The coral reefs of Mararison

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Mararison Island, otherwise known as Malalison Island, lies 4 km off the west coast of Culasi in northern Antique and is about 7 km from Batbatan Island on the northwest. It is separated from Panay Island by a narrow Salangan channel and is situated at 11°25' north latitude (N lat) and 122°01' east longitude (E long).

Transect sites of the coral reefs

a Layag-layag
11°25'05" N lat
122°00'52" E long

b Gatusan
11°25'10" N lat
122°01'05" E long

c Amihanan
11°25'14" N lat
122°01'15" E long

d Kawit
11°24'40" N lat
122°01'31" E long

e Talisay
11°24'48" N lat
122°01'24" E long

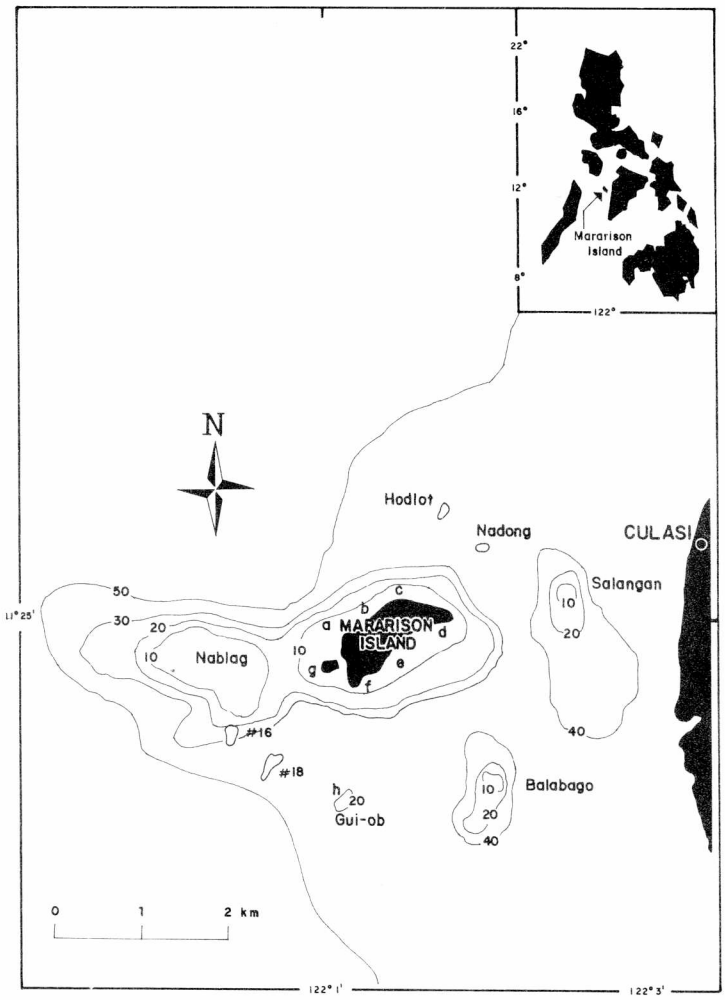
f Punta Ayo
11°24'41" N lat
122°01'20" E long

g Nablag
11°24'38" N lat
122°00'42" E long

h Gui-ob
11°24'07" N lat
122°00'49" E long

Physical features

Mararison is a low island surrounded by a fairly extensive fringing reef. It has a total land area of 0.65 km^2 that is composed mainly of limestone and carbonated rock. The surrounding fringing reef and nearby reefs cover an approximate area of 2.33 km^2. The highest point on the island is 90 m above sea level and is one of two prominent peaks that is covered by grass and few trees. On the island's western tip facing Cuyo East Pass, a small rocky islet named Nablag is separated from the island by a shallow lagoon and a short sandbar. A prominent sandbar named Kawit also lies on the island's eastern tip facing Panay Island. The north side has a relatively steeper slope than the south side where the lone *barangay* community is located. A small pastureland and rice field near Nablag islet are the only arable land in the island. Human settlements are concentrated on the southern part.



A bathymetric map of Mararison Island in Culasi, Antique. Transect stations are also shown. Depth soundings are in meters. Lower case letters refer to transect sites.

Reef structure and corals

The reef fronting the island's southeast side (Kawit and Talisay) is depauperate (5-12% live hard coral cover) with few small colonies of encrusting and massive corals that include *Porites lutea, Pavona varians, Montipora,* and faviids. Most corals in the stretches of rubble and sand in Kawit and Talisay appear to be recent recruits. Larger colonies are found in rocky outcrops and boulders in these stations, particularly in Punta Ayo where live hard coral cover is higher (21-31%). On rocky outcrops of Punta Ayo, massive colonies of *Diplostrea heliopora* and branching *Porites annae* are conspicuous together with *S. hystrix* and *P. damicornis.* Small colonies of encrusting *Montipora* and faviids are also numerous.

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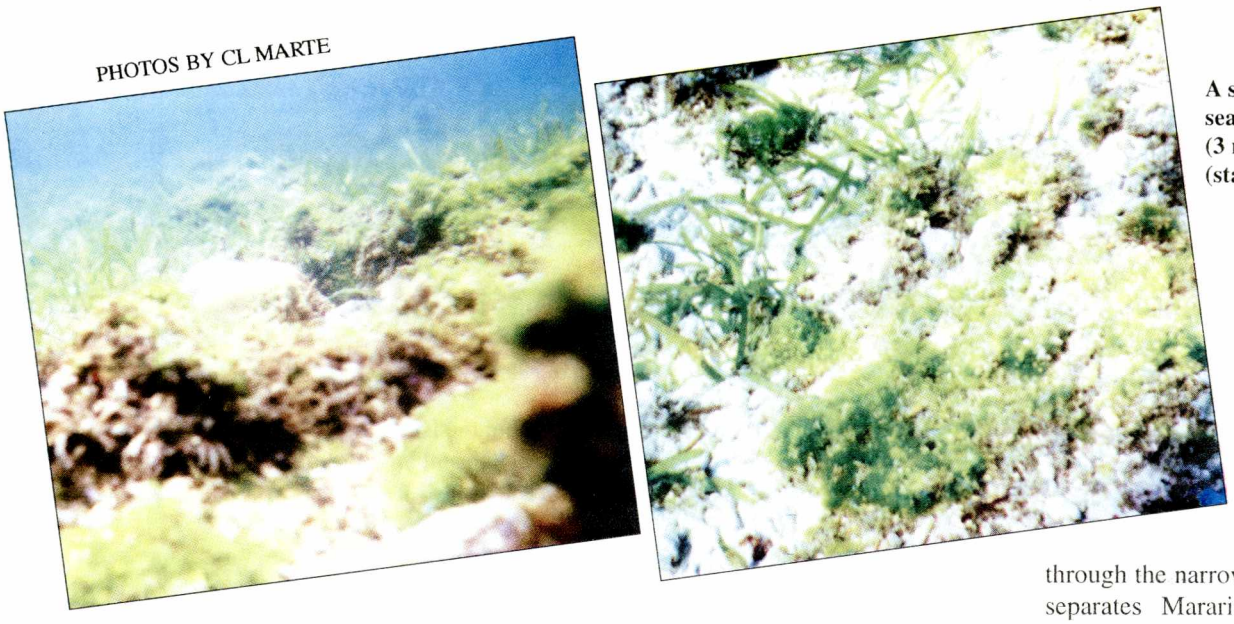


A sparse growth of seagrasses at the reef flat (3 m depth) of Nablag (station g)

Dense stands of branching *Acropora* (*A. formosa, A. nobilis*) interspersed with colonies of *Hydnophora rigida, Porites rus,* and *P. cylindrica* characterize the reef slope at the western end of the island at Nablag where live hard coral cover is high (69%). In addition, many colonies of *P. damicornis, S. hystrix* and various species of corymbose and caespitose *Acropora* are present.

Live hard coral cover in the reef flats (63-65%) and reef slopes (36-47%) of transect stations on the northwest side of the island (Layag-layag, Gatusan, Amihanan) are relatively high and more diverse than reefs on the south side of the island (see next section).

Live hard coral cover at the offshore reef platform at Gui-ob was 24% in 1994. Large colonies of *Turbinaria* sp., *Porites lutea,* plate-like *Montipora* and faviids are found on rock mounds, while numerous small colonies of *Anacropora mathei* are found in rubble and sandy areas.

Seven permanent transect stations, about 300-500 m from each other, were established on the island's fringing reef. An additional station (Gui-ob) was marked at a nearby offshore reef located about 2 km south of the island.

Layag-layag (station a)

Located near Nablag islet on the northwest, the reef flat in this station extends from the shore to about 400 m to the reef crest. The reef flat is an extension of a shallow lagoon separating Nablag islet from the island. The reef front at the 10-20 m depth is dissected by ridges alternating with sand or rubble (spur and groove zone). Further, down the slope to a terrace at the 50 m depth, the substratum is composed of fine sand and silt that have been washed form a small creek and rockfall on the island. The reef flat (3 m depth) and the ridges at the reef slope (10 m) are densely covered by various species of scleractinian corals.

Gatusan (station b)

The reef flat and the spur and groove formations at the reef slope in this station are contiguous with Layag-layag.

Amihan (station c)

The prominence of spur and groove formations diminishes in this northeast station as the reef slope is marked by wider expanses of sand and rubble compared with the previous station. A moderate sub-surface current at 10 m depth becomes discernible as water mass from Cuyo East Pass collides with the eastern tip of the island and flows through the narrow Salangan channel that separates Mararison Island from Panay Island.

Kawit (station d)

Unlike the reef on the north side, Kawit on the southeast end of the island has a gradually sloping substrate that ends on a steep-sided channel (Kawit Deep, 30-40 m depth) that connects with the Salangan channel. The reef flat is composed of barren rock, sand, numerous small coral heads, interspersed with beds of the long-spined black urchin *(Diadema setosum).* Small tridacniids are numerous on barren rocks on the reef flat. The reef slope at Kawit is also marked by numerously large coral boulders and bare rocks.

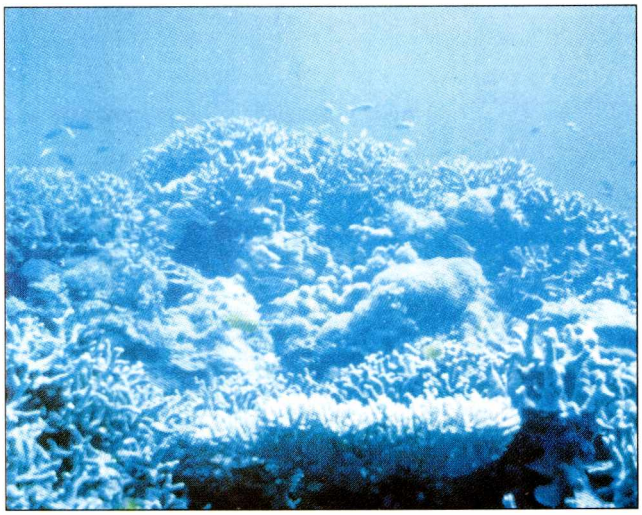
Talisay (station e)

A seagrass bed in front of the *barangay* is denuded and silted. Boat traffic is busy in the area. The reef flat gradually slopes to a bare sandy bottom at 10-15 m depth that is marked by a few isolated rock outcrops. A short spur and groove zone is present along the seaward edge of the reef slope.

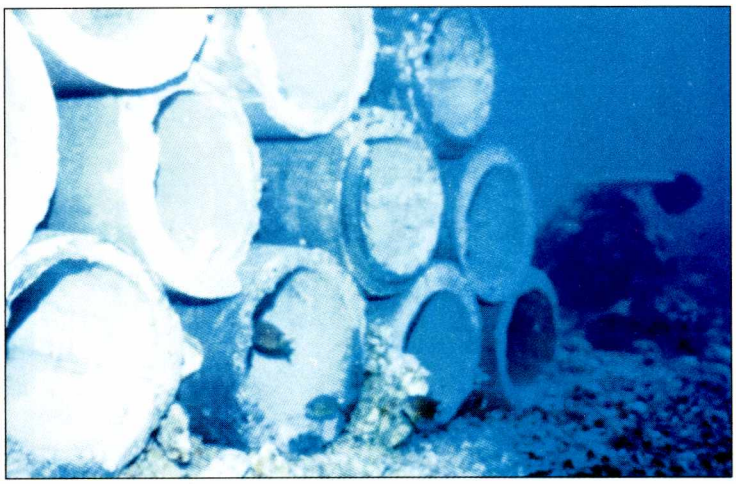
Punta Ayo (station f)

Small boulders mark the beach and the reef flat of this station. Similar to Talisay, the bottom profile gradually slopes to a barren rocky substrate at the 3-5 mm depth before reaching a relatively flat and sandy bottom.

High cover of live hard corals characterizes the northern side of Mararison Island, such as the reef slope (10 m depth) of Gatusan (station b)



Concrete culverts are piled to form an artificial reef habitat at the 20 m depth in Gui-ob (station h). These concrete habitats were deployed May-June 1995 by the island fishers as a component of their legally declaring 28 ha of Gui-ob reef as a marine sanctuary



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Mono-specific beds of branched *Porites annae* are common.

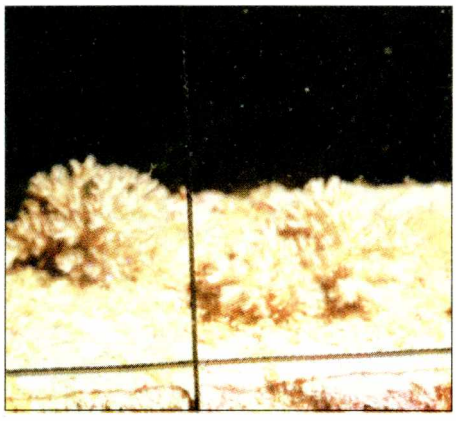
Nablag (station g)

Located at the western end of Nablag islet, the short reef flat extends about 300 m from the sloping edge of a rocky headland. The surge zone is marked by numerous boulders that are barren except for a few growth of *Pocillopora* spp. Sandy channels slope gradually to a depth of 10-15m where mono-specific bands of *Acropora formosa, A. nobilis, Hydnophora rigida* abound. A dense bed of seagrass is located in a nearby cove and a sandbar that separates Nablag islet from Mararison Island.

Gui-ob (station h)

Gui-ob reef is one of eight offshore reef platforms in the island. Located about 2 km south of Talisay (station e), the 0.2 ha reef platform rises from deep water to a depth 0f 20-25 m. In May-June 1995, nine modules each of three designs of concrete artificial structures were deployed by the island community as an integral part of a municipal ordinance that declared Gui-ob reef a no-fishing zone (i.e., marine sanctuary) in 1996. The marine sanctuary encompasses a total of 28 ha or 12% of the island's total reef area.

A recruit of branching hard coral on a concrete artificial reef a year after deployment in Gui-ob (station h)



Noteworthy fauna and flora

Over 100 species of hard corals under 45 genera are found in Mararison Island. Estimated by a line-intercept transect, live hard coral cover in the reef flat on the northwest side of the island (Layag-layag, Gatusan, and Amihanan) is high (63-65%) and is characterized by a highly varied assemblaged of encrusting, massive, and branching corals. Although dense colonies of corals are found on the ridges at the reef slope, live hard coral cover estimate is lower (36-47%) because of rubble and sandy areas that alternate with spur formations. Dominant coral species are massive and branching *Porites* (*P. lutea, P. annae, P. cylinrica*), *Seriatopora hystrix, Pocillopora damicornis, Heliopora coerulea,* and encrusting *Montipora* (*M. tuberculosa, M. danae*). Small colonies of corymbose and caespitose Acropora are also abundant, but small colonies of faviids (*Favia speciosa, F. favus, F. matthai, Goniastrea retiformis*) are present. The foliose corals *Echinopora lamellosa* and *Merulina ampliata* are also conspicuous in these stations.

Based on 1994 and 1995 fish visual census, Mararison Island boasts of 404 species of reef fishes from 43 families.

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Most abundant are the damselfishes consisting of 70% of fish censused. Eight species from three families comprised more than half of the fish counted, namely: damselfishes, *Chromis ternatensis, C. retrofasciatus, C. viridis, Pomacentrus moluccensis, P. lepidogenys,* and *Dascyllus reticulatus;* wrasses, *Cirrhilabrus cyanopleura;* and, anthiinaes, *Pseudanthias huchtii.* In terms of total biomass, damselfishes (29%) rank first, followed by fusiliers (16%) and surgeonfishes (12%).

Chromis lepidogenys are abundant, particularly at the reef flats (up to 3 m depth) of Layag-layag, Gatusan, and Amihanan whereas, *Cirrhilabrus cyanopleura* are conspicuous at mid-water on the reef slope (10 m depth). Schools of *Chromis ternatensis* and *C. viridis* are abundant and seek shelter on dense beds of branching *Acropora* on the reef slope of Nablag. Numerous coral heads and bommies in all stations are inhabited mostly by *Chromis retrofasciatus, Dascyllus reticulatus, Pomacentrus moluccensis*, and *Pseudanthias huchtii.* The jewel damselfish *Plectroglyphidodon lacrymatus* are likewise prominent in the many crevices that mark the reef substrate. Aggregations of *Pomacentrus coelestis,* including various tiny labrids, are numerous in sandy areas between barren rocks scattered on the reef flat of Kawit, Talisay, Punta Ayo, and Nablag. Large acanthurids (*Naso* sp.) and transient residents such as fusiliers and surgeonfishes form the basis of the island's reef fishery.

About 40 species of seaweeds have been identified in the island. Species of green, brown, red, and blue-green algae dominate the algal community. The brown algae *Sargassum polycystum* and *Padina minor* produce the highest annual biomass, followed by the red algae, *Dictyosphaeria cavernosa, Boodlea composita,* and *Codium edule. Lyngbya majuscula* is the dominant blue-green algae.

Five species of seagrasses which cover 0.2 km^2 of the reef have been identified. These include *Cymodocea rotundata, Halophila ovalis, Halodule uninervis, Syringodium isoetifolium,* and *Thallassia hemprichii.*

Scientific importance and research

Mararison Island is one of three island communities of Culasi, Antique. Among other candidate areas in Panay Island, the island was chosen in 1991 by SEAFDEC/AQD to be the pilot site for a community-based and development-oriented research project on fishery management. The project takes on a multi-disciplinary approach to address the widespread degradation of marine ecosystems that exacerbates the impoverishment of coastal fishermen. It involves the collaboration of the major stakeholders who are the local fisherfolk, the local government, non-government organization, and researchers from the major disciplines of sociology, economics, and marine biology. Research studies conducted on the island include an assessment of marine communities, traditional marine resource use, community organizing and capacity building, and generation of alternative livelihood such as seaweed farming, fish cage culture, and animal husbandry. The feasibility of enhancing depleted stocks of abalone and top shell on the island is likewise a major concern. The biological and socio-economic impacts of concrete artificial habitats on reefs under protective management is a continuing activity.

Economic value and social benefits

The reef resources of Mararison Isand are the object of exploitation by a small-scale fishery on which more than 90% of the island's population of 540 individuals depend. Four major types of fishing gears are employed by island fishers, namely: spear gun without (free dive) and with compresor (*hookah*), gill nets, and scoop net. About 70 kg of fish can be caught per operation of a variety of gill nets (e.g., set, drive-in, drift). Spear fishing by free dive and by compressor can catch about 30 kg of fish per operation. Catch comprises mostly surgeonfishes and fusiliers. Annual fish yield from the reef in 1991 and 1992 was estimated at 5.8 t per km^2.

Legal protection

The reef fishery of Mararison Island, just like elsewhere in the country, is characterized by an open access system whereby fishers exploit the fishery anywhere by any means to take any amount possible. This system continued until 1991 when the institution of advocacy and capacity-building among fisherfolks was initiated. To date, the island community has succeeded, through a municipal ordinace, in legitimizing the establishment of a no-fishing zone at Gui-ob reef. The legal institution of a sanctuary at Gui-ob reef may further enhance the anticipated impact on the island's reef fishery of concrete artificial reef habitats in the marine sanctuary.

Livelihood options ... from previous page

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Management

Other reefs adjacent to the island remain under some form of protective management through the collaboration of a fishermen's association, local resource management council, and the island barangay and municipal councils. In Gui-ob and Buganti reefs, the recent deployment of concrete artificial reefs serves as a focus for the overall effort on reef management by the island community, as these structures are expected to enhance fish recruitment by increasing habitat complexity. Although only Gui-ob reef remains strictly closed to any form of exploitation, other reefs may also be considered to be under the same status after conflicts in exploiting the reef fishery are resolved by the fisherfolks themselves. Other management options such as mesh-size limits of fishing nets are under consideration. Except for spear fishing with compressor, destructive fishing practices such as *muro-ami*, blast and cyanide fishing have been banned.

Recommendations

The experiences gained in Mararison Island over the year may hopefully be replicated in other parts of the country. For instance, the identification and the resolution of conflicts in resource utilization among the island fisherfolks are significant developments in mobilizing and in empowering the island community to manage their fishery resources. The involvement of major stakeholders in formulating coastal management schemes that are acceptable to a variety of interest offers promising results. Moreover, the collaboration among researchers from various disciplines ensures a holistic approach to village-based reef management, perhaps the only viable option remaining in surmounting further marginalization of coastal fisherfolks.

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THE FUTURE MALALISON

The future of Malalison rests on these children who are blessed with the charm and innocence of youth, still expectant of what lies ahead. The promise of Malalison should fully belong to them.