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## Sanctuary for marine life

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### **Reef balls not only prevent destruction of marine diversity by trawlers but also encourage more fish species of commercial value to breed**

KUCHING: One biological truism is that habitat diversity creates ecological diversity. We have probably also heard "if you build it, they (marine life) will come."

Sarawak Reef Balls Working Group (SRBWG) has been applying these concepts for nearly a decade in creating new reefs.

Over the past decades, fishing activities along the coasts of Sarawak have been linked to a decline in the abundance and diversity of fringing reefs.

The State government through the Marine Fisheries Department had striven to conserve the marine communities, deploying tyres and parts of the seized and dismantled foreign fishing vessels.

In an effort to supplement these activities, the group later implemented the Reef Ball Pilot Project (first of its kind in Sarawak) in 1998, involving the deployment of 59 reef balls at Pulau Talang-Talang and 181 at Batu Penyu in Sematan.

Where structure does occur, virtual gardens of sessile (permanently attached) invertebrates like algae, barnacles, oysters like giant clams, sponges, sea cucumbers, sea slugs and corals attach to every available surface and in every nook and cranny.

Living within the shelter of these encrusting animals, a host of reef fish species like beautiful squids (sotong), as well as snappers and barramudi feed and breed.

Further up the food chain, larger predatory fish like mackerel, or may be sharks, will be found seeking shelter and the occasional lunch.

The final link in this natural chain is human beings, who have learned that where there is structure, there will be fish to catch.

Thank to the reef balls ... for not only do they prevent trawlers from further destroying the diversity of fringing reefs and marine life around the coastal areas but also encourage more fish species of commercial value to breed.

Research officer (Marine Resource) of Fisheries Research Institute, Sarawak branch, Daud Awang, said the reef ball project in Sarawak was considered a success.

Study, he added, was carried at Talang Talang Island where artificial reefs (reef balls) had been deployed in 1998.

"This study was to evaluate the potential of reef balls as new habitats and their effectiveness in increasing the productivity of the area and diversity of fish fauna.

"The results show that reef balls deployed in 2002 had the highest number of species (33 species) compared with the nearby natural reefs (26 species)," he told **thesundaypost**.

Daud said although the natural-reef area had the highest number of fishes (6,640 individuals) compared with the reef balls (1,631 individuals), reef balls deployed in 2002 had more fish species of commercial value such as the Ephinephelus species, Ltjanus species, Lenthrinus species, Lates species and Rastrelliger species.

He said in contrast, the nearby natural reefs had none of the commercial species of fish.

"This shows that artificial reefs are an effective way to increase fish diversity and the number of commercial fish species.

According to Daud, artificial reefs are designed with specific goals such as creating new habitats on the seafloor for reef creatures, breeding areas, a place to seek protection from predators and to provide a substrate for reef fouling communities which create a food source for primary and upper level consumers.

He said many different materials had been used to create artificial reefs but concrete reef balls were found to be very favourable for artificial reef construction.

Reef balls were the best alternative in conserving coral reefs and marine habitats because they contained no toxins, were more stable, lasting and highly complex and had low neutrality (PH) rate.

"It does not degrade in seawater, is easily moulded, not easily moved once in place though harder to transport to the development site.

"Concrete can be made to have a texture comparable to natural reefs and develop very similar communities as natural reefs."

He said in good weather without sedimentation, a reef ball could be fully covered with invertebrate and marine

plant habitats within six months from the day it was deployed.

"It's also observed that, after more than two years, most of the reef balls are covered by algae and invertebrate. These algae provide food for fishes around reef balls. This will enhance the fish population within the reef ball area."

Reef balls are popularly used around the world and successful in creating essential fish.

In most cases, the evidence indicates that reef balls can easily reach 80 per cent or more of the natural species diversity and population densities of nearby natural reef systems within just a few years.

However, achieving the ultimate goal of 100 per cent may take five or more years and will nearly always require special treatments to match local conditions.

If you had been around to see the reef balls for yourselves, you would have probably noticed the odd-looking bell shaped hollow concrete structures with randomly perforated complex holes.

They are created by filling moulds with a cement mixture. After a day, the moulds are removed and sprayed down with water so that gravels can be exposed. This gravels allow algae and soft corals to grow more easily on the surface of the reef balls.

After completely drying for about 28 days, the reef balls can be deployed to selected places.

According to a senior officer of the State Marine Fisheries Department, Sarawak is the first in Southeast Asia to use reef balls to create habitats for fish.

He said so far, Sarawak had successfully deployed 3,148 reef balls.

State Marine Fisheries Department is one of the members in Sarawak Reef Balls Working Group. Others are Sarawak Forestry Corporation, Marine Police, Public Health and Environment, Ministry, Urban Development and Tourism Ministry, Social Development and Urbanisation Ministry, Sarawak Tourism Board, Natural Resources and Environmental Board, Sarawak Museum Department, Sarawak Turtles' Board, Institute of Marine Fisheries and Universiti Malaysia Sarawak.

The officer said the department hoped to deploy the remaining 859 reef balls this year, placing them in areas where marine biodiversity was low or where fish stocks had diminished.

He said the reef balls were first deployed in Pulau Talang Talang and Batu Penyu, Sematan, before being eventually placed in Kuala Tatau, Kuala Buntal, Tanjung Sipang, Pulau Sempadi, Awat-Awat and Kuala Penipah.

"The reef balls we have are made from the technology from the Reef Development Group Limited, USA. The moulds we used were bought from the US and the production was monitored by the Group," he told **thesundaypost**.

Reef balls come in many sizes to best match the natural reef types being mimicked.

The officer said the reef balls produced here were ultra ball (width 1.68m x height 1.31m and weight 1.591 - 2,045kg), reef or ultra ball (width 1.83m x height 1.16m and weight 1,364 - 1,909kg), pallet ball (width 1.22m x 0.88m and weight 682 - 1,000kg) and bay ball (width 0.91m x height 0.61m and weight 170 - 341kg).

Reef balls are essentially artificial reef structures that mimic a natural reef system, almost immediately attracting fish and many other marine species because of the protective habitat the structures provide.

Another aspect of these artificial reef structures is that overtime, algae and corals begin growing on the reef ball surface, further enhancing the biodiversity of the environment.

Before the introduction of the technology, he said, they were using tyres (better known as *tukun* tyres) and parts of dismantled foreign vessels but the latter were no longer used now as they produced chemicals.

While some countries are deploying reef balls to create scuba diving sites, the reef balls in Sarawak are mainly for protection and conservation.

"The objective of deploying these reef balls is creating a sanctuary for fish to breed and preventing trawlers from fishing near the shore.

Our reef balls are normally placed not more than three nautical miles for the shore.

"If there are reef balls in the area, no trawling can be done. Even if it's done in the area, it will not gain anything because the reef balls will certainly cut the nets, and fishing nets are not cheap now," the officer said.

Only traditional fishing could be carried out within the reef ball area, he added.

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