Misreported purse seine catch landings at Idi Fishing Port, Aceh, Indonesia

[1,3]Abul Hayyi Almufrodi, [2]Eko Sri Wiyono, [2]Zulkarnain

[1] Study Program of Marine Fisheries Technology, Department of Fisheries Resources Utilization, Faculty of Fisheries and Marine Science, IPB University, Indonesia; [2] Department of Fisheries Resources Utilization, Faculty of Fisheries and Marine Science, IPB University, Indonesia; [3] Belawan PSDKP Station, Directorate General of Marine and Fisheries Resources Supervision, 20414, Medan, North Sumatera, Indonesia. Correpsonding author: E. S. Wiyono, eko-psp@apps.ipb.ac.id

Abstract. The accuracy of capture fishery data is essential for effective fish resource management in marine waters. It is therefore important to identify the potential causes of inaccuracy in this data. This study aimed to assess the sources of misreporting in purse seine fisheries at Idi Fishing Port in Aceh, Indonesia and to quantify the extent of catch data not included in the data collection of officers. The survey method was used in this research. Data were collected through interviews and direct observation of the loading and unloading of caught fish carried out by fishermen at both Idi Fishing Port and fishery centres that become fish landing sites. The results showed that there were three dominant types of fish caught by purse seine fishermen at Idi Fishing Port: tuna, skipjack and mackerel. The catch data for the three types of fish was misreported by 2,092.76-4,034.58 kg, representing 6.97-13.43% of the total actual catch in 2023. The causes of this discrepancy include the use of catches as crew rations, wages for loading and unloading labourers, ship management rations, and fish taken by the surrounding community who live around the port area.
Key Words: accuracy data, crew rations, labor wages, resources management.

Introduction. The accuracy of fish catch data is a key requirement for the government to improve the quality of sustainable fish resource management (Chapsos et al 2019). Catch data represent an essential component in calculating the estimated potential and utilisation rate of fish resources in all State Fisheries Management Areas of the Republic of Indonesia (FMA RI). These data serve as a reference point for interpreting the amount of fish resource stock that has been exploited. The current constraints on efforts to fulfill these data requirements are complex. One of the key challenges is the low level of accuracy of fishery statistical data. This is evidenced by the findings of Khan et al (2020), Nugroho and Atmaja (2014), Varkey et al (2010), Wagey et al (2009) and Suherman et al (2020). The Ministry of Marine Affairs and Fisheries of the Republic of Indonesia (MMAF RI) report for 2023 (MMAF 2023) indicates that the accuracy of national catch production data has not yet reached an optimal level due to the low compliance of fishermen in submitting their catches. In many cases, this is due to the presence of fish catch data that is not included in the officer's data collection. The loss of unreported catch data results in incomplete data acquisition (Khairani et al 2022; Bremner et al 2009; World Bank 2012).

The current discussion on illegal unreported and unregulated fishing (IUUF) is limited to illegal fishing activities (Theilen 2013). However, the reality is that the unreported and/or unregulated activities of both legal and illegal fishing operations can have a significant impact on the implementation of sustainable fisheries management (Miller & Sumaila 2016). One of the major causes of incomplete catch data received by data collection officers is misreporting. This results in the data not accurately reflecting the actual reality (Rudd & Branch 2016). This is one of the problems that causes data inaccuracies in efforts to estimate the availability of fish resource stocks (Darmawan et al

2022). As a result, the formulation of policy is not targeted and the chosen management strategy will be misguided (Miller & Sumaila 2016). The causes of misreporting of fish catch data are likely to be wide-ranging (Temple et al 2022). There are many factors behind the misreporting of catch data, both intentional and unintentional (Palmer 2017). Errors in data reporting are frequently the result of fishermen providing catch data below the actual value (Solihin 2010). In some cases, data reporting errors occur when fishermen have two catch record books during fishing operations. One of these books is shown to the inspecting officer, while the other is shown to the ship owner. This second book contains the original number of fish caught.

The misreporting of fish catch data in Indonesia leads to the reporting of fish catch data that is much lower than the actual catch (underreported). In the period between 1950 and 2010, all Indonesian fisheries were underreported by 38% of the actual total catch (Pauly & Budimartono 2015). Meanwhile, the catch of the tonda fishing fleet at Pelabuhanratu Fishing Port has been indicated to be misreported at 46.53-228.02 tons/year, representing a rate of 28.8% per year below the actual catch in the 2012-2022 period (Anggawangsa et al 2022). Some of these results indicate that the fish catch data collection system is not functioning as it should. There may be instances where fish catch data is not included in the data collection due to fishermen deliberately not reporting the entire catch or purely by accident because fishermen are unaware of the predetermined data collection procedures. The loss of data that is not included in the reporting is due to the use of catches as bait, consumption on board, crew rations, and labour wages when unloading fish catches. This discrepancy between the reported catch data and the actual catch results in a loss of data. This phenomenon has been observed in all fishing fleets in Indonesia, with one notable example being the purse seine fishery at the Idi Nusantara Fishing Poert (Idi Fishing Port).

Idi Fishing Port is a central location for capture fisheries activities located in Idi Rayeuk District, East Aceh Regency. In this area, purse seine vessels account for 84.67% of the total fishing fleet. The catch data collection mechanism generally follows national regulations. However, there are indications that fish catch data are not included in the data collection at the Idi Fishing Port. This study aims to identify how catches are misreported for the Idi Fishing Port area.

Material and Method

Participants. This research was conducted in November 2023 at Idi Fishing Port and the fisheries centres located in Idi Rayeuk District, East Aceh Regency, Aceh Province (Figure 1). The research location was selected based on preliminary information obtained through a preliminary survey of loading and unloading activities carried out by fishermen at several fish landing sites. The preliminary survey involved several resource persons who were also respondents. The initial conclusions indicated that there was a misreported catch in the purse seine fishery, which caused missing or non-inclusion in the data collection.

A total of 70 respondents were selected, representing the various fishing fleets in the purse seine sector. According to data from the Marine and Fisheries Resources Surveillance Unit (PSDKP), there are 243 purse seine vessels based in Idi Fishing Port (Langsa SDKP Supervision Unit 2023). The sampling technique employed was the accidental sampling method, which selects samples based on availability at the time of sampling.

Figure 1. The location of Idi Fishing Port, Aceh, Indonesia (map generated using Google Maps 2023).

Data collection. This research was conducted using the survey method. Information was gathered through interviews and direct observation of fish unloading activities conducted by fishermen at Idi Fishing Port and at fishing centres that act as fish landing sites. The data obtained included primary and secondary data. The primary data set comprised information on fish species and catch volumes, as well as details of the data recording and distribution processes. Secondary data was obtained in the form of fishermen's catch reports from November 2023 and Idi Fishing Port daily landing data from 2022. The data was then processed to identify the causes of misreporting in purse seine fisheries at Idi Fishing Port and to determine the amount of misreported catches.

Data analysis. The causes of misreported fish catch in purse seine fisheries at Idi Fishing Port were identified through several stages. The initial stage of the process was to conduct direct observation during fish landing activities. This was done to determine the estimated amount of real catch obtained by purse seine fishers and to monitor the activity of using fish catches before and after the fish unloading process. Furthermore, interviews were conducted to determine the amount of catch actually reported by fishermen and to identify factors that are suspected to be the cause of the estimated catch data that is not included in the reporting. The data not included in the reporting will be accumulated with the data reported by fishermen to the fisheries officer at Idi Fishing Port through the Fishing Log Book (LBPI) so that the difference between the real catch and the reported catch can be calculated. The data processing was carried out using Microsoft Excel to facilitate the analysis of misreported quantification calculations. The calculation formula used for calculating the accumulation of total reported catches with suspected misreported catch is as follows (1):

$$Yt = Xt + mrT$$

The percentage of misreported data can then be calculated using the following formula (2):

$$Xt1 = Xt/Yt \times 100\%$$

Where:
Yt: total actual catch (kg)
Xt: total reported catch (kg)

mrT: misreported (kg)
Xt1: percentage of total catch reported (%)

A descriptive analysis was conducted to describe the amount of real catch production obtained by fishermen, the amount of reporting errors in the quantification of each type of fish caught, and the source of the cause of the misreporting of catches in purse seine fisheries at Idi Fishing Port. In general, there is already a tradition of profit sharing at Idi Fishing Port, with fishermen taking their fish home directly or selling them to their regular fish traders. To this end, the analysis of unreported fish catch data was conducted by calculating the average of the respondents' number of unreported fish. Furthermore, predictions of data deviations were made using a 95% confidence interval. Additionally, to ascertain the types of fish that are most often unreported, the same methodology was employed. Data from respondents were averaged and data deviations were predicted using a 95% confidence interval.

Results and Discussion. The production of purse seine vessels at Idi Fishing Port is primarily focused on pelagic fish catches from both large and small pelagic groups. The most commonly caught large pelagic fish are tuna (*Euthynnus affinis*), skipjack (*Katsuwonus pelamis*), and bigeye tuna (*Thunnus obesus*), while the small pelagic fish group includes mackerel (*Decapterus* spp.), mackerel scad (*Rastrelliger brachysoma*), anchovy (*Stolephorus s*pp.), and long-jawed mackerel (*Selaroides leptolepis*). Furthermore, several other fish catches have been reported, including croaker (*Johnius carouna*), swordfish (*Trichiurus lepturus*), pitcher (*Mene maculata*), triggerfish (*Abalistes stellatus*), and pomfret (*Pampus* spp.). These fish species are by-catches reported by purse seine fishers at Idi Fishing Port. The data from purse seine fishers at Idi Fishing Port indicates that tuna (*Euthynnus affinis*) represents the most frequently caught fish, with a proportion of 54.56% (Figure 2).

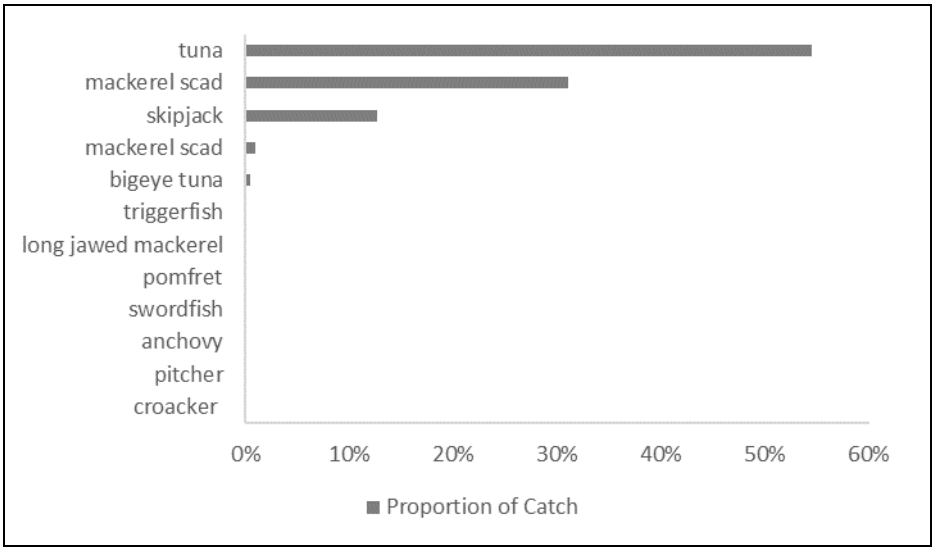

Figure 2. Average proportion of purse seine catch by fish species.

The purse seine catch in Idi Fishing Port was dominated by three types of fish: tuna, mackerel, and skipjack. When each proportion of the three types of fish is summed up, the proportion reaches 98.02% of the total amount of all catches. A similar pattern was observed at PPS Kutaraja Banda Aceh. Research findings indicated that the purse seine catch data at PPS Kutaraja in 2017 was dominated by tuna (*Euthynnus affinis*), mackerel (*Decapterus* spp.), and skipjack (*Katsuwonus pelamis*), with the proportion of catch reaching 97% of the total catch (Anwar et al 2017). Consequently, purse seine gear is an appropriate choice for fishermen in Aceh waters, as the average catch is comprised of these fish (Fajri et al 2018).

Quantification of misreported data. The misreporting of catch data in Idi Fishing Port is due to the rations of crew members, labourers, ship managers and the surrounding community at Idi Fishing Port. The results of field observations of catch data collection indicated that the average crew ration per trip was 10.59 kg, the boat management ration was 5.58 kg, labourers' ration was 2.65 kg, and the local community ration was 1.04 kg (Table 1).

Table 1

Estimation of the amount of unreported fish catch at Idi Fishing Port

Sources of unreported catch	*Catch*	*Mean (kg/trip)*	*CI 95% (kg/trip)*	
			Lower	*Upper*
Crew members	Tuna, skipjack, mackerel	10.59	8.51	12.67
Laborers	Tuna, skipjack, mackerel	2.65	2.16	3.13
Ship managers	Tuna, skipjack, mackerel	5.58	4.78	6.38
Surrounding community at Idi Fishing Port	Tuna, skipjack, mackerel	1.04	0.78	1.30

Table 1 illustrates that the distribution of catches for the crew's allowance has the highest average value of 10.59 kg per trip, with a range of 8.51-12.67 kg across one fishing trip. The ship manager's share ranged from 4.78 to 6.38 kg per trip, while the labourers' wages were between 2.16 and 3.13 kg per trip. The local residents' share was between 0.78 and 1.30 kg per trip. Furthermore, there are other types of fish that are not included in the data collection. Based on interviews with respondents, there has never been a report of squid catches to officers. This is because squid is not a target catch and is only picked up by the net during fishing operations. However, it should be noted that not all purse seine fishermen at Idi Fishing Port obtain squid catches. Based on the daily landing data of squid catch from all respondents, the total amount of squid catch was 188 kg. The average squid catch obtained by purse seine fishers was 6.39-18.92 kg/trip (Figure 3).

Figure 3. Squid catches not reported by fishers.

In general, several causes of misreporting in the purse seine fishery at Idi Fishing Port resulted in the reported catch data being much lower than the actual catch (underreporting). Based on the Table 2, the misreporting of catch data for the three types of purse seine catch in Idi Fishing Port as a whole reached 2,092.76-4,034.58 kg/year or 6.97-13.43% in 2023.

Table 2
Estimated amount of purse seine catch identified as underreported in Idi Fishing Port in 2023

Catch	Reported catch (kg)	Misreported catch (kg)	Total production (kg)	Average of misreported (kg/trip)	Average of Misreported CI 95% (kg/trip)		% Misreported CI 95%	
					Lower	Upper	Lower	Upper
Tuna	36.400	2.409	38.809	200.75	108.89	292.61	3.59	9.65%
Mackerel	36.700	4.035	40.735	130.16	100.88	159.44	8.52%	13.46%
Skipjack	17.000	2.747	19.747	152.61	106.02	199.20	11.23%	21.09%
Total	90.100	9.191	99.291	3.063.67	2.092.76	4.034.58	6.97%	13.43%

Identifying the causes of misreporting. According to Peterman (2004), several sources of uncertainty in fisheries systems include natural variability, observation errors, unclear management objectives and inappropriate policy implementation. Furthermore, simulation results conducted by Omori et al (2016) proved that constant and continuous underreporting of catch and fishing effort leads to an underestimation of maximum sustainable yield (MSY) and biomass values by the same proportion. Several things were found that could cause inaccuracies or errors in the data reported by purse seine fishermen to Idi Fishing Port. Some of these things are:

1. Use of catches for crew rations and wages for loading and unloading labour.

Based on the results of the interviews with the respondents, the catches usually obtained by the purse seine fishermen in PPN Idi are divided into two categories, namely the catch of the vessel and the personal catch of the crew. The catch of the vessel is the responsibility of the captain, where during the process of unloading the catch, the vessel owner usually witnesses the weighing and records the amount of catch obtained. Meanwhile, the personal catch of the crew is usually obtained by using other fishing gear while on board the vessel in the form of hand lines. The crew's catch is personal property, so the captain and ship owner do not feel entitled to the crew's catch and do not feel the need to weigh it during the process of unloading the catch. In addition, there is a routine whereby the vessel owner gives the crew a quota of the vessel's catch if the amount of catch obtained exceeds the target. At the time this research was conducted, based on observations in the field, the type of catch routinely distributed to the crew was identified as skipjack tuna (*Katsuwonus pelamis*).

Meanwhile, the unloading of the purse seine fishermen's catch at PPN Idi is usually done by the crew with the help of unloaders. At each landing site, both at the port and at other docks in the port area, there are unloaders available to help lift or weigh the catch. Based on observations in the field, there is a condition that the workers take the fish caught as their "quota" for the work, outside of the wages they receive. It is noted that the types of fish caught that are often "taken" are tuna (*Euthynnus affinis*) and mackerel (*Decapterus* spp.) with an average of 1-7 kg. However, it was noted that the fish caught as the workers' quota are not recorded by the data collection officers at PPN Idi, resulting in incomplete catch data.

There are several factors that may influence the bias of actual and reported catch data, especially in small and medium-scale tuna fisheries, including unreported catches, as fish are used as bait, for consumption by fishermen on board and for take-home rations (Yuniarta et al 2017), as well as fish that become unloading rations and personal catches of fishermen.

2. Use of catches for the rations of the ship document manager.

Based on field investigations, ship document managers are an important part of the mechanism for recording fishermen's catches at PPN Idi. Ship managers are intermediaries between ship owners and the fishing port authorities who are responsible for issuing the Operational Worthiness Standards (SLO) and Sailing Approval Letters (SPB) for fishing vessels, so they are an important part of reporting catch data because

both SLO and SPB will be issued if there is a report of catch data for vessels that have carried out fishing activities. Therefore, reporting the catches of purse seine vessels at PPN Idi is usually done by ship managers. However, the thing that causes inaccuracy in catch data is due to the catch quota that belongs to the ship manager. Based on observations in the field, some ship managers will get at least 5-10 kg of catch from each purse seine trip. This has become an agreement between the owner and ship manager. The provision of catches to ship managers is carried out during the unloading of the catch without weighing it first, thus the ship manager's fish quota is not recorded in the data collection. It was identified that the types of fish caught by purse seine nets that were usually the share of the ship's management were tuna (*Euthynnus affinis*) and mackerel (*Decapterus* spp.).

3. Catch collection by the local community during unloading.

The unloading of the fish caught by the purse seiners, both at Idi Fishing Port and at the fish warehouse, is usually witnessed by the surrounding community. It is not without reason that this is done by people who usually live not far from the port location, as there is a purpose for taking caught fish. According to the results of the interviews with the respondents, this has been going on for a long time because the ship owner, as the person entitled to the catch, allows it. According to the skippers, the phenomenon of local people taking fish, both at Idi Fishing Port and at the fish warehouse, is an act of charity on the part of the ship owner for the catch made. However, the taking of fish by local people is done before the catch has been weighed, resulting in the loss of catch data. Based on the field research, the average type of fish caught by local residents is tuna and mackerel scad.

From the above description, it can be seen that the catch production data reported by the fishermen to the data collectors during this study did not reflect the actual data. As a result, the accuracy of the catch data in Idi Fishing Port is inaccurate because the catch data reported by the fishermen is much lower than the actual catch. There are a number of limitations in the catch data collection mechanism, particularly in terms of verification during the loading and unloading of the catch, especially as most loading and unloading activities take place at night. Meanwhile, the human resources of Idi Fishing Port currently only include 1 control officer and 1 catch data verifier.

There are several sources of misreported catches, including crew members, wages, boat management, and fish collected by local people who are not weighed beforehand, so that the total catch is misreported. In particular, the use of catches as crew quota reached 10.59 kg/trip. This is also the case in the tonda rod fishery in Pelabuhanratu Fishing Port (Anggawangsa et al 2022). The results showed that the non-reporting of catches as crew quota in the tonda fishing unit amounted to 19.04 kg/trip. In addition, the non-reporting of catches as workers' rations is due to the routine taking of fish catches, which are considered 'rations' outside the payment of wages. The unloaders at Idi Rayeuk are paid in cash after the boat owner has sold the catch. In general, the workers' wage is 5% of the total sale price of the fish caught (Maulana 2021).

The causes of data reporting errors, identified as the allocation of boat managers and the taking of fish catches by the surrounding community, should be of particular concern to the fisheries data managers at Idi Fishing Port. The vessel manager, as the intermediary between the vessel owner and the port in terms of processing the fishing licence file, has become an important part of the catch data collection, as it is usually the vessel manager who reports the catch data to the officers at Idi Fishing Port. The surrounding community that enters the port during the unloading process can be considered as a party directly involved in the catch data collection of purse seine fishermen at Idi Fishing Port. It is therefore necessary to improve the catch data collection system, particularly in the purse seine fishery at Idi Fishing Port, including by reconstructing catch data. Data reconstruction can be done by improving the data for previous years. This will be done so that it can be used more accurately to analyse the level of fish exploitation in the East Aceh region. In addition, it is necessary to increase supervision during the loading and unloading of fish catches, especially during the

weighing of fish catches, and the need for additional data collection officers so that the implementation of the catch data collection mechanism at Idi Fishing Port can work well.

Conclusions. Some of the causes of misreported catches in the purse seine fishery at Idi Fishing Port include the use of catches as crew rations, labour wages, ship manager rations, and the taking of fish caught by people living around the port area. There are three dominant types of fish catches identified as misreported: tuna, mackerel and skipjack. The highest amount of misreported fish catch quantification based on the source of cause is the use of catches as crew rations with an average value of 10.59 kg/trip, while the total purse seine catch production data at Idi Fishing Port is identified as underreported, reaching 2,092.76-4,034.58 kg or 6.97-13.43% of the total actual catch in 2023.

Acknowledgements. We would like to extend our gratitude to Idi Fishing Port for their assistance and data provision during the course of this research. We would also like to thank the fishermen in Idi Rayeuk, Aceh for their willingness to participate in this study.

Conflict of interest. The authors declare that there is no conflict of interest.

References

Anggawangsa R. F., Wiyono E. S., Kurniawati V. R., Wudianto, 2022 [Unreported catches in the tonda fishing rod fishery at Pelabuhanratu Fishing Port]. Indonesian Journal of Fisheries Research 28(2):51-60 [in Indonesian].

Anwar K., Chaliluddin Rahmah A., 2017 [Relationship between purse seine fishing gear length and catch at Lampulo Fishing Port, Aceh]. Unsyiah Scientific Journal of Marine and Fisheries 2(3):396-405 [in Indonesian].

Bremner G., Johnstone P., Bateson T., Clarke P., 2009 Unreported bycatch in the New Zealand west coast South Island hoki fishery. Marine Policy 33(3):504–512.

Chapsos I., Koning J., Noortmann M., 2019 Involving local fishing communities in policy making: addressing illegal fishing in Indonesia. Marine Policy 109(September):103708. doi: 10.1016/j.marpol.2019.103708.

Darmawan, Andayani N. D., Mustaruddin, 2022 Procedure for catches data collection and its implementation: a case study of fishing ports In Jakarta. IOP Conference Series: Earth And Enviromental Science 1033:012021. doi: 10.1088/1755-1315/1033/1/012021.

Fajri I., Mustaruddin, Baskoro M. S., 2018 [The influence of technical and enviromental factors on the performance of purse seine fisheries in Lampulo waters, Aceh Province]. Albacore 2(2):135-144 [in Indonesian].

Khairani R., Syaifuddin, Rengi P., 2022 [Data collection structure and accuracy level of fish catch data at Bungus Ocean Fishing Port, West Sumatra]. Journal of Aquatic Sciences 10(1):68-74 [in Indonesian].

Khan A. M. A., Mill A. C., Gray T. S., Jiang M., Arief H., Brown A., Karman A., Polunin N. V. C., 2020 Reliability of the data on tuna catches obtained from the dockside in Indonesia: a study of stakeholders' perceptions. Marine Policy 122:104242. doi: 10.1016/j.marpol.2020.104242.

Maulana P., 2021 [Profit sharing system on laborers' income in the Idi fish unloading warehouse in East Aceh in the perspective of Shirkah Abdan Akad]. Aceh: Universitas Islam Negeri Ar-Raniry. 81 pp. [in Indonesian].

Miller D. D., Sumaila U. R., 2016 Chapter 4 - IUU fishing and impact on the seafood industry (A. M. Naaum & R. H. B. T.-S. A. and T. Hanner eds.). Academic Press. 83–95 pp.

Nugroho D., Atmaja S. B., 2014 [Study on Combating IUUF in Trawl Fisheries in the Java Sea (WPP – 712)]. Jurnal Kebijakan Perikanan Indonesia 6(2):55-64 [in Indonesian].

Omori K. L., Hoenig J. M., Luehring M. A., Baier-Lockhart K., 2016 Effects of underestimating catch and effort on surplus production models. Fisheries Research 183:138–145.
Palmer M., 2017 Vessel trip reports catch-area reporting errors: potential impacts on the monitoring and management of the Northeast United States groundfish resource 17–02. NOAA Fisheries, Northeast Fisheries Science Center, Woods Hole, MA. 47 pp.
Pauly D., Budimartono V., 2015 Marine fisheries catches of Western, Central and Eastern Indonesia, 1950-2010. Fisheries Centre Working Paper #2015-61 (No. 2015–61). 51 pp.
Peterman R. M., 2004 Possible solutions to some challenges facing fisheries scientists and managers. ICES Journal of Marine Science 61:1331-1343.
Rudd M. B., Branch T. A., 2016 Does unreported catch lead to over fishing? Fish and Fisheries 18(2):313–323.
Solihin A., 2010 [The politics of marine & fisheries law; issues, problems, and critical policy analysis]. Bandung: Nuansa Aulia. 150 pp. [in Indonesian].
Suherman A., Santosa M. A., Ihsan Y. N., Wijayanto D., Juwana S., 2020 The eradication of IUU fishing in Indonesia for economic fisheries. Indonesian Journal of Fisheries Science and Technology 16(3):154–164.
Temple A. J., Skerritt D. J., Howarth P. E. C., Pearce J., Mangi S. C., 2022 Illegal, unregulated and unreported fishing impacts: a systematic review of evidence and proposed future agenda. Marine Policy 139:1-8. doi: 10.1016/j.marpol.2022.105033.
Theilen J. T., 2013 What's in a name? The illegality of illegal, unreported and unregulated fishing. International Journal of Marine and Coastal Law 28(3):533–550.
Varkey D. A., Ainsworth C. H., Pitcher T. J., Goram Y., Sumaila R., 2010 Illegal, unreported and unregulated fisheries catch in Raja Ampat Regency, Eastern Indonesia. Marine Policy 34(2):228–236.
Wagey G., Nurhakim S., Nikijuluw V. P., Badrudin, Pitcher T. J., 2009 A study of illegal, unreported and regulated (IUU) fishing in the Arafura Sea, Indonesia. Research Center for Capture Fisheries Agency for Marine and Fisheries Research Ministry of Marine Affairs and Fisheries, Jakarta. 54 pp.
Yuniarta S., van Zwieten P. A. M., Groeneveld R. A., Wisudo S. H., van Ierland E. C., 2017 Uncertainty in catch and effort data of small- and medium-scale tuna fisheries in Indonesia: sources, operational causes and magnitude. Fisheries Research, 193:173–183.
*** Langsa SDKP Supervision Unit, 2023 [Report on HPK and SLO of Idi PSDKP work area in 2022]. Langsa. Langsa SDKP Supervision Unit. 88 pp. [in Indonesian].
*** Ministry of Marine Affairs and Fisheries (MMAF), 2023 [Regulation of the Minister of Marine Affairs and Fisheries No. 28/PERMEN-KP/2023 concerning the implementation of Government Regulation Number 11 of 2023 about the measured capture fish]. Badan Pemeriksa Keuangan. Jakarta. Accessed: April 28, 2024. https://peraturan.bpk.go.id/Details/265243/permen-kkp-no-28-tahun-2023 [in Indonesian].
*** World Bank, 2012 Hidden harvest : the global contribution of capture fisheries. In Economic and Sector Work (Report number 66469-GLB). Agriculture and Rural Development (ARD), Washington. 70 pp. Accessed: April 28, 2024. Accessed: April 28, 2024. Accessed: April 28, 2024. https://documents.worldbank.org/en/publication/documents-reports/documentdetail/515701468152718292/hidden-harvest-the-global-contribution-of-capture-fisheries.

Received:24 June 2024. Accepted: 17 November 2024. Published online: 22 April 2025.
Authors:
Abul Hayyi Almufrodi, Belawan PSDKP Station, Directorate General of Marine and Fisheries Resources Supervision, 20414, Medan, North Sumatera, Indonesia, e-mail: abulhayyi@kkp.go.id
Eko Sri Wiyono, Department of Fisheries Resource Utilization, Faculty of Fisheries and Marine Sciences, IPB University, 16880, Bogor, West Java, Indonesia, e-mail: eko-psp@apps.ipb.ac.id
Zulkarnain, Department of Fisheries Resource Utilization, Faculty of Fisheries and Marine Sciences, IPB University, 16880, Bogor, West Java, Indonesia, e-mail: zulkarnainl@apps.ipb.ac.id

How to cite this article:
Almufrodi A. H., Wiyono E. S., Zulkarnain, 2025 Misreported purse seine catch landings at Idi Fishing Port, Aceh, Indonesia. AACL Bioflux 18(2):916-925.