

September 2024

Data Collection and Biological Parameters of Octopus in Sulawesi

Introduction

Octopus (*Octopus cyanea*) fisheries data collection is implemented with the support of octopus fishers, community members, partners, and the Indonesia Research and Innovation Body (Badan Riset dan Inovasi Nasional/BRIN) (Table 1). The data collection's main purpose is to understand the octopus fisheries condition and trends across communities in Sulawesi. Partners train and work with community data collectors/enumerators to record octopus fisher's catch using KoboCollect. The collected data is sent into a database, validated by partners, and automatically analysed and visualised in an interactive dashboard.

Table 1 Octopus fisheries communities and partners list

No.	Province	Regency	District	Community	Supporting Partner
1	Sulawesi Utara	Minahasa Utara	Likupang Barat	Bulutui	YAPEKA
2	Sulawesi Utara	Minahasa Utara	Likupang Barat	Gangga Satu	YAPEKA
3	Sulawesi Utara	Minahasa Utara	Likupang Timur	Likupang Dua	YAPEKA
4	Gorontalo	Pohuwato	Popayato	Torosiaje	JAPESDA
5	Sulawesi Tengah	Tojo Una-Una	Talatako	Kadoda	JAPESDA
6	Sulawesi Tengah	Banggai	Luwuk Timur	Uwedikan	JAPESDA
7	Sulawesi Tengah	Banggai Kepulauan	Totikum Selatan	Kalumbatan	LINI
8	Sulawesi Tengah	Banggai Kepulauan	Totikum Selatan	Lobuton	LINI
9	Sulawesi Tengah	Banggai Laut	Banggai Utara	Popisi	LINI
10	Sulawesi Selatan	Kepulauan Selayar	Buki	Mekar Indah	LINI
11	Sulawesi Selatan	Kepulauan Selayar	Bontoharu	Kahu-Kahu	LINI
12	Sulawesi Tenggara	Wakatobi	Wangi-Wangi Selatan	Kapota	KOMANANGI

No.	Province	Regency	District	Community	Supporting Partner
13	Sulawesi Tenggara	Wakatobi	Wangi-Wangi Selatan	Kapota Utara	KOMANANGI
14	Sulawesi Tenggara	Wakatobi	Wangi-Wangi Selatan	Kabita	KOMANANGI
15	Sulawesi Tenggara	Wakatobi	Wangi-Wangi Selatan	Kabita Togo	KOMANANGI
16	Sulawesi Tenggara	Wakatobi	Kaledupa	Sombano	FORKANI
17	Sulawesi Tenggara	Wakatobi	Kaledupa Selatan	Tanomeha	FORKANI
18	Sulawesi Tenggara	Wakatobi	Kaledupa Selatan	Darawa	FORKANI
19	Sulawesi Tenggara	Wakatobi	Binongko	Kampo-Kampo	FONEB
20	Sulawesi Tenggara	Wakatobi	Binongko	Lagongga	FONEB

Octopus Fisheries Across Sulawesi

The octopus fisheries data period is ranging from 01 January 2022 to 31 August 2024. During that period, there are 243,716kg of octopus recorded with a total value of IDR9,990,361,062 and the average per cent mature catch of 92%. The average Catch per Unit of Effort (CPUE) is 4kg/trip and the fisher's average Income per Unit of Effort (IPUE) is IDR131,524/trip.

Total landings of octopus spiked every March in 2022 and 2023, and in 2024 it spiked in February (Figure 1). The overall trend of octopus total landings is decreasing throughout the years.

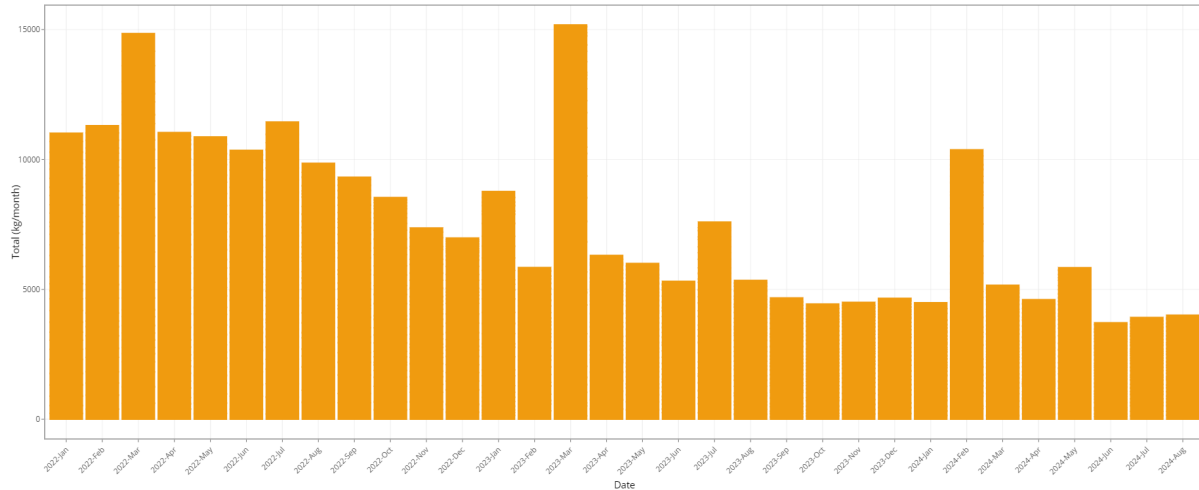


Figure 1 Total landings of octopus across 20 communities in Sulawesi from January 2022 to August 2024

However, looking at the average CPUE in Figure 2, the octopus fisheries in Sulawesi are undergoing an increasing CPUE trend. This is confirmed by the increasing trends of the average mature percentage of octopus in Figure 3. The total landings might be decreasing, but the octopus size that is caught by fishers is increasing gradually throughout the years, therefore it is also reflected in the increasing CPUE. Increasing CPUE and mature percent catch trends indicate an improving octopus fisheries health across Sulawesi.

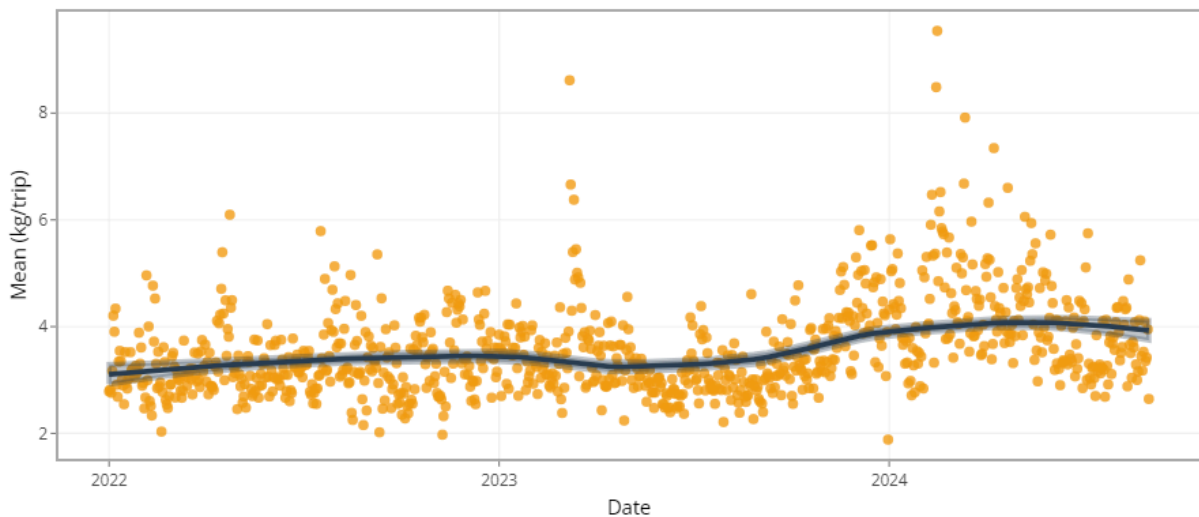


Figure 2 Mean catch per unit of effort (CPUE) of octopus across 20 communities in Sulawesi from January 2022 to August 2024

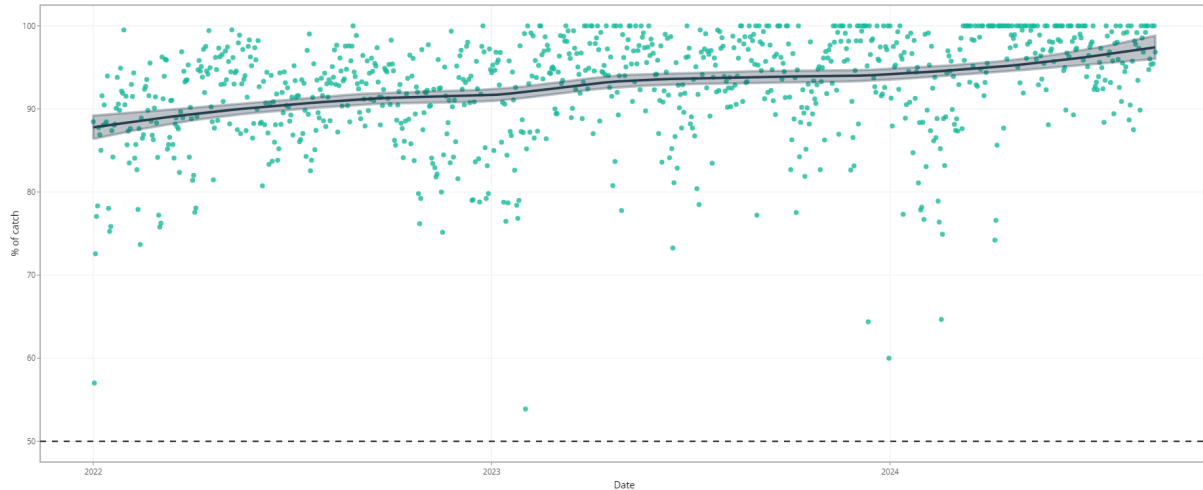


Figure 3 Mean percentage of mature octopus caught across 20 communities in Sulawesi from January 2022 to August 2024. The horizontal dashed line at 50% is a Limit Reference Point (LRP) for the percentage of the mature catch.

Octopus Fisheries in Minahasa Utara

The octopus fisheries data collected in Minahasa Utara is ranging from 01 January 2022 to 31 August 2024. Data is collected from three communities, namely Gangga Satu, Bulutui, and Likupang Dua. The fisher's total landings recorded is 45,721kg and the fisher's total income recorded is IDR1,439,845,037 with the average percentage of mature octopus caught is 96%. Fisher's average CPUE is 4kg/trip and the average IPUE is IDR118,230/trip.

The total landing trend of octopus fisheries in the three communities in Minahasa Utara has fluctuated over the years (Figure 4). There were declines from December 2022 to February 2023, but it increased in March 2023 and fluctuated until August 2024.

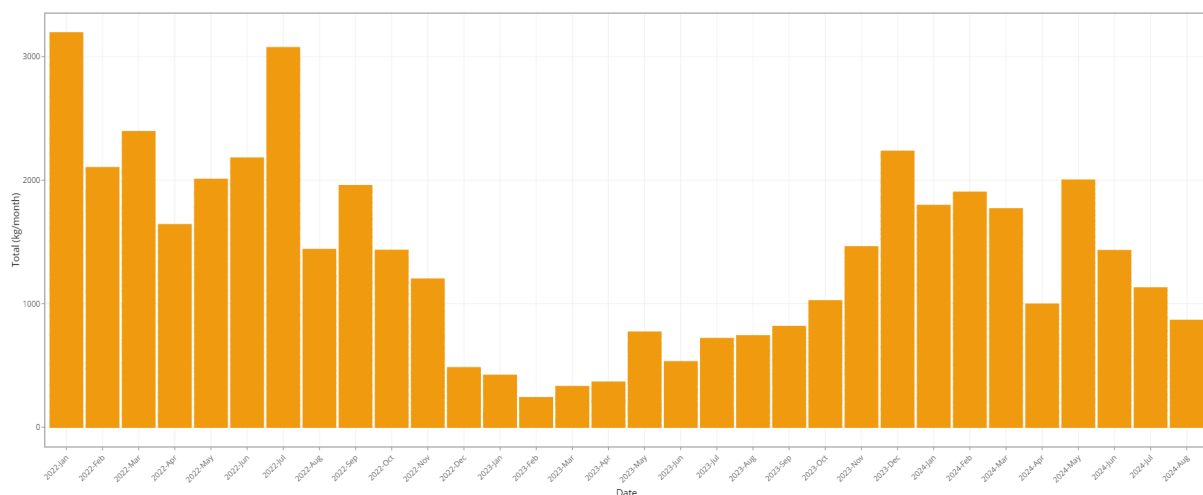


Figure 4 Total landings of octopus in Likupang Dua, Bulutui, and Gangga Satu from January 2022 to August 2024

The trends of CPUE in three communities in Minahasa Utara are increasing from 2022 to 2024 (Figure 5). The same trend is also observed in the percentage of mature octopus caught (Figure 6). From these two indicators, there are signs of improvement in octopus fisheries in the three communities of Minahasa Utara.

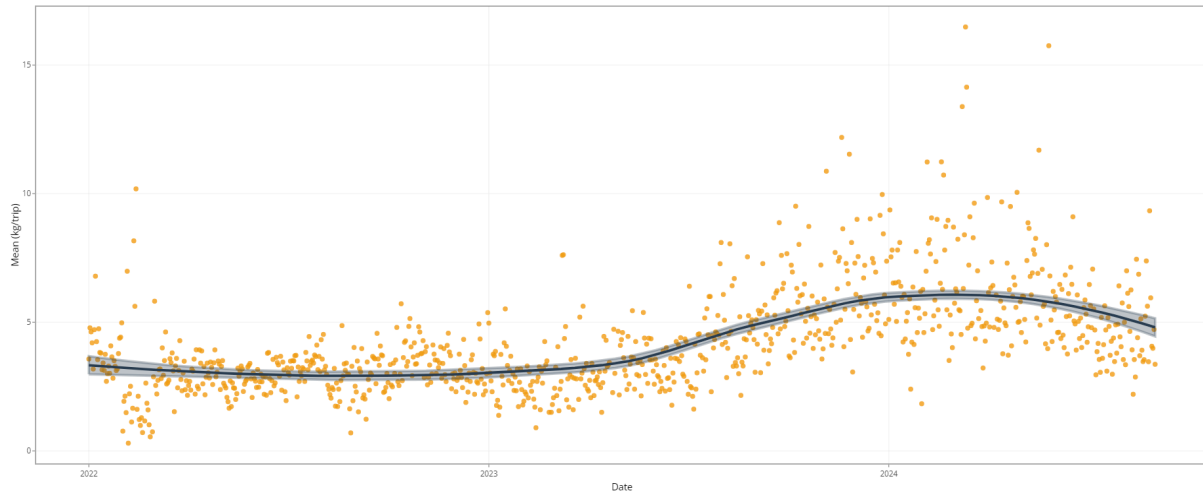


Figure 5 Mean catch per unit of effort (CPUE) of octopus in Likupang Dua, Bulutui, and Gangga Satu from January 2022 to August 2024

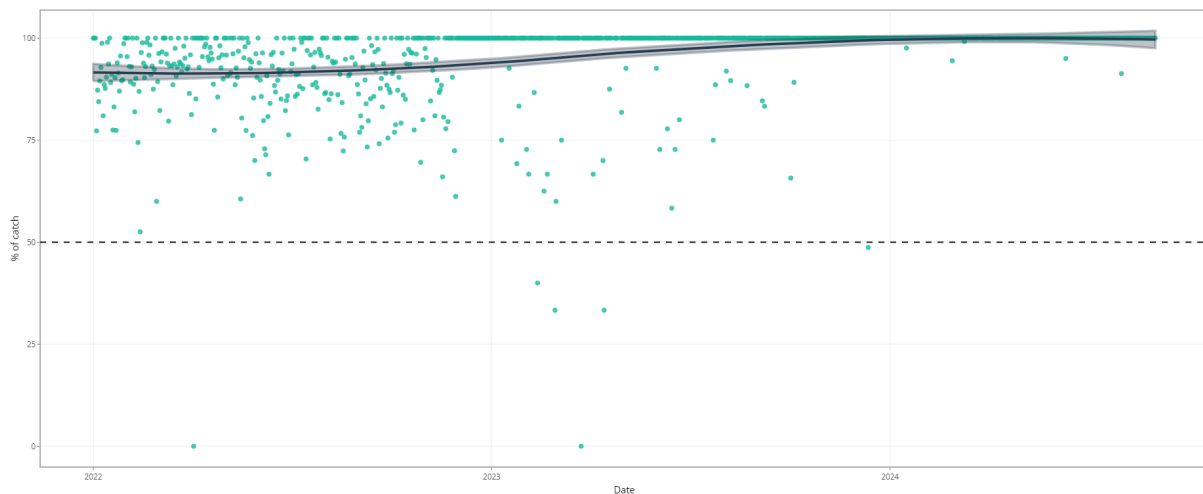


Figure 6 Mean percentage of mature octopus caught in Likupang Dua, Bulutui, and Gangga Satu from January 2022 to August 2024. The horizontal dashed line at 50% is a Limit Reference Point (LRP) for the percentage of the mature catch.

Octopus Fisheries in Pohuwato

The octopus fisheries data collected in Pohuwato is ranging from 01 January 2022 to 31 August 2024. Data is collected from Torosiaje Village. The fisher's total landings recorded is 34,983kg and the fisher's total income recorded is IDR1,537,131,047 with the average percent mature octopus caught is 97%. Fisher's average CPUE is 5kg/trip and the average IPUE is IDR207,864/trip.

The decline of the total landing trend of octopus fisheries in Torosiaje started in October 2022. The trend fluctuates along the months with an observable decline in December 2023, then fluctuates again.

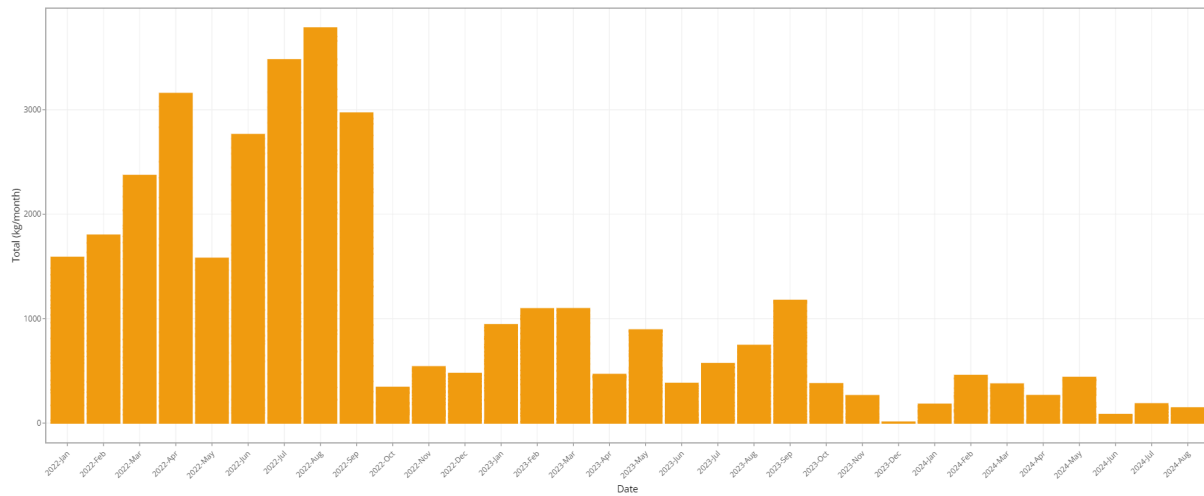


Figure 7 Total landings of octopus in Torosiaje from January 2022 to August 2024

The trend of CPUE in Torosiaje is stable from 2022 to 2024. The percentage of mature octopus caught is also showing a stable trend. From these two indicators, the octopus fisheries in Torosiaje are showing a stable condition.

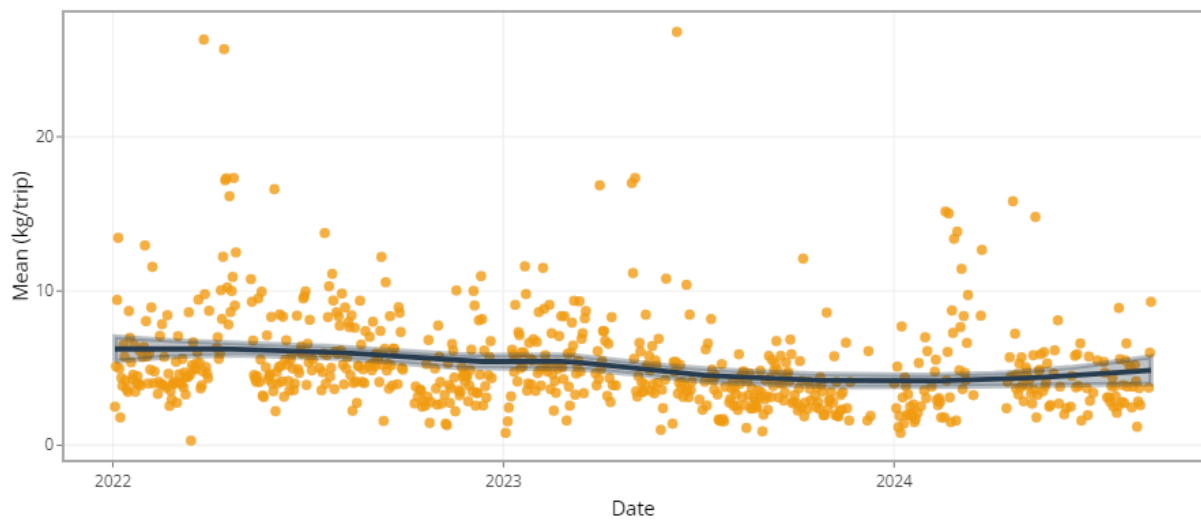


Figure 8 Mean catch per unit of effort (CPUE) of octopus in Torosiaje from January 2022 to August 2024

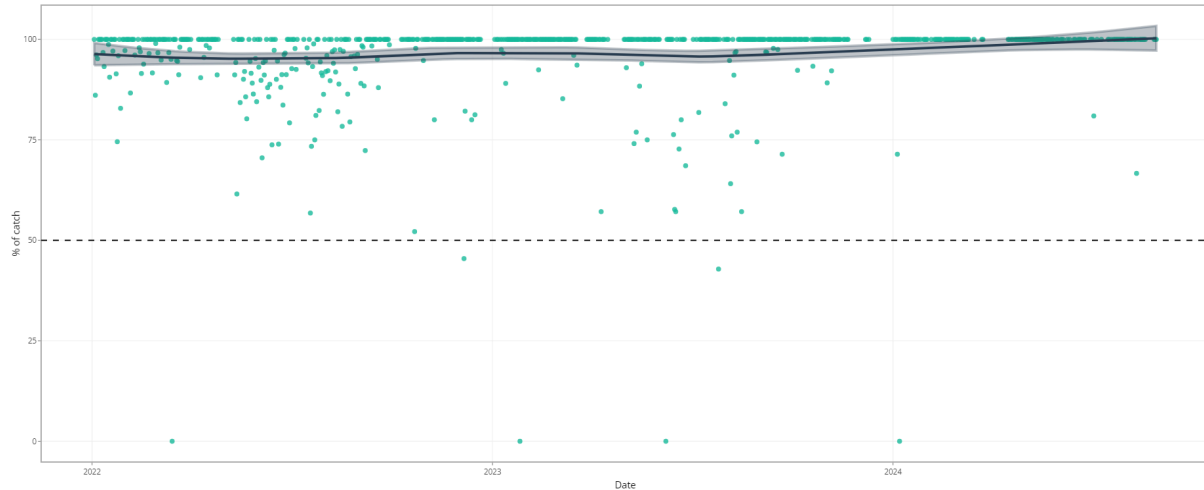


Figure 9 Mean percentage of mature octopus caught in Torosiaje from January 2022 to August 2024. The horizontal dashed line at 50% is a Limit Reference Point (LRP) for the percentage of the mature catch.

Octopus Fisheries in Tojo Una-Una

The octopus fisheries data collected in Tojo Una-Una is ranging from 01 January 2022 to 31 August 2024. Data is collected from Kadoda Village. The fisher's total landings recorded is 13,452kg and the fisher's total income recorded is IDR552,151,802 with the average percent mature octopus caught is 86%. Fisher's average CPUE is 3kg/trip and the average IPUE is IDR95,551/trip.

The total landing trend of octopus fisheries in Kadoda reached a sudden spike in January 2023, then decreased in the next month. Starting from March 2023, the total landings showed a stable trend until August 2024 (Figure 10).

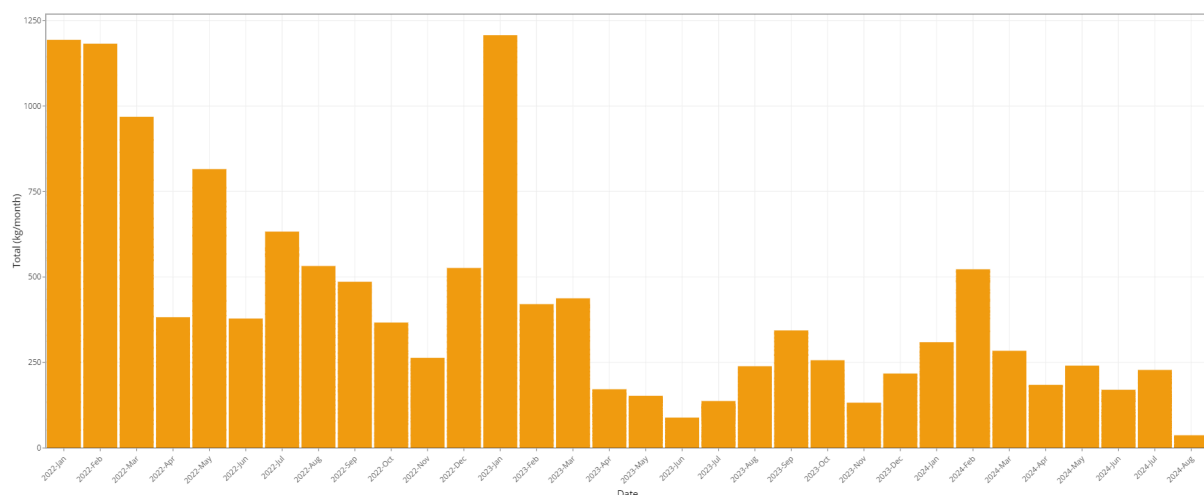


Figure 10 Total landings of octopus in Kadoda from January 2022 to August 2024

The CPUE in Kadoda was in decline during mid-year 2023, then it showed no change of trend until August 2024 (Figure 11). On the other hand, the percentage of mature

octopus caught is showing a stable trend from 2022 to 2024 (Figure 12). From these two indicators, the octopus fisheries in Kadoda are showing a stable condition.

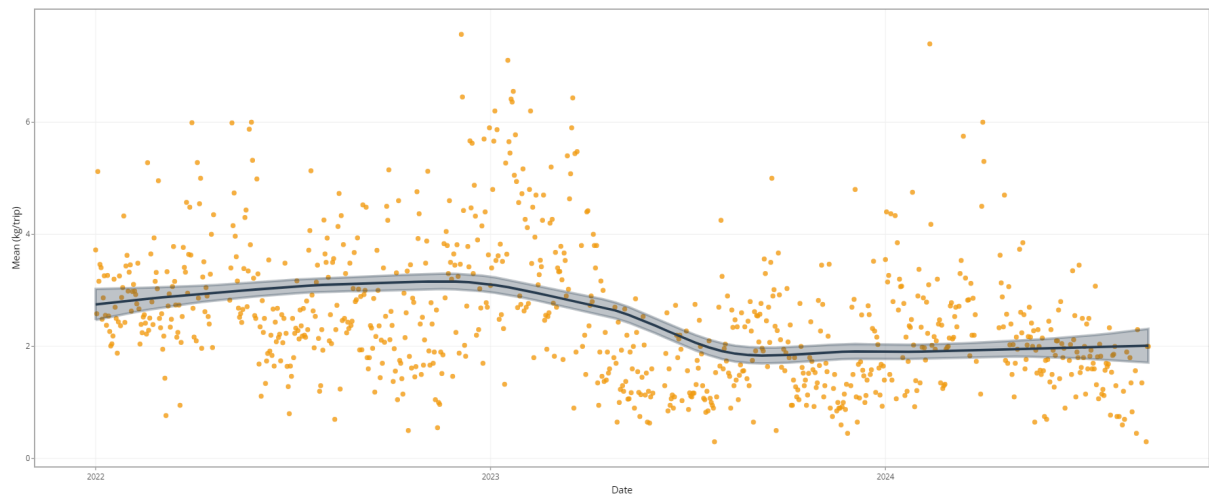


Figure 11 Mean catch per unit of effort (CPUE) of octopus in Kadoda from January 2022 to August 2024

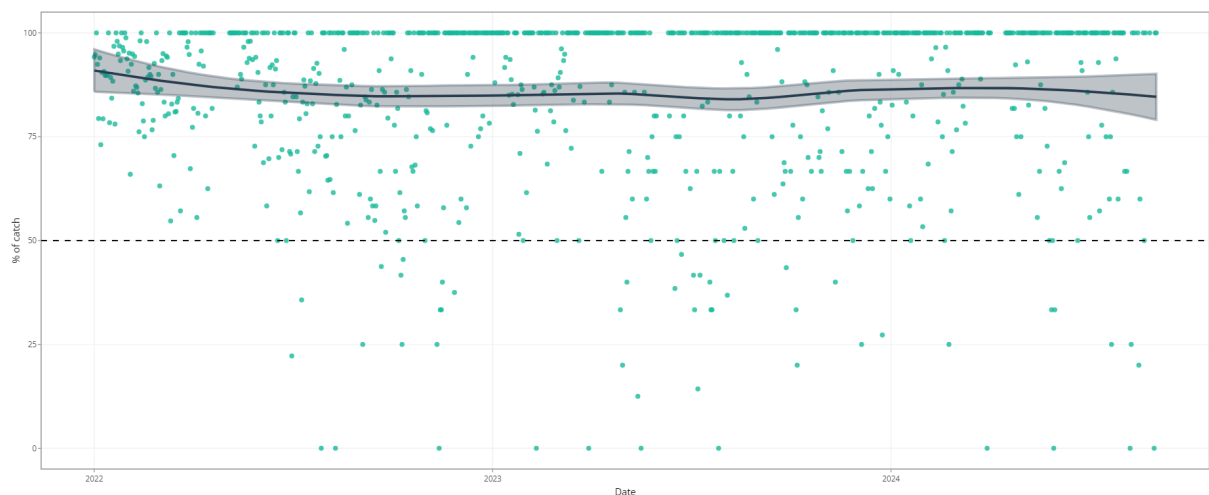


Figure 12 Mean percentage of mature octopus caught in Kadoda from January 2022 to August 2024. The horizontal dashed line at 50% is a Limit Reference Point (LRP) for the percentage of the mature catch.

Octopus Fisheries in Banggai

The octopus fisheries data collected in Banggai is ranging from 01 January 2022 to 31 August 2024. Data is collected from Uwedikan Village. The fisher's total landings recorded is 6,966kg and the fisher's total income recorded is IDR333,996,937 with an average per cent mature octopus caught is 99%. Fisher's average CPUE is 3kg/trip and the average IPUE is IDR139,320/trip.

The total landing trend of octopus fisheries in Uwedikan declined in early 2022 and remained stable until a sudden increase in March 2024. Then, from April 2024 to August 2024, the total landings showed a consistent declining trend (Figure 13).

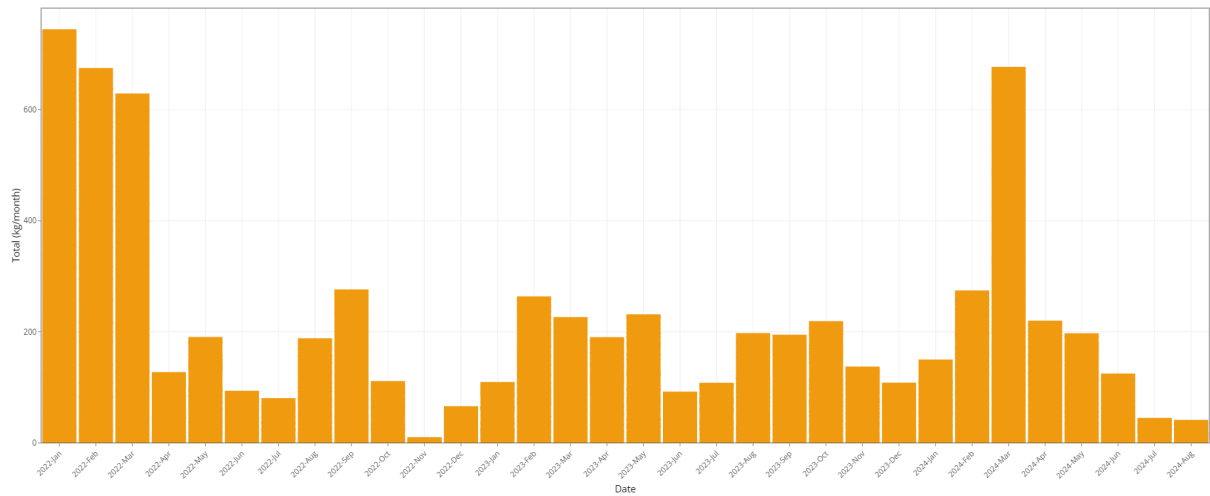


Figure 13 Total landings of octopus in Uwedikan from January 2022 to August 2024

The CPUE in Uwedikan showed no change in trend between 2022 to 2024 (Figure 14). The mean percentage of mature octopus caught is also showing a stable trend from 2022 to 2024 (Figure 15). From these two indicators, the octopus fisheries in Kadoda are showing a stable condition.

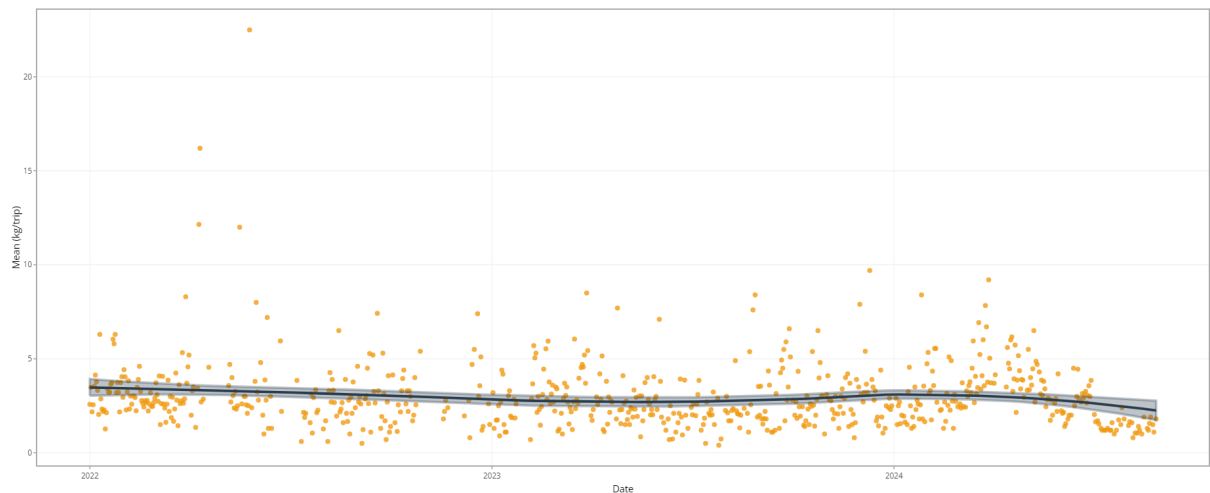


Figure 14 Mean catch per unit of effort (CPUE) of octopus in Uwedikan from January 2022 to August 2024

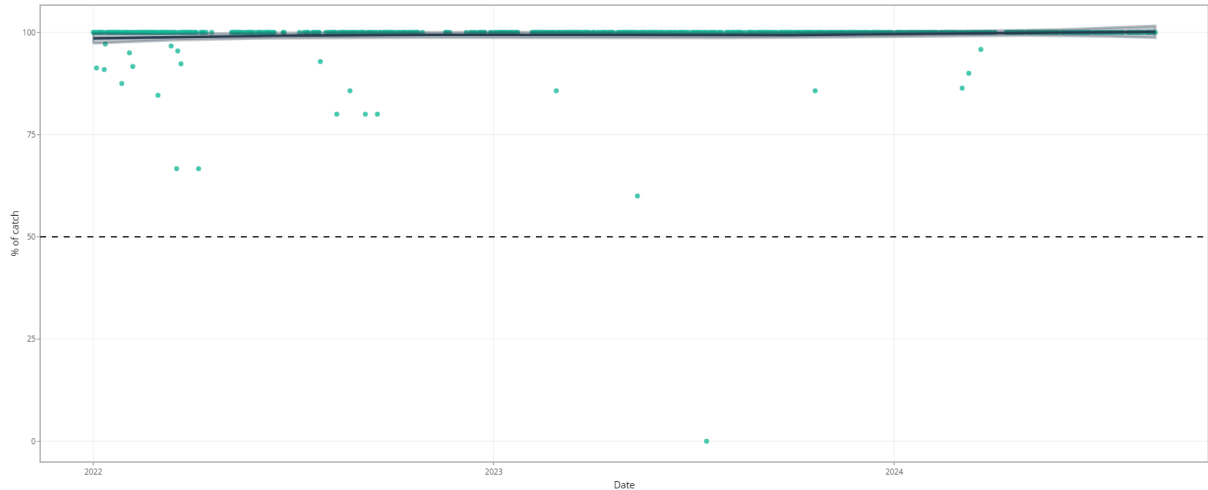


Figure 15 Mean percentage of mature octopus caught in Uwedikan from January 2022 to August 2024. The horizontal dashed line at 50% is a Limit Reference Point (LRP) for the percentage of the mature catch.

Octopus Fisheries in Banggai Kepulauan

The octopus fisheries data collected in Banggai Kepulauan is ranging from 01 January 2022 to 31 August 2024. Data is collected from two communities, namely Kalumbatan and Lobuton. The fisher's total landings recorded is 37,258kg and the fisher's total income recorded is IDR1,584,508,200 with the average percent mature octopus caught is 95%. Fisher's average CPUE is 3kg/trip and the average IPUE is IDR145,481/trip.

Total landings of octopus fisheries in Kalumbatan and Lobuton showed a stable fluctuation over the months. From 2022 to 2024, there are a few spikes in monthly total landings, in May 2022, November 2023, and May 2024 (Figure 16).

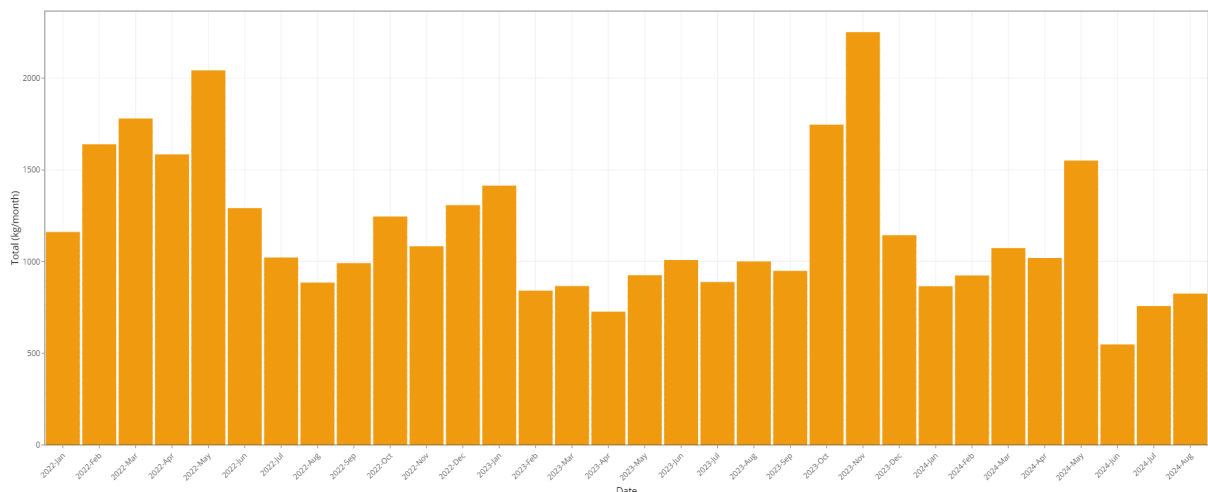


Figure 16 Total landings of octopus in Kalumbatan and Lobuton from January 2022 to August 2024

The CPUE in Kalumbatan and Lobuton showed no change of trend between 2022 to 2024 (Figure 17), however, the mean percentage of mature octopus trend is increasing (Figure 18). Using CPUE as an indicator, the octopus fisheries in Kalumbatan and Lobuton are showing a stable condition with an increase in octopus size caught by the percent mature trend.

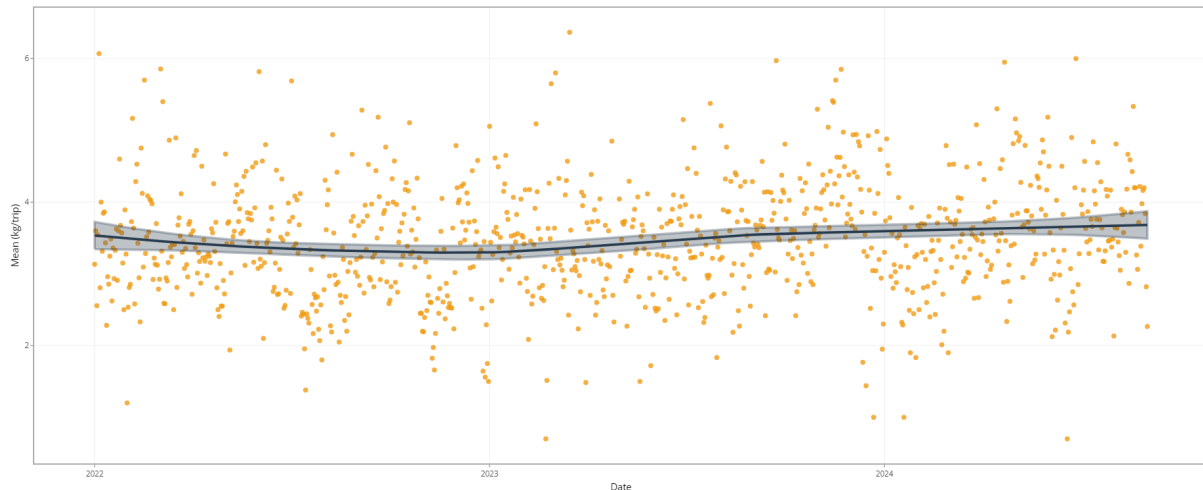


Figure 17 Mean catch per unit of effort (CPUE) of octopus in Kalumbatan and Lobuton from January 2022 to August 2024

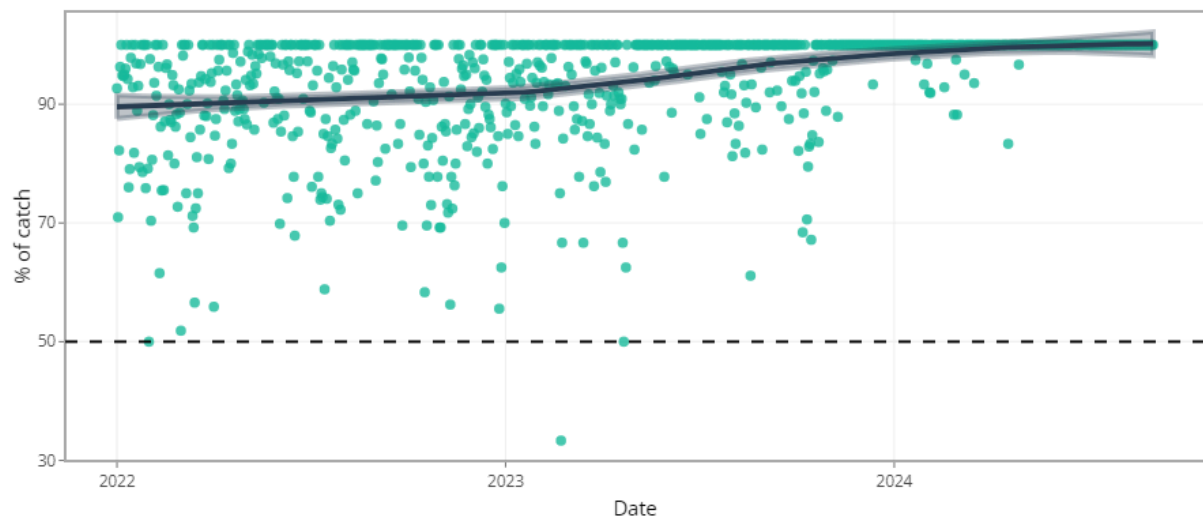


Figure 18 Mean percentage of mature octopus caught in Kalumbatan and Lobuton from January 2022 to August 2024. The horizontal dashed line at 50% is a Limit Reference Point (LRP) for the percentage of the mature catch.

Octopus Fisheries in Banggai Laut

The octopus fisheries data collected in Banggai Laut is ranging from 01 January 2022 to 31 August 2024. Data is collected from Popisi Village. The fisher's total landings recorded is 11,317kg and the fisher's total income recorded is IDR531,377,900 with an average

percentage of mature octopus caught is 93%. Fisher's average CPUE is 3kg/trip and the average IPUE is IDR123,296/trip.

Total landings of octopus fisheries in Popisi showed a decreasing trend over the months. There is a sudden increase in April 2024 and then it continues to decrease in the following months (Figure 19).

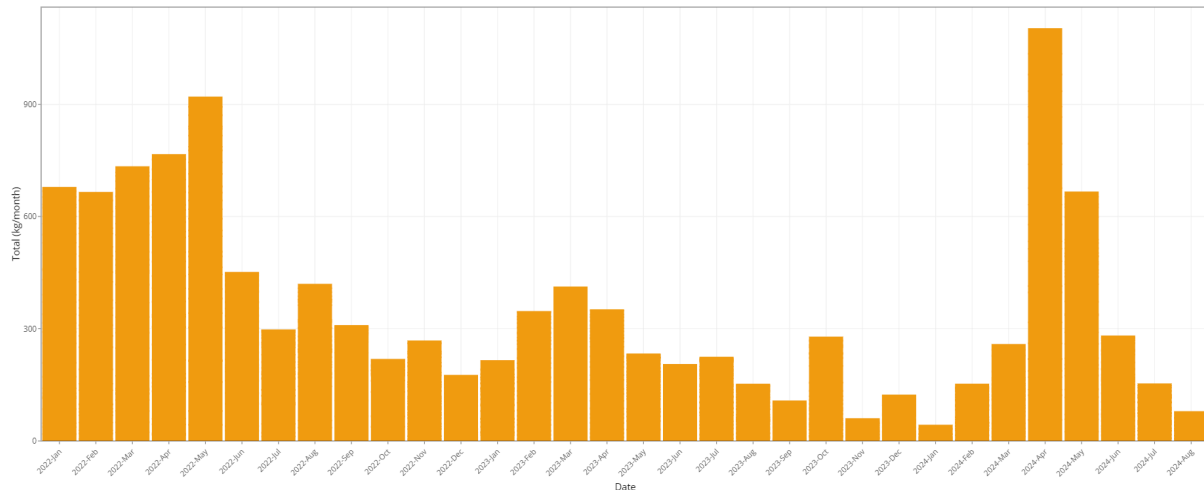


Figure 19 Total landings of octopus in Popisi from January 2022 to August 2024

The CPUE in Popisi showed a slight increase in trend between 2022 to 2024 (Figure 20) as well as the trend of the mean percentage of mature octopus (Figure 21). Using CPUE and mean per cent mature catch as an indicator, the octopus fisheries in Popisi are showing an improvement between 2022 and 2024.

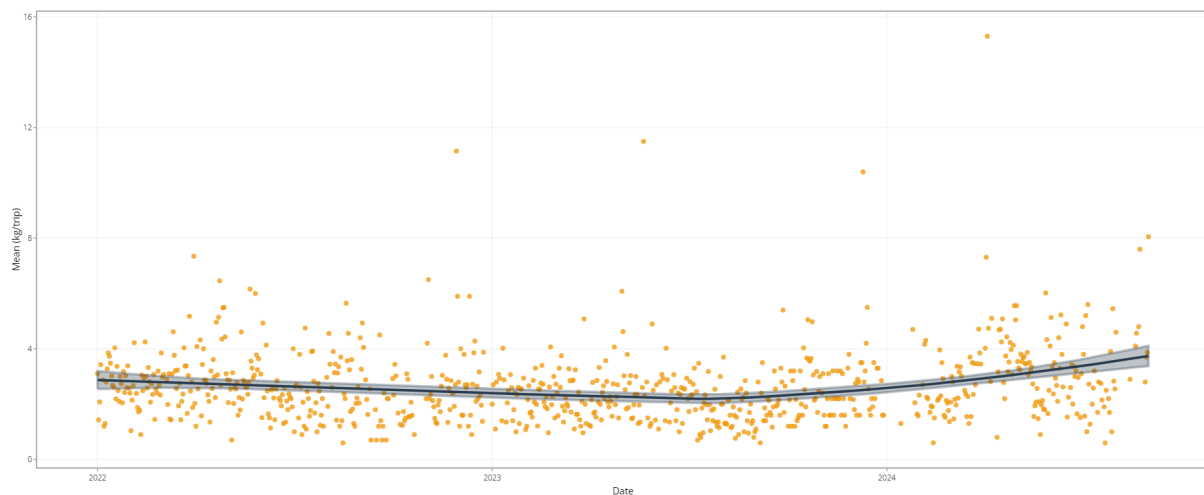


Figure 20 Mean catch per unit of effort (CPUE) of octopus in Popisi from January 2022 to August 2024

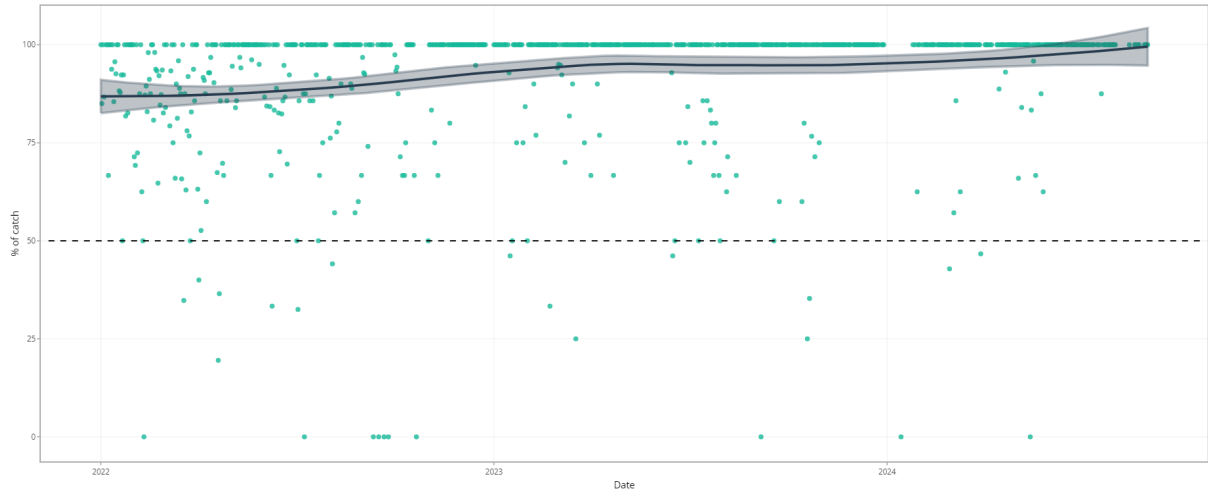


Figure 21 Mean percentage of mature octopus caught in Popisi from January 2022 to August 2024. The horizontal dashed line at 50% is a Limit Reference Point (LRP) for the percentage of the mature catch.

Octopus Fisheries in Kepulauan Selayar

The octopus fisheries data collected in Kepulauan Selayar is ranging from 01 January 2022 to 31 August 2024. Data is collected from two communities, Mekar Indah and Kahu-Kahu. The fisher's total landings recorded is 78,814kg and the fisher's total income recorded is IDR3,416,431,558 with the average percent mature octopus caught is 90%. Fisher's average CPUE is 3kg/trip and the average IPUE is IDR115,123/trip.

Total landings of octopus fisheries in Mekar Indah and Kahu-Kahu showed a stable trend from 2022 to September 2023 with a sudden increase in March 2023. From October 2023 to August 2024 the trend underwent a slight decline with a sudden increase in February 2024 (Figure 22).

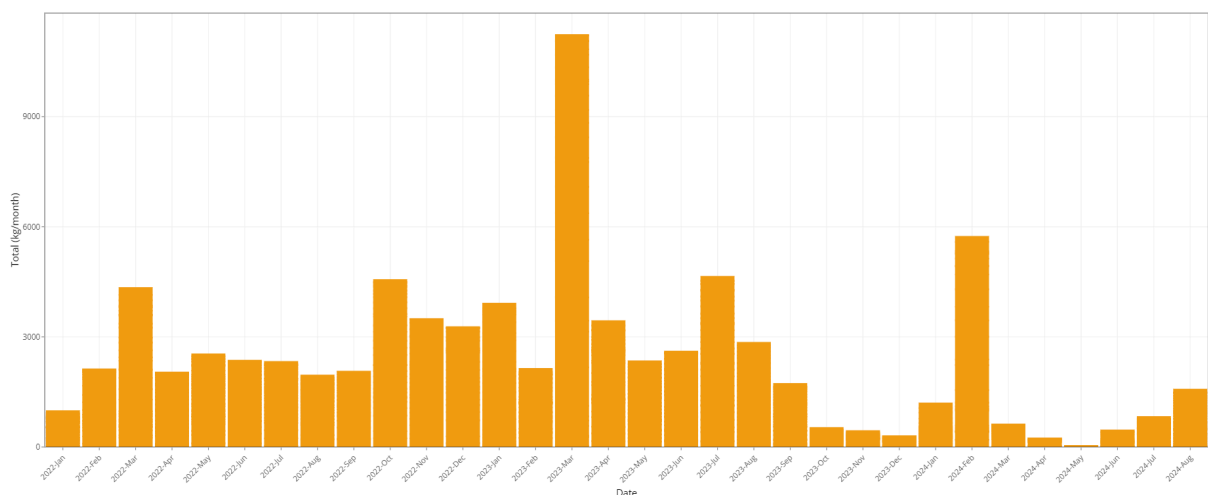


Figure 22 Total landings of octopus in Mekar Indah and Kahu-Kahu from January 2022 to August 2024

Compared to the total landings trend, the CPUE in Mekar Indah and Kahu-Kahu showed a slight increase in trend between 2022 to 2024 (Figure 23). However, the percent maturity trend of octopus remains stable between 2022 and 2024 (Figure 24). Using both trends as indicators, the octopus fisheries conditions in Mekar Indah and Kahu-Kahu are stable.

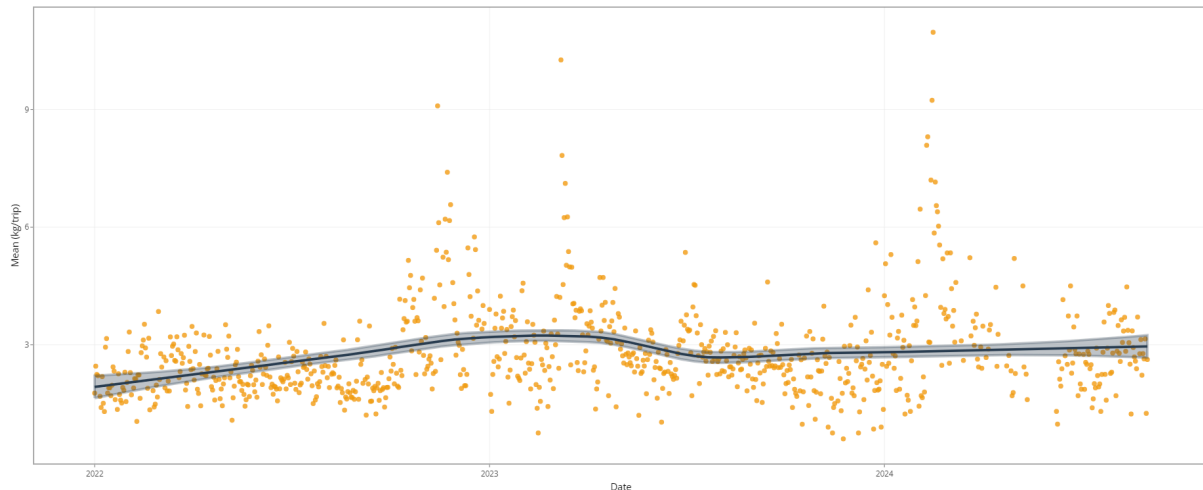


Figure 23 Mean catch per unit of effort (CPUE) of octopus in Mekar Indah and Kahu-Kahu from January 2022 to August 2024

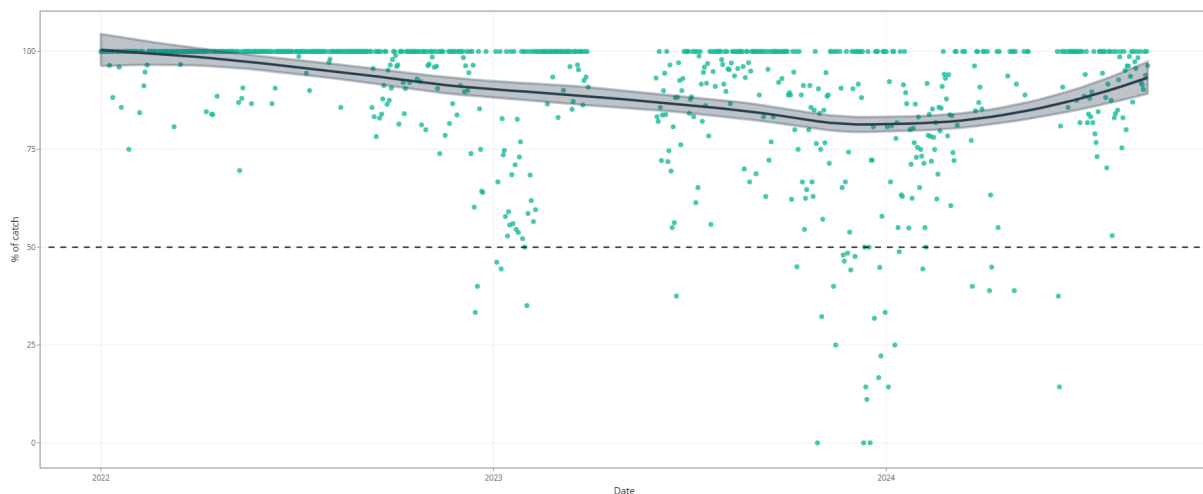


Figure 24 Mean percentage of mature octopus caught in Mekar Indah and Kahu-Kahu from January 2022 to August 2024. The horizontal dashed line at 50% is a Limit Reference Point (LRP) for the percentage of the mature catch.

Octopus Fisheries in Wakatobi

The octopus fisheries data collected in Wakatobi is ranging from 01 January 2022 to 31 August 2024. Data is collected from nine communities in Wakatobi. The fisher's total landings recorded is 20,169kg and the fisher's total income recorded is IDR749,436,034

with the average percent of mature octopus caught is 87%. Fisher's average CPUE is 4kg/trip and the average IPUE is IDR137,069/trip.

Total landings of octopus fisheries in Wakatobi showed a decreasing trend from January–October 2022. There was a sudden increase in December 2023, then it fluctuated along the months showing a stable trend (Figure 25).

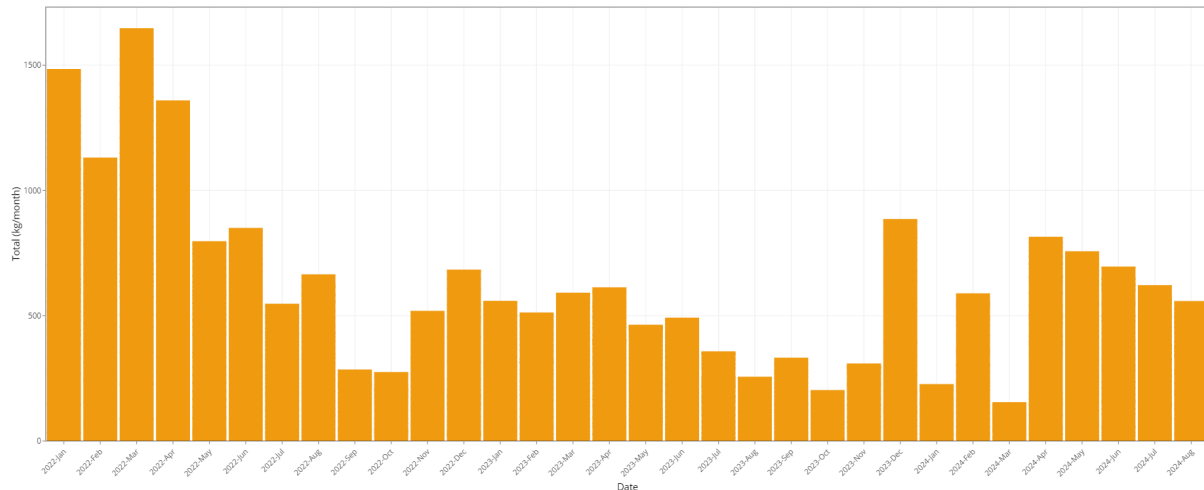


Figure 25 Total landings of octopus across 9 communities in Wakatobi from January 2022 to August 2024

The CPUE in Wakatobi showed an increasing trend between 2022 to 2024 (Figure 26). The percent mature also showed a similar increasing trend between 2022 and 2024 (Figure 27). Using both trends as indicators, the octopus fisheries conditions in nine communities in Wakatobi are showing an improvement, not only by increasing CPUE but also by increasing octopus size based on its maturity percentage.

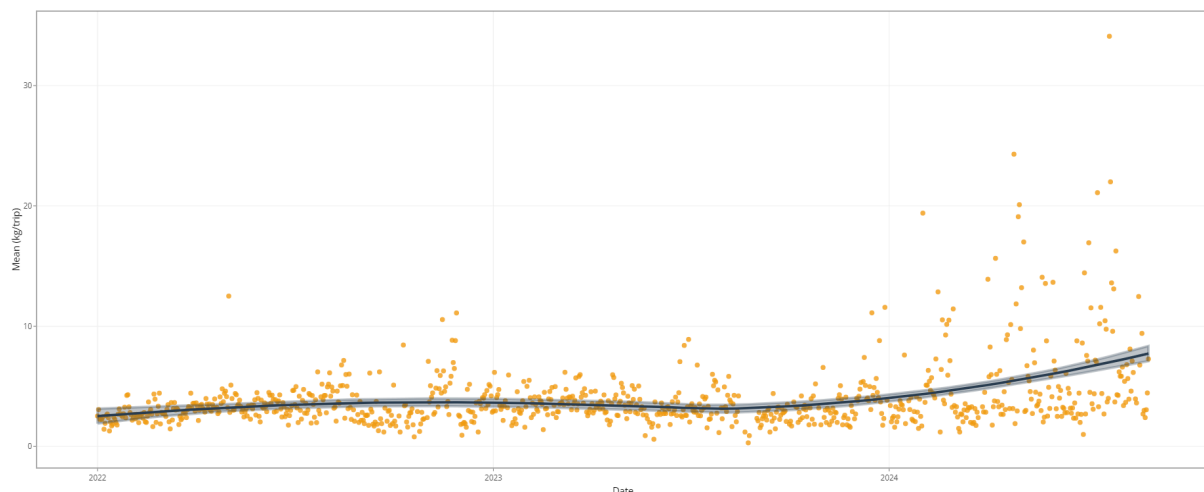


Figure 26 Mean catch per unit of effort (CPUE) of octopus across 9 communities in Wakatobi from January 2022 to August 2024

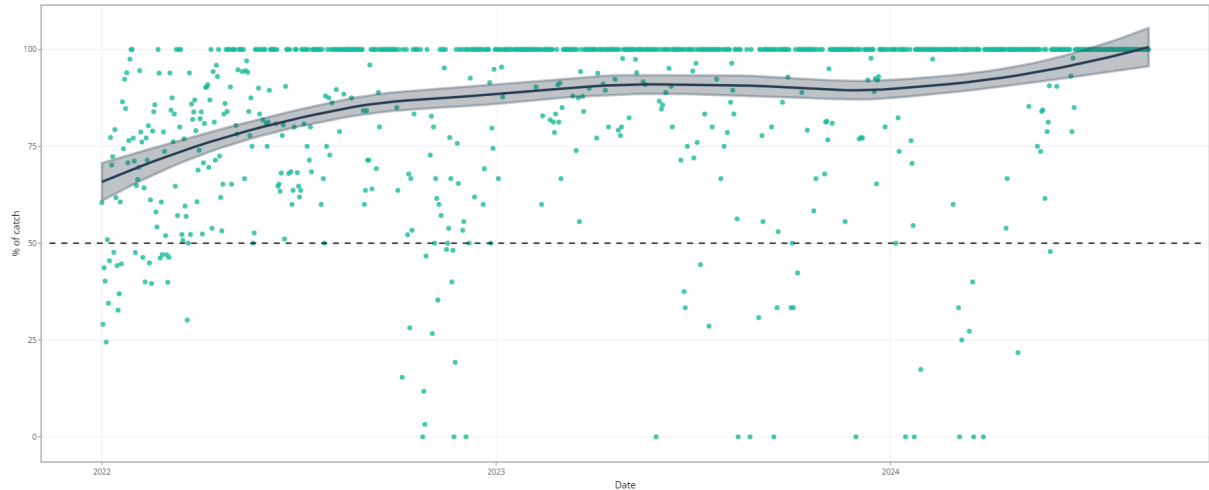


Figure 27 Mean percentage of mature octopus caught across 9 communities in Wakatobi from January 2022 to August 2024. The horizontal dashed line at 50% is a Limit Reference Point (LRP) for the percentage of the mature catch.

The result of the data collection is reflected in the community by conducting regular Data Feedback Sessions (DFS). The DFS is the fundamental activity to decide fisheries management responses and action. It is relevant to the management action by implementing Temporary Closure (TC) in the UoC of the FIP. As the biological and life history status of the day octopus (*Octopus cyanea*) as they are short-life species, temporary closure is considered to be an appropriate management response to recover the local octopus biomass. Additionally, communities also agreed on minimum octopus size catch and the management of fishing gear allowed in their respective management area boundaries.

Appendix



Appendix 1 Community member is sharing his experience as a fisher during a data feedback session in Darawa, Wakatobi



Appendix 2 Staff of Forkani was leading one of the data feedback sessions in Tanomeha, Wakatobi



Appendix 3 Staff of Forkani was leading one of the data feedback sessions in Darawa, Wakatobi



Appendix 4 Data feedback session in Torosiaje, Pohowato



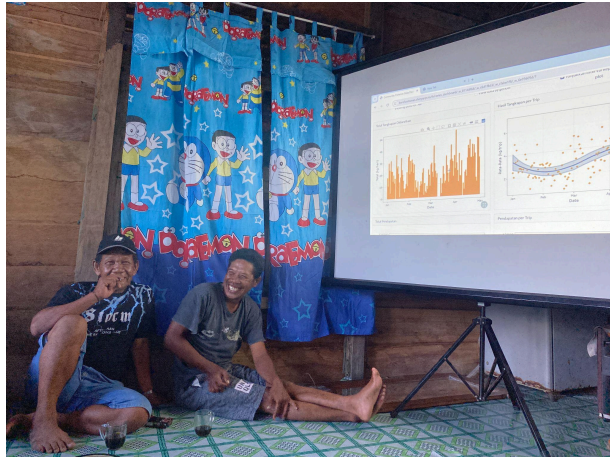
Appendix 5 Data feedback session follow-up discussion in Darawa, Wakatobi



Appendix 6 Redrawing of plots and analysis results for the data feedback session



Appendix 7 Data feedback session using dashboard in Kalumbatan, Banggai Kepulauan



Appendix 8 Data feedback session using dashboard in Popisi, Banggai Laut