



**MARINE
CONSERVATION
PHILIPPINES**

Semiannual Report **ZAMBOANGUITA**



marineconservationphilippines.org

**OCT
2025**

EXECUTIVE SUMMARY

Marine Conservation Philippines Report Zamboanguita - May - August 2025



Marine Conservation Philippines (MCP) conducted a total of **890 surveys** across four survey methodologies (Fish, Substrate, Invertebrates, and Predation) across the three municipalities we monitor (Zamboanguita, Siaton and Santa Catalina) between June - August 2025. With **871 surveys** conducted in the previous season (March - May 2025), this makes a total for this reporting period of **1761 surveys**. **This is an increase of 23% in the number of surveys from the last report.**

	Fish	Substrate	Invertebrates	Predation
Number of Surveys	425	455	455	426

The chart below shows the average fish biomass for the latest survey season for the nine sites monitored in Zamboanguita Municipality, focusing on the density and average size of fish in each of the reefs. Given our focus on food security, we have specifically selected fish families of commercial interest for analysis. **The average commercial biomass for Zamboanguita was ~11kg per 150m²** (Figure 1).

The highest average commercial biomass was at Malatapay, at 34.35 kg per 150m². Basak and Guinsuan had very similar values of ~22 kg per 150m². Basak had continually been Zamboanguita's highest performing MPA in terms of biomass, having been observed to reach a high of 73kg in 2018. The lowest values were at Mojon which was recorded as having 1.9 kg per 150m².

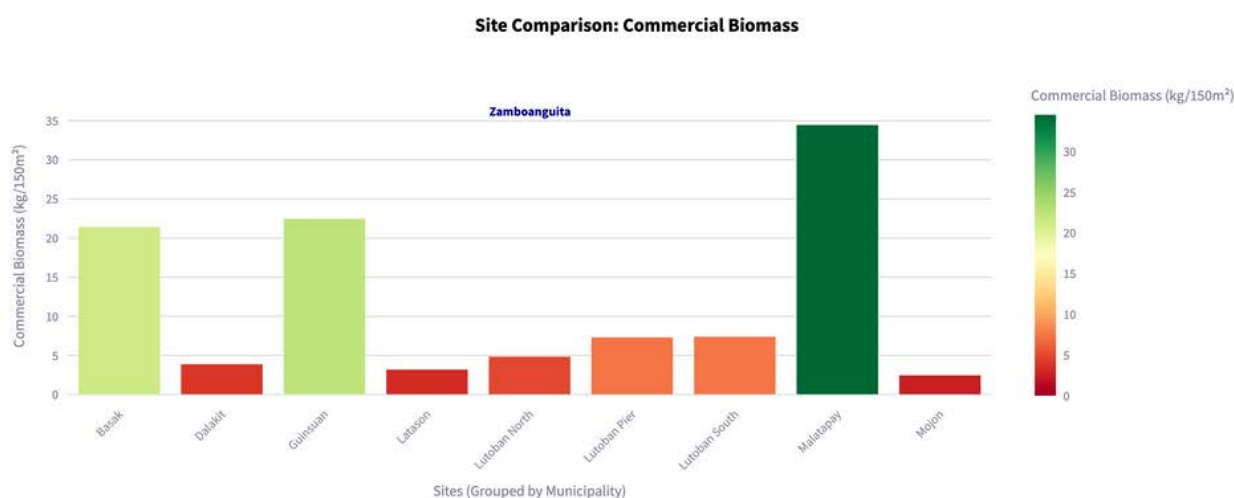


Figure 1. Commercial fish biomass (kg per 150m²) across all survey sites in the Zamboanguita Municipality, June–August 2025. Biomass values represent the estimated weight of commercially important reef fish, providing an indicator of food security potential and MPA effectiveness.

Hard coral cover is an excellent indicator of the overall health of a coral reef, as it is this type of coral that builds the long-term physical structure of the reef. The average hard coral cover for Zamboanguita was 22.52% compared to 37% in 2017 when monitoring began (Figure 2). Interestingly, the highest coral cover was recorded at Lutoban Pier, a non-MPA, at ~37%.

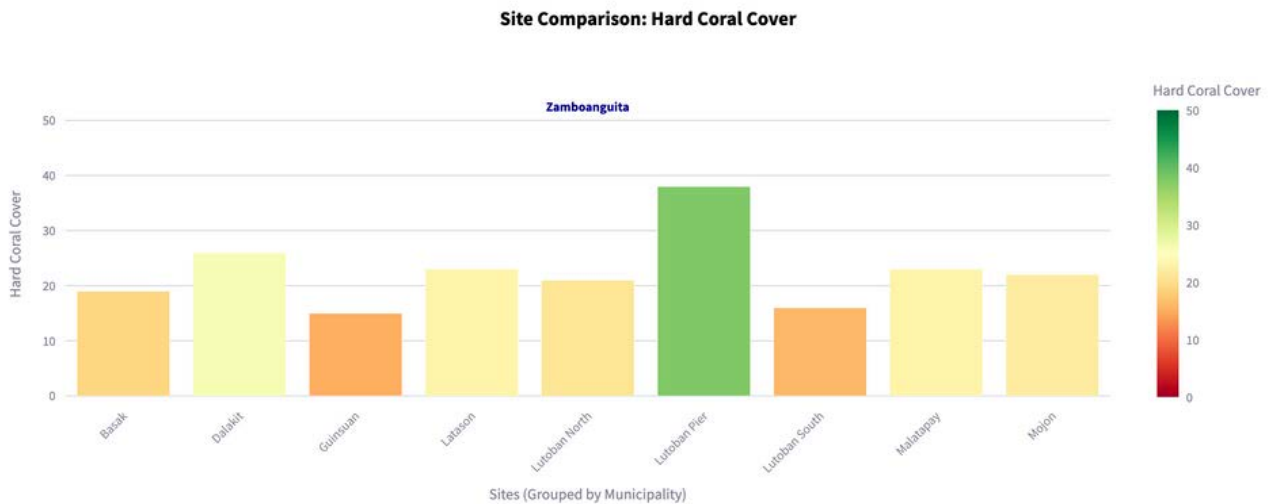


Figure 2. Average hard coral cover across survey sites in the Zamboanugita Municipality June–August 2025 Data is expressed as average percentage cover.

Of the hard coral present, 98% was recorded as healthy, with approximately 2% observed to be affected by bleaching. Predation and silt were present, but only in small amounts. Globally, ocean temperatures are rising in response to human-caused climate change, and incidences of bleaching are becoming increasingly widespread and severe. However, it is interesting to note that the waters off the eastern and southern coasts of Southern Negros can be as much as 1 degree Celsius cooler than the waters of the Sulu Sea to the west, which does afford the area some natural protection against bleaching events. Events of bleaching in the municipality have gradually reduced since 2022, when 18% of hard corals were recorded as bleaching.

Fieldwork during this monitoring period was influenced by adverse weather conditions, including Typhoon Crising in July and Tropical Depression Isang in August.

1716
**SURVEYS
COMPLETED**

**23%
Increase**



22.5%
**HARD CORAL
COVER**

**36.4%
Increase**



11.7 KG
**COMMERCIAL
BIOMASS**

**39.3%
Increase**



Using science to understand how local and global pressures affect marine ecosystems, we empower, engage, and build local and national capacity to reduce and adapt to these pressures, aiming for a sustainable future for the Philippine people and environment.



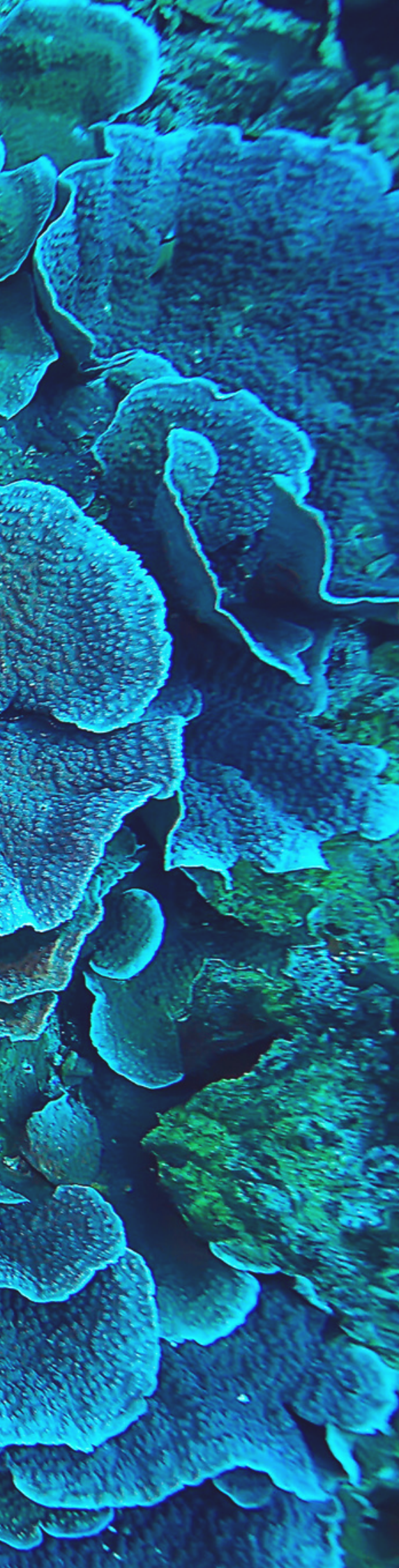


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MONITORING AND SCIENCE AT MCP



The Philippines, situated in the heart of the Coral Triangle, boasts the highest number of Marine Protected Areas (MPAs) of any country in the world, with approximately 1,600-1,800 protected areas. Some of these, such as Tubbataha Reef, are managed at a national level under the NIPAS program and have been implemented to protect and enhance biodiversity. However, the majority are much smaller in scale and managed in combination by the LGU and local community. These MPAs have been created to promote food security and sustainability for the local community. The 1998 Fisheries Code legislation calls for 15% of coastal municipal waters to be protected within no-take MPAs.

Despite the encouraging number of MPAs in the Philippines, they need to be managed effectively if they are to succeed in their goal of enhancing food security. Three things are of fundamental importance to effective management.

- Engagement with, and support from, the local community
- Effective demarcation of the boundaries of the MPA
- Consistent and sustained support from the LGU to patrol and enforce the MPA.

Through a volunteer-based scientific diving program, Marine Conservation Philippines focuses on collecting and analysing biophysical data on the effectiveness & resilience of locally managed MPAs, and offers support to local and regional management units.

MCP's expertise is directed towards using abundance of commercial biomass and MPA effectiveness as the primary indicators of progress in assuring long-term food security. Substrate composition and resilience are considered indirect indicators, being essential for maintaining the commercial productivity of the ecosystem.



MCP's ecological monitoring program has been developed to provide a broad understanding of the regional health and abundance within the reef ecosystems. Its well refined scope of data collection across all MPA sites, through all depth levels, ensures high coverage and accurate data input, with transparency and data quality remaining constant priorities.

Commercial fish & invertebrates diversity, abundance, and fluctuations as well as substrate lifeforms composition & resilience in the MPAs, are being monitored on a seasonal basis. By collecting the same representative dataset per season, change can be tracked, giving a much more detailed picture of change in the MPA over time. Seasons have been defined following PAGASA's (Philippines Atmospheric, Geophysical and Astronomical Services Administration) local recommendation ([December, January, February]; [March, April, May]; [June, July, August]; [September, October, November]).

The monitoring method employed uses 30m transects in a stratified random sampling strategy that recognises three depth ranges (3-7m, 9-13m, 15-19m). The depth ranges selected were chosen based on the spatial distribution of indicator life forms and the difference in indicator densities at different depths.

To collect a dataset representative of the ecosystem, it was necessary to identify these spatial differences and account for them to avoid bias. By observing each depth range and treating the results as an ecologically representative set, it is possible to generate an accurate model of the entire reef structure and community, determine its relative health, and track changes in the ecosystem over time.

The challenge in collecting an ecologically representative dataset lies in conducting a sufficient number of replicates to ensure that all present life forms are accounted for. For each of our sites, monitoring is therefore conducted across the 3 depth ranges and repeated a calculated number of times to ensure high validity. At least 12 replicates were conducted per site, per season and for each ecological indicator group (invertebrates, substrate and fish) to accurately represent the ecosystems of interest. These replicates were used to create 1 representative average of the ecosystem per site and season.



MONITORING SITES

Zamboanguita Municipality



MCP has been conducting its Long Term Monitoring Program since 2017, though monitoring at some sites started later. The complete list of survey sites, along with some key details can be found below.

Site Name	Status	Size (hectares)	Established	Monitored Since
Basak Can Unsang South	MPA	9.1	2006	2017
Dalakit Poblacion	MPA	10.1	2014	2019
Guinsuan	MPA	5.6	2022	2017
Latason	MPA	1.9	2022	2022
Lutoban Gac-Ang North	MPA	15.1	2000	2017
Lutoban Gac-Ang South	MPA	15.1	2000	2019
Lutoban Pier	Non-MPA	-	-	2017
Maluay Malatapay	MPA	1.6	2022	2017
Mojon	MPA	2.11	2024	2025

ZAMBOANGUITA

Community Projects



Marine Conservation Philippines is pleased to continue our work for and with the local community. The following is a summary of the community projects we have undertaken in the last report period of March - August 2025

- **Turtle Monitoring**

Through MCP's on going Turtle monitoring program assisted by DENR, Bantay Dagat and local community members we have successfully protected 5 nests in Turtle Island, Guinsuan and Mojon. Over 300 turtle hatchlings safely made it to the water

- **Ghost nets**

Our Tec trained diving team have successfully removed a 10m² ghost net from a depth of 45m-50m in Malatapay. MCP volunteers have also helped to remove ghost nets in Latason and Guinsuan.

- **Summer camp 2.0**

After the successful return of our summer camp program last year, MCP again hosted local youth leaders for a 3 day immersion program. Last years participants returned as facilitators and helped ensure a smooth running of all activities.

- **Ridge to Reef**

In MCP's first ever partnership with Endangered Species International we held a 2 day youth camp, highlighting the importance of forest biodiversity, native trees, and fish and corals.

- **UNSDSN**

MCP was invited to join United Nations Sustainable Development Solutions Network, with over 100 participants, engaging in presentations and conservation activities.

- **Scholarships**

MCP is excited to welcome 2 brand new scholars who will be undergoing dive training all the way to Divemaster level, as well as being trained to teach our science program.

- **International Mangrove Day**

Joining the Siaton Coast guard in Turtle island to celebrate their 1st founding anniversary, we assisted in the planting of mangrove trees and conducted a beach clean along with the local Bantay Dagat.

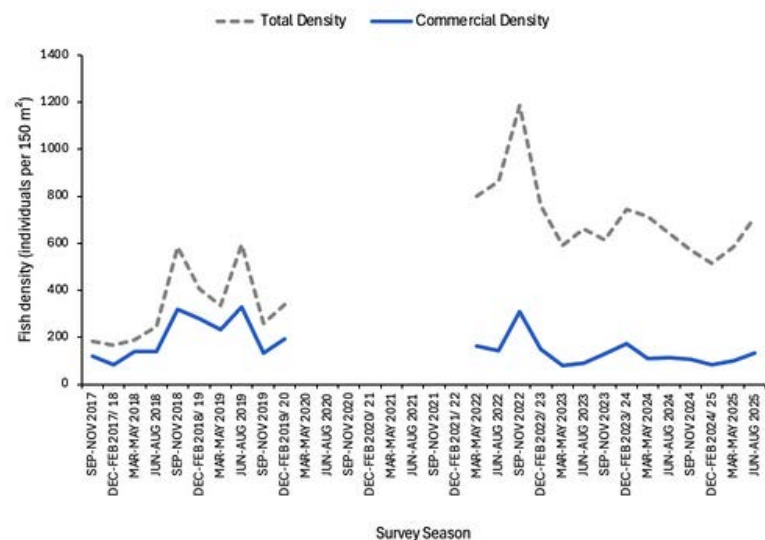
FOOD SECURITY

Biomass of Commercial species



One fundamental measure of an MPA's success is the amount of fish biomass it produces. If there is higher fish biomass inside of an MPA, then there will be more fish available for the community to harvest outside of the MPA. This is known as the '**spillover effect**', and is one of the main ways in which an MPA can promote food security.

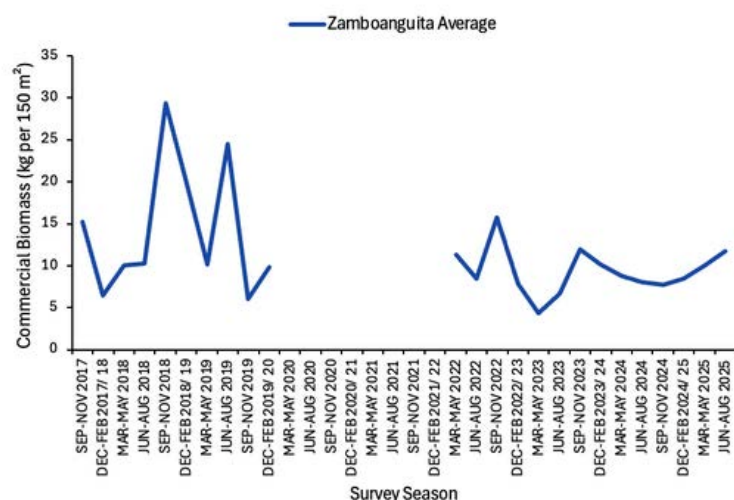
Figure 3. Temporal trends in total fish density and commercial fish density across Zamboanguita Municipality from (2017–2025). Values represent average individuals per 150 m² recorded during seasonal surveys.



Current Status:

In Jun–Aug 2025, Zamboanguita's MPAs recorded an **average total fish density of ~710 individuals per 150m²**, with **commercial species contributing ~135 individuals** per 150m² (Figure 3). We consider this data separately as we monitor some non-commercial fish that are often occur in high numbers (particularly Damselfish), this would misrepresent the data if they were combined together. The average fish density of the reefs in this municipality has remained relatively consistent, with some small seasonal peaks. Damselfish were added to the indicator list after the COVID-19 gap, causing the large jump in total density.

Figure 4. Temporal trends in commercial fish biomass (kg per 150m²) across the Zamboanguita Municipality, (2017–2025). Biomass values represent the estimated weight of commercially important reef fish, providing an indicator of food security potential and MPA effectiveness. Data gaps (2020–2022) reflect periods when surveys were suspended due to COVID-19.



Commercial biomass was ~11.7 kg per 150m² (~720 kg/ha) (Figure 4). The assemblage was strongly dominated by herbivores (~577 individuals per 150m²), followed by carnivores (~92), omnivores (~14), corallivores (~12), and detritivores (~15). This herbivore-driven structure supports ecological resilience, particularly in maintaining algal–coral balance.

The high intra-annual variation is likely due to the seasonal appearance of fish visiting the area to feed or breed. Breeding aggregations have been observed in some sites. Commercial biomass in Zamboanguita has been highly variable, with strong pre-COVID peaks that have not yet been replicated in recent years. Current values (2025) suggest partial recovery but remain well below earlier highs, reflecting the ongoing vulnerability of commercial fish populations to fishing pressure and the slow recovery of larger-bodied taxa.

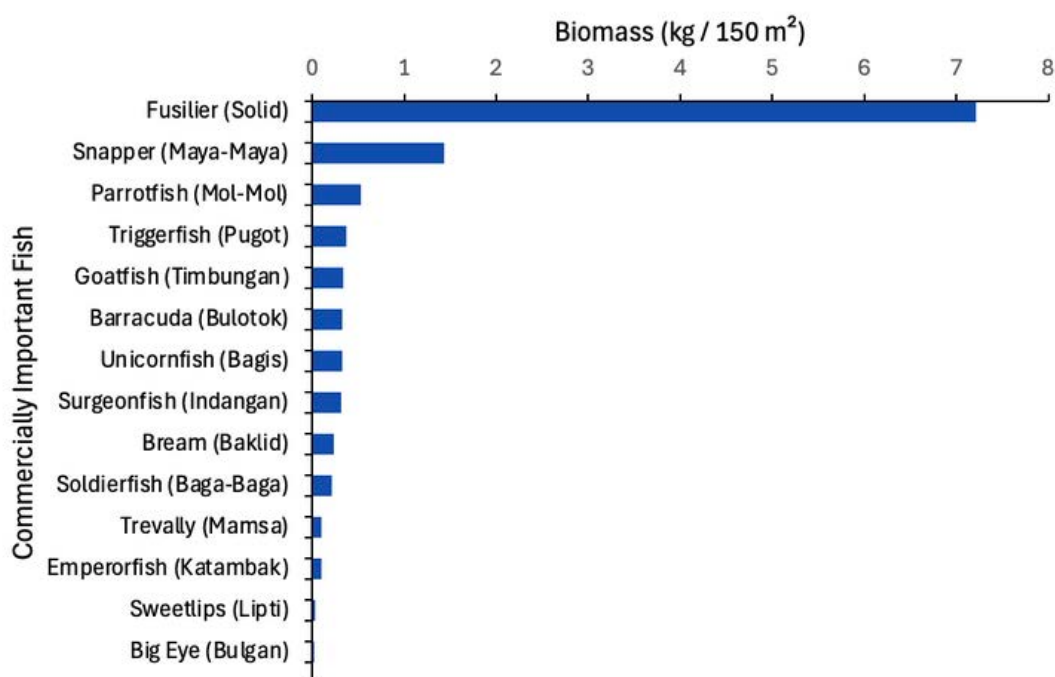


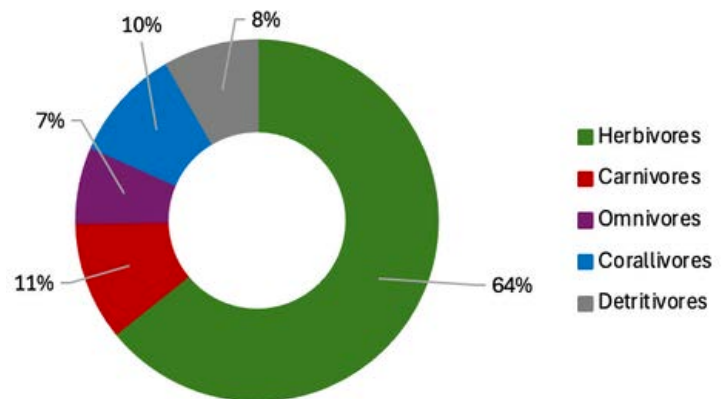
Figure 5. Biomass (kg per 150 m²) of commercially important reef fish groups in Zamboanguita Municipality, averaged across MPAs during June–August 2025. The values represent the average (mean) biomass observed on each survey, highlighting variation in key target families that contribute to local fisheries, food security, and ecosystem resilience.

The biomass of commercially important fish in Zamboanguita Municipality during June–August 2025 was strongly dominated by fusiliers (~7.5 kg/150 m²), which contributed the vast majority of the total catch potential (Figure 5). Snappers (~1.2 kg/150 m²) were the only other group present in notable quantities, while parrotfish, triggerfish, goatfish, and barracuda contributed smaller amounts (<0.5 kg/150 m² each). All other commercially important taxa were recorded only in trace biomass. This distribution suggests that while some key target species remain present, the community is heavily skewed toward fusiliers, indicating limited diversity in commercially valuable stocks and potential vulnerability to food security.

Recent change:

Compared with the last reporting season, commercial density increased ($83 \rightarrow 135$ per 150m^2), and commercial biomass improved ($8.4 \rightarrow 11.7$ kg per 150m^2). Total density also increased from ~ 514 to ~ 710 individuals per 150m^2 . Herbivores increased substantially ($382 \rightarrow 577$ per 150m^2), while carnivores ($78 \rightarrow 92$ per 150m^2) and detritivores ($9 \rightarrow 15$ per 150m^2) also showed moderate gains. These changes indicate strong seasonal recovery across multiple trophic groups, particularly herbivores and commercial species.

Figure 6. Proportional contribution (%) of dietary groups to total fish density for the Zamboanguita Municipality during Jun–Aug 2025. Data include both commercial and non-commercial species, highlighting the ecological importance of abundant herbivores in supporting algal–coral balance.



Dietary structure:

The dietary profile is overwhelmingly herbivore-dominated, reflecting the abundance of parrotfish, surgeonfish, and rabbitfish (Figure 6). Carnivores (e.g., snappers and groupers) and corallivores are present in moderate numbers, while omnivores and detritivores contribute smaller but consistent proportions. Although the dominance of herbivores is ecologically positive, the comparatively low biomass of large-bodied carnivores highlights an incomplete trophic balance.

Long-term context:

Zamboanguita's fish communities have shown high variability since monitoring resumed following the COVID-19 pandemic. Peaks in biomass (e.g., >25 kg per 150m^2 in some 2022–2023 surveys) alternated with sharp declines (e.g., ~ 3 – 4 kg per 150m^2 in weaker seasons). The current biomass (~ 11.7 kg per 150m^2) represents an improvement compared to earlier in 2025 and is closer to medium-term averages for the municipality. Despite this recovery, large-bodied predators remain scarce, suggesting continued vulnerability to fishing pressure outside MPA boundaries.

Ecological interpretation:

This report season shows that Zamboanguita's reefs are currently in a phase of recovery, with herbivore populations driving both density and biomass gains. This supports reef resilience by suppressing algal overgrowth and maintaining coral recruitment potential. However, the continued scarcity of top predators and larger-bodied commercial taxa indicates incomplete recovery and ecological imbalance. While current enforcement appears to be improving outcomes, sustained protection and community compliance are critical to building long-term stability in fish biomass and restoring trophic complexity.

REEF HEALTH AND RESILIENCE

Substrate Composition



The Philippines is situated in the Coral Triangle, an area of immense biodiversity that contains approximately 30% of the world's reefs. Many factors determine the health of coral reefs, but two of the most important are Hard Coral Cover (HCC) and Algae Cover. Hard corals build the reef itself, providing habitat for thousands of other species, many of which are commercially important. Algae, particularly fleshy macroalgae, compete with coral for space. Too much algae can lead to algae dominating the reef. Without the coral and the living space it provides, much of the biodiversity of the reef is lost. Globally, hard coral cover has been decreasing since 2010.

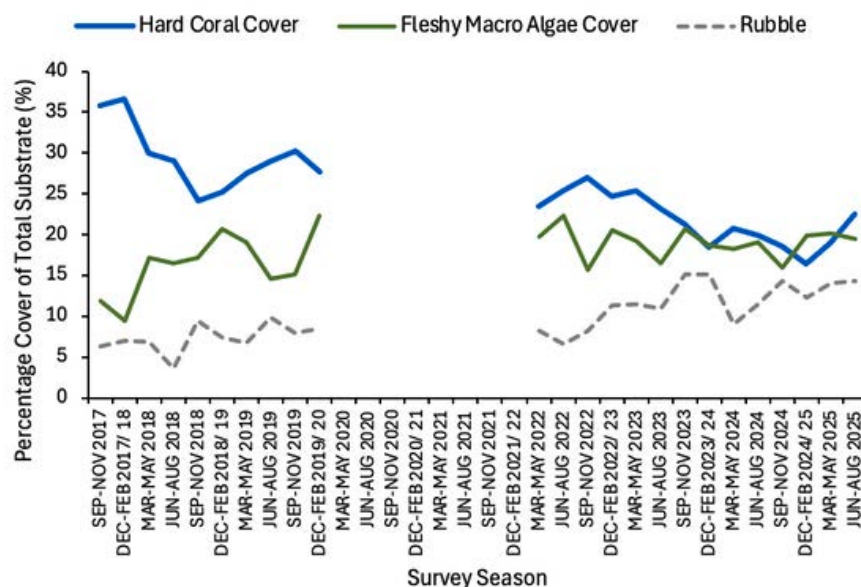


Figure 7. Temporal trends in average hard coral cover, fleshy macroalgae cover, and rubble across the Zamboanguita Municipality (2017–2025). Data is expressed as average percentage cover per survey season.

Current Status:

In June–August 2025, the Zamboanguita municipality recorded an **average hard coral cover of ~22.5%**, **fleshy macroalgae of ~19.5%**, and **rubble of ~14.3%** (Figure 7). The wider benthic composition suggests corals and algae together dominate the seascape, with moderate rubble indicating persistent disturbance. Bleaching levels were very low (~1.3%), consistent with low visible stress across sites this season.

Recent change:

Compared with the previous report, hard coral cover increased slightly (16.5% → 22.5%), while macroalgae remained stable (~20%). Rubble levels also rose (12.2% → 14.3%), suggesting ongoing substrate instability. Bleaching levels increased (0.5% → 1.3%), continuing a trend of low bleaching incidence since early 2023, in contrast to the higher levels recorded during 2022 (8–9%).

Structural implications:

The co-dominance of hard coral and macroalgae reflects a reef community that is resilient but under competitive pressure. Macroalgae levels consistently remain near 20% risk, inhibiting coral recovery if herbivory declines, while rubble (~14%) suggests legacy disturbance or storm impacts. Nonetheless, the persistence of coral cover above 20% is encouraging and suggests ongoing capacity for reef recovery across the municipality.

Long-term context:

Since monitoring began in 2017, hard coral cover in Zamboanguita has declined from ~35–37% (2017–2018) to lows of 16–18% in 2023–2024, before recovering to around 22.5% in 2025. Macroalgae, meanwhile, have steadily increased from ~10–12% in 2017 to a more persistent range of 18–22% in recent years. Rubble has also grown more prominent since 2019, often exceeding 12–15%. Bleaching has fluctuated, with pronounced peaks in 2022 (>8–9%), but has remained minimal since 2023.

Ecological interpretation:

The average benthic condition in Zamboanguita shows a reef system in partial recovery: coral cover is gradually rebounding after lows in 2023–2024, but macroalgal competition and rubble remain significant constraints. The consistently low bleaching incidence since 2023 is a strong positive, highlighting resilience against thermal stress. Continued herbivore biomass and effective MPA management will be key in suppressing macroalgae and stabilising rubble, allowing corals to regain dominance across the municipality.

Fleshy macroalgae have remained a persistent competitor, averaging 19.9% across the time series and at times exceeding coral cover (notably 2022–2024). This suggests that algal competition is now a significant barrier to coral recovery, particularly in reef areas exposed to nutrient inputs from agricultural activities and riverine runoff. Without effective herbivore populations to regulate algal growth, the risk of a long-term ecological phase shift from coral to algae remains high.



Algae are less biodiverse than corals and support fewer species of fish and invertebrates. A shift from hard corals to algae will result in lower climate change resilience, as well as significantly reduced commercial value. Since monitoring resumed after the COVID-19 pandemic, the cover of fleshy macroalgae has at times exceeded that of hard coral, suggesting a risk of algae becoming dominant. Algae thrive on phosphorus and nitrogen, which can be found in high amounts in nutrient runoff from agriculture and sewage. Reefs located near river mouths are likely to see more algal growth in the wet seasons due to upland agricultural runoff. It is unlikely that corals can reclaim the lost substrate in the dry seasons, unless the area supports a healthy population of herbivorous species that can consume the algae.

The increase in rubble cover in recent years likely reflects a combination of destructive natural events (typhoons, storms) and anthropogenic impacts, such as anchor damage, fishing gear, or blast fishing. Rising rubble reduces substrate stability and limits the potential for coral recruitment, further constraining reef resilience.

Fluctuations across the depth ranges follow the natural ecology of substrate organisms present on the reef. A higher abundance of hard coral is expected on shallow reefs, as most coral polyps have a symbiotic relationship with photosynthetic algae (zooxanthellae). Hard corals are highly dependent on this relationship, getting up to 90% of their energy from zooxanthellae. As sunlight decreases with depth, these zooxanthellae-dependent corals will be predominantly found in shallow, clear, calm waters.

Bleaching incidence has been variable, ranging from <1% in some years to over 9% during the 2022 heat stress events. Encouragingly, bleaching has remained relatively low (<2%) since 2024, suggesting some capacity for thermal recovery, though this has not yet translated into a rebound in coral cover.

Overall, reefs in Zamboanguita are under significant pressure, with long-term declines in coral cover, elevated algal competition, and persistent rubble, all of which point to reduced resilience. While the most recent surveys suggest a slight rebound in coral cover and lower bleaching incidence, without reductions in local stressors and protection of herbivore populations, the trajectory risks favouring algae over corals. Continued monitoring and management will be essential to stabilise these reefs and support recovery capacity.



TOURISTIC VALUE

Iconic and Charismatic Species



Southern Negros not only hosts some beautiful coral reefs, but is world famous for the abundance of small, rare animals found in its waters. This is a significant draw for divers and contributes substantially to the local tourism industry.

Tourism has an increasingly vital role to play in the success of Marine Protected Areas, provided it is managed in a thoughtful and conservation-minded manner. The effective ticketing of recreational diving activities will generate income for the communities surrounding an MPA, as well as help cover ongoing maintenance costs. This will enhance the MPA's ability to provide food security.

The table below summarises a wide range of animals with high tourism value which divers and snorkelers would be interested in seeing. The figures represent the percentage of times an indicator was observed during dives between March and August 2025 (Table 1). This provides a representation of how likely divers are to encounter these creatures, aiding dive operations in selecting sites that suit customers.

	Basak MPA	Dalakit MPA	Guinsuan MPA	Latason MPA	Lutoban MPA	Lutoban Pier	Malatapay MPA	Mojon MPA	Municipal Average
Barracudas	11.86	10.63	5.44	11.80	14.81	14.18	19.13	0	10.98
Cephalopods	3.55	6.79	7.61	8.75	10.40	3.73	11.57	2.94	6.91
Cowries	45.7	39.82	23.92	49.98	35.46	33.58	37.39	24.08	36.24
Eels and Snakes	63.05	42.76	48.92	31.42	43.66	36.57	34.05	32.91	41.67
Frogfish	1.17	-	8.70	6.53	4.55	3.73	2.72	6.25	4.21
Giant Clams	13.5	70.82	9.79	13.91	18.30	38.81	9.52	3.13	22.22
Porcupinefish and Pufferfish	92.91	90.28	83.70	81.79	73.47	72.91	85	84.75	83.10
Scorpaenidae	49.86	8.83	56.53	38.04	45.58	44.78	59.17	66.55	46.16
Sharks	-	-	-	1.07	-	-	-	-	0.13
Shrimps	52.24	53.40	52.18	55.72	59.72	47.02	46.26	30.33	49.61
Slugs	69.86	69.91	54.35	67.47	72.80	76.12	71.46	36.40	64.79
Stingrays	14.13	-	6.52	-	1.09	1.49	0.69	-	2.99
Syngnathidae / Pegasidae	5.30	17.42	4.35	20.55	14.55	14.18	9.56	30.33	14.61
Turtles	34.29	-	43.05	7.54	17.19	29.11	59.18	21.33	26.46

Table 1. Average percentage frequency (%) of sightings for key charismatic species across sites in the Zamboanguita Municipality between March and August 2025.

Across the Zamboanguita Municipality, recent sightings of **mobula rays** (Malatapay, Basak, Guinsuan) and a **nurse shark** (Latason) provide an essential boost to the municipality's tourism value, adding rare pelagic and shark encounters to an already diverse range of reef species. These sightings enhance the ecotourism potential of Zamboanguita, reinforcing its reputation as a well-rounded diving destination with both macro and megafauna.

Zamboanguita municipality demonstrates strong tourism potential, with particularly high encounter rates for porcupinefish and pufferfish (83.1%) across all sites (Figure 8). Slugs (64.8%) and shrimps (49.6%) are also consistently abundant, making the area highly attractive to macro-divers. Cowries are present at moderate levels (36.2%), while eels and snakes (41.7%) add additional interest to reef exploration. Giant clams (22.2%) are common sightings in several sites, with Dalakit MPA showing exceptionally high values (70.8%), thereby enhancing the reef's appeal.

Charismatic megafauna are more variable, with turtles averaging 26.5% across sites, supported by particularly high sightings in Malatapay (59.2%) and Guinsuan (43.1%). However, sharks (0.1%) and stingrays (3.0%) infrequent. Frogfish (4.2%) occur in relatively low but notable numbers, with Guinsuan standing out (8.7%).

Overall, Zamboanguita's tourism value lies in its high reliability of reef-associated species, molluscs, and macrofauna, with strong highlights for pufferfish, slugs, shrimps, and turtles. It offers a consistent and diverse diving experience that strongly appeals to macro-divers and reef enthusiasts.

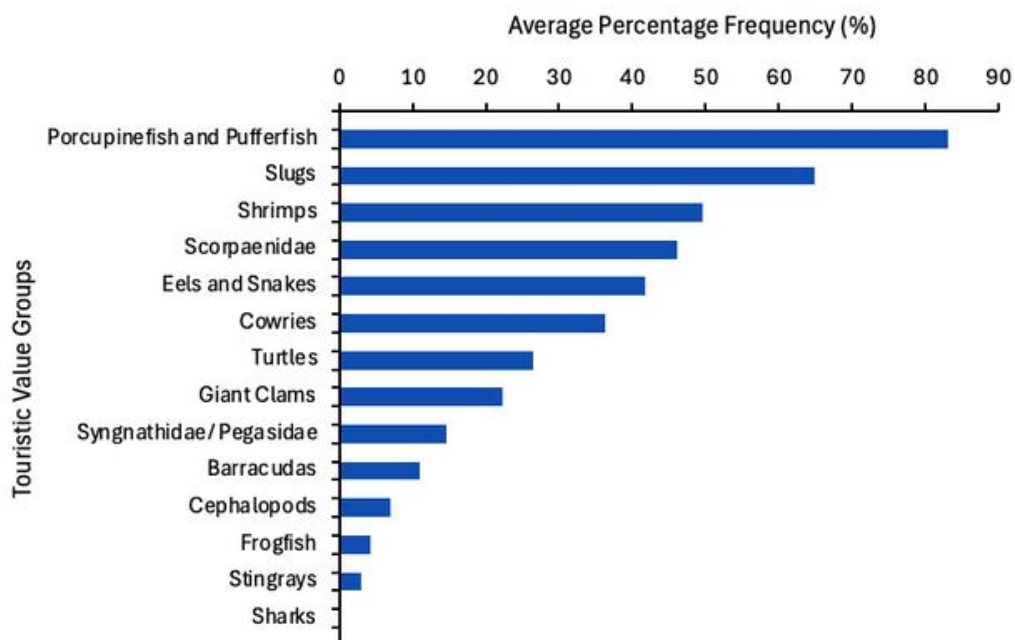


Figure 8. Sightings of high-value tourist species across the Zamboanguita Municipality during the Mar–Aug 2025 survey season. Data is presented as the percentage of dives in which each group was recorded.

In this context, Scorpaenidae refers to lionfish, scorpionfish, and stonefish, while Syngnathidae and Pegasidae includes seahorses, pipefish, sea moths, and sea dragons.



+ PROCEAN



Approximately 200 million tons of trash are currently circulating in our global oceans, with around 11 million tons added each year. The Philippines is responsible for approximately 2.7 million tons of plastic waste alone that is introduced into the sea.

This trash can have devastating effects on marine and coastal ecosystems, from ghost nets killing animals that go to waste and large pieces physically smothering the reef, to microplastics being ingested and concentrated in animals that we ultimately eat, introducing potentially dangerous plastics into our own bodies.

Our partner NGO, Pro Ocean, conducts beach cleans 6 days a week along the coastline from Sibulan to Bayawan, playing a vital role in limiting the ecological damage that trash can cause. The following chart summarises the trash they've collected from March to August 2025 (Figure 9).

In addition, MCP conducted bi-weekly beach cleans throughout 2025, collecting a further 590 kg of trash, complementing Pro Ocean's ongoing efforts.

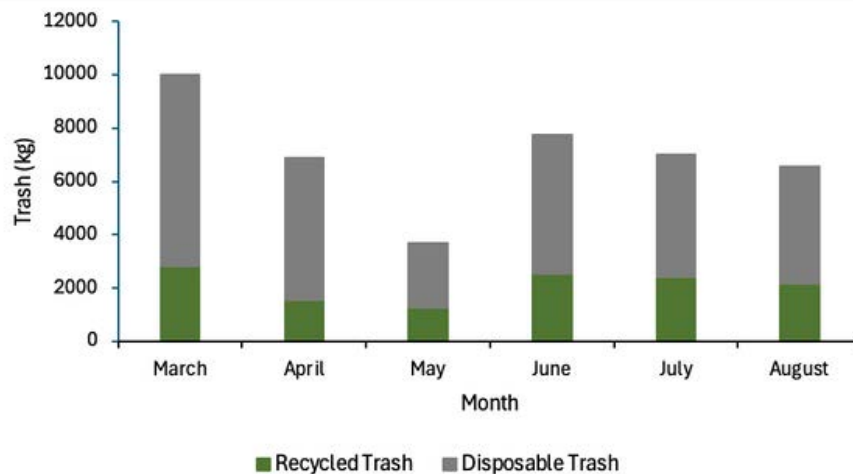


Figure 9. Monthly totals of recycled and disposable trash (kg) collected by Pro Ocean during beach cleans along the Sibulan–Baywan coastline, March–August 2025. Regular clean-up efforts play a key role in reducing the ecological impacts of marine debris in a region where plastic pollution poses a major threat to coastal ecosystems.



MANAGEMENT SUGGESTIONS



- Demarcation is ongoing for sites in Zamboanguita.
- Develop enforcement strategies.
- Consideration of temporary restriction on herbivorous fish in sites of algal domination.
- Community engagement.
- Conduct regular beach and dive cleans.
- Continue monitoring.
- Consider MPAs in coastal activities that could lead to runoff, especially sites in the vicinity of river mouths.
- Use of safe materials in artificial reefs:
<https://www.marineconservationphilippines.org/wp-content/uploads/2018/02/factors-and-principles-artificial-reef-creation.pdf>
- Increased focus on the collection of ticketing revenue for recreational water activities.





**Marine
CONSERVATION
PHILIPPINES**

Semiannual Report **ZAMBOANGUITA**

Section 2 Site Specific Results



MAR 2025

BASAK CAN-UNSANG SOUTH MPA



Basak South MPA has an area of 9.1 hectares and comprises coral reefs, sandy patches, and seagrass beds. There is a relatively narrow band of shallow reef (1-4 m) and a more extensive area of deeper reef (8 - 19 m) on the southern part of the MPA. A river mouth next to the MPA can introduce sediment to the site during the rainy season. The reef is often exposed to wind, longshore currents and wave action. Basak is well-recognised as a dive site and is regularly visited by SCUBA divers.



MPA demarcation based on DENR coordinates

BASAK CAN-UNSANG SOUTH MPA

Food Security



The strong currents that Basak is exposed to can bring in nutrients that support a large amount of life. In particular, the planktivores that make up the majority of fish are likely taking advantage of such plankton being brought in by those strong currents. The rapid increase in biomass observed in various seasons is attributed to the presence of large schools of plankton feeders, primarily fusiliers.

Current Status:

In June–August 2025, Basak recorded an average total fish density of ~758 individuals per 150 m², with commercial species contributing ~214 individuals per 150 m². **Commercial biomass was ~21.2 kg per 150m² (~1,415 kg/ha)**, among the highest observed across Zamboangita's MPAs this season (Figure 10). Herbivores formed the majority (~603 individuals per 150m²), followed by carnivores (~98), omnivores (~7), corallivores (~22), and detritivores (~28).

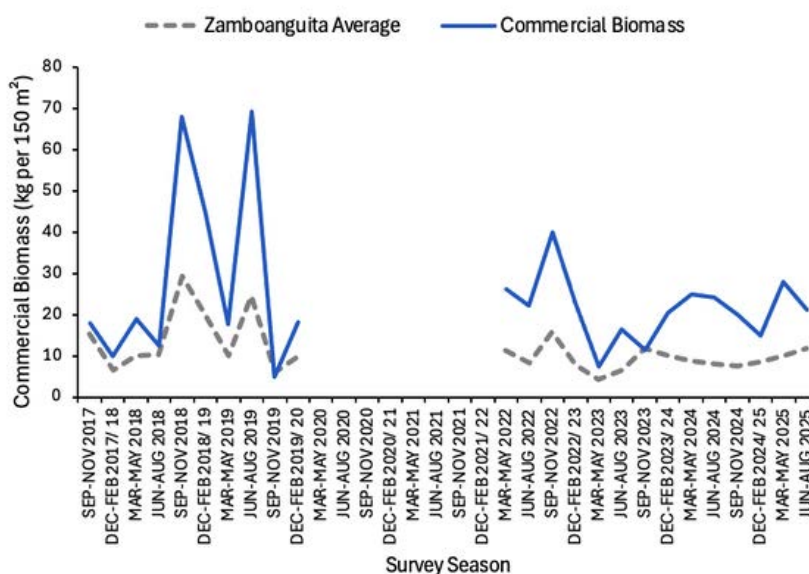


Figure 10. Temporal trends in commercial fish biomass (kg per 150m²) at Basak MPA (2017-2025). Biomass values represent the estimated weight of commercially important reef fish, providing an indicator of food security potential and MPA effectiveness.

Recent Change:

Compared with the previous reporting season, **commercial biomass rose from ~14.8 to ~21.2 kg per 150m², and commercial density increased from ~134 to ~214 individuals per 150m²** (Figure 11). Herbivore densities also increased (482 → 603 individuals per 150m²), suggesting stronger grazing pressure and healthier algal control. Carnivores showed a moderate increase (from 80 to 98 individuals per 150 m²), while corallivores and detritivores also increased in number. Overall, these results suggest an encouraging seasonal rebound in both fish biomass and trophic balance.

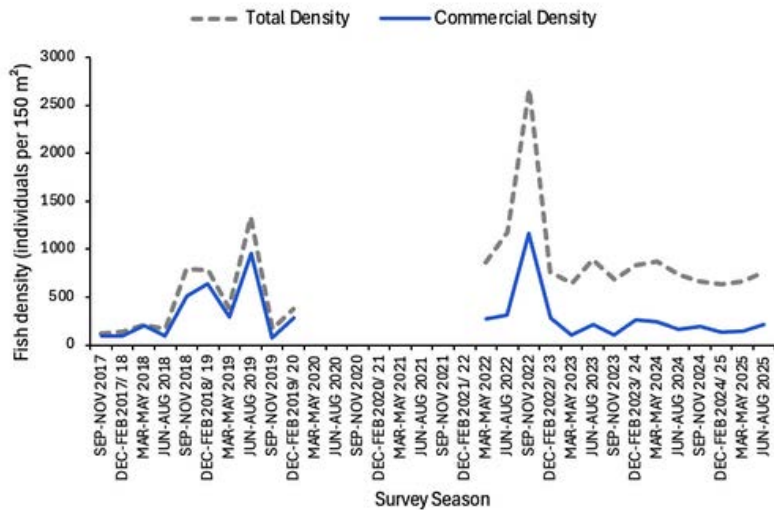
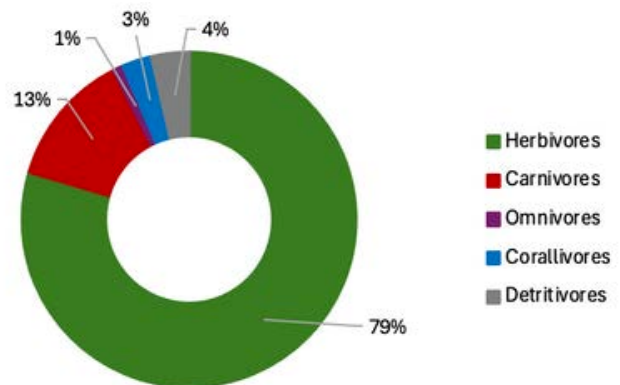


Figure 11. Temporal trends in total fish density and commercial fish density at Basak MPA from (2017-2025). Values represent average individuals per 150 m² recorded during seasonal surveys.

Dietary structure:

The dietary profile at Basak is herbivore-dominated, as expected, with this group playing a crucial role in reef resilience (Figure 12). Carnivores and omnivores remain present in modest densities, while corallivores and detritivores provide additional ecological functions. The steady presence of multiple trophic groups indicates that Basak supports a balanced reef fish community, although it is still skewed toward smaller-bodied herbivores.

Figure 12. Proportional contribution (%) of dietary groups to total fish density at Basak MPA during Jun–Aug 2025. Data include both commercial and non-commercial species, highlighting the ecological importance of abundant herbivores in supporting algal–coral balance.



Fusilier	13.20	Trevally	0.93
Unicornfish	1.32	Goatfish	0.77
Triggerfish	1.25	Bream	0.66
Snapper	1.11	Parrotfish	0.56
Surgeonfish	1.00	Grouper	0.26

Table 2. Mean biomass (kg per 150m²) of the ten most abundant commercial fish groups at Basak MPA during Jun–Aug 2025. Values represent average biomass per survey and highlight the dominant contributors to the commercial fish community.

Commercial Groups:

At Basak, fusiliers strongly dominate the assemblage (13.20 kg/150m²), with unicornfish (1.32), triggerfish (1.25), snappers (1.11), and surgeonfish (1.00) providing the next tier of biomass (Table 2). Notably, Basak recorded the highest surgeonfish biomass of any site in Zamboanguita, highlighting the strength of this important herbivorous group. Goatfish (0.77), bream (0.66), parrotfish (0.56), and groupers (0.26) occur at lower levels but add diversity. Overall, the site supports a relatively balanced mix of mid-trophic species, though the very high fusilier biomass remains the defining feature, while large predators remain scarce.

Long-term context:

Basak has historically recorded strong fish densities, but commercial biomass has been more variable. The current value of ~21.2 kg per 150m² (~1,415 kg/ha) marks a substantial improvement compared with earlier monitoring cycles (e.g., ~7–10 kg per 150m² in 2022–2023). Nonetheless, while biomass levels are now approaching those reported for well-enforced no-take MPAs elsewhere in the Coral Triangle, the scarcity of very large-bodied predators highlights that recovery is still incomplete.

Ecological interpretation:

Basak's reef fish assemblages show encouraging signs of recovery, with higher biomass and density across key commercial groups and strong herbivore representation to support coral–algal balance. The rise in carnivores is a positive signal, though the community still lacks abundant apex predators, which remain vulnerable to fishing pressure outside the MPA. With continued enforcement and habitat protection, Basak has strong potential to consolidate its role as one of the most fish-rich MPAs in Zamboanguita, supporting both biodiversity and fisheries spillover.

Basak has historically been the most productive MPA in Zamboanguita, but this season has been eclipsed by both Malatapay and the new monitoring site of Mojon MPA. Whilst there has been a decrease at Basak, this reflects more a very significant increase at Malatapay, so should not be viewed with concern unless a trend is identified in coming seasons. Basak has relatively good demarcation and enforcement. Basak has regularly produced higher commercial biomass than the municipal average.

BASAK CAN-UNSANG SOUTH MPA

Reef Health And Resilience



Current status:

In June–August 2025, Basak recorded an **average hard coral cover of ~18.6%**, **fleshy macroalgae of ~10.7%**, and **rubble of ~17.5%**. The broader substrate composition reveals sand (~23%) and sessile invertebrates (~20%) as the dominant categories, with hard coral contributing approximately 19% to the habitat overall (Figure 13). Bleaching levels were very low (~0.3%), indicating minimal visible stress during this period.

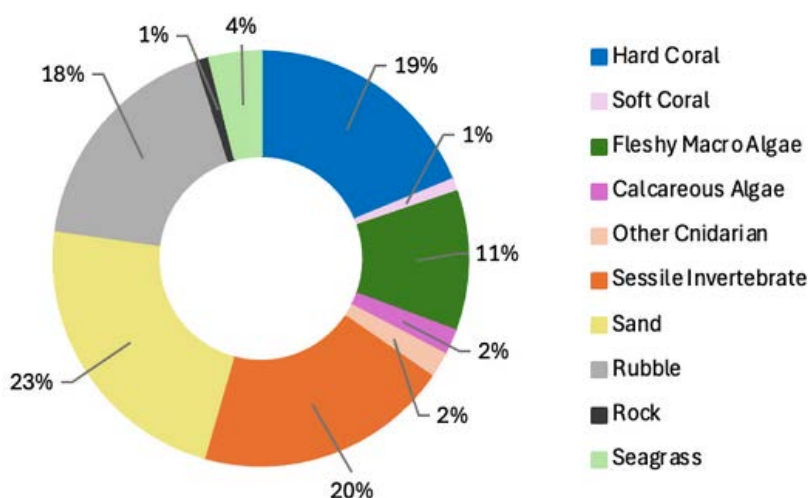


Figure 13. Average benthic substrate composition at Basak MPA (June–August 2025). Values represent the proportional contribution (%) of different benthic categories pooled across all surveys.

Recent change:

Compared with the previous reporting season, **hard coral cover increased markedly (10.3% → 18.6%)**, **suggesting seasonal recovery and potential new growth** (Figure 14). Macroalgae cover remained stable (9–11%), while rubble showed a slight increase (16.4% → 17.5%). Bleaching incidence also declined slightly (0.2% → 0.3%), continuing a downward trend from peaks observed in 2022 (8–9%).

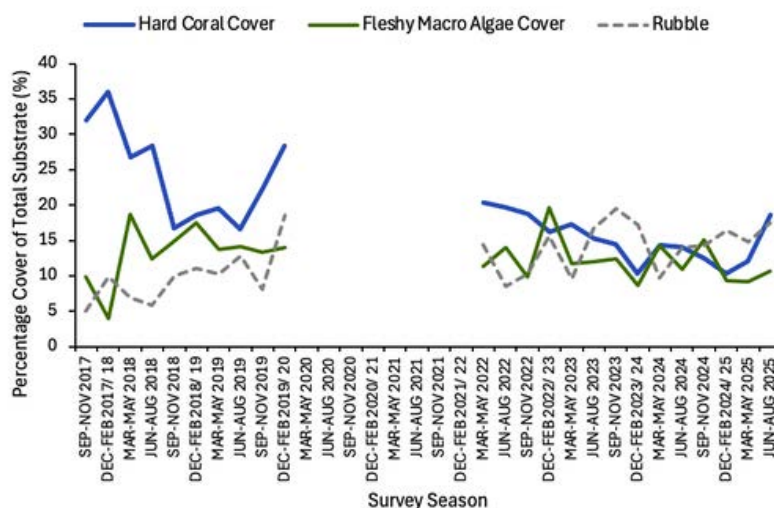


Figure 14. Temporal trends in hard coral cover, fleshy macroalgae cover, and rubble at Basak MPA (2017–2025). Data is expressed as average percentage cover per survey season.

Structural implications:

Stable macroalgal cover combined with rising coral cover indicates that herbivory is effectively limiting algal expansion. The high proportion of sessile invertebrates (~20%) provides additional structural complexity but may compete with corals for space. The persistent rubble fraction (~15–18%) indicates disturbance, but also provides a settlement substrate for future coral recruits.

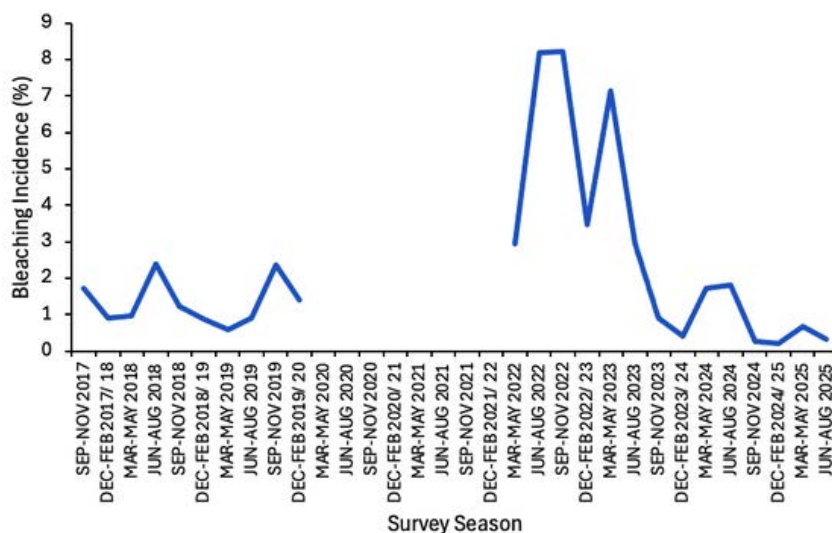


Figure 15. Seasonal bleaching incidence at Basak MPA (2017–2025), shown as average percentage of colonies observed with visible bleaching (either partially or fully bleached) per survey season.

Long-term context:

Since monitoring began, Basak’s hard coral cover has ranged from >36% (2017–2018) to lows near 10% (2023–2024). While current levels remain below historic peaks, the steady recovery since 2024 suggests a gradual positive trajectory. Macroalgae have remained relatively stable over the years, avoiding phase shifts that could inhibit coral recovery. Bleaching, once elevated in 2022–2023 (>7–8%), is now minimal, pointing to improved resilience in recent years (Figure 15).

Ecological interpretation:

Basak’s benthic community is in a transitional state: coral cover is recovering, rubble persists as a legacy of past disturbance, and macroalgae remains under control, likely aided by the site’s high herbivore biomass. With continued low bleaching pressure and intense grazing pressure, Basak has the potential to rebuild coral dominance over time. However, maintaining this trajectory will require consistent MPA protection to prevent further disturbance and allow corals to reclaim substrate from rubble and invertebrates.

As ocean temperatures continue to rise, bleaching events will likely become more frequent and severe. This will be important to monitor, as Basak South is a significant MPA due to the high biomass of commercial fish it produces.

BASAK CAN-UNSANG SOUTH MPA

Tourism Value



Barracudas	11.86	Scorpaenidae	49.86
Cephalopods	3.55	Sharks	0
Cowries	45.70	Shrimps	52.24
Eels and Snakes	63.05	Slugs	69.86
Frogfish	1.17	Stingrays	14.13
Giant Clams	13.50	Syngnathidae and Pegasidae	5.30
Porcupinefish and Pufferfish	92.91	Turtles	34.29

Table 3. Mean encounter rates (%) of selected indicator and charismatic taxa recorded at Basak MPA from March - August 2025. Values represent the percentage of dives in which each group was observed, providing an indication of their relative tourism and ecological value.

Basak is the most established dive location in Zamboanguita, enjoying regular visits from divers coming from Dauin. In particular, many large and colourful members of the Nembrotha family of nudibranchs can be found, as well as many other types of sea slug not summarised in the data. It also hosts some impressively large scorpion fish. Basak is also well known for a large school of resident barracuda, and sometimes large numbers of milkfish. This isn't reflected in the survey data because they are generally found in the sandy area in the southern part of the MPA, and rarely venture onto the reef (or at least haven't done so during our surveys).

Basak demonstrates a very high tourism value, with exceptionally frequent sightings of porcupinefish and pufferfish (92.9%), which is well above the municipal average (Table 3). The site also provides excellent opportunities for slugs (69.9%), eels and snakes (63.1%), and turtles (34.3%), making it one of the strongest locations for megafauna encounters in the municipality. **Mobula rays were also recorded in August, further enhancing the site's attractiveness for divers seeking large pelagic species.**

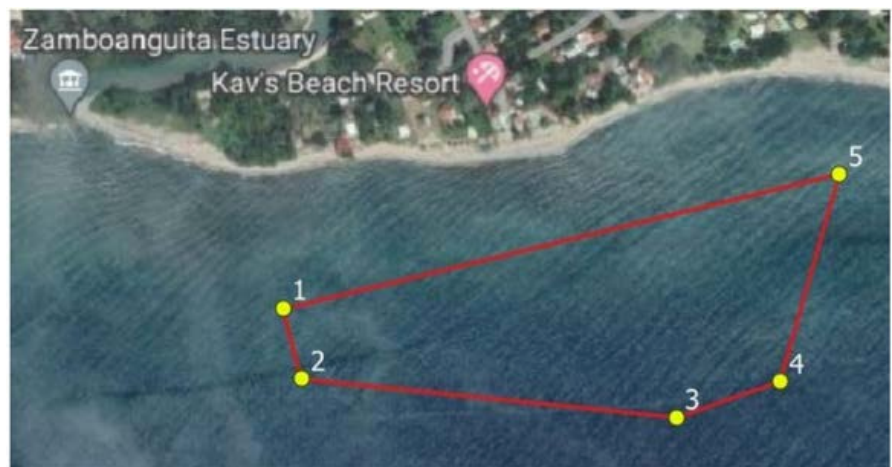
Macro-diversity is further supported by high records of cowries (45.7%), shrimps (52.2%), and scorpionfish (49.9%), all of which exceed typical averages. Stingrays are also relatively common here (14.1%), among the highest frequencies recorded across sites.

Basak now stands out as a particularly high-value site for marine tourism, offering both reliable macro sightings and strong megafauna appeal, including frequent turtles and stingrays.

DALAKIT MPA



Dalakit MPA has an area of 10.1 ha and is characterised by a very shallow coral reef (0 - 5 m) surrounded by sand flats. Due to its location, the reef is relatively protected from prevailing winds and is subject to little current or wave action. MCP began monitoring Dalakit in 2019.



MPA demarcation based on DENR coordinates

DALAKIT MPA

Food Security



Dalakit MPA is notable for its extremely shallow reef, which has a maximum depth of approximately 4 m. The reef is also relatively small and isolated, being surrounded by sandy areas with occasional patches of reef and rubble. Despite this, the MPA supports a surprisingly high amount of fish biomass, although it exhibits greater seasonal variability than the municipal average.

Current Status:

In June–August 2025, Dalakit recorded an **average total fish density of ~347 individuals** per 150 m², with commercial species contributing around 34 individuals per 150 m² (Figure 16). **Commercial biomass was relatively modest at ~3.9 kg per 150m² (~260 kg/ha)** (Figure 17). Herbivores dominated the assemblage (~255 individuals per 150 m²), followed by carnivores (~59), corallivores (~9), omnivores (~9), and detritivores (~15).

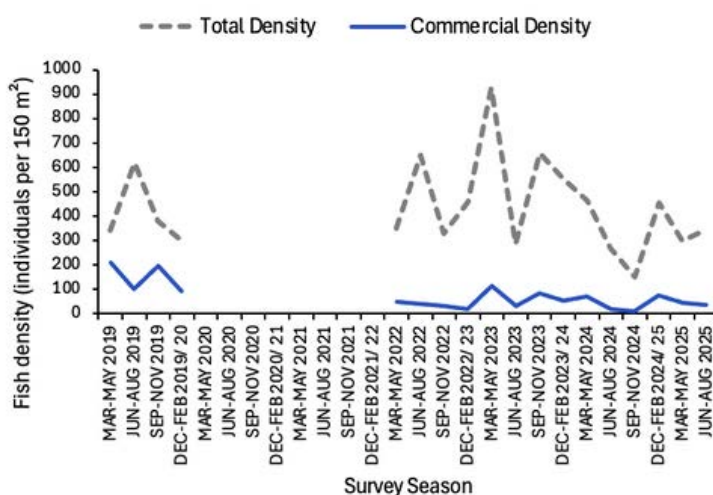
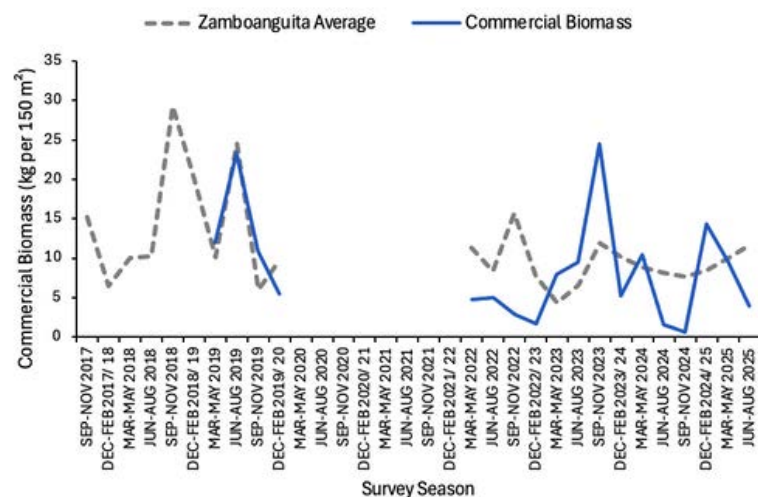


Figure 16. Temporal trends in total fish density and commercial fish density at Dalakit MPA (2019–2025). Values represent average individuals per 150m² recorded during seasonal surveys.

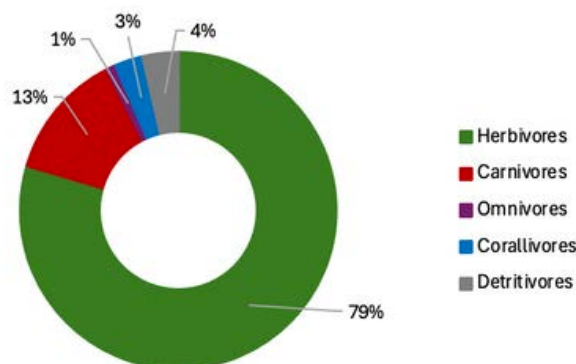
Figure 17. Temporal trends in commercial fish biomass (kg per 150m²) at Dalakit MPA (2019–2025). Biomass values represent the estimated weight of commercially important reef fish, providing an indicator of food security potential and MPA effectiveness.



Recent Change:

Compared with the last reporting period, commercial density dropped sharply ($72.8 \rightarrow 33.8$ per 150m^2), while biomass also declined ($14.4 \rightarrow 3.9$ kg per 150m^2). Herbivore densities decreased ($323 \rightarrow 255$ individuals), and carnivores showed a notable reduction ($87 \rightarrow 59$). These shifts indicate a reduction in both abundance and size structure of commercial species, highlighting a period of decline relative to the strong seasonal values observed earlier in 2025.

Figure 18. Proportional contribution (%) of dietary groups to total fish density at Dalakit MPA during Jun–Aug 2025. Data include both commercial and non-commercial species, highlighting the ecological importance of abundant herbivores in supporting algal–coral balance.



Dietary structure:

The dietary profile remains herbivore-dominated, consistent with other Zamboanguita sites (Figure 18). This is encouraging, as the site can be prone to relatively high algal coverage, so a robust population of herbivores is crucial to maintaining balance. However, the relatively low densities of carnivores, omnivores, and corallivores reduce ecological balance and limit trophic complexity. Detritivores were present in modest numbers, but their contribution is minor compared to that of herbivores.

Snapper	1.56	Goatfish	0.17
Grouper	0.68	Soldierfish	0.11
Parrotfish	0.51	Unicornfish	0.11
Surgeonfish	0.38	Triggerfish	0.09
Emperor	0.30	Rabbitfish	0.01

Table 4. Mean biomass (kg per 150m^2) of the ten most abundant commercial fish groups at Dalakit MPA during Jun–Aug 2025. Values represent average biomass per survey and highlight the dominant contributors to the commercial fish community.

Commercial Groups:

At Dalakit, snappers dominate the commercial biomass (1.56 kg/ 150m^2), followed by a notable presence of groupers (0.68) and parrotfish (0.51) (Table 4). Goatfish (0.17), surgeonfish (0.38), and emperors (0.30) provide additional mid-level contributions, while soldierfish (0.11), unicornfish (0.11), and triggerfish (0.09) occur at lower levels. Rabbitfish are rare (0.01). Overall, the assemblage exhibits moderate diversity, with biomass shared across several groups, but remains limited in large predators, resulting in a skewed structure that favours small to mid-sized commercial species.

Long-term context:

Dalakit's fish communities have historically been variable, with strong peaks in biomass (e.g., >20 kg per 150m² in earlier surveys) alternating with periods of decline. The current biomass (~3.9 kg per 150m²) is among the lowest recorded since monitoring resumed after COVID, showing that recovery is fragile and inconsistent. This variability suggests that fish populations at Dalakit are highly influenced by external pressures, likely including fishing outside MPA boundaries and limited enforcement.

Ecological interpretation:

Dalakit's fish assemblage shows concerning signs of decline, with reductions across commercial biomass, density, and key trophic groups since the last reporting season. While herbivores continue to dominate, supporting algal control, the low biomass of carnivores and the absence of large-bodied predators indicate ecological imbalance. This leaves the reef vulnerable to shifts in fish community structure that may undermine resilience. Strengthening enforcement and ensuring spillover benefits are critical to stabilising and rebuilding Dalakit's fish populations.

DALAKIT MPA

Reef Health And Resilience



The relationship between hard coral and macroalgae cover has been historically quite variable, with several instances of dominance switching. This is potentially concerning, particularly as the river to the south may introduce sediment to the reef, which could reduce light levels and make it more vulnerable to algal dominance.

Current status:

In June–August 2025, Dalakit recorded an **average hard coral cover of ~25.5%**, **fleshy macroalgae of ~34.7%**, and **rubble of ~5.3%**. The broader substrate composition reveals fleshy macroalgae (~35%) and sand (~19%) as the dominant categories, with hard coral contributing approximately 26% to the habitat overall (Figure 19). Bleaching levels were low (~1.3%), indicating limited visible stress during this period.

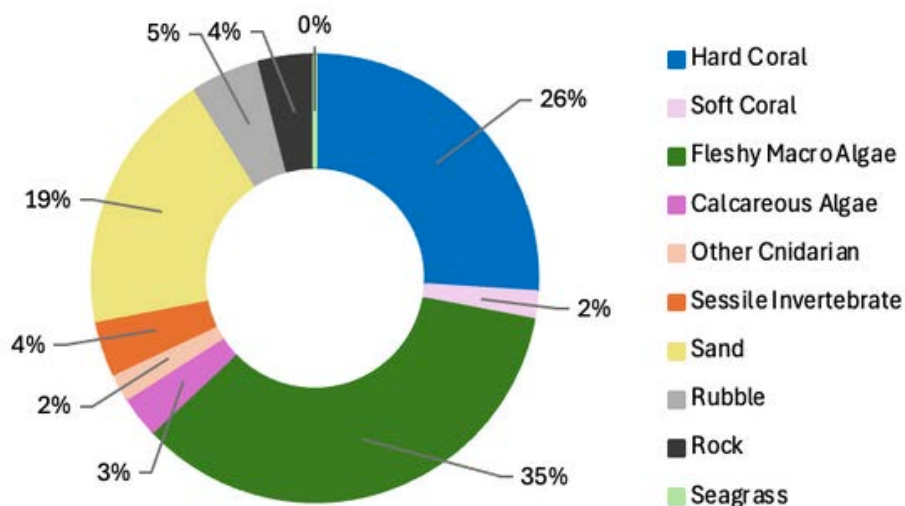


Figure 19. Average benthic substrate composition at Dalakit MPA (June-August 2025). Values represent the proportional contribution (%) of different benthic categories pooled across all surveys.

Recent change:

Since the last report, **hard coral cover at Dalakit has increased (21.3% → 25.5%), indicating moderate seasonal recovery** (Figure 20). Fleshy macroalgae declined (39.4% → 34.7%), reversing earlier seasonal highs. Rubble cover remained stable (5.0% → 5.3%), while bleaching incidence rose slightly (0% → 1.3%), though levels remain very low compared with historic peaks.

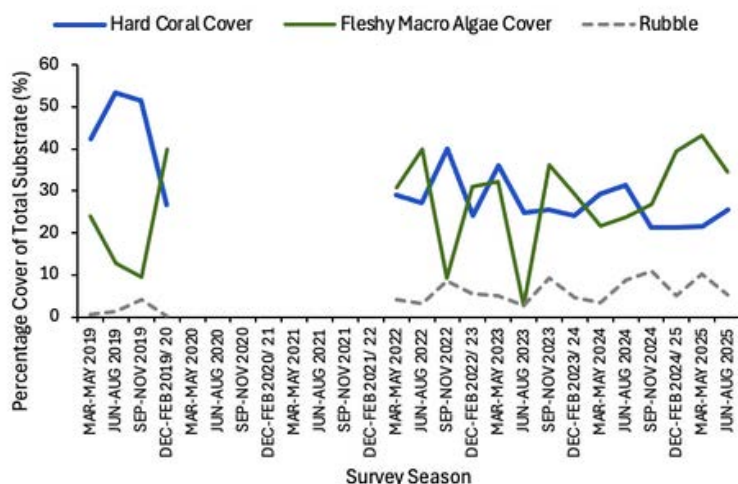
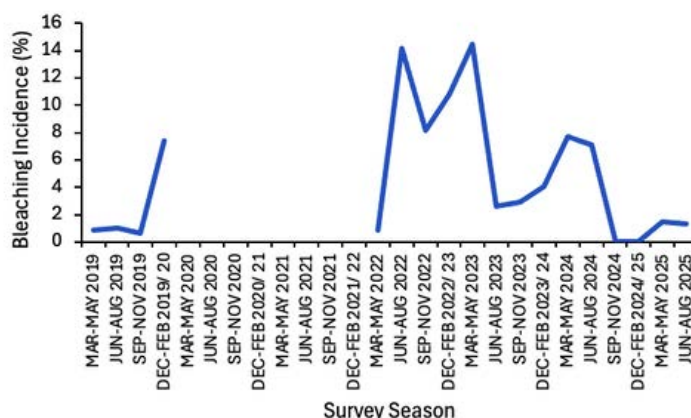


Figure 20. Temporal trends in hard coral cover, fleshy macroalgae cover, and rubble at Dalakit MPA (2019–2025). Data is expressed as average percentage cover per survey season.

Structural implications:

The relatively high macroalgae cover (~35%) remains the primary ecological concern, as it competes strongly with corals for space and light. However, the simultaneous rise in coral and reduction in rubble suggests that corals are maintaining or slowly regaining ground. The moderate sand fraction (~19%) reflects available open substrate but may limit settlement potential unless stabilised.

Figure 21. Seasonal bleaching incidence at Dalakit MPA (2019–2025), shown as average percentage of colonies observed with visible bleaching (either partially or fully bleached) per survey season.



Long-term context:

Since monitoring began, Dalakit has shown strong fluctuations. Coral cover peaked above 50% in 2019 but subsequently declined, stabilising around ~20–30% in recent years. Macroalgae expanded sharply from 2020 onward, frequently surpassing coral cover and driving a competitive imbalance that ultimately led to a phase shift towards an algae-dominated reef. Bleaching incidence was severe during 2022–2023 (10–14%) but has since dropped to background levels (<2%), relieving stress on recovering corals (Figure 21).

Ecological interpretation:

Dalakit's benthic community remains in a coral–algae competitive balance, with coral cover relatively stable but still under pressure from macroalgal dominance. The reduction in rubble and decline in bleaching are positive signs, but sustained herbivory will be essential to curb algal growth and enable further coral recovery. Without intense grazing pressure and protection from disturbance, Dalakit risks remaining locked in an algal-dominated stat.

DALAKIT MPA

Tourism Value



Barracudas	10.63	Scorpaenidae	8.83
Cephalopods	6.79	Sharks	0
Cowries	39.82	Shrimps	53.40
Eels and Snakes	42.76	Slugs	69.91
Frogfish	0	Stingrays	0
Giant Clams	70.815	Syngnathidae and Pegasidae	17.42
Porcupinefish and Pufferfish	90.28	Turtles	0

Table 5. Mean encounter rates (%) of selected indicator and charismatic taxa recorded at Dalakit MPA from March-August 2025. Values represent the percentage of dives in which each group was observed, providing an indication of their relative tourism and ecological value.

Dalakit MPA is not particularly well known for its abundance of charismatic species. Notably, no turtles were observed there during the most recent reporting period, from March to August 2025. This is due to the extensive sandy areas that surround the reef and the lack of the seagrass ecosystem that turtles favour.

However, Dalakit MPA is notable for the high number of giant clams found there. Fish can also be surprisingly abundant there, and it is common to see large groups of adolescent snapper and surgeonfish.

Dalakit demonstrates strong tourism potential, with very high encounter rates for porcupinefish and pufferfish (90.3%), giant clams (70.8%), and slugs (69.9%), all of which are well above typical municipal averages (Table 5). Shrimps (53.4%), cowries (39.8%), and eels and snakes (42.8%) also contribute to the site's strong macro-diver appeal. Syngnathids (17.4%) and barracudas (10.6%) add further diversity, though at moderate levels.

However, the site lacks turtles, sharks, stingrays, and frogfish, reducing the presence of charismatic megafauna that often attract broader ecotourism interest. Overall, Dalakit offers excellent tourism value, particularly for macro and reef invertebrate enthusiasts, but less so for those seeking encounters with large animals.

GUINSUAN MPA



Guinsuan MPA has an area of 5.6 ha and received MPA status in 2022. The monitoring of this reef by MCP began in 2017. Guinsuan consists of patchy areas of shallow reef (1 - 5 m) that are generally separated from a more extensive area of deeper reef (8 - 18 m) by wide seagrass beds. The deeper reef can be patchy, with areas of sand. Due to its location, the reef is exposed to prevailing winds and is commonly subject to longshore currents and wave action.



MPA demarcation based on DENR coordinates

GUINSUAN MPA

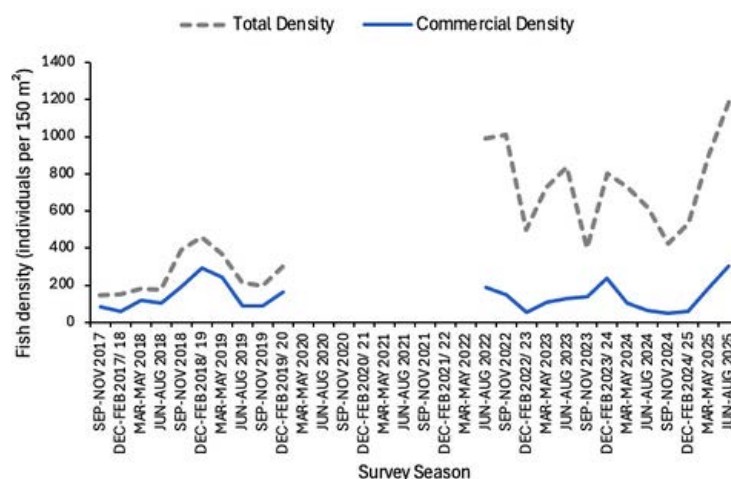
Food Security



Current Status:

In June–August 2025, Guinsuan recorded an **average total fish density of ~1,189 individuals** per 150 m², with commercial species contributing ~302 individuals per 150 m² (Figure 22). **Commercial biomass was approximately 20.1 kg per 150 m² (~1,340 kg/ha)**, one of the highest values observed in Zamboanguita. The assemblage was strongly herbivore-dominated (~1,035 individuals per 150m²), with carnivores (~108), omnivores (~12), corallivores (~11), and detritivores (~23) present at lower but stable densities.

Figure 22. Temporal trends in total fish density and commercial fish density at Dalakit MPA (2017-2025). Values represent average individuals per 150m² recorded during seasonal surveys.



Recent Change:

Compared with the previous reporting season, Guinsuan showed dramatic improvements. Commercial density rose more than fivefold (56.7 → 302 individuals per 150m²), while **commercial biomass increased by 70% (11.8 → 20.1 kg per 150m²)** (Figure 23). Herbivore densities also surged (387 → 1,035 individuals), alongside notable increases in carnivores (70 → 108) and detritivores (12 → 23). These changes indicate strong seasonal recovery and a substantial influx of both schooling herbivores and commercially important species.

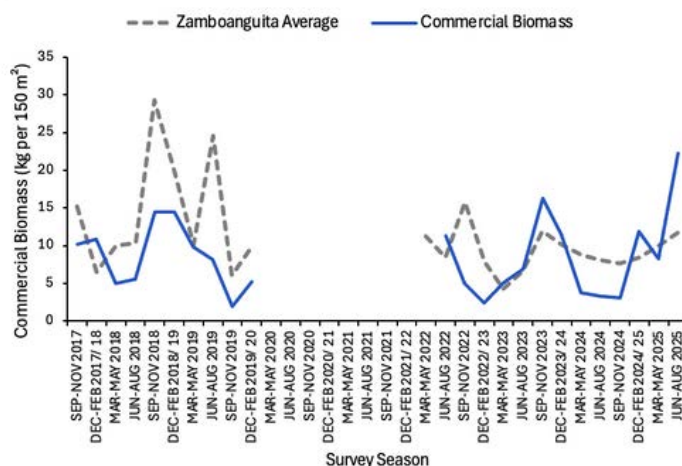
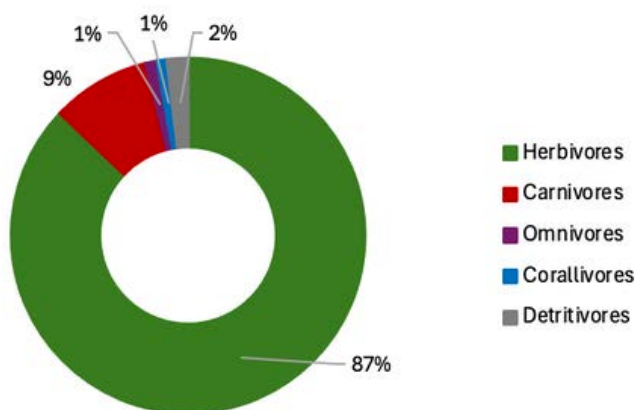


Figure 23. Temporal trends in commercial fish biomass (kg per 150m²) at Guinsuan MPA (2017-2025). Biomass values represent the estimated weight of commercially important reef fish, providing an indicator of food security potential and MPA effectiveness.

Figure 24. Proportional contribution (%) of dietary groups to total fish density at Guinsuan MPA during Jun–Aug 2025. Data include both commercial and non-commercial species, highlighting the ecological importance of abundant herbivores in supporting algal–coral balance.



Dietary structure:

The community remains overwhelmingly herbivore-led, dominated by parrotfish, surgeonfish, and rabbitfish (Figure 24). This robust grazing base is crucial for controlling macroalgae and facilitating coral recovery. Carnivores and corallivores were present in moderate numbers, adding trophic diversity, while omnivores and detritivores contributed minor but consistent roles.

Fusilier	17.20	Triggerfish	0.24
Snapper	2.45	Grouper	0.17
Parrotfish	1.00	Soldierfish	0.14
Bream	0.59	Unicornfish	0.04
Goatfish	0.34	Sweetlips	0.04

Table 6. Mean biomass (kg per 150m²) of the ten most abundant commercial fish groups at Guinsuan MPA during Jun–Aug 2025. Values represent average biomass per survey and highlight the dominant contributors to the commercial fish community.

Commercial Groups:

At Guinsuan, commercial fish biomass is overwhelmingly dominated by fusiliers (17.2 kg/150m²), which contribute more than six times the biomass of the next group (Table 6). Snappers (2.45) and parrotfish (1.0) provide additional mid-trophic biomass, while bream (0.59) and goatfish (0.34) add smaller herbivore and carnivore input. Triggerfish (0.24), groupers (0.17), soldierfish (0.14), unicornfish (0.04), and sweetlips (0.04) occur at much lower levels. Overall, the assemblage is dominated by fusiliers, with snappers providing the only substantial secondary commercial contribution. Large-bodied predators remain scarce, indicating a community skewed toward schooling mid-trophic species.

Long-term context:

Guinsuan has historically supported substantial fish populations; however, the most recent survey represents one of the best results since monitoring resumed following the COVID-19 pandemic. Biomass more than doubled compared with early 2025, and commercial densities are now approaching levels seen in moderately enforced no-take MPAs elsewhere in the Coral Triangle. This indicates an improvement in protection effectiveness, although variability in earlier years highlights ongoing sensitivity to fishing pressure.

Ecological interpretation:

Guinsuan currently stands out as one of the most resilient MPAs in Zamboanguita. The dominance of herbivores is highly beneficial for reef resilience, while the sharp rise in commercial biomass reflects effective local management. However, the continued scarcity of large-bodied carnivores and groupers shows the community remains skewed toward smaller species. Strengthening enforcement will be critical to allow predatory fish to recover, further stabilising the trophic balance and enhancing the reef's ecological integrity.

The food security data may reflect the site's relative newness as an MPA, which was only established in 2022. However, it is subject to many of the same environmental features as Basak South, which is often regarded as the most productive MPA in the municipality; therefore, Guinsuan MPA has considerable potential in contributing to food security.

Whilst each site is subject to different local conditions that will impact the type and amount of fish it can support, Guinsuan's proximity to Basak and general similarity suggest that with effective management, it could support much higher commercial fish biomass. However, Guinsuan is a popular kite-surfing location, which potentially negatively impacts species occupying a niche high in the water column.

GUINSUAN MPA

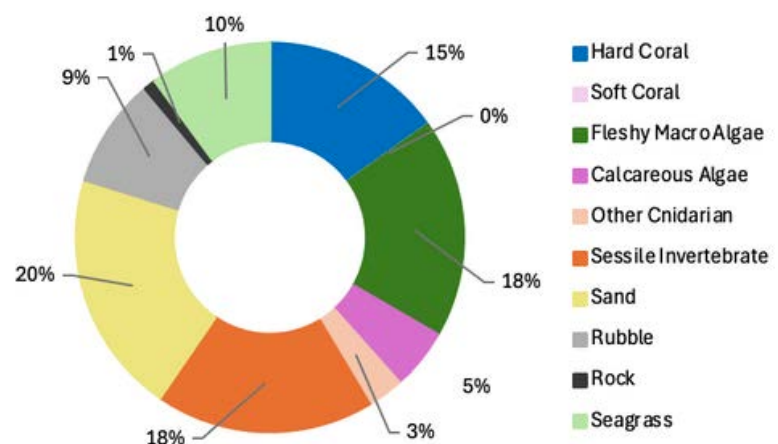
Reef Health And Resilience



Current status:

In June–August 2025, Guinsuan recorded an **average hard coral cover of ~15.1%**, **fleshy macroalgae of ~18.2%**, and **rubble of ~9.2%**. The broader substrate composition is dominated by sand (~20%) and sessile invertebrates (~18%), with hard coral contributing approximately 15% to the overall benthic cover (Figure 25). Notably, seagrass makes up a significant share (~10%), providing additional habitat complexity. Bleaching was low (~1.4%), showing minimal visible stress this season.

Figure 25. Average benthic substrate composition at Guinsuan MPA (June–August 2025). Values represent the proportional contribution (%) of different benthic categories pooled across all surveys.



Recent change:

Since the last report, hard coral cover at Guinsuan has more than doubled (6.3% → 15.1%), showing signs of strong seasonal recovery (Figure 26). Fleshy macroalgae also increased (8.3% → 18.2%), suggesting reduced grazing pressure or favourable growth conditions alongside coral recovery. Rubble remained steady (9.9% → 9.2%). Bleaching incidence rose slightly (0.3% → 1.4%), but levels remain low compared with historic peaks in 2022 (>6–7%).

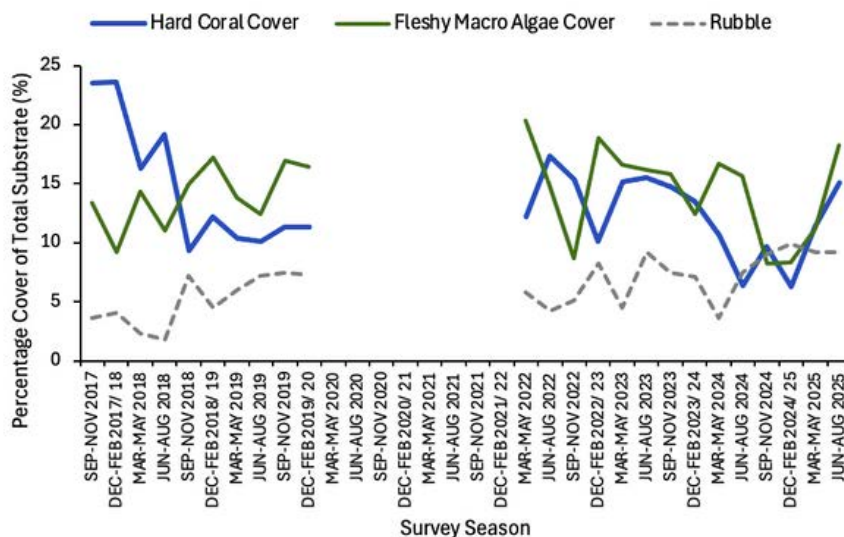


Figure 26. Temporal trends in hard coral cover, fleshy macroalgae cover, and rubble at Guinsuan MPA (2017–2025). Data is expressed as average percentage cover per survey season.

Structural implications:

Guinsuan's benthic structure reflects a mixed habitat: moderate coral cover, relatively high macroalgal presence, and a notable seagrass component (~10%). While seagrass provides key ecological services, the persistent macroalgal fraction highlights potential limits to coral expansion, especially given rubble levels of around 9%. Sessile invertebrates also compete for space, maintaining ecological diversity but constraining coral dominance.

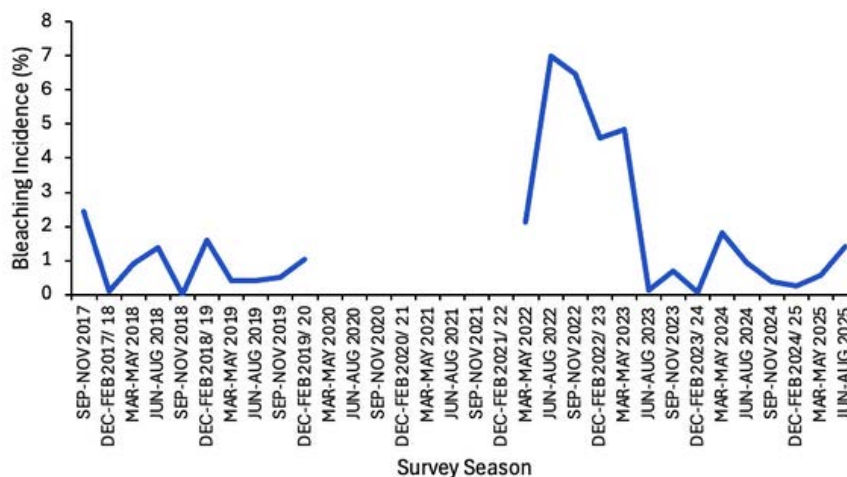


Figure 27. Seasonal bleaching incidence at Guinsuan MPA (2017–2025), shown as average percentage of colonies observed with visible bleaching (either partially or fully bleached) per survey season.

Long-term context:

Since monitoring began in 2017, Guinsuan's hard coral cover has fluctuated from lows of ~6% (2024) to highs above 23% (2017–2018). Macroalgae have remained consistently high, often >15%, suggesting sustained competitive pressure. Bleaching peaked during 2022–2023 (>6%) but has since declined to <2%, indicating improved short-term resilience (Figure 27). Despite these improvements, overall coral cover remains well below early survey levels.

Ecological interpretation:

Guinsuan's benthic community is stable but constrained: corals persist at moderate levels, macroalgae remain strong, and seagrass forms a substantial share of the habitat. While low bleaching is a positive sign, the relatively high algal cover and rubble fraction suggest that coral recovery may remain limited unless herbivory increases further. Continued management focus should be on maintaining herbivore populations to suppress algal dominance and encourage coral regrowth.

GUINSUAN MPA

Tourism Value



Barracudas	5.44	Scorpaenidae	56.53
Cephalopods	7.61	Sharks	0
Cowries	23.92	Shrimps	52.18
Eels and Snakes	48.92	Slugs	54.35
Frogfish	8.70	Stingrays	6.52
Giant Clams	9.79	Syngnathidae and Pegasidae	4.35
Porcupinefish and Pufferfish	83.70	Turtles	43.05

Table 7. Mean encounter rates (%) of selected indicator and charismatic taxa recorded at Guinsuan MPA from March - August 2025. Values represent the percentage of dives in which each group was observed, providing an indication of their relative tourism and ecological value.

The presence of extensive seagrass beds at Guinsuan makes it a relatively good location to see turtles. Whilst the relatively high incidence of nudibranchs and cleaner shrimps does suggest some potential for dive tourism, the densest part of the reef is a relatively long distance away from shore and requires a considerable swim. The reef is also relatively small and can experience strong currents, so it is a site best accessed with boat support.

Guinsuan offers high tourism value, with robust encounter rates for porcupinefish and pufferfish (83.7%), turtles (43.1%), and scorpaenidae (56.5%), making it appealing to both macro and megafauna-oriented divers (Table 7). Slugs (54.4%), shrimps (52.2%), and eels and snakes (48.9%) are also abundant, reinforcing its status as a biodiverse dive site. Frogfish (8.7%) add niche interest, while stingrays (6.5%) provide occasional larger-animal encounters. By contrast, giant clams (9.8%), cowries (23.9%), and syngnathids (4.4%) are less prominent, and sharks are absent.

Mobula rays were observed in both June and August, alongside regular encounters with turtles, making Guinsuan one of the most reliable sites for megafauna within the municipality.

Overall, Guinsuan combines reliable macro sightings with some of the highest turtle encounter rates in the municipality, giving it a strong all-round tourism appeal.

LATASON MPA



Latason MPA has an area of 1.9 ha and consists of shallow and medium coral reefs surrounded by sand flats and seagrass. The depth of the reef ranges from 1 to 13 m. Due to its location, the reef is relatively protected from prevailing winds, which generally limit longshore currents and wave action. The site is subject to a relatively large amount of boat traffic, as the southern part of the site is used as a mooring ground by local fishing vessels. MCP began monitoring Latason in 2022, the year it received MPA status.



MPA demarcation based on DENR coordinates

LATASON MPA

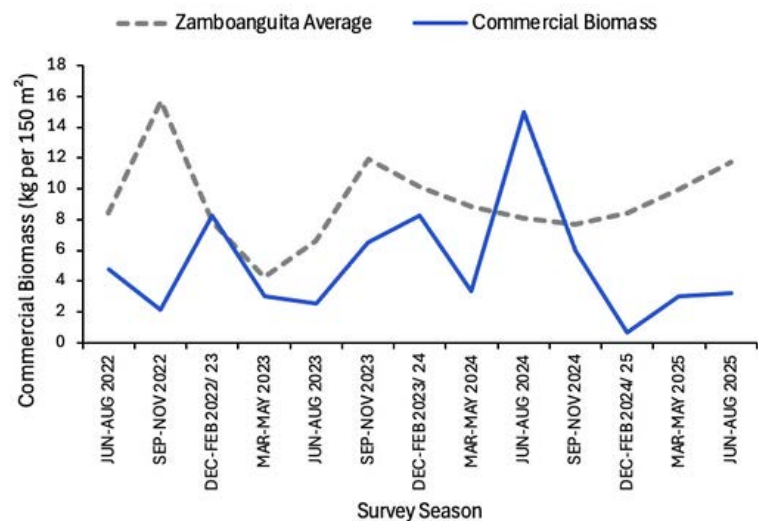
Food Security



Current Status:

In June–August 2025, Latason recorded an **average total fish density of ~462 individuals** per 150 m², with commercial species contributing ~52 individuals per 150 m². **Commercial biomass was modest at ~3.2 kg per 150m² (~216 kg/ha)** (Figure 28). Herbivores dominated the assemblage (~374 individuals per 150m²), followed by carnivores (~56), omnivores (~10), corallivores (~9), and detritivores (~12).

Figure 28. Temporal trends in commercial fish biomass (kg per 150m²) at Latason MPA (2022–2025). Biomass values represent the estimated weight of commercially important reef fish, providing an indicator of food security potential and MPA effectiveness.



Recent Change:

Compared with the last reporting period, Latason showed substantial improvements. Commercial density nearly doubled (26 → 52 per 150m²), while **commercial biomass increased almost fivefold (0.7 → 3.2 kg per 150m²)**. Total density also rose (360 → 462), driven mainly by herbivores (+25%) and a sharp rise in carnivores (+240%) (Figure 29). Omnivores, corallivores, and detritivores all showed moderate gains, suggesting a broad recovery across trophic groups.

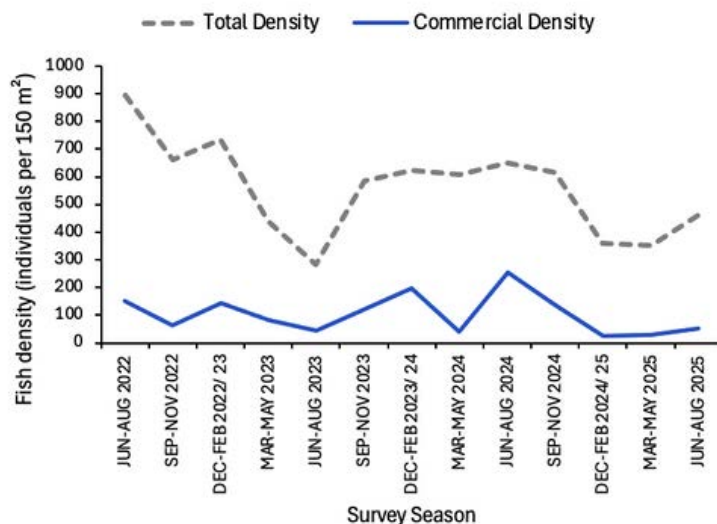


Figure 29. Temporal trends in total fish density and commercial fish density at Latason MPA (2022–2025). Values represent average individuals per 150m² recorded during seasonal surveys.

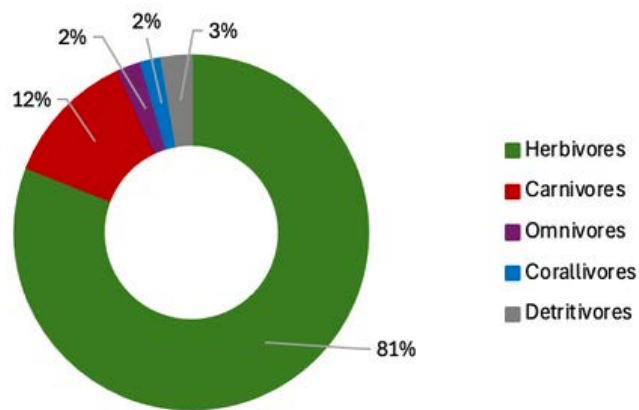


Figure 30. Proportional contribution (%) of dietary groups to total fish density at Latason MPA during Jun–Aug 2025. Data include both commercial and non-commercial species, highlighting the ecological importance of abundant herbivores in supporting algal–coral balance.

Dietary structure:

The assemblage remains herbivore-dominated, a positive indicator for reef resilience (Figure 30). The substantial rise in carnivores contributes to a trophic balance, although densities remain below historical peaks. Omnivores and corallivores are present in modest but stable numbers, supporting functional diversity.

Fusilier	1.63	Goatfish	0.09
Barracuda	0.42	Triggerfish	0.07
Soldierfish	0.40	Surgeonfish	0.07
Parrotfish	0.21	Grouper	0.07
Snapper	0.21	Bream	0.06

Table 8. Mean biomass (kg per 150m²) of the ten most abundant commercial fish groups at Latason MPA during Jun–Aug 2025. Values represent average biomass per survey and highlight the dominant contributors to the commercial fish community.

Commercial Groups:

The fish assemblage at Latason is strongly dominated by fusiliers (1.63 kg/150m²), contributing several times more biomass than any other group (Table 8). Barracuda and soldierfish follow as the main secondary contributors (~0.40–0.42), representing predator and mid-trophic biomass. Parrotfish and snappers each add ~0.21, reflecting moderate herbivore and carnivore input. Goatfish, surgeonfish, groupers, triggerfish, and bream all contribute at lower but consistent levels (~0.06–0.09). Overall, the assemblage is dominated by fusiliers, with a modest mix of mid-level carnivores and herbivores, but with limited biomass from large-bodied predators.

Long-term context:

Latason has exhibited high variability in biomass over recent years, ranging from peaks above 14 kg per 150 m² (June–August 2024) to lows below 1 kg per 150 m² (December–February 2024/25). The current recovery represents a rebound from this recent trough, though biomass remains below the strongest seasonal values. Such fluctuations suggest that the site is influenced by transient schools and variable fishing pressure.

Ecological interpretation:

The Jun–Aug 2025 increase in both commercial density and biomass is encouraging, signalling improved resilience and productivity. However, the site remains vulnerable given its history of sharp declines and the scarcity of large-bodied carnivores. Sustained enforcement and protection are needed to stabilise fish populations and support long-term recovery.

The lack of data prior to its designation as an MPA in 2022 makes it impossible to determine how it performed in terms of commercial fish production in the past.

LATASON MPA

Reef Health And Resilience



Considering monitoring only started at Latason MPA in 2022, the same year it was established as a protected area, it's challenging to identify any long-term trends. The reef within the MPA is typically shallow, with most parts reaching a maximum depth of only around 14 meters.

Current status:

In June–August 2025, Latason MPA recorded an **average hard coral cover of ~23.5%**, **fleshy macroalgae of ~18.0%**, and **rubble of ~10.8%**. The broader substrate composition reveals hard coral as a significant contributor (~23%), complemented by substantial soft coral cover (~9%) and seagrass (~12%), which collectively provide high habitat diversity (Figure 31). Sand (~14%) and rubble (~11%) also form key components, while macroalgae remains a consistent competitor at ~18%. Bleaching levels were very low (~0.8%), reflecting minimal visible stress during this season.

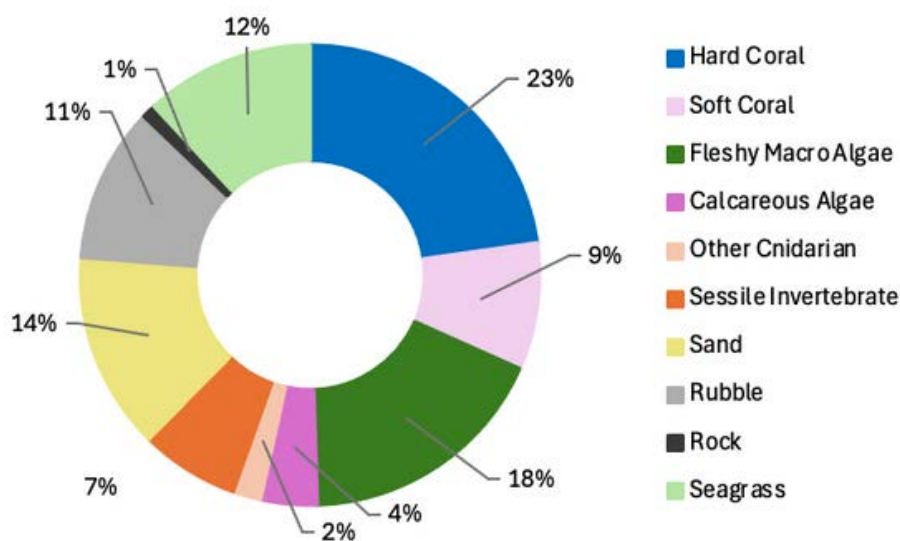
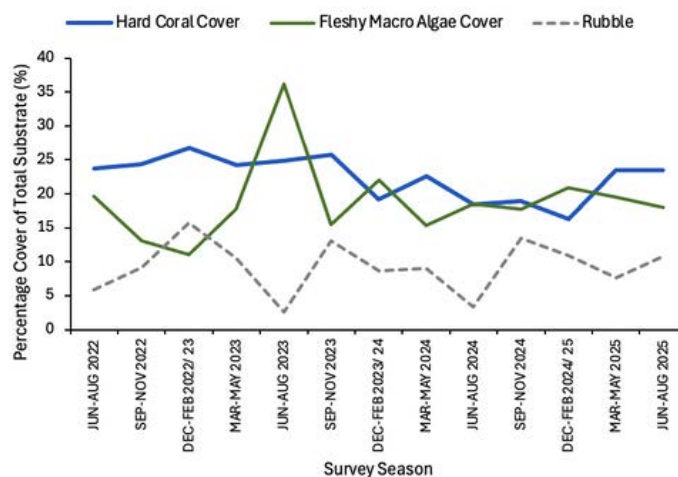


Figure 31. Average benthic substrate composition at Latason MPA (June-August 2025). Values represent the proportional contribution (%) of different benthic categories pooled across all surveys.

Recent change:

Since the last report, **hard coral cover at Latason increased sharply (16.3% → 23.5%), marking a strong seasonal recovery**. Fleshy macroalgae showed a slight decline (20.9% → 18.0%), while rubble remained broadly stable (11.0% → 10.8%) (Figure 32). Bleaching incidence fell slightly (0.6% → 0.8%), remaining very low and far below peaks observed in 2022–2023 (>6%). This stability indicates a resilient benthic community capable of maintaining coral dominance despite fluctuations in algal cover.

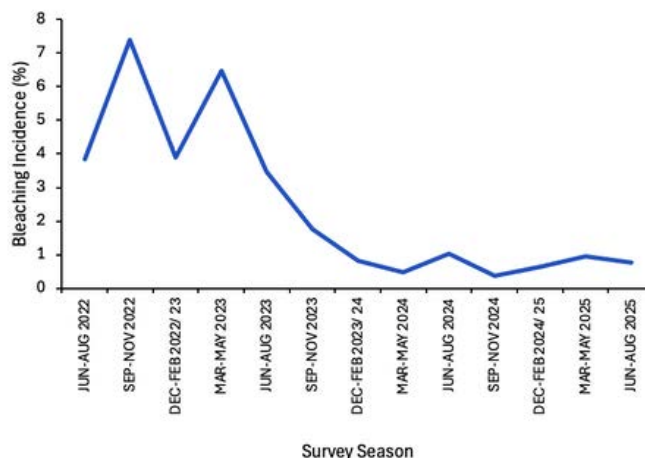
Figure 32. Temporal trends in hard coral cover, fleshy macroalgae cover, and rubble at Latason MPA (2022–2025). Data is expressed as average percentage cover per survey season.



Structural implications:

Latason's benthic structure is among the most balanced in Zamboanguita, with corals (hard + soft ~32%) and seagrass (~12%) jointly supporting high habitat heterogeneity. The consistent presence of macroalgae (~18%) indicates ongoing competition for space, but the strong coral component suggests that grazing pressure is keeping algae in check. The rubble fraction (~11%) may provide recruitment substrate but also reflects periodic stress. Sessile invertebrates (~7%) and calcareous algae (~4%) add secondary structural complexity.

Figure 33. Seasonal bleaching incidence at Latason MPA (2022–2025), shown as average percentage of colonies observed with visible bleaching (either partially or fully bleached) per survey season.



Long-term context:

Since monitoring began in 2022, Latason has maintained relatively high coral cover (18–27%), with macroalgae fluctuating between 11% and 36%. Peaks in bleaching (>7% in late 2022 and mid-2023) coincided with higher algal levels, but subsequent reductions (<1% since late 2023) suggest improved resilience (Figure 33). The persistence of both soft corals and seagrass highlights the site's ecological diversity compared with other MPAs, with corals avoiding the severe declines seen at more disturbed sites.

Ecological interpretation:

Latason supports one of the most diverse and structurally complex benthic assemblages in Zamboanguita, with healthy hard coral cover, notable soft coral and seagrass presence, and limited bleaching stress. The coexistence of corals and macroalgae reflects a delicate balance that is currently favourable to reef resilience, though persistent algal pressure and rubble input could limit further coral expansion. If current low bleaching levels continue and herbivore biomass remains strong, Latason is well-positioned to sustain the coral–algal balance and provide valuable ecosystem services for fisheries and biodiversity.

LATASON MPA

Tourism Value



Barracudas	11.80	Scorpaenidae	38.04
Cephalopods	8.75	Sharks	1.07
Cowries	49.98	Shrimps	55.72
Eels and Snakes	31.42	Slugs	67.47
Frogfish	6.53	Stingrays	0
Giant Clams	13.91	Syngnathidae and Pegasidae	20.55
Porcupinefish and Pufferfish	81.79	Turtles	7.54

Table 9. Mean encounter rates (%) of selected indicator and charismatic taxa recorded at Andulay MPA from March - August 2025. Values represent the percentage of dives in which each group was observed, providing an indication of their relative tourism and ecological value.

Latason is not particularly well known as a dive site, and it doesn't host the most abundant numbers of charismatic species. However, the expansive seagrass beds and shallow, colourful corals can make it an enjoyable dive site. It can be pretty good for nudibranchs and sea slugs, and **some rarer species, such as flamboyant cuttlefish and blue-ring octopuses**, have been observed there, although this is not captured in the data.

Latason demonstrates strong tourism potential, with very high encounter rates for porcupinefish and pufferfish (81.8%), slugs (67.5%), and shrimps (55.7%), all of which are well above municipal averages (Table 9). Cowries (50.0%) are also exceptionally common, adding to the site's appeal for macro enthusiasts. Eels and snakes (31.4%), scorpaenids (38.0%), and syngnathids (20.6%) provide additional diversity, while frogfish (6.5%) offer niche photographic interest.

Larger fauna are present but limited, with only occasional turtles (7.5%) and a small number of shark sightings (1.1%), and no stingrays. **Nurse sharks were recorded in July and August**, providing a rare but notable sighting of megafauna that elevates Latason's tourist profile.

Overall, Latason is a high-value macro and invertebrate site, with particularly strong mollusc and fish diversity; its megafauna presence is modest compared to other sites.

LUTOBAN GAC-ANG MPA



Lutoban MPA has an area of 15.1 ha and is the largest MPA in the southern part of Negros. Due to its size, two sites are monitored at Lutoban, which are then combined to obtain a representative average for the whole site. It consists of shallow to deep coral reefs ranging from 1 to 25 m. Extensive seagrass beds are present between the shoreline and the reef slope. The reef is relatively protected from prevailing winds, though it is occasionally affected by longshore current and wave action.



MPA demarcation based on DENR coordinates

LUTOBAN GAC-ANG MPA

Food Security



- It should be noted that, due to the large size of Lutoban MPA (15 hectares), we surveyed at two separate sub-sites (termed Lutoban North and Lutoban South) to obtain a more representative view of the MPA as a whole. All values for Lutoban MPA are taken as the average (mean) value of the two sub-sites.

Anecdotal reports of illegal fishing at Lutoban, if correct, presumably impact the fish biomass, at this, the largest and oldest MPA in Zamboanguita. Lutoban has recently seen the installation of comprehensive marker buoys to demarcate the boundaries of the MPA, which was hoped to improve the productivity of the MPA.

Current Status:

In June–August 2025, Lutoban recorded an average total fish density of ~602 individuals per 150 m², with commercial species contributing around 78 individuals per 150 m². **Commercial biomass was ~5.4 kg per 150m² (~362 kg/ha)** (Figure 34). Herbivores dominated the assemblage (~485 individuals per 150 m²), followed by carnivores (~83), omnivores (~12), corallivores (~11), and detritivores (~12).

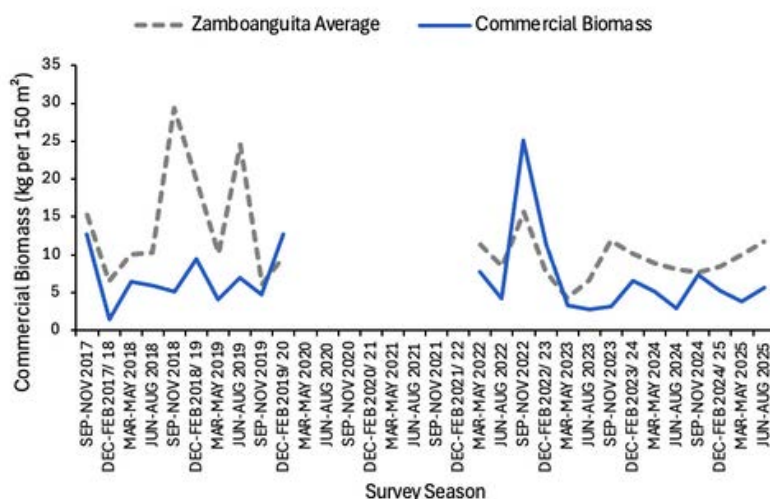


Figure 34. Temporal trends in commercial fish biomass (kg per 150m²) at Lutoban MPA (2017–2025). Biomass values represent the estimated weight of commercially important reef fish, providing an indicator of food security potential and MPA effectiveness.

Recent Change:

Compared with the last reporting period, Lutoban showed a strong recovery. Commercial density increased more than 50% (51.6 → 77.6 per 150m²), and **commercial biomass rose from 5.2 to 5.4 kg per 150m²**. Total density also grew substantially (466 → 602), driven mainly by herbivores (+35%) and moderate gains in carnivores, omnivores, and detritivores (Figure 35). Corallivore densities held stable. These results mark a rebound from the seasonal low observed earlier in 2025.

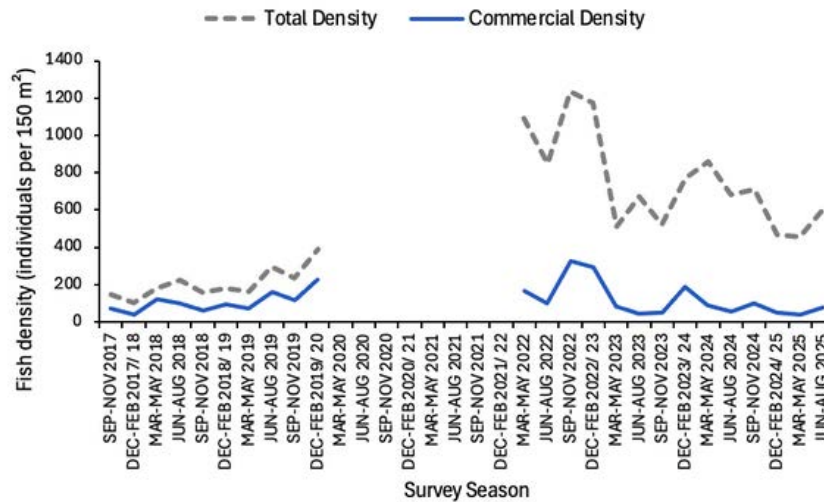
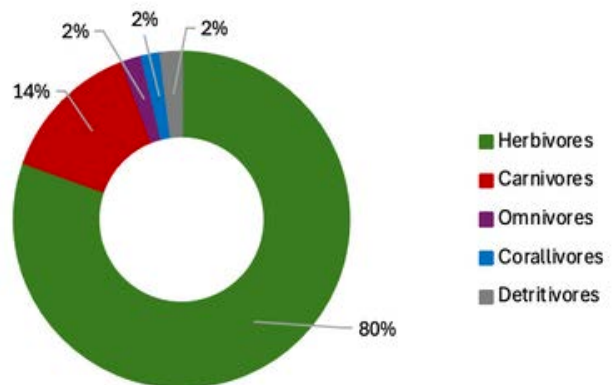


Figure 35. Temporal trends in total fish density and commercial fish density at Lutoban MPA (2017-2025). Values represent average individuals per 150m² recorded during seasonal surveys.

Figure 36. Proportional contribution (%) of trophic group densities to the total fish density at Lutoban MPA during Jun–Aug 2025. Values include both commercial and non-commercial species, ensuring that the role of abundant herbivores in maintaining algal–coral balance is represented.



Dietary structure:

The fish assemblage remains strongly herbivore-dominated, a positive sign for maintaining algal control and coral recovery (Figure 36). Carnivores are present in moderate densities, helping support trophic balance, though omnivores and corallivores remain secondary contributors. Detritivores continue to play a small but consistent role in overall diversity.

Commercial Groups:

At Lutoban MPA, fusiliers dominate the commercial biomass (~3.1 kg/150m²), far exceeding all other groups (Table 10). Parrotfish (~0.6 kg/150 m²), triggerfish (~0.4 kg/150m²) and unicornfish (~0.3 kg/150m²) form the secondary tier, supporting herbivory and mid-trophic roles. Soldierfish, goatfish, and groupers contribute modest amounts (~0.2–0.25 kg/150m² each), while bream and surgeonfish add smaller but consistent biomass. The assemblage remains fusilier-driven with moderate diversity, but predator biomass (e.g., groupers, barracuda) remains limited. Compared with fished sites such as Lutoban Pier, Lutoban MPA maintains stronger biomass levels and a more balanced trophic structure, although recovery of top predators is still incomplete.

Fusilier	3.07	Soldierfish	0.25
Parrotfish	0.57	Goatfish	0.23
Triggerfish	0.42	Grouper	0.20
Unicornfish	0.32	Bream	0.19
Barracuda	0.27	Surgeonfish	0.06

Table 10. Mean biomass (kg per 150m²) of the ten most abundant commercial fish groups at Lutoban MPA during Jun–Aug 2025. Values represent average biomass per survey and highlight the dominant contributors to the commercial fish community.

Long-term context:

Lutoban has exhibited highly variable biomass trends in recent years, with firm peaks (25 kg per 150 m² in Sep–Nov 2022) alternating with lower values (<3 kg per 150 m² in mid-2023). The current value (~5.4 kg per 150m²) represents a moderate rebound but remains well below the site’s historical highs. This variability suggests populations are responsive to both seasonal recruitment pulses and external fishing pressure.

Ecological interpretation:

The recovery in June–August 2025 is encouraging, particularly the strong rebound in herbivore and commercial densities after a weak December–February 2024/25 season. Herbivore dominance continues to underpin reef resilience, but the lack of large-bodied carnivores constrains trophic complexity and biomass accumulation. Consistent enforcement and protection will be critical to stabilising Lutoban’s fish communities and supporting longer-term ecological recovery.

LUTOBAN GAC-ANG MPA

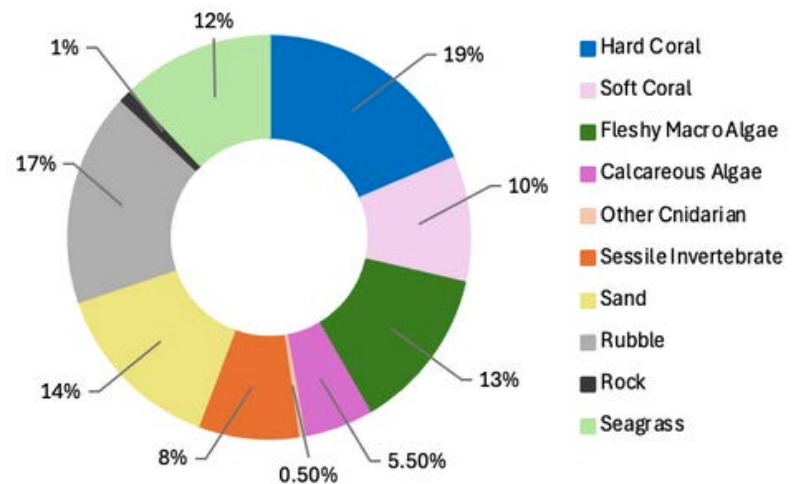
Reef Health And Resilience



Current status:

In June–August 2025, Lutoban MPA recorded an **average hard coral cover of ~18.6%**, **fleshy macroalgae of ~12.9%**, and **rubble of ~17%**. The broader substrate composition consists of sand (~14%) and rubble (~17%) as the dominant unconsolidated components, while hard coral contributes approximately 19% to the habitat overall (Figure 37). Soft coral (~10%) and seagrass (~12%) provide additional live cover, with sessile invertebrates (~8%) and calcareous algae (~6%) adding structural complexity. Bleaching levels were very low (<1%), indicating minimal visible stress during this period.

Figure 37. Average benthic substrate composition at Lutoban MPA (June–August 2025). Values represent the proportional contribution (%) of different benthic categories pooled across all surveys.



Recent change:

Since the last report, **hard coral cover at Lutoban MPA has risen (15.5% → 18.6%)**, pointing to a modest seasonal recovery (Figure 38). Fleshy macroalgae declined (17.1% → 12.9%), reducing competitive pressure on corals. Rubble, however, increased (15.4% → 17.0%), suggesting persistent substrate instability. Bleaching rose slightly (0.7% → 1.9%) but remains low compared with earlier peaks in 2022 (>9%).

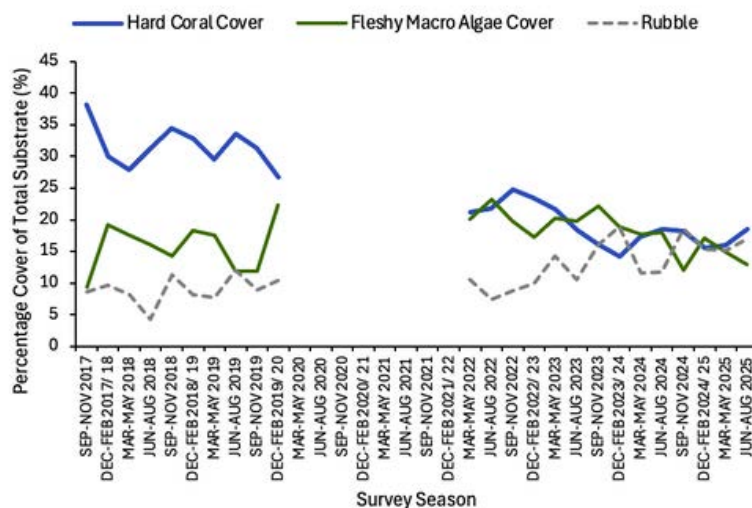


Figure 38. Temporal trends in hard coral cover, fleshy macroalgae cover, and rubble at Lutoban MPA (2017–2025). Data is expressed as average percentage cover per survey season.

Structural implications:

The combination of moderate hard coral and soft coral indicates a structurally diverse benthic community, further enhanced by seagrass, which provides a secondary habitat. However, the persistent rubble fraction highlights legacy disturbance and potential barriers to coral expansion. Stable macroalgal cover suggests that herbivory is helping to suppress algal overgrowth, thereby maintaining space for corals. Sessile invertebrates and calcareous algae add a secondary framework but may compete with coral recruits for substrate.

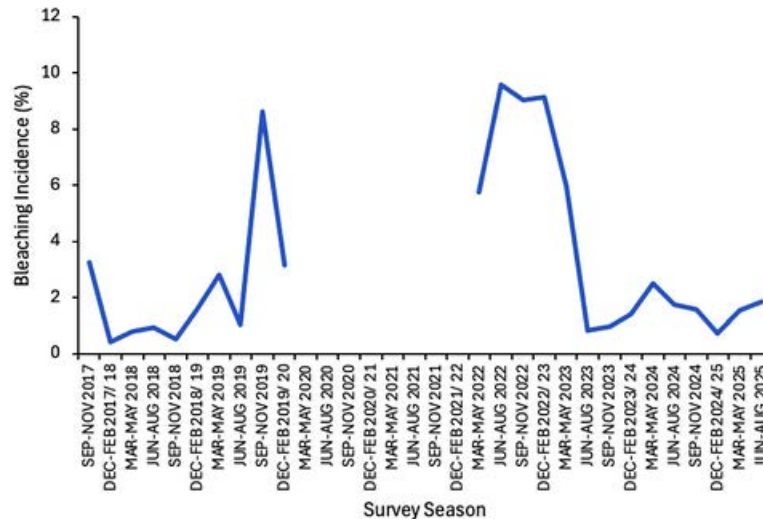


Figure 39. Seasonal bleaching incidence at Lutoban MPA (2017–2025), shown as average percentage of colonies observed with visible bleaching (either partially or fully bleached) per survey season.

Long-term context:

Since monitoring began, Lutoban's coral cover has fluctuated between ~14% and ~34%, with a notable dip in 2023–2024 (~14–18%). The current values (~23–24%) reflect a recovery toward earlier baselines. Macroalgal cover has remained consistently high (~15–22%), peaking at >36% in mid-2023, but has since moderated. Bleaching levels increased in 2022 (by up to ~9–10%) but have since declined to around 1%, indicating improved resilience in recent years (Figure 39).

Ecological interpretation:

Lutoban MPA supports a mixed benthic community, with hard coral rebuilding alongside soft corals, seagrass, and secondary invertebrates. Stable macroalgal cover, combined with declining bleaching incidence, is encouraging for long-term coral persistence; however, the persistent rubble fraction underscores incomplete recovery from past disturbances. The site's structural complexity is enhanced by soft corals, sessile invertebrates, and seagrass, which provide diverse habitats for reef fish. Continued management and protection will be critical to consolidating coral recovery, suppressing macroalgal competition, and reducing rubble through natural consolidation and recruitment.

Lutoban has been vulnerable to high levels of Crown of Thorns sea stars in the past, so it is essential to keep monitoring for the presence of this potentially damaging organism, which can eat a large amount of coral if left unchecked.

LUTOBAN GAC-ANG MPA

Tourism Value



Barracudas	14.81	Scorpaenidae	45.58
Cephalopods	10.40	Sharks	0
Cowries	35.46	Shrimps	59.72
Eels and Snakes	43.66	Slugs	72.80
Frogfish	4.55	Stingrays	1.09
Giant Clams	18.30	Syngnathidae and Pegasidae	14.55
Porcupinefish and Pufferfish	73.47	Turtles	17.19

Table 11. Mean encounter rates (%) of selected indicator and charismatic taxa recorded at Lutoban MPA from March - August 2025. Values represent the percentage of dives in which each group was observed, providing an indication of their relative tourism and ecological value.

Despite underperforming as an MPA, Lutoban is excellent for invertebrates and other charismatic species. The expansive seagrass beds in the shallows provide a habitat for turtles, and sightings are relatively common. Nudibranchs and other sea slugs are also abundant. Although underrepresented in the data, **rarer species such as the flamboyant cuttlefish and blue-ring octopus** have also been observed here.

Lutoban MPA offers high tourism value, with consistently strong sightings of slugs (72.8%), shrimps (59.7%), and porcupinefish and pufferfish (73.5%), making it particularly attractive to macro-focused divers (Table 11). Eels and snakes (43.7%), scorpaenids (45.6%), and cowries (35.5%) add further diversity, while cephalopods (10.4%) and frogfish (4.6%) contribute niche appeal.

Larger fauna are present but less common, with turtles (17.2%) providing occasional encounters with megafauna, and only minimal records of stingrays (1.1%).

Overall, Lutoban MPA represents a well-rounded dive site, combining reliable macro sightings with moderate encounters of turtles. However, it lacks the more substantial presence of megafauna seen at other sites.

LUTOBAN PIER



Lutoban Pier does not have protected status and, as such, functions as a non-MPA control site. It is situated to the north of Lutoban Gac-Ang MPA, and is separated from it by a deep sandy basin. The reef ranges from 1 to 25 m deep. It consists of an expansive area of shallow reef that develops extensively from the shore, as well as relatively steep slopes characterised by large fields of uniform coral growth forms.

LUTOBAN PIER

Food Security



Current Status:

In June–August 2025, Lutoban Pier recorded an **average total fish density of ~804 individuals** per 150 m², with commercial species contributing around 69 individuals per 150 m² (Figure 40). **Commercial biomass was ~7.1 kg per 150m² (~471 kg/ha)** (Figure 41). The assemblage was strongly herbivore-dominated (~651 individuals per 150 m²), followed by carnivores (~114), omnivores (~14), corallivores (~14), and detritivores (~9).

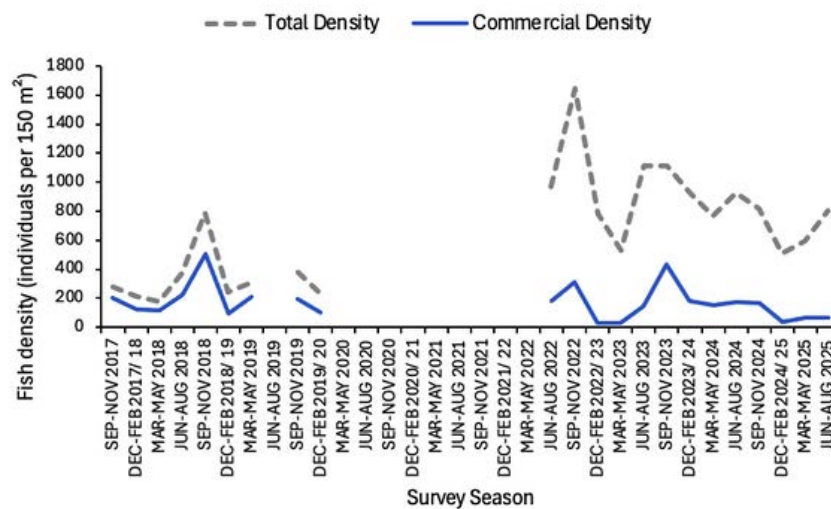


Figure 40. Temporal trends in total fish density and commercial fish density at Lutoban Pier (2017–2025). Values represent average individuals per 150m² recorded during seasonal surveys.

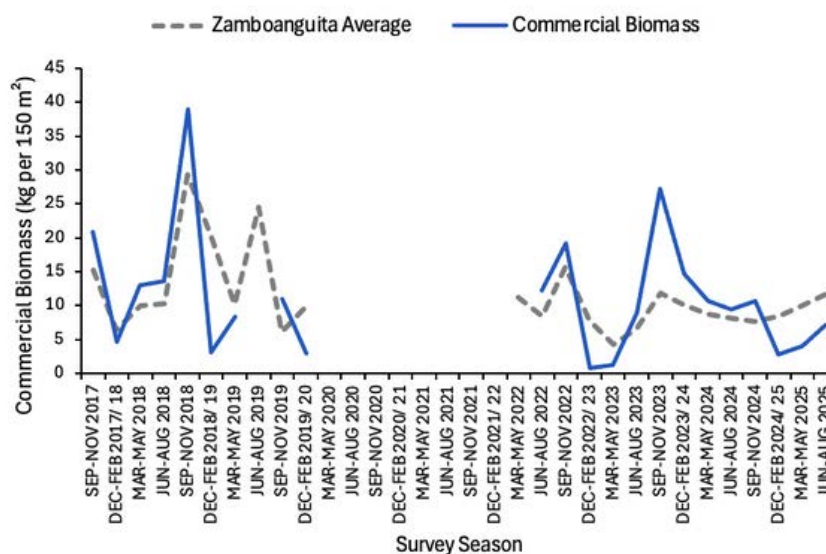
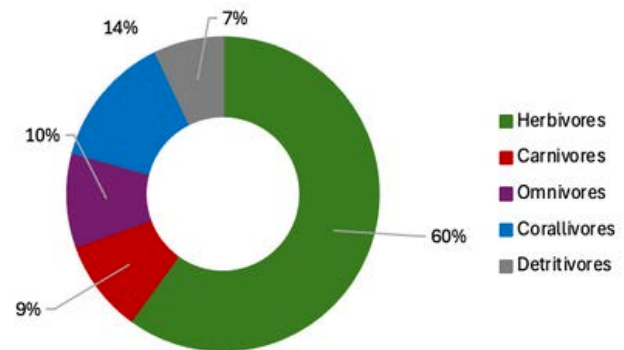


Figure 41. Temporal trends in commercial fish biomass (kg per 150m²) at Lutoban Pier (2017–2025). Biomass values represent the estimated weight of commercially important reef fish, providing an indicator of food security potential and MPA effectiveness.

Recent Change:

Compared with the previous reporting period, Lutoban Pier showed a clear recovery. Commercial density nearly doubled ($36.2 \rightarrow 68.9$ per 150m^2), and **commercial biomass more than doubled ($2.7 \rightarrow 7.1$ kg per 150m^2)**. Total density also rose sharply ($509 \rightarrow 804$), driven largely by gains in herbivores (+274 individuals) and carnivores (+39). Omnivores, corallivores, and detritivores also increased modestly, reflecting a broad-based seasonal rebound.

Figure 42. Proportional contribution (%) of trophic group densities to the total fish density at Lutoban Pier during Jun–Aug 2025. Values include both commercial and non-commercial species, ensuring that the role of abundant herbivores in maintaining algal–coral balance is represented.



Dietary structure:

The fish assemblage remains dominated by herbivores, a pattern consistent with previous seasons at Lutoban Pier (Figure 42). This strong herbivore base is beneficial for maintaining algal control, although the relative scarcity of large-bodied carnivores and groupers continues to limit a higher trophic balance. Moderate densities of omnivores and corallivores enhance diversity, while detritivores remain a small but steady presence.

Fusilier	2.99	Triggerfish	0.32
Snapper	1.49	Grouper	0.23
Parrotfish	0.56	Tuna	0.13
Emperor	0.53	Goatfish	0.10
Soldierfish	0.47	Barracuda	0.08

Table 12. Mean biomass (kg per 150m^2) of the ten most abundant commercial fish groups at Lutoban Pier during Jun–Aug 2025. Values represent average biomass per survey and highlight the dominant contributors to the commercial fish community.

Commercial Groups:

At Lutoban Pier, fusiliers are the dominant commercial group (~ 3.0 kg/ 150m^2), followed by snappers (~ 1.5 kg/ 150m^2) (Table 12). Parrotfish and emperors provide a notable secondary contribution (~ 0.5 kg/ 150m^2 each), while soldierfish and groupers add moderate biomass. Smaller inputs come from triggerfish, goatfish, barracuda, and tuna, resulting in a relatively diverse assemblage for a non-MPA site. Overall, Lutoban Pier supports moderate biomass with a mix of mid-trophic and predatory groups, but densities remain low compared to nearby MPAs, highlighting the effects of fishing pressure.

Long-term context:

Lutoban Pier has shown extreme variability in fish density and biomass over the years. Peaks above 20–27 kg per 150m² (e.g., September–November 2018 and September–November 2023) contrast sharply with lows below 3 kg per 150m² (December–February 2018/19 and December–February 2024/25). The current biomass (~7.1 kg per 150 m²) represents a rebound from the most recent low but remains modest compared to historical highs. This pattern highlights sensitivity to seasonal shifts and likely fishing pressure.

Ecological interpretation:

The Jun–Aug 2025 results suggest Lutoban Pier is recovering after a weak Dec–Feb 2024/25 season, with increases across density, biomass, and all trophic groups. Herbivores continue to provide a strong foundation for reef resilience; however, the absence of large-bodied predators constrains the attainment of a full ecological balance. The site's high variability underscores the need for consistent enforcement and protection to stabilise populations and support longer-term recovery.

LUTOBAN PIER

Reef Health And Resilience



Current status:

In June–August 2025, Lutoban Pier recorded an **average hard coral cover of ~37.8%**, **fleshy macroalgae of ~13.2%**, and **rubble of ~10.1%**. The broader substrate composition is dominated by hard coral (~38%), supplemented by soft coral (~9%) and sessile invertebrates (~11%) (Figure 43). Macroalgae (~13%) remains moderate, while rubble (~10%) and sand (~10%) indicate unconsolidated substrate. Bleaching levels were very low (~1.6%), suggesting minimal stress during this period.

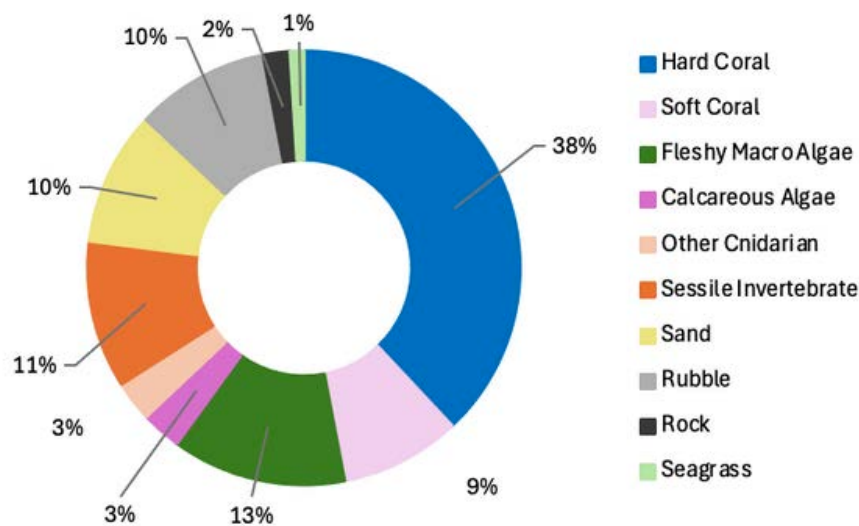


Figure 43. Average benthic substrate composition at Lutoban Pier (June-August 2025). Values represent the proportional contribution (%) of different benthic categories pooled across all surveys.

Recent change:

Since the last report, **hard coral cover at Lutoban Pier has increased (34.1% → 37.8%)**, showing signs of seasonal recovery (Figure 44). Fleshy macroalgae declined (14.6% to 13.2%), easing potential competition for space, while rubble increased slightly (8.2% to 10.1%), suggesting ongoing small-scale disturbance. Bleaching also showed a minor increase (1.3% → 1.6%) but remains very low compared with historical peaks (e.g., >11% in late 2019 and >13% in 2022).

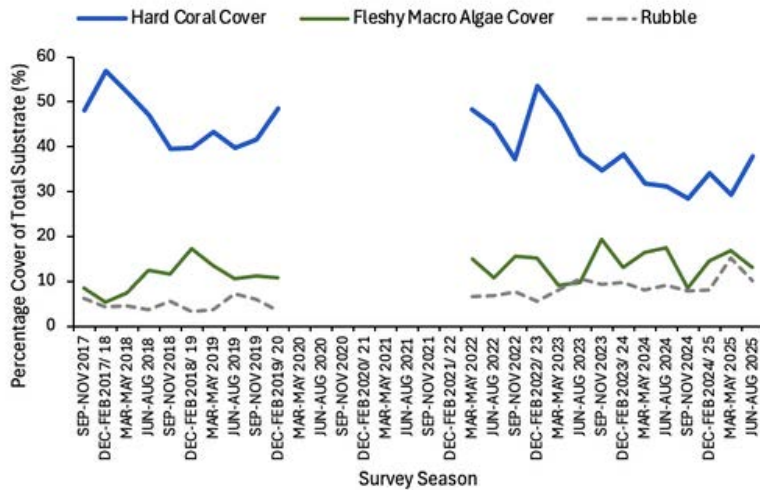
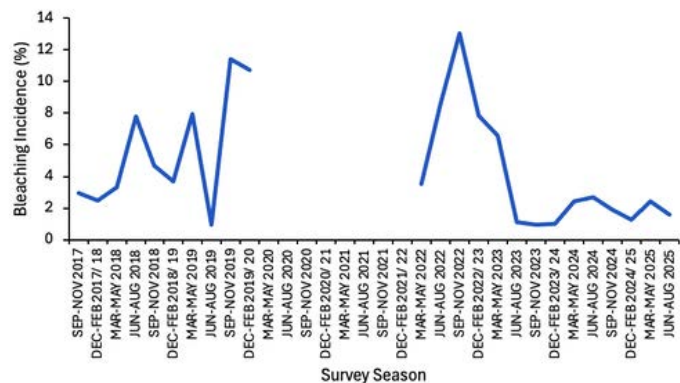


Figure 44. Temporal trends in hard coral cover, fleshy macroalgae cover, and rubble at Lutotban Pier (2017–2025). Data is expressed as average percentage cover per survey season.

Structural implications:

The high coral cover (~38%) provides a strong structural framework for reef-associated fauna, which is further enhanced by secondary contributions from soft corals and sessile invertebrates (~20% combined). Moderate macroalgal levels (~13%) remain present but do not dominate, likely due to the presence of herbivore grazing pressure. Rubble and sand (~20% combined) suggest patches of unconsolidated substrate that could either limit coral expansion or provide settlement opportunities.

Figure 45. Seasonal bleaching incidence at Lutoban Pier (2017–2025), shown as average percentage of colonies observed with visible bleaching (either partially or fully bleached) per survey season.



Long-term context:

Since monitoring began, Lutoban Pier has consistently maintained some of the highest coral cover values in Zamboanguita, often exceeding 30–50% (Figure 43). Coral declined sharply during 2023–2024 (~28–32%) but has since recovered to ~38%, approaching earlier levels. Macroalgae have fluctuated (9–19%), peaking in 2018 and again in 2023, but are now at a lower level. Bleaching, which was occasionally high in 2019–2022 (>8–13%), has dropped to near-background levels (<2%) in recent surveys, indicating improved coral resilience (Figure 45).

Ecological interpretation:

Lutoban Pier is one of the strongest-performing sites in terms of coral dominance, boasting nearly 40% cover and a low incidence of bleaching. The balance of high coral, moderate macroalgae, and secondary structural contributors supports a diverse benthic habitat. Persistent rubble and sand fractions highlight areas of disturbance but also potential for coral recruitment. With continued stability in herbivore populations and low bleaching stress, Lutoban Pier is well-positioned to maintain coral dominance and ecological resilience within the region.

LUTOBAN PIER

Tourism Value



Barracudas	14.18	Scorpaenidae	44.78
Cephalopods	3.73	Sharks	0
Cowries	33.58	Shrimps	47.02
Eels and Snakes	36.57	Slugs	76.12
Frogfish	3.73	Stingrays	1.49
Giant Clams	38.81	Syngnathidae and Pegasidae	14.18
Porcupinefish and Pufferfish	72.91	Turtles	29.11

Table 13. Mean encounter rates (%) of selected indicator and charismatic taxa recorded at Lutoban Pier from March - August 2025. Values represent the percentage of dives in which each group was observed, providing an indication of their relative tourism and ecological value.

Lutoban Pier isn't particularly known for its abundance of charismatic species, though turtles are seen fairly commonly here, their presence supported by the seagrass beds present in the shallows. The site is interesting for its substrate composition, which features large, uniform patches of the same coral type, making for some enjoyable dives.

However, there is no reasonable access, and the area lacks infrastructure, limiting its current potential as a dive tourism spot, except by boat.

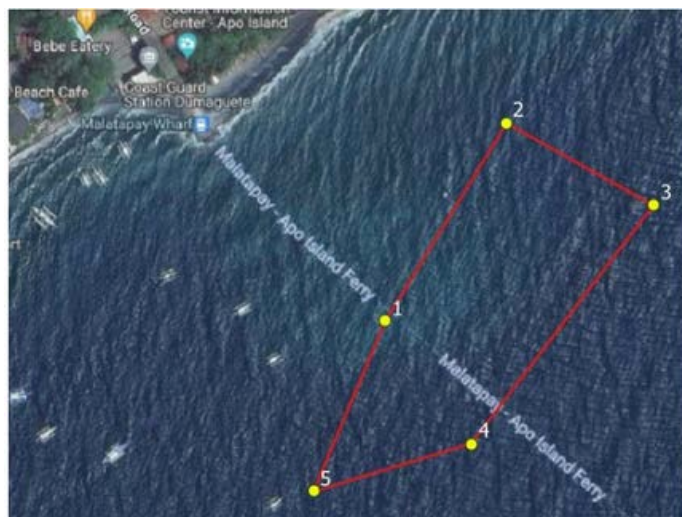
Lutoban Pier demonstrates high tourism potential, with excellent encounter rates for slugs (76.1%), porcupinefish and pufferfish (72.9%), and giant clams (38.8%) (Table 13). Turtles (29.1%) provide regular encounters with megafauna, enhancing the site's broad appeal. Macro diversity is also substantial, with reliable sightings of shrimps (47.0%), cowries (33.6%), scorpaenids (44.8%), and eels and snakes (36.6%). Cephalopods (3.7%), frogfish (3.7%), and syngnathids (14.2%) add niche photographic interest, while larger fauna are limited to low levels of stingrays (1.5%).

Overall, Lutoban Pier is a well-rounded dive site, offering both macro-richness and consistent turtle sightings, making it attractive to a wide range of divers.

MALUAY MALATAPAY MPA



Malatapay MPA has an area of 1.6 ha and was established in 2022. Malatapay consists of shallow to deep coral reefs, surrounded by sand flats and seagrass beds. Our surveys have a maximum depth of 19 m, but a deeper area of mesophotic reef begins at 40 m. As the main port serving Apo Island, Malatapay is subject to considerable boat traffic. The famous Wednesday market also introduces terrestrial pressures to the reef, including animal waste and trash. Malatapay is well-recognised as a dive site and is regularly visited by SCUBA divers.



MPA demarcation based on DENR coordinates

MALUAY MALATAPAY MPA

Food Security



Current Status:

In June–August 2025, Malatapay recorded its highest values in recent years, with an **average total fish density of ~897 individuals** per 150 m² (Figure 46). Commercial species contributed ~349 individuals per 150m², while **commercial biomass surged to ~34.4 kg per 150m² (~1,963 kg/ha)**, the highest recorded since monitoring resumed post-COVID (Figure 47). Herbivores dominated the assemblage (~694 individuals per 150 m²), followed by carnivores (~160), omnivores (~17), corallivores (~10), and detritivores (~15).

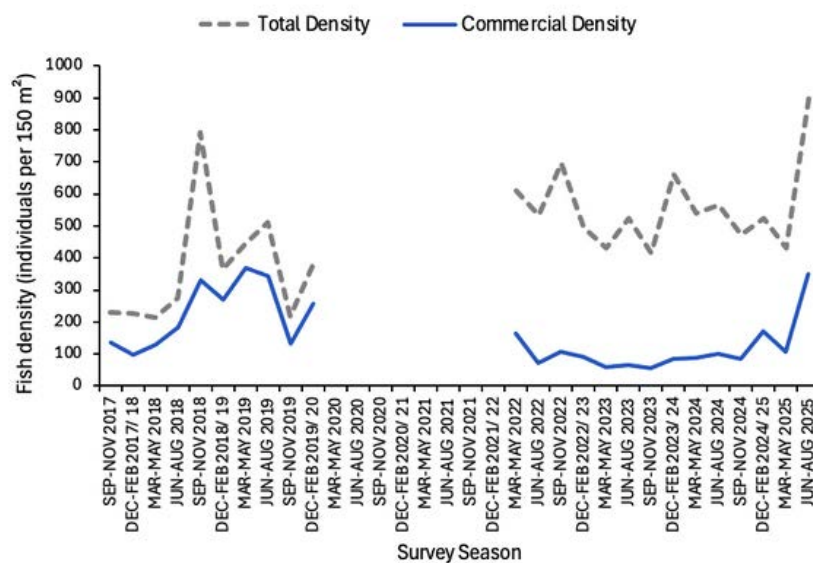


Figure 46. Temporal trends in total fish density and commercial fish density at Malatapay (2017-2025). Values represent average individuals per 150m² recorded during seasonal surveys.

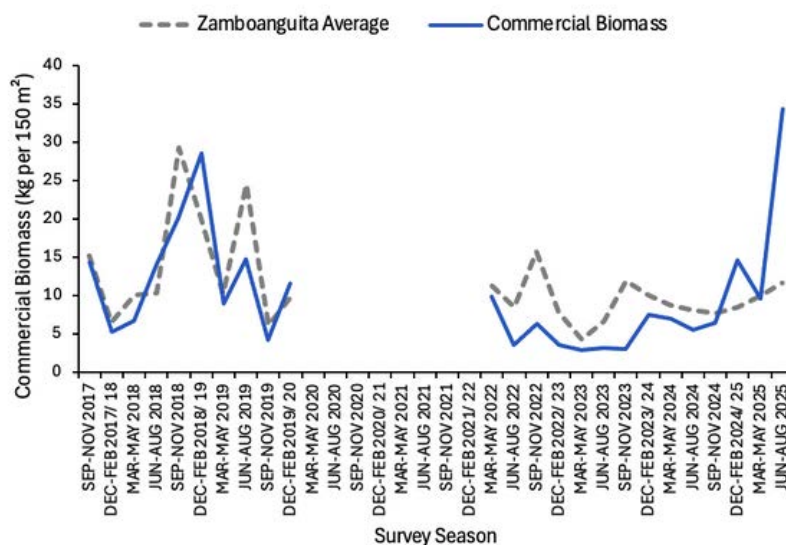
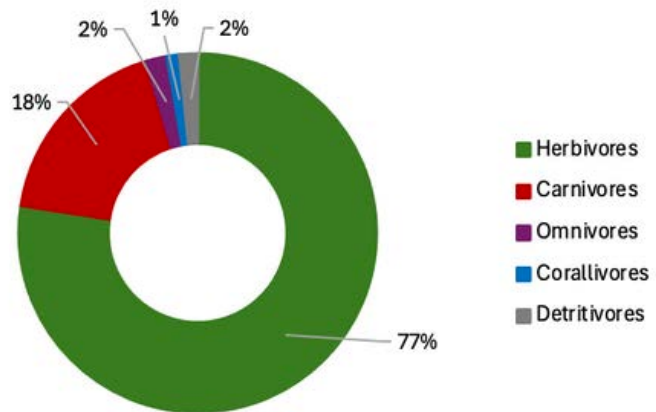


Figure 47. Temporal trends in commercial fish biomass (kg per 150m²) at Malatapay MPA (2017-2025). Biomass values represent the estimated weight of commercially important reef fish, providing an indicator of food security potential and MPA effectiveness.

Recent Change:

Compared with the last reporting period, Malatapay showed dramatic increases. Commercial density more than doubled ($170 \rightarrow 349$ per 150m^2), and **commercial biomass nearly doubled ($14.6 \rightarrow 34.4$ kg per 150m^2)**. Total density also rose steeply ($524 \rightarrow 897$ per 150m^2), mainly driven by gains in herbivores (+297 individuals) and carnivores (+78). This represents one of the strongest seasonal recoveries across Zamboanguita's MPAs.

Figure 48. Proportional contribution (%) of trophic group densities to the total fish density at Malatapay MPA during Jun–Aug 2025. Values include both commercial and non-commercial species, ensuring that the role of abundant herbivores in maintaining algal–coral balance is represented.



Dietary structure:

The assemblage is strongly herbivore-dominated, reflecting the presence of large schools of parrotfish, surgeonfish, and rabbitfish that provide essential grazing functions (Figure 48). Carnivores also made a substantial contribution this season, enhancing the trophic balance compared with previous years. Omnivores, corallivores, and detritivores remained present in lower but stable densities, contributing to ecological diversity.

Fusilier	23.7	Goatfish	0.27
Snapper	5.3	Bream	0.21
Barracuda	1.93	Unicornfish	0.66
Surgeonfish	1.08	Triggerfish	0.30
Parrotfish	0.56	Sweetlips	0.13

Table 14. Mean biomass (kg per 150m^2) of the ten most abundant commercial fish groups at Malatapay MPA during Jun–Aug 2025. Values represent average biomass per survey and highlight the dominant contributors to the commercial fish community.

Commercial Groups:

Malatapay MPA's commercial biomass is overwhelmingly dominated by fusiliers, which contribute the majority of biomass at the site (~ 24 kg/ 150m^2) (Table 14). Snappers form the second tier (~ 5.3 kg/ 150m^2), followed by barracuda (~ 1.9 kg/ 150m^2), highlighting the occasional presence of large predators. Surgeonfish and parrotfish add moderate herbivorous input, while goatfish, bream, unicornfish, and triggerfish contribute at lower but consistent levels.

The notable rise in fusiliers and snappers helped drive the biomass peak, while the consistent presence of herbivores continues to underpin reef resilience. Compared with other sites, Malatapay currently supports one of the strongest commercial assemblages in the municipality.

Long-term context:

Malatapay has historically exhibited variable but often robust fish populations, with past biomass peaks (e.g., ~28.6 kg per 150 m² in December–February 2018/19). The current value (~34.4 kg per 150 m²) represents the highest biomass recorded since that time, suggesting sustained improvements in management and protection. This result is particularly encouraging given that many sites in the region still record biomass <15 kg per 150m².

Ecological interpretation:

The Jun–Aug 2025 results confirm Malatapay as one of Zamboanguita’s most fish-rich and resilient MPAs. The dominance of herbivores ensures strong algal control, while rising carnivore numbers indicate improving trophic balance. The surge in commercial biomass highlights both ecological health and potential benefits to fisheries. Continued enforcement is key to maintaining this momentum, with opportunities to rebuild larger-bodied predators over the long term.

This is one of the highest recorded commercial biomass levels in the municipality, and perhaps surprisingly, considering that Malatapay only became an MPA in 2022. The MPA is also very small, so some variability may be expected. The area is also subject to heavy boat traffic, all of which may have an impact on the site’s potential to support high fish biomass over the long term.

MALUAY MALATAPAY MPA

Reef Health And Resilience



Current status:

In June–August 2025, Malatipay MPA recorded an **average hard coral cover of ~22.8%**, **fleshy macroalgae of ~26.1%**, and **rubble of ~25.1%**. The broader substrate composition is dominated by rubble (~25%) and fleshy macroalgae (~26%), with hard coral contributing approximately 23% to the habitat structure (Figure 49). Sand (~10%), calcareous algae (~6%), and sessile invertebrates (~5%) provide secondary elements, while seagrass (~2%) and other minor categories add small contributions. Bleaching levels were low (~1.6%), indicating minimal stress during this period.

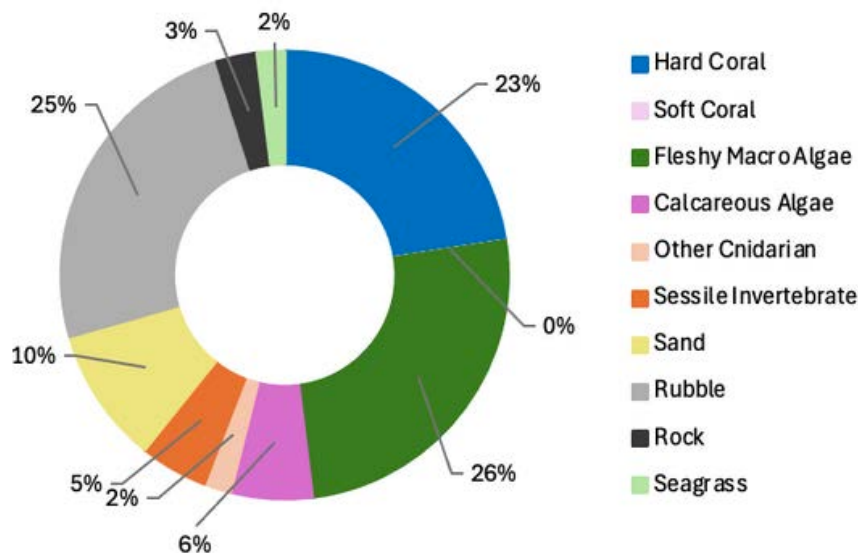


Figure 49. Average benthic substrate composition at Malatipay MPA (June-August 2025). Values represent the proportional contribution (%) of different benthic categories pooled across all surveys.

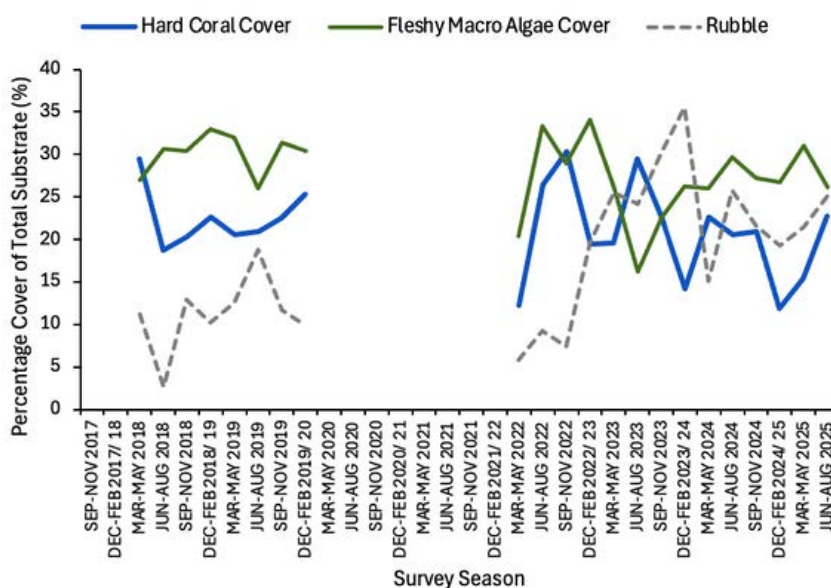
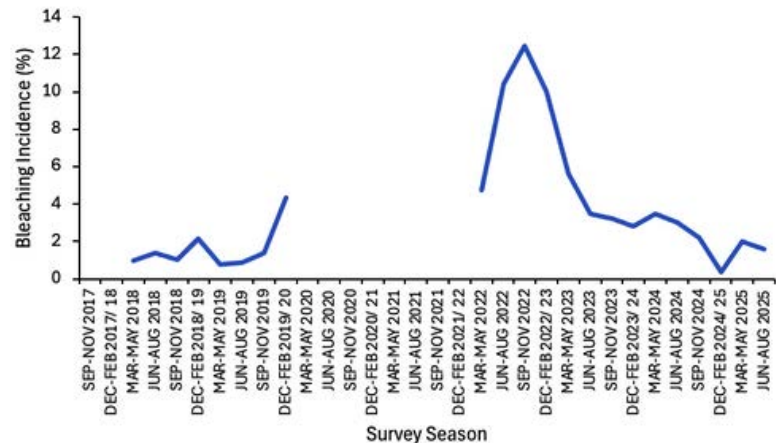


Figure 50. Temporal trends in hard coral cover, fleshy macroalgae cover, and rubble at Malatipay MPA (2017–2025). Data is expressed as average percentage cover per survey season.

Recent change:

Since the last report, **hard coral cover at Malatapay increased (11.8% → 22.8%)**, marking a strong seasonal recovery (Figure 50). Fleshy macroalgae also rose slightly (26.8% → 26.1%, relatively stable), while rubble increased (19.3% → 25.1%), pointing to continued disturbance and substrate turnover. Bleaching rose slightly (0.4% → 1.6%), but remains low compared to the peaks observed in 2022 (10–12%) (Figure 51).

Figure 51. Seasonal bleaching incidence at Malatapay MPA (2017–2025), shown as average percentage of colonies observed with visible bleaching (either partially or fully bleached) per survey season.



Structural implications:

The co-dominance of rubble, macroalgae, and hard coral indicates a reef in a transitional state. While coral cover is relatively healthy for a fished reef, the high proportions of rubble and algae highlight ongoing disturbance and competition for space. Calcareous algae (~6%) provide some consolidation of rubble and enhance the settlement potential of new coral recruits. Sustained grazing pressure will be crucial in suppressing algal overgrowth and enabling corals to expand.

Long-term context:

Since monitoring began, Malatapay has experienced significant fluctuations in coral cover, from highs above 35–37% (2017–2018) to lows near 12–15% (2022–2024). Macroalgae have often been high (>25–30%), reflecting recurring algal pressure, while rubble has increased notably since 2022 (>20–30%). Bleaching has varied, peaking at 12% in late 2022 but declining to <2% in 2025, indicating recent improvement in coral resilience.

Ecological interpretation:

Malatapay's benthic community reflects both recovery potential and persistent stress. Coral cover is rebounding but remains constrained by high rubble and macroalgal competition. The site is ecologically important as it supports a balanced mix of substrates; however, its resilience will depend on controlling algal dominance and allowing corals to reclaim the space. With sustained low bleaching and substantial herbivore populations, Malatapay could gradually shift back toward higher coral dominance, but ongoing management is required to address rubble and algal proliferation.

MALUAY MALATAPAY MPA

Tourism Value



Barracudas	19.13	Scorpaenidae	59.17
Cephalopods	11.57	Sharks	0
Cowries	37.39	Shrimps	46.26
Eels and Snakes	34.05	Slugs	71.46
Frogfish	2.72	Stingrays	0.69
Giant Clams	9.52	Syngnathidae and Pegasidae	9.56
Porcupinefish and Pufferfish	85	Turtles	59.18

Table 15. Mean encounter rates (%) of selected indicator and charismatic taxa recorded at Maluay-Malatapay MPA from March - August 2025. Values represent the percentage of dives in which each group was observed, providing an indication of their relative tourism and ecological value.

Maluay-Malatapay is a relatively well-established diving spot with easy access from both sea and land, as well as good local infrastructure and amenities. It has considerable potential tourism value. It is well known for the **rare species often seen there, including the flamboyant cuttlefish, ghost pipefish, and frogfish.**

The presence of both natural and artificial reefs means the diving there is varied, and the **high levels of turtles** could be of interest to snorkellers as well as divers. There is also a deeper reef at depths of up to 50 meters, which provides challenging yet rewarding diving for divers with the appropriate skills, training, and certification.

Malatapay shows very strong tourism potential, with high encounter rates of porcupinefish and pufferfish (85%), slugs (71.5%), and Scorpaenidae (59.2%) (Table 15). Turtles are also frequently recorded (59.2%), providing a charismatic appeal that enhances the site's attractiveness to divers.

Cowries (37.4%) and shrimps (46.3%) contribute additional macro interest, while moderate sightings of barracudas (19.1%) and eels and snakes (34.1%) offer further variety. Mobula rays were sighted in June and August, adding to the site's already high megafauna tourism value alongside frequent turtle encounters. Although giant clams (9.5%) are less common, the consistent presence of multiple high-value taxa makes Malatapay one of the strongest sites for both biodiversity and diver experience.

MOJON MPA



Mojon MPA is the newest MPA in the municipality, having been established in 2024. Monitoring by MCP commenced simultaneously. The MPA has an area of 2.11 ha and consists of three distinct areas of reef interspersed by sand patches. A maximum depth of 15m reduces the scope of the depth strata used for other sites.



MPA demarcation based on DENR coordinates

It should be noted that monitoring at Mojon only began recently. Continued monitoring will therefore be essential to build a more reliable long-term picture of reef condition. Surveys are restricted to a single fixed area of the reef, therefore results may not fully represent the variability and overall status of the site.

MOJON MPA

Food Security



Current Status:

In June–August 2025, Mojon recorded an average total fish density of ~725 individuals per 150 m², with commercial species contributing just around 40 individuals per 150 m². **Commercial biomass was very low, at approximately 1.9 kg per 150 m² (~129 kg/ha),** among the lowest values recorded across Zamboanguita's MPAs this season (Figure 52). The assemblage was dominated by herbivores (~608 individuals per 150 m²), with carnivores (~70), omnivores (~29), corallivores (~10), and detritivores (~10) present at much lower densities.

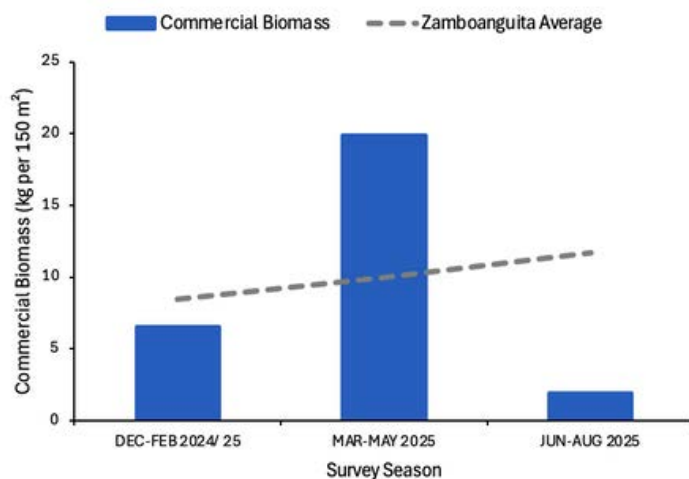


Figure 52. Temporal trends in commercial fish biomass (kg per 150m²) at Mojon MPA (2024-2025). Biomass values represent the estimated weight of commercially important reef fish, providing an indicator of food security potential and MPA effectiveness.

Recent Change:

Compared with the last reporting period, Mojon experienced sharp declines. Commercial density dropped drastically (151 → 40 per 150m²), while biomass collapsed (6.5 → 1.9 kg per 150m²) (Figure 53). Herbivore numbers rose moderately (453 → 608 per 150m²), but this was offset by a sharp reduction in carnivores (174 → 70 per 150m²). These results indicate a severe seasonal contraction in commercial assemblages, leaving Mojon with one of the weakest commercial fish profiles in the municipality.

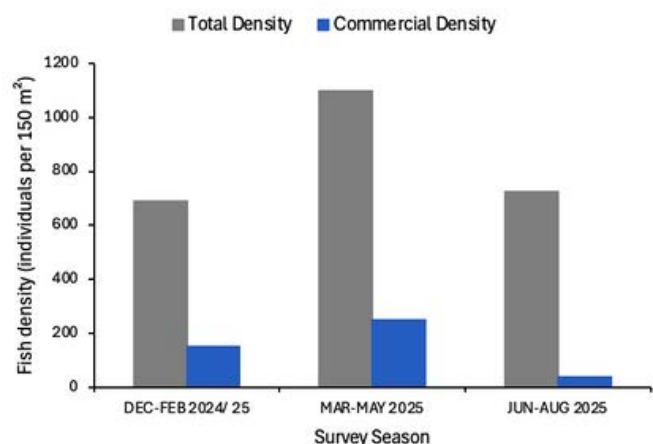


Figure 53. Temporal trends in total fish density and commercial fish density at Mojon MPA (2024-2025). Values represent average individuals per 150m² recorded during seasonal surveys.

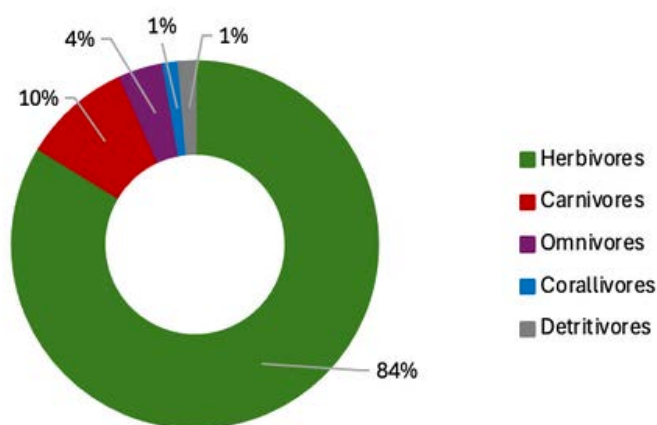


Figure 54. Proportional contribution (%) of trophic group densities to the total fish density at Mojon MPA during Jun–Aug 2025. Values include both commercial and non-commercial species, ensuring that the role of abundant herbivores in maintaining algal–coral balance is represented.

Dietary structure:

The assemblage remains heavily herbivore-dominated, but the very low biomass of commercial species and the decline in carnivores reduce ecological balance and functional diversity (Figure 54). Omnivores, corallivores, and detritivores were present in modest numbers but did not offset the sharp losses in higher trophic groups.

Snapper	0.58	Bream	0.15
Parrotfish	0.22	Sweetlips	0.12
Triggerfish	0.20	Surgeonfish	0.10
Soldierfish	0.20	Grouper	0.10
Unicornfish	0.15	Goatfish	0.09

Table 16. Mean biomass (kg per 150m²) of the ten most abundant commercial fish groups at Mojon MPA during Jun–Aug 2025. Values represent average biomass per survey and highlight the dominant contributors to the commercial fish community.

Commercial Groups:

Mojon MPA's commercial biomass is dominated by snappers, which are the primary contributors (~0.58 kg/15 m²) (Table 16). Parrotfish, triggerfish, and soldierfish provide the next tier of biomass, followed by unicornfish and bream, reflecting moderate herbivore and omnivore input. Sweetlips, surgeonfish, and groupers occur at lower but consistent levels, while goatfish make smaller contributions. Overall, the assemblage exhibits moderate diversity but low biomass, with the notable absence of large predators, such as barracuda or sharks. The trophic structure is therefore skewed toward mid-sized species, limiting ecological balance and potential fisheries value.

Long-term context:

Mojon's fish populations have been variable, but the current biomass (~1.9 kg per 150m²) is among the lowest recorded. Earlier peaks (e.g., ~20 kg per 150m² in Mar–May 2025) highlight the site's capacity for recovery, but the steep drop this season shows that fish populations remain highly unstable and likely vulnerable to external fishing pressure. It is also important to note that only recent monitoring limits long-term comparisons, though the available time series still indicates a pattern of instability.

Ecological interpretation:

Mojon's results are concerning, showing a collapse in commercial biomass and a sharp reduction in carnivores since the last report. While herbivores continue to provide grazing pressure that supports reef resilience, the near-absence of commercial fish and predators leaves the assemblage ecologically unbalanced. Stronger enforcement and spillover management are needed to prevent Mojon from becoming dominated by small-bodied herbivores at the expense of higher trophic functions.

MOJON MPA

Reef Health And Resilience



Current status:

In June–August 2025, Mojon MPA recorded an average **hard coral cover of ~22.4%**, **fleshy macroalgae of ~28.6%**, and **rubble of ~16.8%**. The broader substrate composition reveals that macroalgae (~29%) are the dominant category, followed by hard coral (~22%) and rubble (~17%) (Figure 55). Sand (~17%) also formed a significant component, while sessile invertebrates (~5%) and calcareous algae (~4%) contributed additional structure. Bleaching levels were very low (~0.6%), indicating minimal visible stress at the time of survey.

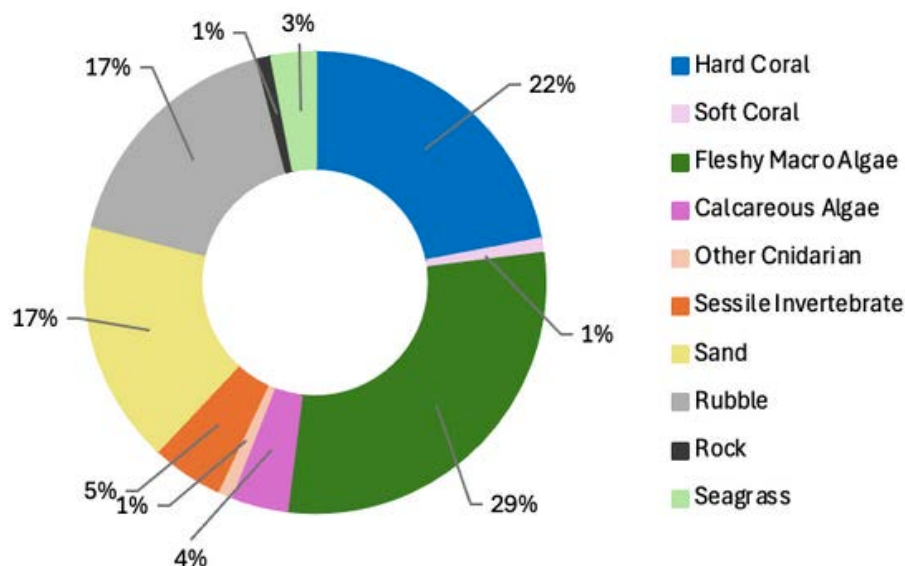


Figure 55. Average benthic substrate composition at Mojon MPA (June-August 2025). Values represent the proportional contribution (%) of different benthic categories pooled across all surveys.

Recent change:

Since the last report, **the hard coral cover at Mojon has increased (17.5% → 22.4%), indicating an** encouraging seasonal recovery. Fleshy macroalgae also rose (25.6% → 28.6%), suggesting stronger competition with corals for space. Rubble nearly doubled (9.6% → 16.8%), pointing to continued disturbance and substrate instability. Bleaching rose slightly from 0% to 0.6%, though levels remain very low compared with other sites in recent years, continuing the recent low levels of bleaching stress observed across the municipality. These shifts suggest that coral gains from earlier in the year may have been offset by increased macroalgal competition.

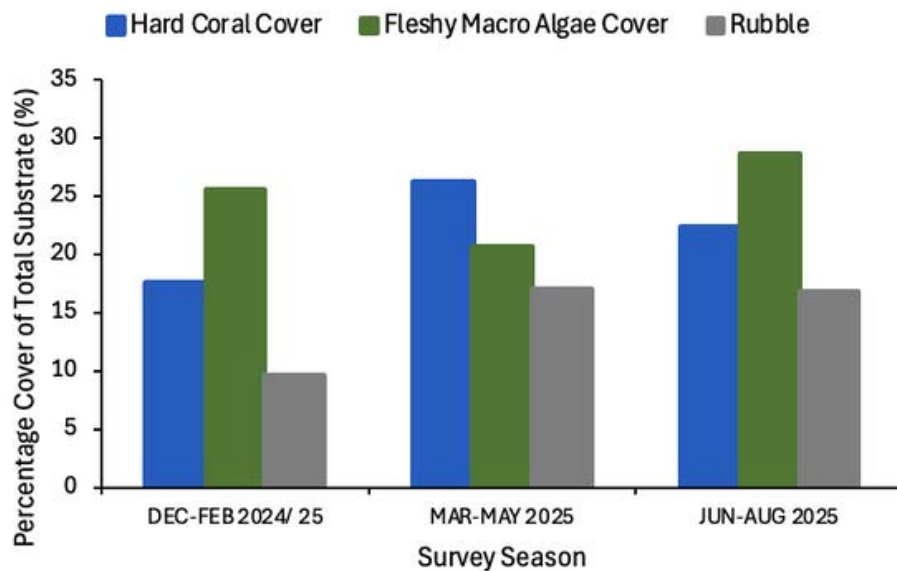


Figure 56. Temporal trends in hard coral cover, fleshy macroalgae cover, and rubble at Mojon MPA (2024–2025). Data is expressed as average percentage cover per survey season.

Structural implications:

The coexistence of macroalgae, rubble, and coral suggests a reef under moderate stress. While hard coral cover remains substantial, the high macroalgal presence (~29%) shows a phase shift, which risks suppressing coral recovery if not controlled by grazing (Figure 56). The relatively high sand and rubble fractions (~34% combined) indicate both habitat instability and potential recruitment space for new coral, depending on consolidation. The low bleaching is a positive signal, but long-term coral growth will depend on limiting algal overgrowth.

Long-term context:

Mojon’s monitoring record is shorter than that of other MPAs, but in 2025, it has already shown significant fluctuations. Coral cover rose from ~17.5% in Dec–Feb 2024/25 to ~26.3% in Mar–May, before dropping to ~22.4% in Jun–Aug. Macroalgae have remained persistently high (~20–29%), reflecting recurring algal competition. Rubble has also increased since early 2025, reaching ~17%. Bleaching levels have stayed very low (<2%), indicating that thermal stress is not currently a major driver of change.

Ecological interpretation:

Mojon’s benthic community reflects a reef with both promise and challenges. Hard coral cover is relatively healthy but faces strong competition from macroalgae and is constrained by high fractions of rubble and sand. The very low bleaching incidence is encouraging, suggesting corals are resilient to recent stress. However, without stronger herbivore grazing and management to limit disturbance, macroalgae dominance could restrict coral recovery. With protection and ecological balance, Mojon has the potential to rebuild coral cover, but current conditions highlight the fragility of its trajectory.

MOJON MPA

Tourism Value



Barracudas	0	Scorpaenidae	66.55
Cephalopods	2.94	Sharks	0
Cowries	24.08	Shrimps	30.33
Eels and Snakes	32.91	Slugs	36.40
Frogfish	6.25	Stingrays	0
Giant Clams	3.13	Syngnathidae and Pegasidae	30.33
Porcupinefish and Pufferfish	84.75	Turtles	21.33

Table 17. Mean encounter rates (%) of selected indicator and charismatic taxa recorded at Mojon MPA from March - August 2025. Values represent the percentage of dives in which each group was observed, providing an indication of their relative tourism and ecological value.

Mojon presents a moderate tourism value, driven primarily by very high encounters with porcupinefish and pufferfish (84.8%) and a strong presence of Scorpaenidae (66.6%) (Table 17). Turtles are also regularly observed (21.3%), adding some megafaunal appeal, while eels and snakes (32.9%) provide further interest.

In contrast, cowries (24.1%) and shrimps (30.3%) occur at only moderate levels, and giant clams are scarce (3.1%). Frogfish (6.3%) add niche value for macro-divers, but the absence of barracudas, sharks, and stingrays reduces broader tourism draw.

Overall, Mojon offers reliable sightings of reef fish and select charismatic species but lacks the diversity of megafauna that defines higher-value sites. With the excellent beach access and facilities, this site will continue to be of interest for recreational diving and snorkelling.

FISH MONITORING

Our fish surveys are conducted using a visual census method based on a 30-meter x 5-meter belt transect. This yields an area of 150 square meters per survey. All target fish that enter the survey zone, from the seafloor to the surface, are counted and sized. The transect is left undisturbed for 15 minutes after it has been laid out, allowing fish to return to the survey area. Surveys are timed to last 10 minutes.

The following is our complete fish indicator list (commercial in bold):

- Angelfish - Bicolor
- Angelfish - Keyhole
- Angelfish - Midnight
- Angelfish - Pearl-Scale
- Angelfish - Other
- Anthias
- **Barracuda**
- **Big Eye**
- **Bream**
- Bristletooth
- Brushtail Tang
- Butterflyfish
- Cornetfish
- Damselfish - Other
- Damselfish - Sergeant
- **Emperorfish - Other**
- **Emperorfish - Long Face**
- **Fusilier**
- **Goatfish**
- **Grouper - Barramundi**
- **Grouper - Brown-Marbled**
- **Grouper - Other**
- Long-Jawed Mackerel
- Moorish Idol
- Needlefish
- **Rabbitfish**
- **Parrotfish - Other**
- **Parrotfish - Bumphead**
- **Parrotfish - Raggedtooth**
- **Parrotfish - Stareye**
- **Pufferfish - Other**
- **Pufferfish - White-Spotted**
- Scad
- Sea Rays
- Sea Snakes
- Sharks
- **Snapper**
- **Soldierfish**
- Squid
- Spadefish
- **Surgeonfish - Other**
- **Surgeonfish - Whitetail**
- **Surgeonfish - Yellow Mask**
- **Sweetlips**
- **Trevally - Other**
- **Trevally - Scad**
- **Triggerfish - Other**
- **Triggerfish - Redtooth**
- **Triggerfish - Titan**
- **Tuna**
- Turtles - Green
- Turtles - Hawksbill
- **Unicornfish - Blue-Spine**
- **Unicornfish - Orangespine**
- **Unicornfish - Other**
- Wrasse - Cleaner
- Wrasse - Humphead
- Wrasse - Other

SUBSTRATE MONITORING

Our substrate surveys utilise a Point Intercept Method, based around a transect length of 30 meters. The substrate directly below every 25 cm increment on the line is identified and recorded. This yields a total of 120 data points per survey.

The following is our comprehensive list of substrate indicators.

Hard Coral

- Branching
- Tabulate
- Plate-like
- Encrusting
- Submassive
- Columnar
- Massive
- Solitary

Soft Coral

- Other Soft Coral
- Gorgonian
- Organ Pipe

Other Cnidarians

- Anemone
- Corallimorph
- Hydroid
- Zoanthid

Sessile Invertebrates

- Sponge - Barrel
- Sponge - Encrusting
- Sponge - Irregular
- Ascidian - Regular
- Ascidian - Encrusting
- Bryozoan

Algae

- Coralline
- Halimeda
- Filamentous
- Macro
- Turf

Health and Vulnerability

- Bleaching
- Disease
- Infestation
- Predation - Coralliophila
- Predation - Crown of Thorns
- Predation - Drupella
- Silt

Substrate

- Giant Clam
- Live Coral Fragment
- Rock
- Rubble
- Sand



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THANK YOU

Please contact us if you would like any additional information, or require assistance with any conservation activities

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