



**MARINE
CONSERVATION
PHILIPPINES**

Semiannual Report **ZAMBOANGUITA**



marineconservationphilippines.org

OCT 2026

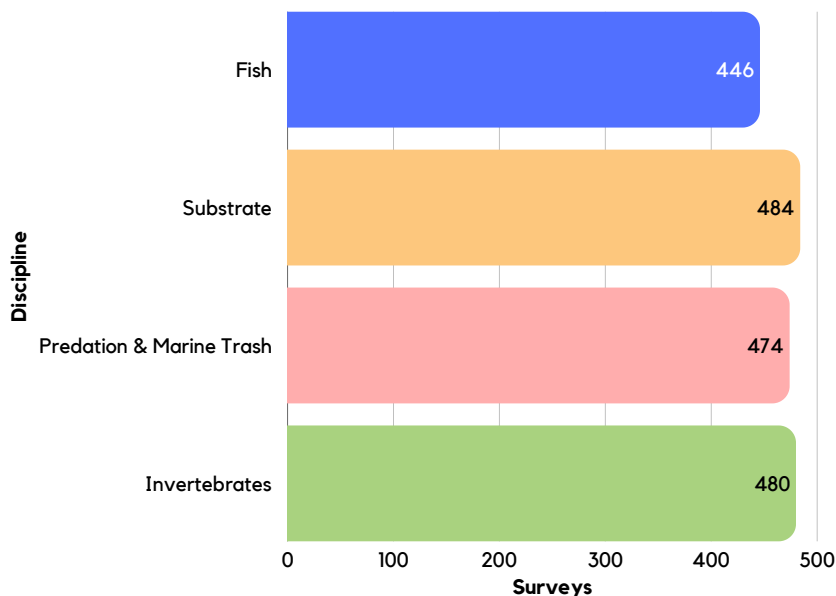
EXECUTIVE SUMMARY

Marine Conservation Philippines Report Zamboanguita - March - August 2026



Marine Conservation Philippines (MCP) conducted a total of **1,884 surveys** across four survey methodologies (Fish, Substrate, Invertebrates, and Predation) across two out of the three municipalities we monitor (Zamboanguita, Siaton) between March and August 2026. With **1002 surveys** conducted in the March - May 2026 season, and **882 surveys** conducted in the June - August 2026 season. We were unable to collect data from the Santa Catalina Municipality during this six month period.

Two super typhoons crossed the area during this reporting period. Super Typhoon Inday and Super Typhoon Kiyapo both passed in July 2026, inside the June–August 2026 season. Storm damage breaks branching and plating coral, converts standing structure into rubble and stirs sediment, and the effect lands on the second half of this six-month average.



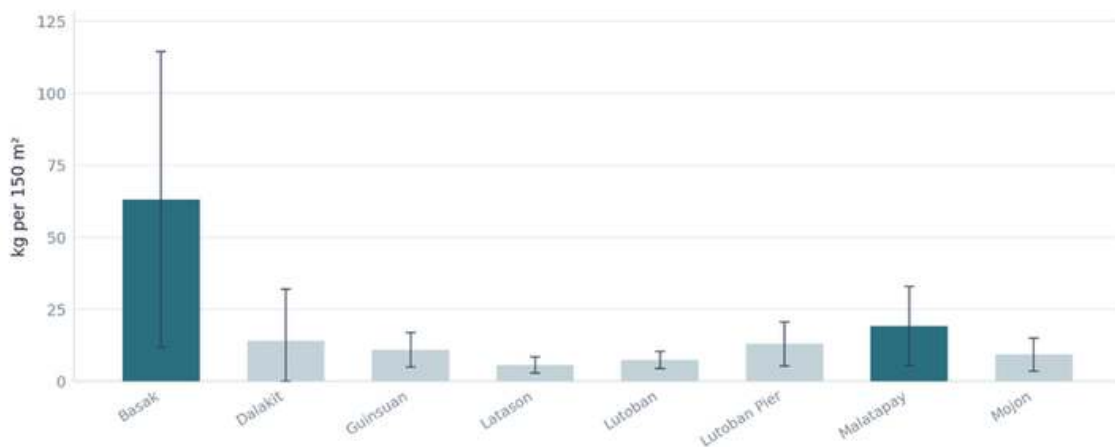
Surveys Collected. The number of surveys collected this six month period for each science discipline.

Headline Indicators. The four headline indicators for Zamboanguita, current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged), with the change against the preceding six months. Colour is keyed to whether the movement is favourable rather than to whether the number rose — falling bleaching reads green. A change under 5% is shown flat.

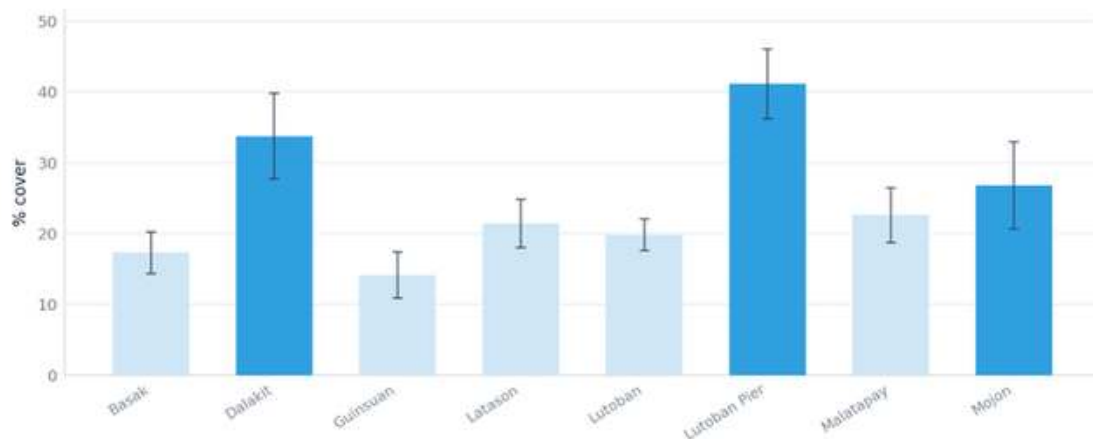
Hard Coral Cover	Commercial Biomass	Fish Density	Bleaching
24.6% of substrate	17.8 kg / 150 m ²	727.2 / 150 m ²	2% of hard coral
▲ 9.5%	▲ 54.9%	▬ 4.1%	▼ 65.9%

Across Zamboanguita, municipal marine monitoring revealed positive seasonal trajectories across both benthic health and reef fauna. Hard coral cover currently averages **24.6%**, placing municipal reefs at the upper threshold of the national "poor" category (0-24.9%) and trending toward "fair." Thermal stress remained minimal, with bleaching impacting under 2% of hard corals, while low macroalgal cover (**10.5%**) helped preserve open substrate space for coral settlement and recruitment.

This stable benthic baseline coincided with strong recovery in mobile reef species. Driven by gains in upper-trophic groups, commercial fish biomass surged by 55% (to **17.82 kg / 150 m²**), while overall fish density remained steady at **727.2 individuals / 150 m²**. Macro-invertebrates also showed encouraging expansion in both abundance and species richness. Coupled with reductions in marine debris and coral predators, these combined gains point to a highly resilient seasonal baseline across Zamboanguita's coastal waters.



Commercial Biomass by Site. Commercial fish biomass at each Zamboanguita site, Mar-May 2026 and Jun-Aug 2026 averaged. Sites at or above the municipal average are highlighted.



Hard Coral Cover by Site. Hard coral cover at each Zamboanguita site, current reporting period. Sites at or above the municipal average are highlighted.

INDICATORS AT A GLANCE



Zamboanguita Indicators at a Glance. Key indicators for Zamboanguita, current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged) against the preceding six months. Each row shows the current value, the preceding six months, and the change. Colour is keyed to whether the movement is favourable. Green indicates improvement, red indicates decline — e.g. macroalgae, rubble, bleaching or debris rising reads red, coral cover rising reads green. A change smaller than 5% is shown as flat.

Indicator	Current	Prior 6 months	Change
Hard coral cover (%)	24.6	22.5	▲ +9%
Macroalgae cover (%)	10.5	12.4	▼ -16%
Rubble (%)	12.9	11.9	▲ +8%
Bleaching (of hard coral) (%)	1.96	5.74	▼ -66%
Total fish density (per 150 m ²)	727.2	698.3	▬ +4%
Commercial fish biomass (kg per 150 m ²)	17.8	11.5	▲ +55%
Invertebrate density (per 150 m ²)	38.8	28.5	▲ +36%
Invertebrate species richness (per 150 m ²)	10.1	8.96	▲ +13%
Coral predators (per 150 m ²)	38.7	47	▼ -18%
Marine debris (items per 150 m ²)	2.77	3.41	▼ -19%

Zamboanguita's key indicators reflect strong ecological gains across fish and benthic communities, highlighted by a sharp rise in commercial fish biomass and notable declines in bleaching, macroalgae, and marine debris.

Benthic & Substrate Health

- Hard Coral Cover: Rose to 24.6% (+9%), approaching the "fair" classification threshold.
- Coral Bleaching: Dropped sharply to 1.96% (-66%), down from 5.74 in the prior period.
- Macroalgae & Rubble: Macroalgae cover declined to 10.5% (-16%), freeing up substrate, while rubble increased slightly to 12.9% (+8%).

Mobile Fauna & Environmental Pressures

- Fish Communities: Commercial biomass jumped 55% to 17.8 kg / 150 m², supported by a stable total fish density of 727.2 individuals / 150 m² (+4%).
- Invertebrates: Density increased to 38.8 per survey (+36%) and species richness rose to 10.1 species (+13%).
- Threats & Debris: Coral predators decreased to 38.7 per survey (-18%), and marine debris fell to 2.77 items per survey (-19%).

SITE COMPARISON

	Basak	Dalakit	Guinsuan	Latason	Lutoban	Lutoban Pier	Malatapay	Mojon
Hard Coral Cover (%)	17.3	33.8	14.1	21.4	19.8	41.1	22.6	26.8
Commercial Biomass (kg)	63.2	14.0	10.9	5.7	7.4	12.9	19.2	9.2
Fish Density (incl. damselfish)	1,158.7	353.1	1,133.5	415.6	553.3	845.3	623.3	734.9
Invert Density	28.5	84.0	26.1	22.5	46.1	39.3	25.9	38.2
Invert Species Richness	9.8	13.1	9.5	8.5	9.9	8.8	9.3	11.8
Bleaching (%)	2.4	0.4	1.9	1.0	3.9	1.9	1.0	3.2
Overall rank	3	1	6	8	7	2	4	4

Site Comparison Heatmap. Key indicators at each site during the current reporting period. Colours are scaled against fixed program-wide reference ranges rather than relative local performance. Hard Coral Cover follows the Philippine classification scale (0–75%; Poor <25%, Fair 25–50%, Good >50%). Bleaching is evaluated on a 0–15% scale with 5% as the critical threshold of concern (inverted scale: green is better). Remaining metrics are normalised against the full historical program dataset across all sites and seasons. Overall ranks represent the unweighted average rank across all six primary indicators within the municipality.

Zamboanguita's monitoring sites demonstrate high spatial variability, ranging from high-current fish hotspots to shallow, invertebrate-rich patch reefs. While top-ranking sites are driven by schooling fish biomass or extensive structural complexity, smaller and newer reserves highlight early-stage recovery and localised microhabitat strengths. Across the municipality, mean coral bleaching remains well under control (1.96% average), benefiting from localised coastal cooling, though individual sites range from 0.4% to 3.9%.

Basak Can-Unsang South leads the municipality in fish metrics, generating an exceptional commercial biomass (63.2 kg per 150 m²) and fish density (1,158.7 ind./150 m²), driven by strong current channels and large schools of fusiliers. It also records high encounter rates for megafauna such as sea turtles and stingrays. Maluay Malatapay and Guinsuan follow as balanced high performers. Maluay Malatapay combines strong commercial biomass (19.2 kg per 150 m²) with high predator densities, sea turtle sightings, and rich nudibranch diversity. Guinsuan provides a critical patchy reef and seagrass transition zone, supporting high turtle encounter frequencies and moderate invertebrate densities (26.1 per 150 m²).

Lutoban Pier and Lutoban Gac-Ang highlight distinct benthic and invertebrate features. Lutoban Pier stands out by recording the highest hard coral cover in the municipality (41.1%), demonstrating remarkable benthic resilience despite being an un-demarcated non-MPA site. Lutoban Gac-Ang exhibits solid hard coral cover (19.8%) and the second highest invertebrate density in the municipality (46.1 per survey), heavily influenced by sea urchin populations that control macroalgae but increase bioerosion risk.

Dalakit functions as an invertebrate specialist, characterised by a shallow, isolated reef structure with 33.8% hard coral cover. While its commercial fish biomass sits at 14.0 kg per 150 m², it leads the municipality in giant clam presence alongside high macro-invertebrate density (84 individuals per survey) and richness (13.1 species per survey), the highest in Zamboanguita. Mojon and Latason represent emerging and specialised reserves. Mojon, established in 2024, represents the newest MPA; while holding moderate fish biomass (9.2 kg per 150 m²), it serves as a key nursery habitat with high syngnathid sightings, and rich invertebrate diversity (11.8 species per survey). Latason is a small reserve (1.9 ha) with lower overall biomass (5.7 kg per 150 m²), yet acts as a vital micro-refuge for benthic predators like frogfish and bamboo sharks.

SITES TO WATCH

Compared against each site's own preceding six months, not against the other sites.

Latason

- **Key Volatility:** Low commercial fish biomass, high macroalgae expansion (>30% increase), and elevated marine debris/ghost gear accumulation (>30% increase).
- **Interpretation:** As a small reserve (1.9 ha), Latason is particularly vulnerable to edge effects, localised fishing pressure on reserve boundaries, and net entrapment. Accumulation of abandoned fishing gear and marine debris damages fragile coral structures, creating open substrate that rapid-growing macroalgae quickly colonizes in the presence of seasonal coastal runoff.
- **Recommended Action:** Direct targeted ghost-net and debris retrieval dives within the reserve, strengthen perimeter boundary marking, and work with local fisherfolk associations to reduce gear loss along sanctuary edges.

Mojon

- **Key Volatility:** Substantial rise in loose coral rubble (>30% increase) and macroalgae cover.
- **Interpretation:** Established in 2024, Mojon is in an early stage of ecological recovery. The combination of high substrate instability (rubble) and macroalgae competition hampers coral larval settlement and slows reef accretion. The site's structural vulnerability is likely exacerbated by wave action and terrestrial runoff during wet seasons.
- **Recommended Action:** Prioritise herbivore protection (e.g., parrotfish and surgeonfish) to control algal overgrowth on rubble, explore artificial substrate stabilization or coral recruitment tiles if natural settlement remains suppressed, and conduct seasonal runoff tracking.

Lutoban

- **Key Volatility:** Elevated sea urchin densities (*Diadema* spp.) alongside a notable increase in coral rubble (>30% increase) and localized marine debris.

- **Interpretation:** High densities of bioeroding sea urchins, while effective at grazing macroalgae, can weaken the underlying structural framework of hard corals when present in excess. This leads to accelerated coral fragmentation and rubble production, particularly when compound physical stressors (such as storms or coastal debris) are present.
- **Recommended Action:** Monitor urchin population thresholds to balance macroalgae grazing against net bioerosion, schedule regular debris removal patrols, and enforce sanctuary buffer zones to limit mechanical reef damage.

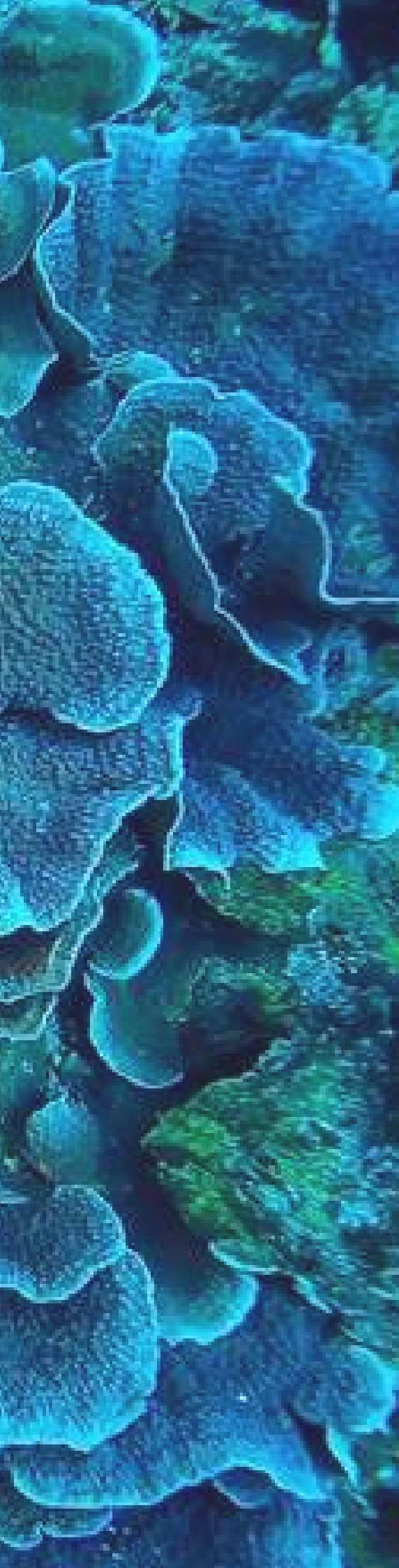


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MONITORING AND SCIENCE AT MCP



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, predation 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

COMMUNITY PROJECTS



Marine Conservation Philippines (MCP) is proud to continue working alongside local government units (LGUs), partner agencies, and coastal communities. Between March and August 2026, our joint initiatives spanned habitat restoration, ghost gear retrieval, capacity building, and MPA expansion across Southern Negros.

Reporting Period Impact Highlights

- 1,428 kg total marine waste and ghost gear recovered across 10 targeted clean-up operations.
 - 300 mangrove propagules planted to strengthen coastal buffering and nursery habitats.
 - 39 local community members, fisherfolk, and Bantay Dagat officers certified/trained.
 - 1 new Marine Protected Area (MPA) established with MCP technical support.
- **Clean-ups and Ghost Net Removal**

Abandoned, lost, or discarded fishing gear represents the single largest category of benthic debris recorded in both Zamboanguita and Siaton. Because lost nets continue to trap and kill marine life indefinitely, gear retrieval directly mitigates ongoing ecological mortality.

- **SCUBA Surero Dive (Tambobo Bay, Siaton):** Recovered **457 kg** of underwater waste in collaboration with the Philippine Coast Guard (PCG), LDRRMO, and the Siaton Fishery Office.
- **Women's Month Coastal & Dive Clean (Salag, Siaton):** Removed **94 kg** of debris alongside nine partner agencies, including PCG, MENRO, ProOcean, Maritime Police, Agriculture Office, Tourism Office, LDRRMO, BFAR, and Fire & Rescue.
- **Earth Day Clean-Up (Antulang, Siaton):** Collected **172 kg** of waste (140 kg non-recyclable, 32 kg recyclable) with ProOcean.
- **World Oceans Day Clean-Up:** Executed our largest shoreline retrieval of the period in partnership with ProOcean and DENR, recovering **390 kg** (327 kg non-recyclable, 63 kg recyclable).
- **World Mangrove Day Clean-Up (Turtle Island):** Combined a targeted mangrove cleanup with an environmental education campaign for local youth.

- **Targeted Ghost Net Retrievals**

Ghost fishing gear was retrieved from four high-priority reef sites identified during routine UVC monitoring:

- **Siaton:** Salag and Bangcolotan (**64.5 kg** total gear recovered).
- **Zamboanguita:** Lutoban Pier and Maluay Malatapay.

- **Habitat Restoration & MPA Expansion**

- **Mangrove Reforestation (Bonbonon, Siaton):** Planted **300 mangrove propagules** in coordination with the LGU and PCG. Mangroves trap terrestrial runoff and sediment before it reaches fringing reefs while serving as critical nursery grounds for juvenile reef fish.
- **New MPA Support (San Jose):** Technical and logistical support contributed to the formal opening of the **Hidden Treasure Marine Sanctuary** alongside the LGU and Tourism Office, securing long-term habitat protection.

- **Capacity Building & Training**

Building local capacity ensures marine stewardship remains sustainable independent of visiting volunteer programs.

- **Emergency First Response (EFR):** Trained **25 local Bantay Dagat** at Maluay, Malatapay in emergency first response and water safety.
- **Diver Certifications:** Certified **10 local residents** through Open Water Diver courses in Siaton and **4 divers** from Tanjay through a Rescue Diver course.
- **Community Snorkel Surveys:** Provided equipment and logistical assistance to Dr. Rene (University of the Philippines) to train local community members in standardised snorkel-based monitoring techniques.

- **Education, Youth & Research Collaboration**

- **MCP Summer Camp:** Brought together 12 participants from Microbea and local fisherfolk youth for Discover Scuba Diving sessions, fish identification workshops, and community engagement activities. Campers collected **251 kg** of waste (188 kg non-recyclable, 63 kg recyclable).
- **Juvenile Fish Research:** Contributed data and participation to the Fisherfolk Association forum on the Juvenile Fish Research Project, assessing larval recruitment and stock replenishment across local reefs.
- **Eco-Tourism Promotion:** Produced underwater visual data and media footage to support sustainable marine eco-tourism initiatives in San Jose.



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 2026.

In addition, MCP conducted bi-weekly beach cleans throughout 2026, collecting a further 470 kg of trash, complementing Pro Ocean's ongoing efforts.



Pro Ocean Trash Collection. Monthly totals of recycled and disposable trash (kg) collected by Pro Ocean during beach cleans along the Sibulan–Bayawan coastline, March–August 2026. 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.



FOOD SECURITY - MUNICIPALITY RESULTS



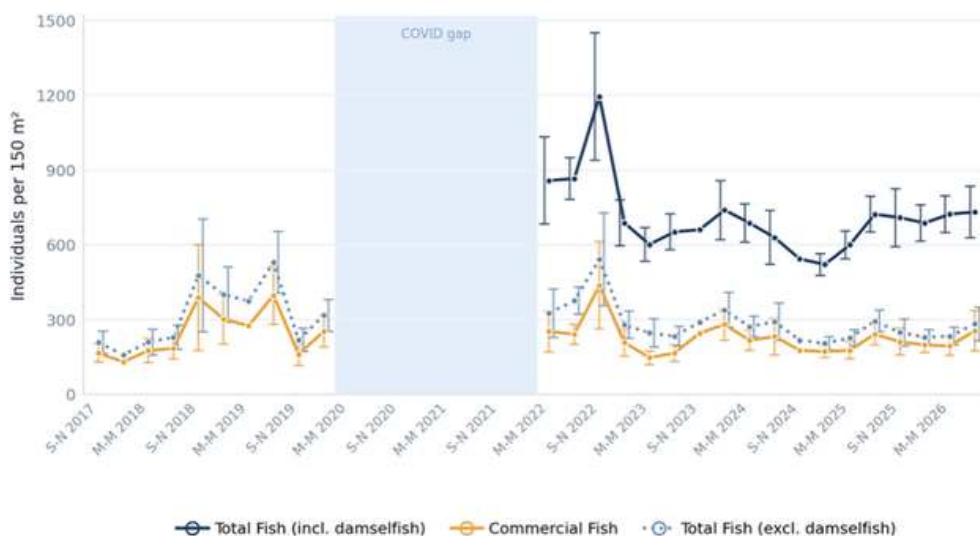
Biomass of Commercial species

One fundamental measure of a Marine Protected Area's (MPA) success is the fish biomass it produces. Where biomass inside a reserve is higher, adults and larvae move across its boundaries into surrounding waters, the spillover effect, directly supporting local food security. Biomass provides a far more meaningful measure of fishery health than individual counts alone, as fish weight scales exponentially with length. Consequently, a reef holding a few large fish offers significantly greater fishery value than one holding many small individuals of the same combined count.

Commercial and total density are reported separately throughout. Some abundant species are of no food value, damselfish in particular, which entered the protocol in 2022 and now make up roughly two thirds of everything counted, and combining them would misrepresent what is available to fisherfolk.

Current Status:

In March–August 2026, Zamboanguita recorded an average total fish density of **727.2 individuals per 150 m²**, with commercial species contributing **224.8 individuals per 150 m²**. Commercial biomass averaged **17.82 kg per 150 m²**, equivalent to roughly **1,188 kg per hectare**, which sits in the high range for the program. By dietary group the assemblage was led by herbivores (~468.1 ind.), planktivores (~119.3 ind.), carnivores (~107.3 ind.), detritivores (~11.6 ind.), corallivores (~11.6 ind.), omnivores (~5.5 ind.) and parasitivores (~3.8 ind.), so herbivores dominate the fish community at this scale.



Fish Density Trends. Total and commercial fish density, Zamboanguita, 2017–2026. The solid total is everything counted, damselfish included, and begins at Mar–May 2022 — the season damselfish entered the survey protocol. The dotted line excludes them and runs the whole record. The gap between them is the damselfish contribution, currently around two thirds of all individuals counted.



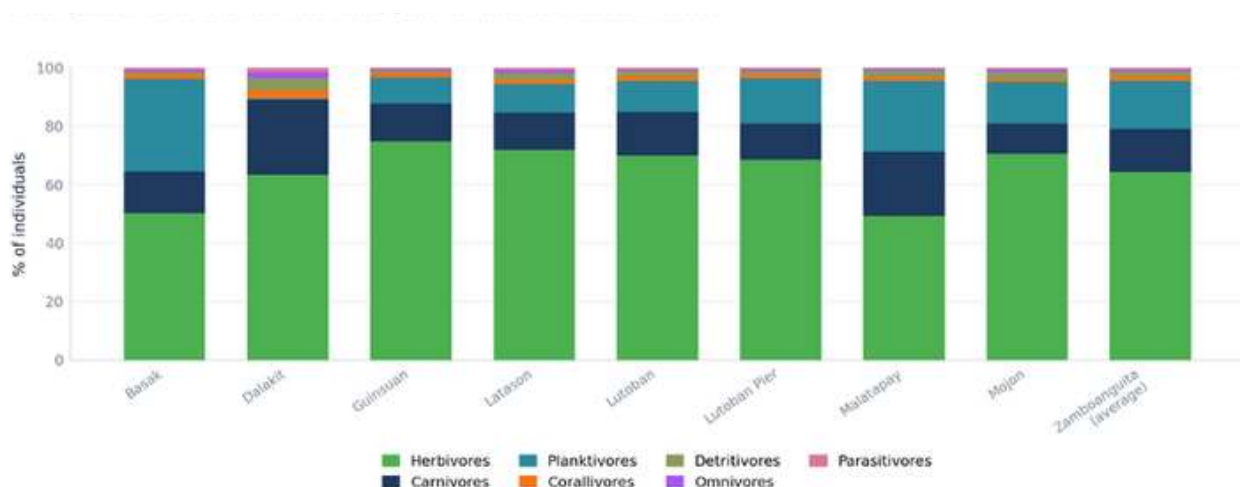
Commercial Biomass Trends. Commercial fish biomass, Zamboanguita, 2017–2026. Estimated from visual length and count records using species-specific length–weight relationships; values are a relative index of standing stock rather than a fisheries yield estimate.

Recent Change:

Against the preceding six months, total fish density is little changed (698.3 → 727.2 individuals per 150 m² including damselfish, 238.6 → 257.9 excluding them), commercial density slightly higher (204.5 → 224.8) and commercial biomass substantially higher (11.50 → 17.82 kg per 150 m²). Within the assemblage, herbivores moved 464.0 → 468.1, carnivores moved 98.0 → 107.3 and planktivores moved 105.2 → 119.3 individuals per 150 m².

Dietary Structure:

By share of individuals the community is herbivores (64.4%), planktivores (16.4%) and carnivores (14.8%), with the remaining groups together making up 4.5%. Trophic structure matters because grazing species control algal growth and so mediate the competition between coral and algae described in the next section.



Dietary Composition by Site. Share of fish counted in each dietary group at each Zamboanguita site, current reporting period, with the municipal average at the right.

Commercial Groups:

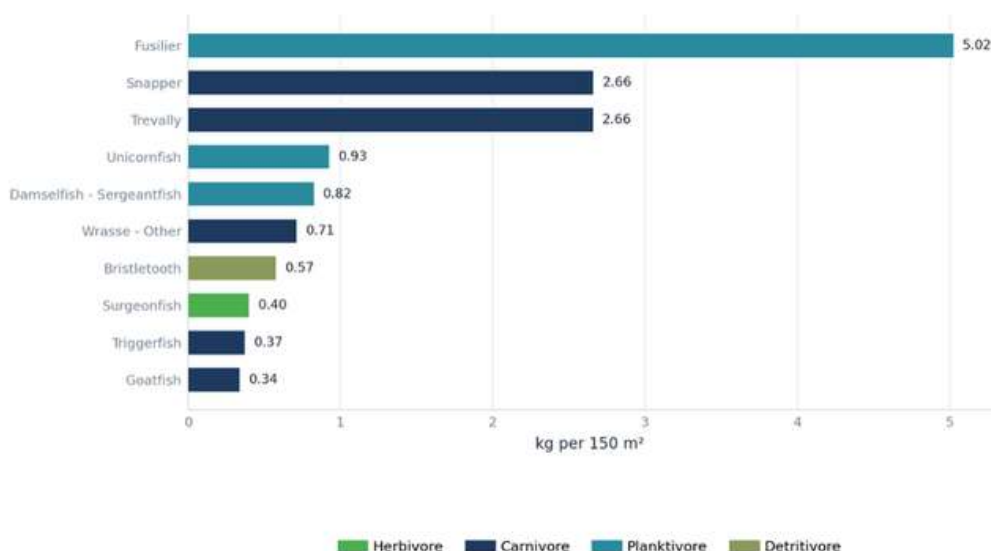
Commercial fish biomass across Zamboanguita is driven primarily by fast-growing, mid-sized schooling species, with Fusiliers standing as the single largest contributor at 5.02 kg / 150 m² (31.0% of total commercial biomass). Mid-to-high trophic predators are present in notable quantities, led by Snappers (2.66 kg / 150 m², 16.4%) and Trevally (2.66 kg / 150 m², 16.4%) compared to higher-density groups like Wrasses (59 ind. / 150 m²) and Fusiliers (69.1 ind. / 150 m²). Key herbivorous and grazing families, including Unicornfish (0.93 kg / 150 m²), Bristletooth (0.57 kg / 150 m²), and Surgeonfish (0.40 kg / 150 m²), collectively account for 11.7% of commercial biomass, with Triggerfish (0.37 kg / 150 m²), and Goatfish (0.34 kg / 150 m²) adding a further 4.4%. While the significant contribution from Snappers and Trevally indicates a stronger predatory baseline than neighboring areas, commercial weight remains predominantly carried by schooling planktivores and mid-sized species. This distribution reflects characteristic fishing pressures where larger, high-value apex predators are selectively targeted, leaving mobile planktivorous schools to maintain the bulk of standing fish biomass across municipal reefs.

Top Commercial Fish Families. The ten commercial fish families contributing most to biomass at Zamboanguita, current reporting period. Sub-types are rolled into their family.

Commercial Families	Biomass (kg / 150 m ²)	Density (ind. /150 m ²)	% of Commercial Biomass
Fusilier	5.02	69.1	31
Snapper	2.66	19.2	16.4
Trevally	2.66	2.3	16.4
Unicornfish	0.93	4.9	5.7
Damselfish - Sergeantfish	0.82	17	5.1
Wrasse - Other	0.71	59	4.4
Bristletooth	0.57	10.5	3.5
Surgeonfish	0.4	2	2.5
Triggerfish	0.37	2.7	2.3
Goatfish	0.34	7.4	2.1

Long-term context:

The 2017–19 baseline for Zamboanguita is 17.06 kg per 150 m² of commercial biomass and 323.4 fish per 150 m². Current biomass stands +4% against that baseline and density -20%. The highest commercial biomass on record here was 26.78 kg per 150 m² in Sep–Nov 2018. Current levels are 33% below it. Two protocol changes limit what the long record can be asked. Damselfish entered the list in 2022, so only the damselfish-excluded series is comparable across the full period; and fish size bins changed in 2025 with both schemes running side by side through 2025–26, which biases early biomass slightly low.



Top Commercial Fish by Biomass. The ten commercial fish families contributing most biomass in Zamboanguita, current reporting period, coloured by trophic group. Sub-types are rolled into their family.

Ecological interpretation:

Herbivores are only 8.2% of the fish counted once damselfish are set aside, a thin grazing guild for a reef of this type. With macroalgae at 10.5% of substrate, the combination is consistent with grazing pressure being insufficient to hold algal cover down, the mechanism that keeps a reef on the algal side of a phase shift once it arrives there. Planktivores make up 37.6% of the assemblage. Planktivore abundance tracks current and plankton supply rather than reef condition, so it inflates total density without indicating recovery. Across the municipality, protected sites (Basak, Dalakit, Guinsuan, Latason, Lutoban, Malatipay, Mojon) average 18.51 kg per 150 m² of commercial biomass against 12.94 at the unprotected sites (Lutoban Pier). That gap is consistent with the MPAs contributing to higher standing stock, though site habitat and depth differ too and the comparison is not controlled.

The average commercial fish counted weighs about 79 g. Against the 2017–19 baseline of 68 g that is +17%. Mean size is holding up, which suggests individuals are surviving long enough to grow and that the size structure has not been truncated. Carnivores are 41.6% of the assemblage once damselfish are set aside, which is a high share. On a lightly fished reef the pyramid narrows towards the top; a wide carnivore band usually means small mid-water carnivores rather than large predators, so it should be read with the commercial table above rather than as evidence of an intact predator community. At roughly 1,188 kg per hectare, standing commercial stock is high by regional standards and comparable with well-enforced reserves. That is worth stating plainly to the people who maintain it.

REEF HEALTH AND RESILIENCE - MUNICIPALITY RESULTS



Substrate Composition

Located within the Coral Triangle, a global hotspot encompassing nearly 30% of the world's coral reefs, Zamboanguita's marine ecosystem depends fundamentally on its benthic composition. Hard corals form the structural architecture of the reef, providing critical shelter and breeding grounds for diverse marine life, including economically vital fishery species. Conversely, fleshy macroalgae compete directly with corals for space and light. When algal overgrowth goes unchecked, reefs risk phase-shifts that reduce both biodiversity and economic value. Globally, hard coral cover has experienced a sustained decline since 2010, driven by compound thermal, physical, and land-based stressors. Macroalgae thrive on elevated nitrogen and phosphorus inputs from coastal agricultural runoff and untreated wastewater, particularly during wet-season discharge events. In the absence of robust herbivorous fish populations to graze down seasonal blooms, corals struggle to reclaim lost substrate.

Current Status:

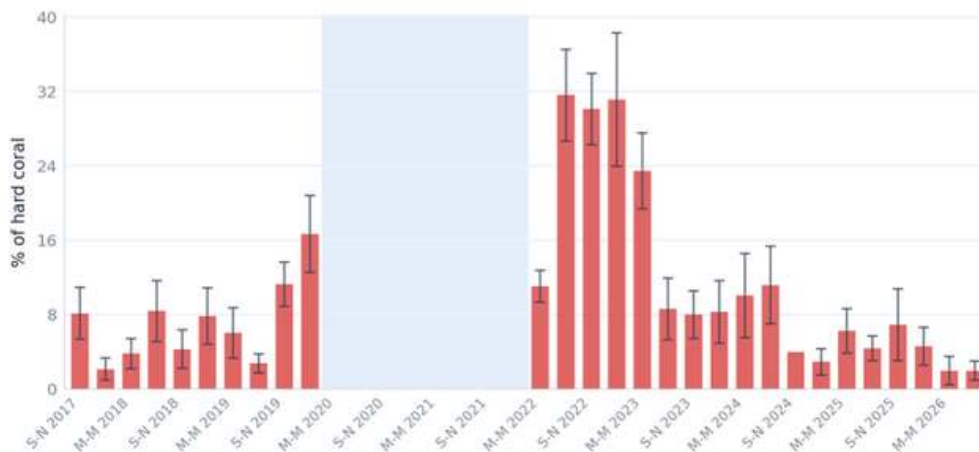
During March–August 2026, Zamboanguita recorded an average hard coral cover of **24.6%**, macroalgae of **10.5%** (18.7% once turf is included) and rubble of **12.9%**. Coral cover places the reef in the **poor** band of the Philippine classification. Bleaching affected 1.96% of hard coral, below the 5% level conventionally treated as a concern threshold, suggesting low thermal stress over the survey period. Beyond bleaching, 0.26% showed predation scarring; 0.19% was recently killed. Overall the reef can be described as coral-dominated, with limited algal presence and moderate unconsolidated substrate.



Reef Substrate Trends. Hard coral, macroalgae and rubble cover, Zamboanguita, 2017–2026. Both algal conventions are shown: the solid line is macroalgae alone, the current headline definition, and the dashed line adds turf algae, which is what editions before 2026 published as "Fleshy Macro Algae Cover" and is the figure to compare against those.

Recent Change:

Compared with the preceding six months, hard coral cover is slightly higher (22.5 → 24.6%), macroalgae notably lower (12.4 → 10.5%), rubble slightly higher (11.9 → 12.9%) and bleaching substantially lower (5.74 → 1.96%). Taken together this indicates more unconsolidated substrate. Super Typhoon Inday and Super Typhoon Kiyapo crossed the area inside this reporting period, so physical damage is the first explanation for this, storm breakage converts standing coral into rubble directly, where gradual pressure does not.



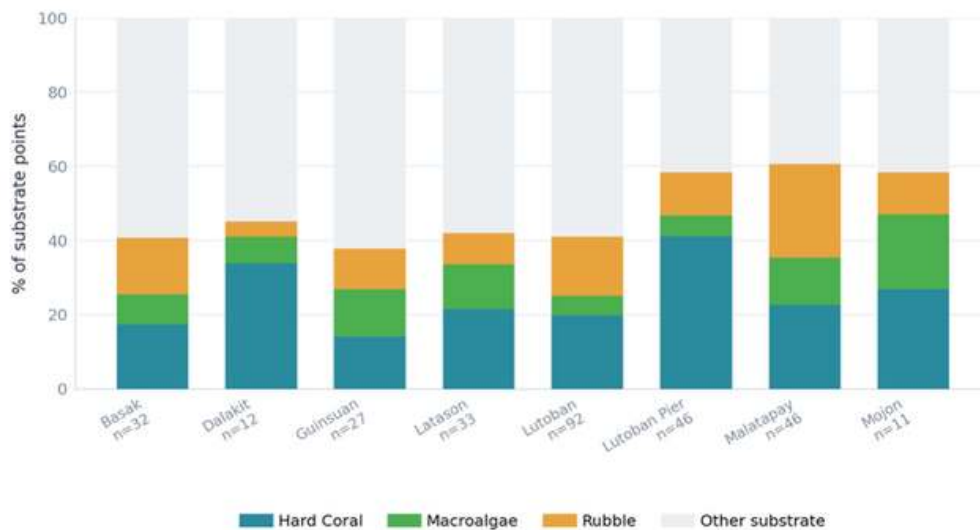
Bleaching Incidence. Bleached coral as a percentage of hard coral cover, Zamboanguita, by season. Combines partially and fully bleached records. Bleaching is episodic, so each season is shown independently. Note this is a share of hard coral, not of all substrate points as reported in earlier editions.

Structural Implications:

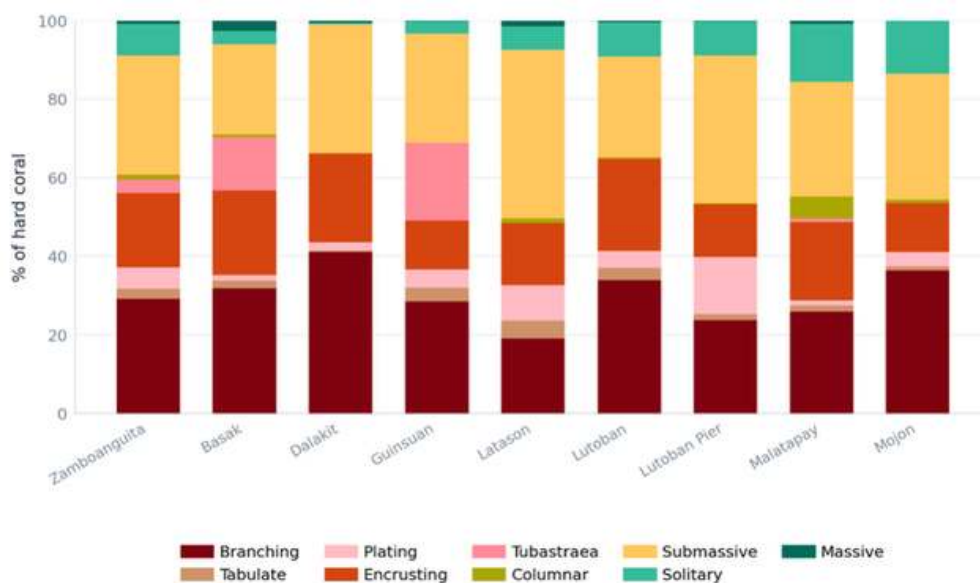
Of all points recorded, 24.6% is living hard coral, 18.8% is fleshy algae competing for the same space, 28.1% is unconsolidated material (rubble and sand), 4.8% is consolidated surface available for settlement (bare rock and coralline algae) and 24.3% is occupied by other stable but non-reef-building life, soft corals, sessile invertebrates and seagrass. The combination of poor coral cover and relatively low rubble (12.9%) indicates that most of the reef framework is stable and physically suitable for coral growth and recruitment. Sand accounts for a further 13.4% of points, which is habitat rather than damage. Macroalgae has fallen against the preceding six months (-16%), which suggests algal competition is easing and more substrate is becoming available for coral settlement. That may reflect grazing pressure or simply favourable conditions, and one period is not a trend, but the direction is favourable.

Within the living coral, growth form determines how much shelter the reef offers and how well it resists disturbance. The cover present is led by submassive (30.4%), branching (29.1%) and encrusting (18.9%). On MCP's classification, 59.5% of the coral sits in low-resilience forms and 8.8% in high-resilience forms. Most of the cover is therefore in forms that provide good shelter but are first to be lost in a thermal or storm event, so the headline cover figure is more fragile than it appears.

Taken together, poor coral cover at 24.6%, macroalgae at 10.5% and rubble at 12.9%, this is a reef in a **transitional** state, shaped by both physical disturbance (the unconsolidated fraction) and biological competition (the algal fraction). Neither is currently at a level that would prevent recovery.



Reef Substrate Composition by Site. Substrate composition at each Zamboanguita site, current reporting period. Other substrate includes sand, rock, coralline algae, soft coral and sessile invertebrates.



Coral Growth Forms by Site. Share of hard coral in each growth form at every Zamboanguita site, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged). Growth forms are ordered from least to most resilient: low resilience covers branching, tabulate, plating, encrusting and Tubastraea; medium covers columnar and submassive; high covers solitary and massive.

Long-term Context:

Against the 2017–19 baseline of 30.5% hard coral, 5.7% macroalgae and 7.1% rubble, coral cover is -19%, macroalgae +85% and rubble +82%. Coral cover peaked at 37.3% in Dec–Feb 2017/18 and now stands 24.6%. Bleaching peaked at 31.6% of hard coral in Jun–Aug 2022, and has remained below the 5% concern level for the last 3 seasons, since Dec–Feb 2025/26.

Two definitions changed for this edition and are not comparable with earlier reports: macroalgae is now macroalgae alone rather than macroalgae plus turf, and bleaching is a share of hard coral rather than of all substrate points, which makes it read three to four times higher on identical observations.

Ecological Interpretation:

With cover in the poor band this reef has little margin: a single disturbance removes a large share of what remains, and recovery from a low base is slow. Condition is not uniform across the municipality: Lutoban Pier holds the highest coral cover (41.1%), Mojon carries the most macroalgae (20.1%) and Malatapay the most rubble (25.2%). Local conditions and management effectiveness therefore matter as much as municipality-wide pressures, and the site sections should be read for the detail. Protected sites average 22.3% hard coral against 41.1% at the unprotected site.

Of the coral present, 37.2% is in fast-growing forms (branching, tabulate, plating) and 50.0% in slow, robust ones (massive, submassive, encrusting). That ratio sets how quickly cover can rebuild and how much survives a disturbance, and the two pull against each other: the fast forms drive recovery but are the first lost, the slow ones persist but add cover at a fraction of the rate. A cover figure held up mostly by slow forms is stable but will rebuild slowly from any loss, so recovery here should be measured in decades rather than seasons. For every point of substrate a coral larva could settle on, there are 3.9 points already held by fleshy algae. Settlement space is the binding constraint on recovery here, not larval supply: even a good recruitment year has little bare ground to land on.

Of the pressures acting here, the ones open to local action are enforcement, the herbivore populations that hold algae down, and the physical impacts that break coral and make rubble, anchoring, destructive fishing and trampling. Continued enforcement, maintenance of herbivore populations and reduction of physical impacts are the levers available locally.

PREDATION AND MARINE DEBRIS

- MUNICIPALITY RESULTS

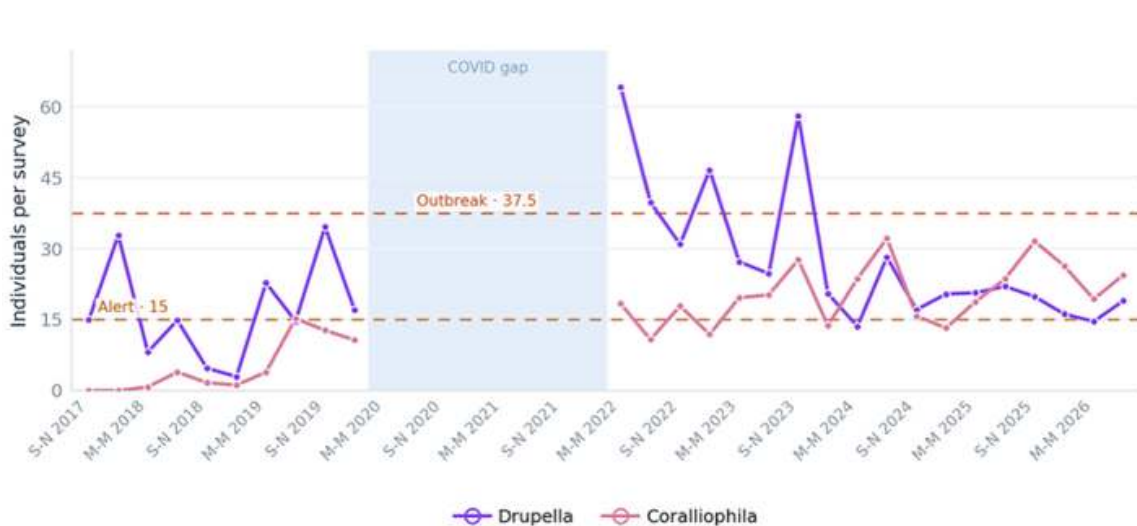


Corallivorous snails and Crown of Thorns feed directly on living coral. At low densities they are a normal part of the reef; above MCP's management thresholds they remove cover faster than it can regrow and become a target for direct intervention. Marine debris is reported alongside them because both are pressures that management can act on locally, unlike thermal stress.

Current Status:

Drupella averaged **16.8 per survey** (above the alert threshold) and Coralliophila 21.9 (above the alert threshold), giving a combined corallivorous snail load of 38.7 per survey. Crown of Thorns averaged 0.048 per survey (below the alert threshold).

Marine debris averaged **2.77 items per survey**. By category it breaks down as fishing gear 1.58 (57%), consumer plastics 0.65 (23%), household & sanitary 0.54 (19%) and other debris 0.00 (0%). The categories are mutually exclusive and sum to the total, so nothing is double-counted between them. Fishing gear is the largest category at 57% of items. That is a sea-based source: gear lost or discarded by boats working the reef, which responds to gear marking, retrieval dives and work with fishers rather than to municipal waste collection.



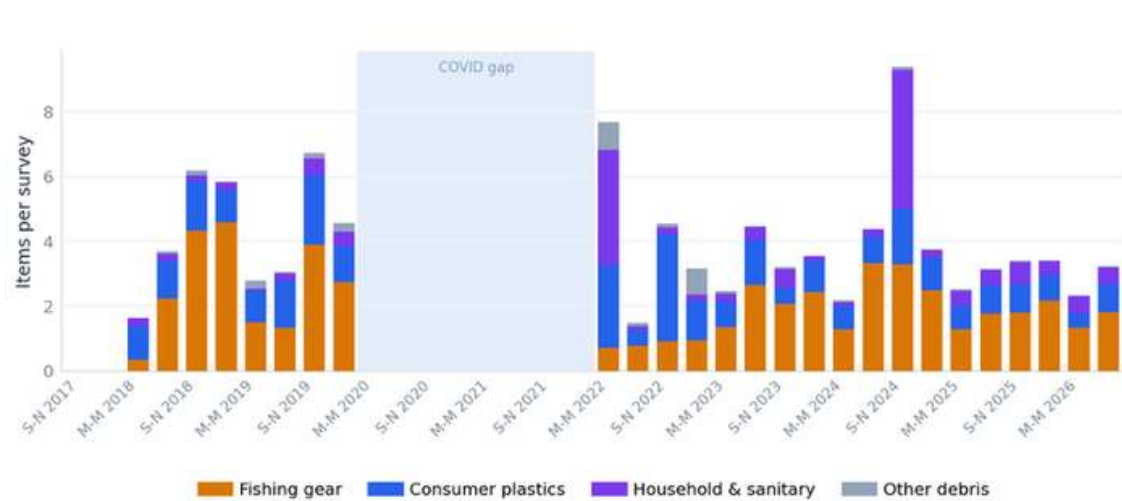
Coral Predators. Corallivorous snail abundance, Zamboanguita, 2017-2026. Drupella and Coralliophila share one threshold set and one axis. Dashed rules mark MCP management thresholds — alert 15, outbreak 37.5, extreme 75 per survey.

Recent Change:

Against the preceding six months, Drupella is slightly lower (18.0 → 16.8), Coralliophila notably lower (29.0 → 21.9), Crown of Thorns substantially higher (0.016 → 0.048) and debris notably lower (3.41 → 2.77 items per survey).



Crown of Thorns. Crown of Thorns abundance, Zamboanguita, 2017–2026. Dashed rules mark MCP management thresholds for Crown of Thorns (alert 0.1125, outbreak 0.225, extreme 0.45 per survey).



Marine Debris Composition. Marine debris recorded per survey, Zamboanguita, 2017–2026, broken down by category. Categories are mutually exclusive and sum to the recorded total, so bar height is total debris and no item is counted twice.

Long-term Context:

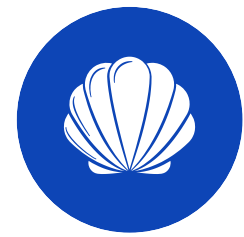
The 2017–19 baseline is 14.5 *Drupella*, 3.3 *Coralliophila* and 0.184 Crown of Thorns per survey, with 2.91 debris items. Current levels stand +16%, +558%, -74% and -5% against those. *Drupella* peaked at 64.2 per survey in Mar–May 2022. These figures pool all depths. *Drupella* is roughly eleven times more abundant shallow than deep, so we have a depth-resolved workbook, where we can detect outbreaks in the shallows.

Ecological Interpretation:

Combined snail abundance is at outbreak level. *Drupella* and *Coralliophila* aggregate on already-stressed colonies, so high counts often follow coral damage rather than initiate it, but once aggregated they suppress the recovery of the colonies that survived. More than half the debris recorded (57.1%) is fishing gear. That is a different management problem from land-based waste: it points at gear loss by fishers working the reef and responds to gear marking, retrieval and fisher engagement rather than to municipal waste collection.

On management: corallivorous snails can be removed by hand and that is the standard response above outbreak level, but removal only works if it is repeated, the snails recruit from surrounding reef and a single clearance is recolonised. Directing effort at the aggregations on living coral, rather than spreading it across the site, is what makes the effort worthwhile. The debris is a fisheries problem before it is a waste problem. Lost gear keeps fishing after it is lost, so it is both a debris indicator and a mortality source, and it accumulates on exactly the structure that snags it, the high-relief coral that matters most. Gear marking and retrieval dives address it.

INVERTEBRATE STATUS - MUNICIPALITY RESULTS



Invertebrates carry functions the fish community does not. Urchins graze algae and erode old reef framework; sea cucumbers turn over and clean sediment; giant clams filter water and build structure. Many are also directly harvested commercially, which makes them among the first indicators to respond to fishing pressure — they are sedentary, conspicuous and slow to recover.

Current Status:

Zamboanguita supported an average invertebrate density of **38.8 individuals per survey**, drawn from **10.1 distinct species per survey**. Density varies considerably between sites: highest at Dalakit (84 per survey) and lowest at Latason (22.5). Richness follows a similar pattern, highest at Dalakit (13.1 species per survey) and lowest at Latason (8.5).

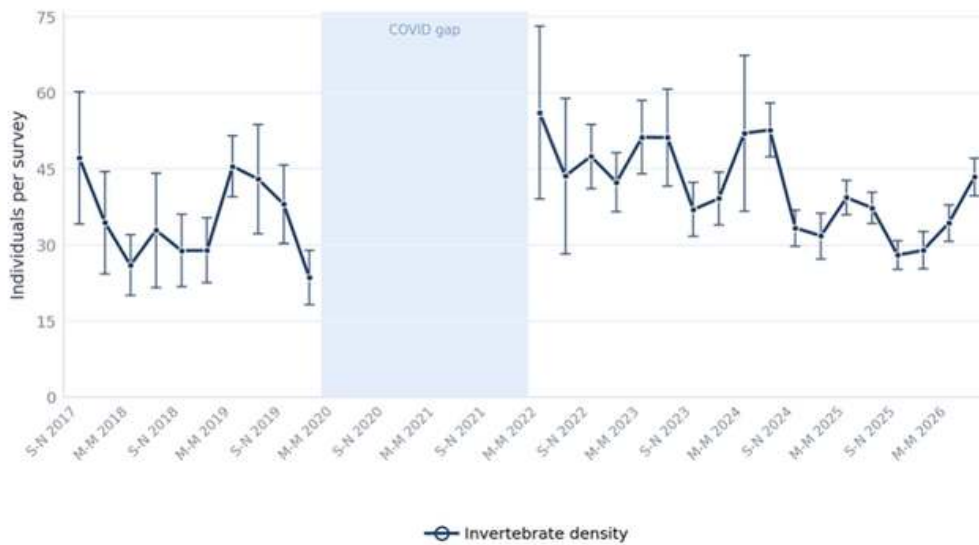
- **Species richness definition.** Richness is the average number of distinct species recorded per individual survey. Earlier editions divided a pooled species list by the number of surveys, which fell as more surveys were carried out; those figures are not comparable with these.

***Invertebrate status by site.** Invertebrate density, commercially important density and species richness at each Zamboanguita site, current reporting period, with the municipal average. The municipal figure is the mean of the site values. Richness is the average number of distinct species recorded per individual survey, so it does not rise simply because more surveys were carried out.*

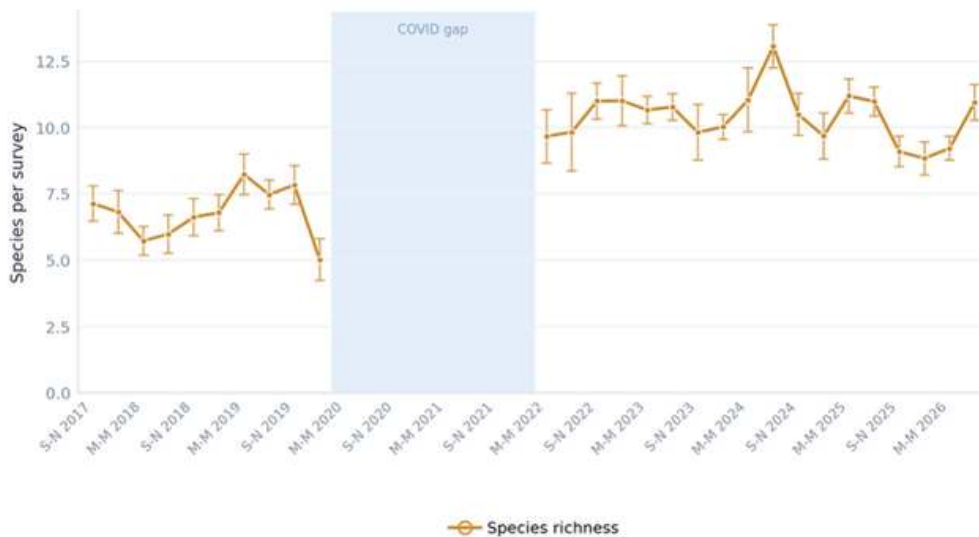
Site	Density (ind./150 m ²)	Commercially Important (ind./150 m ²)	Species Richness (species/150 m ²)
Basak	28.5	13.2	9.8
Dalakit	84	75.3	13.1
Guinsuan	26.1	10.9	9.5
Latason	22.5	12.7	8.5
Lutoban	46.1	32	9.9
Lutoban Pier	39.3	28.2	8.8
Malatapay	25.9	13.5	9.3
Mojon	38.2	22.5	11.8
Zamboanguita Average	38.8	26	10.1

Recent Change:

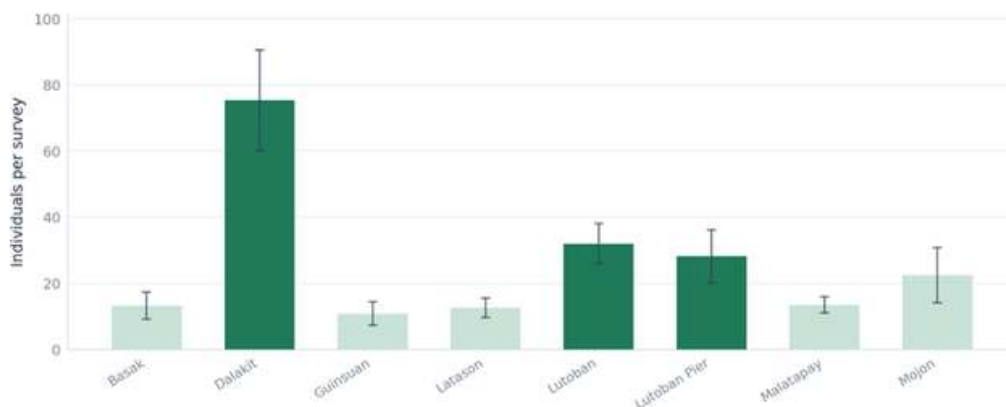
Against the preceding six months, density is substantially higher (28.5 → 38.8 per survey), richness slightly higher (9.0 → 10.1 species) and commercially important species substantially higher (16.7 → 26.0).



Invertebrate Density. Total invertebrate density, Zamboanguita, 2017-2026.



Invertebrate Species Richness. Invertebrate species richness, Zamboanguita, 2017-2026.



Commercially Important Invertebrates by Site. Commercially important invertebrate density at each Zamboanguita site, current reporting period. Sites at or above the municipal average are highlighted.

Commercial Groups:

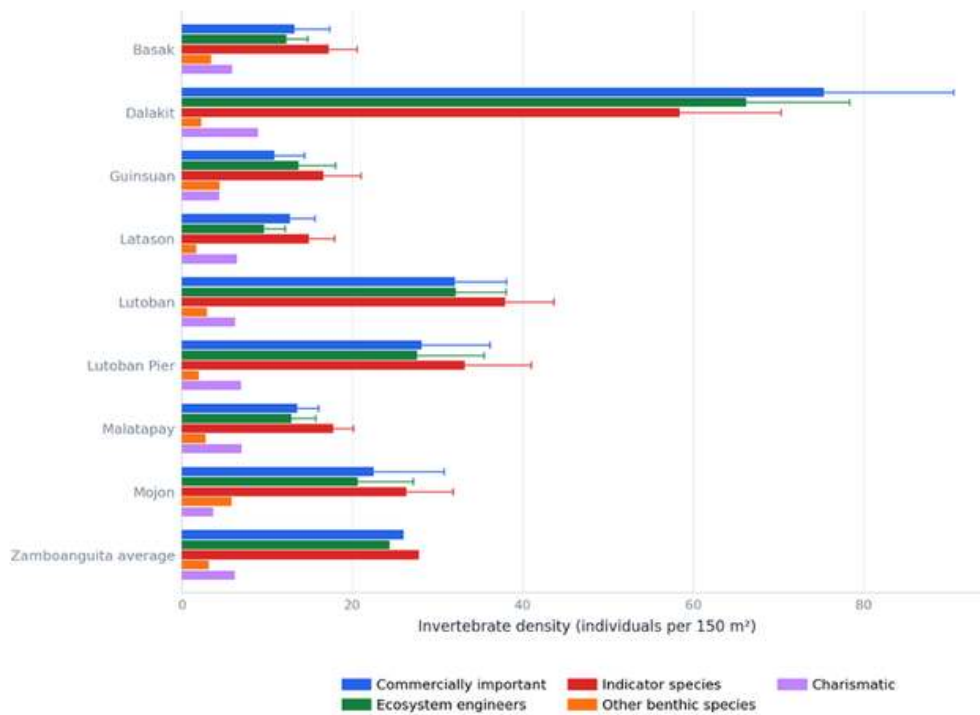
Commercially important invertebrates averaged 26.0 per survey, 67.1% of all invertebrates counted. Within the key harvested groups, urchins averaged 18.7 per survey, sea cucumbers 1.05 and giant clams 0.61. The ten most abundant invertebrate taxa, by density, and ten most abundant commercially important taxa are listed below. Those ten harvested taxa in the table below total 24.58 individuals per survey, 63% of all invertebrates counted, led by Urchin - Diadema at 17.22 per survey. The community is dominated by sea urchins. Their grazing helps keep settlement space open for coral recruitment, so high urchin abundance is a mixed signal rather than a bad one, beneficial for recruitment, but at sustained high density urchins also erode reef framework.

Most abundant invertebrate taxa. The ten most abundant invertebrates (left), and the ten most abundant commercially important invertebrates (right) by density in Zamboanguita.

Top 10 Invertebrates	Individuals per 150 m ²	Top 10 Commercial	Individuals per 150 m ²
Urchin - Diadema	17.22	Urchin - Diadema	17.22
Sea Star	3.59	Urchin - Rock Boring	1.46
Nudibranch	3.27	Other Shell	0.99
Lionfish	1.71	Cone Shell	0.92
Cleaner Shrimp - Banded Coral	1.59	Other Bivalve	0.9
Urchin - Rock Boring	1.46	Sea Cucumber - Pinkfish	0.86
Other Shell	0.99	Conch - Scorpion Spider	0.7
Cone Shell	0.92	Giant Clam	0.66
Other Bivalve	0.9	Cowrie - Tiger	0.47
Sea Cucumber - Pinkfish	0.86	Sea Cucumber - Black Spotted	0.4

Functional Groups:

Per survey: ecosystem engineers 24.4, sensitive indicator species 27.8, charismatic species 6.2, benthic associates and predators 3.2. These groups overlap by design, a species can be both commercially important and charismatic, so they do not sum to total invertebrate density. A relatively high abundance of sensitive indicator species suggests conditions still suitable for disturbance-intolerant taxa; a high abundance of ecosystem engineers, mostly urchins, indicates that herbivory and bioerosion are active processes here.



Invertebrate Functional Groups by Site. Invertebrate functional group density at each Zamboanguita site, current reporting period. Shown as absolute density rather than as shares: a species can belong to more than one functional group, so the groups overlap and do not sum to total invertebrate density or to 100%. Each bar is therefore read against the axis, and against the same group at the other sites, not against the other bars in its own row.

Long-term Context:

The 2017–19 baseline is 35.8 individuals and 6.8 species per survey. Density stands +8% against that and richness +47%. Richness figures in editions before 2026 divided a pooled species list by the number of surveys, which fell as survey effort rose. They are not comparable with these.

Ecological Interpretation:

Protected sites average 38.7 invertebrates per survey against 39.3 at the unprotected sites. Protection status alone does not determine invertebrate abundance, habitat, reef complexity and local fishing pressure all contribute, so the comparison should be read as one factor among several rather than as a test of the MPAs. 67% of the invertebrates counted are on the commercially important list. A community that is mostly harvestable taxa is not automatically healthy, it usually means the abundant species happen to be targeted ones, here urchins, rather than that the harvested stocks are in good condition. The giant clam and sea cucumber figures are the better test of that, because they are the taxa fishers take first. Each species contributes 3.8 individuals per survey on average. A rising figure with flat richness means the same few taxa are becoming more abundant rather than the community broadening, which is the pattern that precedes an urchin-dominated reef.

Herbivorous fish still outnumber urchins (21.1 against 18.7 per survey), so grazing pressure remains mostly in the fish community. That is the more stable arrangement of the two, and it is worth protecting: herbivorous fish crop algae without eroding the framework the way urchins do.

TOURISTIC VALUE

Iconic and Charismatic Species

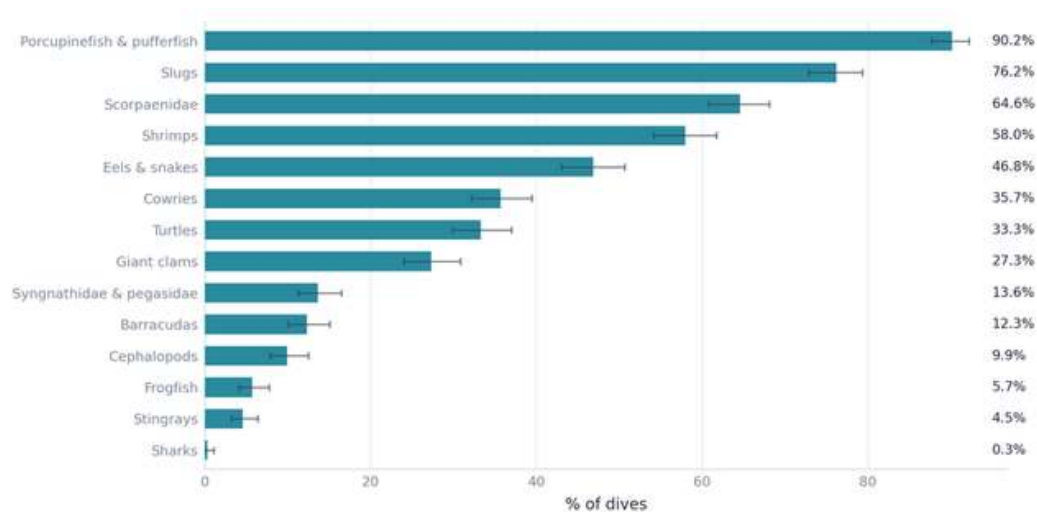


Southern Negros not only hosts some beautiful coral reefs, but is world famous for the abundance of small, rare animals found in its waters. This is a significant draw for divers and contributes substantially to the local tourism industry. Tourism has an increasingly important role to play in the success 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 around an MPA, as well as help to 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 potential tourism value that divers and snorkellers would be interested in seeing. The figures represent the percentage of dives between March and August 2026 on which each group was recorded. This provides a representation of how likely divers are to encounter these creatures, aiding dive operations in selecting sites that suit customers.

Touristic Species Encounter Rates Heatmap. The percentage of dives at sites in Zamboanguita in which each touristic group was recorded, current reporting period.

	Basak	Dalakit	Guinsuan	Latason	Lutoban	Lutoban Pier	Malatapay	Mojon	Zamboanguita Average
Barracudas	19.4	8.3	1.7	8	13.6	11	31.7	5	12.3
Cephalopods	9.7	5.6	10.9	9.8	13.4	5.9	11	13.3	9.9
Cowries	45.8	30.6	24	46.8	28.6	31.8	51.4	26.7	35.7
Eels & snakes	70.8	52.8	52.7	26.2	38.4	27.6	39.5	66.7	46.8
Frogfish	8.3	0	16.1	3.3	4.7	2	6.4	5	5.7
Giant clams	16.7	86.1	14.4	31.8	14.8	32.9	8.2	13.3	27.3
Porcupinefish & pufferfish	93.1	90.3	98.5	89.2	82.9	88	93.4	85.8	90.2
Scorpaenidae	76.4	50	80.1	44.1	58	53.8	71.6	82.5	64.6
Sharks	0	0	0	1.9	0.6	0	0	0	0.3
Shrimps	56.9	62.5	60.4	59.5	51.8	51	58.5	63.3	58
Slugs	77.8	65.3	56.5	78.3	81.2	77.2	82.6	90.8	76.2
Stingrays	11.1	18.1	2.9	0	1.6	0	2.7	0	4.5
Syngnathidae & pegasidae	9.7	5.6	4.8	18.3	12.8	9.9	15.6	32.5	13.6
Turtles	41.7	0	62.2	12.1	21.8	33.2	67.9	27.5	33.3



Touristic Species Encounter Rate. Percentage of dives in which each touristic species group was recorded, Zamboanguita, current reporting period. Encounter rate is a presence measure and is not comparable to density.

Zamboanguita demonstrates strong and diverse tourism potential. Porcupinefish and pufferfish were recorded on 90.2% of dives across the eight monitored sites. Slugs (76.2%), Scorpaenidae (64.6%), shrimps (58.0%) and eels and snakes (46.8%) are also consistently encountered, providing a reliable foundation for macro-diving and reef wildlife. Cowries (35.7%) and giant clams (27.3%) add further benthic diversity, while frogfish (5.7%), cephalopods (9.9%) and syngnathids and pegasids (13.6%) offer opportunities for divers interested in cryptic and specialised species.

Several sites stand out for particular components of the portfolio. Mojon has the strongest macro profile in the municipality, leading on slugs (90.8%), Scorpaenidae (82.5%), shrimps (63.3%) and syngnathids and pegasids (32.5%) — the last at more than double the municipal average. Dalakit is distinctive for giant clams at 86.1%, more than two and a half times any other site, and has the highest stingray rate (18.1%). Basak has a broad profile, leading on eels and snakes (70.8%) with strong cowrie (45.8%), Scorpaenidae (76.4%) and shrimp (56.9%) rates and relatively frequent barracudas (19.4%). Guinsuan combines the highest porcupinefish and pufferfish rate in either municipality (98.5%) with frogfish at 16.1% — nearly three times the municipal average, and turtles at 62.2%. Malatapay leads on turtles (67.9%), barracudas (31.7%) and cowries (51.4%).

The most frequently encountered groups were porcupinefish and pufferfish (90.2% of dives), slugs (76.2%) and Scorpaenidae (64.6%). Encounter rate is the percentage of dives on which a group was seen at least once. It measures how likely a diver is to see something, not how many are there. This dataset begins in December 2024, so no long-term trend is reported.

Charismatic megafauna add a dimension Siaton does not have. Turtles were recorded on 33.3% of dives municipality-wide, more than twice the Siaton figure, and at Malatapay and Guinsuan on roughly two dives in three. Barracudas average 12.3%. Stingrays are less common at 4.5% but reach 18.1% at Dalakit. Sharks remain very rare, recorded only at Latason (1.9%) and Lutoban (0.6%). Three sites, Latason, Mojon and Lutoban Pier, recorded no stingrays at all, and Dalakit recorded no turtles.

Overall, Zamboanguita offers highly reliable reef and macrofaunal encounters alongside more variable opportunities for larger animals. Mojon suits macro divers and underwater photographers; Dalakit offers a giant-clam experience available nowhere else in the programme; Guinsuan combines exceptional reef-fish encounters with turtles and frogfish; Malatipay is the megafauna site, with turtles and barracudas both highest; and Basak offers breadth across most groups. The sites are complementary rather than interchangeable, which lets the municipality serve macro enthusiasts, recreational reef divers and visitors hoping for larger animals without sending them all to the same reef.

MANAGEMENT SUGGESTIONS



Dalakit — coral predator removal.

Combined snail load at Dalakit is 93.6 per survey, two and a half times the 37.5 outbreak threshold and the highest at any site in either municipality. Crown of Thorns is at 0.250 per survey, above its own outbreak threshold of 0.225 and up from 0.071 in the preceding six months. This matters more than the numbers alone because of where they are: Dalakit is the best-ranked site in Zamboanguita, with the least bleaching (0.40%), the least rubble (4.1%), the highest invertebrate density (84.0) and richness (13.1) in the municipality, and the second-highest coral cover (33.8%). This is a high-quality reef under acute predator pressure. Crown of Thorns is the predator for which direct removal is most clearly justified, because unlike the snails it can strip substantial cover quickly. One encouraging sign: *Coralliophila* at Dalakit fell from 89.2 to 56.5 against the preceding six months.

Dalakit — municipal waste management.

Marine debris at Dalakit is 6.83 items per survey, two and a half times the municipal average and the highest of any site, up 16%. Its composition is the reason it needs a different response from everywhere else: 49% household and sanitary waste, 27% consumer plastics, and only 24% fishing gear. At every other Zamboanguita site fishing gear is 58% to 84% of debris. Dalakit is land-based, so collection, drainage and sanitation are the targets, and the same site is also 178% above its 2017–19 debris baseline, the steepest rise in the municipality.

Guinsuan and Latason — the two flagged sites.

Guinsuan carries 14.1% hard coral, the lowest of any site in either municipality, deep in the poor band, with bleaching up 114% against its own previous six months. Latason has rubble up 56% with coral at 21.4%, and holds the municipality's lowest commercial biomass (5.66 kg per 150 m²), lowest invertebrate density (22.5) and lowest richness (8.5), last of eight on the composite ranking. Both are MPAs, so the question here is enforcement and physical damage rather than access. Guinsuan is worth noting for a second reason: it carries the municipality's second-highest fish density (1,133 per 150 m²) on its worst coral, which means the fish are there on very little structure and the structure is what to protect.

MANAGEMENT SUGGESTIONS



Malatapay — rubble at a quarter of the substrate.

Malatapay carries 25.2% rubble, 96% above the municipal average and the highest in the municipality, on a reef with 22.6% coral cover. Rubble at that level is a recruitment problem before it is anything else: coral larvae need stable ground to settle on, and unconsolidated rubble moves. The field question is the same as at Andulay in Siaton, whether this is recent storm breakage or long-standing, which a swim survey answers and which determines whether anything can be done about it.

Herbivores, and Mojon in particular.

Herbivorous fish are between 3.6% and 12.0% of non-damselfish counts at every Zamboanguita site, a thin grazing guild everywhere in the municipality, and macroalgae, at 10.5%, remains 86% above the 2017–19 baseline despite falling 16% this period. At three sites invertebrate grazers now outnumber herbivorous fish outright. Mojon carries the municipality's highest macroalgae (20.1%, 92% above the municipal average) with bleaching at 3.18%, and is the site where a herbivore measure would be tested first.

Record what is working at Basak.

Basak holds 63.18 kg per 150 m² of commercial biomass, 255% above the municipal average and more than three times the next-highest site, with the highest fish density in the municipality (1,159 per 150 m²) and the lowest corallivore load (9.9 per survey). Its coral cover is low (17.3%, seventh of eight), so this is not a reef in good structural condition; it is a reef holding an exceptional standing stock on modest structure. Whatever combination of enforcement, habitat and fishing pattern produces that is the most valuable unexplained thing in this report, and it should be documented.

OCT 2026



**MARINE
CONSERVATION
PHILIPPINES**

Semiannual Report ZAMBOANGUITA

Section 2 Site Specific Results



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



Basak is a **marine protected area** in Zamboanguita. Hard coral cover is **17.3%** (poor on the national classification) and commercial fish biomass **63.18 kg per 150 m²**. This period rests on **27 surveys**, with 28 seasons on record since 2017.

Hard Coral Cover	Commercial Biomass	Fish Density	Bleaching
17.3% of substrate	63.2 kg / 150 m ²	1158.7 / 150 m ²	2.4% of hard coral
▲ 17.1%	▲ 161.9%	▲ 20%	▼ 64.8%

Basak indicators at a glance. Every headline indicator for Basak, current reporting period, against this site's own preceding six months and the Zamboanguita average for the same period. Colour is keyed to whether the movement is favourable rather than to whether the number rose. Green indicates improvement, red indicates decline — e.g. macroalgae, rubble, bleaching or debris rising reads red, coral cover rising reads green. A change smaller than 5% is shown as flat.

Indicator	Current	Prior 6 months	Change	Zamboanguita Average
Hard coral cover (%)	17.3	14.8	▲ +17%	24.6
Macroalgae cover (%)	8.2	7.8	▲ +5%	10.5
Rubble (%)	15.2	19.3	▼ -21%	12.9
Bleaching (of hard coral) (%)	2.38	6.76	▼ -65%	1.96
Total fish density (per 150 m ²)	1,159	966	▲ +20%	727
Commercial fish biomass (kg per 150 m ²)	63.18	24.12	▲ +162%	17.82
Invertebrate density (per 150 m ²)	28.5	22.4	▲ +27%	38.8
Invertebrate species richness (per 150 m ²)	9.8	8.7	▲ +13%	10.1
Coral predators (per 150 m ²)	9.9	16.9	▼ -41%	38.7
Marine debris (items per 150 m ²)	2.14	3.5	▼ -39%	2.77

What moved this period:

- Commercial fish biomass substantially higher (+162%) — favourable
- Bleaching (of hard coral) substantially lower (-65%) — favourable
- Coral predators substantially lower (-41%) — favourable

BASAK CAN-UNSANG SOUTH MPA

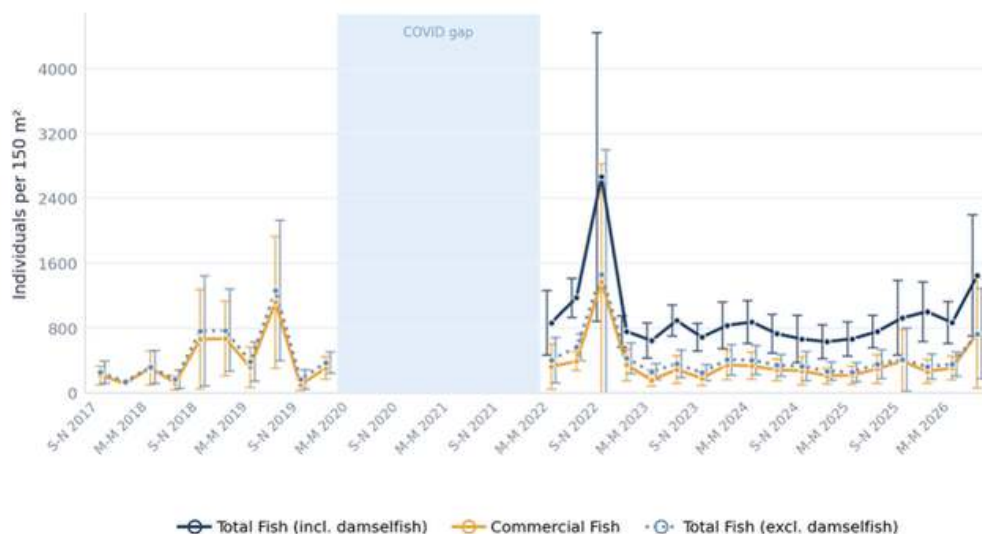
Food Security



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:

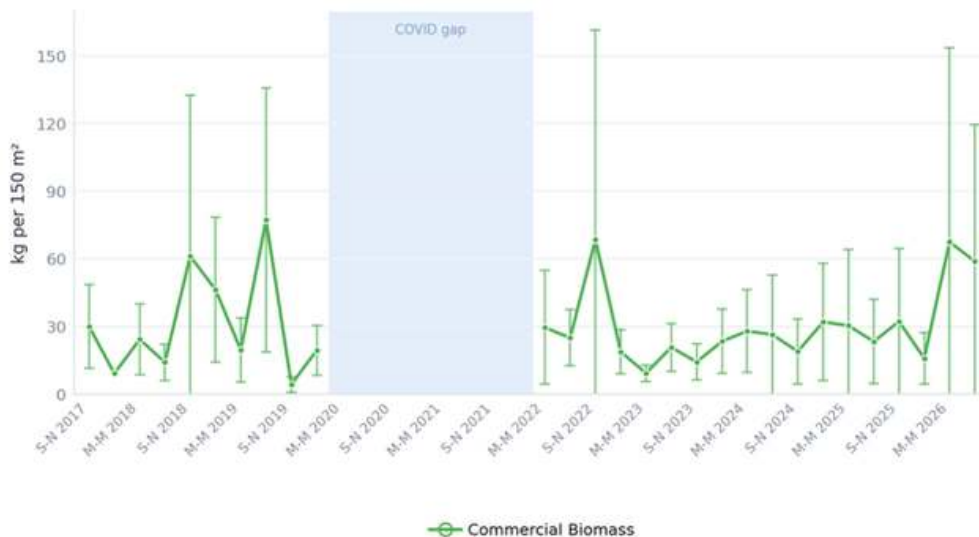
In March–August 2026, Basak recorded an average total fish density of **1,158.7 individuals per 150 m²**, with commercial species contributing **523.1 individuals per 150 m²**. Commercial biomass averaged **63.18 kg per 150 m²**, equivalent to roughly **4,212 kg per hectare**, which sits in the high range for the program. By dietary group the assemblage was led by herbivores (~581.1 ind.), planktivores (~367.2 ind.), carnivores (~165.8 ind.), corallivores (~19.3 ind.), detritivores (~9.5 ind.), omnivores (~9.2 ind.) and parasitivores (~6.4 ind.), so herbivores dominate the fish community at this scale.



Fish Density Trends. Total and commercial fish density at Basak, 2017–2026. The solid total includes damselfish and begins at Mar–May 2022, the season they entered the protocol; the dotted line excludes them and runs the whole record, so it is the comparable series across the COVID gap and against the 2017–19 baseline. The gap between the two is the damselfish contribution.

Recent Change:

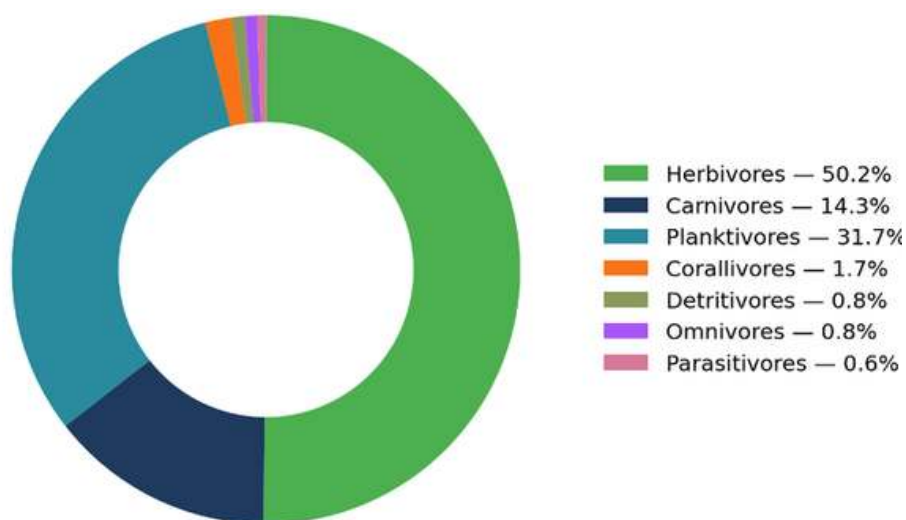
Against the preceding six months, total fish density is notably higher (965.6 → 1,158.7 individuals per 150 m² including damselfish, 369.3 → 542.8 excluding them), commercial density substantially higher (328.8 → 523.1) and commercial biomass substantially higher (24.12 → 63.18 kg per 150 m²). Within the assemblage, herbivores moved 600.3 → 581.1, carnivores moved 128.0 → 165.8 and planktivores moved 206.8 → 367.2 individuals per 150 m².



Commercial Biomass Trends. Commercial fish biomass at Basak, 2017–2026.

Dietary structure:

By share of individuals the community is herbivores (50.2%), planktivores (31.7%) and carnivores (14.3%), with the remaining groups together making up 3.8%. Trophic structure matters because grazing species control algal growth and so mediate the competition between coral and algae described in the next section.



Dietary Composition. Share of fish recorded in each dietary group, Basak, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged).

Commercial Groups:

Trevally is the largest single contributor at 23.59 kg per 150 m², 37.1% of commercial biomass. Larger predatory taxa (Trevally, Snapper) are present but at lower densities, so commercial biomass is carried largely by mid-sized and schooling species rather than by large predators. That is the pattern expected on reefs under fishing pressure, where the largest predatory fish are removed first.

The ten commercial fish families contributing most to biomass at Basak this period are listed below. Sub-types are rolled into their family.

Top commercial fish families. The ten commercial fish families contributing most to biomass at Basak, current reporting period, with the share of commercial biomass each carries. Sub-types are rolled into their family.

Commercial Families	Biomass (kg/ 150 m ²)	Density (ind./150 m ²)	% of Commercial Biomass
Trevally	23.59	11.7	37.1
Fusilier	22.28	249.9	35
Snapper	5.83	60.4	9.2
Surgeonfish	1.74	5	2.7
Triggerfish	1.59	7.1	2.5
Unicornfish	1.46	9.3	2.3
Damselfish - Sergeantfish	1.42	50	2.2
Wrasse - Other	0.97	49	1.5
Goatfish	0.9	14.3	1.4
Bream	0.85	15.2	1.3

Long-term context:

The 2017–19 baseline for Basak is 35.25 kg per 150 m² of commercial biomass and 509.0 fish per 150 m². Current biomass stands +79% against that baseline and density +7%. The highest commercial biomass on record here was 77.22 kg per 150 m² in Jun–Aug 2019. Current levels are 18% below it. Two protocol changes limit what the long record can be asked. Damselfish entered the list in 2022, so only the damselfish-excluded series is comparable across the full period; and fish size bins changed in 2025 with both schemes running side by side through 2025–26, which biases early biomass slightly low.

Ecological interpretation:

Basak ranks first of the 8 sites surveyed in the municipality on commercial biomass this period. Commercial biomass is above the 2017–19 baseline, consistent with effective protection or with a strong cohort working through the stock. Herbivores are only 3.6% of the fish counted once damselfish are set aside, a thin grazing guild for a reef of this type. Damselfish do not make up the difference: they defend small algal territories rather than grazing the reef broadly, so they add to the herbivore count without adding much grazing pressure. Planktivores make up 57.7% of the assemblage. Planktivore abundance tracks current and plankton supply rather than reef condition, so it inflates total density without indicating recovery. The average commercial fish counted weighs about 121 g. Against the 2017–19 baseline of 80 g that is +52%. Mean size is holding up, which suggests individuals are surviving long enough to grow and that the size structure has not been truncated.

Carnivores are 30.5% of the assemblage once damselfish are set aside, which is a high share. On a lightly fished reef the pyramid narrows towards the top; a wide carnivore band usually means small mid-water carnivores rather than large predators, so it should be read with the commercial table above rather than as evidence of an intact predator community. At roughly 4,212 kg per hectare, standing commercial stock is high by regional standards and comparable with well-enforced reserves. That is worth stating plainly to the people who maintain it.

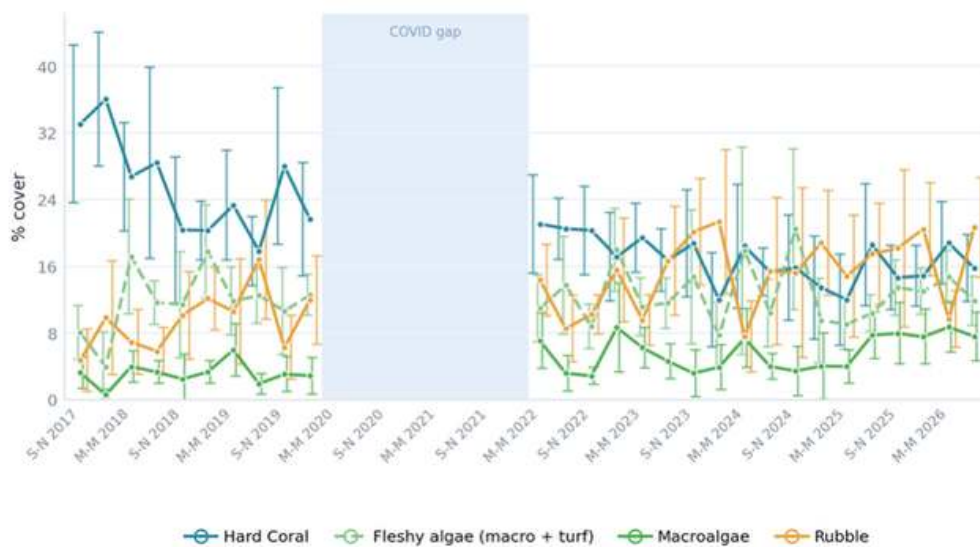
BASAK CAN-UNSANG SOUTH MPA

Reef Health And Resilience

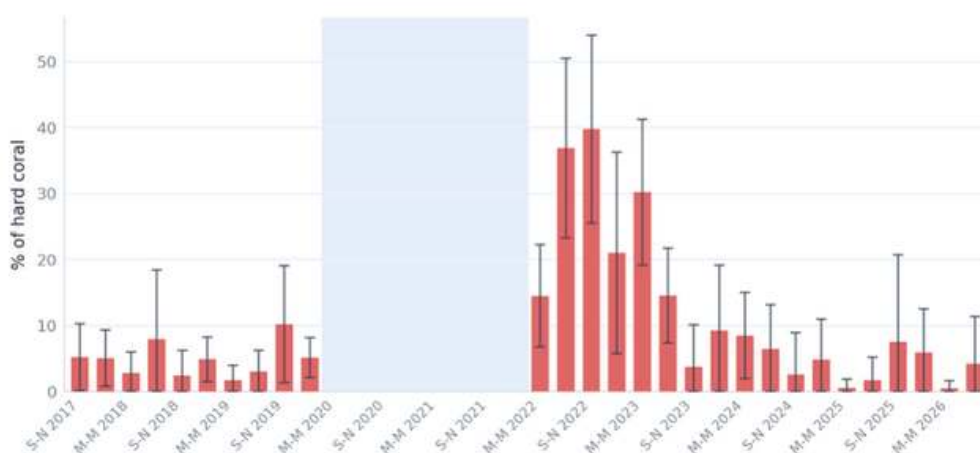


Current status:

During March–August 2026, Basak recorded an average hard coral cover of **17.3%**, macroalgae of **8.2%** (13.3% once turf is included) and rubble of **15.2%**. Coral cover places the reef in the poor band of the Philippine classification. Bleaching affected 2.38% of hard coral, below the 5% level conventionally treated as a concern threshold, suggesting low thermal stress over the survey period. Beyond bleaching, 0.10% showed predation scarring. Overall the reef can be described as coral-dominated, with limited algal presence and substantial unconsolidated substrate.



Reef Substrate Trends. Hard coral, macroalgae and rubble cover at Basak, 2017–2026. Solid line is macroalgae alone; dashed adds turf, the pre-2026 published definition.



Bleaching Incidence. Bleached coral as a percentage of hard coral cover at Basak, by season. Combines partially and fully bleached records.

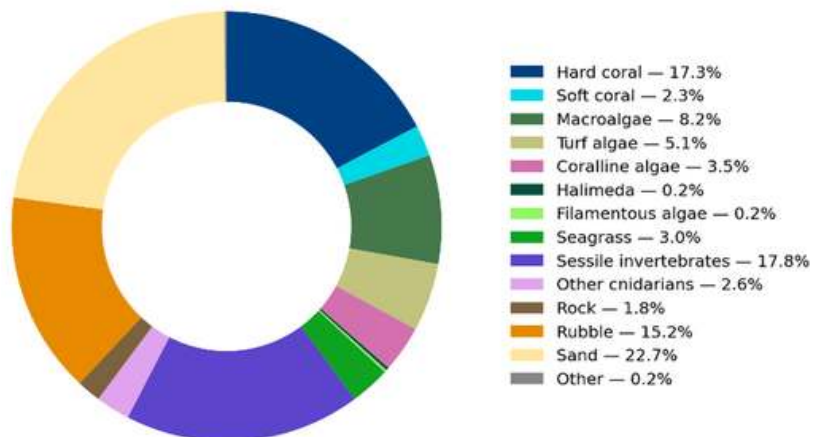
Recent Change:

Compared with the preceding six months, hard coral cover is notably higher (14.8 → 17.3%), macroalgae slightly higher (7.8 → 8.2%), rubble notably lower (19.3 → 15.2%) and bleaching substantially lower (6.76 → 2.38%). Taken together this indicates increased algal presence. Super Typhoon Inday and Super Typhoon Kiyapo crossed the area inside this reporting period, so physical damage is the first explanation for this.

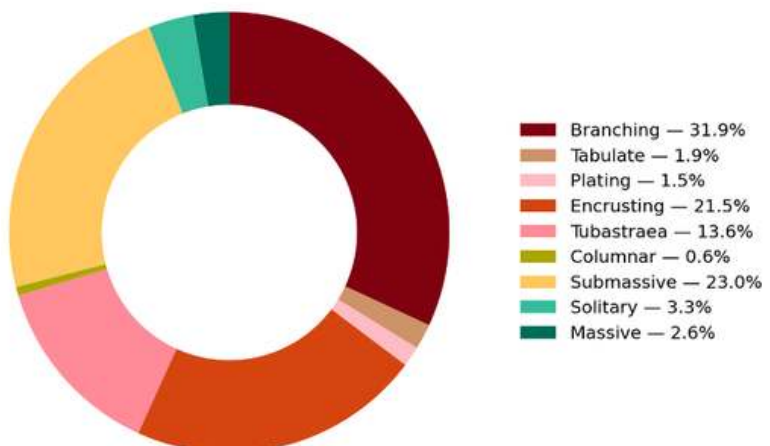
Structural Implications:

Of all points recorded, 17.3% is living hard coral, 13.7% is fleshy algae competing for the same space, 37.9% is unconsolidated material (rubble and sand), 5.3% is consolidated surface available for settlement (bare rock and coralline algae) and 25.7% is occupied by other stable but non-reef-building life, soft corals, sessile invertebrates and seagrass. The combination of poor coral cover and rubble at 15.2% indicates that substrate instability is likely to be limiting recruitment in places: rubble moves in swell, and larvae that settle on it are abraded or buried before they can consolidate, so rubble fields tend to persist rather than recover on their own. Sand adds a further 22.7%, bringing the unconsolidated fraction to 37.9% in total. Macroalgae has risen against the preceding six months (+5%), so competition for settlement space is intensifying rather than easing. Fleshy algae pre-empt the surfaces coral larvae need and deter grazers once established, which is how a reef gets held on the algal side rather than crossing back.

Substrate Composition. Full substrate composition, Basak, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged). Each category is a share of all points recorded on the transect.



Coral Growth Forms. Share of hard coral in each growth form at Basak, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged). Forms are ordered from least to most resilient: low resilience covers branching, tabulate, plating, encrusting and Tubastraea; medium covers columnar and submassive; high covers solitary and massive.



Within the living coral, growth form determines how much shelter the reef offers and how well it resists disturbance; this protocol records no rugosity, so growth form is the closest available proxy for structural complexity. The cover present is led by branching (31.9%), submassive (23.1%) and encrusting (21.5%). On MCP's classification, resistance to disturbance, not shelter, 70.4% of the coral sits in low-resilience forms and 5.9% in high-resilience forms. Most of the cover is therefore in forms that provide good shelter but are first to be lost in a thermal or storm event, so the headline cover figure is more fragile than it appears.

Taken together, poor coral cover at 17.3%, macroalgae at 8.2% and rubble at 15.2%, this is a reef in a **transitional** state, shaped by both physical disturbance (the unconsolidated fraction) and biological competition (the algal fraction). Physical instability is the binding constraint here; algal competition is not currently at a level that would prevent recovery.

Long-term context:

Against the 2017–19 baseline of 25.8% hard coral, 3.1% macroalgae and 9.6% rubble, coral cover is -33%, macroalgae +162% and rubble +58%. Coral cover peaked at 36.1% in Dec–Feb 2017/18 and now stands 17.3%. Bleaching peaked at 39.8% of hard coral in Sep–Nov 2022, and has remained below the 5% concern level for the last 2 seasons, since Mar–May 2026. Two definitions changed for this edition and are not comparable with earlier reports: macroalgae is now macroalgae alone rather than macroalgae plus turf, and bleaching is a share of hard coral rather than of all substrate points, which makes it read three to four times higher on identical observations.

Ecological interpretation:

Basak ranks seventh of the 8 sites surveyed in the municipality on hard coral cover and fourth on macroalgae, counting the least algal site first. With cover in the poor band this reef has little margin: a single disturbance removes a large share of what remains, and recovery from a low base is slow. Of the coral present, 35.3% is in fast-growing forms (branching, tabulate, plating) and 47.2% in slow, robust ones (massive, submassive, encrusting). That ratio sets how quickly cover can rebuild and how much survives a disturbance, and the two pull against each other: the fast forms drive recovery but are the first lost, the slow ones persist but add cover at a fraction of the rate. A cover figure held up mostly by slow forms is stable but will rebuild slowly from any loss, so recovery here should be measured in decades rather than seasons. For every point of substrate a coral larva could settle on, there are 2.6 points already held by fleshy algae. There is workable settlement space relative to algal cover, so recruitment is not obviously space-limited, which makes larval supply and post-settlement survival the things to look at if cover is not rebuilding.

Of the pressures acting here, the ones open to local action are enforcement, the herbivore populations that hold algae down, and the physical impacts that break coral and make rubble, anchoring, destructive fishing and trampling. Thermal stress is not one of them, which is why the bleaching figure is reported as context rather than as something to manage.

BASAK CAN-UNSANG SOUTH MPA

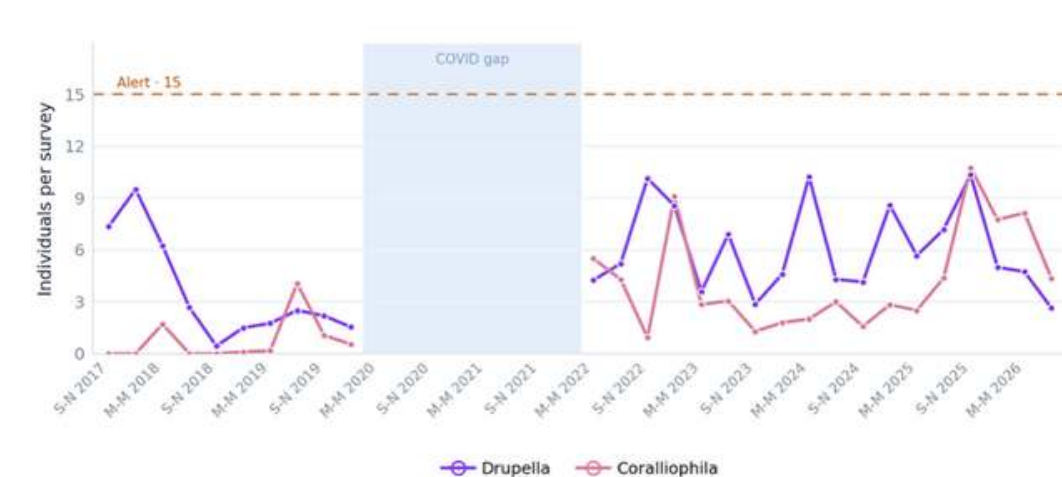


Predation and Marine Debris

Current Status:

Drupella averaged **3.7 per survey** (below the alert threshold) and Coralliophila **6.2** (below the alert threshold), giving a combined corallivorous snail load of 9.9 per survey. Crown of Thorns averaged 0.000 per survey (below the alert threshold).

Marine debris averaged **2.14 items per survey**. By category it breaks down as fishing gear 1.55 (72%), consumer plastics 0.41 (19%) and household & sanitary 0.17 (8%). The categories are mutually exclusive and sum to the total, so nothing is double-counted between them. Fishing gear is the largest category at 72% of items. That is a sea-based source: gear lost or discarded by boats working the reef, which responds to gear marking, retrieval dives and work with fishers rather than to municipal waste collection.



Coral Predators. Corallivorous snail abundance at Basak, 2017-2026. Drupella and Coralliophila share one threshold set and one axis. Dashed rules mark MCP management thresholds — alert 15, outbreak 37.5, extreme 75 per survey.



Crown of Thorns. Crown of Thorns abundance at Basak, 2017-2026. Dashed rules mark MCP management thresholds for Crown of Thorns (alert 0.1125, outbreak 0.225, extreme 0.45 per survey).

Recent Change:

Against the preceding six months, *Drupella* is substantially lower (7.7 → 3.7), *Coralliophila* substantially lower (9.2 → 6.2), Crown of Thorns not comparable (0.000 → 0.000) and debris substantially lower (3.50 → 2.14 items per survey).



Marine Debris. Marine debris at Basak, current reporting period. The centre figure is total items per survey and the ring is what that total is made of; the categories are mutually exclusive, so the slices sum to the centre figure. The sparkline is the site's own total debris per survey across the full record, 2017–2026, with the COVID gap left empty.

Long-term Context:

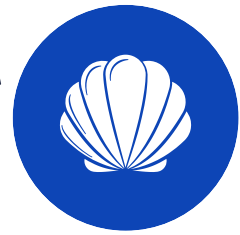
The 2017–19 baseline is 4.0 *Drupella*, 0.8 *Coralliophila* and 0.052 Crown of Thorns per survey, with 3.61 debris items. Current levels stand -8%, +729%, -100% and -41% against those. *Drupella* peaked at 10.3 per survey in Sep–Nov 2025. These figures pool all depths. *Drupella* is roughly eleven times more abundant shallow than deep, so we have a depth-resolved workbook, where we can detect outbreaks in the shallows.

Ecological Interpretation:

Corallivore abundance sits below the thresholds that would trigger management action. More than half the debris recorded (72.5%) is fishing gear. That is a different management problem from land-based waste: it points at gear loss by fishers working the reef and responds to gear marking, retrieval and fisher engagement rather than to municipal waste collection.

The debris is a fisheries problem before it is a waste problem. Lost gear keeps fishing after it is lost, so it is both a debris indicator and a mortality source, and it accumulates on exactly the structure that snags it, the high-relief coral that matters most. Gear marking and retrieval dives address it; municipal collection does not.

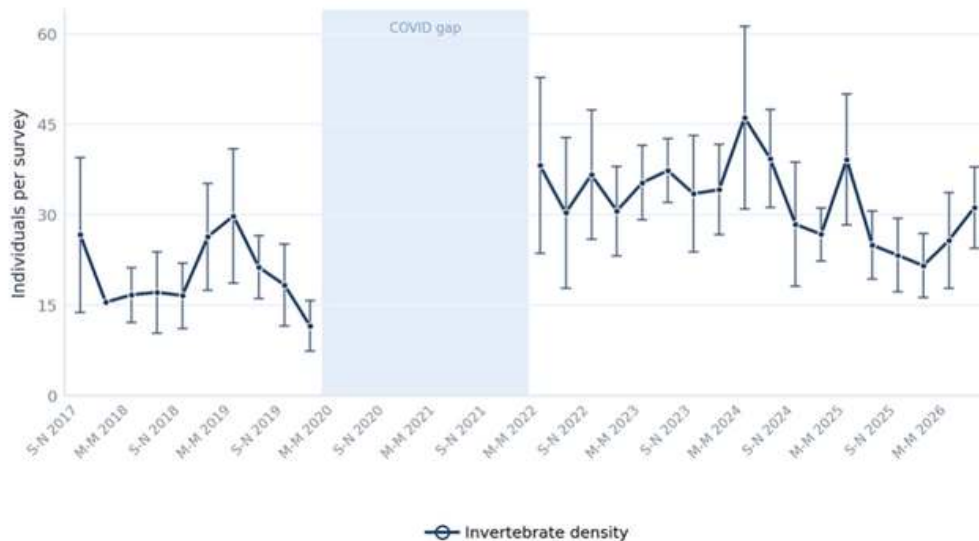
BASAK CAN-UNSANG SOUTH MPA



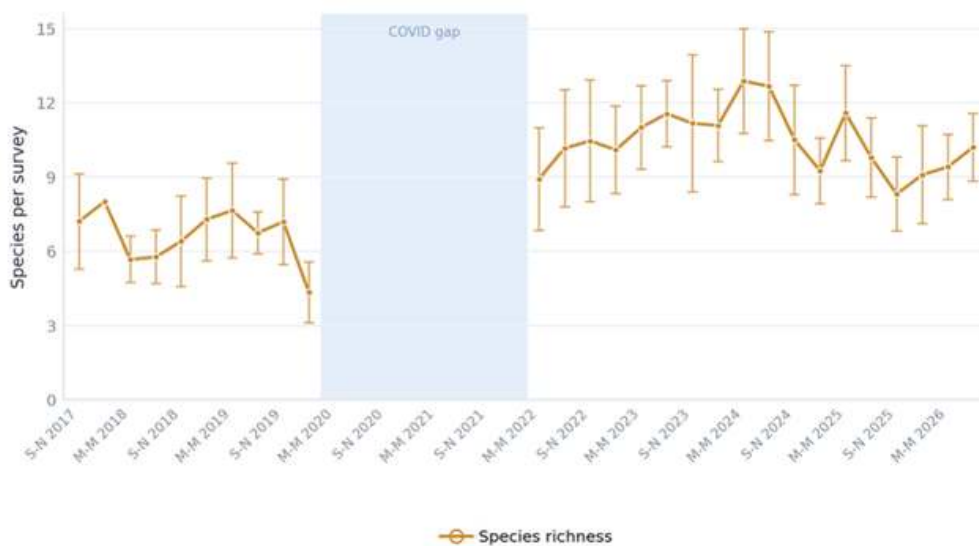
Invertebrate Status

Current Status:

Basak supported an average invertebrate density of **28.5 individuals per survey**, drawn from **9.8 distinct species per survey**.



Invertebrate Density. Total invertebrate density at Basak, 2017-2026.



Invertebrate Species Richness. Invertebrate species richness at Basak, 2017-2026.

Recent Change:

Against the preceding six months, density is notably higher (22.4 → 28.5 per survey), richness slightly higher (8.7 → 9.8 species) and commercially important species substantially higher (7.7 → 13.2).

Commercial Groups:

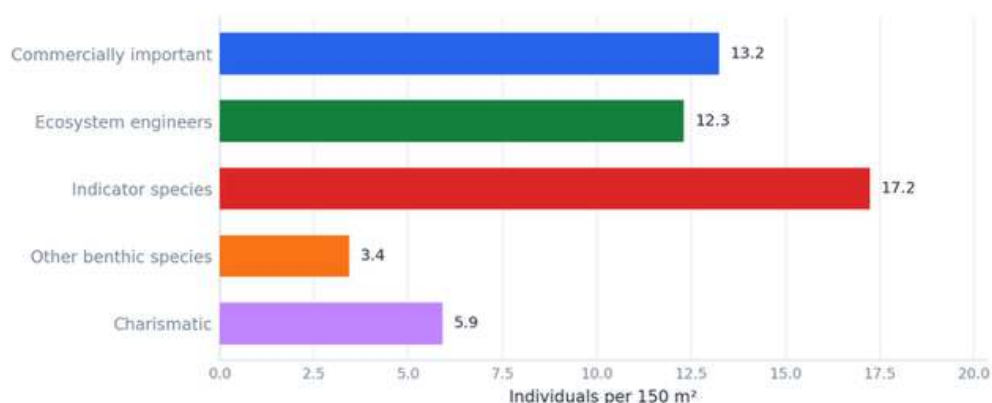
Commercially important invertebrates averaged 13.2 per survey, 46.5% of all invertebrates counted. Within the key harvested groups, urchins averaged 3.5 per survey, sea cucumbers 1.53 and giant clams 0.13. Those ten total 12.37 individuals per survey, 43% of all invertebrates counted, led by Urchin - Diadema at 3.17 per survey.

Most abundant invertebrate taxa. The ten most abundant invertebrates (left), and the ten most abundant commercially important invertebrates (right) by density at Basak.

Top 10 Invertebrates	Individuals per 150 m ²	Top 10 Commercial	Individuals per 150 m ²
Sea Star	6.63	Urchin - Diadema	3.17
Nudibranch	3.5	Other Shell	1.67
Urchin - Diadema	3.17	Other Bivalve	1.53
Lionfish	1.73	Conch - Other	1.47
Other Shell	1.67	Sea Cucumber - Pinkfish	1.43
Other Bivalve	1.53	Cowrie - Tiger	0.93
Conch - Other	1.47	Conch - Scorpion Spider	0.73
Sea Cucumber - Pinkfish	1.43	Mantis Shrimp	0.73
Cleaner Shrimp - Banded Coral	1	Cone Shell	0.37
Cowrie - Tiger	0.93	Urchin - Rock Boring	0.33

Functional Groups:

Per survey: ecosystem engineers 12.3, sensitive indicator species 17.2, charismatic species 5.9, benthic associates and predators 3.4. These groups overlap by design, a species can be both commercially important and charismatic, so they do not sum to total invertebrate density. A relatively high abundance of sensitive indicator species suggests conditions still suitable for disturbance-intolerant taxa; a high abundance of ecosystem engineers, mostly urchins, indicates that herbivory and bioerosion are active processes here.



Invertebrate Functional Groups. Invertebrate functional group density, Basak, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged). A species can belong to more than one group, a giant clam is both commercially important and charismatic, so these groups overlap and do not sum to total invertebrate density.

Long-term context:

The 2017–19 baseline is 21.3 individuals and 6.8 species per survey. Density stands +34% against that and richness +43%. Richness figures in editions before 2026 divided a pooled species list by the number of surveys, which fell as survey effort rose. They are not comparable with these.

Ecological interpretation:

Basak ranks fifth of the 8 sites surveyed in the municipality on invertebrate density and fourth on species richness. Giant clams sit well below baseline. As a sessile, conspicuous and valuable species they are among the first taken and among the slowest to return. Each species contributes 2.9 individuals per survey on average. A rising figure with flat richness means the same few taxa are becoming more abundant rather than the community broadening, which is the pattern that precedes an urchin-dominated reef.

Herbivorous fish still outnumber urchins (19.5 against 3.5 per survey), so grazing pressure remains mostly in the fish community. That is the more stable arrangement of the two, and it is worth protecting: herbivorous fish crop algae without eroding the framework the way urchins do.

BASAK CAN-UNSANG SOUTH MPA

Tourism Value



Touristic Species	Mean Encounter Rate (%)		
Barracudas	19.4	Scorpaenidae	76.4
Cephalopods	9.7	Sharks	0
Cowries	45.8	Shrimps	56.9
Eels and Snakes	70.8	Slugs	77.8
Frogfish	8.3	Stingrays	11.1
Giant Clams	16.7	Syngnathidae and Pegasidae	9.7
Porcupinefish and Pufferfish	93.1	Turtles	41.7

Touristic species encounter rates. The percentage of dives at Basak in which each touristic group was recorded, current reporting period.

Basak is the most established dive location in Zamboanguita, enjoying regular visits from divers coming from Dauin. The site is particularly well known for its diverse sea slug assemblage, including large and colourful members of the Nembrotha family, as well as impressive scorpionfish. Basak is also known for a large school of resident barracuda and, at times, large numbers of milkfish. These larger schooling species may not be fully reflected in the survey data, as they are generally associated with the sandy area in the southern part of the MPA and rarely venture onto the reef during monitoring dives. The previous sighting of mobula rays adds to Basak's reputation for occasional encounters with large pelagic species, including tuna. Individual large turtles and basket sea stars have also been recorded here, the latter a distinctive subject for photographers.

Basak demonstrates very high tourism value, with exceptionally frequent sightings of porcupinefish and pufferfish (93.1%), well above the municipal average of 90.2%. Slugs (77.8%) are also frequently encountered, while eels and snakes (70.8%) are particularly prominent and represent the highest encounter rate for this group across the municipality. Scorpaenidae (76.4%) and shrimps (56.9%) further strengthen the site's macro-diving appeal, with the frequent occurrence of large scorpionfish providing additional visual interest for divers and underwater photographers. Cowries (45.8%) are also well represented, adding further diversity to the reef experience.

Basak also provides strong opportunities for encounters with larger and charismatic species. Turtles were recorded in 41.7% of dives, above the municipal average of 33.3%, while stingrays occurred in 11.1% of dives.

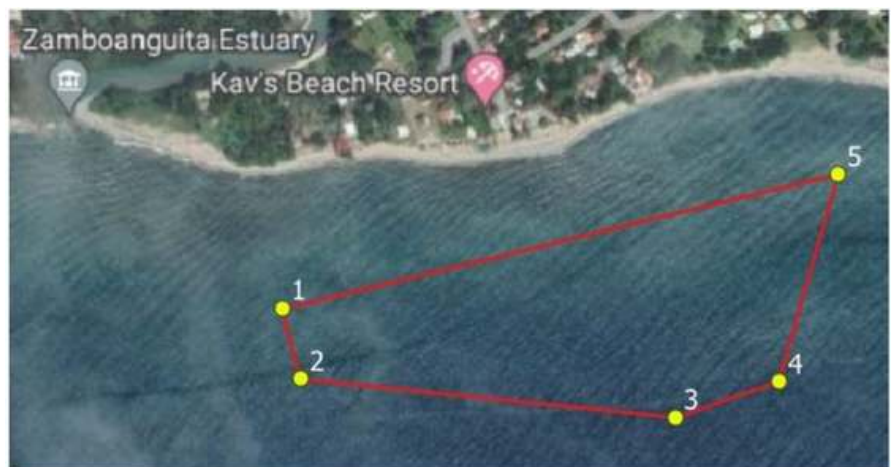
Barracudas were recorded in 19.4% of dives, providing a notable pelagic component despite the survey data likely underrepresenting the resident barracuda aggregation. Frogfish were encountered in 8.3% of dives, while no sharks were recorded during the monitoring period. The combination of regular turtle sightings, stingrays, barracudas and occasional mobula ray observations adds an important megafauna dimension to Basak's otherwise strong macro-diving profile.

Overall, Basak remains a particularly high-value site for marine tourism, combining reliable reef and macrofaunal encounters with strong opportunities for charismatic marine wildlife. Its exceptionally high porcupinefish and pufferfish encounters, abundant slugs, eels and snakes, and frequent Scorpaenidae provide a strong foundation for regular recreational and macro-focused diving, while turtles, stingrays and barracudas broaden its appeal. The site's established reputation, resident barracuda aggregation, distinctive sea slug diversity, and occasional sightings of larger pelagic species such as mobula rays further strengthen its tourism potential. Basak is therefore well positioned as one of Zamboanguita's most established and diverse dive destinations.

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

Indicators At A Glance



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.

Dalakit is a **marine protected area** in Zamboanguita. Hard coral cover is **33.8%** (fair on the national classification) and commercial fish biomass **14.03 kg per 150 m²**. This period rests on **8 surveys**, with 22 seasons on record since 2017.

Hard Coral Cover	Commercial Biomass	Fish Density	Bleaching
33.8% of substrate	14 kg / 150 m ²	353.1 / 150 m ²	0.4% of hard coral
▲ 9.7%	— 0.6%	▼ 18.3%	▼ 83.2%

Dalakit indicators at a glance. Every headline indicator for Dalakit, current reporting period, against this site's own preceding six months and the Zamboanguita average for the same period. Colour is keyed to whether the movement is favourable rather than to whether the number rose. Green indicates improvement, red indicates decline — e.g. macroalgae, rubble, bleaching or debris rising reads red, coral cover rising reads green. A change smaller than 5% is shown as flat.

Indicator	Current	Prior 6 months	Change	Zamboanguita Average
Hard coral cover (%)	33.8	30.8	▲ +10%	24.6
Macroalgae cover (%)	7.2	9.3	▼ -23%	10.5
Rubble (%)	4.1	5.8	▼ -30%	12.9
Bleaching (of hard coral) (%)	0.4	2.36	▼ -83%	1.96
Total fish density (per 150 m ²)	353	432	▼ -18%	727
Commercial fish biomass (kg per 150 m ²)	14.03	13.94	— +1%	17.82
Invertebrate density (per survey)	84	40.3	▲ +108%	38.8
Invertebrate species richness (species per survey)	13.1	10	▲ +31%	10.1
Coral predators (per survey)	93.6	125.4	▼ -25%	38.7
Marine debris (items per survey)	6.83	5.88	▲ +16%	2.77

What moved this period:

- Invertebrate density substantially higher (+108%) — favourable
- Bleaching (of hard coral) substantially lower (-83%) — favourable
- Invertebrate species richness substantially higher (+31%) — favourable

DALAKIT MPA

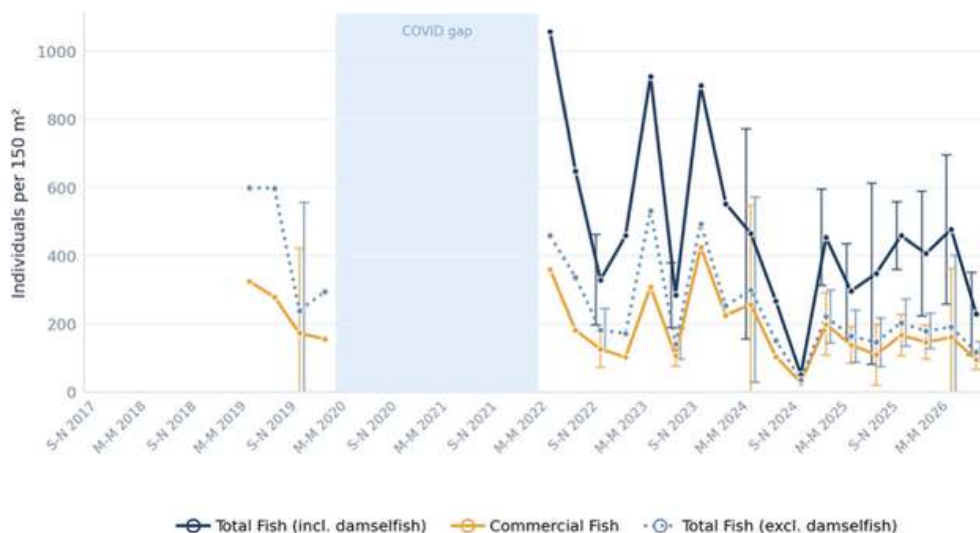
Food Security



Current Status:

In March–August 2026, Dalakit recorded an average total fish density of **353.1 individuals per 150 m²**, with commercial species contributing 128.1 individuals per 150 m².

Commercial biomass averaged **14.03 kg per 150 m²**, equivalent to roughly **935 kg per hectare**, which sits in the moderately high range for the program. By dietary group the assemblage was led by herbivores (~223.8 ind.), carnivores (~90.8 ind.), detritivores (~15.4 ind.), corallivores (~10.1 ind.), omnivores (~7.4 ind.), parasitivores (~4.6 ind.) and planktivores (~1.1 ind.), so herbivores dominate the fish community at this scale.



Fish Density Trends. Total and commercial fish density at Dalakit, 2017–2026.



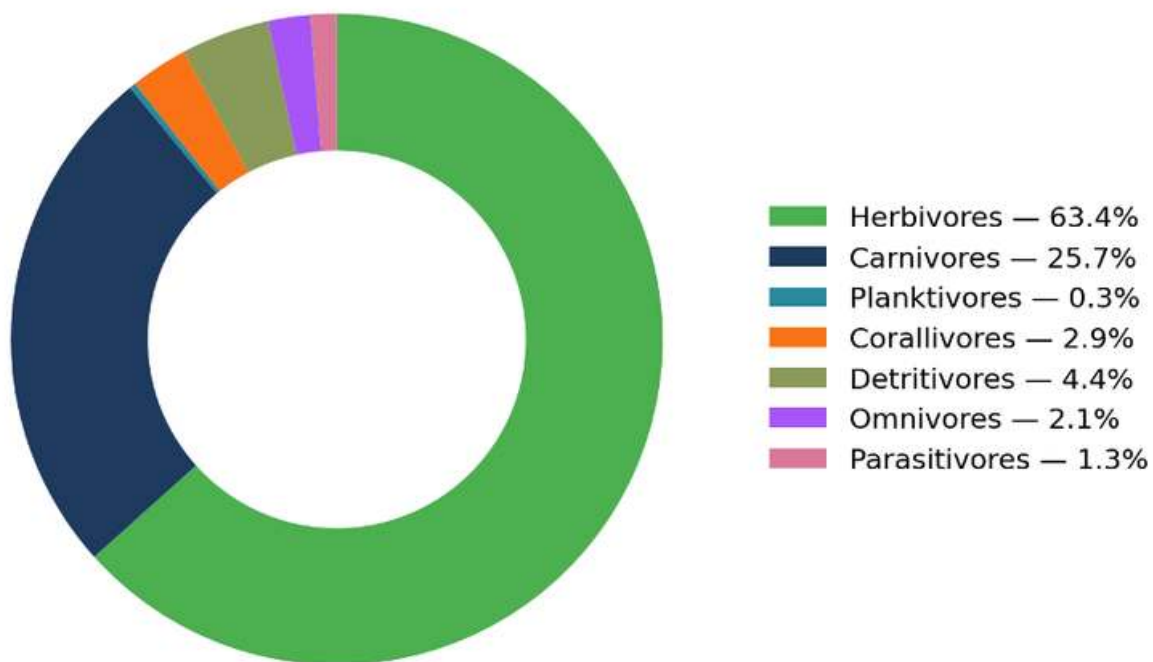
Commercial Biomass Trends. Commercial fish biomass at Dalakit, 2017–2026.

Recent Change:

Against the preceding six months, total fish density is notably lower (432.1 → 353.1 individuals per 150 m² including damselfish, 191.0 → 154.1 excluding them), commercial density notably lower (156.6 → 128.1) and commercial biomass little changed (13.94 → 14.03 kg per 150 m²). Within the assemblage, herbivores moved 273.1 → 223.8, carnivores moved 109.9 → 90.8 and planktivores moved 3.9 → 1.1 individuals per 150 m².

Dietary structure:

By share of individuals the community is herbivores (63.4%), carnivores (25.7%) and detritivores (4.4%), with the remaining groups together making up 6.6%. Trophic structure matters because grazing species control algal growth and so mediate the competition between coral and algae described in the next section. Damselfish alone are 199.0 individuals per 150 m² and are counted as herbivores, so they carry most of that herbivore share. Set them aside and the remaining assemblage is carnivores (58.9%), herbivores (16.5%) and detritivores (10.0%). The two views answer different questions: the first describes what is on the reef, the second what is available to a fishery and which fish do the grazing that keeps settlement space open, since damselfish farm small algal patches rather than cropping the reef broadly.



Dietary Composition. Share of fish recorded in each dietary group, Dalakit, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged).

Commercial Groups:

Trevally is the largest single contributor at 6.32 kg per 150 m², 45.0% of commercial biomass. Larger predatory taxa (Trevally, Snapper, Grouper) are present but at lower densities, so commercial biomass is carried largely by mid-sized and schooling species rather than by large predators. That is the pattern expected on reefs under fishing pressure, where the largest predatory fish are removed first.

Top commercial fish families. The ten commercial fish families contributing most to biomass at Dalakit, current reporting period, with the share of commercial biomass each carries. Sub-types are rolled into their family.

Commercial Families	Biomass (kg/ 150 m ²)	Density (ind./150 m ²)	% of Commercial Biomass
Trevally	6.32	31.2	45
Surgeonfish	1.66	7.6	11.8
Soldierfish	1.43	6	10.2
Snapper	1.17	12.8	8.4
Bristletooth	1.02	15.4	7.3
Wrasse - Other	0.38	27	2.7
Brushtail Tang	0.37	6.6	2.7
Grouper	0.33	2.9	2.3
Bream	0.26	4.4	1.8
Goatfish	0.21	4.6	1.5

Long-term context:

The 2017–19 baseline for Dalakit is 32.86 kg per 150 m² of commercial biomass and 598.5 fish per 150 m². Current biomass stands -57% against that baseline and density -74%. The highest commercial biomass on record here was 52.41 kg per 150 m² in Sep–Nov 2023. Current levels are 73% below it. Two protocol changes limit what the long record can be asked. Damselfish entered the list in 2022, so only the damselfish-excluded series is comparable across the full period; and fish size bins changed in 2025 with both schemes running side by side through 2025–26, which biases early biomass slightly low.

Ecological interpretation:

Dalakit ranks third of the 8 sites surveyed in the municipality on commercial biomass this period. Commercial biomass at Dalakit sits well below its 2017–19 baseline, which is what would be expected where extraction has continued to outpace replacement. The average commercial fish counted weighs about 109 g. Against the 2017–19 baseline of 109 g that is +0%. Mean size is holding up, which suggests individuals are surviving long enough to grow and that the size structure has not been truncated.

Carnivores are 58.9% of the assemblage once damselfish are set aside, which is a high share. On a lightly fished reef the pyramid narrows towards the top; a wide carnivore band usually means small mid-water carnivores rather than large predators, so it should be read with the commercial table above rather than as evidence of an intact predator community.

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:

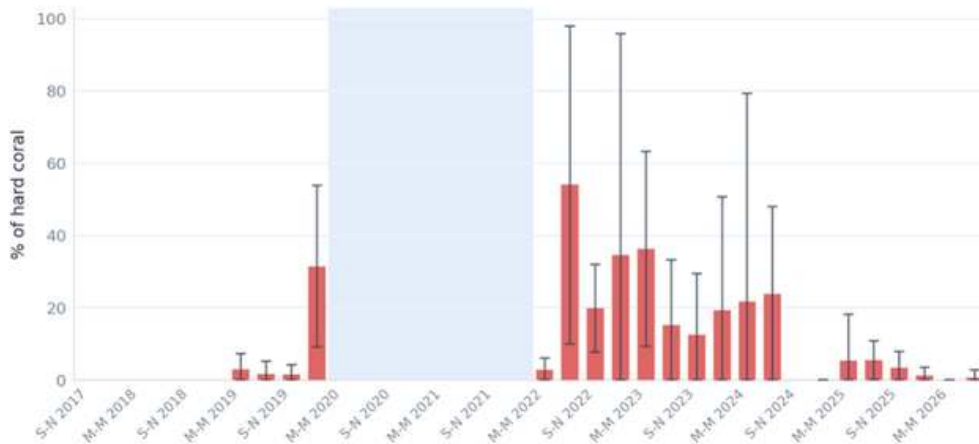
During March–August 2026, Dalakit recorded an average hard coral cover of **33.8%**, macroalgae of **7.2%** (26.5% once turf is included) and rubble of **4.1%**. Coral cover places the reef in the fair band of the Philippine classification. Bleaching affected 0.40% of hard coral, below the 5% level conventionally treated as a concern threshold, suggesting low thermal stress over the survey period. Beyond bleaching, 0.26% showed predation scarring. Overall the reef can be described as coral-dominated, with limited algal presence and moderate unconsolidated substrate.



Reef Substrate Trends. Hard coral, macroalgae and rubble cover at Dalakit, 2017-2026. Solid line is macroalgae alone; dashed adds turf, the pre-2026 published definition.

Recent change:

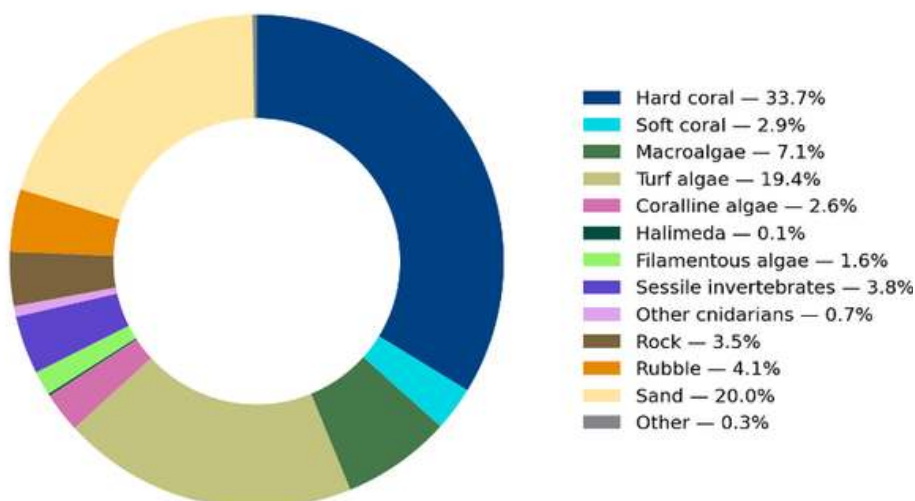
Compared with the preceding six months, hard coral cover is slightly higher (30.8 → 33.8%), macroalgae notably lower (9.3 → 7.2%), rubble notably lower (5.8 → 4.1%) and bleaching substantially lower (2.36 → 0.40%). No component moved sharply enough to suggest an acute disturbance in the period, despite super typhoon Inday and super typhoon Kiyapo inside it.



Bleaching Incidence. Bleached coral as a percentage of hard coral cover at Dalakit, by season. Combines partially and fully bleached records.

Structural implications:

Of all points recorded, 33.8% is living hard coral, 28.3% is fleshy algae competing for the same space, 24.1% is unconsolidated material (rubble and sand), 6.2% is consolidated surface available for settlement (bare rock and coralline algae) and 7.4% is occupied by other stable but non-reef-building life, soft corals, sessile invertebrates and seagrass. The combination of fair coral cover and relatively low rubble (4.1%) indicates that most of the reef framework is stable and physically suitable for coral growth and recruitment. Sand accounts for a further 20.0% of points, which is habitat rather than damage. Macroalgae has fallen against the preceding six months (-23%), which suggests algal competition is easing and more substrate is becoming available for coral settlement. That may reflect grazing pressure or simply favourable conditions, and one period is not a trend, but the direction is favourable.

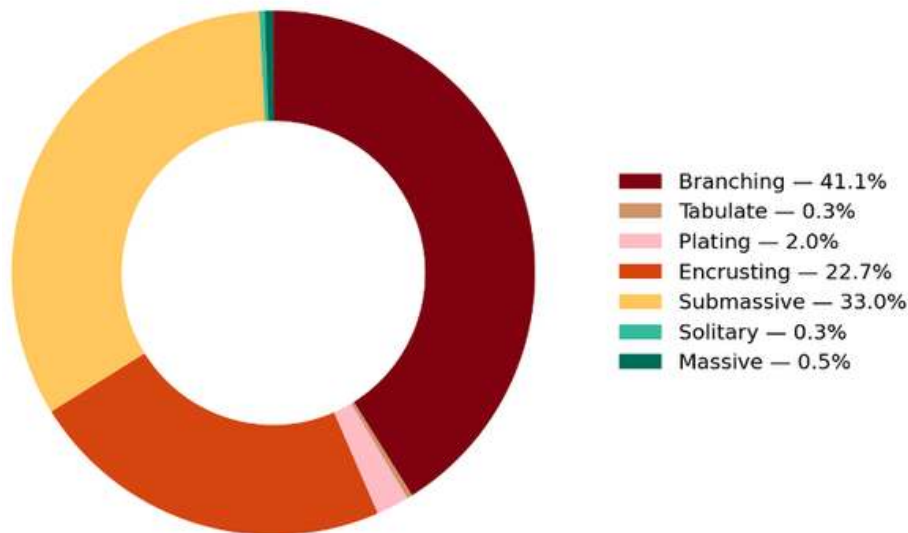


Substrate Composition. Full substrate composition, Dalakit, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged).

Within the living coral, growth form determines how much shelter the reef offers and how well it resists disturbance; this protocol records no rugosity, so growth form is the closest available proxy for structural complexity. The cover present is led by branching (41.1%), submassive (33.0%) and encrusting (22.7%).

On MCP's classification, resistance to disturbance, not shelter, 66.1% of the coral sits in low-resilience forms and 0.9% in high-resilience forms. Most of the cover is therefore in forms that provide good shelter but are first to be lost in a thermal or storm event, so the headline cover figure is more fragile than it appears.

Taken together, fair coral cover at 33.8%, macroalgae at 7.2% and rubble at 4.1%, this is a reef in a **clearly coral-dominated state**, shaped by both physical disturbance (the unconsolidated fraction) and biological competition (the algal fraction). Neither is currently at a level that would obviously prevent recovery.



Coral Growth Forms. Share of hard coral in each growth form at Dalakit, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged). Growth forms are ordered from least to most resilient: low resilience covers branching, tabulate, plating, encrusting and *Tubastraea*; medium covers columnar and submassive; high covers solitary and massive.

Long-term Context:

Against the 2017–19 baseline of 48.2% hard coral, 7.2% macroalgae and 0.9% rubble, coral cover is -30%, macroalgae -0% and rubble +337%. Coral cover peaked at 53.3% in Jun–Aug 2019 and now stands 33.8%. Bleaching peaked at 54.0% of hard coral in Jun–Aug 2022, and has remained below the 5% concern level for the last 4 seasons, since Sep–Nov 2025. Two definitions changed for this edition and are not comparable with earlier reports: macroalgae is now macroalgae alone rather than macroalgae plus turf, and bleaching is a share of hard coral rather than of all substrate points, which makes it read three to four times higher on identical observations.

Ecological Interpretation:

Dalakit ranks second of the 8 sites surveyed in the municipality on hard coral cover and third on macroalgae, counting the least algal site first. Bleaching has stayed below the concern threshold for 4 consecutive seasons, which has allowed partial stabilisation; the reef is in a phase of cautious stabilisation rather than active recovery. Of the coral present, 43.5% is in fast-growing forms (branching, tabulate, plating) and 56.2% in slow, robust ones (massive, submassive, encrusting).

That ratio sets how quickly cover can rebuild and how much survives a disturbance, and the two pull against each other: the fast forms drive recovery but are the first lost, the slow ones persist but add cover at a fraction of the rate. A cover figure held up mostly by slow forms is stable but will rebuild slowly from any loss, so recovery here should be measured in decades rather than seasons. For every point of substrate a coral larva could settle on, there are 4.6 points already held by fleshy algae. Settlement space is the binding constraint on recovery here, not larval supply: even a good recruitment year has little bare ground to land on.

Of the pressures acting here, the ones open to local action are enforcement, the herbivore populations that hold algae down, and the physical impacts that break coral and make rubble, anchoring, destructive fishing and trampling. Thermal stress is not one of them, which is why the bleaching figure is reported as context rather than as something to manage.

DALAKIT MPA

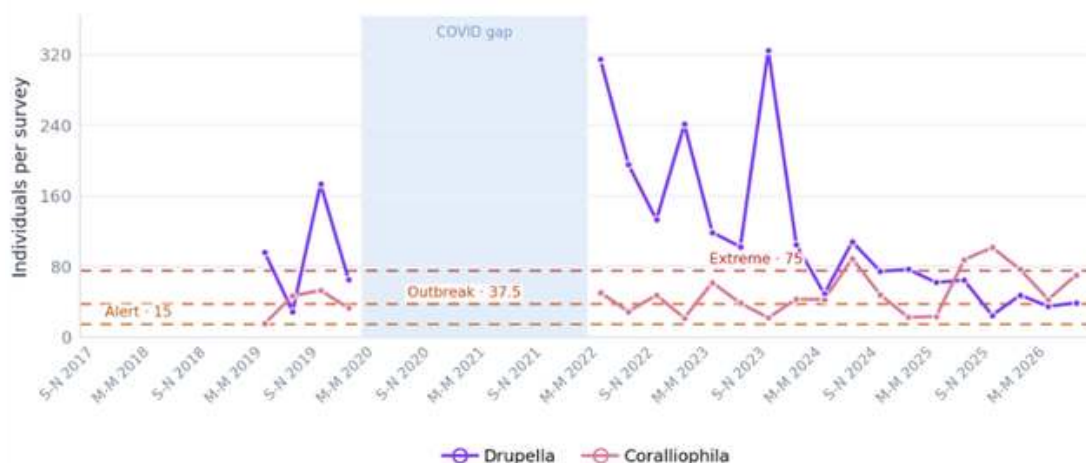
Predation and Marine Debris



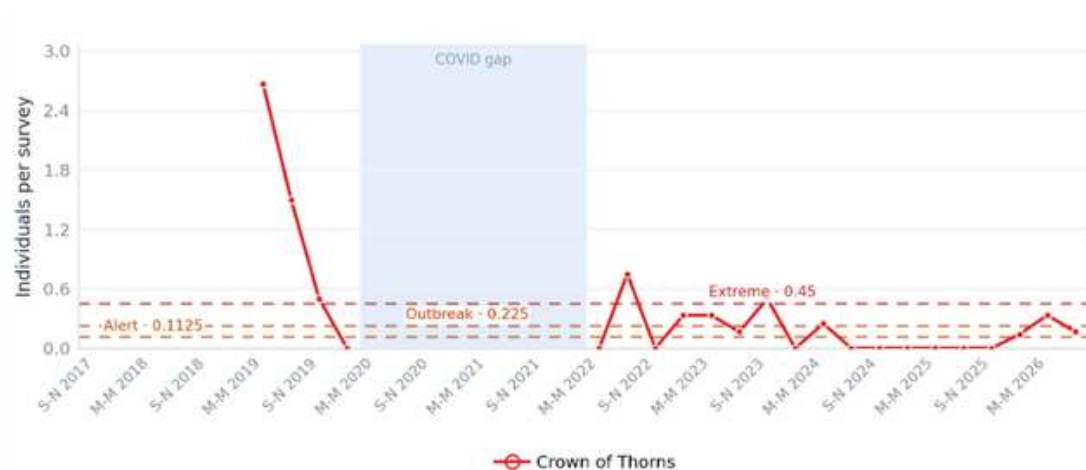
Current Status:

Drupella averaged **36.8 per survey** (above the alert threshold) and Coralliophila **56.5** (above the outbreak threshold), giving a combined corallivorous snail load of 93.3 per survey. Crown of Thorns averaged 0.250 per survey (above the outbreak threshold).

Marine debris averaged **6.83 items per survey**. By category it breaks down as household & sanitary 3.33 (49%), consumer plastics 1.83 (27%) and fishing gear 1.67 (24%). The categories are mutually exclusive and sum to the total, so nothing is double-counted between them. Household & sanitary is the largest category at 49% of items, ahead of fishing gear. That points at a land-based source, waste reaching the reef from shore or from rivers, which is a municipal collection and drainage problem rather than a fisheries one.



Coral Predators. Corallivorous snail abundance at Dalakit, 2017-2026. Drupella and Coralliophila share one threshold set and one axis. Dashed rules mark MCP management thresholds — alert 15, outbreak 37.5, extreme 75 per survey.



Crown of Thorns. Crown of Thorns abundance at Dalakit, 2017-2026. Dashed rules mark MCP management thresholds for Crown of Thorns (alert 0.1125, outbreak 0.225, extreme 0.45 per survey).

Recent Change:

Against the preceding six months, *Drupella* is little changed (36.2 → 36.8), *Coralliophila* substantially lower (89.2 → 56.5), Crown of Thorns substantially higher (0.071 → 0.250) and debris notably higher (5.88 → 6.83 items per survey).



Marine Debris. Marine debris at Dalakit, current reporting period. The centre figure is total items per survey and the ring is what that total is made of; the categories are mutually exclusive, so the slices sum to the centre figure. The sparkline is the site's own total debris per survey across the full record, 2017–2026, with the COVID gap left empty.

Long-term Context:

The 2017–19 baseline is 62.7 *Drupella*, 31.0 *Coralliophila* and 2.083 Crown of Thorns per survey, with 2.46 debris items. Current levels stand -41%, +82%, -88% and +178% against those. *Drupella* peaked at 324.5 per survey in Sep–Nov 2023. These figures pool all depths. *Drupella* is roughly eleven times more abundant shallow than deep, so we have a depth-resolved workbook, where we can detect outbreaks in the shallows.

Ecological Interpretation:

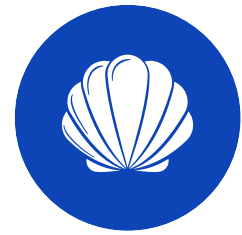
Combined snail abundance is at outbreak level. *Drupella* and *Coralliophila* aggregate on already-stressed colonies, so high counts often follow coral damage rather than initiate it, but once aggregated they suppress the recovery of the colonies that survived. Crown of Thorns is at or above its outbreak threshold. Unlike the snails it can remove substantial cover quickly and is the predator for which direct removal is usually justified. Read against the coral actually present, the load is 2.8 corallivorous snails per percentage point of hard coral cover. That ratio matters more than the raw count: the same number of snails on half the coral is twice the pressure per colony, so a site losing cover while snail numbers hold steady is under increasing predation even though the indicator looks flat. Only 0.26% of hard coral shows predation scarring, which is low relative to the snail abundance recorded. Snails aggregate on a few colonies rather than spreading across the reef, so a high count with little visible scarring is consistent with localised feeding fronts rather than reef-wide pressure, worth confirming with a targeted search rather than assumed.

On management: corallivorous snails can be removed by hand and that is the standard response above outbreak level, but removal only works if it is repeated, the snails recruit from surrounding reef and a single clearance is recolonised. Directing effort at the aggregations on living coral, rather than spreading it across the site, is what makes the effort worthwhile.

Most of the debris is land-based rather than lost gear, which places the response with municipal waste collection and drainage rather than with the fishery. Land-based debris also arrives in pulses after rain, so the timing of the surveys relative to the last heavy rainfall affects what was counted.

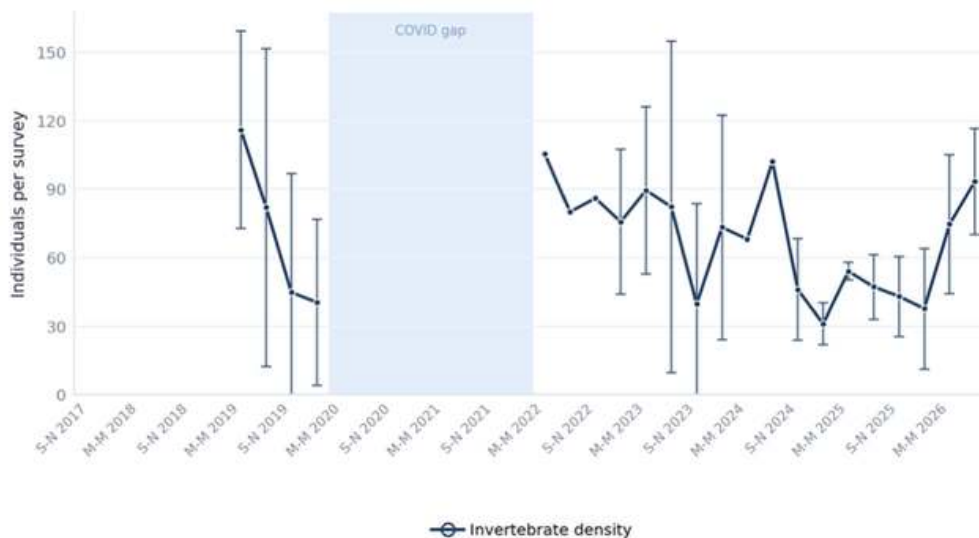
DALAKIT MPA

Invertebrate Status

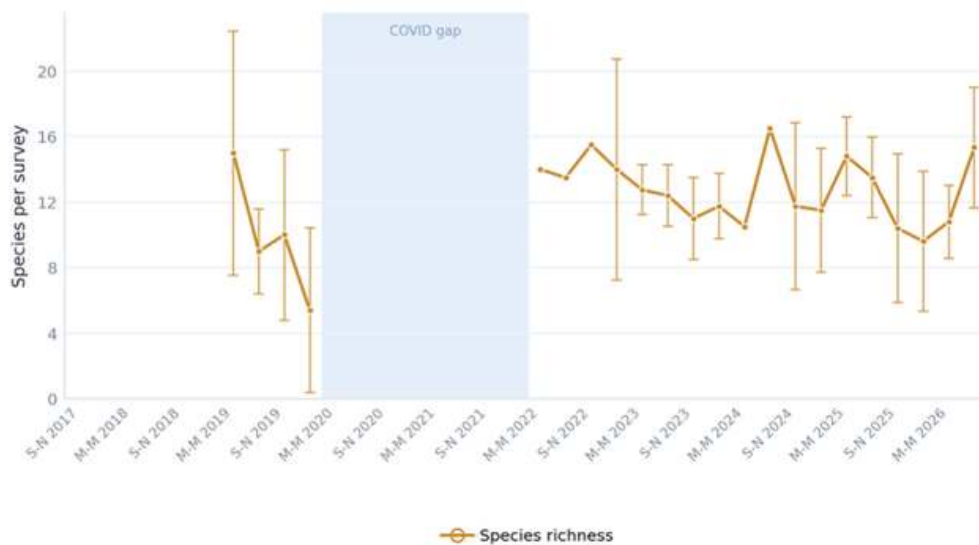


Current Status:

Dalakit supported an average invertebrate density of **84 individuals per survey**, drawn from **13.1 distinct species per survey**.



Invertebrate Density. Total invertebrate density at Dalakit, 2017-2026.



Invertebrate Species Richness. Invertebrate species richness at Dalakit, 2017-2026.

Recent Change:

Against the preceding six months, density is substantially higher (40.3 → 84.0 per survey), richness substantially higher (10.0 → 13.1 species) and commercially important species substantially higher (33.4 → 75.3).

Commercial Groups:

Commercially important invertebrates averaged 75.3 per survey, 89.7% of all invertebrates counted. Within the key harvested groups, urchins averaged 61.4 per survey, sea cucumbers 0.00 and giant clams 3.85. Those ten total 74.63 individuals per survey, 89% of all invertebrates counted, led by Urchin - Diadema at 53.23 per survey. The community is dominated by sea urchins. Their grazing helps keep settlement space open for coral recruitment, so high urchin abundance is a mixed signal rather than a bad one, beneficial for recruitment, but at sustained high density urchins also erode reef framework.

Most abundant invertebrate taxa. The ten most abundant invertebrates (left), and the ten most abundant commercially important invertebrates (right) by density at Dalakit.

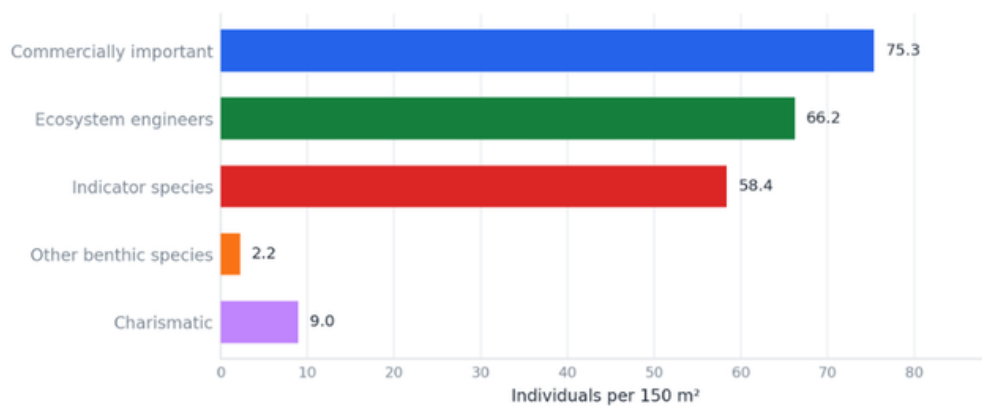
Top 10 Invertebrates	Individuals per 150 m ²	Top 10 Commercial	Individuals per 150 m ²
Urchin - Diadema	53.23	Urchin - Diadema	53.23
Urchin - Rock Boring	7.77	Urchin - Rock Boring	7.77
Giant Clam	3.68	Giant Clam	3.68
Nudibranch	1.92	Other Bivalve	1.85
Other Bivalve	1.85	Other Shell	1.67
Other Shell	1.67	Cone Shell	1.52
Cone Shell	1.52	Pearl Oyster	1.42
Pearl Oyster	1.42	Cowrie - Other	1.33
Sea Star	1.37	Conch - Scorpion Spider	1.17
Cowrie - Other	1.33	Turban - Other	1

Functional Groups:

Per survey: ecosystem engineers 66.2, sensitive indicator species 58.4, charismatic species 9.0, benthic associates and predators 2.2. These groups overlap by design, a species can be both commercially important and charismatic, so they do not sum to total invertebrate density. A relatively high abundance of sensitive indicator species suggests conditions still suitable for disturbance-intolerant taxa; a high abundance of ecosystem engineers, mostly urchins, indicates that herbivory and bioerosion are active processes here.

Long-term Context:

The 2017–19 baseline is 99.0 individuals and 12.0 species per survey. Density stands -15% against that and richness +9%. Richness figures in editions before 2026 divided a pooled species list by the number of surveys, which fell as survey effort rose. They are not comparable with these.



Invertebrate Functional Groups. Invertebrate functional group density, Dalakit, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged).

Ecological Interpretation:

Dalakit ranks first of the 8 sites surveyed in the municipality on invertebrate density and first on species richness. Urchin abundance is high. Urchins are effective algal grazers and keep settlement space open, but at sustained high density they also erode reef framework, so the benefit is not unbounded. 90% of the invertebrates counted are on the commercially important list. A community that is mostly harvestable taxa is not automatically healthy, it usually means the abundant species happen to be targeted ones, here urchins, rather than that the harvested stocks are in good condition. The giant clam and sea cucumber figures are the better test of that, because they are the taxa fishers take first.

Each species contributes 6.4 individuals per survey on average. A rising figure with flat richness means the same few taxa are becoming more abundant rather than the community broadening, which is the pattern that precedes an urchin-dominated reef. Invertebrate grazers now outnumber herbivorous fish here (61.4 urchins against 25.5 herbivorous fish per survey, damselfish set aside). Urchins and herbivorous fish are partial substitutes, but not equivalent: urchins graze slowly and erode limestone as they feed, so a reef whose grazing has shifted to invertebrates loses algae and framework at the same time. It is also a less stable arrangement, because urchin populations boom and crash on disease in a way fish populations do not. Giant clams at 3.85 per survey are present in numbers that suggest the site is not being systematically gleaned. They are among the first taxa to disappear under collection pressure, so their presence is a more informative sign than total density.

DALAKIT MPA

Tourism Value



Touristic Species		Mean Encounter Rate (%)	
Barracudas	8.3	Scorpaenidae	50
Cephalopods	5.6	Sharks	0
Cowries	30.6	Shrimps	62.5
Eels and Snakes	52.8	Slugs	65.3
Frogfish	0	Stingrays	18.1
Giant Clams	86.1	Syngnathidae and Pegasidae	5.6
Porcupinefish and Pufferfish	90.3	Turtles	0

Touristic species encounter rates. The percentage of dives at Dalakit in which each touristic group was recorded, current reporting period.

Dalakit MPA is particularly notable for its high abundance of giant clams, which remain one of the site's strongest tourism assets. The site also supports a diverse reef community, with fish often occurring in substantial numbers, including groups of adolescent snapper and surgeonfish. Although Dalakit is not particularly well known for large charismatic species, its extensive reef and sandy areas provide a different diving experience focused more strongly on benthic biodiversity and reef-associated fauna.

Dalakit demonstrates strong tourism potential, with exceptionally high encounter rates for giant clams (86.1%), the highest recorded across all monitored sites in Zamboanguita, more than two and a half times any other site, and more than three times the municipal average of 27.3%. Porcupinefish and pufferfish (90.3%) were also observed in the vast majority of dives, while shrimps (62.5%) and slugs (65.3%) provide further opportunities for macro-divers and underwater photographers. Eels and snakes (52.8%) and Scorpaenidae (50.0%) add additional reef-fish diversity, while cowries (30.6%) contribute to the site's broader invertebrate appeal.

Dalakit also stands out for its relatively frequent stingray encounters, which were recorded in 18.1% of dives, representing the highest stingray encounter rate among the monitored sites in Zamboanguita and four times the municipal average. In contrast, no turtles, sharks or frogfish were recorded during the monitoring period. Dalakit is the only site in either municipality with no turtle records at all, while barracudas (8.3%), cephalopods (5.6%) and syngnathids and pegasids (5.6%) were encountered less frequently.

The absence of turtles may be associated with the extensive sandy areas surrounding the reef and the limited availability of seagrass habitat, which can provide important foraging areas for turtles.

Overall, Dalakit offers a distinctive tourism experience centred on abundant benthic and reef-associated fauna rather than large charismatic species. Its exceptionally high giant clam encounter rate, combined with very frequent porcupinefish and pufferfish sightings and strong occurrences of shrimps, slugs, and eels and snakes, provides a reliable foundation for reef and macro-diving. The relatively frequent stingray encounters add an additional megafauna attraction, although opportunities for turtles and other large animals remain limited. Dalakit is therefore particularly well suited to divers interested in reef biodiversity, giant clams, macrofauna and underwater photography, offering a complementary experience to sites where charismatic megafauna are more prominent.

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

Indicators At A Glance



Guinsuan is a **marine protected area** in Zamboanguita. Hard coral cover is **14.1%** (poor on the national classification) and commercial fish biomass **10.90 kg per 150 m²**. This period rests on **30 surveys**, with 29 seasons on record since 2017.

Hard Coral Cover	Commercial Biomass	Fish Density	Bleaching
14.1% of substrate	10.9 kg / 150 m ²	1133.5 / 150 m ²	1.89% of hard coral
— 4%	▲ +73%	▲ +38%	▲ +114%

Guinsuan indicators at a glance. Every headline indicator for Guinsuan, current reporting period, against this site's own preceding six months and the Zamboanguita average for the same period. Colour is keyed to whether the movement is favourable rather than to whether the number rose. Green indicates improvement, red indicates decline — e.g. macroalgae, rubble, bleaching or debris rising reads red, coral cover rising reads green. A change smaller than 5% is shown as flat.

Indicator	Current	Prior 6 months	Change	Zamboanguita Average
Hard coral cover (%)	14.1	14.7	— -4%	24.6
Macroalgae cover (%)	12.7	10.1	▲ +25%	10.5
Rubble (%)	11	8.8	▲ +24%	12.9
Bleaching (of hard coral) (%)	1.89	0.88	▲ +114%	1.96
Total fish density (per 150 m ²)	1,133	822	▲ +38%	727
Commercial fish biomass (kg per 150 m ²)	10.9	6.3	▲ +73%	17.82
Invertebrate density (per survey)	26.1	18.9	▲ +38%	38.8
Invertebrate species richness (species per survey)	9.5	7.4	▲ +27%	10.1
Coral predators (per survey)	10.3	10.8	— -5%	38.7
Marine debris (items per survey)	3.3	2.56	▲ +29%	2.77

What moved this period:

- Bleaching (of hard coral) substantially higher (+114%) — unfavourable
- Commercial fish biomass substantially higher (+73%) — favourable
- Invertebrate density substantially higher (+38%) — favourable

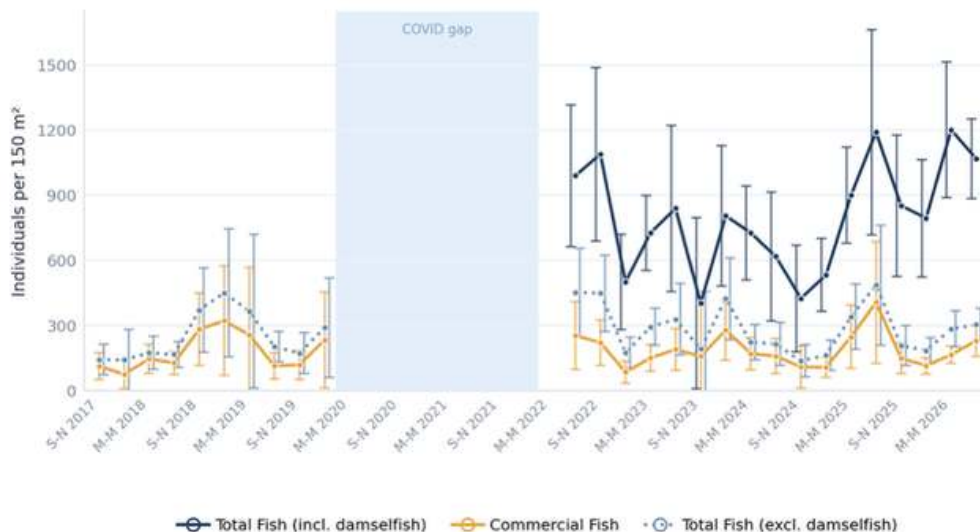
GUINSUAN MPA

Food Security

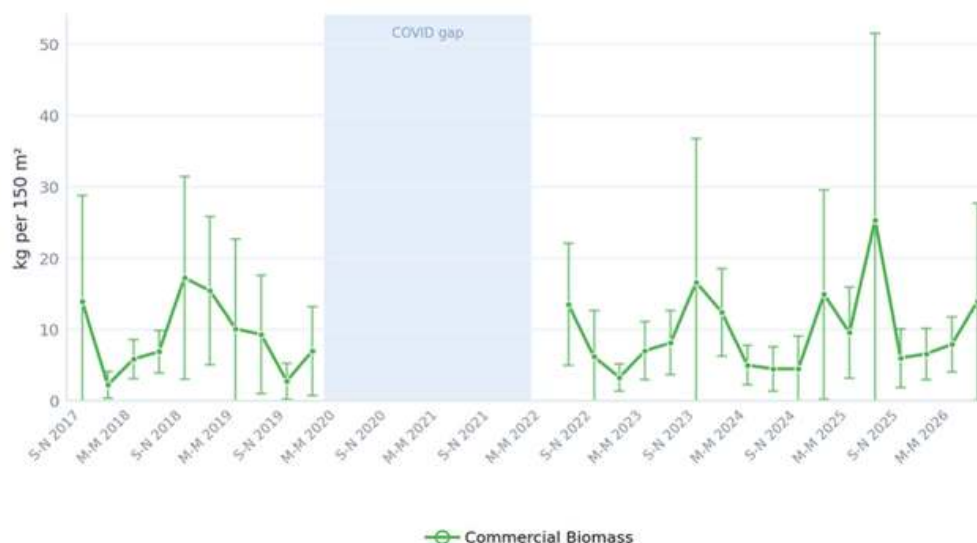


Current Status:

In March–August 2026, Guinsuan recorded an average total fish density of **1,133.5 individuals per 150 m²**, with commercial species contributing **197.9 individuals per 150 m²**. Commercial biomass averaged **10.90 kg per 150 m²**, equivalent to roughly **726 kg per hectare**, which sits in the moderately high range for the program. By dietary group the assemblage was led by herbivores (~848.8 ind.), carnivores (~147.7 ind.), planktivores (~99.0 ind.), corallivores (~19.7 ind.), detritivores (~7.8 ind.), omnivores (~5.6 ind.) and parasitivores (~4.9 ind.), so herbivores dominate the fish community at this scale.



Fish Density Trends. Total and commercial fish density at Guinsuan, 2017–2026.



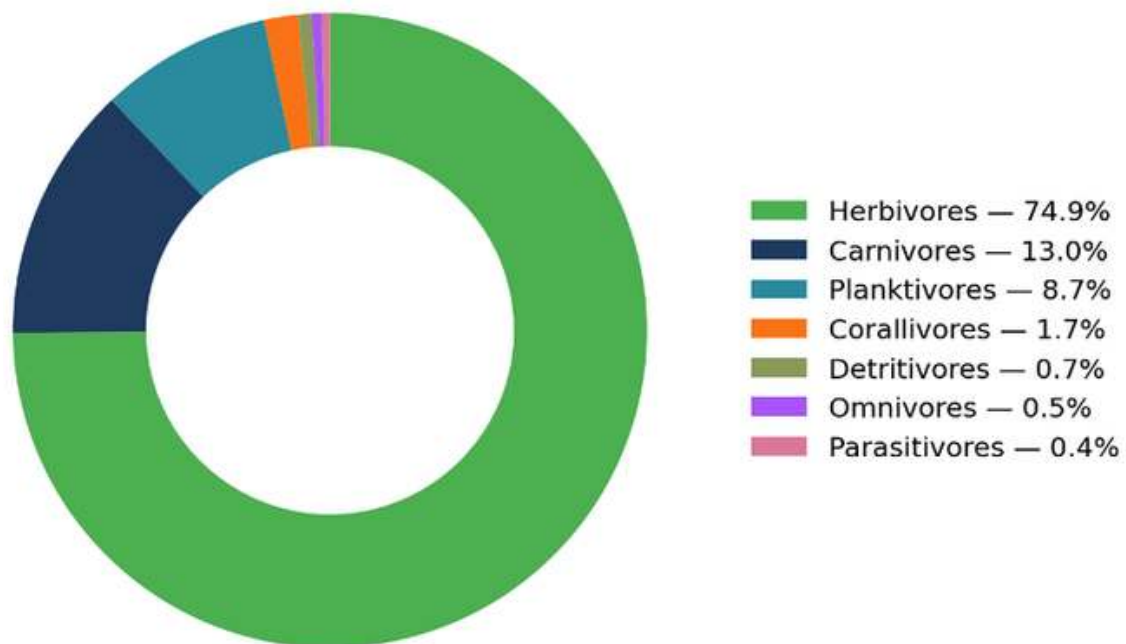
Commercial Biomass Trends. Commercial fish biomass at Guinsuan, 2017–2026.

Recent Change:

Against the preceding six months, total fish density is substantially higher (822.3 → 1,133.5 individuals per 150 m² including damselfish, 196.6 → 294.3 excluding them), commercial density substantially higher (132.3 → 197.9) and commercial biomass substantially higher (6.30 → 10.90 kg per 150 m²). Within the assemblage, herbivores moved 637.4 → 848.8, carnivores moved 80.7 → 147.7 and planktivores moved 77.9 → 99.0 individuals per 150 m².

Dietary Groups:

By share of individuals the community is herbivores (74.9%), carnivores (13.0%) and planktivores (8.7%), with the remaining groups together making up 3.3%. Trophic structure matters because grazing species control algal growth and so mediate the competition between coral and algae described in the next section.



Dietary Composition. Share of fish recorded in each dietary group, Guinsuan, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged).

Commercial Groups:

The ten commercial fish families contributing most to biomass at Guinsuan this period are listed on the following page. Sub-types are rolled into their family. **Snapper** is the largest single contributor at 4.10 kg per 150 m², 39.1% of commercial biomass. Larger predatory taxa (Snapper) are present but at lower densities, so commercial biomass is carried largely by mid-sized and schooling species rather than by large predators. That is the pattern expected on reefs under fishing pressure, where the largest predatory fish are removed first.

Long-term Context:

The 2017–19 baseline for Guinsuan is 10.11 kg per 150 m² of commercial biomass and 251.7 fish per 150 m². Current biomass stands +8% against that baseline and density +17%. The highest commercial biomass on record here was 25.30 kg per 150 m² in Jun–Aug 2025. Current levels are 57% below it.

Top commercial fish families. The ten commercial fish families contributing most to biomass at Guinsuan, current reporting period, with the share of commercial biomass each carries. Sub-types are rolled into their family.

Commercial Families	Biomass (kg/ 150 m ²)	Density (ind./150 m ²)	% of Commercial Biomass
Snapper	4.1	25	39.1
Damselfish - Sergeantfish	1.59	13.6	15.1
Wrasse - Other	1.37	82.3	13
Bream	0.71	15.7	6.8
Bristletooth	0.47	7.9	4.5
Fusilier	0.45	14.1	4.3
Goatfish	0.31	14.7	3
Parrotfish	0.3	6	2.9
Surgeonfish	0.19	1.2	1.8
Triggerfish	0.17	1.9	1.6

Damselfish entered the list in 2022, so only the damselfish-excluded series is comparable across the full period; and fish size bins changed in 2025 with both schemes running side by side through 2025–26, which biases early biomass slightly low.

Ecological Interpretation:

Guinsuan ranks fifth of the 8 sites surveyed in the municipality on commercial biomass this period. Herbivores are only 8.1% of the fish counted once damselfish are set aside, a thin grazing guild for a reef of this type. Damselfish do not make up the difference: they defend small algal territories rather than grazing the reef broadly, so they add to the herbivore count without adding much grazing pressure.

GUINSUAN MPA

Reef Health And Resilience

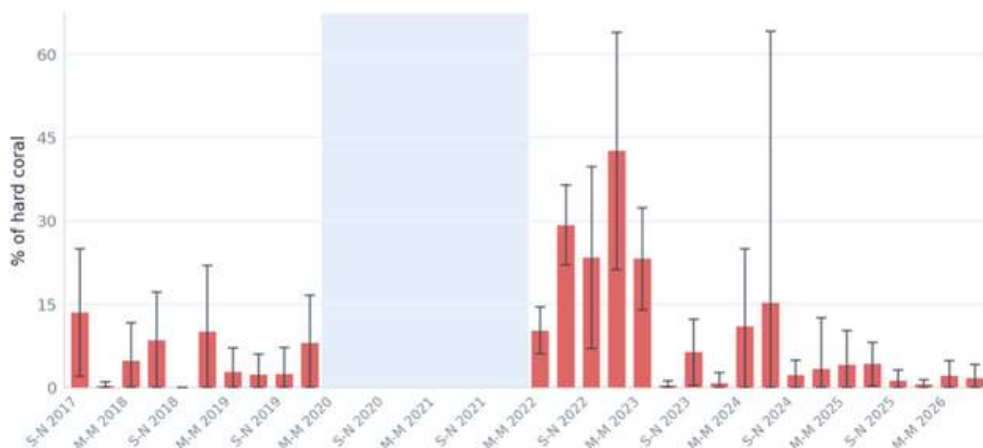


Current status:

During March–August 2026, Guinsuan recorded an average hard coral cover of **14.1%**, macroalgae of **12.7%** (17.9% once turf is included) and rubble of **11.0%**. Coral cover places the reef in the poor band of the Philippine classification. Bleaching affected 1.89% of hard coral, below the 5% level conventionally treated as a concern threshold, suggesting low thermal stress over the survey period. Beyond bleaching, 0.48% showed predation scarring; 0.06% was recently killed, as a share of all points. Overall the reef can be described as structurally mixed, with noticeable algal presence and moderate unconsolidated substrate.



Reef Substrate Trends. Hard coral, macroalgae and rubble cover at Guinsuan, 2017–2026. Solid line is macroalgae alone; dashed adds turf, the pre-2026 published definition.



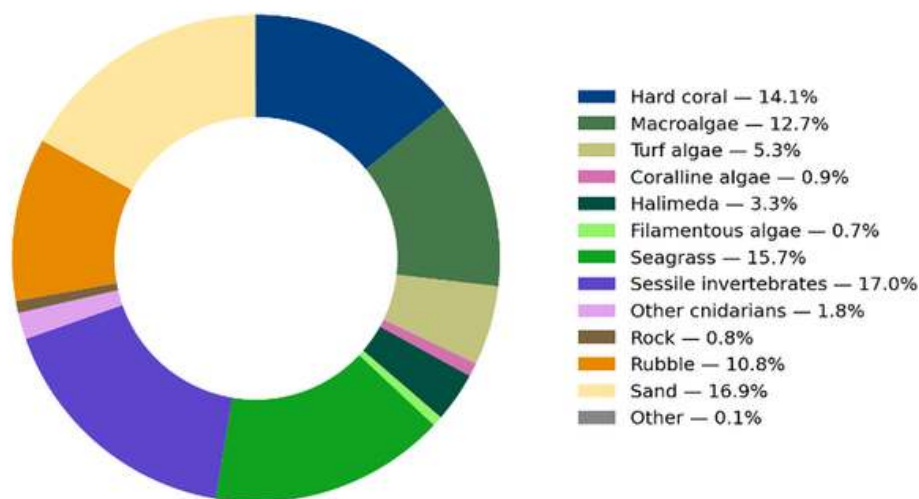
Bleaching Incidence. Bleached coral as a percentage of hard coral cover at Guinsuan, by season. Combines partially and fully bleached records.

Recent Change:

Compared with the preceding six months, hard coral cover is little changed (14.7 → 14.1%), macroalgae notably higher (10.1 → 12.7%), rubble notably higher (8.8 → 11.0%) and bleaching substantially higher (0.88 → 1.89%). Taken together this indicates increased algal presence and more unconsolidated substrate. Super Typhoon Inday and Super Typhoon Kiyapo crossed the area inside this reporting period, so physical damage is the first explanation to test for any of this, storm breakage converts standing coral into rubble directly, where gradual pressure does not.

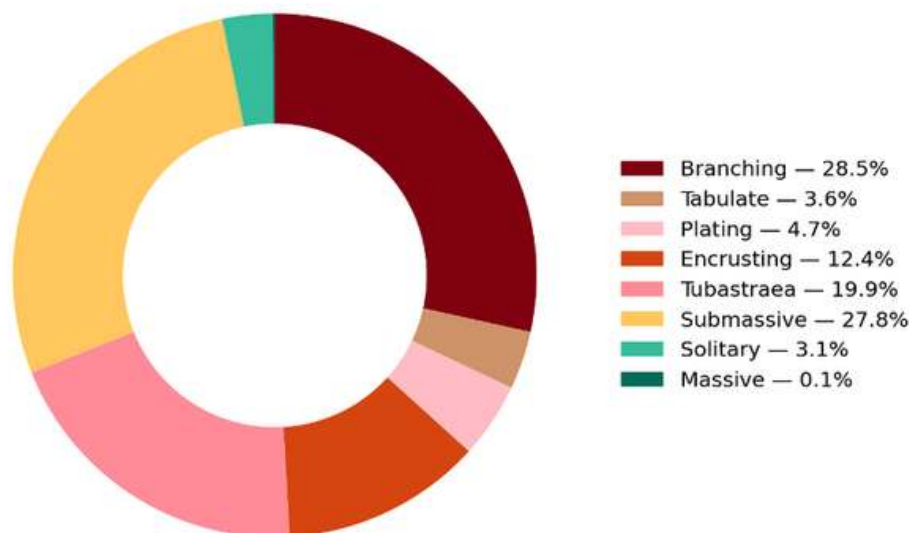
Structural Implications:

Of all points recorded, 14.1% is living hard coral, 21.9% is fleshy algae competing for the same space, 27.7% is unconsolidated material (rubble and sand), 1.7% is consolidated surface available for settlement (bare rock and coralline algae) and 34.4% is occupied by other stable but non-reef-building life, soft corals, sessile invertebrates and seagrass. The combination of poor coral cover and relatively low rubble (11.0%) indicates that most of the reef framework is stable and physically suitable for coral growth and recruitment. Sand accounts for a further 16.9% of points, which is habitat rather than damage. Macroalgae has risen against the preceding six months (+25%), so competition for settlement space is intensifying rather than easing. Fleshy algae pre-empt the surfaces coral larvae need and deter grazers once established, which is how a reef gets held on the algal side rather than crossing back.



Substrate Composition. Full substrate composition, Guinsuan, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged).

Within the living coral, growth form determines how much shelter the reef offers and how well it resists disturbance; this protocol records no rugosity, so growth form is the closest available proxy for structural complexity. The cover present is led by branching (28.5%), submassive (27.8%) and tubastraea (19.9%). On MCP's classification, resistance to disturbance, not shelter, 68.9% of the coral sits in low-resilience forms and 3.2% in high-resilience forms.



Coral Growth Forms. Share of hard coral in each growth form at Guinsuan, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged). Forms are ordered from least to most resilient: low resilience covers branching, tabulate, plating, encrusting and Tubastraea; medium covers columnar and submassive; high covers solitary and massive.

Most of the cover is therefore in forms that provide good shelter but are first to be lost in a thermal or storm event, so the headline cover figure is more fragile than it appears. Taken together, poor coral cover at 14.1%, macroalgae at 12.7% and rubble at 11.0%, this is a reef in a transitional state, shaped by both physical disturbance (the unconsolidated fraction) and biological competition (the algal fraction). Algal competition is the binding constraint here; the substrate itself is stable enough to support recruitment if that competition eases.

Long-term Context:

Against the 2017–19 baseline of 17.3% hard coral, 6.0% macroalgae and 3.7% rubble, coral cover is -18%, macroalgae +113% and rubble +198%. Coral cover peaked at 26.2% in Dec–Feb 2017/18 and now stands 14.1%. Bleaching peaked at 42.6% of hard coral in Dec–Feb 2022/23, and has remained below the 5% concern level for the last 8 seasons, since Sep–Nov 2024. Two definitions changed for this edition and are not comparable with earlier reports: macroalgae is now macroalgae alone rather than macroalgae plus turf, and bleaching is a share of hard coral rather than of all substrate points, which makes it read three to four times higher on identical observations.

Ecological Interpretation:

Guinsuan ranks eighth of the 8 sites surveyed in the municipality on hard coral cover and sixth on macroalgae, counting the least algal site first. Bleaching has stayed below the concern threshold for 8 consecutive seasons, which has allowed partial stabilisation; the reef is in a phase of cautious stabilisation rather than active recovery. With cover in the poor band this reef has little margin: a single disturbance removes a large share of what remains, and recovery from a low base is slow. Of the coral present, 36.7% is in fast-growing forms (branching, tabulate, plating) and 40.3% in slow, robust ones (massive, submassive, encrusting).

That ratio sets how quickly cover can rebuild and how much survives a disturbance, and the two pull against each other: the fast forms drive recovery but are the first lost, the slow ones persist but add cover at a fraction of the rate. A cover figure held up mostly by slow forms is stable but will rebuild slowly from any loss, so recovery here should be measured in decades rather than seasons. For every point of substrate a coral larva could settle on, there are 12.9 points already held by fleshy algae. Settlement space is the binding constraint on recovery here, not larval supply: even a good recruitment year has little bare ground to land on.

Of the pressures acting here, the ones open to local action are enforcement, the herbivore populations that hold algae down, and the physical impacts that break coral and make rubble, anchoring, destructive fishing and trampling. Thermal stress is not one of them, which is why the bleaching figure is reported as context rather than as something to manage.

GUINSUAN MPA

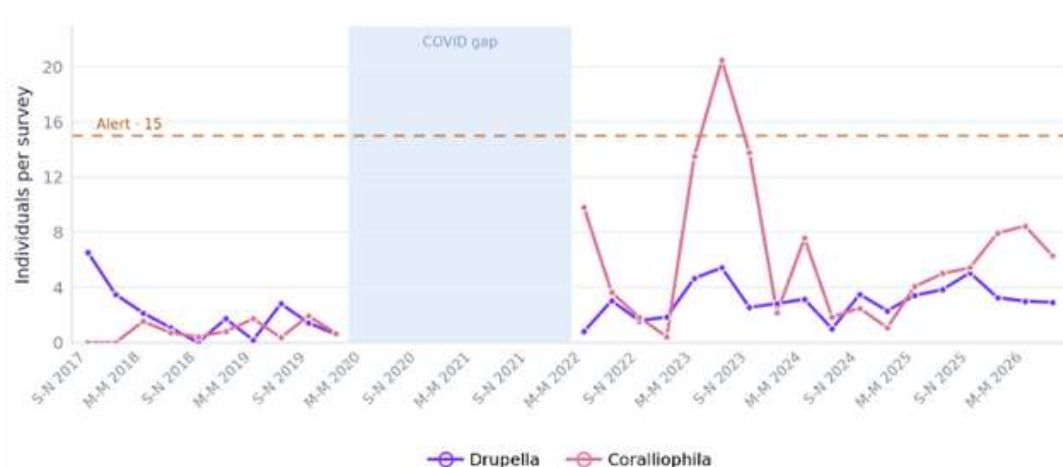
Predation and Marine Debris



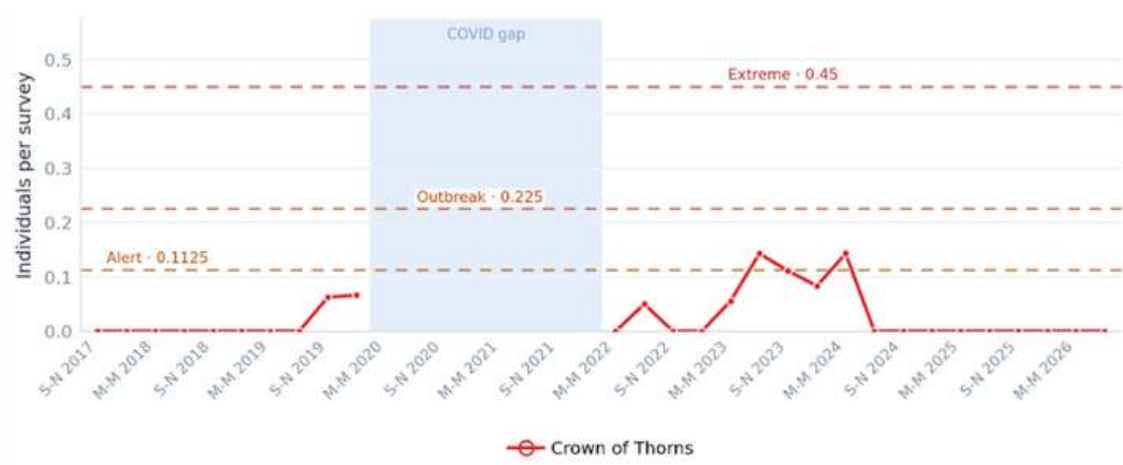
Current Status:

Drupella averaged **3.0 per survey** (below the alert threshold) and *Coralliophila* 7.4 (below the alert threshold), giving a combined corallivorous snail load of 10.3 per survey. Crown of Thorns averaged 0.000 per survey (below the alert threshold).

Marine debris averaged **3.30 items per survey**. By category it breaks down as fishing gear 1.97 (60%), consumer plastics 1.11 (34%) and household & sanitary 0.22 (7%). The categories are mutually exclusive and sum to the total, so nothing is double-counted between them. Fishing gear is the largest category at 60% of items. That is a sea-based source: gear lost or discarded by boats working the reef, which responds to gear marking, retrieval dives and work with fishers rather than to municipal waste collection.



Coral Predators. Corallivorous snail abundance at Guinsuan, 2017-2026. *Drupella* and *Coralliophila* share one threshold set and one axis. Dashed rules mark MCP management thresholds — alert 15, outbreak 37.5, extreme 75 per survey.



Crown of Thorns. Crown of Thorns abundance at Guinsuan, 2017-2026. Dashed rules mark MCP management thresholds for Crown of Thorns (alert 0.1125, outbreak 0.225, extreme 0.45 per survey).

Recent Change:

Against the preceding six months, *Drupella* is notably lower (4.2 → 3.0), *Coralliophila* slightly higher (6.7 → 7.4), Crown of Thorns not comparable (0.000 → 0.000) and debris notably higher (2.56 → 3.30 items per survey).



Marine Debris. Marine debris at Guinsuan, current reporting period. The centre figure is total items per survey and the ring is what that total is made of; the categories are mutually exclusive, so the slices sum to the centre figure. The sparkline is the site's own total debris per survey across the full record, 2017–2026, with the COVID gap left empty.

Long-term Context:

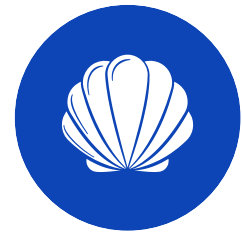
The 2017–19 baseline is 2.2 *Drupella*, 0.7 *Coralliophila* and 0.000 Crown of Thorns per survey, with 3.47 debris items. Current levels stand +32%, +957%, and -5% against those. *Drupella* peaked at 6.5 per survey in Sep–Nov 2017. These figures pool all depths. *Drupella* is roughly eleven times more abundant shallow than deep, so we have a depth-resolved workbook, where we can detect outbreaks in the shallows.

Ecological Interpretation:

Corallivore abundance sits below the thresholds that would trigger management action. More than half the debris recorded (59.7%) is fishing gear. That is a different management problem from land-based waste: it points at gear loss by fishers working the reef and responds to gear marking, retrieval and fisher engagement rather than to municipal waste collection. The debris is a fisheries problem before it is a waste problem. Lost gear keeps fishing after it is lost, so it is both a debris indicator and a mortality source, and it accumulates on exactly the structure that snags it, the high-relief coral that matters most. Gear marking and retrieval dives address it; municipal collection does not.

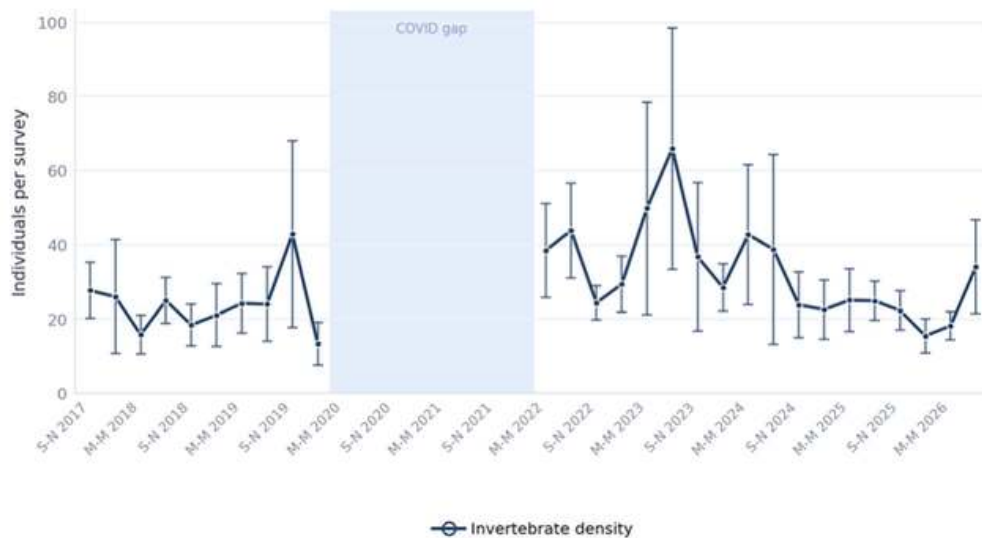
GUINSUAN MPA

Invertebrate Status



Current Status:

Guinsuan supported an average invertebrate density of **26.1 individuals per survey**, drawn from **9.5 distinct species per survey**.



Invertebrate Density. Total invertebrate density at Guinsuan, 2017-2026.



Invertebrate Species Richness. Invertebrate species richness at Guinsuan, 2017-2026.

Recent Change:

Against the preceding six months, density is substantially higher (18.9 → 26.1 per survey), richness notably higher (7.4 → 9.5 species) and commercially important species substantially higher (5.6 → 10.9).

Commercial Groups:

Commercially important invertebrates averaged 10.9 per survey, 41.6% of all invertebrates counted. Within the key harvested groups, urchins averaged 4.3 per survey, sea cucumbers 2.82 and giant clams 0.03. Those ten total 10.40 individuals per survey, 40% of all invertebrates counted, led by Urchin - Diadema at 3.60 per survey.

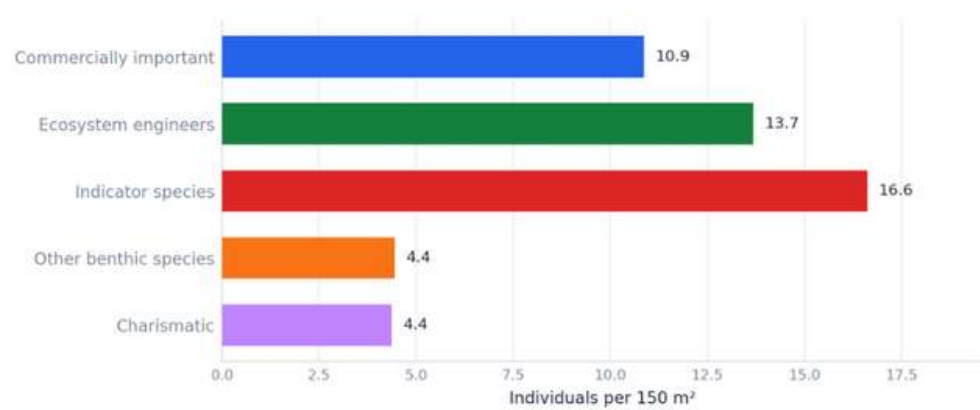
Most abundant invertebrate taxa. The ten most abundant invertebrates (left), and the ten most abundant commercially important invertebrates (right) by density at Guinsuan.

Top 10 Invertebrates	Individuals per 150 m ²	Top 10 Commercial	Individuals per 150 m ²
Sea Star	6.15	Urchin - Diadema	3.6
Urchin - Diadema	3.6	Sea Cucumber - Pinkfish	2.82
Lionfish	2.86	Cone Shell	0.78
Sea Cucumber - Pinkfish	2.82	Other Shell	0.74
Nudibranch	1.69	Urchin - Rock Boring	0.69
Cleaner Shrimp - Banded Coral	1.57	Other Bivalve	0.59
Porcupinefish	1.07	Cowrie - Tiger	0.44
Cone Shell	0.78	Pearl Oyster	0.35
Other Shell	0.74	Mantis Shrimp	0.24
Urchin - Rock Boring	0.69	Conch - Scorpion Spider	0.14

Functional Groups:

Per survey: ecosystem engineers 13.7, sensitive indicator species 16.6, charismatic species 4.4, benthic associates and predators 4.4. These groups overlap by design, a species can be both commercially important and charismatic, so they do not sum to total invertebrate density. A relatively high abundance of sensitive indicator species suggests conditions still suitable for disturbance-intolerant taxa; a high abundance of ecosystem engineers, mostly urchins, indicates that herbivory and bioerosion are active processes here.

Invertebrate Functional Groups.
Invertebrate functional group density, Guinsuan, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged).



Long-term Context:

The 2017–19 baseline is 22.8 individuals and 5.7 species per survey. Density stands +15% against that and richness +65%. Richness figures in editions before 2026 divided a pooled species list by the number of surveys, which fell as survey effort rose. They are not comparable with these.

Ecological Interpretation:

Guinsuan ranks sixth of the 8 sites surveyed in the municipality on invertebrate density and fifth on species richness. Low urchin abundance alongside substantial macroalgal cover suggests grazing capacity here rests with herbivorous fish rather than with invertebrates, and that it is not currently sufficient to hold algae down. Each species contributes 2.8 individuals per survey on average. A rising figure with flat richness means the same few taxa are becoming more abundant rather than the community broadening, which is the pattern that precedes an urchin-dominated reef.

Herbivorous fish still outnumber urchins (23.8 against 4.3 per survey), so grazing pressure remains mostly in the fish community. That is the more stable arrangement of the two, and it is worth protecting: herbivorous fish crop algae without eroding the framework the way urchins do.

GUINSUAN MPA

Tourism Value



Touristic Species	Mean Encounter Rate (%)		
Barracudas	1.7	Scorpaenidae	80.1
Cephalopods	10.9	Sharks	0
Cowries	24	Shrimps	60.4
Eels and Snakes	52.7	Slugs	56.5
Frogfish	16.1	Stingrays	2.9
Giant Clams	14.4	Syngnathidae and Pegasidae	4.8
Porcupinefish and Pufferfish	98.5	Turtles	62.2

Touristic species encounter rates. The percentage of dives at Guinsuan in which each touristic group was recorded, current reporting period.

The presence of extensive seagrass beds at Guinsuan makes it a relatively good location for turtle encounters, while the site's reef also supports a diverse range of macrofauna and reef-associated species. However, the densest part of the reef is relatively far from shore and requires a considerable swim to access. The reef itself is relatively small and can experience strong currents, meaning that Guinsuan is best accessed with boat support, particularly for visitors unfamiliar with local conditions.

Guinsuan demonstrates high tourism value, with exceptionally frequent sightings of porcupinefish and pufferfish (98.5%), the highest encounter rate recorded at any site in either municipality. Scorpaenidae (80.1%) are also particularly abundant, while shrimps (60.4%) and eels and snakes (52.7%) provide strong opportunities for reef and macro-diving. Slugs were encountered in 56.5% of dives, while frogfish (16.1%) provide an especially notable niche attraction for macro divers and underwater photographers, the highest frogfish encounter rate in either municipality, roughly five times the Siaton average. Cephalopods (10.9%) also contribute to the site's broader macro-diversity.

Guinsuan provides particularly strong opportunities for charismatic megafauna, with turtles recorded in 62.2% of dives. This is the second-highest turtle encounter rate among the monitored sites and is consistent with the presence of extensive seagrass habitat that can provide important foraging areas. Mobula rays were observed in both June and August, alongside regular encounters with turtles, further strengthening Guinsuan's potential for megafauna-focused diving. Barracudas (1.7%) and stingrays (2.9%) were less frequently encountered, while no sharks were recorded during the monitoring period.

Overall, Guinsuan combines exceptionally reliable reef-fish encounters with strong opportunities for both macrofauna and charismatic megafauna, giving it a particularly diverse tourism profile. Although distance from shore and potentially strong currents mean that boat support is preferable, Guinsuan is well positioned as one of Zamboanguita's strongest all-round dive sites, particularly for visitors interested in combining reef biodiversity, macro subjects and charismatic marine wildlife.

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

Indicators At A Glance



Latason is a **marine protected area** in Zamboanguita. Hard coral cover is **21.4%** (poor on the national classification) and commercial fish biomass **5.66 kg per 150 m²**. This period rests on **30 surveys**, with 18 seasons on record since 2022.

Hard Coral Cover	Commercial Biomass	Fish Density	Bleaching
21.4% of substrate	5.7 kg / 150 m ²	415.6 / 150 m ²	1% of hard coral
— 1.8%	▲ 25.1%	— 3.6%	▼ 83.5%

Latason indicators at a glance. Every headline indicator for Latason, current reporting period, against this site's own preceding six months and the Zamboanguita average for the same period. Colour is keyed to whether the movement is favourable rather than to whether the number rose. Green indicates improvement, red indicates decline — e.g. macroalgae, rubble, bleaching or debris rising reads red, coral cover rising reads green. A change smaller than 5% is shown as flat.

Indicator	Current	Prior 6 months	Change	Zamboanguita Average
Hard coral cover (%)	21.4	21.8	— -2%	24.6
Macroalgae cover (%)	12.1	16.4	▼ -26%	10.5
Rubble (%)	8.4	5.4	▲ +56%	12.9
Bleaching (of hard coral) (%)	1.04	6.33	▼ -84%	1.96
Total fish density (per 150 m ²)	416	431	— -4%	727
Commercial fish biomass (kg per 150 m ²)	5.66	4.52	▲ +25%	17.82
Invertebrate density (per survey)	22.5	20.3	▲ +11%	38.8
Invertebrate species richness (species per survey)	8.5	8.2	— +4%	10.1
Coral predators (per survey)	23.4	40.2	▼ -42%	38.7
Marine debris (items per survey)	2.66	6.12	▼ -57%	2.77

What moved this period:

- Bleaching (of hard coral) substantially lower (-84%) — favourable
- Marine debris substantially lower (-57%) — favourable
- Rubble substantially higher (+56%) — unfavourable

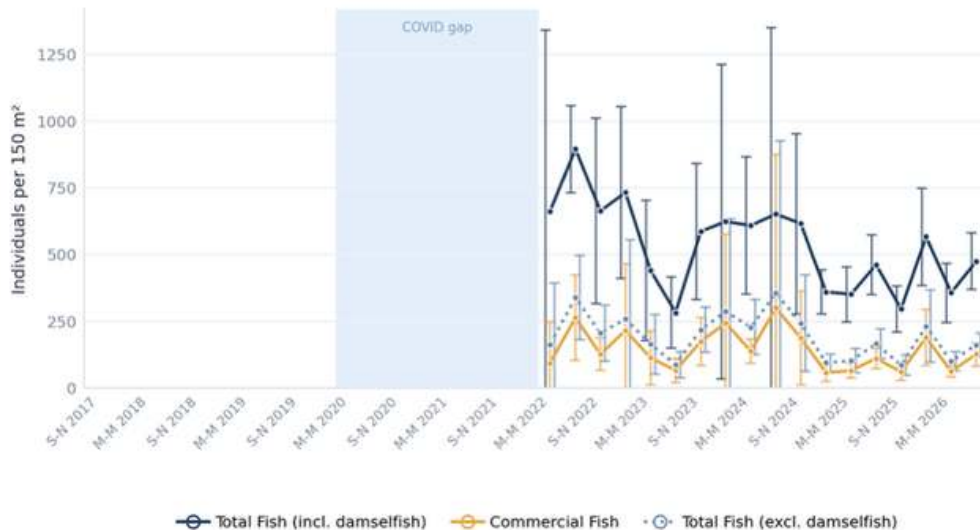
LATASON MPA

Food Security



Current Status:

In March–August 2026, Latason recorded an average total fish density of **415.6 individuals per 150 m²**, with commercial species contributing **94.2 individuals per 150 m²**. Commercial biomass averaged **5.66 kg per 150 m²**, equivalent to roughly **377 kg per hectare**, which sits in the moderate range for the program. By dietary group the assemblage was led by herbivores (~299.0 ind.), carnivores (~52.9 ind.), planktivores (~40.8 ind.), detritivores (~9.1 ind.), corallivores (~5.8 ind.), omnivores (~4.7 ind.) and parasitivores (~3.3 ind.), so herbivores dominate the fish community at this scale.



Fish Density Trends. Total and commercial fish density at Latason, 2017–2026.



Commercial Biomass Trends. Commercial fish biomass at Latason, 2017–2026.

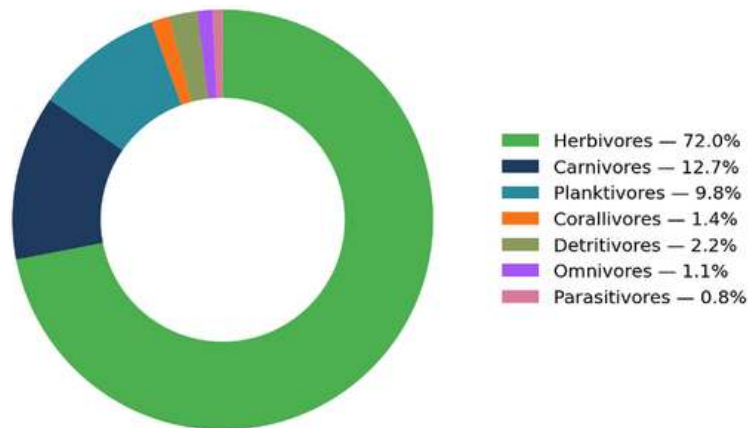
Recent Change:

Against the preceding six months, total fish density is little changed (431.1 → 415.6 individuals per 150 m² including damselfish, 158.5 → 130.7 excluding them), commercial density notably lower (124.8 → 94.2) and commercial biomass notably higher (4.52 → 5.66 kg per 150 m²). Within the assemblage, herbivores moved 281.7 → 299.0, carnivores moved 47.0 → 52.9 and planktivores moved 80.6 → 40.8 individuals per 150 m². Commercial biomass rose while commercial numbers fell, meaning fewer but larger individuals: some fish are surviving long enough to grow.

Dietary Structure:

By share of individuals the community is herbivores (72%), carnivores (12.7%) and planktivores (9.8%), with the remaining groups together making up 5.5%. Trophic structure matters because grazing species control algal growth and so mediate the competition between coral and algae described in the next section.

Dietary Composition. Share of fish recorded in each dietary group, Latason, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged).



Commercial Groups:

Top commercial fish families. The ten commercial fish families contributing most to biomass at Latason, current reporting period, with the share of commercial biomass each carries. Sub-types are rolled into their family.

Commercial Families	Biomass (kg/ 150 m ²)	Density (ind./150 m ²)	% of Commercial Biomass
Fusilier	2.49	20.3	44.6
Bristletooth	0.56	8.8	10.1
Wrasse - Other	0.5	32.9	9
Surgeonfish	0.46	2.1	8.2
Unicornfish	0.27	1.3	4.8
Triggerfish	0.23	2.1	4.1
Goatfish	0.21	4.6	3.8
Soldierfish	0.18	1.1	3.3
Brushtail Tang	0.15	2.7	2.7
Grouper	0.11	2.3	1.9

Fusilier is the largest single contributor at 2.49 kg per 150 m², 44.6% of commercial biomass. Larger predatory taxa (Grouper) are present but at lower densities, so commercial biomass is carried largely by mid-sized and schooling species rather than by large predators. That is the pattern expected on reefs under fishing pressure, where the largest predatory fish are removed first.

Long-term Context:

The highest commercial biomass on record here was 15.82 kg per 150 m² in Jun–Aug 2024. Current levels are 64% below it. Latason was only introduced post-COVID so there is limited long-term data for comparison.

Ecological Interpretation:

Latason ranks eighth of the 8 sites surveyed in the municipality on commercial biomass this period. Herbivores are only 12.0% of the fish counted once damselfish are set aside, a thin grazing guild for a reef of this type. Damselfish do not make up the difference: they defend small algal territories rather than grazing the reef broadly, so they add to the herbivore count without adding much grazing pressure. With macroalgae at 12.1% of substrate, the combination is consistent with grazing pressure being insufficient to hold algal cover down, the mechanism that keeps a reef on the algal side of a phase shift once it arrives there. The average commercial fish counted weighs about 60 g.

Carnivores are 40.4% of the assemblage once damselfish are set aside, which is a high share. On a lightly fished reef the pyramid narrows towards the top; a wide carnivore band usually means small mid-water carnivores rather than large predators, so it should be read with the commercial table above rather than as evidence of an intact predator community.

LATASON MPA

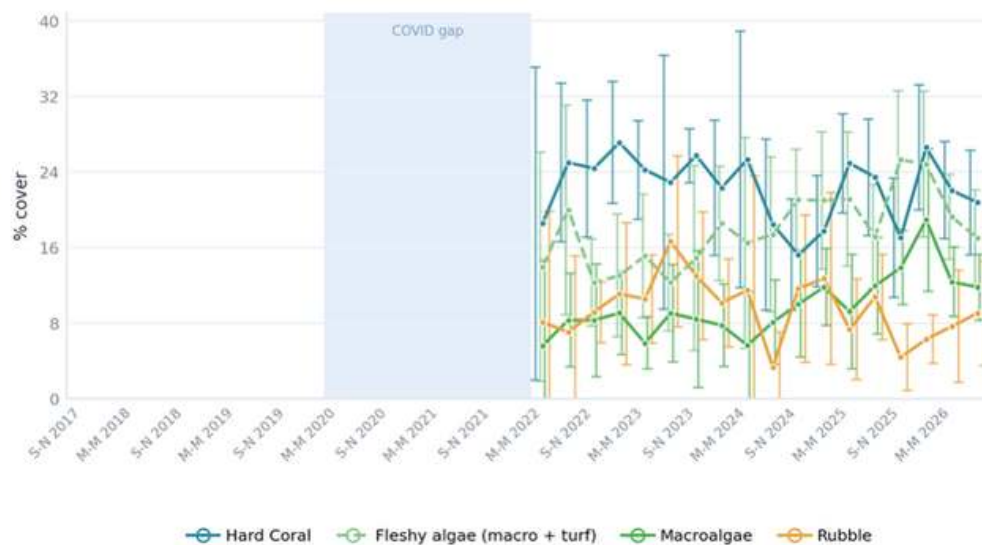
Reef Health And Resilience



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:

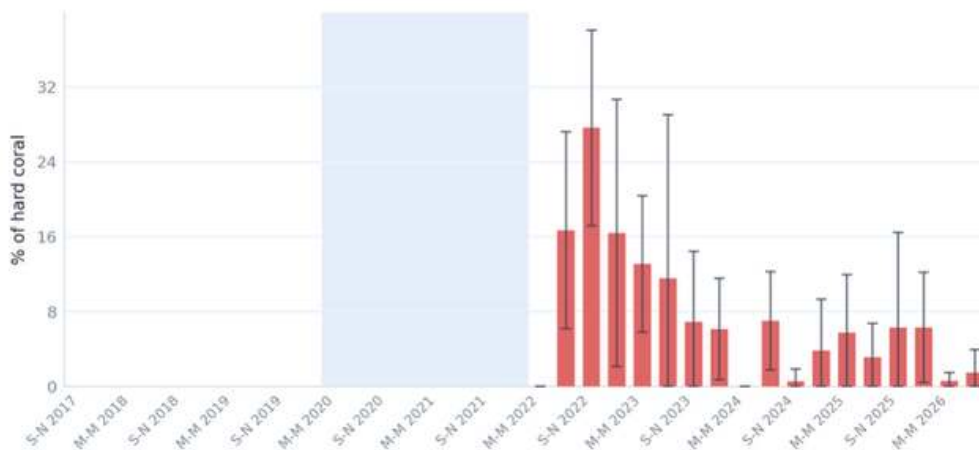
During March–August 2026, Latason recorded an average hard coral cover of **21.4%**, macroalgae of **12.1%** (18.1% once turf is included) and rubble of **8.4%**. Coral cover places the reef in the **poor** band of the Philippine classification. Bleaching affected 1.04% of hard coral, below the 5% level conventionally treated as a concern threshold, suggesting low thermal stress over the survey period. Beyond bleaching, 0.11% showed predation scarring; 0.14% was recently killed, as a share of all points. Overall the reef can be described as coral-dominated, with noticeable algal presence and moderate unconsolidated substrate.



Reef Substrate Trends. Hard coral, macroalgae and rubble cover at Latason, 2017-2026.

Recent change:

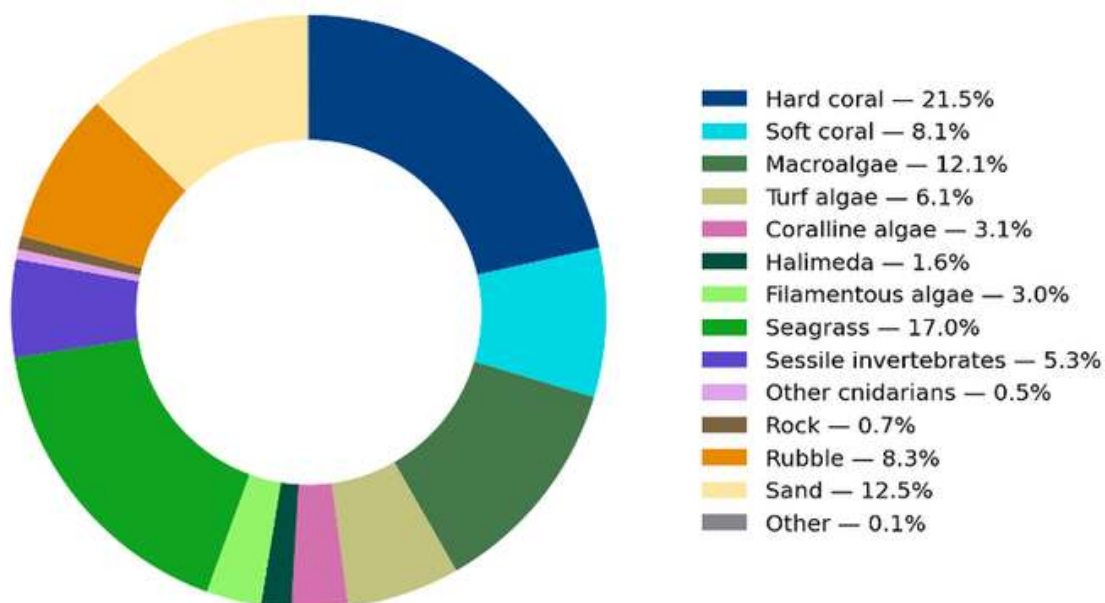
Compared with the preceding six months, hard coral cover is little changed (21.8 → 21.4%), macroalgae notably lower (16.4 → 12.1%), rubble substantially higher (5.4 → 8.4%) and bleaching substantially lower (6.33 → 1.04%). Taken together this indicates more unconsolidated substrate. Super Typhoon Inday and Super Typhoon Kiyapo crossed the area inside this reporting period, so physical damage is the first explanation for this.



Bleaching Incidence. Bleached coral as a percentage of hard coral cover at Latason, by season. Combines partially and fully bleached records.

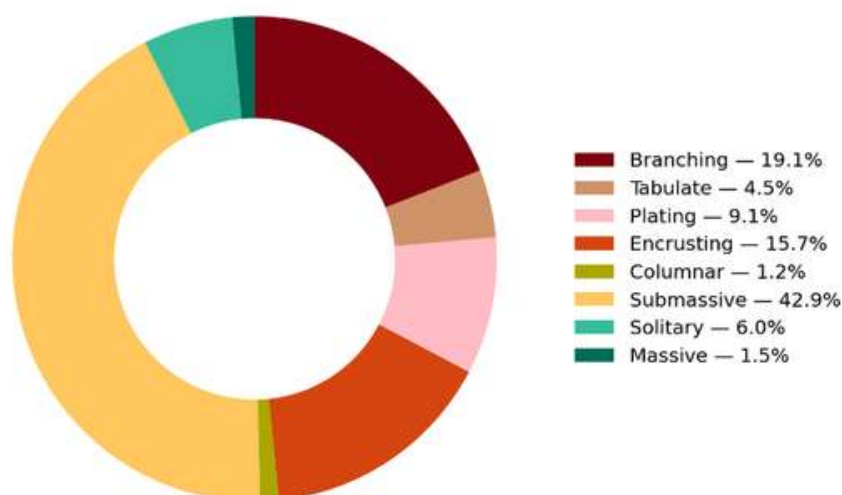
Structural implications:

Of all points recorded, 21.4% is living hard coral, 22.9% is fleshy algae competing for the same space, 20.8% is unconsolidated material (rubble and sand), 3.8% is consolidated surface available for settlement (bare rock and coralline algae) and 31.0% is occupied by other stable but non-reef-building life, soft corals, sessile invertebrates and seagrass. The combination of poor coral cover and relatively low rubble (8.4%) indicates that most of the reef framework is stable and physically suitable for coral growth and recruitment. Sand accounts for a further 12.5% of points, which is habitat rather than damage. Macroalgae has fallen against the preceding six months (-26%), which suggests algal competition is easing and more substrate is becoming available for coral settlement. That may reflect grazing pressure or simply favourable conditions, and one period is not a trend, but the direction is the favourable one.



Substrate Composition. Full substrate composition, Latason, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged).

Coral Growth Forms. Share of hard coral in each growth form at Latason, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged). Forms are ordered from least to most resilient: low resilience covers branching, tabulate, plating, encrusting and *Tubastraea*; medium covers columnar and submassive; high covers solitary and massive.



Within the living coral, growth form determines how much shelter the reef offers and how well it resists disturbance; this protocol records no rugosity, so growth form is the closest available proxy for structural complexity. The cover present is led by submassive (42.9%), branching (19.1%) and encrusting (15.7%). On MCP's classification, resistance to disturbance, not shelter, 48.4% of the coral sits in low-resilience forms and 7.5% in high-resilience forms.

Taken together, poor coral cover at 21.4%, macroalgae at 12.1% and rubble at 8.4%, this is a reef in a **transitional** state, shaped by both physical disturbance (the unconsolidated fraction) and biological competition (the algal fraction). Algal competition is the binding constraint here; the substrate itself is stable enough to support recruitment if that competition eases.

Long-term Context:

Coral cover peaked at 27.1% in Dec–Feb 2022/23 and now stands 21.4%. Bleaching peaked at 27.6% of hard coral in Sep–Nov 2022, and has remained below the 5% concern level for the last 2 seasons, since Mar–May 2026.

Ecological Interpretation:

Latason ranks fifth of the 8 sites surveyed in the municipality on hard coral cover and fifth on macroalgae, counting the least algal site first. Rubble rising alongside falling coral points at physical breakage rather than at thermal stress, which kills coral in place and leaves the skeleton standing. With super typhoon Inday and super typhoon Kiyapo, storm damage is the obvious cause. With cover in the poor band this reef has little margin: a single disturbance removes a large share of what remains, and recovery from a low base is slow. Of the coral present, 32.7% is in fast-growing forms (branching, tabulate, plating) and 60.1% in slow, robust ones (massive, submassive, encrusting). That ratio sets how quickly cover can rebuild and how much survives a disturbance, and the two pull against each other: the fast forms drive recovery but are the first lost, the slow ones persist but add cover at a fraction of the rate.

A coral cover figure held up mostly by slow forms is stable but will rebuild slowly from any loss, so recovery here should be measured in decades rather than seasons. For every point of substrate a coral larva could settle on, there are 6.1 points already held by fleshy algae. Settlement space is the binding constraint on recovery here, not larval supply: even a good recruitment year has little bare ground to land on.

Of the pressures acting here, the ones open to local action are enforcement, the herbivore populations that hold algae down, and the physical impacts that break coral and make rubble, anchoring, destructive fishing and trampling. Thermal stress is not one of them, which is why the bleaching figure is reported as context rather than as something to manage.

LATASON MPA

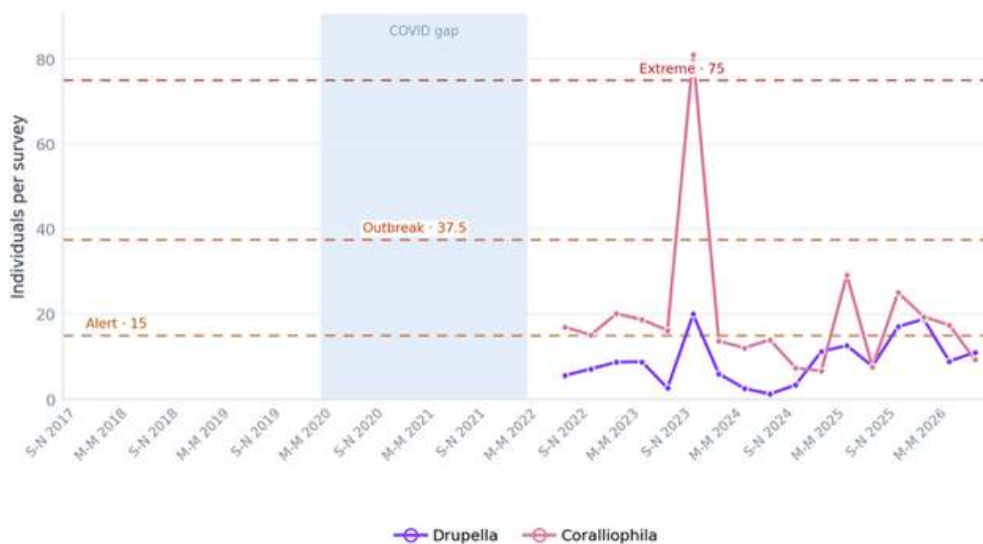
Predation and Marine Debris



Current Status:

Drupella averaged **10.0 per survey** (below the alert threshold) and *Coralliophila* **13.4** (below the alert threshold), giving a combined corallivorous snail load of 23.4 per survey. Crown of Thorns averaged 0.000 per survey (below the alert threshold).

Marine debris averaged **2.66 items per survey**. By category it breaks down as fishing gear 2.23 (84%), consumer plastics 0.36 (14%) and household & sanitary 0.06 (2%). The categories are mutually exclusive and sum to the total, so nothing is double-counted between them. Fishing gear is the largest category at 84% of items. That is a sea-based source: gear lost or discarded by boats working the reef, which responds to gear marking, retrieval dives and work with fishers rather than to municipal waste collection.



Coral Predators. Corallivorous snail abundance at Latason, 2017-2026. *Drupella* and *Coralliophila* share one threshold set and one axis. Dashed rules mark MCP management thresholds — alert 15, outbreak 37.5, extreme 75 per survey.



Crown of Thorns. Crown of Thorns abundance at Latason, 2017-2026. Dashed rules mark MCP management thresholds for Crown of Thorns (alert 0.1125, outbreak 0.225, extreme 0.45 per survey).

Recent Change:

Against the preceding six months, *Drupella* is substantially lower (18.0 → 10.0), *Coralliophila* substantially lower (22.2 → 13.4), Crown of Thorns not comparable (0.000 → 0.000) and debris substantially lower (6.12 → 2.66 items per survey).



Marine Debris. Marine debris at Latason, current reporting period. The centre figure is total items per survey and the ring is what that total is made of; the categories are mutually exclusive, so the slices sum to the centre figure. The sparkline is the site's own total debris per survey across the full record, 2017–2026, with the COVID gap left empty.

Long-term Context:

Drupella peaked at 20.0 per survey in Sep–Nov 2023. These figures pool all depths. *Drupella* is roughly eleven times more abundant shallow than deep, so we have a depth-resolved workbook, where we can detect outbreaks in the shallows.

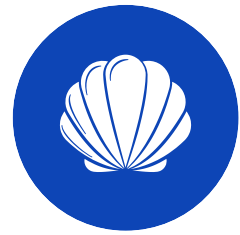
Ecological Interpretation:

Corallivore abundance sits below the thresholds that would trigger management action. More than half the debris recorded (84.1%) is fishing gear. That is a different management problem from land-based waste: it points at gear loss by fishers working the reef and responds to gear marking, retrieval and fisher engagement rather than to municipal waste collection.

On management: corallivorous snails can be removed by hand and that is the standard response above outbreak level, but removal only works if it is repeated, the snails recruit from surrounding reef and a single clearance is recolonised. Directing effort at the aggregations on living coral, rather than spreading it across the site, is what makes the effort worthwhile. The debris is a fisheries problem before it is a waste problem. Lost gear keeps fishing after it is lost, so it is both a debris indicator and a mortality source, and it accumulates on exactly the structure that snags it, the high-relief coral that matters most. Gear marking and retrieval dives address it; municipal collection does not.

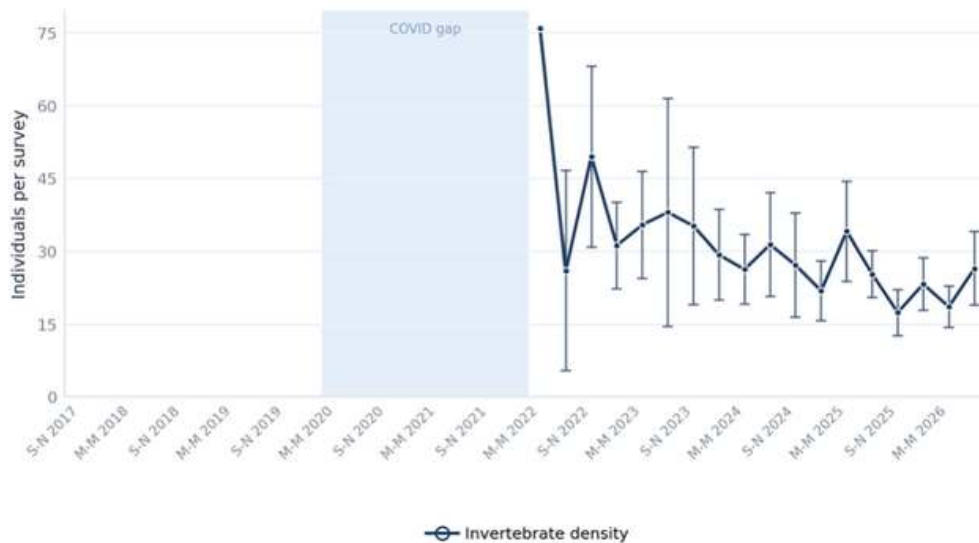
LATASON MPA

Invertebrate Status



Current Status:

Latason supported an average invertebrate density of **22.5 individuals per survey**, drawn from **8.5 distinct species per survey**.



Invertebrate Density. Total invertebrate density at Latason, 2017-2026.



Invertebrate Species Richness. Invertebrate species richness at Latason, 2017-2026.

Recent Change:

Against the preceding six months, density is slightly higher (20.3 → 22.5 per survey), richness little changed (8.2 → 8.5 species) and commercially important species notably higher (11.0 → 12.7).

Commercial Groups:

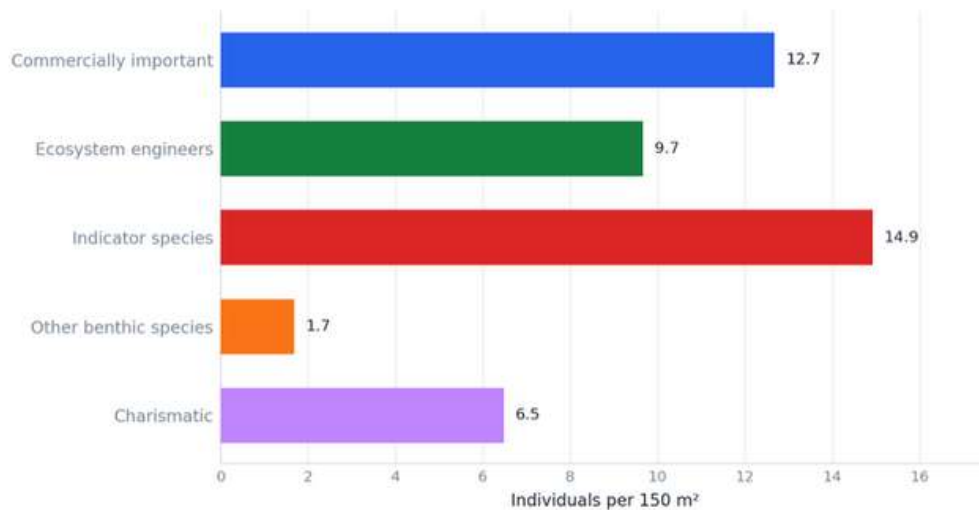
Commercially important invertebrates averaged 12.7 per survey, 56.4% of all invertebrates counted. Within the key harvested groups, urchins averaged 6.1 per survey, sea cucumbers 0.71 and giant clams 0.16. Those ten total 11.80 individuals per survey, 52% of all invertebrates counted, led by Urchin - Diadema at 5.91 per survey. The community is dominated by sea urchins. Their grazing helps keep settlement space open for coral recruitment, so high urchin abundance is a mixed signal rather than a bad one, beneficial for recruitment, but at sustained high density urchins also erode reef framework.

Most abundant invertebrate taxa. The ten most abundant invertebrates (left), and the ten most abundant commercially important invertebrates (right) by density at Latason.

Top 10 Invertebrates	Individuals per 150 m ²	Top 10 Commercial	Individuals per 150 m ²
Urchin - Diadema	5.91	Urchin - Diadema	5.91
Nudibranch	3.41	Cone Shell	1.54
Sea Star	2.29	Other Bivalve	0.99
Cleaner Shrimp - Banded Coral	1.76	Other Shell	0.87
Cone Shell	1.54	Cowrie - Tiger	0.58
Other Bivalve	0.99	Sea Cucumber - Pinkfish	0.53
Other Shell	0.87	Conch - Scorpion Spider	0.5
Pipefish	0.61	Pearl Oyster	0.37
Cowrie - Tiger	0.58	Mantis Shrimp	0.29
Sea Cucumber - Pinkfish	0.53	Pen Oyster	0.21

Functional Groups:

Per survey: ecosystem engineers 9.7, sensitive indicator species 14.9, charismatic species 6.5, benthic associates and predators 1.7. These groups overlap by design, a species can be both commercially important and charismatic, so they do not sum to total invertebrate density. A relatively high abundance of sensitive indicator species suggests conditions still suitable for disturbance-intolerant taxa; a high abundance of ecosystem engineers, mostly urchins, indicates that herbivory and bioerosion are active processes here.



Invertebrate Functional Groups. Invertebrate functional group density, Latason, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged).

Ecological Interpretation:

Latason ranks eighth of the 8 sites surveyed in the municipality on invertebrate density and eighth on species richness. Each species contributes 2.6 individuals per survey on average. A rising figure with flat richness means the same few taxa are becoming more abundant rather than the community broadening, which is the pattern that precedes an urchin-dominated reef. Herbivorous fish still outnumber urchins (15.7 against 6.1 per survey), so grazing pressure remains mostly in the fish community. That is the more stable arrangement of the two, and it is worth protecting: herbivorous fish crop algae without eroding the framework the way urchins do.

Giant clams and sea cucumbers together average under one individual per survey. Both are sessile or near-sessile, conspicuous and valuable, which makes them the most direct indicator of whether a site is actually being protected as opposed to declared — they cannot flee a diver and they do not recover quickly, so where they are absent, extraction has been sustained.

LATASON MPA

Tourism Value



Touristic Species		Mean Encounter Rate (%)	
Barracudas	8	Scorpaenidae	44.1
Cephalopods	9.8	Sharks	1.9
Cowries	46.8	Shrimps	59.5
Eels and Snakes	26.2	Slugs	78.3
Frogfish	3.3	Stingrays	0
Giant Clams	31.8	Syngnathidae and Pegasidae	18.3
Porcupinefish and Pufferfish	89.2	Turtles	12.1

Touristic species encounter rates. The percentage of dives at Latason in which each touristic group was recorded, current reporting period.

Latason is not particularly well known as a dive site, and it does not host the highest abundance of charismatic species within Zamboanguita. However, its expansive seagrass beds and shallow, colourful corals provide an enjoyable diving environment with potential for both reef and macro-diving. The site is particularly suitable for encounters with nudibranchs and other sea slugs, while rarer species such as flamboyant cuttlefish and blue-ring octopuses have also been observed, although these occasional sightings are not captured in the encounter-rate data.

Latason demonstrates good tourism potential, with very high encounter rates for porcupinefish and pufferfish (89.2%) and slugs (78.3%). Cowries (46.8%) are also particularly abundant, representing one of the highest encounter rates for this group across the monitored sites. Shrimps (59.5%) provide further reliable macro-diving opportunities, while syngnathids and pegasids (18.3%) are relatively prominent and add specialised interest for macro divers and underwater photographers. Giant clams (31.8%) and cephalopods (9.8%) contribute additional benthic and invertebrate diversity, while eels and snakes (26.2%) and Scorpaenidae (44.1%) provide further reef-associated fauna.

Larger fauna are present but remain relatively limited. Turtles were recorded in 12.1% of dives, while barracudas were encountered in 8.0% of dives and no stingrays were recorded. Sharks were observed in 1.9% of dives, the highest shark encounter rate recorded among the monitored sites in Zamboanguita. Bamboo sharks were recorded in July and August, providing a rare but notable megafauna encounter that adds to Latason's tourism appeal, although such sightings should not be considered a reliable attraction based on the overall encounter rate.

Overall, Latason is best characterised as a high-value macro and invertebrate diving site, supported by abundant slugs, cowries, shrimps, and porcupinefish and pufferfish. Its extensive seagrass beds, shallow colourful corals and occasional sightings of unusual species provide additional interest, particularly for underwater photographers and biodiversity-focused divers. While opportunities for turtles and other large animals are more limited than at sites such as Guinsuan and Malatapay, the occasional presence of sharks provides an important complementary megafauna attraction.

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

Indicators At A Glance



Lutoban is a marine protected area in Zamboanguita. Hard coral cover is **19.8%** (poor on the national classification) and commercial fish biomass **7.42 kg per 150 m²**. This period rests on 81 surveys, with 29 seasons on record since 2017.

Hard Coral Cover	Commercial Biomass	Fish Density	Bleaching
19.8% of substrate	7.4 kg / 150 m ²	553.3 / 150 m ²	3.9% of hard coral
— 0.5%	▲ 15.5%	— 0.7%	▲ 5%

Lutoban indicators at a glance. Every headline indicator for Lutoban, current reporting period, against this site's own preceding six months and the Zamboanguita average for the same period. Colour is keyed to whether the movement is favourable rather than to whether the number rose. Green indicates improvement, red indicates decline — e.g. macroalgae, rubble, bleaching or debris rising reads red, coral cover rising reads green. A change smaller than 5% is shown as flat.

Indicator	Current	Prior 6 months	Change	Zamboanguita Average
Hard coral cover (%)	19.8	19.7	— +1%	24.6
Macroalgae cover (%)	5.2	5.6	▼ -6%	10.5
Rubble (%)	15.9	12.4	▲ +28%	12.9
Bleaching (of hard coral) (%)	3.9	3.71	▲ +5%	1.96
Total fish density (per 150 m ²)	553	550	— +1%	727
Commercial fish biomass (kg per 150 m ²)	7.42	6.43	▲ +15%	17.82
Invertebrate density (per survey)	46.1	39.6	▲ +16%	38.8
Invertebrate species richness (species per survey)	9.9	9.8	— +0%	10.1
Coral predators (per survey)	39.9	45.9	▼ -13%	38.7
Marine debris (items per survey)	1.86	4.5	▼ -59%	2.77

What moved this period:

- Marine debris substantially lower (-59%) — favourable
- Rubble notably higher (+28%) — unfavourable
- Invertebrate density notably higher (+16%) — favourable

LUTOBAN GAC-ANG MPA

Food Security

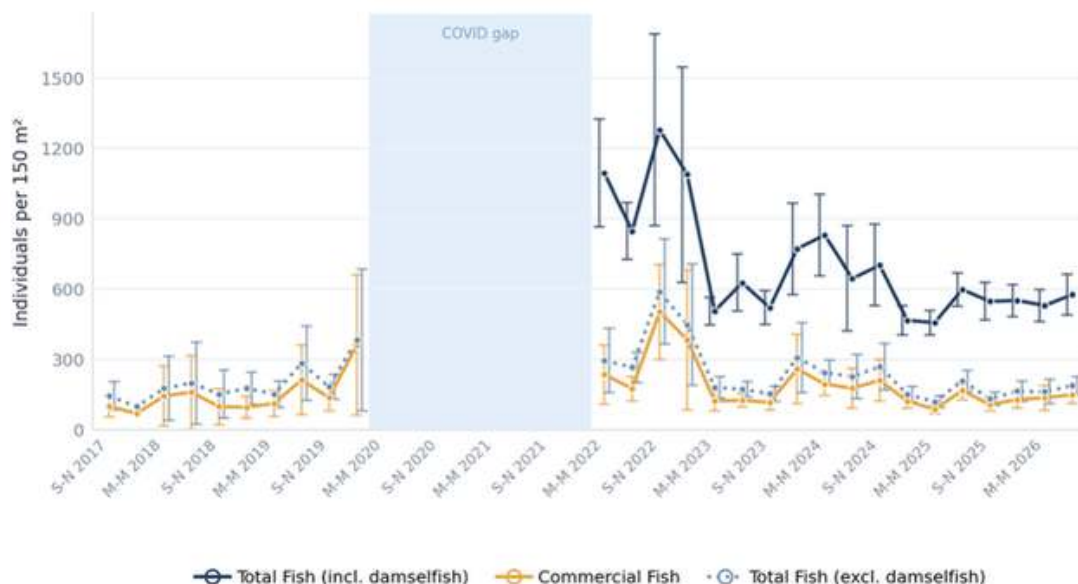


- It should be noted that, due to the large size of Lutoban MPA (15 hectares), we surveyed at two separate sub-sites (termed Lutoban North and Lutoban South) to obtain a more representative view of the MPA as a whole. All values for Lutoban MPA are taken as the average (mean) value of the two sub-sites.

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:

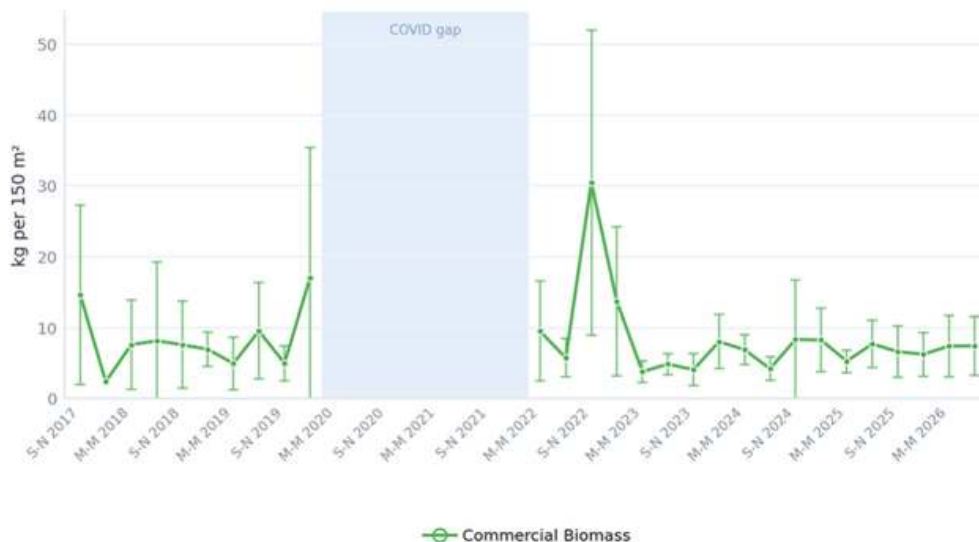
In March–August 2026, Lutoban recorded an average total fish density of **553.3 individuals per 150 m²**, with commercial species contributing **143.0 individuals per 150 m²**. Commercial biomass averaged **7.42 kg per 150 m²**, equivalent to roughly **495 kg per hectare**, which sits in the moderate range for the program. By dietary group the assemblage was led by herbivores (~386.8 ind.), carnivores (~83.3 ind.), planktivores (~58.7 ind.), corallivores (~9.3 ind.), detritivores (~9.2 ind.), omnivores (~3.0 ind.) and parasitivores (~2.9 ind.), so herbivores dominate the fish community at this scale.



Fish Density Trends. Total and commercial fish density at Lutoban, 2017–2026.

Recent Change:

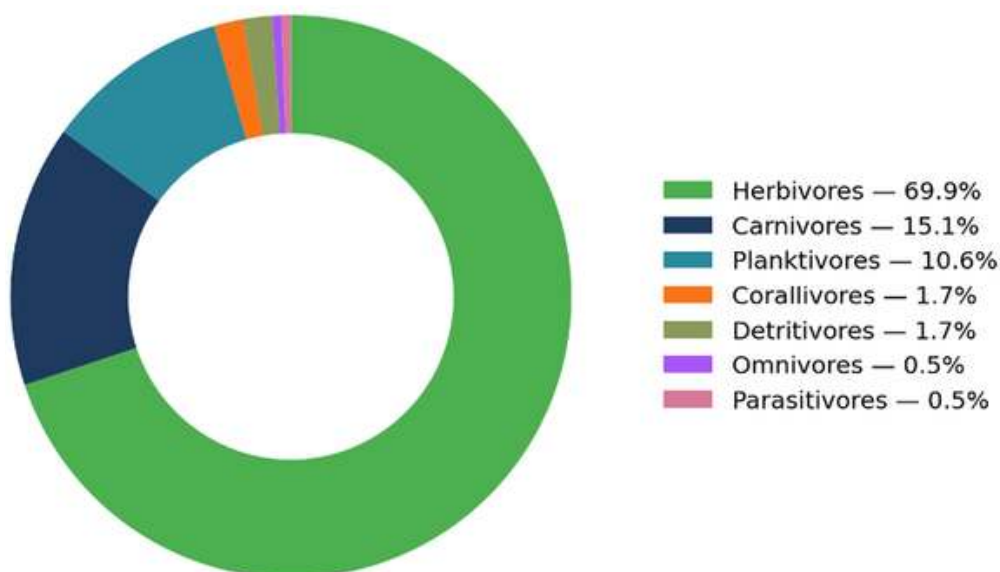
Against the preceding six months, total fish density is little changed (549.5 → 553.3 individuals per 150 m² including damselfish, 148.3 → 175.7 excluding them), commercial density notably higher (118.3 → 143.0) and commercial biomass notably higher (6.43 → 7.42 kg per 150 m²).



Commercial Biomass Trends. Commercial fish biomass at Lutoban, 2017–2026.

Dietary Structure:

By share of individuals the community is herbivores (69.9%), carnivores (15.1%) and planktivores (10.6%), with the remaining groups together making up 4.4%. Trophic structure matters because grazing species control algal growth and so mediate the competition between coral and algae described in the next section.



Dietary Composition. Share of fish recorded in each dietary group, Lutoban, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged).

Commercial Groups:

The ten commercial fish families contributing most to biomass at Lutoban this period are listed below. Sub-types are rolled into their family. **Fusilier** is the largest single contributor at 2.21 kg per 150 m², 29.7% of commercial biomass. Larger predatory taxa (Barracuda) are present but at lower densities, so commercial biomass is carried largely by mid-sized and schooling species rather than by large predators. That is the pattern expected on reefs under fishing pressure, where the largest predatory fish are removed first.

Top commercial fish families. The ten commercial fish families contributing most to biomass at Lutoban, current reporting period, with the share of commercial biomass each carries. Sub-types are rolled into their family.

Commercial Families	Biomass (kg/ 150 m ²)	Density (ind./150 m ²)	% of Commercial Biomass
Fusilier	2.21	34.3	29.7
Unicornfish	1.85	7.3	25
Wrasse - Other	0.53	59.6	7.2
Bristletooth	0.51	9.3	6.8
Soldierfish	0.4	3.5	5.5
Goatfish	0.33	6.5	4.4
Bream	0.27	5.5	3.6
Triggerfish	0.25	2.2	3.4
Barracuda	0.21	1.5	2.8
Parrotfish	0.15	1.3	2

Long-term context:

The 2017–19 baseline for Lutoban is 7.72 kg per 150 m² of commercial biomass and 173.3 fish per 150 m². Current biomass stands -4% against that baseline and density +1%. The highest commercial biomass on record here was 30.44 kg per 150 m² in Sep–Nov 2022. Current levels are 76% below it. Two protocol changes limit what the long record can be asked. Damselfish entered the list in 2022, so only the damselfish-excluded series is comparable across the full period; and fish size bins changed in 2025 with both schemes running side by side through 2025–26, which biases early biomass slightly low.

Ecological interpretation:

Lutoban ranks seventh of the 8 sites surveyed in the municipality on commercial biomass this period. Herbivores are only 7.4% of the fish counted once damselfish are set aside, a thin grazing guild for a reef of this type. Damselfish do not make up the difference: they defend small algal territories rather than grazing the reef broadly, so they add to the herbivore count without adding much grazing pressure. Planktivores make up 31.3% of the assemblage. Planktivore abundance tracks current and plankton supply rather than reef condition, so it inflates total density without indicating recovery.

The average commercial fish counted weighs about 52 g. Against the 2017–19 baseline of 62 g that is -17%. Fish are smaller on average than they were, which is the clearest single sign of fishing pressure: extraction removes large individuals first, and the stock responds by shifting to fast-growing small ones. It matters disproportionately because weight rises with roughly the cube of length, so a modest fall in mean size is a large fall in yield.

Carnivores are 47.4% of the assemblage once damselfish are set aside, which is a high share. On a lightly fished reef the pyramid narrows towards the top; a wide carnivore band usually means small mid-water carnivores rather than large predators, so it should be read with the commercial table above rather than as evidence of an intact predator community.

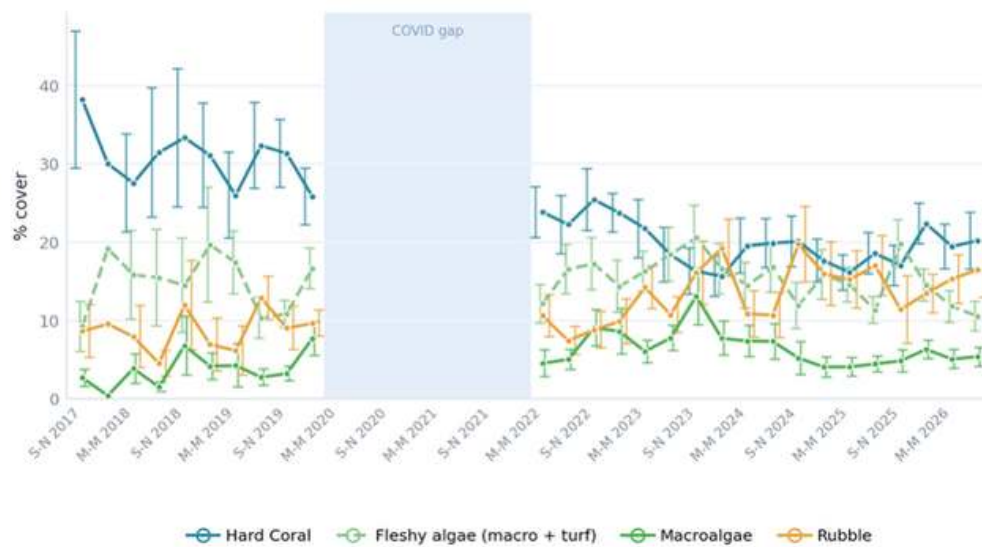
LUTOBAN GAC-ANG MPA

Reef Health And Resilience

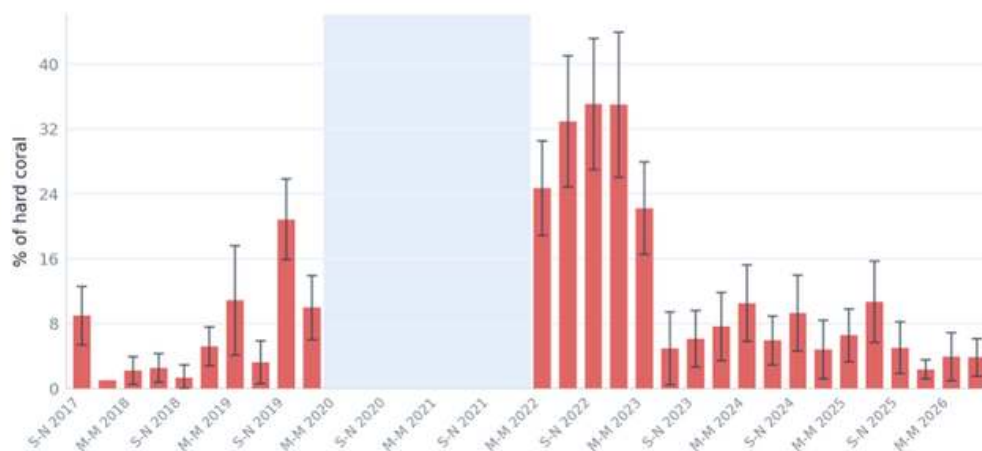


Current status:

During March–August 2026, Lutoban recorded an average hard coral cover of **19.8%**, macroalgae of **5.2%** (11.2% once turf is included) and rubble of **15.9%**. Coral cover places the reef in the poor band of the Philippine classification. Bleaching affected 3.90% of hard coral, below the 5% level conventionally treated as a concern threshold, suggesting low thermal stress over the survey period. Beyond bleaching, 0.52% showed predation scarring; 0.18% was recently killed, as a share of all points. Overall the reef can be described as coral-dominated, with limited algal presence and substantial unconsolidated substrate.



Reef Substrate Trends. Hard coral, macroalgae and rubble cover at Lutoban, 2017–2026. Solid line is macroalgae alone; dashed adds turf, the pre-2026 published definition.



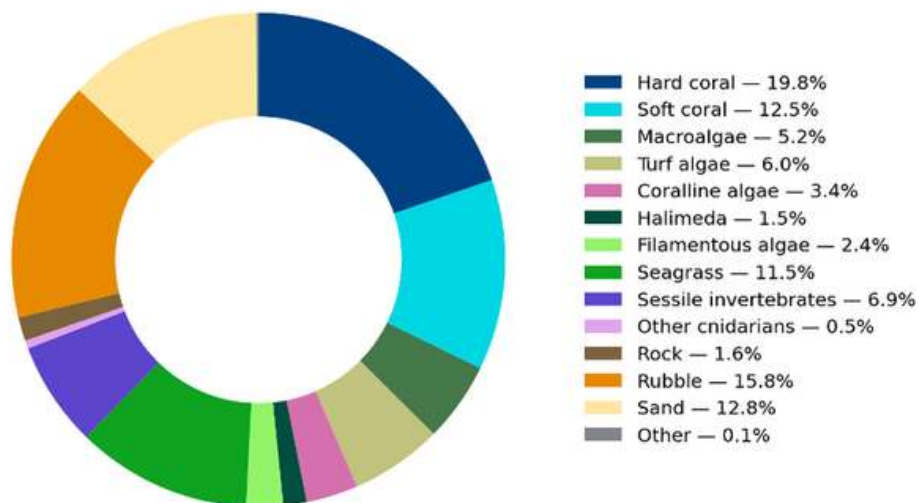
Bleaching Incidence. Bleached coral as a percentage of hard coral cover at Lutoban, by season. Combines partially and fully bleached records.

Recent Change:

Compared with the preceding six months, hard coral cover is little changed (19.7 → 19.8%), macroalgae slightly lower (5.6 → 5.2%), rubble notably higher (12.4 → 15.9%) and bleaching slightly higher (3.71 → 3.90%). Taken together this indicates more unconsolidated substrate. Super Typhoon Inday and Super Typhoon Kiyapo crossed the area inside this reporting period, so physical damage is the first explanation to test for any of this, storm breakage converts standing coral into rubble directly, where gradual pressure does not.

Structural implications:

Of all points recorded, 19.8% is living hard coral, 15.2% is fleshy algae competing for the same space, 28.6% is unconsolidated material (rubble and sand), 5.0% is consolidated surface available for settlement (bare rock and coralline algae) and 31.4% is occupied by other stable but non-reef-building life, soft corals, sessile invertebrates and seagrass. The combination of poor coral cover and rubble at 15.9% indicates that substrate instability is likely to be limiting recruitment in places: rubble moves in swell, and larvae that settle on it are abraded or buried before they can consolidate, so rubble fields tend to persist rather than recover on their own. Sand adds a further 12.8%, bringing the unconsolidated fraction to 28.6% in total. Macroalgae has fallen against the preceding six months (-6%), which suggests algal competition is easing and more substrate is becoming available for coral settlement. That may reflect grazing pressure or simply favourable conditions, and one period is not a trend, but the direction is the favourable one.

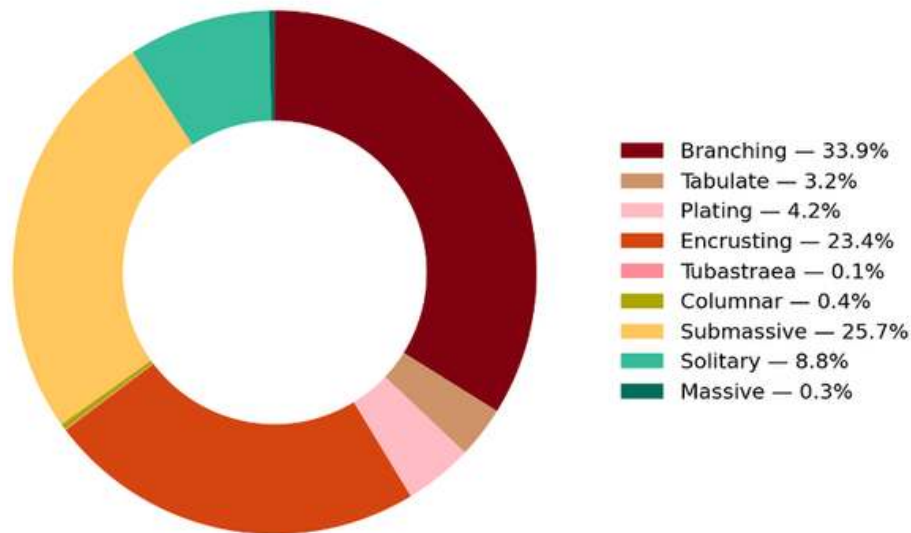


Substrate Composition. Full substrate composition, Lutoban, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged).

Within the living coral, growth form determines how much shelter the reef offers and how well it resists disturbance; this protocol records no rugosity, so growth form is the closest available proxy for structural complexity. The cover present is led by branching (33.9%), submassive (25.7%) and encrusting (23.4%). On MCP's classification, resistance to disturbance, not shelter, 64.8% of the coral sits in low-resilience forms and 9.1% in high-resilience forms.

Most of the cover is therefore in forms that provide good shelter but are first to be lost in a thermal or storm event, so the headline cover figure is more fragile than it appears.

Taken together, poor coral cover at 19.8%, macroalgae at 5.2% and rubble at 15.9%, this is a reef in a **transitional** state, shaped by both physical disturbance (the unconsolidated fraction) and biological competition (the algal fraction). Physical instability is the binding constraint here; algal competition is not currently at a level that would prevent recovery.



Coral Growth Forms. Share of hard coral in each growth form at Lutoban, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged). Forms are ordered from least to most resilient: low resilience covers branching, tabulate, plating, encrusting and Tubastraea; medium covers columnar and submassive; high covers solitary and massive.

Long-term Context:

Against the 2017–19 baseline of 31.2% hard coral, 3.3% macroalgae and 8.6% rubble, coral cover is -37%, macroalgae +58% and rubble +85%. Coral cover peaked at 38.2% in Sep–Nov 2017 and now stands 19.8%. Bleaching peaked at 35.1% of hard coral in Sep–Nov 2022, and has remained below the 5% concern level for the last 3 seasons, since Dec–Feb 2025/26. Two definitions changed for this edition and are not comparable with earlier reports: macroalgae is now macroalgae alone rather than macroalgae plus turf, and bleaching is a share of hard coral rather than of all substrate points, which makes it read three to four times higher on identical observations.

Ecological Interpretation:

Lutoban ranks sixth of the 8 sites surveyed in the municipality on hard coral cover and first on macroalgae, counting the least algal site first. With cover in the poor band this reef has little margin: a single disturbance removes a large share of what remains, and recovery from a low base is slow. Of the coral present, 41.3% is in fast-growing forms (branching, tabulate, plating) and 49.5% in slow, robust ones (massive, submassive, encrusting). That ratio sets how quickly cover can rebuild and how much survives a disturbance, and the two pull against each other: the fast forms drive recovery but are the first lost, the slow ones persist but add cover at a fraction of the rate. A cover figure held up mostly by slow forms is stable but will rebuild slowly from any loss, so recovery here should be measured in decades rather than seasons.

For every point of substrate a coral larva could settle on, there are 3.1 points already held by fleshy algae. Settlement space is the binding constraint on recovery here, not larval supply: even a good recruitment year has little bare ground to land on.

Of the pressures acting here, the ones open to local action are enforcement, the herbivore populations that hold algae down, and the physical impacts that break coral and make rubble, anchoring, destructive fishing and trampling. Thermal stress is not one of them, which is why the bleaching figure is reported as context rather than as something to manage.

LUTOBAN GAC-ANG MPA

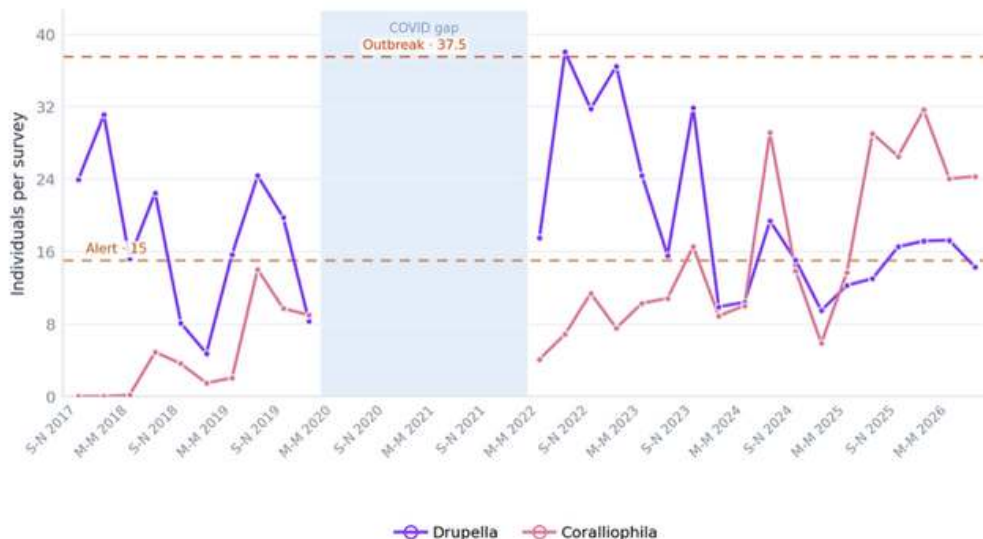
Predation and Marine Debris



Current Status:

Drupella averaged **15.8 per survey** (above the alert threshold) and *Coralliophila* **24.2** (above the alert threshold), giving a combined corallivorous snail load of 39.9 per survey. Crown of Thorns averaged 0.000 per survey (below the alert threshold).

Marine debris averaged **1.86 items per survey**. By category it breaks down as fishing gear 1.51 (81%), consumer plastics 0.29 (16%) and household & sanitary 0.05 (3%). The categories are mutually exclusive and sum to the total, so nothing is double-counted between them. Fishing gear is the largest category at 81% of items. That is a sea-based source: gear lost or discarded by boats working the reef, which responds to gear marking, retrieval dives and work with fishers rather than to municipal waste collection.



Coral Predators. Corallivorous snail abundance at Lutoban, 2017–2026. *Drupella* and *Coralliophila* share one threshold set and one axis. Dashed rules mark MCP management thresholds — alert 15, outbreak 37.5, extreme 75 per survey.



Crown of Thorns. Crown of Thorns abundance at Lutoban, 2017–2026. Dashed rules mark MCP management thresholds for Crown of Thorns (alert 0.1125, outbreak 0.225, extreme 0.45 per survey).

Recent Change:

Against the preceding six months, *Drupella* is slightly lower (16.8 → 15.8), *Coralliophila* notably lower (29.1 → 24.2), Crown of Thorns not comparable (0.000 → 0.000) and debris substantially lower (4.50 → 1.86 items per survey).



Marine Debris. Marine debris at Lutoban, current reporting period. The centre figure is total items per survey and the ring is what that total is made of; the categories are mutually exclusive, so the slices sum to the centre figure. The sparkline is the site's own total debris per survey across the full record, 2017–2026, with the COVID gap left empty.

Long-term Context:

The 2017–19 baseline is 18.2 *Drupella*, 3.3 *Coralliophila* and 0.267 Crown of Thorns per survey, with 2.28 debris items. Current levels stand -13%, +639%, -100% and -19% against those. *Drupella* peaked at 38.1 per survey in Jun–Aug 2022. These figures pool all depths. *Drupella* is roughly eleven times more abundant shallow than deep, so we have a depth-resolved workbook, where we can detect outbreaks in the shallows.

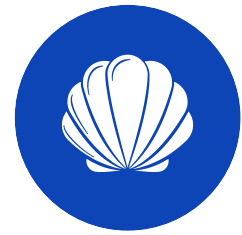
Ecological Interpretation:

Combined snail abundance is at outbreak level. *Drupella* and *Coralliophila* aggregate on already-stressed colonies, so high counts often follow coral damage rather than initiate it, but once aggregated they suppress the recovery of the colonies that survived. More than half the debris recorded (81.4%) is fishing gear. That is a different management problem from land-based waste: it points at gear loss by fishers working the reef and responds to gear marking, retrieval and fisher engagement rather than to municipal waste collection.

On management: corallivorous snails can be removed by hand and that is the standard response above outbreak level, but removal only works if it is repeated, the snails recruit from surrounding reef and a single clearance is recolonised. Directing effort at the aggregations on living coral, rather than spreading it across the site, is what makes the effort worthwhile. The debris is a fisheries problem before it is a waste problem. Lost gear keeps fishing after it is lost, so it is both a debris indicator and a mortality source, and it accumulates on exactly the structure that snags it, the high-relief coral that matters most. Gear marking and retrieval dives address it; municipal collection does not.

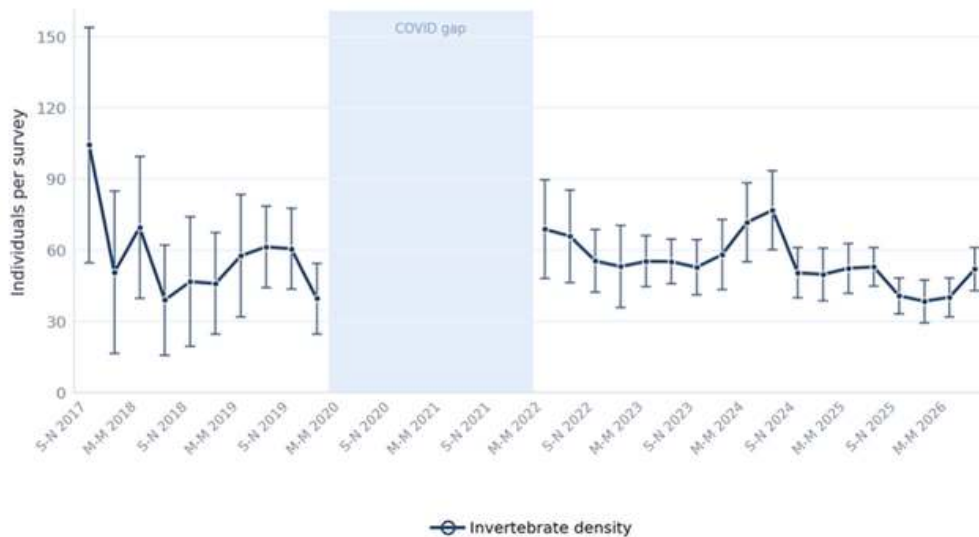
LUTOBAN GAC-ANG MPA

Invertebrate Status

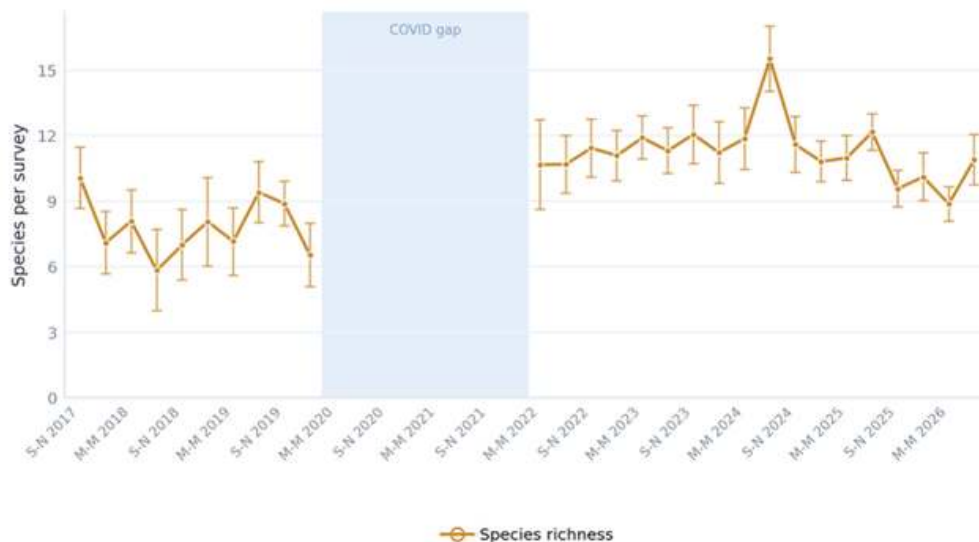


Current Status:

Lutoban supported an average invertebrate density of **46.1 individuals per survey**, drawn from **9.9 distinct species per survey**.



Invertebrate Density. Total invertebrate density at Lutoban, 2017-2026.



Invertebrate Species Richness. Invertebrate species richness at Lutoban, 2017-2026.

Recent Change:

Against the preceding six months, density is notably higher (39.6 → 46.1 per survey), richness little changed (9.8 → 9.9 species) and commercially important species notably higher (26.1 → 32.0).

Commercial Groups:

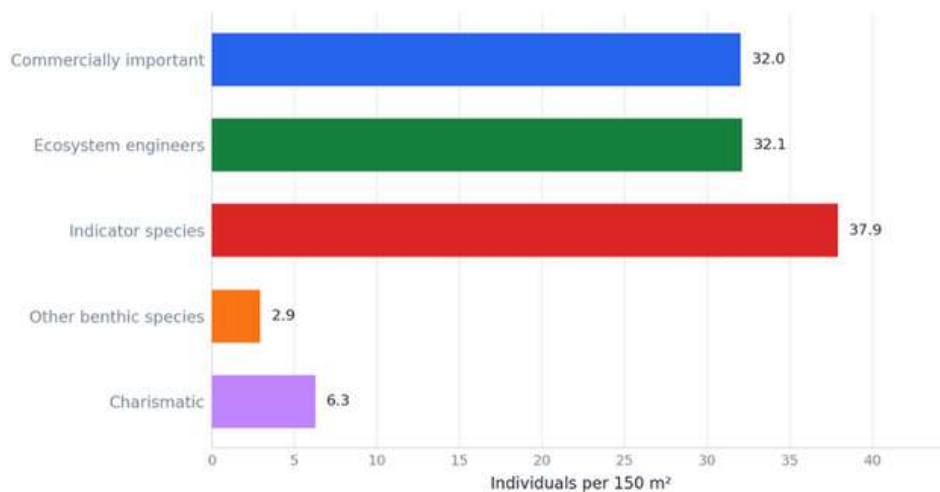
Commercially important invertebrates averaged 32.0 per survey, 69.5% of all invertebrates counted. Within the key harvested groups, urchins averaged 26.4 per survey, sea cucumbers 0.68 and giant clams 0.15. Those ten total 30.25 individuals per survey, 66% of all invertebrates counted, led by Urchin - Diadema at 25.67 per survey. The community is dominated by sea urchins. Their grazing helps keep settlement space open for coral recruitment, so high urchin abundance is a mixed signal rather than a bad one, beneficial for recruitment, but at sustained high density urchins also erode reef framework.

Most abundant invertebrate taxa. The ten most abundant invertebrates (left), and the ten most abundant commercially important invertebrates (right) by density at Lutoban.

Top 10 Invertebrates	Individuals per 150 m ²	Top 10 Commercial	Individuals per 150 m ²
Urchin - Diadema	25.67	Urchin - Diadema	25.67
Sea Star	4.46	Other Bivalve	1.03
Nudibranch	4.44	Cone Shell	0.77
Lionfish	1.69	Conch - Scorpion Spider	0.63
Cleaner Shrimp - Banded Coral	1.39	Urchin - Rock Boring	0.62
Other Bivalve	1.03	Other Shell	0.5
Cone Shell	0.77	Mantis Shrimp	0.31
Conch - Scorpion Spider	0.63	Sea Cucumber - Pinkfish	0.29
Urchin - Rock Boring	0.62	Honeycomb Oyster	0.22
Other Shell	0.5	Sea Cucumber - Black Spotted	0.21

Functional Groups:

Per survey: ecosystem engineers 32.1, sensitive indicator species 37.9, charismatic species 6.3, benthic associates and predators 2.9. These groups overlap by design, a species can be both commercially important and charismatic, so they do not sum to total invertebrate density. A relatively high abundance of sensitive indicator species suggests conditions still suitable for disturbance-intolerant taxa; a high abundance of ecosystem engineers, mostly urchins, indicates that herbivory and bioerosion are active processes here.



Invertebrate Functional Groups. Invertebrate functional group density, Lutoban, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged). A species can belong to more than one group.

Long-term Context:

The 2017–19 baseline is 59.4 individuals and 7.8 species per survey. Density stands -22% against that and richness +26%. Richness figures in editions before 2026 divided a pooled species list by the number of surveys, which fell as survey effort rose. They are not comparable with these.

Ecological Interpretation:

Lutoban ranks second of the 8 sites surveyed in the municipality on invertebrate density and third on species richness. Urchin abundance is high. Urchins are effective algal grazers and keep settlement space open, but at sustained high density they also erode reef framework, so the benefit is not unbounded. Giant clams sit well below baseline. As a sessile, conspicuous and valuable species they are among the first taken and among the slowest to return. 70% of the invertebrates counted are on the commercially important list. A community that is mostly harvestable taxa is not automatically healthy, it usually means the abundant species happen to be targeted ones, here urchins, rather than that the harvested stocks are in good condition. The giant clam and sea cucumber figures are the better test of that, because they are the taxa fishers take first. Each species contributes 4.7 individuals per survey on average. A rising figure with flat richness means the same few taxa are becoming more abundant rather than the community broadening, which is the pattern that precedes an urchin-dominated reef. Invertebrate grazers now outnumber herbivorous fish here (26.4 urchins against 13.0 herbivorous fish per survey, damselfish set aside). Urchins and herbivorous fish are partial substitutes, but not equivalent: urchins graze slowly and erode limestone as they feed, so a reef whose grazing has shifted to invertebrates loses algae and framework at the same time. It is also a less stable arrangement, because urchin populations boom and crash on disease in a way fish populations do not. Giant clams and sea cucumbers together average under one individual per survey. Both are sessile or near-sessile, conspicuous and valuable, which makes them the most direct indicator of whether a site is actually being protected as opposed to declared, they cannot flee a diver and they do not recover quickly, so where they are absent, extraction has been sustained.

LUTOBAN GAC-ANG MPA

Tourism Value



Touristic Species		Mean Encounter Rate (%)	
Barracudas	13.6	Scorpaenidae	58
Cephalopods	13.4	Sharks	0.6
Cowries	28.6	Shrimps	51.8
Eels and Snakes	38.4	Slugs	81.2
Frogfish	4.7	Stingrays	1.6
Giant Clams	14.8	Syngnathidae and Pegasidae	12.8
Porcupinefish and Pufferfish	82.9	Turtles	21.8

Touristic species encounter rates. The percentage of dives at Lutoban in which each touristic group was recorded, current reporting period.

Despite underperforming as an MPA, Lutoban offers good tourism potential for invertebrate and reef-focused diving. The expansive seagrass beds in the shallows provide habitat for turtles, while nudibranchs and other sea slugs are particularly abundant. Although not fully represented in the encounter-rate data, rarer species such as flamboyant cuttlefish and blue-ringed octopuses have also been observed at the site, adding potential interest for experienced macro divers and underwater photographers. Bamboo sharks have also been recorded here, which is likely what the site's 0.6% shark encounter rate represents.

Lutoban MPA demonstrates strong tourism value, particularly for macro-divers, with very high encounter rates for slugs (81.2%) and porcupinefish and pufferfish (82.9%). Slugs are among the most frequently encountered groups at the site, while Scorpaenidae (58.0%), shrimps (51.8%) and eels and snakes (38.4%) provide additional opportunities for reef and macro-diving. Cephalopods (13.4%) are the highest recorded in the municipality, representing a useful source of specialised macro interest, while cowries (28.6%), frogfish (4.7%) and syngnathids and pegasids (12.8%) contribute further diversity.

Larger fauna are present but remain less frequent than at some other sites in Zamboanguita. Turtles were recorded in 21.8% of dives, providing regular but not highly reliable encounters with megafauna, while barracudas (13.6%) add some pelagic interest. Stingrays were encountered in only 1.6% of dives, and sharks were similarly rare (0.6%).

The occasional shark sightings nevertheless provide an additional high-value encounter for divers, although these should be considered opportunistic rather than a consistent tourism attraction.

Overall, Lutoban MPA provides a well-rounded diving experience with a clear strength in macrofauna and reef-associated biodiversity. Its high encounter rates for slugs and porcupinefish and pufferfish, together with strong sightings of Scorpaenidae, shrimps, and eels and snakes, provide a reliable foundation for recreational and macro-focused diving. The relatively frequent presence of cephalopods and the possibility of encountering rarer species such as flamboyant cuttlefish, blue-ringed octopuses and bamboo sharks further enhance its specialist appeal. While turtle encounters are more moderate and other megafauna are relatively uncommon, Lutoban's combination of abundant invertebrate life, seagrass habitat and occasional unusual species makes it a valuable complementary dive site within Zamboanguita.

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

Indicators At A Glance



Lutoban Pier is a **non-MPA reference site** in Zamboanguita. Hard coral cover is **41.1%** (fair on the national classification) and commercial fish biomass **12.94 kg per 150 m²**. This period rests on **40 surveys**, with 29 seasons on record since 2017.

Hard Coral Cover	Commercial Biomass	Fish Density	Bleaching
41.1% of substrate	12.9 kg / 150 m ²	845.3 / 150 m ²	1.9% of hard coral
▲ 25.4%	▲ 38.6%	▲ 12.1%	▼ 45.4%

Lutoban Pier indicators at a glance. Every headline indicator for Lutoban Pier, current reporting period, against this site's own preceding six months and the Zamboanguita average for the same period. Colour is keyed to whether the movement is favourable rather than to whether the number rose. Green indicates improvement, red indicates decline — e.g. macroalgae, rubble, bleaching or debris rising reads red, coral cover rising reads green. A change smaller than 5% is shown as flat.

Indicator	Current	Prior 6 months	Change	Zamboanguita Average
Hard coral cover (%)	41.1	32.8	▲ +25%	24.6
Macroalgae cover (%)	5.5	8.7	▼ -36%	10.5
Rubble (%)	11.7	12.1	▬ -4%	12.9
Bleaching (of hard coral) (%)	1.92	4.5	▼ -57%	1.96
Total fish density (per 150 m ²)	845	754	▲ +12%	727
Commercial fish biomass (kg per 150 m ²)	12.94	9.33	▲ +39%	17.82
Invertebrate density (per survey)	39.3	29.2	▲ +35%	38.8
Invertebrate species richness (species per survey)	8.8	8	▲ +10%	10.1
Coral predators (per survey)	52.5	46.6	▲ +13%	38.7
Marine debris (items per survey)	2.23	1.86	▲ +20%	2.77

What moved this period:

- Bleaching (of hard coral) substantially lower (-57%) — favourable
- Commercial fish biomass substantially higher (+39%) — favourable
- Macroalgae cover substantially lower (-36%) — favourable

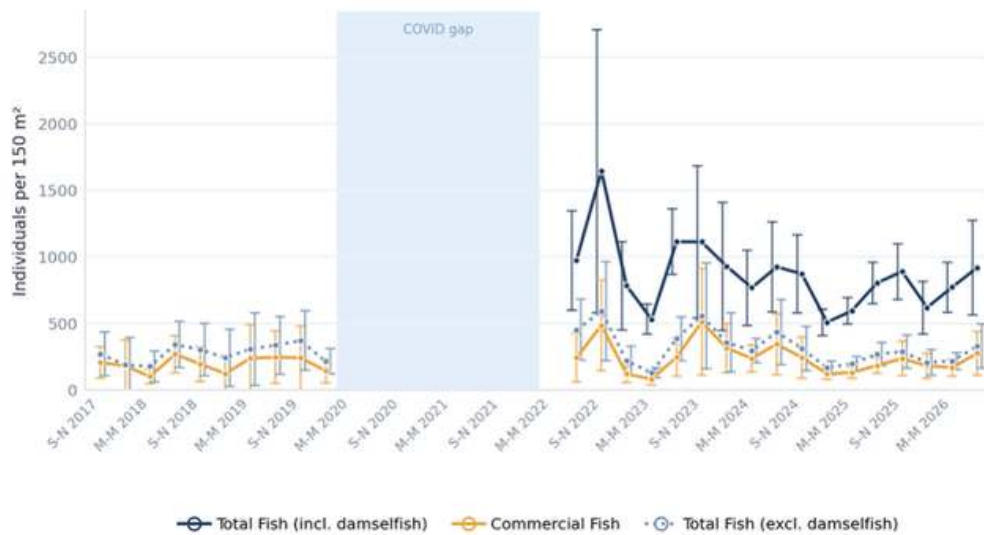
LUTOBAN PIER

Food Security

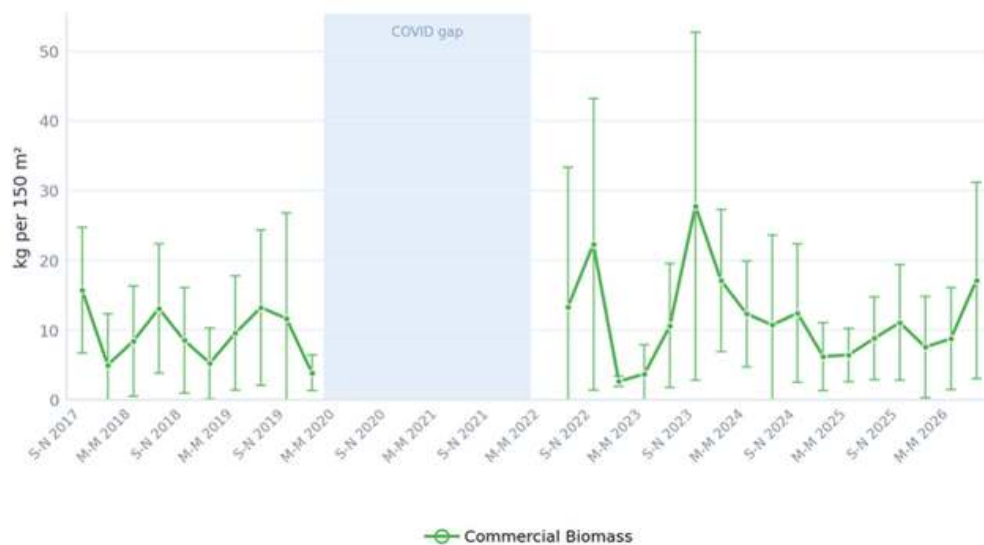


Current Status:

In March–August 2026, Lutoban Pier recorded an average total fish density of **845.3 individuals per 150 m²**, with commercial species contributing **221.8 individuals per 150 m²**. Commercial biomass averaged **12.94 kg per 150 m²**, equivalent to roughly **863 kg per hectare**, which sits in the moderately high range for the program. By dietary group the assemblage was led by herbivores (~579.3 ind.), planktivores (~131.7 ind.), carnivores (~104.7 ind.), corallivores (~12.6 ind.), detritivores (~10.0 ind.), omnivores (~4.0 ind.) and parasitivores (~3.0 ind.), so herbivores dominate the fish community at this scale.



Fish Density Trends. Total and commercial fish density at Lutoban Pier, 2017–2026.



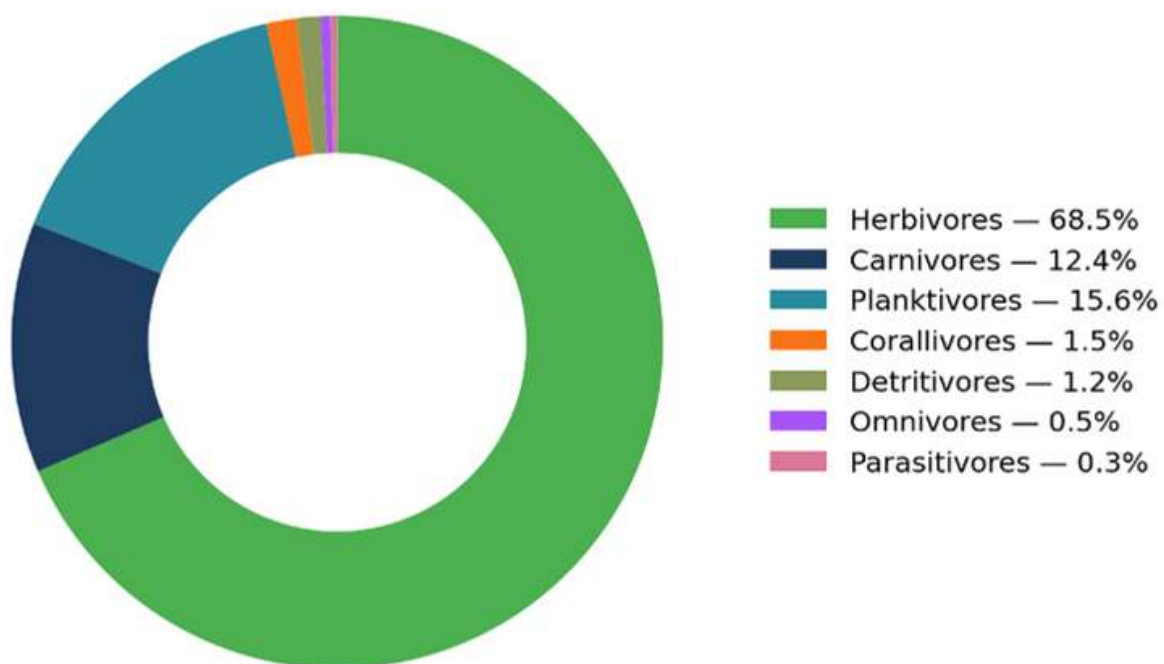
Commercial Biomass Trends. Commercial fish biomass at Lutoban Pier, 2017–2026.

Recent Change:

Against the preceding six months, total fish density is slightly higher (753.9 → 845.3 individuals per 150 m² including damselfish, 247.4 → 273.5 excluding them), commercial density slightly higher (208.9 → 221.8) and commercial biomass substantially higher (9.33 → 12.94 kg per 150 m²). Within the assemblage, herbivores moved 516.2 → 579.3, carnivores moved 98.1 → 104.7 and planktivores moved 114.2 → 131.7 individuals per 150 m².

Dietary structure:

By share of individuals the community is herbivores (68.5%), planktivores (15.6%) and carnivores (12.4%), with the remaining groups together making up 3.5%. Trophic structure matters because grazing species control algal growth and so mediate the competition between coral and algae described in the next section.



Dietary Composition. Share of fish recorded in each dietary group, Lutoban Pier, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged).

Commercial Groups:

The ten commercial fish families contributing most to biomass at Lutoban Pier this period are listed on the following page. Sub-types are rolled into their family. **Fusilier** is the largest single contributor at 5.98 kg per 150 m², 45.5% of commercial biomass. Larger predatory taxa (Snapper, Barracuda, Trevally) are present but at lower densities, so commercial biomass is carried largely by mid-sized and schooling species rather than by large predators. That is the pattern expected on reefs under fishing pressure, where the largest predatory fish are removed first.

Long-term Context:

The 2017–19 baseline for Lutoban Pier is 9.85 kg per 150 m² of commercial biomass and 271.1 fish per 150 m². Current biomass stands +31% against that baseline and density +1%.

Top commercial fish families. The ten commercial fish families contributing most to biomass at Lutoban Pier, current reporting period, with the share of commercial biomass each carries. Sub-types are rolled into their family.

Commercial Families	Biomass (kg/ 150 m ²)	Density (ind./150 m ²)	% of Commercial Biomass
Fusilier	5.98	85.5	45.5
Snapper	3.04	21.6	23.1
Unicornfish	0.89	6.3	6.8
Wrasse - Other	0.54	67.8	4.1
Barracuda	0.38	2.5	2.9
Bristletooth	0.36	10	2.8
Damselfish - Sergeantfish	0.36	9.3	2.8
Trevally	0.25	0.3	1.9
Triggerfish	0.24	2.5	1.8
Soldierfish	0.23	1.6	1.7

The highest commercial biomass on record here was 27.75 kg per 150 m² in Sep–Nov 2023. Current levels are 53% below it. Two protocol changes limit what the long record can be asked. Damselfish entered the list in 2022, so only the damselfish-excluded series is comparable across the full period; and fish size bins changed in 2025 with both schemes running side by side through 2025–26, which biases early biomass slightly low.

Ecological Interpretation:

Lutoban Pier ranks fourth of the 8 sites surveyed in the municipality on commercial biomass this period. Commercial biomass is above the 2017–19 baseline, consistent with a strong cohort working through the stock. Herbivores are only 6.1% of the fish counted once damselfish are set aside, a thin grazing guild for a reef of this type. Damselfish do not make up the difference: they defend small algal territories rather than grazing the reef broadly, so they add to the herbivore count without adding much grazing pressure.

Planktivores make up 44.8% of the assemblage. Planktivore abundance tracks current and plankton supply rather than reef condition, so it inflates total density without indicating recovery. The average commercial fish counted weighs about 58 g. Against the 2017–19 baseline of 51 g that is +16%. Mean size is holding up, which suggests individuals are surviving long enough to grow and that the size structure has not been truncated. Carnivores are 38.3% of the assemblage once damselfish are set aside, which is a high share. On a lightly fished reef the pyramid narrows towards the top; a wide carnivore band usually means small mid-water carnivores rather than large predators, so it should be read with the commercial table above rather than as evidence of an intact predator community.

LUTOBAN PIER

Reef Health And Resilience

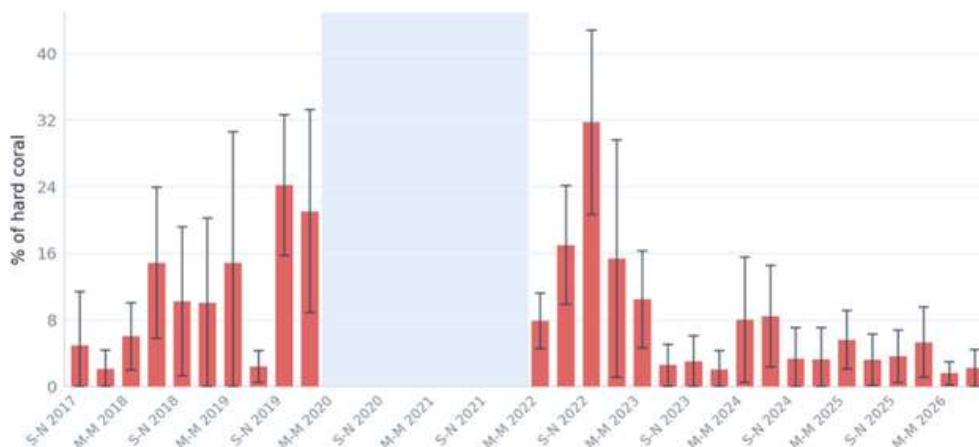


Current status:

During March–August 2026, Lutoban Pier recorded an average hard coral cover of **41.1%**, macroalgae of **5.5%** (11.1% once turf is included) and rubble of **11.7%**. Coral cover places the reef in the fair band of the Philippine classification. Bleaching affected 1.92% of hard coral, below the 5% level conventionally treated as a concern threshold, suggesting low thermal stress over the survey period. Beyond bleaching, 0.09% showed predation scarring; 0.36% was recently killed, as a share of all points. Overall the reef can be described as coral-dominated, with limited algal presence and moderate unconsolidated substrate.



Reef Substrate Trends. Hard coral, macroalgae and rubble cover at Lutoban Pier, 2017–2026. Solid line is macroalgae alone; dashed adds turf, the pre-2026 published definition.



Bleaching Incidence. Bleached coral as a percentage of hard coral cover at Lutoban Pier, by season. Combines partially and fully bleached records.

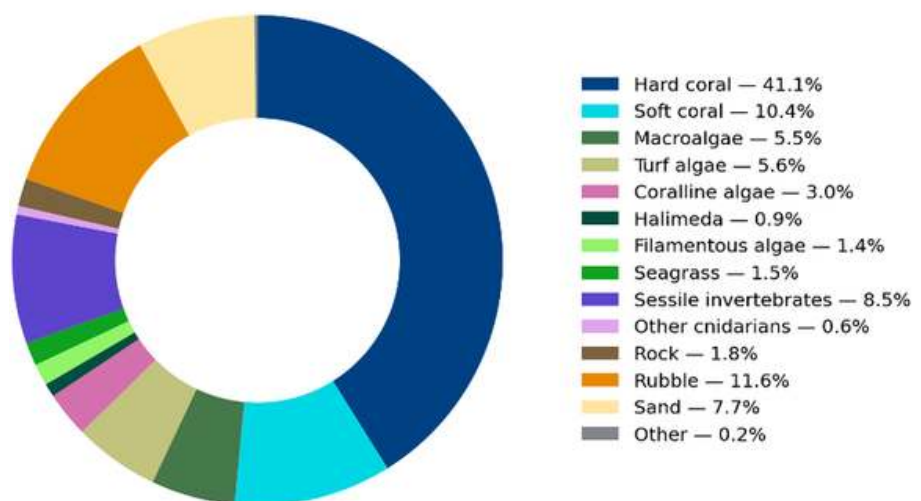
Recent Change:

Compared with the preceding six months, hard coral cover is notably higher (32.8 → 41.1%), macroalgae substantially lower (8.7 → 5.5%), rubble little changed (12.1 → 11.7%) and bleaching substantially lower (4.50 → 1.92%). No component moved sharply enough to suggest an acute disturbance in the period, despite super typhoon Inday and super typhoon Kiyapo inside it. Either the sites were sheltered from the worst of it, or the damage is masked by averaging the storm season together with the calm one before it.

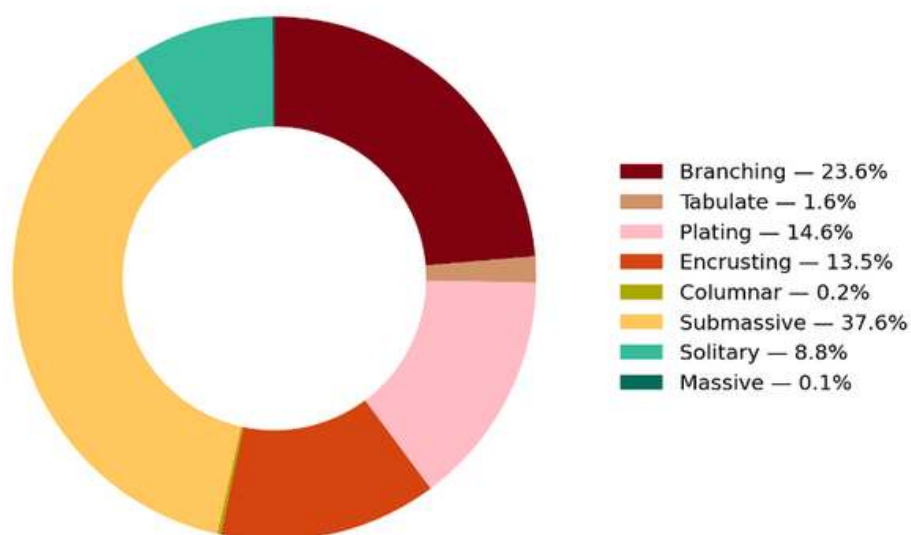
Structural implications:

Of all points recorded, 41.1% is living hard coral, 13.5% is fleshy algae competing for the same space, 19.4% is unconsolidated material (rubble and sand), 4.8% is consolidated surface available for settlement (bare rock and coralline algae) and 21.0% is occupied by other stable but non-reef-building life, soft corals, sessile invertebrates and seagrass. The combination of fair coral cover and relatively low rubble (11.7%) indicates that most of the reef framework is stable and physically suitable for coral growth and recruitment. Sand accounts for a further 7.8% of points, which is habitat rather than damage. Macroalgae has fallen against the preceding six months (-36%), which suggests algal competition is easing and more substrate is becoming available for coral settlement. That may reflect grazing pressure or simply favourable conditions, and one period is not a trend, but the direction is the favourable one.

Substrate Composition. Full substrate composition, Lutoban Pier, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged). Each category is a share of all points recorded on the transect.



Within the living coral, growth form determines how much shelter the reef offers and how well it resists disturbance; this protocol records no rugosity, so growth form is the closest available proxy for structural complexity. The cover present is led by submassive (37.6%), branching (23.6%) and plating (14.6%). On MCP's classification, resistance to disturbance, not shelter, 53.3% of the coral sits in low-resilience forms and 8.9% in high-resilience forms. Most of the cover is therefore in forms that provide good shelter but are first to be lost in a thermal or storm event, so the headline cover figure is more fragile than it appears. Taken together, fair coral cover at 41.1%, macroalgae at 5.5% and rubble at 11.7%, this is a reef in a **clearly coral-dominated state**, shaped by both physical disturbance (the unconsolidated fraction) and biological competition (the algal fraction). Neither is currently at a level that would obviously prevent recovery.



Coral Growth Forms. Share of hard coral in each growth form at Lutoban Pier, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged). Forms are ordered from least to most resilient: low resilience covers branching, tabulate, plating, encrusting and *Tubastraea*; medium covers columnar and submassive; high covers solitary and massive.

Long-term Context:

Against the 2017–19 baseline of 46.6% hard coral, 3.5% macroalgae and 4.6% rubble, coral cover is -12%, macroalgae +59% and rubble +157%. Coral cover peaked at 56.8% in Dec–Feb 2017/18 and now stands 41.1%. Bleaching peaked at 31.8% of hard coral in Sep–Nov 2022, and has remained below the 5% concern level for the last 2 seasons, since Mar–May 2026.

Ecological Interpretation:

Lutoban Pier ranks first of the 8 sites surveyed in the municipality on hard coral cover and second on macroalgae, counting the least algal site first. Of the coral present, 39.8% is in fast-growing forms (branching, tabulate, plating) and 51.2% in slow, robust ones (massive, submassive, encrusting). That ratio sets how quickly cover can rebuild and how much survives a disturbance, and the two pull against each other: the fast forms drive recovery but are the first lost, the slow ones persist but add cover at a fraction of the rate. A cover figure held up mostly by slow forms is stable but will rebuild slowly from any loss, so recovery here should be measured in decades rather than seasons. For every point of substrate a coral larva could settle on, there are 2.8 points already held by fleshy algae. There is workable settlement space relative to algal cover, so recruitment is not obviously space-limited, which makes larval supply and post-settlement survival the things to look at if cover is not rebuilding.

LUTOBAN PIER

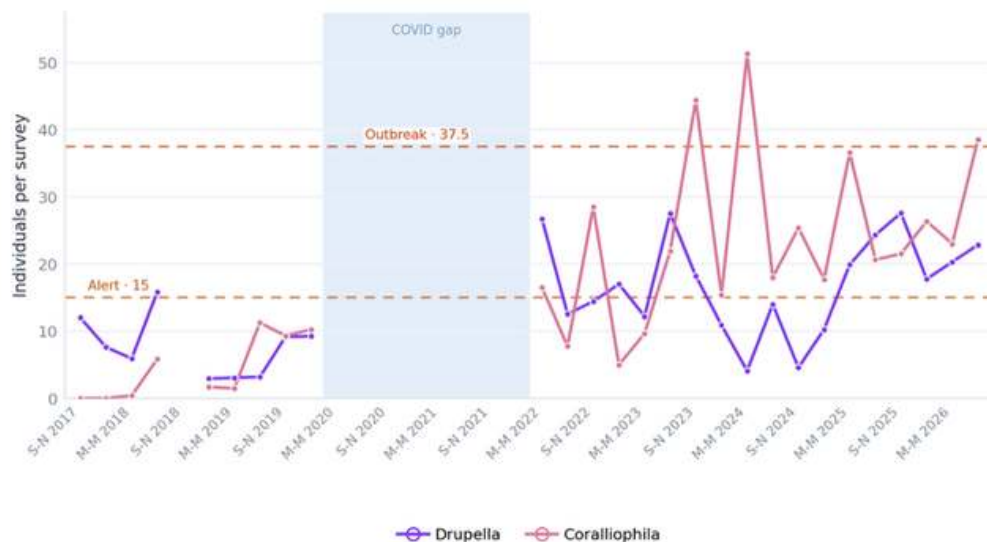
Predation and Marine Debris



Current Status:

Drupella averaged **21.6 per survey** (above the alert threshold) and Coralliophila **30.8** (above the alert threshold), giving a combined corallivorous snail load of 52.4 per survey. Crown of Thorns averaged 0.132 per survey (above the alert threshold).

Marine debris averaged **2.23 items per survey**. By category it breaks down as fishing gear 1.80 (81%), consumer plastics 0.36 (16%), household & sanitary 0.05 (2%) and other debris 0.03 (1%). The categories are mutually exclusive and sum to the total, so nothing is double-counted between them. Fishing gear is the largest category at 81% of items. That is a sea-based source: gear lost or discarded by boats working the reef, which responds to gear marking, retrieval dives and work with fishers rather than to municipal waste collection.



Coral Predators. Corallivorous snail abundance at Lutoban Pier, 2017-2026. Drupella and Coralliophila share one threshold set and one axis. Dashed rules mark MCP management thresholds — alert 15, outbreak 37.5, extreme 75 per survey.



Crown of Thorns. Crown of Thorns abundance at Lutoban Pier, 2017-2026. Dashed rules mark MCP management thresholds for Crown of Thorns (alert 0.1125, outbreak 0.225, extreme 0.45 per survey).

Recent Change:

Against the preceding six months, *Drupella* is little changed (22.7 → 21.6), *Coralliophila* notably higher (23.9 → 30.8), Crown of Thorns not comparable (0.000 → 0.132) and debris notably higher (1.86 → 2.23 items per survey).



Marine Debris. Marine debris at Lutoban Pier, current reporting period. The centre figure is total items per survey and the ring is what that total is made of; the categories are mutually exclusive, so the slices sum to the centre figure. The sparkline is the site's own total debris per survey across the full record, 2017–2026, with the COVID gap left empty.

Long-term Context:

The 2017–19 baseline is 7.2 *Drupella*, 3.0 *Coralliophila* and 0.035 Crown of Thorns per survey, with 1.68 debris items. Current levels stand +199%, +941%, +276% and +33% against those. *Drupella* peaked at 27.6 per survey in Sep–Nov 2025. These figures pool all depths. *Drupella* is roughly eleven times more abundant shallow than deep, so we have a depth-resolved workbook, where we can detect outbreaks in the shallows.

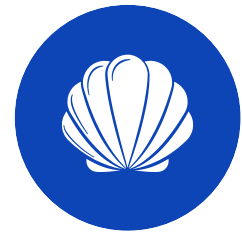
Ecological Interpretation:

Combined snail abundance is at outbreak level. *Drupella* and *Coralliophila* aggregate on already-stressed colonies, so high counts often follow coral damage rather than initiate it, but once aggregated they suppress the recovery of the colonies that survived. More than half the debris recorded (80.5%) is fishing gear. That is a different management problem from land-based waste: it points at gear loss by fishers working the reef and responds to gear marking, retrieval and fisher engagement rather than to municipal waste collection.

On management: corallivorous snails can be removed by hand and that is the standard response above outbreak level, but removal only works if it is repeated, the snails recruit from surrounding reef and a single clearance is recolonised. Directing effort at the aggregations on living coral, rather than spreading it across the site, is what makes the effort worthwhile. The debris is a fisheries problem before it is a waste problem. Lost gear keeps fishing after it is lost, so it is both a debris indicator and a mortality source, and it accumulates on exactly the structure that snags it, the high-relief coral that matters most. Gear marking and retrieval dives address it; municipal collection does not.

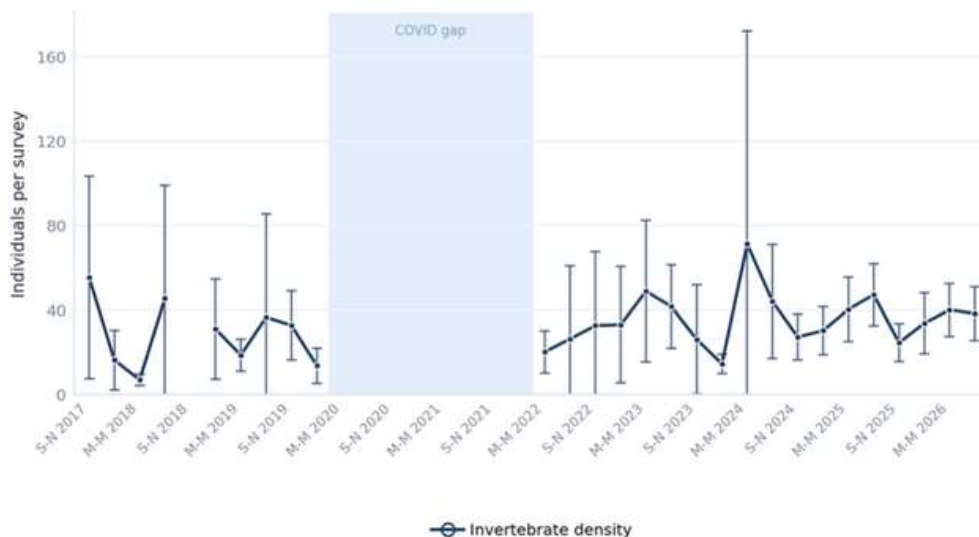
LUTOBAN PIER

Invertebrate Status

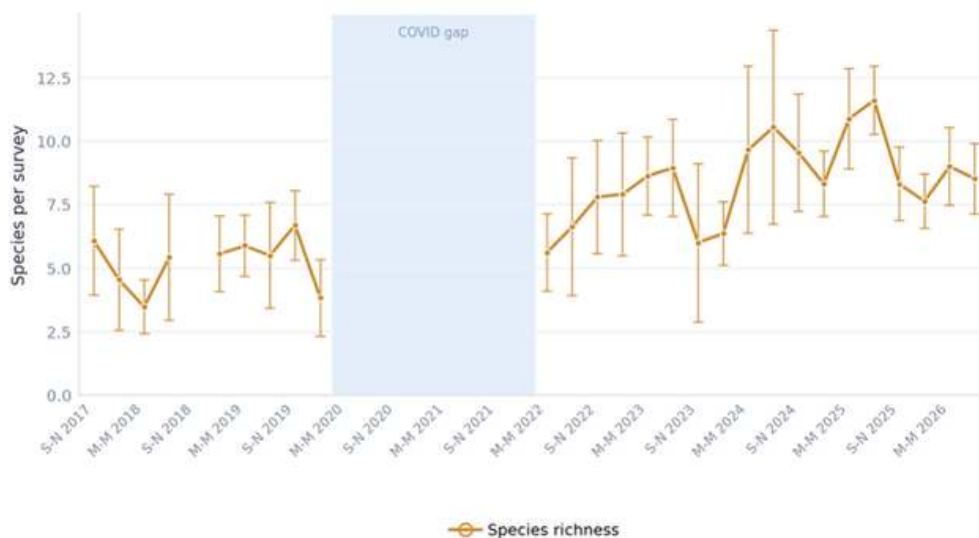


Current Status:

Lutoban Pier supported an average invertebrate density of **39.3 individuals per survey**, drawn from **8.8 distinct species per survey**.



Invertebrate Density. Total invertebrate density at Lutoban Pier, 2017-2026.



Invertebrate Species Richness. Invertebrate species richness at Lutoban Pier, 2017-2026.

Recent Change:

Against the preceding six months, density is substantially higher (29.2 → 39.3 per survey), richness slightly higher (8.0 → 8.8 species) and commercially important species substantially higher (20.4 → 28.2).

Commercial Groups:

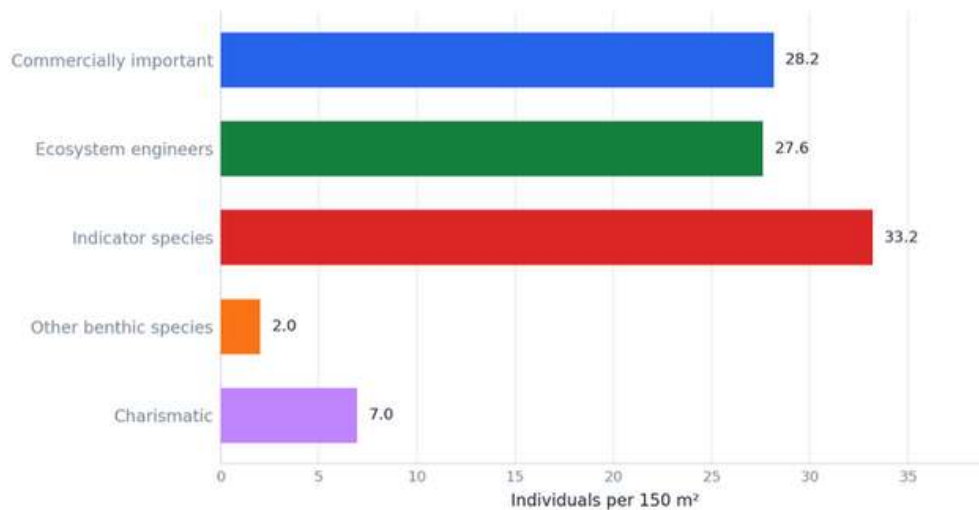
Commercially important invertebrates averaged 28.2 per survey, 71.7% of all invertebrates counted. Within the key harvested groups, urchins averaged 23.4 per survey, sea cucumbers 0.84 and giant clams 0.38. Those ten total 26.87 individuals per survey, 68% of all invertebrates counted, led by Urchin - Diadema at 23.01 per survey. The community is dominated by sea urchins. Their grazing helps keep settlement space open for coral recruitment, so high urchin abundance is a mixed signal rather than a bad one, beneficial for recruitment, but at sustained high density urchins also erode reef framework.

Most abundant invertebrate taxa. The ten most abundant invertebrates (left), and the ten most abundant commercially important invertebrates (right) by density at Lutoban Pier.

Top 10 Invertebrates	Individuals per 150 m ²	Top 10 Commercial	Individuals per 150 m ²
Urchin - Diadema	23.01	Urchin - Diadema	23.01
Nudibranch	4.73	Cone Shell	0.76
Sea Star	2.49	Sea Cucumber - Black Spotted	0.75
Lionfish	1.24	Other Shell	0.54
Cleaner Shrimp - Banded Coral	0.82	Cowrie - Tiger	0.54
Cone Shell	0.76	Giant Clam	0.36
Sea Cucumber - Black Spotted	0.75	Top - Nilo	0.25
Cushion Star	0.68	Urchin - Other	0.23
Other Shell	0.54	Other Bivalve	0.23
Cowrie - Tiger	0.54	Mantis Shrimp	0.21

Functional Groups:

Per survey: ecosystem engineers 27.6, sensitive indicator species 33.2, charismatic species 7.0, benthic associates and predators 2.0. These groups overlap by design, a species can be both commercially important and charismatic, so they do not sum to total invertebrate density. A relatively high abundance of sensitive indicator species suggests conditions still suitable for disturbance-intolerant taxa; a high abundance of ecosystem engineers, mostly urchins, indicates that herbivory and bioerosion are active processes here.



Invertebrate Functional Groups. Invertebrate functional group density, Lutoban Pier, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged). A species can belong to more than one group.

Long-term Context:

The 2017–19 baseline is 30.1 individuals and 5.2 species per survey. Density stands +30% against that and richness +68%. Richness figures in editions before 2026 divided a pooled species list by the number of surveys, which fell as survey effort rose. They are not comparable with these.

Ecological Interpretation:

Lutoban Pier ranks third of the 8 sites surveyed in the municipality on invertebrate density and seventh on species richness. 72% of the invertebrates counted are on the commercially important list. A community that is mostly harvestable taxa is not automatically healthy, it usually means the abundant species happen to be targeted ones, here urchins, rather than that the harvested stocks are in good condition. The giant clam and sea cucumber figures are the better test of that, because they are the taxa fishers take first. Each species contributes 4.5 individuals per survey on average. A rising figure with flat richness means the same few taxa are becoming more abundant rather than the community broadening, which is the pattern that precedes an urchin-dominated reef.

Invertebrate grazers now outnumber herbivorous fish here (23.4 urchins against 16.7 herbivorous fish per survey, damselfish set aside). Urchins and herbivorous fish are partial substitutes, but not equivalent: urchins graze slowly and erode limestone as they feed, so a reef whose grazing has shifted to invertebrates loses algae and framework at the same time. It is also a less stable arrangement, because urchin populations boom and crash on disease in a way fish populations do not.

LUTOBAN PIER

Tourism Value



Touristic Species		Mean Encounter Rate (%)	
Barracudas	11	Scorpaenidae	53.8
Cephalopods	5.9	Sharks	0
Cowries	31.8	Shrimps	51
Eels and Snakes	27.6	Slugs	77.2
Frogfish	2	Stingrays	0
Giant Clams	32.9	Syngnathidae and Pegasidae	9.9
Porcupinefish and Pufferfish	88	Turtles	33.2

Touristic species encounter rates. The percentage of dives at Lutoban Pier in which each touristic group was recorded, current reporting period.

Lutoban Pier is not particularly known for an abundance of charismatic species, although turtles are encountered relatively regularly at the site, with their presence supported by the seagrass beds found in the shallows. The site is also interesting for its substrate composition, which features large, relatively uniform patches of the same coral type and can provide an enjoyable and distinctive diving experience. Harlequin shrimp have been recorded here, a high-value subject for macro photographers that the broader shrimp group does not distinguish. However, the lack of reasonable land-based access and limited infrastructure constrain its current potential as a dive tourism destination, meaning that the site is most practically accessed by boat.

Lutoban Pier demonstrates good tourism potential for reef and macro-diving, with high encounter rates for porcupinefish and pufferfish (88.0%) and slugs (77.2%). Giant clams (32.9%) are also relatively prominent, providing an additional attraction for divers interested in benthic biodiversity and the second-highest rate in the municipality after Dalakit. Scorpaenidae (53.8%), shrimps (51.0%) and cowries (31.8%) contribute further to the site's reef and macro-diving appeal, while eels and snakes (27.6%) provide additional reef-associated diversity. Cephalopods (5.9%), frogfish (2.0%) and syngnathids and pegasids (9.9%) occur less frequently but provide occasional opportunities for specialised macro observation and underwater photography.

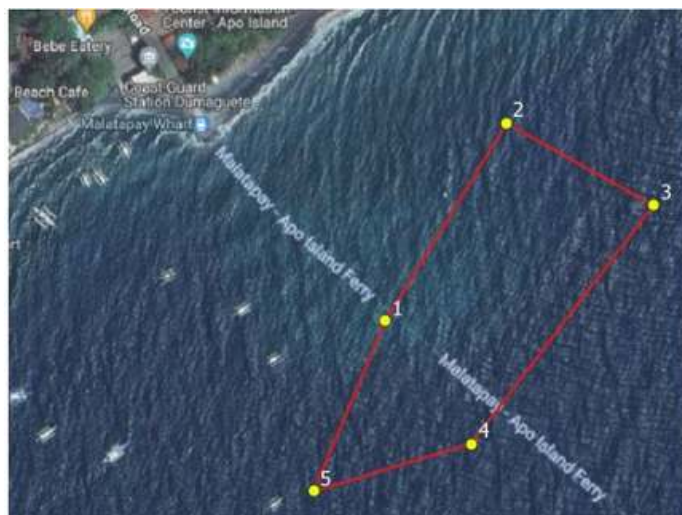
Lutoban Pier also provides a moderate opportunity for encounters with larger marine wildlife. Turtles were recorded in 33.2% of dives, almost exactly the municipality-wide average of 33.3%, making them an important component of the site's tourism appeal. Barracudas were encountered in 11.0% of dives, providing some additional pelagic interest, although stingrays and sharks were not recorded during the monitoring period. The site's megafauna value is therefore centred primarily on turtles rather than a broad range of large charismatic species.

Overall, Lutoban Pier offers a balanced diving experience, with its strongest tourism value coming from reliable reef and macrofaunal encounters combined with regular turtle sightings. Its distinctive coral substrate, shallow seagrass habitat and occasional harlequin shrimp further contribute to the character of the site. However, limited access and infrastructure remain significant constraints to developing Lutoban Pier as a more accessible dive tourism destination. With boat support, the site nevertheless offers a worthwhile experience for divers interested in reef biodiversity, macrofauna and turtles.

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

Indicators At A Glance



Malatipay is a marine protected area in Zamboanguita. Hard coral cover is **22.6%** (poor on the national classification) and commercial fish biomass **19.16 kg per 150 m²**. This period rests on **42 surveys**, with 28 seasons on record since 2017.

Hard Coral Cover	Commercial Biomass	Fish Density	Bleaching
22.6% of substrate	19.2 kg / 150 m ²	623.3 / 150 m ²	1% of hard coral
— 1.5%	▼ 13.6%	— 1%	▼ 67.8%

Malatipay indicators at a glance. Every headline indicator for Malatipay, current reporting period, against this site's own preceding six months and the Zamboanguita average for the same period. Colour is keyed to whether the movement is favourable rather than to whether the number rose. Green indicates improvement, red indicates decline — e.g. macroalgae, rubble, bleaching or debris rising reads red, coral cover rising reads green. A change smaller than 5% is shown as flat.

Indicator	Current	Prior 6 months	Change	Zamboanguita Average
Hard coral cover (%)	22.6	22.3	— +2%	24.6
Macroalgae cover (%)	12.7	16.1	▼ -21%	10.5
Rubble (%)	25.2	19.7	▲ +28%	12.9
Bleaching (of hard coral) (%)	0.95	2.95	▼ -68%	1.96
Total fish density (per 150 m ²)	623	617	— +1%	727
Commercial fish biomass (kg per 150 m ²)	19.16	22.18	▼ -14%	17.82
Invertebrate density (per survey)	25.9	22.4	▲ +15%	38.8
Invertebrate species richness (species per survey)	9.3	8.2	▲ +13%	10.1
Coral predators (per survey)	46	36.8	▲ +25%	38.7
Marine debris (items per survey)	1.66	2.36	▼ -30%	2.77

What moved this period:

- Bleaching (of hard coral) substantially lower (-68%) — favourable
- Marine debris notably lower (-30%) — favourable
- Rubble notably higher (+28%) — unfavourable

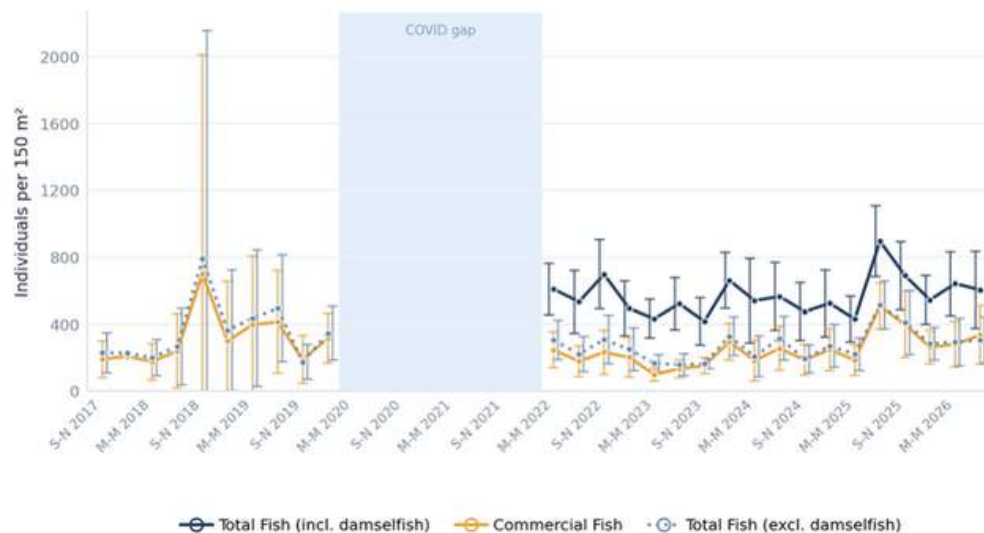
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Food Security



Current Status:

In March–August 2026, Malatapay recorded an average total fish density of **623.3 individuals per 150 m²**, with commercial species contributing **307.2 individuals per 150 m²**. Commercial biomass averaged **19.16 kg per 150 m²**, equivalent to roughly **1,277 kg per hectare**, which sits in the high range for the program. By dietary group the assemblage was led by herbivores (~307.2 ind.), planktivores (~150.9 ind.), carnivores (~137.5 ind.), detritivores (~14.8 ind.), corallivores (~8.5 ind.), omnivores (~3.0 ind.) and parasitivores (~1.5 ind.), so herbivores dominate the fish community at this scale.



Fish Density Trends. Total and commercial fish density at Malatapay, 2017–2026.



Commercial Biomass Trends. Commercial fish biomass at Malatapay, 2017–2026.

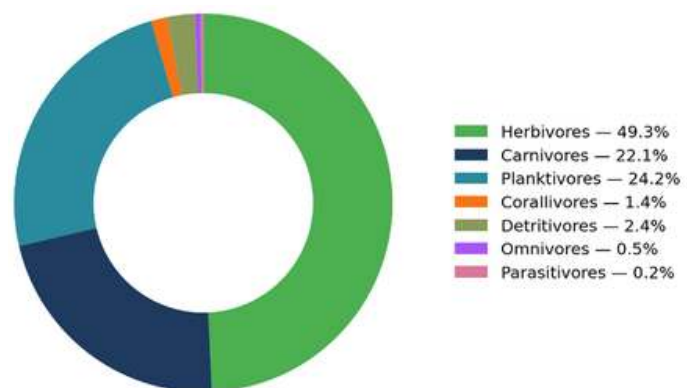
Recent Change:

Against the preceding six months, total fish density is little changed (617.4 → 623.3 individuals per 150 m² including damselfish, 346.4 → 298.9 excluding them), commercial density slightly lower (329.9 → 307.2) and commercial biomass slightly lower (22.18 → 19.16 kg per 150 m²). Within the assemblage, herbivores moved 275.5 → 307.2, carnivores moved 157.5 → 137.5 and planktivores moved 153.7 → 150.9 individuals per 150 m².

Dietary Structure:

By share of individuals the community is herbivores (49.3%), planktivores (24.2%) and carnivores (22.1%), with the remaining groups together making up 4.5%. Trophic structure matters because grazing species control algal growth and so mediate the competition between coral and algae described in the next section.

Dietary Composition. Share of fish recorded in each dietary group, Malatapay, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged).



Top commercial fish families. The ten commercial fish families contributing most to biomass at Malatapay, current reporting period, with the share of commercial biomass each carries. Sub-types are rolled into their family.

Commercial Families	Biomass (kg/ 150 m ²)	Density (ind./150 m ²)	% of Commercial Biomass
Snapper	6.94	40.9	36.2
Fusilier	5.44	103	28.4
Damselfish - Sergeantfish	2.07	38.5	10.8
Barracuda	1.09	13.2	5.7
Wrasse - Other	0.77	66.8	4
Bristletooth	0.76	14.8	3.9
Goatfish	0.39	7.6	2
Parrotfish	0.25	3.3	1.3
Triggerfish	0.25	1.8	1.3
Unicornfish	0.22	3.2	1.1

Commercial Groups:

Snapper is the largest single contributor at 6.94 kg per 150 m², 36.2% of commercial biomass. Larger predatory taxa (Snapper, Barracuda) are present but at lower densities, so commercial biomass is carried largely by mid-sized and schooling species rather than by large predators. That is the pattern expected on reefs under fishing pressure, where the largest predatory fish are removed first.

Long-term context:

The 2017–19 baseline for Malatapay is 19.28 kg per 150 m² of commercial biomass and 375.5 fish per 150 m². Current biomass stands -1% against that baseline and density -20%. The highest commercial biomass on record here was 39.36 kg per 150 m² in Sep–Nov 2018. Current levels are 51% below it.

Ecological interpretation:

Malatapay ranks second of the 8 sites surveyed in the municipality on commercial biomass this period. Herbivores are only 7.1% of the fish counted once damselfish are set aside, a thin grazing guild for a reef of this type. Damselfish do not make up the difference: they defend small algal territories rather than grazing the reef broadly, so they add to the herbivore count without adding much grazing pressure. With macroalgae at 12.7% of substrate, the combination is consistent with grazing pressure being insufficient to hold algal cover down, the mechanism that keeps a reef on the algal side of a phase shift once it arrives there. Planktivores make up 37.6% of the assemblage. Planktivore abundance tracks current and plankton supply rather than reef condition, so it inflates total density without indicating recovery.

The average commercial fish counted weighs about 62 g. Against the 2017–19 baseline of 59 g that is +6%. Mean size is holding up, which suggests individuals are surviving long enough to grow and that the size structure has not been truncated. Carnivores are 46.0% of the assemblage once damselfish are set aside, which is a high share. On a lightly fished reef the pyramid narrows towards the top; a wide carnivore band usually means small mid-water carnivores rather than large predators, so it should be read with the commercial table above rather than as evidence of an intact predator community. At roughly 1,277 kg per hectare, standing commercial stock is high by regional standards and comparable with well-enforced reserves.

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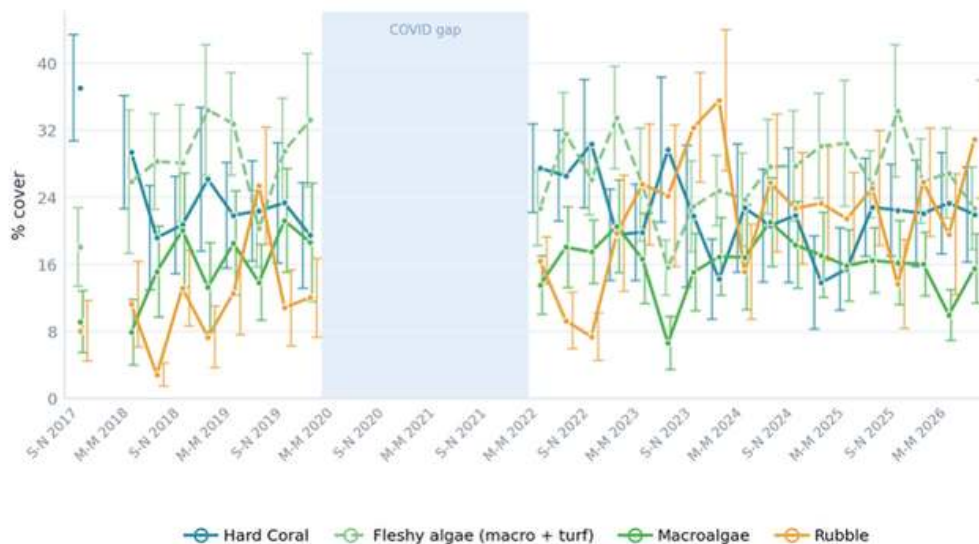
Reef Health And Resilience



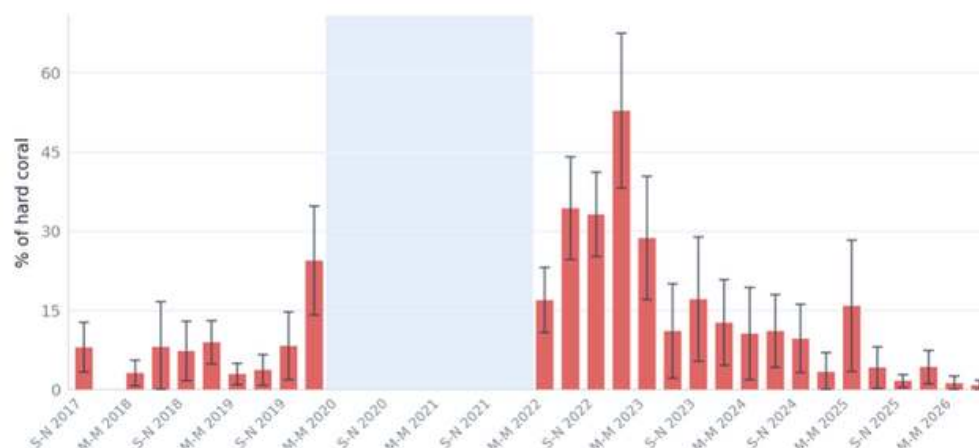
Current status:

During March–August 2026, Malatapay recorded an average hard coral cover of **22.6%**, macroalgae of **12.7%** (24.8% once turf is included) and rubble of **25.2%**. Coral cover places the reef in the poor band of the Philippine classification.

Bleaching affected 0.95% of hard coral, below the 5% level conventionally treated as a concern threshold, suggesting low thermal stress over the survey period. Beyond bleaching, 0.07% was diseased; 0.13% was recently killed, as a share of all points. Overall the reef can be described as coral-dominated, with noticeable algal presence and substantial unconsolidated substrate.



Reef Substrate Trends. Hard coral, macroalgae and rubble cover at Malatapay, 2017-2026. Solid line is macroalgae alone; dashed adds turf, the pre-2026 published definition.



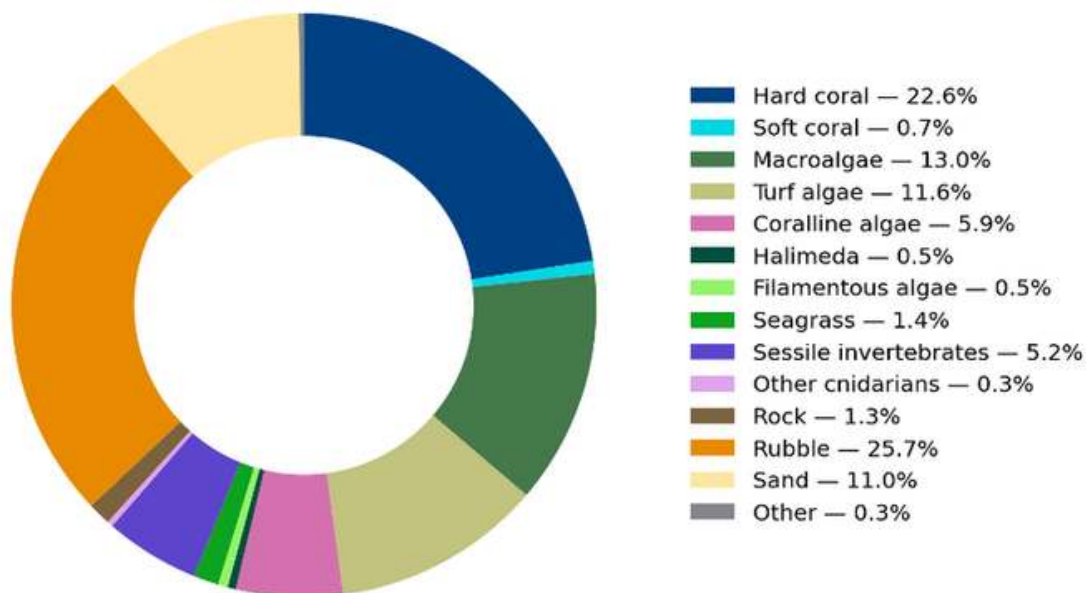
Bleaching Incidence. Bleached coral as a percentage of hard coral cover at Malatapay, by season. Combines partially and fully bleached records.

Recent change:

Compared with the preceding six months, hard coral cover is little changed (22.3 → 22.6%), macroalgae notably lower (16.1 → 12.7%), rubble notably higher (19.7 → 25.2%) and bleaching substantially lower (2.95 → 0.95%). Taken together this indicates more unconsolidated substrate. Super Typhoon Inday and Super Typhoon Kiyapo crossed the area inside this reporting period, so physical damage is the first explanation for this.

Structural implications:

The benthic composition sets the terms for everything above it. Of all points recorded, 22.6% is living hard coral, 25.6% is fleshy algae competing for the same space, 36.8% is unconsolidated material (rubble and sand), 7.1% is consolidated surface available for settlement (bare rock and coralline algae) and 7.7% is occupied by other stable but non-reef-building life, soft corals, sessile invertebrates and seagrass. The combination of poor coral cover and rubble at 25.2% indicates that substrate instability is likely to be limiting recruitment in places: rubble moves in swell, and larvae that settle on it are abraded or buried before they can consolidate, so rubble fields tend to persist rather than recover on their own. Sand adds a further 11.0%, bringing the unconsolidated fraction to 36.8% in total. Macroalgae has fallen against the preceding six months (-21%), which suggests algal competition is easing and more substrate is becoming available for coral settlement. That may reflect grazing pressure or simply favourable conditions, and one period is not a trend, but the direction is the favourable one.

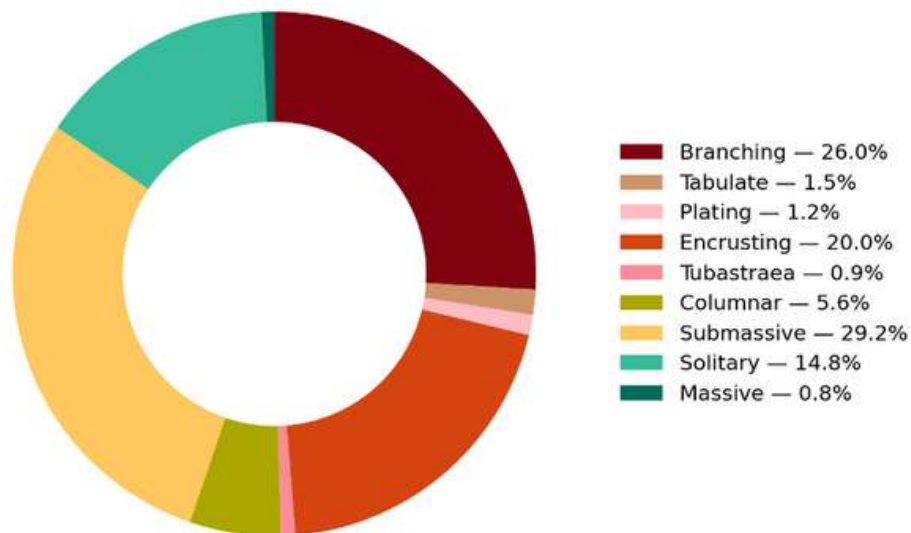


Substrate Composition. Full substrate composition, Malatapay, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged).

Within the living coral, growth form determines how much shelter the reef offers and how well it resists disturbance; this protocol records no rugosity, so growth form is the closest available proxy for structural complexity. The cover present is led by submassive (29.2%), branching (26.0%) and encrusting (20.0%).

On MCP's classification, resistance to disturbance, not shelter, 49.6% of the coral sits in low-resilience forms and 15.6% in high-resilience forms.

Taken together, poor coral cover at 22.6%, macroalgae at 12.7% and rubble at 25.2%, this is a reef in a **transitional** state, shaped by both physical disturbance (the unconsolidated fraction) and biological competition (the algal fraction). Both are currently at levels that would slow any recovery from here.



Coral Growth Forms. Share of hard coral in each growth form at Malatapay, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged). Forms are ordered from least to most resilient: low resilience covers branching, tabulate, plating, encrusting and Tubastraea; medium covers columnar and submassive; high covers solitary and massive.

Long-term Context:

Against the 2017–19 baseline of 25.2% hard coral, 14.0% macroalgae and 11.5% rubble, coral cover is -10%, macroalgae -9% and rubble +119%. Coral cover peaked at 37.1% in Sep–Nov 2017 and now stands 22.6%. Bleaching peaked at 52.8% of hard coral in Dec–Feb 2022/23, and has remained below the 5% concern level for the last 5 seasons, since Jun–Aug 2025. Two definitions changed for this edition and are not comparable with earlier reports: macroalgae is now macroalgae alone rather than macroalgae plus turf, and bleaching is a share of hard coral rather than of all substrate points, which makes it read three to four times higher on identical observations.

Ecological Interpretation:

Malatapay ranks fourth of the 8 sites surveyed in the municipality on hard coral cover and seventh on macroalgae, counting the least algal site first. Bleaching has stayed below the concern threshold for 5 consecutive seasons, which has allowed partial stabilisation; the reef is in a phase of cautious stabilisation rather than active recovery. With cover in the poor band this reef has little margin: a single disturbance removes a large share of what remains, and recovery from a low base is slow.

Of the coral present, 28.8% is in fast-growing forms (branching, tabulate, plating) and 50.0% in slow, robust ones (massive, submassive, encrusting). That ratio sets how quickly cover can rebuild and how much survives a disturbance, and the two pull against each other: the fast forms drive recovery but are the first lost, the slow ones persist but add cover at a fraction of the rate. A cover figure held up mostly by slow forms is stable but will rebuild slowly from any loss, so recovery here should be measured in decades rather than seasons. For every point of substrate a coral larva could settle on, there are 3.6 points already held by fleshy algae. Settlement space is the binding constraint on recovery here, not larval supply: even a good recruitment year has little bare ground to land on.

Of the pressures acting here, the ones open to local action are enforcement, the herbivore populations that hold algae down, and the physical impacts that break coral and make rubble, anchoring, destructive fishing and trampling. Thermal stress is not one of them, which is why the bleaching figure is reported as context rather than as something to manage.

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Predation and Marine Debris

Current Status:

Drupella averaged **24.8 per survey** (above the alert threshold) and Coralliophila **21.2** (above the alert threshold), giving a combined corallivorous snail load of 46.0 per survey. Crown of Thorns averaged 0.000 per survey (below the alert threshold).

Marine debris averaged **1.66 items per survey**. By category it breaks down as fishing gear 1.07 (64%), consumer plastics 0.48 (29%) and household & sanitary 0.12 (7%). The categories are mutually exclusive and sum to the total, so nothing is double-counted between them. Fishing gear is the largest category at 64% of items. That is a sea-based source: gear lost or discarded by boats working the reef, which responds to gear marking, retrieval dives and work with fishers rather than to municipal waste collection.



Coral Predators. Corallivorous snail abundance at Malatapay, 2017-2026. Drupella and Coralliophila share one threshold set and one axis. Dashed rules mark MCP management thresholds — alert 15, outbreak 37.5, extreme 75 per survey.



Crown of Thorns. Crown of Thorns abundance at Malatapay, 2017-2026. Dashed rules mark MCP management thresholds for Crown of Thorns (alert 0.1125, outbreak 0.225, extreme 0.45 per survey).

Recent Change:

Against the preceding six months, *Drupella* is substantially higher (18.8 → 24.8), *Coralliophila* notably higher (17.9 → 21.2), Crown of Thorns substantially lower (0.053 → 0.000) and debris notably lower (2.36 → 1.66 items per survey).



Marine Debris. Marine debris at Malatapay, current reporting period. The centre figure is total items per survey and the ring is what that total is made of; the categories are mutually exclusive, so the slices sum to the centre figure. The sparkline is the site's own total debris per survey across the full record, 2017–2026, with the COVID gap left empty.

Long-term Context:

The 2017–19 baseline is 30.1 *Drupella*, 3.7 *Coralliophila* and 0.161 Crown of Thorns per survey, with 3.04 debris items. Current levels stand -18%, +466%, -100% and -45% against those. *Drupella* peaked at 112.5 per survey in Dec–Feb 2017/18. These figures pool all depths. *Drupella* is roughly eleven times more abundant shallow than deep, so we have a depth-resolved workbook, where we can detect outbreaks in the shallows.

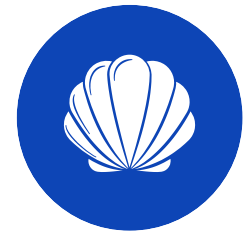
Ecological Interpretation:

Combined snail abundance is at outbreak level. *Drupella* and *Coralliophila* aggregate on already-stressed colonies, so high counts often follow coral damage rather than initiate it, but once aggregated they suppress the recovery of the colonies that survived. More than half the debris recorded (64.1%) is fishing gear. That is a different management problem from land-based waste: it points at gear loss by fishers working the reef and responds to gear marking, retrieval and fisher engagement rather than to municipal waste collection.

On management: corallivorous snails can be removed by hand and that is the standard response above outbreak level, but removal only works if it is repeated, the snails recruit from surrounding reef and a single clearance is recolonised. Directing effort at the aggregations on living coral, rather than spreading it across the site, is what makes the effort worthwhile. The debris is a fisheries problem before it is a waste problem. Lost gear keeps fishing after it is lost, so it is both a debris indicator and a mortality source, and it accumulates on exactly the structure that snags it, the high-relief coral that matters most. Gear marking and retrieval dives address it; municipal collection does not.

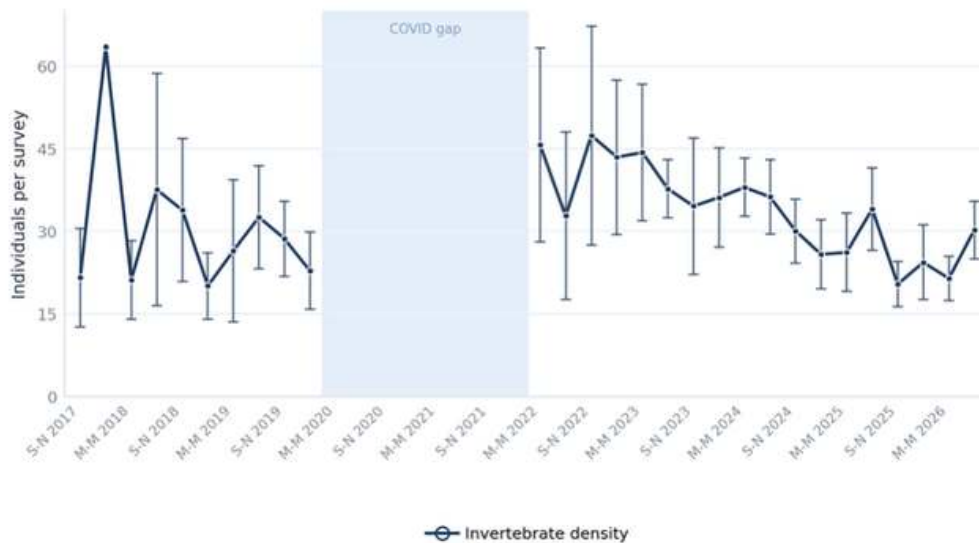
MALUAY MALATAPAY MPA

Invertebrate Status

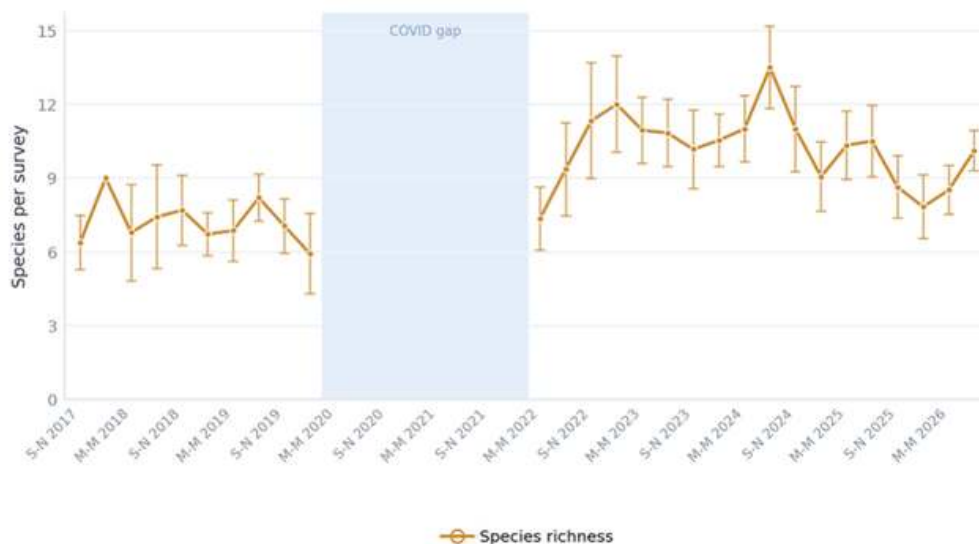


Current Status:

Malatapay supported an average invertebrate density of **25.9 individuals per survey**, drawn from **9.3 distinct species per survey**.



Invertebrate Density. Total invertebrate density at Malatapay, 2017-2026.



Invertebrate Species Richness. Invertebrate species richness at Malatapay, 2017-2026.

Recent Change:

Against the preceding six months, density is notably higher (22.4 → 25.9 per survey), richness slightly higher (8.2 → 9.3 species) and commercially important species substantially higher (10.2 → 13.5).

Commercial Groups:

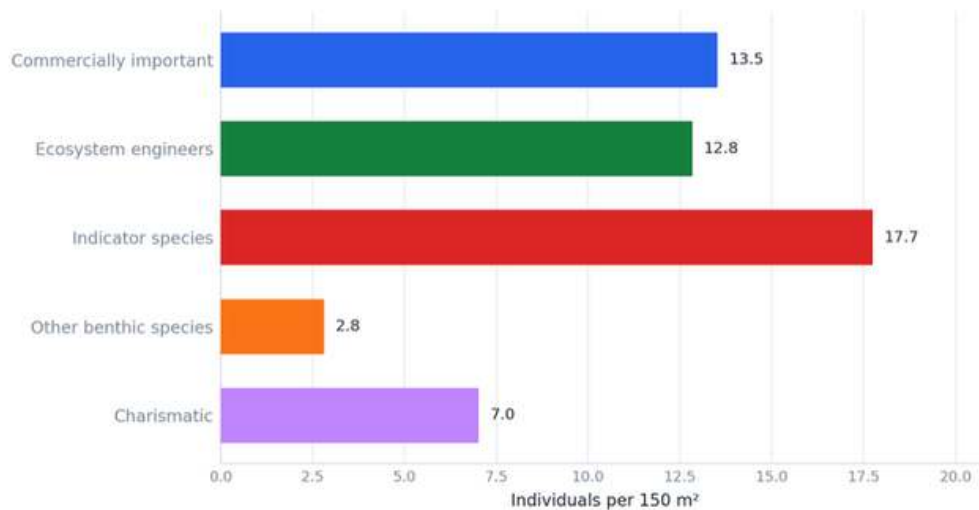
Commercially important invertebrates averaged 13.5 per survey, 52.3% of all invertebrates counted. Within the key harvested groups, urchins averaged 8.4 per survey, sea cucumbers 0.93 and giant clams 0.07. Those ten total 12.44 individuals per survey, 48% of all invertebrates counted, led by Urchin - Diadema at 7.43 per survey. The community is dominated by sea urchins. Their grazing helps keep settlement space open for coral recruitment, so high urchin abundance is a mixed signal rather than a bad one, beneficial for recruitment, but at sustained high density urchins also erode reef framework.

Most abundant invertebrate taxa. The ten most abundant invertebrates (left), and the ten most abundant commercially important invertebrates (right) by density at Malatapay.

Top 10 Invertebrates	Individuals per 150 m ²	Top 10 Commercial	Individuals per 150 m ²
Urchin - Diadema	7.43	Urchin - Diadema	7.43
Nudibranch	4.78	Cone Shell	1.04
Sea Star	3.24	Urchin - Rock Boring	0.83
Lionfish	1.74	Other Shell	0.65
Cone Shell	1.04	Conch - Scorpion Spider	0.56
Urchin - Rock Boring	0.83	Cowrie - Tiger	0.48
Cleaner Shrimp - Banded Coral	0.81	Other Bivalve	0.43
Other Shell	0.65	Sea Cucumber - Pinkfish	0.39
Conch - Scorpion Spider	0.56	Pearl Oyster	0.33
Cowrie - Tiger	0.48	Sea Cucumber - Black Spotted	0.31

Functional Groups:

Per survey: ecosystem engineers 12.8, sensitive indicator species 17.7, charismatic species 7.0, benthic associates and predators 2.8. These groups overlap by design, a species can be both commercially important and charismatic, so they do not sum to total invertebrate density. A relatively high abundance of sensitive indicator species suggests conditions still suitable for disturbance-intolerant taxa; a high abundance of ecosystem engineers, mostly urchins, indicates that herbivory and bioerosion are active processes here.



Invertebrate Functional Groups. Invertebrate functional group density, Malatapay, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged). A species can belong to more than one group.

Long-term Context:

The 2017–19 baseline is 32.1 individuals and 7.4 species per survey. Density stands -19% against that and richness +26%. Richness figures in editions before 2026 divided a pooled species list by the number of surveys, which fell as survey effort rose. They are not comparable with these.

Ecological Interpretation:

Malatapay ranks seventh of the 8 sites surveyed in the municipality on invertebrate density and sixth on species richness. Giant clams sit well below baseline. As a sessile, conspicuous and valuable species they are among the first taken and among the slowest to return. Each species contributes 2.8 individuals per survey on average. A rising figure with flat richness means the same few taxa are becoming more abundant rather than the community broadening, which is the pattern that precedes an urchin-dominated reef.

Herbivorous fish still outnumber urchins (21.3 against 8.4 per survey), so grazing pressure remains mostly in the fish community. That is the more stable arrangement of the two, and it is worth protecting: herbivorous fish crop algae without eroding the framework the way urchins do.

MALUAY MALATAPAY MPA

Tourism Value



Touristic Species	Mean Encounter Rate (%)		
Barracudas	31.7	Scorpaenidae	71.6
Cephalopods	11	Sharks	0
Cowries	51.4	Shrimps	58.5
Eels and Snakes	39.5	Slugs	82.6
Frogfish	6.4	Stingrays	2.7
Giant Clams	8.2	Syngnathidae and Pegasidae	15.6
Porcupinefish and Pufferfish	93.4	Turtles	67.9

Touristic species encounter rates. The percentage of dives at Malatapay in which each touristic group was recorded, current reporting period.

Maluay-Malatapay is a relatively well-established diving site with easy access from both sea and land, as well as good local infrastructure and amenities, giving it considerable potential for marine tourism. The site is well known for unusual and charismatic species, including flamboyant cuttlefish, ghost pipefish and frogfish, which provide additional interest for macro divers and underwater photographers even where these species are not fully represented in the encounter-rate data. The combination of natural and artificial reefs provides varied diving environments, while a deeper reef extending to approximately 50 metres offers more challenging opportunities for divers with the appropriate skills, training and certification.

Malatapay demonstrates very strong tourism potential, with exceptionally frequent encounters with porcupinefish and pufferfish (93.4%) and slugs (82.6%). Scorpaenidae (71.6%) are also frequently encountered, while cowries (51.4%), the highest rate in the municipality, and shrimps (58.5%) contribute substantial macro and reef biodiversity. Eels and snakes (39.5%) and cephalopods (11.0%) provide further diversity, while syngnathids and pegasids (15.6%) add specialised interest for macro-focused divers. The relatively frequent frogfish encounters (6.4%) complement the known presence of rarer species and further strengthen the site's potential for underwater photography.

Malatapay is particularly notable for its strong megafauna and pelagic component. Turtles were recorded in 67.9% of dives, the highest turtle encounter rate among all monitored sites in Zamboanguita and more than twice the municipal average, making them one of the site's most important tourism attractions.

Barracudas were also recorded in 31.7% of dives, likewise the highest encounter rate in the municipality, providing a strong pelagic component to the diving experience. Mobula rays were observed in June and August, further enhancing the site's potential for charismatic megafauna encounters. Stingrays were less common (2.7%), while no sharks were recorded during the monitoring period. Giant clams, at 8.2%, are the lowest in the municipality and are the one clear gap in the site's profile.

Overall, Maluay-Malatapay stands out as one of Zamboanguita's strongest all-round dive tourism destinations, combining exceptionally reliable reef and macrofaunal encounters with the municipality's most frequent encounters with charismatic megafauna. The presence of rare species such as flamboyant cuttlefish, ghost pipefish and frogfish, together with occasional mobula ray sightings, further enhances its specialist appeal. Combined with good accessibility, established infrastructure, varied natural and artificial reefs, and opportunities for deeper diving, Malatapay is particularly well positioned to support a broad range of marine tourism experiences.

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

Indicators At A Glance



Mojon is a **marine protected area** in Zamboanguita. Hard coral cover is **26.8%** (fair on the national classification) and commercial fish biomass **9.25 kg per 150 m²**. This period rests on **9 surveys**, with 7 seasons on record since 2025.

Hard Coral Cover	Commercial Biomass	Fish Density	Bleaching
26.8% of substrate	9.2 kg / 150 m ²	734.9 / 150 m ²	3.2% of hard coral
▲ 16.1%	▲ 78.9%	▼ 27.6%	▼ 82.7%

Mojon indicators at a glance. Every headline indicator for Mojon, current reporting period, against this site's own preceding six months and the Zamboanguita average for the same period. Colour is keyed to whether the movement is favourable rather than to whether the number rose. Green indicates improvement, red indicates decline — e.g. macroalgae, rubble, bleaching or debris rising reads red, coral cover rising reads green. A change smaller than 5% is shown as flat.

Indicator	Current	Prior 6 months	Change	Zamboanguita Average
Hard coral cover (%)	26.8	23.1	▲ +16%	24.6
Macroalgae cover (%)	20.1	25.5	▼ -21%	10.5
Rubble (%)	11.4	11.9	▬ -5%	12.9
Bleaching (of hard coral) (%)	3.18	18.42	▼ -83%	1.96
Total fish density (per 150 m ²)	735	1,014	▼ -28%	727
Commercial fish biomass (kg per 150 m ²)	9.25	5.17	▲ +79%	17.82
Invertebrate density (per survey)	38.2	34.7	▲ +10%	38.8
Invertebrate species richness (species per survey)	11.8	11.3	▬ +4%	10.1
Coral predators (per survey)	34.1	53.5	▼ -36%	38.7
Marine debris (items per survey)	1.52	0.5	▲ +203%	2.77

What moved this period:

- Marine debris substantially higher (+203%) — unfavourable
- Bleaching (of hard coral) substantially lower (-83%) — favourable
- Commercial fish biomass substantially higher (+79%) — favourable

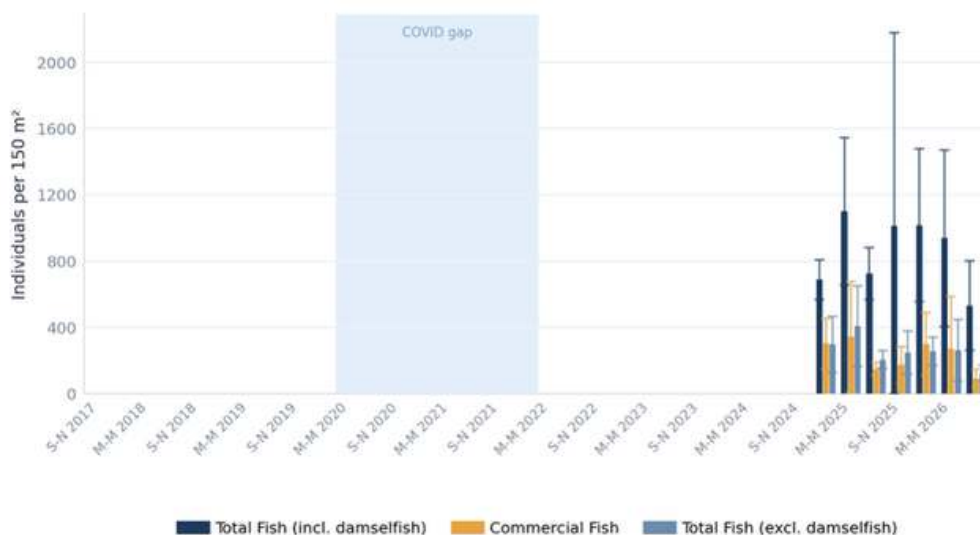
MOJON MPA

Food Security

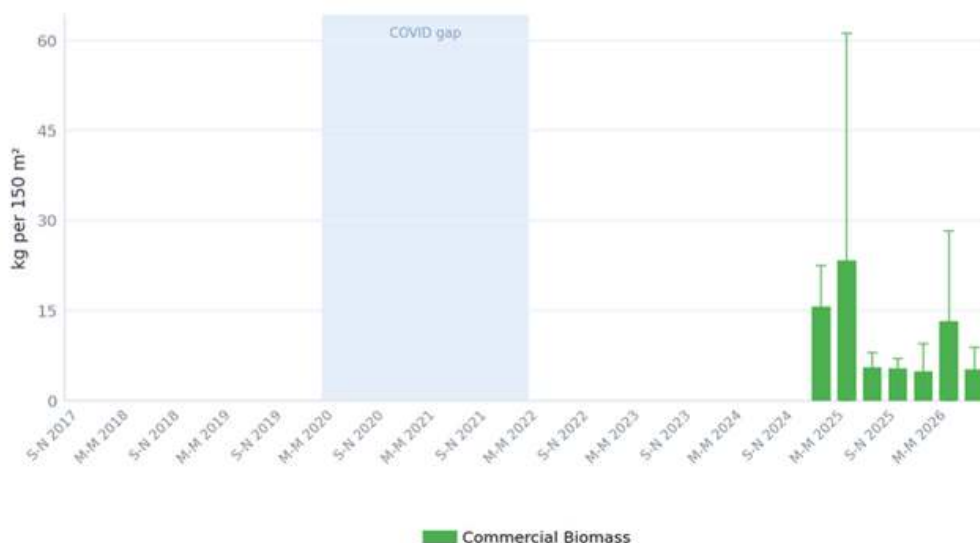


Current Status:

In March–August 2026, Mojon recorded an average total fish density of **734.9 individuals per 150 m²**, with commercial species contributing **182.7 individuals per 150 m²**. Commercial biomass averaged **9.25 kg per 150 m²**, equivalent to roughly **616 kg per hectare**, which sits in the moderate range for the program. By dietary group the assemblage was led by herbivores (~518.8 ind.), planktivores (~105.2 ind.), carnivores (~76.0 ind.), detritivores (~17.1 ind.), corallivores (~7.4 ind.), omnivores (~6.7 ind.) and parasitivores (~3.8 ind.), so herbivores dominate the fish community at this scale.



Fish Density Trends. Total and commercial fish density at Mojon, 2017–2026.



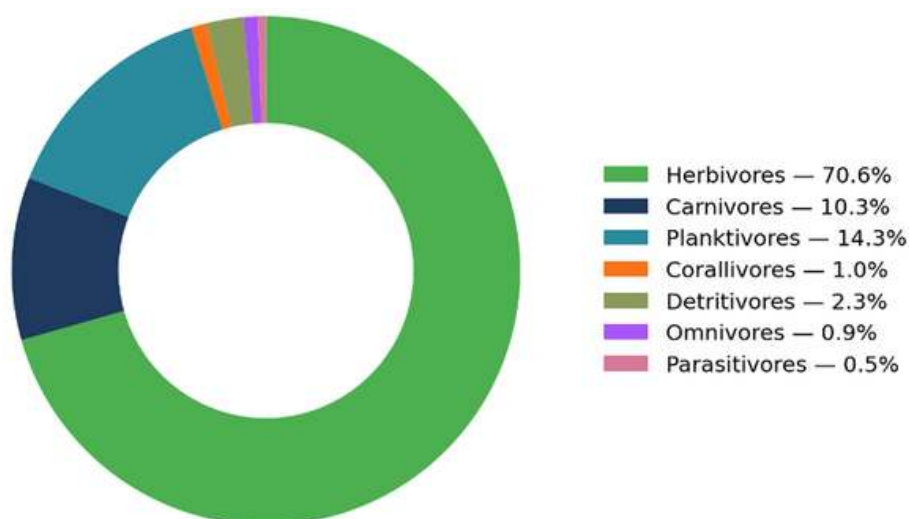
Commercial Biomass Trends. Commercial fish biomass at Mojon, 2017–2026. Shown as bars because this site has too few surveyed seasons to support a trend line.

Recent Change:

Against the preceding six months, total fish density is notably lower (1,014.4 → 734.9 individuals per 150 m² including damselfish, 251.1 → 193.2 excluding them), commercial density notably lower (236.4 → 182.7) and commercial biomass substantially higher (5.17 → 9.25 kg per 150 m²). Within the assemblage, herbivores moved 713.1 → 518.8, carnivores moved 95.8 → 76.0 and planktivores moved 160.9 → 105.2 individuals per 150 m². Commercial biomass rose while commercial numbers fell, meaning fewer but larger individuals: some fish are surviving long enough to grow.

Dietary structure:

By share of individuals the community is herbivores (70.6%), planktivores (14.3%) and carnivores (10.3%), with the remaining groups together making up 4.8%. Trophic structure matters because grazing species control algal growth and so mediate the competition between coral and algae described in the next section.



Dietary Composition. Share of fish recorded in each dietary group, Mojon, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged).

Commercial Groups:

Damselfish - Sergeantfish is the largest single contributor at 2.64 kg per 150 m², 30.0% of commercial biomass. Larger predatory taxa (Trevally, Grouper) are present but at lower densities, so commercial biomass is carried largely by mid-sized and schooling species rather than by large predators. That is the pattern expected on reefs under fishing pressure, where the largest predatory fish are removed first.

Long-term context:

The highest commercial biomass on record here was 23.39 kg per 150 m² in Mar–May 2025. Current levels are 60% below it. Two protocol changes limit what the long record can be asked. Damselfish entered the list in 2022, so only the damselfish-excluded series is comparable across the full period; and fish size bins changed in 2025 with both schemes running side by side through 2025–26, which biases early biomass slightly low.

Top commercial fish families. The ten commercial fish families contributing most to biomass at Mojon, current reporting period, with the share of commercial biomass each carries. Sub-types are rolled into their family.

Commercial Families	Biomass (kg/ 150 m ²)	Density (ind./150 m ²)	% of Commercial Biomass
Damselfish - Sergeantfish	2.64	51.9	30
Bristletooth	1.23	16.9	14
Soldierfish	1.07	9.9	12.1
Wrasse - Other	0.85	46.7	9.7
Fusilier	0.58	17.7	6.6
Surgeonfish	0.5	2.2	5.7
Trevally	0.29	0.4	3.3
Grouper	0.29	3.8	3.3
Triggerfish	0.28	3	3.2
Brushtail Tang	0.23	8.6	2.6

Ecological interpretation:

Mojon ranks sixth of the 8 sites surveyed in the municipality on commercial biomass this period. The average commercial fish counted weighs about 51 g. Carnivores are 39.3% of the assemblage once damselfish are set aside, which is a high share. On a lightly fished reef the pyramid narrows towards the top; a wide carnivore band usually means small mid-water carnivores rather than large predators, so it should be read with the commercial table above rather than as evidence of an intact predator community.

MOJON MPA

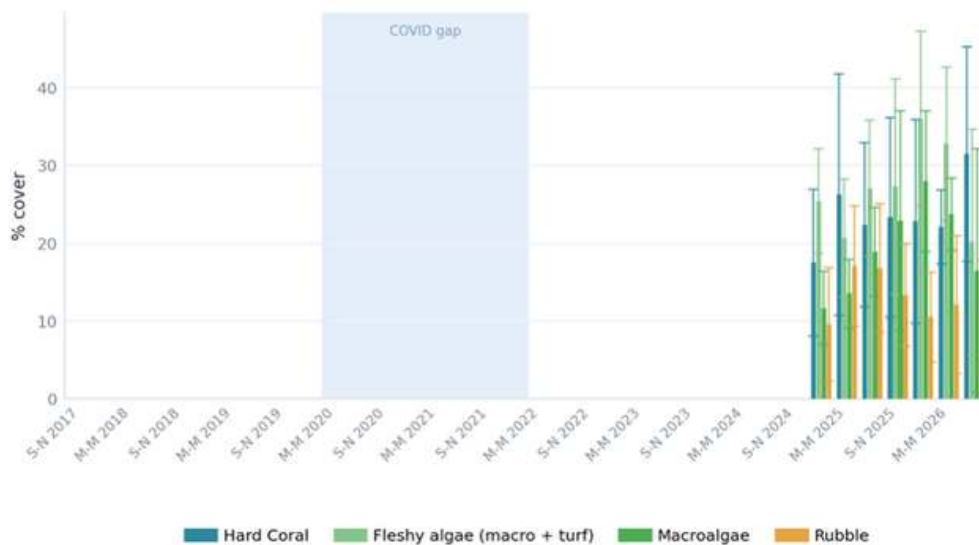
Reef Health And Resilience



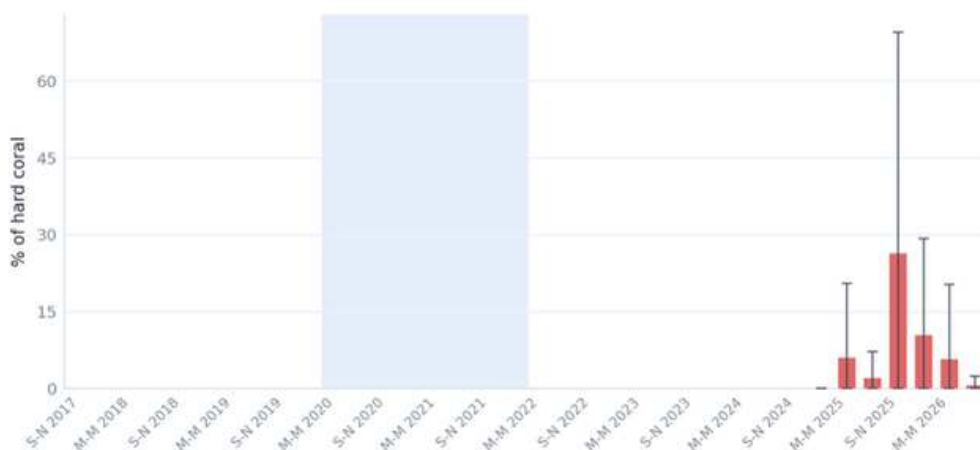
Current status:

During March–August 2026, Mojon recorded an average hard coral cover of **26.8%**, macroalgae of **20.1%** (26.5% once turf is included) and rubble of **11.4%**. Coral cover places the reef in the fair band of the Philippine classification.

Bleaching affected 3.18% of hard coral, below the 5% level conventionally treated as a concern threshold, suggesting low thermal stress over the survey period. Beyond bleaching, 0.48% showed predation scarring; 0.67% was recently killed, as a share of all points. Overall the reef can be described as structurally mixed, with noticeable algal presence and moderate unconsolidated substrate.



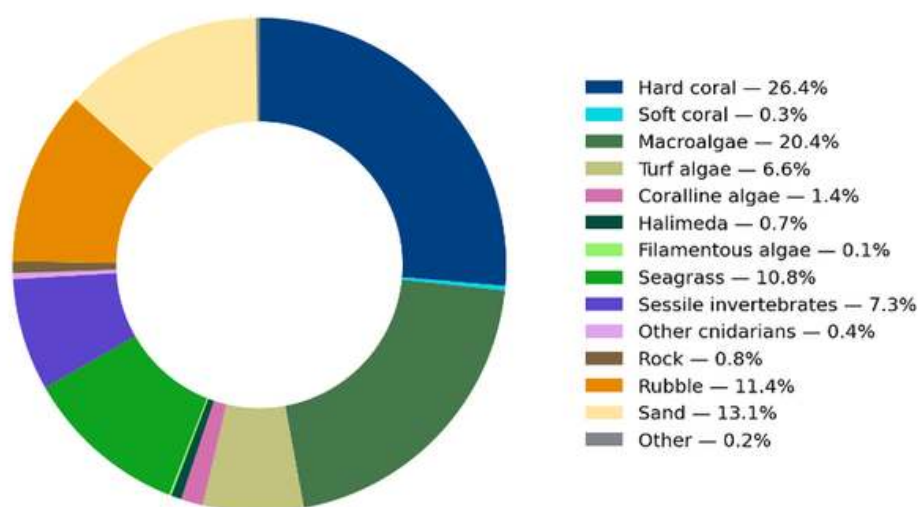
Reef Substrate Trends. Hard coral, macroalgae and rubble cover at Mojon, 2017–2026. Solid line is macroalgae alone; dashed adds turf, the pre-2026 published definition. Shown as bars because this site has too few surveyed seasons to support a trend line.



Bleaching Incidence. Bleached coral as a percentage of hard coral cover at Mojon, by season. Combines partially and fully bleached records.

Structural implications:

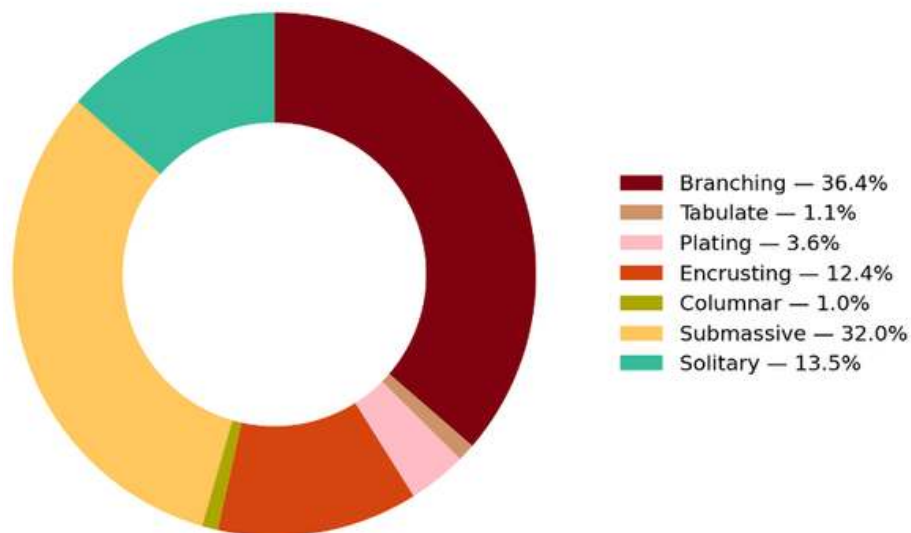
Of all points recorded, 26.8% is living hard coral, 27.9% is fleshy algae competing for the same space, 24.5% is unconsolidated material (rubble and sand), 2.2% is consolidated surface available for settlement (bare rock and coralline algae) and 18.8% is occupied by other stable but non-reef-building life, soft corals, sessile invertebrates and seagrass. The combination of fair coral cover and relatively low rubble (11.4%) indicates that most of the reef framework is stable and physically suitable for coral growth and recruitment. Sand accounts for a further 13.1% of points, which is habitat rather than damage. Macroalgae has fallen against the preceding six months (~21%), which suggests algal competition is easing and more substrate is becoming available for coral settlement. That may reflect grazing pressure or simply favourable conditions, and one period is not a trend, but the direction is the favourable one.



Substrate Composition. Full substrate composition, Mojon, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged).

Within the living coral, growth form determines how much shelter the reef offers and how well it resists disturbance; this protocol records no rugosity, so growth form is the closest available proxy for structural complexity. The cover present is led by branching (36.4%), submassive (32.0%) and solitary (13.5%). On MCP's classification, resistance to disturbance, not shelter, 53.5% of the coral sits in low-resilience forms and 13.5% in high-resilience forms. Most of the cover is therefore in forms that provide good shelter but are first to be lost in a thermal or storm event, so the headline cover figure is more fragile than it appears.

Taken together, fair coral cover at 26.8%, macroalgae at 20.1% and rubble at 11.4%, this is a reef in a **transitional** state, shaped by both physical disturbance (the unconsolidated fraction) and biological competition (the algal fraction). Algal competition is the binding constraint here; the substrate itself is stable enough to support recruitment if that competition eases.



Coral Growth Forms. Share of hard coral in each growth form at Mojon, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged). Forms are ordered from least to most resilient: low resilience covers branching, tabulate, plating, encrusting and *Tubastraea*; medium covers columnar and submassive; high covers solitary and massive.

Long-term Context:

Coral cover peaked at 31.5% in Jun–Aug 2026 and now stands 26.8%. Bleaching peaked at 26.4% of hard coral in Sep–Nov 2025. Two definitions changed for this edition and are not comparable with earlier reports: macroalgae is now macroalgae alone rather than macroalgae plus turf, and bleaching is a share of hard coral rather than of all substrate points, which makes it read three to four times higher on identical observations.

Ecological Interpretation:

Mojon ranks third of the 8 sites surveyed in the municipality on hard coral cover and eighth on macroalgae, counting the least algal site first. Of the coral present, 41.1% is in fast-growing forms (branching, tabulate, plating) and 44.4% in slow, robust ones (massive, submassive, encrusting). That ratio sets how quickly cover can rebuild and how much survives a disturbance, and the two pull against each other: the fast forms drive recovery but are the first lost, the slow ones persist but add cover at a fraction of the rate. A cover figure held up mostly by slow forms is stable but will rebuild slowly from any loss, so recovery here should be measured in decades rather than seasons. For every point of substrate a coral larva could settle on, there are 12.7 points already held by fleshy algae. Settlement space is the binding constraint on recovery here, not larval supply: even a good recruitment year has little bare ground to land on.

Of the pressures acting here, the ones open to local action are enforcement, the herbivore populations that hold algae down, and the physical impacts that break coral and make rubble, anchoring, destructive fishing and trampling. Thermal stress is not one of them, which is why the bleaching figure is reported as context rather than as something to manage.

MOJON MPA

Predation and Marine Debris



Current Status:

Drupella averaged **18.7 per survey** (above the alert threshold) and *Coralliophila* **15.4** (above the alert threshold), giving a combined corallivorous snail load of **34.1 per survey**. Crown of Thorns averaged 0.000 per survey (below the alert threshold).

Marine debris averaged **1.52 items per survey**. By category it breaks down as fishing gear 0.88 (58%), consumer plastics 0.35 (23%) and household & sanitary 0.28 (19%). The categories are mutually exclusive and sum to the total, so nothing is double-counted between them. Fishing gear is the largest category at 58% of items. That is a sea-based source: gear lost or discarded by boats working the reef, which responds to gear marking, retrieval dives and work with fishers rather than to municipal waste collection.



Coral Predators. Corallivorous snail abundance at Mojon, 2017-2026. *Drupella* and *Coralliophila* share one threshold set and one axis. Dashed rules mark MCP management thresholds — alert 15, outbreak 37.5, extreme 75 per survey.



Crown of Thorns. Crown of Thorns abundance at Mojon, 2017-2026. Dashed rules mark MCP management thresholds for Crown of Thorns (alert 0.1125, outbreak 0.225, extreme 0.45 per survey).

Recent Change:

Against the preceding six months, *Drupella* is slightly lower (19.9 → 18.7), *Coralliophila* substantially lower (33.6 → 15.4), Crown of Thorns not comparable (0.000 → 0.000) and debris substantially higher (0.50 → 1.52 items per survey).



Marine Debris. Marine debris at Mojon, current reporting period. The centre figure is total items per survey and the ring is what that total is made of; the categories are mutually exclusive, so the slices sum to the centre figure. The sparkline is the site's own total debris per survey across the full record, 2017–2026, with the COVID gap left empty.

Long-term Context:

Drupella peaked at 34.5 per survey in Mar–May 2025. These figures pool all depths. *Drupella* is roughly eleven times more abundant shallow than deep, so we have a depth-resolved workbook, where we can detect outbreaks in the shallows.

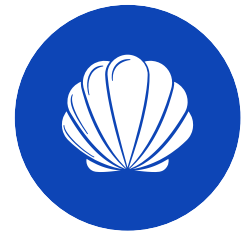
Ecological Interpretation:

Drupella is above the alert level, the point at which MCP would normally watch the site rather than intervene at it. More than half the debris recorded (58.2%) is fishing gear. That is a different management problem from land-based waste: it points at gear loss by fishers working the reef and responds to gear marking, retrieval and fisher engagement rather than to municipal waste collection. Debris rose sharply against the previous period. Debris is episodic and one season is not a trend, but a repeat next season would warrant action.

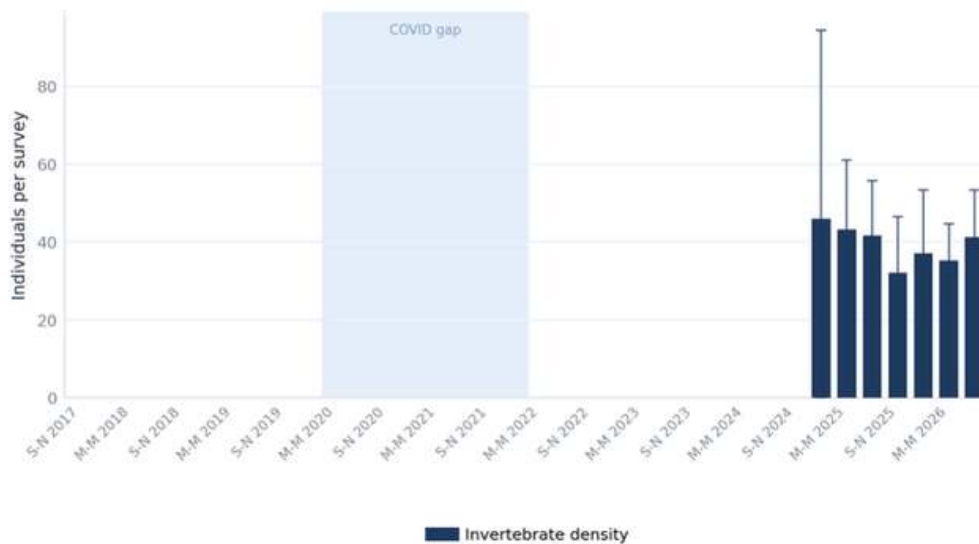
On management: corallivorous snails can be removed by hand and that is the standard response above outbreak level, but removal only works if it is repeated, the snails recruit from surrounding reef and a single clearance is recolonised. Directing effort at the aggregations on living coral, rather than spreading it across the site, is what makes the effort worthwhile. The debris is a fisheries problem before it is a waste problem. Lost gear keeps fishing after it is lost, so it is both a debris indicator and a mortality source, and it accumulates on exactly the structure that snags it, the high-relief coral that matters most. Gear marking and retrieval dives address it; municipal collection does not.

MOJON MPA

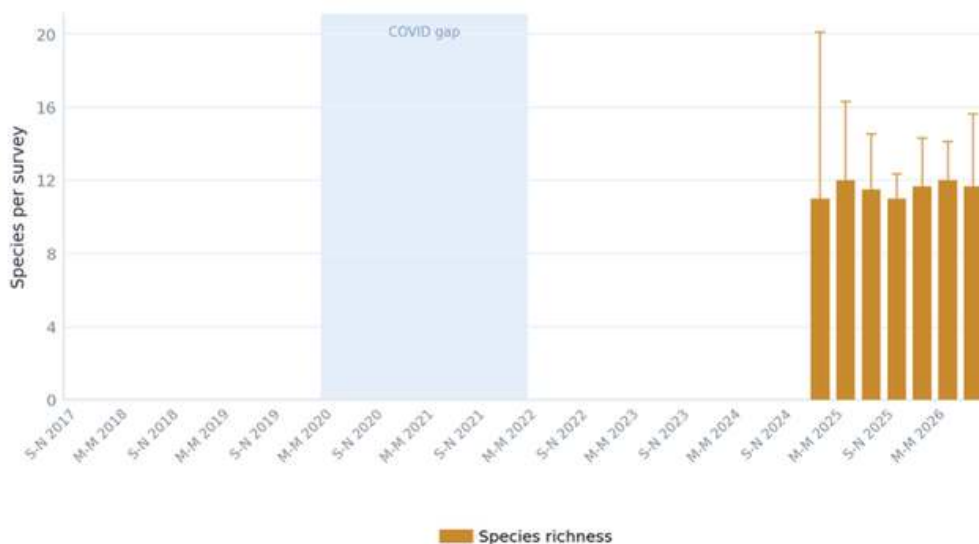
Invertebrate Status



Mojon supported an average invertebrate density of **38.2 individuals per survey**, drawn from **11.8 distinct species per survey**.



Invertebrate Density. Total invertebrate density at Mojon, 2017-2026. Shown as bars because this site has too few surveyed seasons to support a trend line.



Invertebrate Species Richness. Invertebrate species richness at Mojon, 2017-2026. Shown as bars because this site has too few surveyed seasons to support a trend line.

Recent Change:

Against the preceding six months, density is slightly higher (34.7 → 38.2 per survey), richness little changed (11.3 → 11.8 species) and commercially important species slightly higher (19.8 → 22.5).

Commercial Groups:

Commercially important invertebrates averaged 22.5 per survey, 58.8% of all invertebrates counted. Within the key harvested groups, urchins averaged 16.2 per survey, sea cucumbers 0.92 and giant clams 0.08. Those ten total 21.67 individuals per survey, 57% of all invertebrates counted, led by Urchin - Diadema at 15.75 per survey. The community is dominated by sea urchins. Their grazing helps keep settlement space open for coral recruitment, so high urchin abundance is a mixed signal rather than a bad one, beneficial for recruitment, but at sustained high density urchins also erode reef framework.

Most abundant invertebrate taxa. The ten most abundant invertebrates (left), and the ten most abundant commercially important invertebrates (right) by density at Mojon.

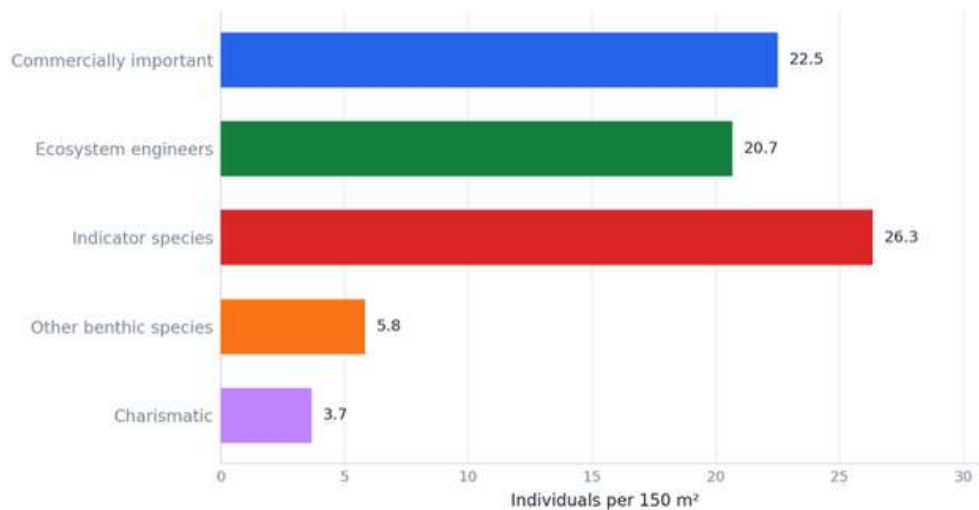
Top 10 Invertebrates	Individuals per 150 m ²	Top 10 Commercial	Individuals per 150 m ²
Urchin - Diadema	15.75	Urchin - Diadema	15.75
Cleaner Shrimp - Banded Coral	4.33	Conch - Scorpion Spider	1.67
Lionfish	3.25	Other Shell	1.25
Sea Star	2.08	Other Bivalve	0.58
Conch - Scorpion Spider	1.67	Cone Shell	0.58
Nudibranch	1.67	Urchin - Rock Boring	0.42
Cushion Star	1.42	Sea Cucumber - Black Spotted	0.42
Other Shell	1.25	Cowrie - Other	0.33
Scorpionfish	0.92	Scallop	0.33
Pipefish	0.75	Sea Cucumber - Amberfish	0.33

Functional Groups:

Per survey: ecosystem engineers 20.7, sensitive indicator species 26.3, charismatic species 3.7, benthic associates and predators 5.8. These groups overlap by design, a species can be both commercially important and charismatic, so they do not sum to total invertebrate density. A relatively high abundance of sensitive indicator species suggests conditions still suitable for disturbance-intolerant taxa; a high abundance of ecosystem engineers, mostly urchins, indicates that herbivory and bioerosion are active processes here.

Long-term Context:

Richness figures in editions before 2026 divided a pooled species list by the number of surveys, which fell as survey effort rose. They are not comparable with these.



Invertebrate Functional Groups. Invertebrate functional group density, Mojon, averaged over the current reporting period (Mar-May 2026 and Jun-Aug 2026 averaged). A species can belong to more than one group.

Ecological Interpretation:

Mojon ranks fourth of the 8 sites surveyed in the municipality on invertebrate density and second on species richness. Each species contributes 3.2 individuals per survey on average. A rising figure with flat richness means the same few taxa are becoming more abundant rather than the community broadening, which is the pattern that precedes an urchin-dominated reef. Herbivorous fish still outnumber urchins (33.5 against 16.2 per survey), so grazing pressure remains mostly in the fish community. That is the more stable arrangement of the two, and it is worth protecting: herbivorous fish crop algae without eroding the framework the way urchins do.

MOJON MPA

Tourism Value



Touristic Species		Mean Encounter Rate (%)	
Barracudas	5	Scorpaenidae	82.5
Cephalopods	13.3	Sharks	0
Cowries	26.7	Shrimps	63.3
Eels and Snakes	66.7	Slugs	90.8
Frogfish	5	Stingrays	0
Giant Clams	13.3	Syngnathidae and Pegasidae	32.5
Porcupinefish and Pufferfish	85.8	Turtles	27.5

Touristic species encounter rates. The percentage of dives at Mojon in which each touristic group was recorded, current reporting period.

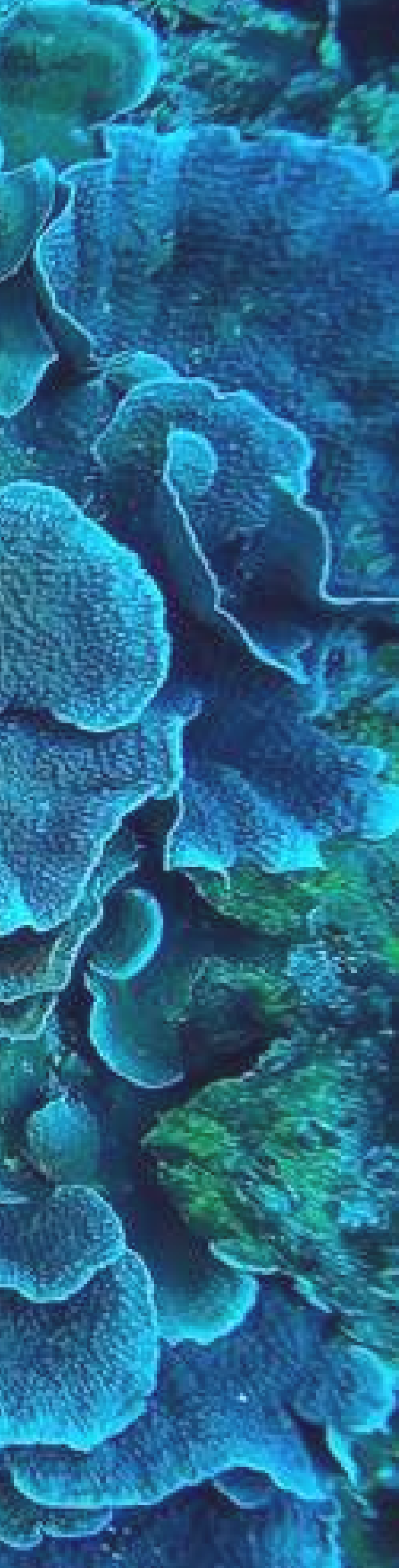
Mojon offers good potential for recreational and macro-diving, supported by excellent beach access and existing facilities that make the site relatively convenient for visitors. Manta and eagle rays have been observed at the site, and wonderpuss octopus recorded, the rays being the only large pelagic records at Mojon, since neither appears in the stingray or shark rows of the encounter-rate data. While the site is not otherwise strong for large charismatic megafauna, its reef communities provide a diverse range of smaller and cryptic species that support rewarding dives for macro enthusiasts and underwater photographers.

Mojon demonstrates particularly strong tourism value through its exceptionally high encounter rate for slugs (90.8%), the highest recorded at any site in either municipality. Scorpaenidae (82.5%) are also extremely common and the highest in Zamboangita, while shrimps (63.3%) and eels and snakes (66.7%) provide further reliable opportunities for observing reef-associated fauna. Syngnathids and pegasids (32.5%) are especially notable, representing the highest encounter rate for this group in the municipality at more than double the municipal average and providing strong specialist interest for macro divers and underwater photographers. Cephalopods (13.3%) also contribute to the site's macro-diving appeal, while frogfish (5.0%) and cowries (26.7%) add further diversity.

Mojon provides some opportunities for charismatic megafauna, although these are more limited than at sites such as Guinsuan and Malatipay. Turtles were recorded in 27.5% of dives, providing a moderate and relatively regular megafauna encounter.

Barracudas were observed in only 5.0% of dives, while no sharks or stingrays were recorded during the monitoring period. Giant clams were also relatively uncommon (13.3%), meaning that the site's tourism value is driven primarily by its abundant reef and macrofaunal species rather than by large charismatic animals.

Overall, Mojon has a strong and distinctive tourism profile centred on macrofauna, reef biodiversity and accessibility. Its exceptionally high encounter rates for slugs, Scorpaenidae, eels and snakes, and shrimps provide a reliable foundation for biodiversity-focused diving, while the exceptionally frequent syngnathid and pegasid sightings give the site particular appeal for experienced macro divers and underwater photographers. Moderate turtle encounters and the occasional manta or eagle ray provide an additional charismatic component. With excellent beach access and existing facilities, Mojon remains well suited to recreational diving and snorkelling, while its unusually strong macrofaunal profile provides opportunities to further develop its appeal as a specialist macro-diving destination.



GLOSSARY

Benthic: Relating to the bottom of the sea or the organisms that live there.

Biomass: The total mass of living organisms in a given area, here estimated as weight (kg) of fish per survey area.

Bleaching: Loss of symbiotic algae from coral tissue due to stress (typically heat), causing corals to turn white.

Corallivore: An organism that feeds on coral, such as butterflyfish.

Detritivore: An organism that feeds on dead organic matter (detritus).

Diadema: A genus of long-spined sea urchins that are important algae grazers on coral reefs.

Ecosystem Engineer: A species that significantly modifies its habitat, affecting other species (e.g. sea urchins, giant clams).

Herbivore: An organism that feeds on plants/algae. On reefs, herbivorous fish control algae growth.

MPA: Marine Protected Area — a designated zone where human activities are restricted to protect marine life.

Rubble: Broken fragments of dead coral on the reef substrate, often from storm damage or destructive practices.

Spillover Effect: The movement of fish from inside an MPA to surrounding fishing grounds, benefiting local fisheries.

Trophic Group: A classification of organisms by their diet/feeding behaviour within the food web.

SITES SUMMARY

Every Zamboanguita site on the same indicators for the current reporting period, so the sites can be read against each other and against the municipal average. Municipal figures are the mean of the site values, so a site above the municipal figure is above its own municipality's average, not a national benchmark.

Site	Basak	Dalakit	Guinsuan	Latason	Lutoban	Lutoban Pier	Malatapay	Mojon	Zamboanguita average
Hard Coral (%)	17.3	33.8	14.1	21.4	19.8	41.1	22.6	26.8	24.6
Macroalgae (%)	8.2	7.2	12.7	12.1	5.2	5.5	12.7	20.1	10.5
Rubble (%)	15.2	4.1	11	8.4	15.9	11.7	25.2	11.4	12.9
Bleaching (% coral)	2.38	0.4	1.89	1.04	3.9	1.92	0.95	3.18	1.96
Commercial Biomass (kg / 150 m ²)	63.18	14.03	10.9	5.66	7.42	12.94	19.16	9.25	17.82
Fish Density (ind / 150 m ²)	1,159	353	1,133	416	553	845	623	735	727
Invertebrate Density (ind / 150 m ²)	28.5	84	26.1	22.5	46.1	39.3	25.9	38.2	38.8
Invertebrate Species Richness (species / 150 m ²)	9.8	13.1	9.5	8.5	9.9	8.8	9.3	11.8	10.1
Predators (ind / 150 m ²)	9.9	93.6	10.3	23.4	39.9	52.5	46	34.1	38.7
Marine Debris (pieces / 150 m ²)	2.14	6.83	3.3	2.66	1.86	2.23	1.66	1.52	2.77

Where the Sites Differ:

- **Hard Coral (%)** — best at Lutoban Pier (41.1), worst at Guinsuan (14.1)
- **Macroalgae (%) (lower is better)** — best at Lutoban (5.2), worst at Mojon (20.1)
- **Rubble (%) (lower is better)** — best at Dalakit (4.1), worst at Malatapay (25.2)
- **Bleaching (% coral) (lower is better)** — best at Dalakit (0.40), worst at Lutoban (3.90)
- **Commercial Biomass (kg / 150 m²)** — best at Basak (63.18), worst at Latason (5.66)
- **Fish Density (ind / 150 m²)** — best at Basak (1,159), worst at Dalakit (353)
- **Invertebrate Density (ind / survey)** — best at Dalakit (84.0), worst at Latason (22.5)
- **Invertebrate Species Richness (species / survey)** — best at Dalakit (13.1), worst at Latason (8.5)
- **Predators (ind / survey) (lower is better)** — best at Basak (9.9), worst at Dalakit (93.6)
- **Marine Debris (items / survey) (lower is better)** — best at Mojon (1.52), worst at Dalakit (6.83)

Sites that Stand Apart:

Sites differing from the municipal average by half or more on any indicator:

- **Basak** — commercial biomass (kg / 150 m²) 255% above the municipal figure (favourable); fish density (ind / 150 m²) 59% above the municipal figure (favourable); predators (ind / survey) 74% below the municipal figure (favourable)
- **Dalakit** — rubble (%) 68% below the municipal figure (favourable); bleaching (% coral) 80% below the municipal figure (favourable); fish density (ind / 150 m²) 51% below the municipal figure (unfavourable)
- **Guinsuan** — fish density (ind / 150 m²) 56% above the municipal figure (favourable); predators (ind / survey) 73% below the municipal figure (favourable)
- **Latason** — commercial biomass (kg / 150 m²) 68% below the municipal figure (unfavourable)
- **Lutoban** — macroalgae (%) 50% below the municipal figure (favourable); bleaching (% coral) 99% above the municipal figure (unfavourable); commercial biomass (kg / 150 m²) 58% below the municipal figure (unfavourable)
- **Lutoban Pier** — hard coral (%) 67% above the municipal figure (favourable)
- **Malatapay** — rubble (%) 96% above the municipal figure (unfavourable); bleaching (% coral) 51% below the municipal figure (favourable)
- **Mojon** — macroalgae (%) 92% above the municipal figure (unfavourable); bleaching (% coral) 62% above the municipal figure (unfavourable)

Sites Carrying the Flags

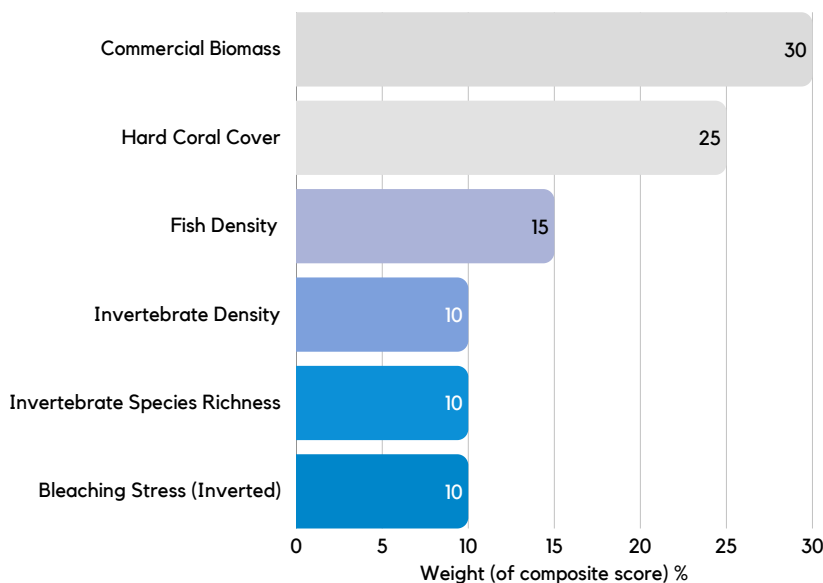
From the rule-based flagging at the top of this report, the following sites met two or more criteria:

- **Guinsuan** — bleaching (of hard coral) substantially higher (+114%); hard coral cover in the poor band (14.1%)
- **Latason** — rubble substantially higher (+56%); hard coral cover in the poor band (21.4%)

MUNICIPAL SITE PERFORMANCE RANKING

This ranking evaluates the 8 Zamboanguita sites against each other using a composite weighted model. Rather than averaging the indicators equally, it weights them by their relative ecological and socio-economic importance, so that the measures most closely tied to management success carry the most influence.

Weighted Score = Σ (indicator rank $\times$ weight). Lower is better, because rank 1 is the best on an indicator. A site ranking first on everything would score 1.00.



Weighted Model Breakdown. Indicator weights in the Zamboanguita site performance ranking. The weighted score is the sum of each indicator rank multiplied by its weight, so commercial biomass and hard coral cover together decide 55% of where a site lands. Bleaching is inverted, so the least-bleached site ranks first on it. Weights are set by MCP and reflect management priority, not statistical importance.

The Weights and Why

Indicator	Weight	Rationale
Commercial Biomass	30%	Heavily weighted to reflect MPA enforcement strength, spillover potential and functional fishery recovery.
Hard Coral Cover	25%	The fundamental baseline for structural complexity, nursery habitat and overall reef resilience.
Fish Density	15%	Tracks general community abundance, recruitment success and trophic diversity.
Invertebrate Density	10%	Assesses macro-invertebrate population health — e.g. grazing sea urchins, giant clams, sea cucumbers.
Species Richness	10%	A proxy for benthic biodiversity and ecological niche availability.
Bleaching	10%	Measures acute thermal vulnerability. Inverted, so sites with lower bleaching rank higher and climate-resilient microclimates are rewarded.

Site Ranking

Site Rank by Indicator. Every Zamboanguita site ranked on each of the six indicators in the composite, current reporting period. Note: Individual indicator ranks are in parentheses alongside site metrics. Lower weighted scores denote superior overall performance. This is the composite taken apart: a site can lead on habitat and trail on fish stock in the same row, which the single weighted score cannot show.

	Basak	Dalakit	Guinsuan	Latason	Lutoban	Lutoban Pier	Malatipay	Mojon
Status	MPA	MPA	MPA	MPA	MPA	Non-MPA	MPA	MPA
Commercial Biomass (kg / 150 m ²)	63.18 (1)	14.03 (3)	10.90 (5)	5.66 (8)	7.42 (7)	12.94 (4)	19.16 (2)	9.25 (6)
Hard Coral Cover (%)	17.3 (7)	33.8 (2)	14.1 (8)	21.4 (5)	19.8 (6)	41.1 (1)	22.6 (4)	26.8 (3)
Fish Density (ind / 150 m ²)	1,159 (1)	353 (8)	1,133 (2)	416 (7)	553 (6)	845 (3)	623 (5)	735 (4)
Invertebrate Density (ind / 150 m ²)	28.5 (5)	84.0 (1)	26.1 (6)	22.5 (8)	46.1 (2)	39.3 (3)	25.9 (7)	38.2 (4)
Invertebrate Species Richness (species / 150 m ²)	9.8 (4)	13.1 (1)	9.5 (5)	8.5 (8)	9.9 (3)	8.8 (7)	9.3 (6)	11.8 (2)
Bleaching (%)	2.38 (6)	0.40 (1)	1.89 (4)	1.04 (3)	3.90 (8)	1.92 (5)	0.95 (2)	3.18 (7)
Weighted Score	3.7	2.9	5.3	6.6	5.8	3.4	3.85	4.45
Final Rank	3	1	6	8	7	2	4	5

Key Findings

- **Dalakit** takes the overall top rank with a weighted score of 2.90, as a protected site. It leads the municipality on Invertebrate density, Species richness and Bleaching.
- Protected sites average rank 4.9 against 2.0 for the unprotected ones, so protection is not showing up as an advantage on this composite. That usually points at enforcement or at habitat differences between the sites rather than at the principle, and it is worth checking against patrol records before drawing a conclusion.
- **Latason** sits last at 6.60, weakest in the municipality on Commercial biomass, Invertebrate density and Species richness.

Priority Action Plan

- **Evaluate Lutoban Pier for formal protection.** It carries 41.1% hard coral, among the highest in Zamboanguita, with no formal protection and commercial biomass at 12.94 kg per 150 m². High-quality benthic habitat left open to extraction is the clearest case for a closure or a seasonal restriction.
- **Check enforcement at Lutoban.** It is a declared MPA but ranks 7 of 8 on commercial biomass (7.42 kg per 150 m²). A protected site near the bottom on standing stock points at enforcement rather than at the designation.

- **Watch thermal stress at Lutoban.** Bleaching is 3.90% of hard coral, the highest in Zamboanguita. Track it against the sea-temperature record and check whether the site has a local reason for higher exposure.
- **Check enforcement at Latason.** It is a declared MPA but ranks 8 of 8 on commercial biomass (5.66 kg per 150 m²). A protected site near the bottom on standing stock points at enforcement rather than at the designation.

MPA VS. NON-MPA

Zamboanguita has seven protected sites and one unprotected reference site, **Lutoban Pier**. That single site has to stand for every reef in the municipality that is open to fishing, and it is not a typical one: it is a pier site, different in structure, depth profile and history from the seven it is being compared against. The comparison below is therefore presented, but it should not be read as a test of the MPAs.

Protected against unprotected sites. Mean of the site values for each group, current reporting period. Differences are not controlled for depth, exposure, reef type or history, and the sites were assigned to protection decades ago on grounds unrelated to survey design, so the comparison is indicative rather than a test.

Indicator	MPAs (Basak, Dalakit, Guinsuan, Latason, Lutoban, Malatapay, Mojon)	Non-MPA (Lutoban Pier)	Difference
Commercial fish biomass (kg / 150 m ²) — mean	18.51	12.94	+43% in MPAs
Commercial fish biomass (kg / 150 m ²) — median	10.9	12.94	—16% in MPAs
Hard coral cover (%)	22.3	41.1	—46%
Macroalgae cover (%)	11.2	5.5	+103% (unfavourable)
Rubble (%)	13	11.7	11%
Bleaching (% of hard coral)	1.96	1.92	2%
Total fish density (ind / 150 m ²)	710	845	—16%
Invertebrate density (ind / survey)	38.8	39.3	—1%
Invertebrate species richness (species / survey)	10.3	8.8	+17% (favourable)
Coral predators (ind / survey)	36.7	52.5	—30% (favourable)
Marine debris (items / survey)	2.85	2.23	+28% (unfavourable)
Mean rank on the weighted composite	4.9	2	Lutoban Pier ahead

Read the two biomass rows together. On the mean, the MPAs hold 43% more commercial biomass than the unprotected site, the result you would expect and want. On the median they hold 16% less. The whole of the difference is Basak, which carries 63.18 kg per 150 m², more than three times the next-highest MPA and nearly five times the municipal median. The seven MPA values are 5.66, 7.42, 9.25, 10.90, 14.03, 19.16 and 63.18. One site is doing all the work, and an average that rests on a single observation is not a finding.

Lutoban Pier is ahead on most of the table, including hard coral cover, where it holds 41.1% against an MPA average of 22.3%, the highest cover of any site in the municipality, unprotected. It also ranks second of eight on the weighted composite, ahead of six of the seven MPAs.

None of that is evidence that protection does not work here. It is evidence that one reference site cannot carry this comparison. A pier has structure, depth and shelter that a fringing reef does not; the report's own notes record that Lutoban Pier differs in habitat and history and not only in protection status. With a sample of one there is no way to separate the effect of not being protected from the effect of being a pier.

What the table does say. Three things survive the caveats, because they do not depend on the single-site comparison:

- Corallivore pressure is lower inside the MPAs, 36.7 per survey against 52.5, but the municipal average of 38.7 is still above MCP's outbreak threshold of 37.5, and Dalakit alone sits at 93.6. Protection is not the lever for this one; removal is.
- Invertebrate richness is higher inside the MPAs (10.3 against 8.8 species per survey), and that difference holds on the median as well as the mean.
- Macroalgae is roughly double inside the MPAs, which given how thin the herbivore guild is at every Zamboanguita site (3.6%–12.0% of non-damselfish counts) is more likely a grazing and habitat signal than a protection one.

What would make this page worth printing next edition. A second unprotected reference site on fringing reef, comparable in depth and exposure to the MPAs. One additional site, surveyed to the same protocol, would turn this from a page of caveats into a real comparison, and it is the single highest-value addition that could be made to the Zamboanguita monitoring design.

The second thing worth doing is smaller and cheaper: find out what is different about Basak. It holds the highest commercial biomass and the highest fish density in the municipality on modest coral cover (17.3%, seventh of eight) and the lowest corallivore load (9.9 per survey). Whatever combination of enforcement, habitat and fishing pattern produces that is the most valuable unexplained thing in this report, and it should be written down while the people who know it are still available to ask.



DATA NOTES AND DISCLAIMERS

Reading the figures. Three conventions apply throughout and are not repeated under each figure. **Whiskers are 95% confidence intervals** for the average the point or bar shows, calculated from the individual surveys behind it; no whisker is drawn where fewer than three surveys contributed, because an interval from two dives is arithmetic rather than information.

Coral predator thresholds. The dashed rules on the predator figures are MCP's own management thresholds, not statistical ones: for *Drupella* and *Coralliophila*, which share a threshold set and an axis, alert 15, outbreak 37.5 and extreme 75 individuals per survey. Crown of Thorns is charted separately because its thresholds, alert 0.1125, outbreak 0.225, extreme 0.45 per survey, are roughly a hundred times lower and are not proportional to the snail ones, so putting both on one scale would make whichever series is not being read invisible.

Bleaching figures combine partially and fully bleached records.

Survey design, and what the error bars mean. Surveys are randomly located within three depth strata, shallow, medium and deep, at each site, with effort targeted evenly across the three. Depths are pooled in every figure in this report; because the strata are sampled at close to equal effort, the pooled average needs no reweighting. The whiskers on the figures are 95% confidence intervals for the average, calculated from the individual surveys behind each point. They describe how well the average is pinned down, not how variable the reef is from dive to dive. Two intervals that do not overlap indicate a real difference; two that do overlap are not proof that there is no difference, because the correct test is on the difference between the averages rather than on the overlap. Where a point rests on fewer than three surveys no interval is drawn, because an interval from two dives is arithmetic rather than information. Municipal averages carry the survey-level uncertainty propagated through the average of the sites, they describe how well the average of these monitoring sites is known, and the sites are the program's fixed stations rather than a random sample of the municipality's reefs.

Survey effort is not equal across sites. Some sites carry many more surveys than others, and some have fewer zones or depth ranges. Every figure in this report is an average per survey rather than a total, so effort differences do not inflate a site's numbers, but sites with few surveys carry more uncertainty and their season-to-season movement should be read cautiously.

Baseline lengths differ. Mojon and the Santa Catalina sites entered the program recently and have far shorter records than the established Zamboanguita and Siaton sites. Where a site has fewer than eight surveyed seasons its data is shown as bars rather than a trend line, because a line through a handful of points implies a trajectory the data cannot support.

The COVID-19 gap. Monitoring was suspended for eight consecutive seasons, March 2020 to February 2022. This appears as a shaded band on every long-term chart, drawn to the true width of the gap, and no values are plotted inside it.



DATA NOTES AND DISCLAIMERS

Damselfish were added to the protocol in 2022. They now account for roughly two thirds of all individuals counted. Including them makes total fish density appear to double across the COVID gap when, on a consistent species set, it has declined by about a fifth. Both are quoted because damselfish entered the survey protocol only in 2022, the inclusive total is what the survey counts today, and the damselfish-excluded figure is the only one that can be read against the 2017–19 baseline or across the COVID gap.

Two definitions changed for this edition and are not comparable with earlier reports: macroalgae is now macroalgae alone rather than macroalgae plus turf, and bleaching is a share of hard coral rather than of all substrate points, which makes it read three to four times higher on identical observations.

Species richness is now the average number of distinct species per survey. Earlier editions divided a pooled species list by the number of surveys, producing a figure that fell as survey effort rose. The two are not comparable.

Commercial biomass is now a per-survey average. Earlier editions reported a multi-survey total labelled as an average, which scaled with the number of dives carried out.

Lutoban North and South are combined into a single reporting site, as in previous editions. South has a sparser early record, so the combined figure is weighted towards North in the earliest seasons.

Biomass is an index, not a yield. It is estimated from visual length and count records using published length–weight relationships, and indicates standing stock rather than harvestable catch.

Touristic value is presence-based. Encounter rate is the percentage of dives in which a group was seen at least once, regardless of how many individuals were present. The dataset begins in December 2024.

Observer variation. Surveys are carried out by different divers over the years. Training and protocols are standardised, but some between-observer variation is unavoidable.

Disturbance events this period. Two super typhoons crossed the area in July 2026, **Super Typhoon Inday** and **Super Typhoon Kiyapo** both inside the Jun–Aug 2026 season and therefore inside the second half of this reporting period. Because every figure in this report averages Mar–May and Jun–Aug together, a storm effect is diluted by the pre-storm season and will read as a smaller movement than it was. The Jun–Aug season alone is in the workbooks for anyone who needs the post-storm figure on its own.

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):

A note on how these are used. Dietary groups drive the fish composition figures; a species carrying two groups is counted in the first listed so the shares total 100%. The commercial flag drives commercial density and biomass.

Category	Dietary Group
Angelfish - Bicolour	Herbivore
Angelfish - Keyhole	Herbivore
Angelfish - Midnight	Herbivore
Angelfish - Other	Omnivore
Angelfish - Pearl Scale	Herbivore
Anthias	Planktivore
Barracuda	Carnivore
Big Eye	Carnivore
Bream	Carnivore
Bristletooth	Detritivore
Butterflyfish	Corallivore
Damselfish	Herbivore
Damselfish - Sergeantfish	Planktivore
Emperor	Carnivore
Emperor - Longface	Carnivore
Fusiliers	Planktivore
Goatfish	Carnivore / Omnivore
Grouper - Barramundi	Carnivore
Grouper - Brown-Marbled	Carnivore
Grouper - Other	Carnivore
Moorish Idol	Omnivore
Needlefish	Carnivore
Parrotfish - Bumphead	Herbivore
Parrotfish - Other	Herbivore
Parrotfish - Raggedtooth	Herbivore
Parrotfish - Stareye	Herbivore
Pufferfish - Other	Omnivore
Pufferfish - White Spotted	Omnivore
Rabbitfish	Herbivore / Omnivore

Category	Dietary Group
Sea Ray	Carnivore
Sea Snake	Carnivore
Snapper	Carnivore
Soldierfish	Carnivore
Spadefish	Omnivore
Squid	Carnivore
Surgeonfish - Brushtail Tang	Herbivore
Surgeonfish - Other	Herbivore / Omnivore
Surgeonfish - Whitetail	Planktivore
Surgeonfish - Yellowmask	Omnivore
Sweetlips	Carnivore
Trevally	Carnivore
Trevally - Scad	Carnivore / Planktivore
Triggerfish - Other	Carnivore
Triggerfish - Redtooth	Planktivore
Triggerfish - Titan	Carnivore
Tuna - Long-Jawed Mackerel	Planktivore
Tuna - Other	Carnivore
Turtle - Green	Herbivore / Omnivore
Turtle - Hawksbill	Omnivore
Turtle - Other	Omnivore
Unicornfish - Blue-Spine	Herbivore
Unicornfish - Orange-Spine	Herbivore
Unicornfish - Other	Planktivore
Wrasse - Cleaner	Parasitivore / Carnivore
Wrasse - Humphead	Carnivore
Wrasse - Other	Carnivore / Omnivore

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.

Coral Growth Forms

Resilience is MCP's classification of how well each form withstands disturbance.

Hard Coral	Resilience
Branching	Low
Columnar	Medium
Encrusting	Low
Massive	High
Plating	Low
Solitary	High
Submassive	Medium
Tabulate	Low
Tubastraea	Low

Coral Condition

Recorded against a coral point to describe its state.

Health and Vulnerability
Bleaching - Fully
Bleaching - Partially
Coral Disease
Infestation - Flatworm
Infestation - Terpios Sponge
Predation - COT
Predation - <i>Coralliophila</i>
Predation - <i>Drupella</i>
Recently Killed
Silt

Other Benthic Categories

Everything else scored on the point-intercept transect.

Benthic Categories	
Algae	Sessile Invertebrates
Coralline	Barrel Sponge
<i>Halimeda</i>	Encrusting Sponge
Filamentous	Irregular Sponge
Macroalgae	Ascidian
Turf	Encrusting Ascidian
Soft Coral	Bryozoan
Soft Coral	Substrate
Gorgonian	Giant Clam
Organ Pipe	Live Coral Fragment
Other Cnidarians	Rock
Anemone	Rubble
Corallimorph	Sand
Hydroid	
Zoanthid	

PREDATION & MARINE DEBRIS MONITORING

Our predation surveys are conducted using a visual census method based on a 30-meter x 5-meter belt transect. All targets present or that enter the survey zone are identified, counted and sized.

The following is our complete predation and marine debris indicator list. Three coral predators and 24 debris categories. Corallivores and debris are both recorded on the predation survey.

Coral Predators

Category	Scientific name	Feeding group
<i>Coralliophila</i>	<i>Coralliophila</i> spp.	Corallivore
Crown of Thorns (COTS)	<i>Acanthaster planci</i> species complex	Corallivore
<i>Drupella</i>	<i>Drupella</i> spp.	Corallivore

Marine Debris

Category	
Cigarette Butts	Metal
Diapers and Nappies	Other
Electronics	Paper and Card
Fish Cage (in use)	Plastic Bag
Fish Cage (not in use)	Rope
Fishing Line	Hard Plastic (Other)
Fishing Net	Soft Plastic (Other)
Ghost Net	Soft Plastic Drinking Bag
Glass and Ceramics	Soft Plastic Straw
Hard Plastic Bottle	Soft Plastic Wrapper
Hard Plastic Cutlery	Textiles & Bags
Hard Plastic Toys	(Nothing Found)

INVERTEBRATE MONITORING

Our invertebrate surveys are conducted using a visual census method based on a 30-meter x 5-meter belt transect. All target invertebrates present or that enter the survey zone are identified, counted and sized.

The following is our complete invertebrate indicator list. Invertebrate functional groups overlap, so a species can appear in more than one and the group densities do not sum to total invertebrate density.

Category	Functional Groups				
	Co	E	I	B	Ch
Echinoderms					
Sea Star					
Cushion Star					
Urchin - Collector					
Urchin - Diadema					
Urchin - Other					
Urchin - Rock Boring					
Sea Cucumber - Amberfish					
Sea Cucumber - Black Spotted					
Sea Cucumber - Sandfish					
Sea Cucumber - Leopard					
Sea Cucumber - Magnum					
Sea Cucumber - Other					
Sea Cucumber - Pinkfish					
Sea Cucumber - Volcano					
Gastropods					
Conch - Other					
Scorpion Spider Conch					
Giant Turban					
Turban - Other					
Nilo Top					
Top - Other					
Triton's Trumpet					
Horned Helmet					
Cone Shell					
Common Egg Cowrie					
Cowrie - Other					
Tiger Cowrie					
Other Shell					
Slugs					
Nudibranch					
Headshield Slug					
Sapsucking Slug					
Flatworm					

Category	Functional Groups				
	Co	E	I	B	Ch
Bivalves					
Giant Clam					
Giant Boring Clam					
Thorny Oyster					
Pearl Oyster					
Pen Oyster					
Honeycomb Oyster					
Scallop					
Other Bivalve					
Arthropods					
Banded Coral Shrimp					
Cleaner Shrimp - Other					
Harlequin Shrimp					
Shrimp - Other					
Mantis Shrimp					
Lobster					
Crab					
Cephalopods					
Blue-ringed Octopus					
Octopus - Other					
Cuttlefish - Other					
Flamboyant Cuttlefish					
Benthic Fish(Ish)					
Eel					
Ribbon Eel					
Pipefish					
Seahorse					
Frogfish					
Lionfish					
Scorpionfish					
Porcupinefish					
Blue Spotted Stingray					
Blue Spotted Ribbontail Ray					

Key:

- Commercially Important Species
- Ecosystem Engineers
- Indicator Species (Reef Health & Diversity)
- Other Benthic Species
- Charismatic Species



**MARINE
CONSERVATION
PHILIPPINES**

THANK YOU

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

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