# Composition of Catches on Bottom Gill Net Fishing Gear in Sedanau Waters of Natuna Regency

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## ABSTRACT

The bottom gill net is one of the fishing gears made from a rectangular net installed at the bottom of the water. The basic gill net construction used is a net thread made of monofilament polyamide material, the size of the fishing gear used is a net length of 2.50 meters, a net body width of 1.5 meters, and a mesh size of 3 inches. Knowing the state of the environment is a very important reason to increase the catch by using environmental parameters such as physical parameters that are easier to observe. The main fishing items are Coral Pond (*Lethrinus lentjan*), Timunan (*Lutjanidae vitta*), Yellowtail (*Lutjanus fulviflamma*), Red Snapper (*L.bitaeniatus*), and Kuwe (*Caranx ignobilis)*. Bycatch is Black Pomfret (*Parastromateus niger*), Seminyak (*Plectorhinchus*), Gerut (*Pamadasys maculatus),* Stingray (*Dasyatis* sp), Lepu Batu (*Pterois volitans),* and Crab (*Portunidae)*. This study aims to determine the composition of the catch. This research was carried out in Sedanau waters in Natuna Regency, Riau Islands Province for 7 days in February 2022 using the survey method. One unit of basic gill mesh is operated to collect data and is analyzed by analysis of the composition of types and weights. The results showed that 11 types of fish were caught and dominated by Yellowtail (*L.fulviflamma*) as many as 77 with a percentage value of 26.46%.

**Keywords:** Bottom Gillnet, Catch Result, Sedanau

## 1. INTRODUCTION

Sedanau waters are located in the sea of Natuna Regency and have a water area of 262,197.07 km$^2$ (DKP, 2017). Natuna Regency is one of the cities in Riau Islands Province which consists of several archipelagos directly adjacent to the South China Sea, so it is passed by international shipping lanes. Natuna has potential natural resources, especially oil, and gas, but it is also rich in fishery resources and has marine tourism potential to be developed.

In general, the waters of Natuna Regency are divided into three areas, namely Area I covering Tiga Island, Sedanau and the surrounding sea prioritized to support sustainable fisheries activities, area II covering North Bunguran and the surrounding sea prioritized for fisheries reserves, and Area III covering the east coast of Bunguran Island and the surrounding sea prioritized to support marine tourism activities. Natuna waters are also prepared as an integrated fisheries center that has high potential fisheries resources, both capture fisheries and aquaculture. In fishing

activities, the Natuna community uses several fishing tools including gill nets, Tonda fishing rods, floating bags, fishing nets, shrimp nets, bubu, and soon (DKP, 2017).

The gill net is a type of fishing gear made of mesh material in the shape of a rectangle where the mesh size is the same. One of the demersal fishing methods in Sedanau waters is the operation of a bottom gill net. The construction of the net used is a net thread made of polyamide monofilament, the size of the fishing gear used is 250 meters long, the width of the net body is 1.5 m, and the mesh size is 3 inches. In general, fish can be caught with a gill net by being entangled (gilled) around the operculum in the mesh and entangled in the net body. The method of catching fish in bottom gill net gear is by blocking the swimming direction of the fish - the fish. By blocking it is expected that the fish will break through the net and get entangled (gilled) in the mesh or entangled in the body of the net. Gill nets are selective fishing gear because the size of the fish caught is relatively uniform. Fishing using gill nets is not a new

technology for fishermen, this is because the material is easy to obtain, technically easy to operate, economically easy to reach by fishermen, and more selective on the size of fish caught (Putri et al., 2018).

Gill net vessels are included in a group of fishing vessels with static gear operating methods so that the speed of the ship is not an important factor because this fishing gear works statically, but high ship stability is more necessary so that when operating fishing gear can run well. Based on the location of the net in the waters the gill net can be divided into three types, namely surface gill net, midwater gill net, and bottom gill net. The target of gill net fishing gear is different in each region. Based on the method of operation, gill nets can be divided into several types, namely set gill nets, drift gill nets, and encircling gill nets.

The catch in bottom gill net gear is almost impossible to get a single target. The main catch in bottom gill net fishing gear in Sedanau island waters is bottom fish, such as timunan (*L.vitta*), yellowtail (*L.fulviflamma),* coral pond (*Lethrinus lentjan),* red snapper (*L.bitaeniatus),* and kuwe (*Caranx ignobilis*). In the operation of bottom gill net gear, it is inseparable from the presence of catches that are not the main target in fishing, namely bycatch and discard catches. Under these conditions, it is difficult to realize a bottom gill net that produces lower by catch and discard.

## 2. RESEARCH METHODS
### Time and Place
This research was conducted on 10-17 February 2022 in Sedanau Island Waters, Natuna Regency, Kepulauan Riau Province.

### Methods
The method used in this research is the survey method. The survey method aims to obtain catch composition data in the form of fish weight and fish species, as well as to obtain other supporting data in the form of identification of basic gill net gear construction used during the study.

According to Hutomo et al. (1987), the catch calculation method is as follows:
$$P\ (\%) = \frac{N1}{N}\ x\ 100$$
Description:
P    =    Percentage of one type of fish caught (%)
N1    =    The specific weight of fish at each

sampling (kg)
N    =    Total weight of catch per hauling (kg)

Catch composition data were analyzed using Akiyama's (1997) formulation, using the main catch and bycatch comparison method, which is:
$$\text{Main catch} = \frac{\sum main\ catch}{total\ of\ caught}\ x\ 100$$
$$\text{Bycatch} = \frac{\sum bycatch}{total\ of\ caught}\ x\ 100$$

The results of descriptive and quantitative analyses will describe the percentage (%) of main catch and bycatch.

### Procedure
The steps taken during the research are as follows:

Preparation. Checking or checking the ship and engine, checking the net in the form of arranging the net on the ship to make it easier when lowering the net, checking fuel as fuel to drive the ship's engine, and paying attention to the direction of the current because the bottom gill net is operated by blocking the water current.

Setting (Fishing Gear Drop). The lowering of the bottom gill net starts with the lowering of weight 2 (two) followed by the lowering of buoy 1 (one), and then the lowering of the net body. When lowering the net body, the vessel should move backward at a low speed until all the net body has been lowered into the water and end by dropping weight 2 (two) along with buoy 1 (one). The lowering of the net is done by following the direction of the current movement. This was done so that the position of the net in the water could be stretched perfectly. The process of lowering the net lasted for 20 minutes. After that, the net was left in the water for 8 hours.

Hauling (Lifting of Fishing Gear). Hauling is the process of lifting fishing gear from the water to the boat, after the net has been left in the water for 8 hours then the bottom gill net is lifted onto the boat by pulling the mark buoy first and followed by pulling the net body slowly until it reaches the weight. This process takes 15 minutes when the waters are calm, while in choppy waters this process takes 20-25 minutes. The catch caught in the net will be collected by the fishermen when it reaches the fishermen's residence.

## 3. RESULT AND DISCUSSION

**Fishing Gear Operation**

The fishing process was carried out at 07.30 am at the fishing location and at 15.10 am to carry out the *hauling* process. The vessel used in the operation is a 2 GT wooden boat. A bottom gill net is a type of gill net operated at the bottom of the water, where at both ends of the net is tied an anchor so that the location of the net will settle. This net is stretched close to the seabed, meaning that the types of fish to be caught are bottom or demersal fish. The fishing process is carried out for 7 consecutive days except on Friday because the custom of local fishermen on Friday no one is doing fishing activities. The catch of bottom gill net in Sedanau waters consists of 5 (five) types of main catch and 6 (six) types of bycatch.

According to Broadhurst (2000), the main catch is aquatic biota which is the main target of the catch and is a high priority for fishermen in catching. The main catch criteria obtained from interviews with fishermen are fish that have a high enough selling value. The main target fish are red snapper (*L.bitaeniatus*) with a selling price of 40,000/kg, kuwe (*C.ignobilis)* with a selling price of 45,000/kg, coral pond (*Lethrinus lentjan)* with a selling price of 25,000/kg, timunan (*L.vitta),* and yellowtail (*L.fulviflamma)* with a selling price of 15,000/kg. According to Catchpole et al. (2004), the main catches that have a high percentage of probability of being caught indicate that the availability of these organisms is relatively stable in the waters. Broadhurst (2000) stated that bycatch is part of the catch of fishermen that is unwanted or not the main target of fishing but can still be utilized (consumed) and has a high economic value.

**Catch Composition**

The types of fish caught consisted of 5 main catches consisting of the coral pond (*Lethrinus lentjan*), Timunan (*L.vitta),* Yellowtail (*L.fulviflamma),* Red snapper (*L.bitaeniatus),* and Kuwe (*C.ignobilis).* The other 6 species were bycatch consisting of Black Pomfret (*Parastromateus niger*), Seminyak (*Plectorhinchus),* Gerut (*Pomadasys maculatus),* Rajungan (*Portunidae),* stingray (*Dasyatis* sp), and Lepu batu (*Pterois volitans).* The composition of fish species based on the number of individuals (fish) can be seen in Table 1 and the composition of the catch based on weight can be seen in Table 2, which is as follows:

**Table 1. Catch composition by species (fish)**

| Hari | Hasil Tangkapan | | | | | | | | | | | Jumlah (ekor) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tambak karang | Timunan | Ekor kuning | Kakap merah | Kuwe | Seminyak | Bawal hitam | Gerut | Rajungan | Pari | Lepu batu | |
| 1 | 13 | 16 | 14 | 0 | 3 | 2 | 1 | 0 | 0 | 3 | 1 | 53 |
| 2 | 15 | 10 | 13 | 7 | 0 | 1 | 0 | 2 | 4 | 5 | 0 | 57 |
| 3 | 8 | 12 | 13 | 5 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 42 |
| 4 | 9 | 5 | 9 | 8 | 3 | 0 | 1 | 2 | 5 | 3 | 1 | 46 |
| 5 | 8 | 0 | 10 | 0 | 13 | 1 | 0 | 0 | 0 | 2 | 0 | 34 |
| 6 | 3 | 7 | 14 | 0 | 0 | 0 | 0 | 2 | 0 | 6 | 0 | 32 |
| 7 | 7 | 8 | 4 | 0 | 1 | 0 | 0 | 0 | 2 | 5 | 0 | 27 |
| **Total** | **63** | **58** | **77** | **20** | **20** | **6** | **2** | **7** | **11** | **25** | **2** | **291** |

Based on Table 1 above, it can be seen the composition of the catch in the number of tails, namely with a total catch of 291 fish consisting of Coral Pond (*L.lentjan)* as many as 63 fish, Timunan (*L.vitta*) as many as 58 fish, Yellowtail (*L.fulviflamma)* as many as 77 fish, Red Snapper (*L.bitaeniatus*) as many as 20 fish, Kuwe (*C.ignobilis*) as many as 20 fish, Seminyak (*Plectorhinchus)* as many as 6 fish, Black Pomfret (*P.niger*) as many as 2 fish, Gerut (*P.maculatus)* as many as 7 fish, *Portunidae* as many as 11 fish, Stingray (*Dasyatis* sp) as many as 25 fish, and Lepu Batu (*P. volitans)* as many as 2 fish. In Table 5, it can be seen that the highest catch was on day 2, namely 57 fish and the lowest catch was on day 7, namely 27 fish.

**Table 2. Catch composition in weight**

| Hari | Hasil Tangkapan | | | | | | | | | | | Jumlah (kg) |
| | Tambak karang | Timunan | Ekor kuning | Kakap merah | Kuwe | Seminyak | Bawal hitam | Gerut | Rajungan | Pari | Lepu batu | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 8,7 | 4,8 | 6,2 | 0 | 3,2 | 2,3 | 1,4 | 0 | 0 | 1,5 | 0,2 | 28,3 |
| 2 | 6,3 | 3,3 | 4,2 | 3,9 | 0 | 0,7 | 0 | 0,9 | 1,6 | 2,3 | 0 | 23,2 |
| 3 | 5,9 | 5,5 | 6,4 | 2,4 | 0 | 1,4 | 0 | 0,4 | 0 | 0,6 | 0 | 22,6 |
| 4 | 5,7 | 1,7 | 3 | 3 | 2,2 | 0 | 1 | 0,9 | 1,7 | 2,5 | 0,3 | 22 |
| 5 | 3,4 | 0 | 0,9 | 0 | 5,2 | 0,9 | 0 | 0 | 0 | 1,6 | 0 | 12 |
| 6 | 0,6 | 1,8 | 4,2 | 0 | 0 | 0 | 0 | 1 | 0 | 3,8 | 0 | 11,4 |
| 7 | 2,6 | 1,9 | 0,7 | 0 | 0,9 | 0 | 0 | 0 | 0,4 | 3 | 0 | 9,5 |
| Total | 33,2 | 19 | 25,6 | 9,3 | 11,5 | 5,3 | 2,4 | 3,2 | 3,7 | 15,3 | 0,5 | 129 |

Table 2 shows data on the composition of the catch in the number of fish with a total catch of 129 kg consisting of Coral Pond (*L.lentjan*) as much as 33.2 kg, Timunan (*L.vitta*) *as much as* 19 kg, Yellowtail (*L.fulviflamma) as much as* 25.6 kg, Red Snapper (*L.bitaeniatus*) 9,3 kg, Kuwe (*C.ignobilis*) as much as 11.5 kg, Seminyak (*Plectorhinchus*) as much as 5.3 kg, Black Pomfret (*P.niger*) as much as 2.4 kg, Gerut (*P.maculatus)* as much as *3*.2 kg, Rajungan (*Portunidae)* as much as *3*.7 kg, stingray (*Dasyatis* sp) as much as 15.3 kg, and Lepu Batu (*Pterois volitans)* as much as 0.5 kg. In Table 2, it can be seen that the highest catch was on day 1, which was 28.3 kg and the lowest catch was on day 7, which was 9.5 kg.

After collecting data on the catch of the bottom gill net, it can be seen that there was a decrease in catch during the study. The occurrence of a decrease in catches is strongly influenced by weather conditions and water conditions. In February 2022 at the research location, there was a North wind season characterized by strong winds accompanied by small rains which resulted in cooler water temperatures, and slightly bumpy waters, where these conditions greatly affect the distribution of fish in the waters so that it also affects the availability of fish. Current speed is also one of the factors that affect the catch, because in general fish - fish that have swimming power smaller than the speed of the current will be easily carried by the water current so that the fish will be entangled in the body of the net.

**Table 3. Percentage of main catch and bycatch per day**

| Day | Main catch (fish) | Percentage (%) | Bycatch (fish) | Percentage (%) |
|---|---|---|---|---|
| 1 | 46 | 86,79 | 7 | 13,21 |
| 2 | 45 | 78,95 | 12 | 21,05 |
| 3 | 38 | 90,48 | 4 | 9,52 |
| 4 | 34 | 73,91 | 12 | 26,09 |
| 5 | 31 | 91,18 | 3 | 8,82 |
| 6 | 24 | 75 | 8 | 25 |
| 7 | 20 | 74,07 | 7 | 25,93 |
| Total | 238 | | 53 | |

Table 3 shows the percentage value and number of individuals of the main catch and by catch composition during the 7 days of the fishing process. From Table 3 it can be seen that the highest percentage value of the main catch is on day 5 which is 91.18% and, the lowest percentage value is on day 4 which is 73.91%. While the highest percentage value of by catch is on day 4, namely 26.09% and the lowest value are on day 5, namely 8.82%. The total number of main catch individuals was highest on day 1 with 46 fish and the lowest number was on day 7 with 20 fish. While the total number of by catch individuals was highest on day 2 and day 4 with 12 fish, and the lowest number was on day 5 with 3 fish. A comparison of the percentage of main catch and by catch during the study can be seen in Figure 1.
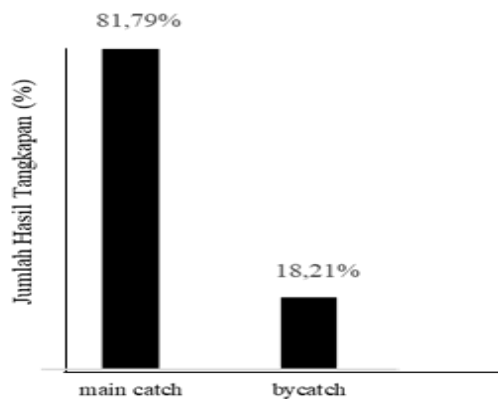
**Figure 1. Comparison of *Main Catch* and *Bycatch* Percentages**

Figure 1 shows the percentage comparison of the main catch (81.79%) and by catch (18.21%). It can be seen that the catch is very dominated by the main catch.

Table 4 shows the percentage comparison of the main catch and by catch species during the study. Yellowtail (*L.fulviflamma*) was the fish species with the highest percentage value and total number of catches reaching (26.46% and 77 fish), followed by coral pond (*L.lentjan*) reaching (21,65% and 63 fish), timunan (*L. vitta*) reached (19.93% and 58 fish), stingray (*Dasyatis* sp) reached (8.59% and 25 fish), red snapper (*L.bitaeniatus),* and kuwe (*Caranx ignobilis)* reached (6,87% and 20 fish), crab (*Portunidae)* reached *(*3.87% and 11 fish), gerut (*P.maculatus)* reached *(*2.41% and 7 fish), Seminyak (*P.flavomaculatus)* reached (2.06% and 6 fish), lepu batu (*P.volitans)* and black pomfret (*P.niger)* only reached (0.7% and 2 fish) which are the species with the lowest percentage value and number of catches.

**Table 4. Recapitulation of species and total catches**

| Local name | Latin name | Number of individuals | Percentage (%) |
|---|---|---|---|
| Coral pond | *Lethrinus lentjan* | 63 | 21,65 % |
| Timunan | *Lutjanidae vitta* | 58 | 19,93 % |
| Yellow tail | *Lutjanus fulviflamma* | 77 | 26,46 % |
| Red snapper | *Lutjanus bitaeniatus* | 20 | 6,87 % |
| Kuwe | *Caranx ignobilis* | 20 | 6,87 % |
| Seminyak | *Plectorhinchus* | 6 | 2,06 % |
| Black pomfret | *Parastromateus niger* | 2 | 0,69 % |
| Gerut | *Pomadasys maculatus* | 7 | 2,41 % |
| Mackerel | *Portunidae* | 11 | 3,78 % |
| Pari | *Dasyatis* sp | 25 | 8,59 % |
| Lepu batu | *Pterois volitans* | 2 | 0,69 % |
| Total | | 291 | |

According to Putri et al. (2018), stated that the operation of Gill Net will affect the stock of fish resources if it is not properly regulated. Fish resource management strategies are needed to optimize catches and preserve fish resources. Bycatch not only affects fish stocks in waters, but also affects food chains and habitats, and ultimately disrupts and damages aquatic ecosystems (Harrington et al. 2005; Kelleher 2005).

Ecosystem approaches to fisheries management are being developed around the world to conform to the principles of environmentally sound fisheries management. There is ample evidence that fishing activities can affect populations of non-target species (e.g. bycatch) and cause physical damage to habitats and ecosystems (Hall & Mainprize 2005 and Jennings 2005; 2007)

### 4. CONCLUSIONS

Based on the results of the research and discussion, the following conclusions and suggestions can be drawn: The catch during the study obtained as many as 11 species (5 main catch and 6 by catch). The composition of the catch in bottom gill net gear during the study consisted of the main catch and by catch. The following are details of the main catches, namely coral pond (*L.lentjan*), Timunan (*L.vitta)*, yellowtail (*L.fulviflamma*), red snapper (*L.bitaeniatus*), and Kuwe (*C.ignobilis*). While the details of bycatch are Black Pomfret (*P.niger*), Seminyak (*P.flavomaculatus*), Gerut (*P.maculatus),* stingray (*Dasyatis* sp), Lepu batu (*Pterois*

*volitans),* and Rajungan (*Portunidae).*

From the results of this study, it is recommended not to conduct fishing soon or every day. Although the bottom gill net is an environmentally friendly and selective fishing gear, to save fisheries resources, the community must limit fishing activities because it will also have an impact on the availability of fisheries resources in Sedanau waters.

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