

ENVIRONMENTAL FRIENDLINESS ANALYSIS OF PURSE SEINE OPERATED BY KM SUMBER BARU, BELAWAN, NORTH SUMATERA

Analisis Keramah Lingkungan Purse Seine yang Dioperasikan KMSumber Baru, Belawan, Sumatera Utara

By:

Adhiatma Mario Sipahutar¹, Abdul Kohar Mudzakir^{1*}, Indradi Setiyanto¹

¹Departemen Perikanan Tangkap, Fakultas Perikanan dan Ilmu Kelautan, Universitas Diponegoro
Jl. Prof. Sudarto, SH, Tembalang, Semarang, Jawa Tengah - 50275
Telp/Fax. +6224 7474698
adhiatmamarioo@gmail.com, akohmud@gmail.com, indradi.fpik@gmail.com

* Correspondence: akohmud@gmail.com

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ABSTRACT

The operation of the Purse Seine fishing gear has been regulated in Regulation of Ministry of Marine and Fisheries Affair No. 71 of 2016, but there are still vessels that violate the rules and modify fishing gear, do not report the number of main and by-catch, which need to be studied in depth regarding the environmentally friendly level of a fishing gear. The purpose of this study was to determine the level of environmental friendliness of Purse Seine KM fishing gear. New Source based in PPS Belawan. The method used in this research is to use a score based on the criteria of the Code of Conduct for Responsible Fisheries (CCRF) and analysis of the suitability of fishing gear with the Regulation of Minister of Marine Affairs and Fisheries No. 71 of 2016. Based on the results of the study it was found that the Purse Seine KM. Sumber Baru in terms of Permen KP number 71 of 2016 has a mismatch in the specifications of fishing gear from the aspect of ship size. Meanwhile, based on the CCRF criteria, a final weighting score of 31 was obtained, which means Purse Seine KM fishing gear. Sumber Baru is a fishing gear that is less environmentally friendly.

Keywords: CCRF, OFP Belawan, Purse Seine, Sustainability.

ABSTRAK

Pengoperasian alat tangkap *Purse Seine* telah diatur dalam Permen KP No 71 Tahun 2016. Namun masih ada kapal yang menyalahi aturan dan memodifikasi alat tangkap, tidak melaporkan jumlah tangkapan utama dan sampingan. Padahal, informasi tersebut sangat diperlukan untuk mengkaji secara mendalam terkait tingkat ramah lingkungan suatu alat tangkap. Tujuan dari penelitian ini adalah untuk mengetahui tingkat keramahan lingkungan alat tangkap *Purse Seine* KM. Sumber Baru yang berbasis di PPS Belawan. Metode yang digunakan dalam penelitian ini adalah dengan menggunakan skor berdasarkan kriteria *Code of Conduct for Responsible Fisheries* (CCRF) dan analisis kesesuaian alat tangkap dengan peraturan Permen KP No. 71 Tahun 2016. Berdasarkan hasil penelitian ditemukan bahwa alat tangkap *Purse Seine* KM. Sumber Baru ditinjau dari aspek Permen KP nomor 71 Tahun 2016 memiliki tidak kesesuaian spesifikasi alat tangkap dari aspek ukuran kapal. Sementara berdasarkan kriteria CCRF didapatkan skor pembobotan akhir 31 yang berarti alat tangkap *Purse Seine* KM. Sumber Baru merupakan alat tangkap yang kurang ramah lingkungan.

Kata kunci: CCRF, PPS Belawan, *Purse Seine*, Keberlanjutan.

INTRODUCTION

Environmentally friendly fishing activities are the basic principles in the use of fishing technology starting from the construction of materials and how to operate (Sumardi *et al.* 2014; Amarullah and Sumardi 2018; Siahaan *et al.* 2016). Eco-friendly fishing technology itself can be defined as fishing gear that has little or no negative impact on the environment and can preserve fish resources in a waters. (Bubun and Amir 2016; Fadli *et al.* 2020).

Belawan Ocean Fishing Port (OFP) is one of the largest fishing ports in WPP-NRI 571, located in Medan City, North Sumatra. It is considered as strategic position, which is located between the waters of the East Coast of Sumatra (the Malacca Strait), the waters of the Indonesian Exclusive Economic Zone (ZEEI) and the South China Sea, and is an entry point for the economic activities of several countries in Asia. The waters of the Malacca Strait have a fairly high potential for capture fisheries. The area included in WPP-NRI 571 has a diversity of fish resources, including white pomfret, black pomfret, red snapper, grouper and largehead hairtail.

The use of fishing gear at OFP Belawan is dominated by purse seine gear where in 2016 the number of purse seine fishing gear operating at OFP Belawan is divided into several size depend on the vessel size. The 5-10 GT vessel were 14 units, 11-20 GT were 7 units, in size 21-30 GT were 5 units, 108 units of 31-50 GT, 9 units of 51-100 GT and 25 units for 101-200 GT, the total was 168 units in year of 2016 (OFP Belawan 2017). Purse seine fishing gear is an active fishing gear considering the operation of the vessel, the method used is looping nets in schools of fish. The use of purse seine fishing gear has been regulated in the Minister of Marine Affairs and Fisheries Regulation No. 71 of 2016, which consists of one boat purse seine and two boats purse seine. Purse seine or purse seine is an effective fishing tool for catching pelagic fish that have the behavior of living in large groups, both in coastal and offshore waters. Scad are one of the small pelagic fish that are the target of purse seine fishing gear.

Purse seine fishing gear has a lot of catches in one fishing trip. If the physiological aspects of the catch are not considered, it will be difficult to obtain sustainable fishing (Rusmilyansari 2012; Safitri and Magdalena 2018). The size of the fish caught should be the first concern of fishermen in order to maintain a sustainable fish stock. Internationally sustainable fishing is regulated in the Code of

Conduct for Responsible Fisheries (CCRF). CCRF is an agreed standard for responsible monitoring of fishing activities. according to Firdaus *et al.* (2017), CCRF is used as a guideline for the implementation of fishery activities in a responsible manner. These guidelines provide complements for national and international efforts to ensure the sustainable and sustainable use of marine resources. It is important that there is awareness of this from decision makers of fisheries management authorities, fishing companies, fishing organizations, and non-governmental organizations to preserve Indonesia's fishery resources.

According to Suman *et al.* (2018) currently the level of fish utilization in Belawan OFP is in fully exploited status. The use of purse seine fishing gear at OFP Belawan needs to pay attention to important aspects in the application of CCRF in fishing activities. Environmentally friendly fishing activities can be seen in terms of operating methods, materials and equipment construction, fishing grounds and the availability of fish resources while preserving the environment and fish resources (Megwalu *et al.* 2018).

The status of the utilization of fish resources in OFP Belawan which has been fully exploited makes a study to analyze the level of use of fishing gear in OFP Belawan, especially purse seines, is important. One of the vessels in OFP Belawan that operates using a purse seine is the KM Sumber Baru. The reason to choose KM Sumber Baru as the research object was based on several consideration, such as: the vessel is based in Belawan with the registration number 2005 PPa No.3724/N, the fishing ground at FMA 571, and belongs to the category of large vessels that carry out fishing with similar type of fishing gear used in OFP Belawan.

KM Sumber Baru is one of the vessels that has scad fish as its main target. Identification of the initial problem with KM Sumber Baru is that when operating the fishing gear they use can participate in catching fish that are not suitable for catching. This can be seen from the size of the KM Sumber Baru mesh size which is not up to standard.

Based on the description above, this study was aimed to i) analyze the suitability of KM Sumber Baru fishing gear with regulations in Indonesia, and ii) analyze the environmental friendliness of KM Sumber Baru fishing gear according to CCRF.

METHODS

This research was carried out from March to April 2021 at the Belawan Ocean Fishery Port (OFP), State Fisheries Management Area of the Republic of Indonesia (WPPNRI) 571. Sampling in this study was the snowball sampling method by taking one sample and then proceeding to other samples until it reached a large number of samples in accordance with the number of samples required. The sample that has been taken will be considered sufficient if the number has met the population requirements that will be the object of research.

In this study, the population that will be the object of this research is all the crew of KM. Sumber Baru based in OFP Belawan. The exact number of the crew was 24 person. The data used in this study are primary data and secondary data. Primary data were obtained from direct observations in the field either by means of interviews or through questionnaires given to respondents, while secondary data was data obtained from literature studies or literature studies.

To assess the level of environmental friendliness of the purse seine fishing gear KM Sumber Baru, a weighting score was used based on the criteria issued by Ministry of Marine Affairs and Fisheries (2006). Furthermore, the weighting score consists of 9 criteria for environmentally friendly fishing gear in accordance with the CCRF was also conducted. The weight (score) given to each of these sub-criteria is one (1) to four (4). On Table 1 presented the scoring criteria in this study.

The maximum score or value in this study is 36 points. The points obtained are then

divided into 4 categories with a range of values as follows.

RESULTS

The most dominant type of fish caught and landed at the OFP Belawan is the scad fish (*decapterus*). Other types of fish are squid (*Loligo*), mackerel (*Rastrelliger kanagurta*), tank goby (*Glossogobius giuris*), jackfruit fish (*Artocarpus heterophyllus*), silver croaker (*Pennahia argentata*), anchovy (*Engraulidae*), yellowstripe scad (*Selaroides leptolepis*), curd (*Nemipterus virgatus*) and cuttlefish (*Seppida*).

Fish production in OFP Belawan is fluctuated. Based on Figure 2 the number of fishery production decreased. The value of fishery production at OFP Belawan is indeed large, it is undeniable because of the large number of ships that rely on OFP Belawan and its status as an Ocean Fishing Port. The process of ups and downs in the amount of production value is certainly influenced by the demand and sales processes experienced by OFP Belawan (Fadli et al. 2020).

Based on Figure 3 it can be seen that the purse seine is the most widely used type of fishing gear. The calculation of the type of purse seine in OFP Belawan consists of PSPK (Purse Seine Small Pelagic) and PSPB (Purse Seine Pelagic Large). The Basic Lampara vessel was no longer used in 2017 because according to PERMEN KP No. 2 of 2015 which no longer allows the existence of this vessel activity. The number of purse seine vessels is directly proportional to the catch that lands at the TPI, which is still dominated by small pelagic fish and large pelagic fish. Based on Figure 4 the number of fishing fleets according to onboard motor, from 2015-2019 is fluctuated.

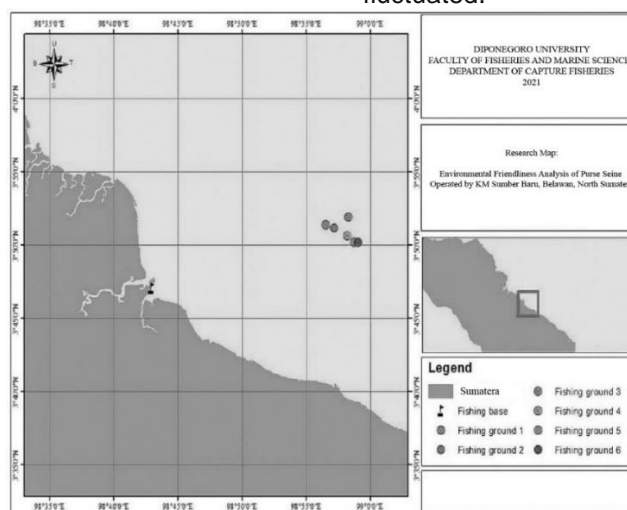


Figure 1 Research Location

Table 1 Criteria for Environmentally Friendly Fishing Gear

| No | Criteria | Description | Score |
|----|---|--|-------|
| 1 | High Selectivity | • The tool catches more than three species with vastly different sizes | 1 |
| | | • A tool to catch three species with vastly different sizes | 2 |
| | | • Tools for capturing less than three species of approximately the same size | 3 |
| | | • A tool to catch only one species with approximately the same size | 4 |
| 2 | Does not damage the habitat, place to live and breed organisms | • Causes habitat destruction over large areas | 1 |
| | | • Causes habitat destruction in narrow areas | 2 |
| | | • Causes some habitat in a narrow area | 3 |
| | | • Safe for habitat (do not destroy habitat) | 4 |
| 3 | No harm to fishermen (fishers) | • Fishing gear and how to use it can cause death to fishermen | 1 |
| | | • Fishing gear and its use can result in permanent (permanent) disability. | 2 |
| | | • Fishing gear and its use can result in temporary health problems | 3 |
| | | • Safe fishing gear for fishermen | 4 |
| 4 | Produce fishgood quality | • Dead and rotten fish | 1 |
| | | • Dead fish, fresh and physically disabled | 2 |
| | | • Fresh dead fish | 3 |
| | | • Live Fish | 4 |
| 5 | The product does not harm the health of consumers | • Great chance of causing death | 1 |
| | | • Chance to cause consumer health problems | 2 |
| | | • Very small chance for consumer health problems | 3 |
| | | • Safe for consumers | 4 |
| 6 | Minimum wasted catch | • By-catch consists of several types (species) that are not sold in the market | 1 |
| | | • by-catch consists of several types and some are sold in the market | 2 |
| | | • by-catch less than three types and sell well in the market | 3 |
| | | • by-catch less than three kinds and high price in the market | 4 |
| 7 | The fishing gear used must have a minimum impact on bio-diversity | • The fishing gear and its operations cause the death of all living things and damage the habitat | 1 |
| | | • Fishing gear and its operations lead to the death of several species and damage to habitat | 2 |
| | | • Fishing gear and operations cause the death of some species but do not destroy habitat | 3 |
| | | • Safe for the diversity of biological resources | 4 |
| 8 | Does not catch protected species | • Fish that are protected by law are often caught | 1 |
| | | • Protected fish caught several times | 2 |
| | | • Protected fish have been caught | 3 |
| | | • Protected fish are never caught | 4 |
| 9 | Socially accepted | Public acceptance of a fishing gear, will depend on the social, economic, and cultural conditions in a place. A tool is socially accepted by the community if: (1) the investment costs are cheap, (2) it is economically profitable, (3) it does not conflict with local culture, (4) does not conflict with existing regulations. The weighting of the criteria is determined by assessing the reality on the ground that: | |
| | | • Fishing gear fulfills one of the four statements above | 1 |
| | | • Fishing gear fulfills two of the four statements above | 2 |
| | | • Fishing gear fulfills three of the four statements above | 3 |
| | | • The fishing gear fulfills all of the above statements | 4 |

Source: Ministry of Marine Affairs and Fisheries, 2006

Table 2 Categorization of Environmentally Friendly Scores

| No | Eco-friendly category | Score (X) |
|----|--------------------------------|----------------------|
| 1 | Environmentally friendly | $X > 31.5$ |
| 2 | Quite Environmentally friendly | $22.5 < X \leq 31.5$ |
| 3 | Not environmentally friendly | $13.5 < X \leq 22.5$ |
| 4 | Damaging the environment | $X \leq 13.5$ |

Source: Boesono et al. 2019

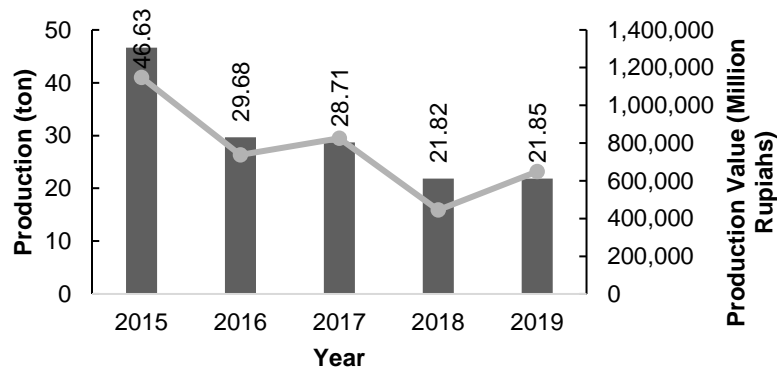


Figure 2 Production and Production Value of Capture Fisheries at OFP Belawan 2015-2019

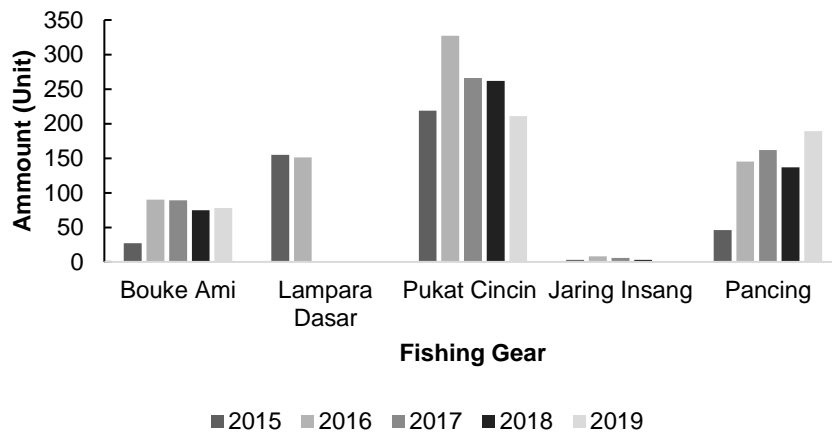


Figure 3 Number of fishing gear in OFP Belawan 2015-2019

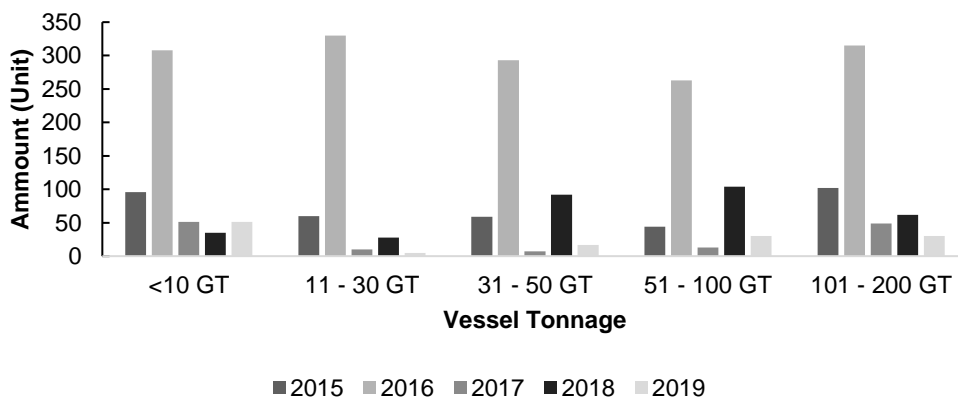


Figure 4 Fishing Vessel Fleet in OFP Belawan 2015-2019

Specifications of KM Sumber Baru

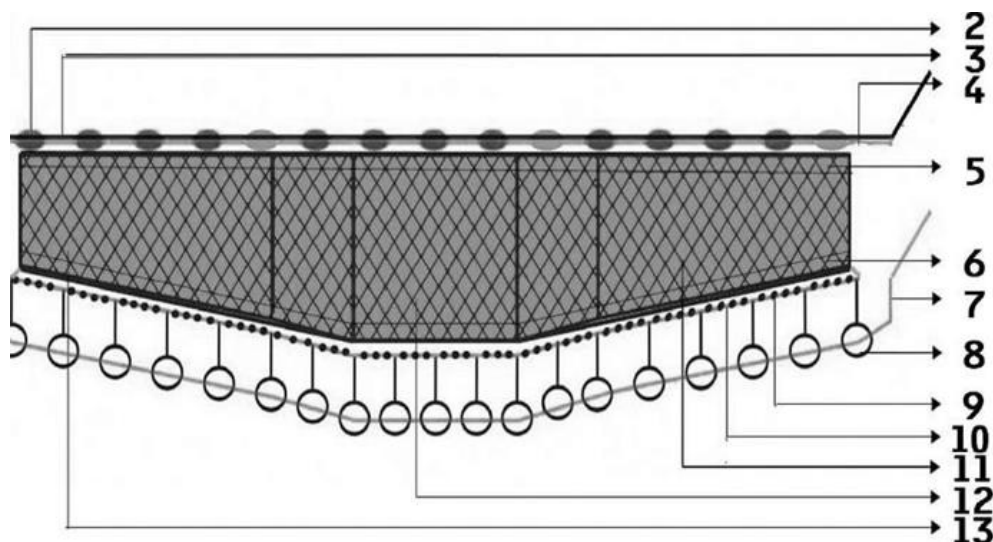
KM Sumber Baru is a privately owned vessel with a capacity of 142 GT. KM Sumber Baru was made in 2003 made of wood with the ship's book number 007789. The dimensions of the vessel have a length of 26.88 m; with a width of 8.80 m and a depth of 3 m. According

to the ship's documents, KM Sumber Baru has a capacity of 35 people, but 20 crew members usually sail, including the engineer and helmsman. The fish hold storage system is still using ice cubes, not using a freezer. The results of construction measurements and specifications for Purse Seine KM Sumber Baru can be seen at Table 3 and Figure 5-7.

Table 3 Specifications for Purse Seine's KM. Sumber Baru

| Ingredient | Material Type | Size | | # | Weight (g) | Amount |
|-----------------|---------------|--------|----------|----|------------|--------|
| | | Ø (mm) | Long (m) | | | |
| Life Strap | PE | 26 | 600 | - | - | 1 |
| Weight Rope | PE | 15 | 600 | - | - | 1 |
| Top Riss Strap | PE | 26 | 600 | - | - | 1 |
| Bottom Rise | PE | 12 | 600 | - | - | 1 |
| Ring Strap | PE | 15 | 2 | - | - | 360 |
| Rope Drawstring | PE | 52 | 600 | - | - | 1 |
| Serapat Atas | PA | 1.5 | - | 9 | - | - |
| Serapat Bawah | PA | 1.5 | - | 40 | - | - |
| Wings (1) | PA | 1.5 | - | 18 | - | - |
| Body | PA | 1.5 | - | 18 | - | - |
| Wings (2) | PA | 1.5 | - | 18 | - | - |
| Lifebuoy | PVC | 115 | 0.18 | - | - | 1800 |
| Ballast | Iron | 59.6 | 0.05 | - | 160 | 3600 |
| Ring | Iron | 19 | - | - | 1000 | 360 |
| | White | | | | | |

Source: Research Results, 2021



Note:

- 1. Sign Buoys; 2. Buoys; 3. Talis Ris Atas; 4. Floating Strap; 5. Serapat Atas; 6. Serapat Bawah; 7. Drawstring; 8. Wrinkle Ring; 9. Ballast; 10. Weight rope; 11. Wing 2; 12. Body; 13. Wing 1

Figure 5 Construction of Purse Seine's KM Sumber Baru

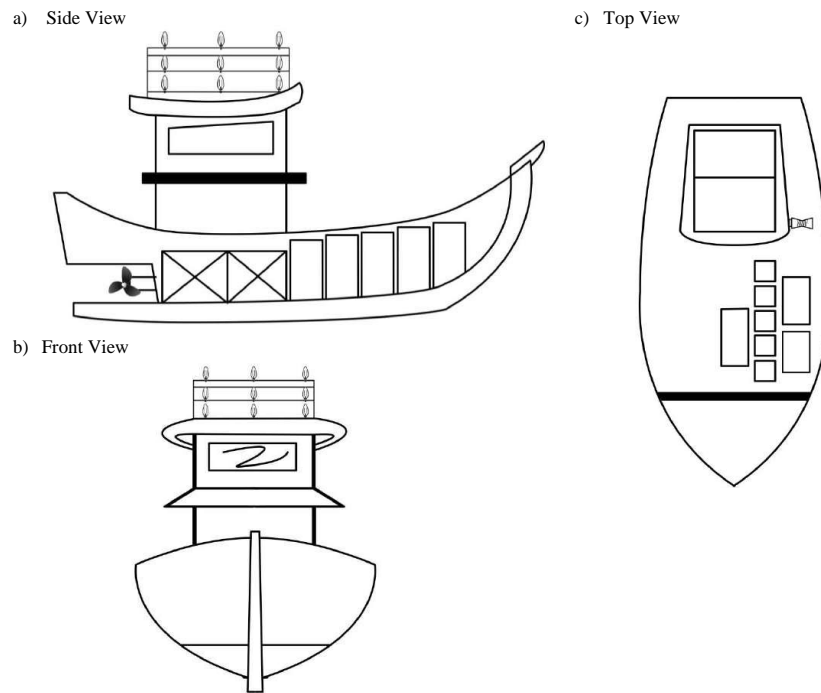


Figure 6 Construction KM Sumber Baru



Figure 7 Documentation of KM Sumber Baru

KM Sumber Baru Catches

Based on observations in the KM Sumber Baru setting, it was found that the fish caught by KM Sumber Baru consisted of scad fish, black skipjack, and mackerel. The detailed results of the settings on the KM Sumber Baru observed in this study are presented in Table 4.

Based on Table 4 it can be seen that the average catch of the main fish is at 300 kg in

total per settings. According to the fishermen, the fish caught are quite large, in April the fishermen will stop going to sea because it is the famine season. This is reinforced by Hamka *et al.* (2016), the peak season for scad fishing in the waters of Southeast Maluku Regency is in December, January, February, March, while June, July to November are the lean season and the middle season.

The catches were fish that were about 20 cm in size. Scad Fish measuring around 20

cm is a fish that deserves to be caught because it has passed the age of first gonad maturity (Liestiana *et al.* 2015; Najamuddin *et al.* 2004; Pralampita and Umi 2010). Small fish that are not caught are expected to have the opportunity to grow and reproduce to maintain a balance of stocks in the waters. The scad (*Decapterus spp.*) is one of the most important small pelagic fishery communities in Indonesia. Fish belonging to the Carangidae tribe can live in groups. The price of this fish at OFP Belawan ranges from Rp. 33,000 – Rp. 35,000/kg. The scad fish caught by KM. This Sumber Baru measures between 19-22 cm. This category includes catches that are in accordance with fish standards that are ready for consumption because they have passed the size of the fish in the spawning phase. Mahmud and Bubun (2015) stated that the length of the scad fish at the time of first spawning was 18 cm with a maximum length of 35 cm.

The by-catch of the KM Sumber Baru cruise is black skipjack (*Euthynnus lineatus*). This fish has a fairly high economic value if it is sold. According to Hidayat *et al.* (2018) and Padmaningrat *et al.* (2017), the frequency of length of kawa-kawa caught by fishermen at the research location ranged from 18.2 cm to 33.5 cm with an average of 25.01 cm. When

referring to cmFL, the shortest cob is 33.7 cm. Banyar tuna usually live in schooling which usually move in groups. The price of tuna in Belawan ranges from Rp. 22,000 – Rp. 24,000/kg.

The catch with low weights obtained by fishermen is mackerel (*Rastrelliger sp.*). The condition of mackerel fish resources and the high demand for mackerel in the local market requires management efforts for sustainability. The number of requests that continue to increase makes this mackerel fish resource small. Generally, these fish are caught using Purse Seine and gill nets. The amount earned is reasonable little but still useful and valuable in the market. The price of puffer fish in Belawan ranges from Rp. 20,000 – Rp. 22,000/kg.

Purse Seine Eco-Friendly Analysis

Based on the environmental friendliness category by CCRF, the level of environmental friendliness of the purse seine fishing gear KM Sumber Baru gets a score of 31 which is included in the less environmentally friendly category. The average value of the environmental friendliness of purse seine fishing gear for each criterion can be seen in Table 5.

Table 4 Purse Seine Catches KM Sumber Baru

| No | Settings | Date | Fish Type | Weight (Kgs) |
|----|----------|----------------|--|--------------|
| 1 | 1 and 2 | March 16, 2021 | Scad fish (<i>Decapterus spp</i>) | 353 |
| | | | Black Skipjack (<i>Euthynnus lineatus</i>) | 47 |
| | | | Mackerel (<i>Rastrelliger sp.</i>) | 103 |
| 2 | 3 and 4 | March 17, 2021 | Scad fish (<i>Decapterus spp</i>) | 295 |
| | | | Black Skipjack (<i>Euthynnus lineatus</i>) | 28 |
| | | | Bloating (<i>Rastrelliger sp.</i>) | 36 |
| 3 | 5 and 6 | March 18, 2021 | Scad fish (<i>Decapterus spp</i>) | 301 |
| | | | Black Skipjack (<i>Euthynnus lineatus</i>) | 32 |
| | | | Bloating (<i>Rastrelliger sp.</i>) | 36 |

Source: Research Results, 2021



Figure 8 Scad Fish (*Decapterus spp*)

Figure 9 Black Skipjack (*Euthynnus lineatus*)Figure 10 Mackerel (*Rastrelliger sp.*)

Table 5 Environmental Friendly Assessment of Purse Seine Fishing Equipment KM Baru Source

| No | Criteria | Explanation | Score |
|-------|---|--|-------|
| 1 | High Selectivity | Catch tool less than three species with a size more or less the same | 3 |
| 2 | Does not damage habitats, places live and breed Organism | Safe for habitat (do not damage habitat) | 3 |
| 3 | No harm to fishermen (fish catcher) | Safe fishing gear for fishermen | 4 |
| 4 | Produce good fish good quality | Fresh dead fish | 3 |
| 5 | The product is harmless consumer health | Safe for consumers | 4 |
| 6 | The wasted catch Minimum | <i>by-catch</i> less than three types and high value in the market | 3 |
| 7 | Fishing gear used have to make an impact minimum against Biodiversity | Safe for diversity biological resources | 3 |
| 8 | Does not catch the type protected by law | Protected fish never Caught | 4 |
| 9 | Socially accepted | Fishing gear meets all statement items are accepted Social | 4 |
| Total | | | 31 |

Source: Research Results, 2021

DISCUSSION

Selectivity of Purse Seine of KM Sumber Baru has a fairly high selectivity, where the Purse Seine fishing gear catches species with relatively the same size. This type of Purse Seine is also used by majority of fishing vessels whose fishing gear is purse seine. The similarity of types makes the results of this study describe the condition of similar vessels operating in OFP Belawan. Purse Seine selectivity can be seen based on mesh size and fishing ground selection by helmsman. The size of the mesh allows the fish caught to have a size that matches the mesh size of the Purse Seine and a body shape that is in accordance with the hanging ratio of the Purse Seine, where the bag has a mesh size of 2 inches and is in accordance with regulations Regulation of Ministry of Marine Affairs and Fisheries No. 71 Year 2016.

The Purse Seine is operated in deep sea waters in WPP 571 with a depth of 10 m below sea level and the net also does not touch the bottom of the water which does not disturb the coral ecosystem and small fish habitat. There is a small chance to damage the coral or seagrass that is caught a little. If this fishing gear is operated close to large corals or seagrasses, it is likely that the Purse Seine will be damaged due to friction with corals. This is reinforced by Bastardie *et al.* (2021), that the Purse Seine fishing gear which has a target of catching pelagic fish is operated on the water surface column, so it does not cause habitat damage in both wide and narrow water areas and coral reef habitats at the bottom of the waters.

The level of danger to fishermen is minimal. The minimal risk makes this fishing gear very productive for fishermen. Field conditions and natural conditions in the Purse Seine KM operating method. Sumber Baru does not endanger working fishermen, always obeying the SOPs that have been agreed upon. Fishermen brought in KM. Sumber Baru is an experienced fisherman. This Purse Seine operating method is also very good for the safety of fishermen. This is reinforced by Fadli *et al.* (2020), that it is said to be safe for fishermen because the operation of the Purse Seine fishing gear does not cause fatal work accidents.

The quality of fish produced by Purse Seine KM. Sumber Baru are good, namely fish produced in a state of fresh death. The process of operating the catch is fast. The fish are immediately raised and immediately put

into the hold which previously contained ice cubes for more durable storage. The construction of fishing gear that does not injure the fish, makes the fish more awake because the fish are only led to the bag. The fish are also directly loaded onto the boat so there will be minimal damage to the fish but it is still possible to injure the fish due to the friction of the net, and also piles of ice when put in the hold. This is reinforced by Wiranata *et al.* (2017), that the good and correct handling that is still being carried out is by implementing a cold chain system, namely by keeping the fish in a cold state (low temperature) so that the freshness of the fish can be maintained properly.

The resulting product does not harm consumers. Products produced by Purse Seine KM. Sumber Baru. The catch does not endanger consumers because the fish caught in Purse Seine are generally dead fresh with ice and minimal physical defects. Low temperatures are used to kill other organisms attached to the fish so as not to harm consumers and maintain the quality of the catch. This does not make the fish caught dangerous for consumers. This is reinforced by Wiranata *et al.* (2017), that ice is able to reduce the temperature of fish to close to 0°C so that it has a role in slowing the activity of microorganisms that can delay spoilage in fish. Minimum wasted byproducts. The by-catch of the Purse Seine of KM Sumber Baru is fish that has high economic value. By-catch consisted of tuna Banyar (*Euthynnus lineatus*) and pufferfish (*Rastrelliger sp.*). The fish can also be sold and made as a side dish for fishermen who go sailing. According to Squires *et al.* (2021), Purse Seine catches for "bycatch" species, that the majority of non-tuna tuna species are considered "targets" and are used and sold in the local market, so the amount of bycatch discarded is very low. impact on biodiversity.

Purse Seine of KM Sumber Baru is a selective vessel in fishing, so it catches very few protected species. If there is a case, it must be due to accident. Fishing carried out by KM Sumber Baru is sufficient to avoid species protected by law. Species passing in the Purse Seine fishing line are also very rarely passed by protected species. This is reinforced by Squires *et al.* (2021), that species such as sharks or turtles are rarely found in Purse Seine operations and most appear to be released, in part because of current laws prohibiting landings. Socially accepted. Purse Seine KM. Sumber Baru is a vessel that is classified as socially accepted by the

community. The existence of this fishing gear does not cause social unrest in the community. The fishing that is carried out generates economic benefits

Based on the nine criteria that have been described, the average value of all criteria for environmentally friendly fishing gear is 31 and is included in the less environmentally friendly category. The criteria that must be considered so that purse seine fishing gear can become more environmentally friendly fishing gear are criteria that have an average value of 3. If these criteria can be improved, purse seine fishing gear will have a better level of environmental friendliness.

CONCLUSION

The main catch of Purse Seine KM. Sumber Baru is scad fish (*Decapterus spp*) which has an L_c value greater than L_m value, from this result it is known that most of the Scad fish caught have passed the size of the first gonadal maturity ($L_c > L_m$). Purse Seine of KM Sumber Baru has a high point value of 31 out of a total score of 36, so the Purse Seine fishing gear is included in the score criteria $22,5 < X \leq 31,5$ which means it is not environmentally friendly.

RECOMMENDATION

The results of this study are expected to contribute to policy implications on the management of KM Sumber Baru. This implication is necessary considering the level of availability of fishery resources in FMA 571 which is almost fully exploited. Environmental friendliness of fishing gear must be a priority in carrying out fishing activities. The development of fishing is expected to be a promising thing for investment in the future.

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