

March 2025

Participative Coral Reef Ecological Survey in Sulawesi

Introduction

As a species that is highly associated with coral reefs, octopus populations are highly dependent on the quality of the coral reef ecosystem. A healthy coral reef ecosystem can support the sustainability of octopus fishing activities, so existing fisheries management efforts must also ensure the conservation of coral reefs. One form of fisheries management that can protect the coral reef ecosystem while also maintaining the sustainability of fishing activities is the implementation of a temporary closure. However, the location of the temporary closure needs to be determined based on data. Therefore, the condition of the coral reef ecosystem needs to be assessed as part of fisheries management efforts, so that the community can make accurate and informed decisions regarding temporary closures in their fisheries management areas.

The condition of the coral reef is surveyed using the manta tow method (English *et al.* 1997, Sukmara *et al.* 2001). The manta tow method is used because it provides a snapshot of coral reef conditions in a relatively short time, is simple to perform after brief training, is relatively inexpensive, and can involve the community in its implementation. Between September 2024 and February 2025, four partners have been able to facilitate 7 communities within the UoC in implementing coral reef ecological surveys using manta tow method (Table 1).

Table 1 Ecological survey locations using manta tow from September 2024 to February 2025

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	Sulawesi Tengah	Tojo Una-Una	Talatako	Kadoda	JAPESDA
5	Sulawesi Tenggara	Wakatobi	Kaledupa	Sombano	FORKANI
6	Sulawesi Tenggara	Wakatobi	Binongko	Kampo-Kampo	FONEB

No.	Province	Regency	District	Community	Supporting Partner
7	Sulawesi Tenggara	Wakatobi	Binongko	Lagongga	FONEB

Coral Reef Ecological Survey Results

Based on the manta tow survey, mean live hard coral (HCL) cover across 7 communities in Sulawesi is 34.53% (± 0.90). Figure 1 shows Kampo-Kampo yields the highest mean live hard coral cover with 55.83% (± 1.49) and Likupang Dua has the lowest mean live hard coral cover with 20.81% (± 1.96). In terms of dead hard coral (HCD) cover, Likupang Dua has the highest dead coral cover which is 28.51% (± 2.22) while Kampo-Kampo dan Lagongga have the lowest with 10.00% (± 0.00) and 10.00% (± 2.89) respectively. As part of the coral reef complex, rock substrate should also be made into considerations to understand the quality of octopus' habitat. Sombano has the highest rock cover with 14.23% (± 1.27) while Bulutui, Gangga Satu, and Likupang Dua all three communities have the lowest rock cover with 0.00% (± 0.00).

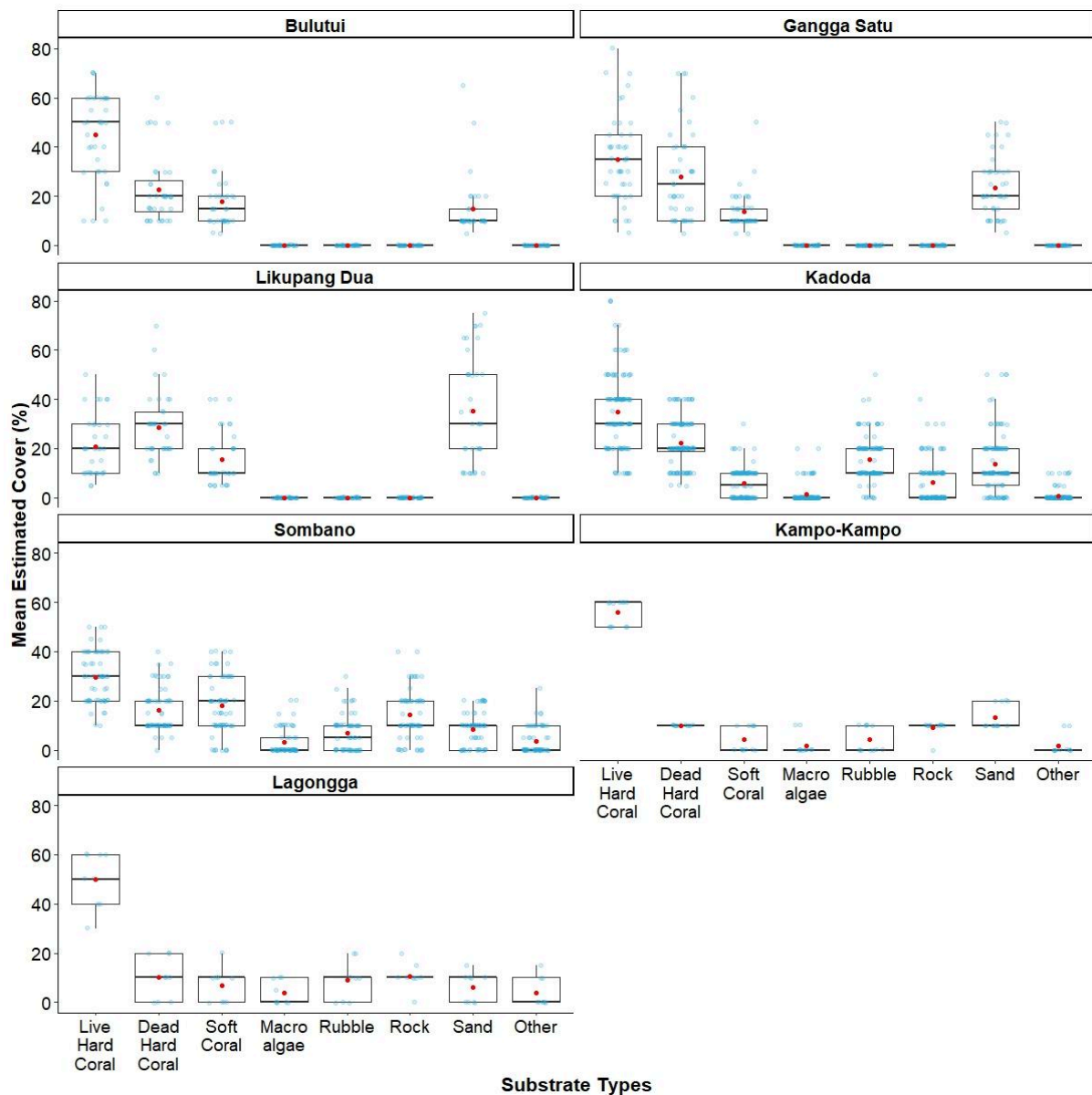


Figure 1 Estimated substrate cover by communities between September 2024 and February 2025 in Sulawesi. Each box represents the interquartile range (IQR) with 25th and 75th percentile. Vertical line is 1.5*IQR. Black horizontal line in each box is a median value. The light blue dots are data points for estimated substrate cover in each tows. The red dot represents the mean substrate cover from all the tows.

The coral reef of Gangga Satu is in moderate condition with an average live hard coral cover of 34.89% (± 2.61). The coral reef along the crest of Gangga Satu is generally in moderate condition with a couple of locations that are in good condition, whereas coral cover in Pulau Lihaga is generally in better condition (Figure 2). The community of Gangga Satu now has more complete information to support their decision on the alternative location of temporary closure should they decide to relocate the closure area to Pulau Lihaga or the eastern part of Gangga Satu.

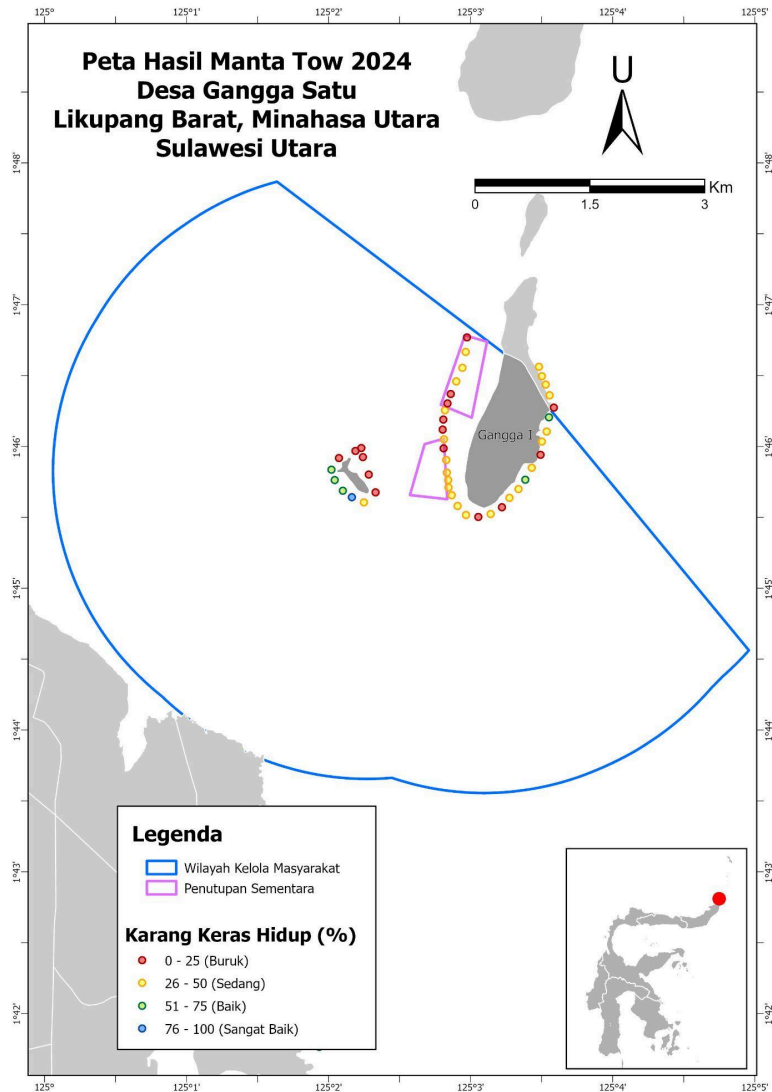


Figure 2 Manta tow results and analysis in Gangga Satu October 2024

The coral reef of Bulutui is in moderate condition with an average live hard coral cover of 44.86% (± 2.92). The coral reef around the jetty of Bulutui is in poor to moderate condition, whereas the coral reef in the reef around Pulau Tamperong is generally in better condition. Based on the survey results, the current temporary closure area is already placed at coral reefs with good condition (Figure 3). Should the community decide to relocate, now they have another alternative, which is the northeastern part of Pulau Tamperong.

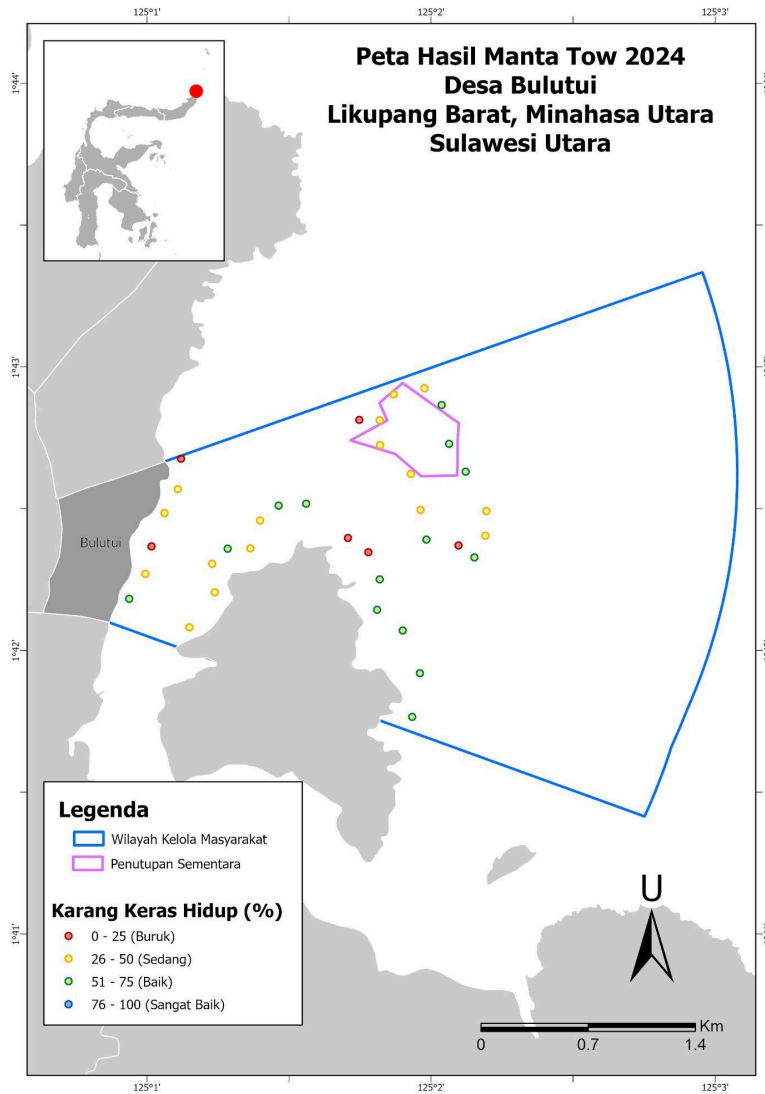


Figure 3 Manta tow results and analysis in Bulutui October 2024

The coral reef of Likupang Dua is in poor condition with an average live hard coral cover of 20.81% (± 1.96). There are some parts of coral reef in Likupang Dua that are in moderate condition (Figure 4). The current temporary closure location is already located in a coral reef with moderate condition. Should the community decide to relocate the closure area, there are alternatives on the reef in front of the community.

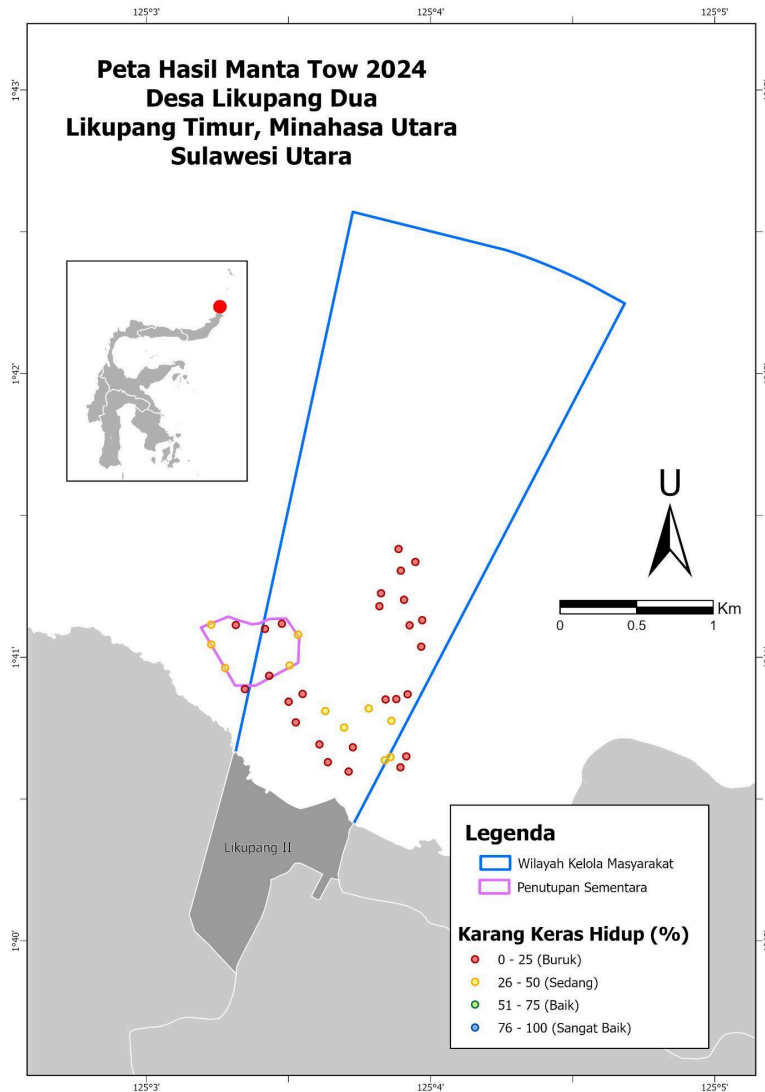


Figure 4 Manta tow results and analysis in Likupang Dua October 2024

The coral reef of Kadoda is in moderate condition with an average live coral cover of 34.84% (± 1.39). The coral reef around Kadoda and across the settlement are generally in moderate condition. Coral reefs with good condition were found on the reef north of Kadoda. The previous closure area was located at the northern part reef with good condition, but the community was having a challenging time to do surveillance and ensure compliance with the fishers, therefore it was moved to the current location (Figure 5). The community of Kadoda now has complete information about the coral reef condition that can support their decision making on the temporary closure area.

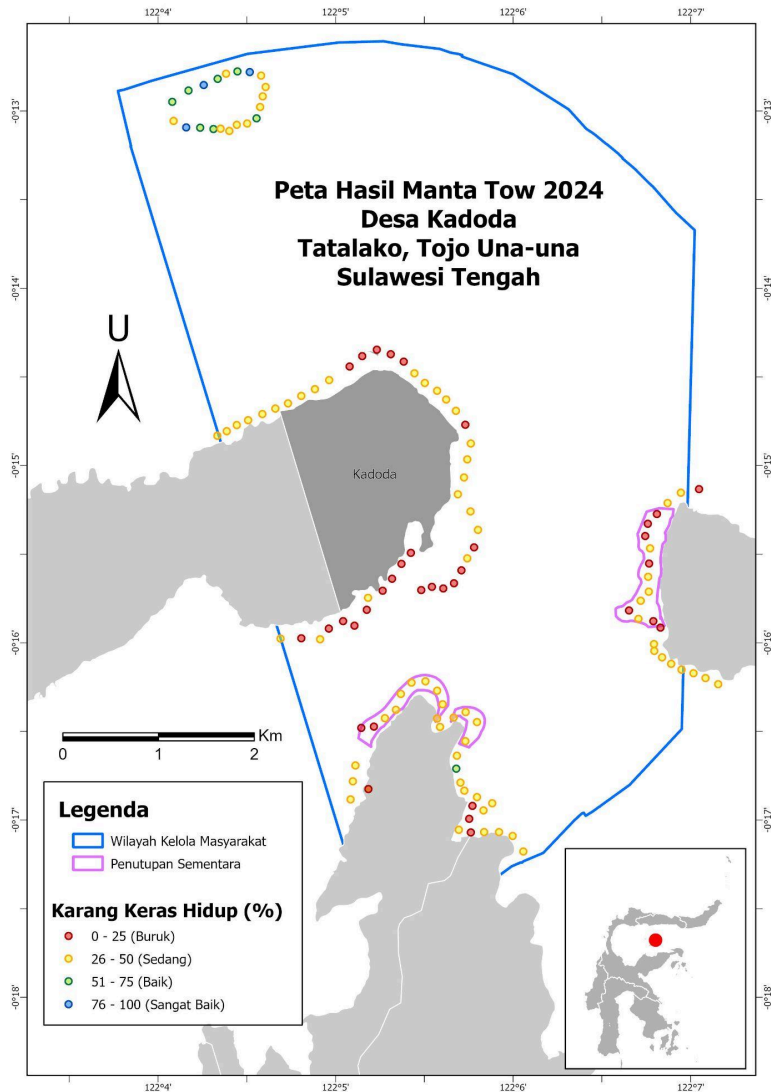


Figure 5 Manta tow results and analysis in Kadoda October 2024

The coral reefs of both Kampo-Kampo and Lagongga are in good condition with an average live coral cover of 55.83% (± 1.49) and 50.00% (± 3.73) respectively. Based on the manta tow results, the community in Kampo-Kampo now have alternatives should they decide to relocate the temporary closure area to the northern part of their fisheries management area. The community in Lagongga already established a temporary closure area in a good location but have the potential to expand their closure area to the south (Figure 6).

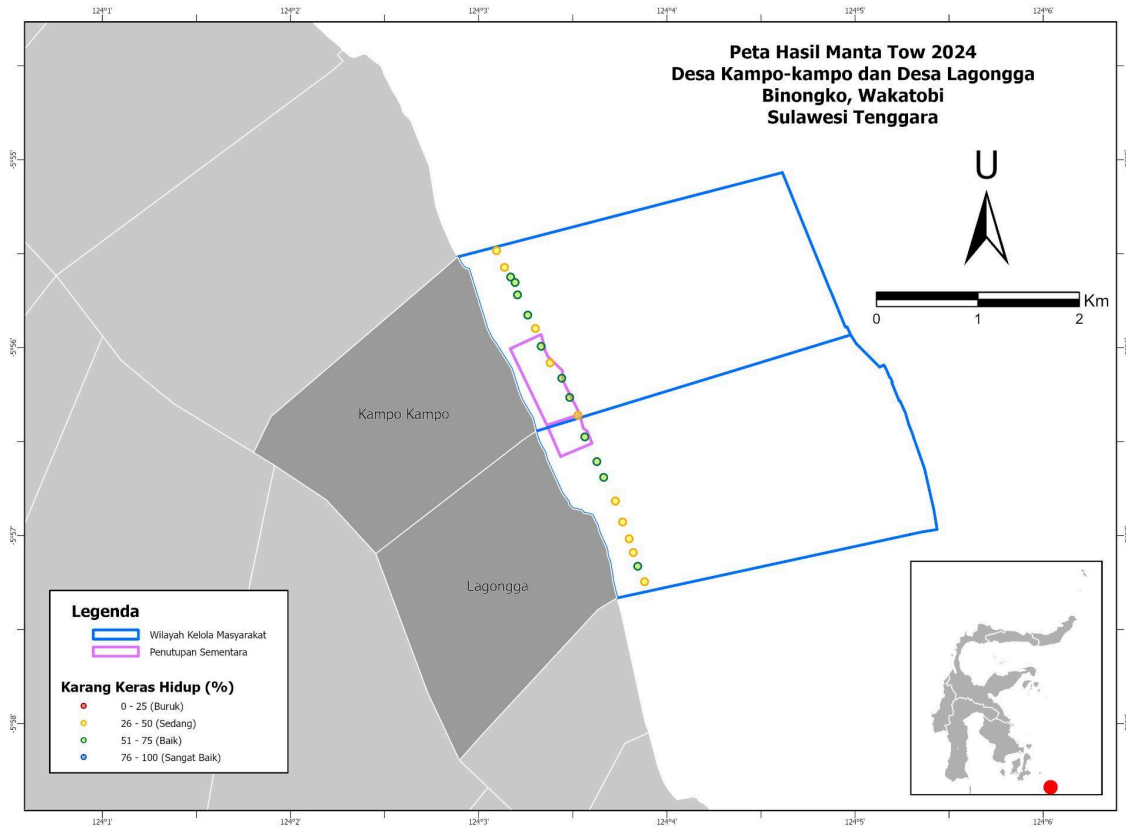


Figure 6 Manta tow results and analysis in Kampo-Kampo and Lagongga November 2024

The coral reefs of Sombano are in moderate condition with an average live coral cover of 29.69% (± 1.24). Most of the coral in Sombano are in moderate condition with a certain area in the southern part that is in poor condition (Figure 7). The community in Sombano have alternative locations should they decide to relocate the temporary closure. Based on the manta tow results, the northern part of Sombano is a potential location for temporary closure with moderate coral cover.

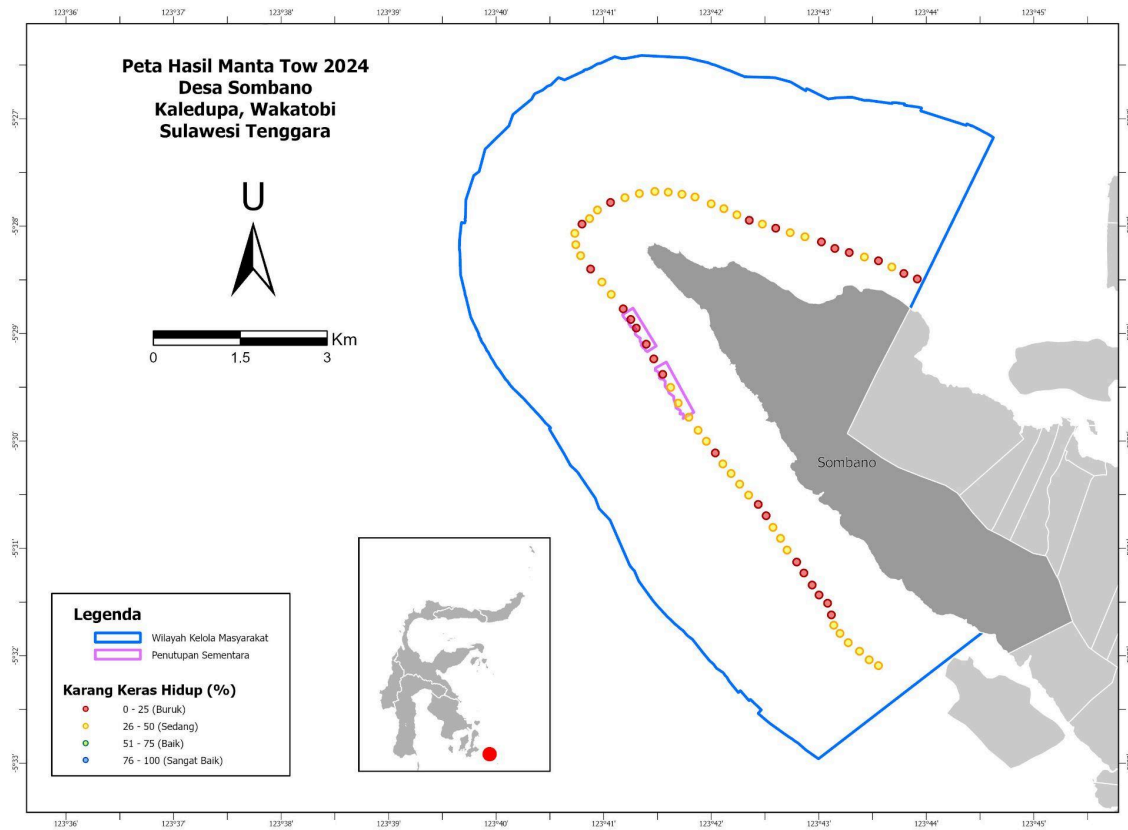


Figure 7 Manta tow results and analysis in Sombano November 2024

References

- English S, Wilkinson C, Baker V. 1997. Survey manual for tropical marine resources 2nd Edition. Australian Institute of Marine Science.
- Sukmara A., Siahainenia AJ, Rotinsulu C. 2001. Panduan pemantauan terumbu karang berbasis-masyarakat dengan metoda manta tow. Proyek Pesisir. Publikasi Khusus. University of Rhode Island, Coastal Resources Center, Narragansett, Rhode Island, USA.

Appendix



Appendix 1 FONEB's staff is conducting manta tow training for community members and fishers group from Lagongga and Kampo-Kampo



Appendix 2 FORKANI's staff is supporting the community of Sombano during manta tow as a boat observer



Appendix 3 YAPEKA is conducting the manta tow with community members from Likupang Dua



Appendix 4 JAPESDA is facilitating manta tow with the community members of Kadoda



Appendix 5 FONEB's staff is conducting a data feedback session on the manta tow results with the community members of Kampo-Kampo