudrajat *et al.*, 2014). According to Silaban *et al.* (2017), handline is an environmentally friendly fishing gear, because it has the best environmental aspect value compared to other pelagic fishing gear such as floating liftnet and boat seine net.

Handlines were first introduced by Bugis fishermen in Sendang Biru, Malang. The development of handline boats cannot be separated from the development of fish aggregating devices (FAD) in the south of West Java. Handlines have developed in the last 10 years but recorded from 2005, until 2009 there were more handlines than gillnet (Anggawangsa and Hargiyatno, 2012). This indicates a change in fishing gear from gillnet boats to handlines.

Issues raised by the studyare knowing the best hairtail fishing season so that it provides optimal benefits for fishermen. In addition, knowing several things about the characteristics of the fishing area. This information is important and is expected to assist fishermen in choosing when and where to operate the hand line appropriatelly. The purpose of this study was to describe the hairtail fishing unit, to analyze the catch composition of fishing gears, to analyze the fishing season patterns of hairtail fish, and to analyze hairtail fishing grounds in Palabuhanratu bay.

Material and Methods

Time and place of research

This research was conducted at Palabuhanratu Fishing Port, Sukabumi, in October 2020. The research method used was a survey method, by conducting interviews with 20 fishermen, the head of Palabuhanratu Fishing Port and their staffs. The data obtained are in the form of data on catch production, the composition of types of catch and other data. The data obtained are then processed and analyzed at the Department of Fisheries Resources Utilization, Faculty of Fisheries and Marine Sciences, IPB University. The data collected in this study consisted of primary data including the type of fishing gear, the composition of the types and the production of the catch obtained from interviews and field observations of fish landing activities at Palabuhanratu Fishing Port in October 2020. Secondary data were collected is such as monthly fish production data from 2015 to 2019 at Palabuhanratu Fishing Port. The data on the catch composition of the hairtail fish were analyzed using descriptive analysis, by analyzing data from hairtail fish caught from 2015–2019. The research locations during the study are presented in Figure 1.

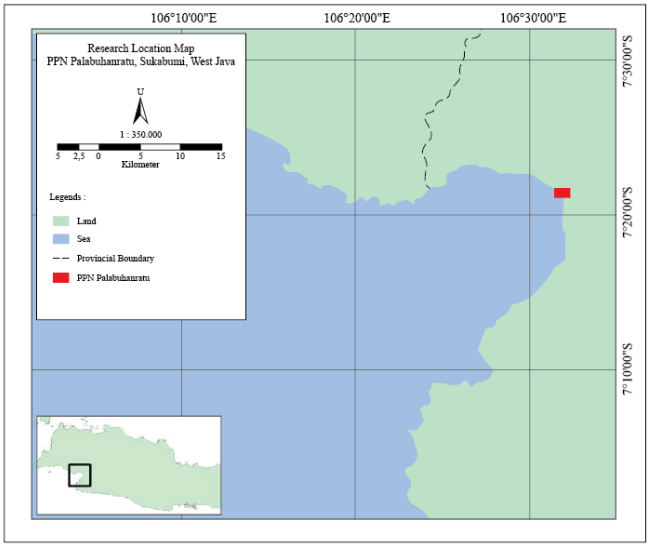

Figure 1. Palabuhanratu bay research location.

Productivity

Productivity is calculated to determine how productive the handline fishing is to catch hairtail at a certain time and unit of effort. The level of utilization of fish resources was analyzed using Catch Per Unit Effort (CPUE). If the productivity value decreases, it indicates a decrease in biomass or resources, on the contrary, if the productivity value increases, it indicates that the resources is in good condition. According to Wudji and Suwarso (2015), CPUE calculations with the following formula:

$$CPUE_i = \frac{Catch_i}{Effort_i}$$

Where :

$CPUE_i$: catch per effort expended at time-i (kg/trip)

$Catch_i$: catch at time-i (kg)

$Effort_i$: effort expended at time-i (trip).

Furthermore, it is analyzed descriptively by comparing each boat's catch with one another. If the value of the CPUE trend increases from year to year, it can be considered that the fish resources in the area are relatively good, which means that the fishing business is presumably still profitable and vice versa if the CPUE trend decreases, it is suspected that overfishing indication will begin (Prasetyo *et al.,* 2018).

Fishing season index

The fishing season index (FSI) was calculated to determine the pattern of the fishing season. The calculation of the fishing season index uses two dominant fish species caught on the purse seine based on monthly NPF Palabuhanratu Fishing Port data for the last 5 years. Monthly catch data and fishing trip data are processed using Microsoft Excel. The fishing season pattern was analyzed using time series analysis of monthly data on the catch of handline fishing gear for five years (2015-2019), then followed by calculating the moving average. According to Wahju *et al.* (2011) the calculation steps are as follows:

1) Arrange a series of CPUEi from January 2015 until December 2019

$$ni = CPUEi$$

Where:
i : 1, 2, 3,....., n
ni : CPUE sequence-i

2) Arrange moving average CPUE for 12 months (MA)

$$MAi = \frac{1}{12}\left(\sum_{i=i-6}^{i+5} CPUE\right)$$

Where :
MAi : moving average 12 month sequence -i
CPUEi : CPUE sequence -i
i : 6, 7,..., n-5

3) Arrange moving average centered CPUE (MAC)

$$MACi = \frac{1}{2}\left(\sum_{i=i}^{i=1} MAi\right)$$

Where:
MACi : moving average centered CPUE sequence -i
MAi : moving average 12 month sequence -i
i : 7, 8, ..., n-5

4) Month Average Ratio (MAR)

$$MARi = \frac{CPUEi}{MACi}$$

Where:
MARi : month average ratio-i
CPUEi : CPUE sequence-i
i : 6, 7, ..., n-5

5) Arrange average value in matrix ixj for each month, starting from June-July. Next calculate the value of the total average ratio each month, then calculate the total of the whole average and catching season pattern.

(1) The average ratio for sequence month-i (ARSMi)

$$ARSMi = \frac{1}{n}\left(\sum_{j=1}^{n} ARSMij\right)$$

Where :
ARSMi : average ratio for sequence month - i
ARSMij: average ratio for sequence month i x j
i :1, 2, ..., 12
j : 1, 2, 3, ..., n

(2) Total of month average ratio (TMAR)

$$TMAR = \sum_{i=1}^{12} ARMSi$$

Where :
TMAR : total month average ratio
ARMSi : average ratio for sequence month -i
i : 1, 2, ..., 12

(3) Calculate correction factor

The ideal value of TMAR is 1200, however, many factors cause the value to stray from 1200, therefore, the month average ratio must be corrected with a value, called correction factor (CF).

$$CF = \frac{1200}{TMAR}$$

Where :
CF : correction factor
TMAR : Total of month average ratio

(4) Catching seasonal index

$$FSIi = ARSMi \; x \; CF$$

Where :
FSIi : fishing seasonal index sequence -i
ARSMi : average ratio for month sequence -i
i : 1, 2, ..., 12

Fishing Season Index (FSI) used to determine the right time to carry out fishing operations so that the level of profit obtained by fishermen can be maximized with sustainable fish resources. According to Zulkarnain and Wahyu (2012), the fishing season is divided into three categories, namely peak season, medium season and low season. The following is a classification of fishing seasons (Table 1).

Table 1. Fishing season index category.

No	FSI Value	Season Category
1	< 50%	Lean
2	50% ≤ FSI < 100%	Normal
3	≥ 100%	Peak

Source: Zulkarnain and Wahyu (2012)

After the FSI value is known the diagram of the dominant fishing season pattern using the handline, then overlay the two season pattern diagrams and analyzed descriptively. The explanation regarding the accuracy of the fishermen in carrying out the catch is whether or not they are in accordance with the fishing season in Palabuhanratu Fishing Port.

Distribution of fishing ground

Retrieval of data to make a map of the distribution of fishing grounds using coordinate point data (latitude and longitude) obtained from the fishing unit at Palabuhanratu Fishing Port. The selected respondents are the captain or crew representing one fishing unit. The fishing unit chosen was the one that uses handline fishing gear. The data were collected to create a map of the distribution of the fishing area including the name of the fleet, gross tonnage (GT) size, the coordinates of the fishing location, and the time of the catch. The data then processed using hardware tabulated in Microsoft Excel and then converted into position data (Degree, Minute, Second / D^{O}M'S". Latitude and longitude data will be converted into numerical formulas. Then processed using ArcGIS 10.3 software to form a thematic map which is the distribution fishing ground at Palabuhanratu Fishing Port The high fishing activity in an area indicates that the area may have an abundant distribution of fish, so that the area can be used as a good area for fishing (Rivai *et al.,* 2017).

Results

Handline fishing unit

The fishing boat is useful as a means of transportation that carries all fishing units to the fishing ground and brings them back to the fishing base along with the catch they have obtained. The hairtail fishing unit uses a hand line located at Palabuhanratu Fishing Port using a jukung boat made of fiberglass with an outboard engine of 5.5-15 PK. The boat size (overall lenght) 2.5 m equipped with an anchor, a generator and a cool box made of styrofoam and fiber. Hairtail fishing business owners at Palabuhanratu Fishing Port tend to use a 15 PK outboard engine due to its more efficient use than a 5 PK. The use of an outboard motor is very suitable for water areas with high waves characteristic such as in southern Java waters.

According to Pusat Penyuluhan Kelautan dan Perikanan (2011), a handline is a very simple type of fishing gear, usually consisting of main line, sink and bait and is operated by one person. In the area of Palabuhanratu hand line fishing gear is known as "pancing gajrut". The handline construction consists of:

1. Reel is made of round plastic material with a diameter of 15 cm and a thickness of 4.5 cm. Serves to roll up the handline that has been used;
2. Mainline made of nylon monofilament number 1000 with a length of 70-110 m. This line serves to place branch lines with an installation distance of 1.5 m - 2 m;
3. Branch line made of nylon monofilament number 500 with a length of 1 m serves to place the hook;
4. Hook made of steel with numbers 10 and 11, where the number of each fishing line is 30-50 pieces serves to place bait so that fish can be caught;
5. Wireleader made of aluminum with a length of 15 cm which is attached to the end of a branch line connected by a hook. This wireleader serves so that the branchline is not easily broken due to the bite of hairtail fish with sharp teeth;
6. Swivel is made of stainless steel with size number 3, so that the fishing line does not become entangled when operating the handline;
7. Sink made of stone totaling 1 piece weighing 2 kg and serves to sink fishing gear so that its position is perpendicular to the bottom of the water;

8. Bait, the type of bait used in hand-line fishing gear is to use hairtail fish, houndfish (*Tylosurus crocodilus*) or sardine (*Sardinella fimbriata*) bait.

Handline operation method

The hand line fishing operation is carried out at night and the preparation stage starts from noon to late afternoon. Fishermen leave at 16.00 WIB, to catch hairtail fish at night and return to the port at 06.00 WIB. Meanwhile, for those who catch fish in the morning and afternoon, fishermen leave at 03.00 WIB and return to the port at 10.00 WIB.

In operating hand line, there are several steps that must be done, such as:

1. Preparation stage handline fishermen consisting of 3 people prepare equipment before leaving for the fishing ground including preparation of fishing gear, purchasing bait, fuel, ice, food and checking the readiness of the boat.
2. In determining the location of the hairtail fishing ground, local fishermen use experience and information from previous catches or fishermen who have arrived at the fishing ground first.
3. After arriving at the fishing ground location, the handline fishing gear is ready to operate. First, prepare the bait by filling the body of the fish, then lowering the anchor of the boat so that the boat does not move, the sink on the fishing line is lowered then lowering one by one the fishing line that has been tied to the bait. Soaking time is usually around 15-30 minutes depending on the number of fish in these waters.
4. After soaking for a while and feeling that much of the bait had been eaten by the fish, the fisherman pulled the handline onto the boat. Fishermen can feel that the bait has been eaten by feeling the vibrations on the fishing line will be strong.

Catch composition

Handline is generally specialized in catching hairtail fish. The types of hairtail fish that are usually caught using the handline are hairtail "bedog" (*Trichiurus savala*), hairtail meleu (*Trichiurus lepturus*) and "gelang luyung" (*Gempylus serpens*). The bycatch of hand line varies widely, such as scad mackerel (*Decapterus kurroides*), purple-spotted bigeye (*Priacanthus tayenus*), giant trevally (*Caranx* sp.), spanish mackerel fish, long jawed mackerel, grouper, little tuna, etc. The percentage of hairtail fish (*Trichiurus* sp.) caught using hand-line fishing gear in 2019 was 92%. Apart from the catch of hairtail, the other fish catch was only about 8% (Figure 2).

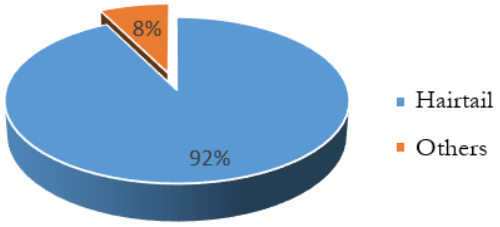

Figure 2. Catch composition of handline catch in 2019.

Hairtail production with handline

Based on Figure 3, the amount of production can be seen that in 2015-2017 production at Palabuhanratu Fishing Port decreased from 83,319 kg to 59,300 kg in 2016 and 35,368 kg in 2017. In 2018 it increased by 14,585 kg to 49,953 kg. In 2019, there was a significant increase again to 159,187 kg. In general, the catch of hairtail fish was the most dominant compared to other fish. The dominance of hairtail fish as the largest catch occurs every year compared to other fish.

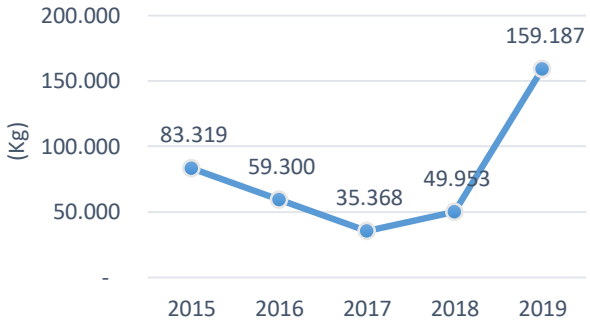

Figure 3. Hairtail fish production using handline fishing gear.

Productivity

Catching productivity can provide information to fishermen about the ability level of fishing gear to obtain catches. Then information about the pattern of the fishing season and dominant fishing areas is needed to facilitate fishing operations using hand lines. By knowing this information, it is hoped that fishermen will find it easier in the fishing process and can reduce the risk of loss from the fishing business.

Based on the calculation of the level of productivity, as presented in Figure 4, the productivity level of hand lines that land their catch at Palabuhanratu Fishing Port tends to decline from 2015 to 2019. Productivity in 2015 amounted to 15.20 kg/trip decreased to only 7.98 kg/trips in

2017, then started to rise again to 11.32 kg/trip in 2019.

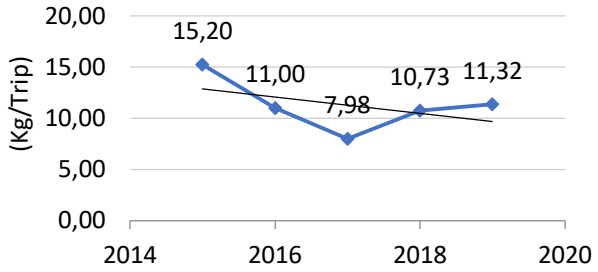

Figure 4. Productivity of handline fishing gear.

Hairtail fishing season index

Hairtail (*Trichiurus sp.*) tends to migrate from one area to another. The time period for hairtail fish (*Trichiurus sp.*) to live in a certain area (fish season) is not known with certainty. In fact, this information is needed to make fishing activities more efficient. Therefore, information about the trend of catch in a certain time is needed as an initial estimate of the season for hairtail fish (*Trichiurus sp.*).

This analysis uses monthly CPUE data for a specific time (from 2015-2019). Based on the IMP value, it can be seen the trend of the fishing season so that the right fishing time can be determined. The fishing season index value can be seen in Figure 5.

Based on the IMP value, it can be seen that the trend of the fishing season for hairtail fish in Palabuhanratu Bay. Figure 5 shows a good fishing season for catching hairtail fish in Palabuhanratu Bay, namely June, August, September October and November, and the peak fishing season in October. April is the season of transition from the west and east seasons.

Fishing ground

Hairtail fishing ground in Palabuhanratu Bay with the handline fishing unit was relatively still around Palabuhanratu bay. The fishing ground was located around the South Karanghawu, West Ujung Genteng, South Sawarna and West Ujung Karang Bentang as well as in the waters of the Teluk Ratu and its surroundings. The fishing ground position that was often used by handline fishermen is presented in Table 2 and Figure 6.

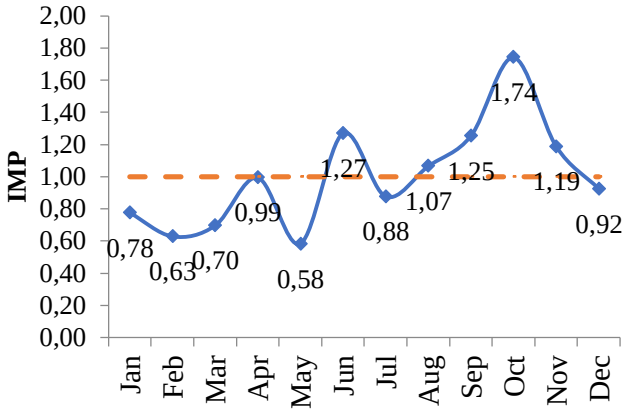

Figure 5. Hairtail fishing season index.

Tabel 2. Position of hairtail fishing grounds with handlines.

No.	Waters name	Coordinate position
1	South Karanghawu	7°00'01.0"S 106°25'03.6"E
2	South Karanghawu	7°00'46.5"S 106°24'22.2"E
3	South Karanghawu	7°00'51.2"S 106°23'25.5"E
4	South Karanghawu	7°01'10.1"S 106°22'09.4"E
5	South Karanghawu	7°01'01.2"S 106°20'00.8"E
6	West Ujung Karang Bentang	7°04'47.4"S 106°28'08.2"E
7	West Ujung Karang Bentang	7°04'56.8"S 106°27'30.5"E
8	West Ujung Karang Bentang	7°05'13.7"S 106°26'46.3"E
9	West Ujung Karang Bentang	7°05'39.4"S 106°25'56.6"E
10	West Ujung Karang Bentang	7°06'27.3"S 106°25'16.7"E
11	South Sawarna	7°00'08.5"S 106°15'21.4"E
12	South Sawarna	7°01'33.3"S 106°15'34.9"E
13	South Sawarna	7°02'24.3"S 106°15'28.2"E
14	South Sawarna	7°02'41.1"S 106°16'16.2"E
15	South Sawarna	7°02'50.7"S 106°16'31.0"E
16	West Ujung Genteng	7°12'57.4"S 106°21'05.7"E
17	West Ujung Genteng	7°12'08.0"S 106°20'06.5"E
18	West Ujung Genteng	7°13'01.5"S 106°18'59.1"E
19	West Ujung Genteng	7°14'12.8"S 106°18'17.6"E
20	West Ujung Genteng	7°15'18.5"S 106°16'43.2"E

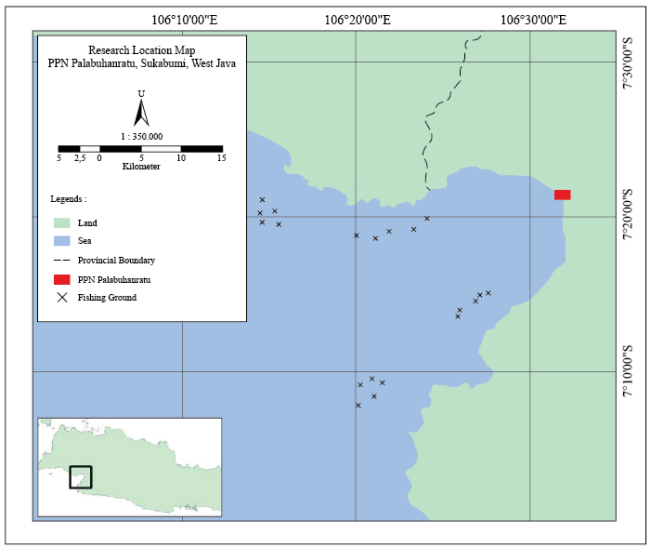

Figure 6. Hairtail fishing grounds with handlines.

Discussion

Catching productivity can provide information to fishermen about the ability level offishing gear to obtain catches. If the fishing area is known in advance, it will be more effective and efficient to increase fishing productivity (Nurhayati *et al*., 2018; Rahman *et al*., 2019; Saraswati *et al*., 2019). Fishermen can find it easier in the fishing process and can reduce the risk of loss from fishing efforts. An increase in fishing business and production in the long term can cause a decrease in fish biomass and fishermen's income. Information also needed in hand-line fishing is about the fishing season patterns. Currently, most fishermen still rely on experience from generation to generation (Wudji *et al*., 2012; Wudji and Suwarso, 2015). In addition to determining the fishing season pattern of each type of fish, it is hoped that fishing activities will be carried out on time and under control, and fishing will be more effective and efficient by knowing the fishing area in advance (Harjanti *et al*., 2012; Branenda *et al*., 2019).

According to Islamiati *et al.* (2018), June is the peak of hairtail fish spawning in Palabuhanratu. This month, massive hairtail fishing should not be carried out, but the fishermen still catch them because they are considered profitable. This is consistent with the large IMP value for the month. The higher the IMP value, the higher the number of catches.

According to Islamiati *et al.* (2018), June is the peak of hairtail fish spawning in Palabuhanratu. This month, massive hairtail fishing should not be carried out, but the fishermen still catch them because they are considered profitable. This is consistent with the large IMP value for the month. The higher the IMP value, the higher the number of catches.

According to Sari (2008), The highest level of gastric filling of the hairtail *(Trichiurus savala)* occurred in November. The gastric content index is an indication for determining the forage activity of fish per fishing time, this is comparable to the high IMP rate of 119% in November. The IMP value can be used to assist hairtail fishermen in knowing the right fishing time so that the fishing can be done effectively and efficiently. The IMP value in December – May tends to decline, then increases during the transitional season from the west to the east season and again decreases in the east season. Although the analysis shows that the fishing season for hairtail fish (*Trichiurus sp.*) In the waters of Pelabuhanratu Bay lasts for 8 months, in reality fishing activities can be carried out throughout the year.

The fishing productivity of catching hairtail fish in 2019 is 11.32 kg/trip. Hairtail fishing business is still very profitable and the catch rate can still be increased. This is indicated by the productivity value of hand line fishing rods which continues to increase from 2018 to 2019. Even the productivity of hairtail fish in 2019 has increased almost 4 times compared to the previous year.

The fishing pattern for hairtail fish in Palabuhanratu Bay can be done all the time of the year, especially for catching fish in the bay waters. Meanwhile, fishing areas outside the bay, such as in Ujung Genteng waters in the east or in Cikembang waters which are on the west, are not carried out throughout the year. Hand line fishers will catch hairtail fish in both places during the fishing season. From the results of the analysis of the hairtail fish season pattern, information was obtained that the season for lay fish is from May to December with the peak season in October. According to information from fishermen, one of the factors affecting the season for hairtail fish is the current condition in the waters of Palabuhanratu Bay and surrounding .

Oceanographic conditions in the waters of Palabuhanratu Bay are more influenced by the tidal phenomenon. At high tide, the water mass moves into the bay and at a depth of approximately 200 m to the southwest of Pelabuhanratu, part of the water mass is diverted towards the west side along the coast of Cimaja, Cisolok, Pelabuhanratu. Some of the other water masses were diverted to the east along the coasts of Cidadap, Cimandiri and Tanjung Kembang (PRTK, 2004).

The tidal character (tide) in the waters of Palabuhanratu Bay is the propagation of the tidal influence that occurs in the Indonesian Ocean. This

happens because the waters of Palabuhanratu Bay are directly connected to the ocean waters off the Indian Ocean (Wyrtki, 1961; Pariwono, 1988). The waters of Palabuhanratu Bay are influenced by tidal patterns. During high tide, the mass of water tends to enter the bay with a maximum speed of 0.43 m/s, while during low tide, the mass of water will move out of the bay with a maximum speed of 0.48 m/s. According to Sukresno *et al.* (2015), oceanographic environmental factors such as currents and temperature have a strong relationship with the presence of fish in the waters. The temperature condition under the surface layer is an indicator to determine the mass transfer of water vertically or horizontally. This transfer of water mass carries nutrients. Changes in nutrient concentrations affect water fertility and will have an impact on the distribution of fish. The depth of hairtail fish swimming in Palabuhanratu Bay, Indian Ocean tends to be around 0-100 m. Temperature conditions and currents at a certain depth affect the preference for the presence of fish. As a visual and phototaxis predator, lay fish need light to find food and its life depends on light input into the water

Conclusion

Handline is an environmentally friendly fishing gear, because it has the best environmental aspect value compared to other pelagic fishing gear such as floating liftnet and boat seine net. Handline is generally specialized in catching hairtail fish. The percentage of hairtail fish (*Trichiurus* sp.) caught using hand-line fishing gear in 2019 was 92%, the other fish catch was only about 8%. The results of the analysis show that the fishing season for hairtail (*Trichiurus sp.*) in the waters of Pelabuhanratu Bay lasts for 5 months with the peak of the fishing season in October. However, the reality is that fishing activities can be carried out throughout the year. The potential fishing ground are located around the South Karanghawu, West Ujung Genteng, South Sawarna and West Ujung Karang Bentang as well as in the waters of the Teluk Ratu and its surroundings.

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