

Coral Frame Programme in Tun Sakaran

Extensive damage has been inflicted on coral reefs in the Semporna area (and elsewhere in Sabah) from the use of explosives to 'catch' fish. Fish bombing began at least 50 years ago and surveys indicate that virtually every reef has been affected at some time.



Report by Elisabeth Wood

The Marine Conservation Society and Sabah Parks, through the Semporna Islands Project, are demonstrating 'conservation in action' in the Tun Sakaran Marine Park by making and setting up 'coral frames' in bombed areas.

Progress has been made since the first coral frames were deployed at fish bombed sites in the Tun Sakaran Marine Park in June 2011. A total of 200 frames have now been made and deployed on the reef front of the fringing reef at Sibuan, Mantabuan and Kapikan and on the Southern Rim Reef off Boheydulang.

The frames were placed along the reef front at depths between 3-6m, where the greatest damage has been inflicted. Each was seeded with 85-90 coral fragments, attached with plastic cable

ties. The coral fragments were preferentially sourced from loose colonies, provided they were not damaged. Some pieces are also taken from attached, donor colonies.

The frames have proved to be very stable and show no signs of deterioration. Survival of the fragments in the first few months after seeding depends on a wide variety of biological and environmental factors. For reasons unknown, initial survival at Mantabuan was only just over 50%, but thereafter survival has been between 87 – 99% between monitoring surveys.

Growth rate depends primarily on the species and growth form. Branching corals (particularly *Acropora* and *Pocillopora* species) have shown the fastest growth, with some colonies of *Acropora* attaining more than 30cm diameter after 1.5-2 years. Trials were carried out with a few

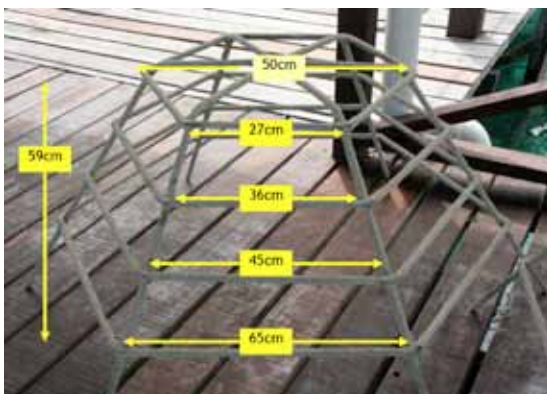


Intact and healthy reef with corals hundreds of years old. Recently-bombed reef showing destruction of both massive

foliose and small semi-massive corals but these have significantly slower growth and the foliose corals showed poor survival.

The bars of the frame are stable and elevated off the reef surface and vacant spaces provided a suitable surface for attachment of other organisms. Natural colonists consisted mainly of hydroids and seasquirts and these were cleaned off as far as possible in order to reduce competition with the coral fragments. A few hard corals, soft corals and sea fans also appeared on the frames, having settled as tiny post-larval forms.

A range of fish roamed onto the frames to feed and/or shelter. Observations of their behaviour showed that they often hovered inside the frame and sometimes moved quickly from frame to frame in seek of refuge. Other fish appeared



Frame, showing dimensions. The overall height from the ground is 59cm and the width of the 'footprint' is 1m 30cm.



and branching corals. Reefs that have been reduced to rubble may never fully recover. Photo: Adam Broadbent

to be visiting mainly to feed and were observed browsing on the surface of the bars or the attached organisms.

The first fish colonists were noted about 9 months after deployment and were tiny juvenile pomacentrids (humbug, *Dascyllus* species) and unidentified wrasse. They were living in coral fragments (especially *Pocillopora* and *Acropora*) that had grown to a large enough size to provide a safe refuge.

The numbers, size and variety of resident fish increased over time and after 2 years, between 70-90% of the frames were colonised by anything between one and well over 50 fish. Most of these individuals were small species that will probably remain on the frames, but a few (e.g. groupers) were juveniles that will move away and extend their territories/home range as they grow into adults.

The coral frames have undoubtedly been a success and it is to be hoped that their presence will continue to enhance biodiversity. It is acknowledged that, given the size of the Park (over 100km of reef front), the frames can repair only a fraction of the reefs that have been damaged by fish bombing. However, the programme is of considerable value for various other reasons. In particular, it has established a robust methodology that can be used by Park managers, the private



This frame was seeded in June 2011 (above). The same frame 20 months after deposition (below).



Frame No. 19 in September 2012, 15 months after deposition (above) and 31 months later (below).



on the left, a newly-attached nodule of Galaxea, on the right the same fragment of Galaxea after six months, showing



how the skeleton and tissues have grown over the cable-tie.

sector and local communities to help regenerate damaged reefs or create additional habitat.

The coral frame programme has also helped to increase awareness by highlighting the impacts of fish bombing on the reefs and showing that positive steps can be taken to encourage regrowth and recovery.

Der Erfolg des Projekts wird durch die Tatsache unterstrichen, dass die Methodik bereits von der

Privatwirtschaft in Pulau Pom Pom (Semporna) und in anderen Teilen Sabahs, einschließlich Kudat und Tunku Abdul Rahman Park repliziert wurde. Darüber hinaus hat das malaysische Fischereiministerium Finanzmittel für die Herstellung und Aufstellung weiterer Rahmen im Tun Sakaran Marine Park in den nächsten zwei Jahren bereitgestellt, nachdem verschiedene Methoden der Riff-Restaurierung evaluiert worden sind.

The success of the project is shown by the fact that the methodology has already been re-



A frame 2.5 years after seeding and now supporting dense growths of Pocillopora and three species of Dascyllus (*D. trimaculatus*, *D. aruanus* and *D. reticulatus*).

plicated by the private sector at Pulau Pom Pom (Semporna) and in other parts of Sabah, including Kudat and the Tunku Abdul Rahman Park. In addition, having evaluated different methods of reef restoration, the Malaysian Federal Department of Fisheries have assigned funds for the deployment of more frames in Tun Sakaran Marine Park over the next two years.

It is hoped that the private sector, local communities, conservation organisations and management authorities will work together to further develop and monitor the coral frame programme.

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Project partner:

Marine Conservation Society Unit 3, (MCS)

Dr. Elizabeth Wood

Wolf Business Park Alton Road

Ross on Wye

Herefordshire HR9 5NB

Great Britain