

The compliance level of purse seine fleet toward fishing regulation at Nizam Zachman fishing port, Jakarta

¹Gugun Gunawan, ²Ari Purbayanto, ²Iin Solihin

¹ Study Program of Marine Fisheries Technology, Graduate School, Bogor Agricultural University, Bogor, Indonesia; ² Department of Fisheries Resource Utilization, Faculty of Fisheries and Marine Science, Bogor Agricultural University, Bogor, Indonesia.
Corresponding author: A. Purbayanto, purbayanto@apps.ipb.ac.id

Abstract. The level of compliance of purse seine fishing fleet in Nizam Zachman Jakarta Fishing Port (NZJFP) is a serious problem because there are many boats that always commit fishing violation. Thus, the level of compliance needs to be researched in order to prevent illegal, unreported, and unregulated (IUU) fishing. The purpose of this research is to know the level of compliance of purse seine fishing fleet that is based in NZJFP. Data collection was done by purposive sampling method. The level of compliance of the purse seine fleet to the fishing port was classified as forceful with a value above 80%, to the fishing area was somewhat less strong with a value below 60%, to the fishing equipment was relatively strong with a value of 60-80%, and to the operation of the boat was strong with a value of 60-80%, as well as the compliance level of purse seine fleet in NZJFP was classified as very strong, above 80%.

Key Words: compliance, IUU fishing, NZJFP, purse seine.

Introduction. Fishing port is a center of fishery economic activity that will have an impact on the economic growth of the region as a whole (Gumilang et al 2016). Development in the fishing port area will cause multiplier effects for the growth of other economic sectors, improve welfare, and increase state and local revenue (MMAF 2016). According to Lubis et al (2010) the fishing port is very important for capture fisheries because the fishing port is the center of the economy starting when the fish are caught from the fishing ground and when it will be further marketed.

Nizam Zachman Jakarta Fishing Port (NZJFP) is located in Muara Baru (Jakarta Bay), Penjaringan Village, Penjaringan Sub-District, North Jakarta. It has the authority and responsibility of carrying out the government general duties at the fishing port (MMAF 2016). NZJFP development is directed to support fisheries activities nationally and is expected to have an international reputation while the fish marketing distribution in NZJFP is divided into 3 markets, namely the local market, export market and industrial unit around NZJFP (Sam et al 2011).

Fish production in 2018 at the NZJFP amounted to 188,401,347 kg, consisting of marine fishery production of 66,880,056 kg, and incoming fish production of 121,521,291.41 kg. The catch with the highest volume of marine fishery production was found in purse seine, i.e. 39,731,990 kg or 59.41% of the total marine fishery production. Marketing of fishery products in NZJFP through exports were 148,676.63 tons with a value of USD 568,147,106.67 (NZJFP 2019). A significant contribution to the export value of Indonesian fishery products from the NZJFP should be followed up to increase the competitiveness of Indonesian fishery products in international trade. The importers from the European Union (EU) and the United State of America (USA) are very concerned about traceability on imported fishery product and they have much self-awareness to reject the fishery product that has obtained from illegal, unreported, and unregulated (IUU) fishing (Abdillah 2019).

IUU fishing is a fishing activity that is carried out unlawfully, not reported, or performed without arrangement. This activity is one of the activities that are prohibited by the government, because it has an influential effect on the sustainability of fishing activities, both in terms of resources and economy. In addition, IUU fishing is an offense often committed by Indonesian-flagged fishing boats such as fishing activities without having a fishing license, not following national, international provisions and not reporting fish catches (Samola et al 2018). According to the Jakarta Marine and Fisheries Resources Control Base (JMFRCB) data in the period 2018, there were 231 boats based in the NZJFP that committed fishing violations and 42 boats breached the base port, which was dominated by the purse seine fleet. Purse seine was a dominant fishing gear in the NZJFP which was 411 units in 2019 (JMFRSB 2019). Based on the issues raised above, this research aims to assess the level of compliance of the purse seine fleet that is based at NZJFP.

Material and Method

Research time and location. The field research for data collection was carried out from December 2019 to January 2020 at the NZJFP, Jakarta Marine and Fisheries Resources Surveillance Base, and Directorate of Surveillance and Fleet Operations, Ministry of Marine Affairs and Fisheries, Republic of Indonesia.

Data collection. Data were collected through interviews using questionnaires and observations in the field. The sampling was conducted by purposive sampling of 50 purse seiners > 30 GT (gross tonnage), which is composed of the captain of the boats, owners, fisheries harbor masters, and fisheries supervisors. The purposive sampling method is used with respondent consideration chosen because they have competence in the field of port management, as well as supervision of marine and fisheries resources (Sugiono 2013).

Data analysis. The compliance level of the purse seine fleet was assessed using several parameters and sub-parameters. The data was analyzed by the scoring method with the following calculation stages:

1. Specifies parameters and sub-parameters (Table 1):

Table 1

The parameter and sub-parameter measurement

No	Parameter	Sub-parameter
1 st	Base port	- Worthiness of a base port with SIPI; - The compliance of the base port.
2 nd	Fishing ground	- SPKP transmitter existence (fishing vessel monitoring system); - Fishing operations path.
3 rd	Fishing gear	- The types of fishing gear used; - Fishing gear components and specifications; - Amount and the type of fishing aids tool; - Fish aids tool specifications.
4 th	The vessel operational capabilities	- SIPI suitability; - Fishing gear and fish aggregating device suitability; - Vessel physical suitability; - Suitability of the composition of the crew with crew list; - Number and type of fish; - SPKP transmitter.

Source: (MMAF 2017); Annotation: SIPI: Fishing License; SPKP: Fishing Boat Monitoring System.

2. Scaling and standard parameter indicator, sub-parameter, scales using Likert scale. The maximum and minimum score values of the respondents are calculated using the following formula:

$$TR \times Pn$$

Based on data obtained from the interviewed respondents, the compliance level of purse seine fleet in NZJFP was calculated using the following formula:

$$\% \text{ The level of obedience} = \frac{JS}{(NS \times TR)}$$

whereas:

JS = number of answer scores; NS = maximum score value;
TR = total respondent; Pn = Likert score number selection.

The interpretation of the percentage scales from the lowest to the highest value can be seen in Figure 1:

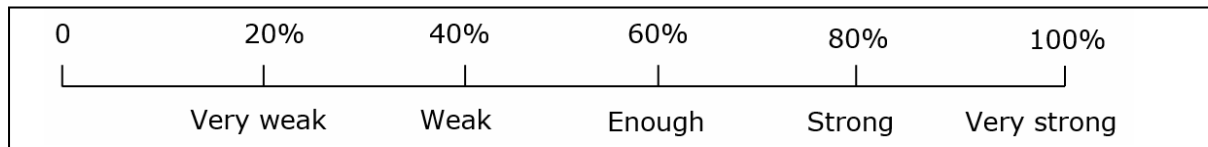


Figure 1. Interpretation of the percentage scales.

where: 0-20% = very weak; 21-40% = weak; 41-60% = enough; 61-80% = strong; 81-100% = very strong (Riduwan 2007).

- In the next step, the data from the respondent's answer was compared with the data on the SPKP (Marine and Fisheries Supervisory Unit, hereinafter referred to SPKP). Once the SPKP data was obtained, then the results of its analysis were interpreted to identify the boat's activities, starting from departures at the base port to the arrival of the fishing operation.

Results

The compliance of the base port. The result of the purse seine fleet compliance level assessment at NZJFP, based on parameter and sub-parameter on the base port is presented on Figure 2.

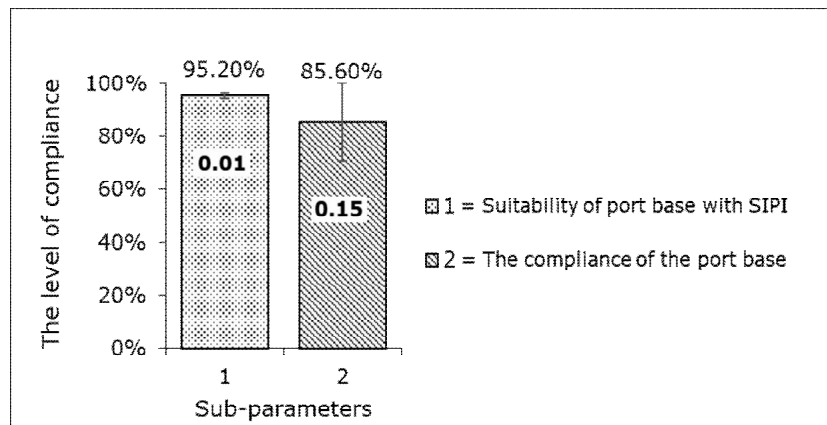


Figure 2. The level of compliance of the purse seine fleet to the base port.

Figure 2 shows the average value of sub-parameter one which is the suitability of the base port with SIPI with an average value of $95.20 \pm 0.01\%$ (standard deviation). While sub-parameter 2 is the observance of the base port and it shows an average value of $85.60 \pm 0.15\%$. Both calculations of the level of compliance of purse seine fleet to the base port are both seen from sub-parameter one and two, it can be concluded that both are classified in a very strong level of compliance. This can be seen from the average scale values each being above 81%. This phenomenon can be explained because the existing base port accommodates the interest of fishing boats in carrying out their operations (Sullivan & Shah 2008). The purse seine fleet, based in NZJFP, can carry out

activities starting from the preparatory stage of the boat's departure until landing the catch at the base port listed in SIPI in accordance with the applicable rules (Dicky et al 2019).

Although the purse seine fleet has a very strong level of compliance, there are still some weaknesses in NZJFP monitoring. The weakness is especially in the sub-compliance of the base port, as can be seen from observation of VMS (Vessel Monitoring System) that the vessel allegedly committed a violation of the base port (Figure 3). This can happen because the fishing ground of these vessels tends to be far from the origin port (Zeller & Pauly 2019). This condition takes a long time to reach the port of origin or the port in accordance with fishing license (SIPI).

So that, the vessels are free to land their catch at the port that is not their base port. According to the Fisheries Law No. 45 of 2009, in article 41 paragraph 3 "Every fishing boat and fish carrier shall land a catch at designated fishing port or others". According to Yuninie et al (2019) if the boat or fishing fleet does not follow the rules in landing its catch, then it will potentially impact in the loss of the state because it can be said to be indicated to carry out IUU fishing activities (Sumaila et al 2006).

Figure 3 (a) shows the MFV (Motor Fishing Vessel) RJ boat departed from Pekalongan Fishing Port to the fishing ground in the Indian Ocean, Southern Java first conducted a fishing operation from October 28 until December 29, 2019. The boat then headed to the NZJFP and entered the port on January 13, 2020. Based on the SIPI data owned by MFV RJ boat, the boat has a base port at Muncar, Cilacap, and Pekalongan Fishing Ports, not in the NZJFP. Figure 3 (b) shows the MFV SS boat departed from Pekalongan Fishing Port to the fishing ground in the Indian Ocean, Southern Sumba Island (Fisheries Management Area-FMA 572) conducted fishing operation from September 04 until December 27, 2020. Then monitored MFV SS boat sailing towards the port, on 03 January 2020 the boat was already in front of Pekalongan Fishing Port's pool, then the boat sailed back and entered the NZJFP. Data on SIPI of MFV SS boat did not have a license to anchor at NZJFP, and only has a license to anchor at Bai Island Fishing Port, Pekalongan Fishing Port, and Palabuhanratu Fishing Port.

The compliance with fishing ground. The results of the level of purse seine fleet compliance assessment at NZJFP, based on parameters and sub-parameters in the fishing ground are presented in Figure 4.

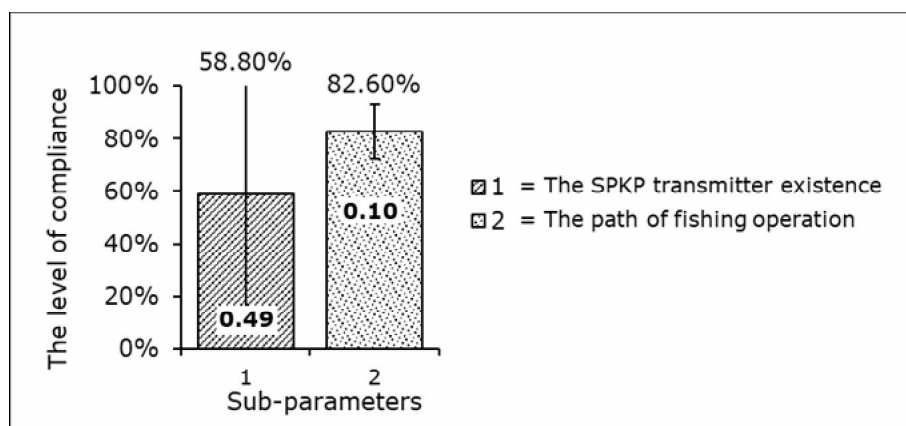


Figure 4. The compliance level of purse seine fleet to fishing ground.

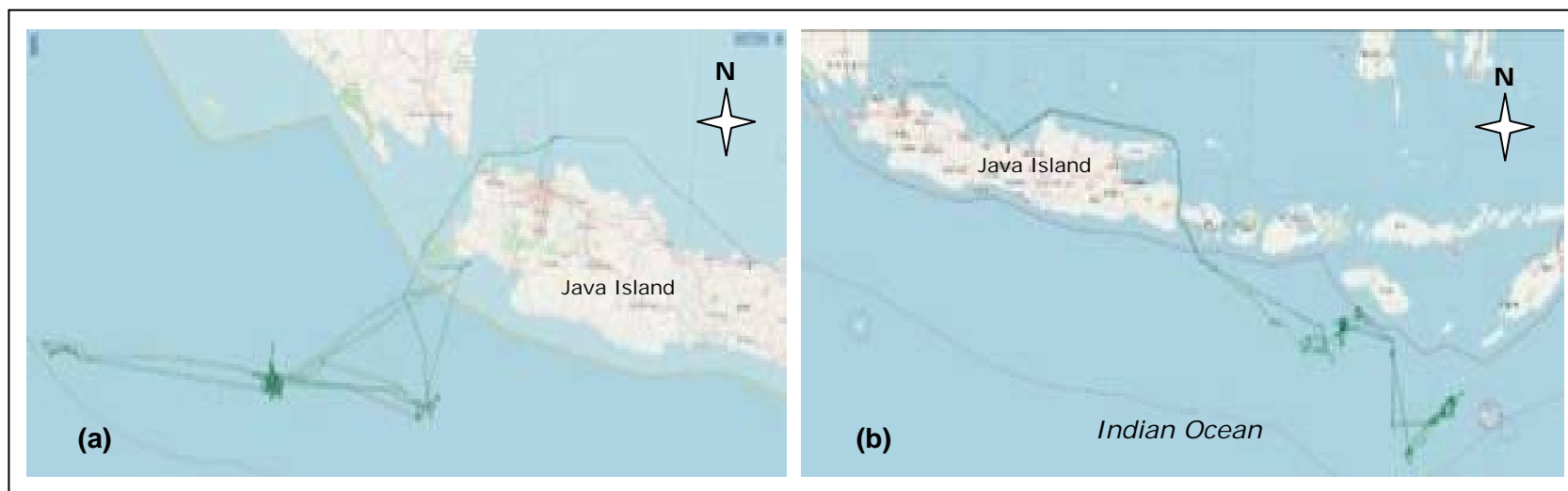


Figure 3. Screen display of VMS showing the pattern of purse seiner movement that is identified as violation of the base port (no scale).

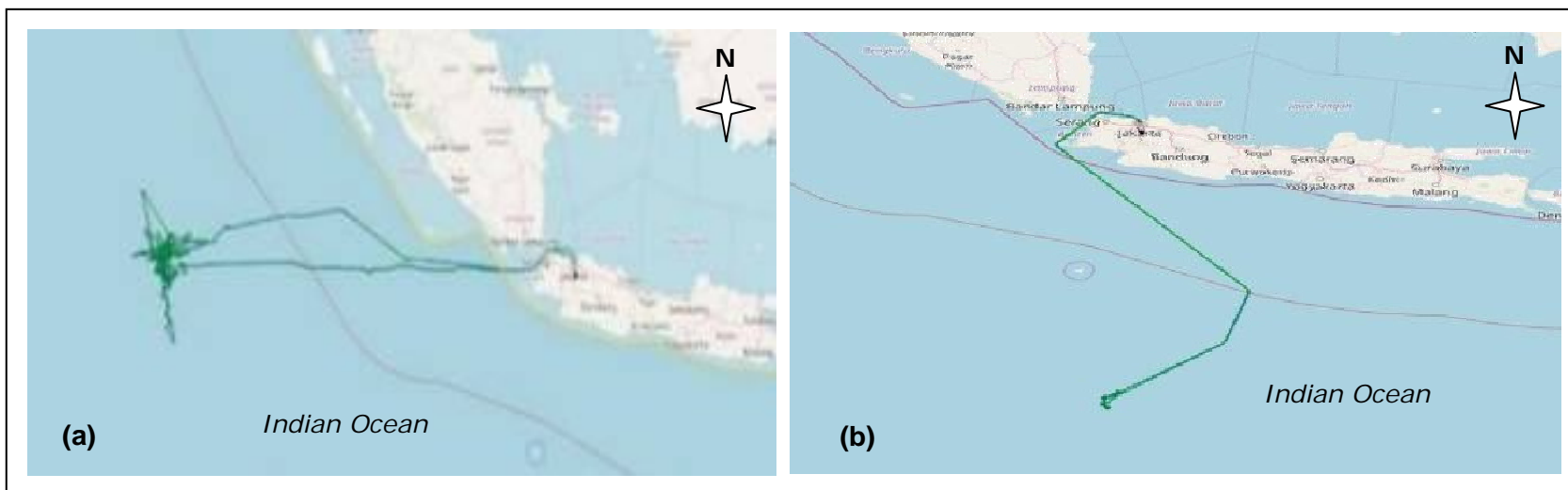


Figure 5. Screen display of VMS showing the pattern of purse seine fleet movement identified as committing fishing ground violation (no scale).

Figure 4 shows the average value of sub-parameter 1 which is the presence of the SPKP transmitter with an average value of $58.50 \pm 0.49\%$. While sub-parameter 2 which is the path of the fishing operation shows an average value of $82.60 \pm 0.10\%$. Both of the calculation results of the purse seine fleet compliance level to the fishing ground area shows there are quite significant differences. In the sub-parameters of the SPKP transmitter existence is considered sufficient because it has a scale value above 40% (below 60%). While the sub-parameter of fishing operation path is very strong because the value is more than 81%. Based on the result of interviews with the purse seine fishers, the presence of SPKP transmitter has not provided optimal benefits in fishing operation. Fishers expect with the SPKP transmitter on board, the Ministry of Marine Affairs and Fisheries (MMAF) center control can directly respond to the technical and non-technical constraints experienced by fishermen during the fishing operation. Surveillance or monitoring activities are very important in preventing IUU fishing activities (Supit et al 2016). Meanwhile, according to Marine Affairs and Fisheries Minister regulation No. 10 of 2019, the SPKP is one of the fishing vessel supervisory systems using the equipment that has been determined to know the movement and activity of fishing boats. According to (Febriansyah et al 2016), the use of SPKP transmitters will be very helpful to the government monitoring and controlling fishing activity, so that it can prevent IUU fishing activities.

Based on the observation to boat movement pattern through VMS, it is known the boat activities that are suspected of fishing ground violation. Figure 5 (a) shows the movement of the MFV PHS boat sailed from NZJFP to the fishing ground, during fishing operation, the monitored boat entered, and did fishing in the offshore waters. After fishing, the boat returned to NZJFP. According to SIPI documents listed the permitted fishing ground is ZEEI Indian Ocean (West Sumatera, South Java). Figure 5 (b) on June 26, 2019, shows the movement of MFV PHS boat departed from NZJFP to fishing ground FMA-572 and FMA-573. On 05 July 2019 the position of monitored boat entered and conducted fishing in the offshore waters until 24, 2019, then the vessel returned to port and on 05 December, 2019 the vessel entered NZJFP.

The compliance level with fishing gear. The results of the purse seine fleet compliance level assessment in NZJFP, based on parameter and fishing gear sub-parameter are presented in Figure 6.

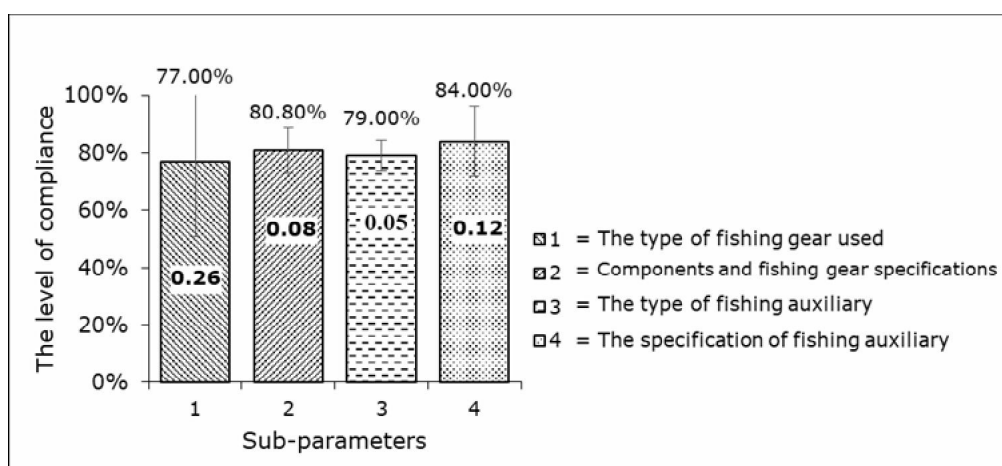


Figure 6. The compliance level of purse seine fleet to fishing gear.

Figure 6 shows the value of sub-parameter 1 that is the type of fishing gear used with an average value of $77.00 \pm 0.26\%$, sub-parameter 2 components and the fishing gear specification with an average value of $80.80 \pm 0.08\%$. Furthermore, sub-parameter 3 is a type of fishing aids or auxiliary tool with the average value of $79.00 \pm 0.05\%$, and sub-parameter 4 is fishing auxiliary tool specifications with an average value of $84.00 \pm 0.12\%$. The four sub-parameters measured to see the level of purse seine compliance to fishing gear, there is one sub-parameter that is classified as very strong

namely the sub-parameter specification of the fishing auxiliary with an average value above 81%, meanwhile the other three sub-parameters are classified strong because they have an average value of 60-80%. Overall, the level of purse seine fleet compliance to the fishing gear is relatively good, because based on the observation results in the field, fishing gear and fishing auxiliary used already follow the existing rules, nevertheless, the findings during study, some purse seine fleets could not show the SIPR (fish aggregating device installation permit) that is a completeness that must be carried in fishing operation.

From the interview, the type of fishing gear operated in NZJFP is divided into two groups, namely big pelagic purse seine and small pelagic purse seine. According to Jatmiko et al (2020), the difference between big pelagic purse seine and small pelagic purse seine can be seen from the net mesh size, the head rope, the power of FAD (fish aggregating device) lamp and the boat tonnage. In order to increase the productivity of purse seine in NZJFP, purse seine fleet use fishing auxiliaries such as FAD and lamps. According to the regulation of Marine Affairs and Fisheries Minister No. 26 of 2014, the FAD uses various in forms and types of binders/attractor of the solid object, serve to entice fish to gather, that is utilized to increase the efficiency and effectiveness of fishing operations. Efficiency is achieved because the character of fishing is more hunting, becoming more certain because the fish are localized (Wudianto et al 2019).

The level of purse seine fleet compliance to the base port. The result of the level of purse seine compliance fleet assessment at NZJFP, based on parameter and sub-parameter of the boat operational capabilities are presented in Figure 7.

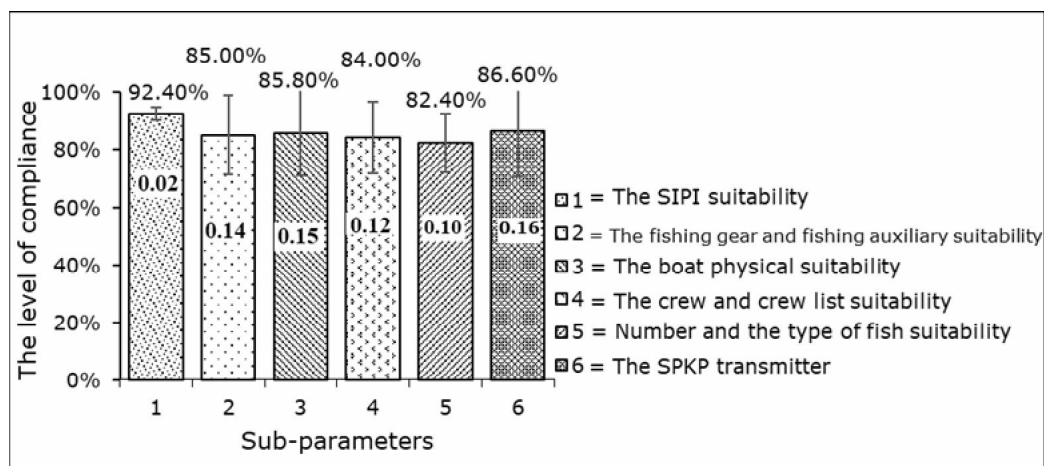


Figure 7. The level of purse seine fleet compliance with the boat operational suitability.

Figure 7 shows the value of sub-parameter 1 which is SIPI suitability with an average value of $92.40 \pm 0.02\%$, sub-parameter 2 which is fishing gear and fishing auxiliary suitability with an average value of $85.00 \pm 0.14\%$. Furthermore, sub-parameter 3 is boat physical suitability with average value of $85.80 \pm 0.15\%$. Sub-parameter 4 namely boat crew suitability with crew list with average value of $84.00 \pm 0.12\%$. Sub-parameter 5 namely number suitability and types of fish with an average value of $82.40 \pm 0.10\%$, sub-parameter 6 namely SPKP transmitter with average value of $86.60 \pm 0.16\%$. The calculation result of purse seine fleet compliance level with boat operational suitability that is viewed from all parameters, all of them are classified very strong because they have average scale value above 81% with suitability SIPI sub-parameter having the highest value. This can happen because of the all activities in NZJFP, purse seine fleet tends to obey the rules.

Purse seine boat that based in NZJFP carrying out arrival and departure activities, must fulfill the rules. Boat arrival activities are such as unloading the catch, loading the equipment, boat maintenance, and other port needs. The captain must report to fishing harbormaster then issued vessel arrival report certificate before carrying out the activity. Furthermore, when departing the boat, first meets the inspection of administrative

requirement and fishing boat technical feasibility. The fishing boat must have a sailing approval letter issued by the fishing harbormaster, by first fulfilling the port obligations (Diamantina et al 2020).

The level of compliance of purse seine fleet at NZJFP. The result of the level of purse seine fleet compliance at NZJFP to the base port parameter, fishing ground, fishing gear and boat operational capabilities are presented in Figure 8.

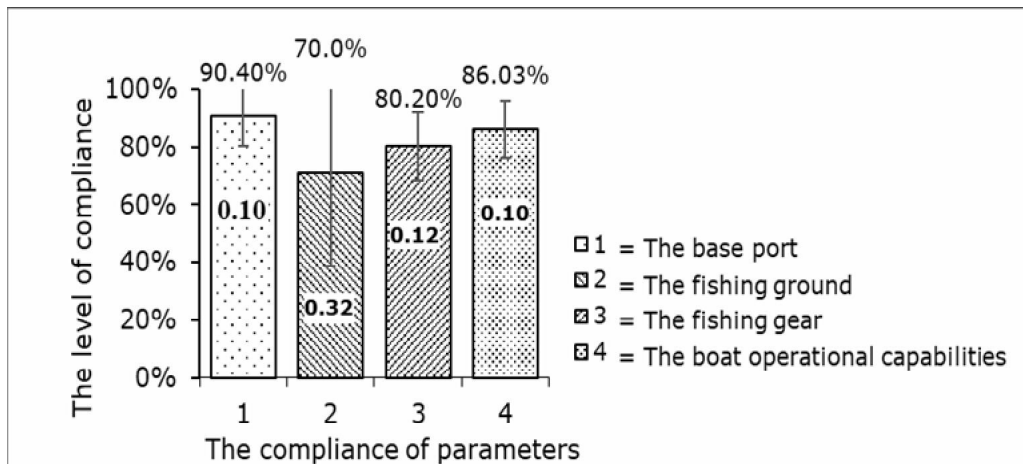


Figure 8. The level of purse seine fleet compliance at NZJFP.

Figure 8 shows the sub-parameter 1 which is base port with an average value of $90.40 \pm 0.10\%$ sub-parameter value of fishing ground with an average value of $70.70 \pm 0.32\%$; the sub-parameter value of fishing gear with an average value of $80.20 \pm 0.12\%$; and sub-parameter value of boat operational capabilities with an average value of $86.03 \pm 0.10\%$. The four sub-parameters are divided into two groups namely, the group which is classified very strong scales that are base port sub-parameter and boat operational capabilities with an average value above 81%, and the other group that classified strong scales because they have an average value below 81% (above 60%) that are fishing ground and fishing ground sub-parameters. The level of purse seine fleet compliance is good, but the level of purse seine fleet compliance, when viewed from the fishing ground parameter, is still the alleged violation committed by purse seine fleet when carrying out the fishing activity. Thus there is still violation committed by the purse seine fleet that do not comply with the issued SIPI, so it is necessary to conduct more maximum supervision in order to minimize the IUU fishing activities.

Conclusions. The compliance level of purse seine fleet toward base port parameter, fishing gear, and boat operational worthiness has overall classified as a strong scale even to very strong. Although the purse seine fleet has a very strong level of compliance, there are still some weaknesses in the NZJFP surveillance. The weaknesses are especially in the sub-compliance aspect of the base port, as can be seen from VMS observations.

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Authors:

Gugun Gunawan, Study Program of Marine Fisheries Technology, Graduate School, Bogor Agricultural University, IPB Dramaga Campus, Postal Code 16128, Bogor, Indonesia, e-mail: gnwngugun@gmail.com

Ari Purbayanto, Department of Fisheries Resources Utilization, Faculty of Fisheries and Marine Science, Bogor Agricultural University, IPB Dramaga Campus, Jl. Agathis, Postal Code 16128, Bogor, Indonesia, e-mail: purbayanto@apps.ipb.ac.id,

Iin Solihin, Department of Fisheries Resources Utilization, Faculty of Fisheries and Marine Science, Bogor Agricultural University, IPB Dramaga Campus, Jl. Agathis, Postal Code 16128, Bogor, Indonesia, e-mail: iin_solihin@apps.ipb.ac.id

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