

SARAWAK REEF BALL® PROJECT REPORT: An environmental friendly artificial reef for marine conservation and resources enhancement in Sarawak

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What is reef ball?

Reef ball is a dome-shaped artificial reef that created and patented by the Reef Ball Development Group Ltd. from United State of America (USA). Reef ball made from special mixture of cement, sand, gravel, micro-silica fume and DURACEM 800 (www.reefball.org/).

Nowadays, reef ball have been used by more than 80 countries worldwide for various project such as protect marine turtle's critical habitat, protect traditional fishermen's fishing ground from illegal trawlers, enhance marine life (as fish aggregate device), reef rehabilitation/restoration, anchor, SCUBA diving site, research site, beach erosion control method, and tool for mangrove replanting program(www.reefball.org/).

Reef ball is very special artificial reef because it has same pH with salt water (mimic the natural limestone); no organic and toxic chemical content (Environmental friendly); rough and sharp surface (Provides suitable condition for settlement of coral polyps and other micro-organisms, ripping trawler nets that entangle to it); hollowed centre (provide shelter for marine life and circulation of ocean current-remain stable); heavy (stable) around 2 tonnes; and durable which will last over 500 years (www.reefball.org/).

Background of Sarawak Reef Ball Project

Before 1998, around 100 individuals of dead marine turtles recorded along the coast of Sarawak annually. Most of the dead turtles were found along the beach near Sematan which is located five nautical miles from the Pulau Talang-Talang Besar and Pulau Talang-Talang Kechil of Talang-Satang National Park (formerly known as Sarawak Turtle Islands). It was suspected that most of the deaths were caused by illegal trawler activities that operated at the sea turtle's critical habitats (feeding grounds, migratory routes, interesting resting habitat during nesting season). Joint enforcement and patrolling by Forest Department Sarawak and Marine Fisheries Department were not effective because fishing trawlers always detected the enforcement team and fleet earlier. At the same time local/traditional fishermen 'cried' for help and complained to the authorities because fishing trawlers destroyed their fishing nets, fish habitat (sea floor) and taken all their fishing resources.

Achievements

In 1998, the State Government provided RM300, 000.00 to initiate the project. The grant was used by Forest Department Sarawak to purchasing six (6) reef ball molds, bringing in the trainers from USA and purchasing some reef balls. In 1999, the Sarawak Reef Ball Working Group (SRBWG) that comprises of 13 governmental agencies was formed to oversee the project implementation.

Sarawak Reef Ball Working Group (SRBWG) - a group of governmental agencies in Sarawak that was formed in 1999 to coordinate the implementation of the Reef Ball projects. At the moment, SRBWG consists of SARAWAK FORESTRY Corporation, Sarawak Forest Department, Marine Fisheries Department Sarawak, Fisheries Research Institute Sarawak, Universiti Malaysia Sarawak (UNIMAS), Sarawak Tourism Board, ; Sarawak Museum Department, Turtle Board, Ministry of Public Health and Environment, Natural Resource and Environment Board, Marine Police Contingent Sarawak, Marine Department Sarawak, Ministry of Tourism, and Ministry of Social Development and Urbanization.

Since 1999, around 3,000 units of reef ball have been deployed at the areas that have been identified as sea turtle resting areas during nesting season in Talang-Satang National Park waters. Another 400 units have been deployed in Lawas, Tatau and Santubong waters for protection of marine life habitat from illegal trawlers. Most of the project were funded by Federal and State grants. In 2000, Petroliam National Berhad (PETRONAS) provided RM50,000 for purchase 100 units of reef ball in Pulau Batang Besar waters.

Since then, less than 20 dead sea turtles were recorded annually from this area. Interview survey by Forest Department Sarawak in 2003 found that local communities experienced an increase of total catches and income since the deployment of reef balls in the area. Although annual fish landings in Sarawak has dropped from 157,707.80 mt in 2001 to 119458.64 mt in 2011 (32.02%) but annual fish landings at Sematan District has increased from 1008.68 mt in 2001 to 3065.53 mt in 2011. The increased of fish landings in Sematan District for 303.92% within 11 years and decreased of dead turtle by 80-90% since the deployment of reef balls revealed the significant impact of reef balls project in protection and enhancement of marine life in the reef ball deployment. Nowadays, Sematan is known as the most popular sport fishing site in Kuching division. Indirectly, the reef ball project has contributed to the improvement of socio-economic of local community that live around the project site.

Using the government grant from Ministry of Natural Resource and Environment, Forestry Department Sarawak purchased another six (6) units of Reef ball mold and brought over two trainers from Reef Ball Innovation Ltd. USA to Sarawak in 2001. A total of 16 local contractors attended the 3-days the reef ball construction course in Kuching. 2005, Dasanrama Sdn Bhd was authorized as the sole licensed contractor to sell reef balls in Borneo by the Reef ball Foundation, Inc. USA. In 2005, SARAWAK FORESTRY (provided technical expertise on reef rehabilitation program in Tunku Abdul Rahman Park (TARP), Sabah. A total of 230 reef balls were deployed at the shallow reefs within TARP waters which were completely destroyed by Tropical Storm Greg in 1996. Very impressive growth of corals were observed on the reef balls that deployed 10 years ago (see attachment).

In 2007, Sarawak Marine Fisheries Department purchased three units of Reef Ball mold through Dasanrama Sdn Bhd (Licenced Reef Ball Contractor in Borneo).

Moving forward

Sarawak has demonstrated to the world that reef ball (an environmental friendly artificial reef) is an effective tool for marine environment conservation, protection, and enhancement. Tisen & Bali (2000); Bali *et al.* (2008) , reported that the Sarawak Reef Ball Project has succeed in protection of turtle's inter-nesting habitat and traditional fishermen fishing ground near the turtle main nesting beaches. The project needs to be

expanded to entire of Sarawak coastal areas to protect the turtle's migratory routes, interesting swimming habitat and also traditional fishermen fishing grounds from illegal fishing trawler activities. SARAWAK FORESTRY Corporation needs support, contribution and strong cooperation from various stakeholders such as private sectors and local communities in many ways. Since 1998, implementation of reef ball project in Sarawak only relies on government grant. However amount of grant is insufficient due to very large areas need to be conserved.

In 2013, SARAWAK FORESTRY Corporation and Malaysia Liquefied Natural Gas (MLNG) Group of Companies have signed the Memorandum of Understanding (MoU) to embark the 'BEACON Project' – Biodiversity, Environment and Conservation, - a signature environmental sustainability development program that aims to conserve, protect, regenerate and enhance marine biodiversity, especially coral reefs, by placing reef balls in Similajau National Park waters. Under the MoU, MLNG group of companies will fund for the reef ball project amounting of RM 4.5 million from 2013 to 2015. A total of 1,500 units of reef ball will be deployed in Similajau National Park waters in the period of three years to protect the turtle's migratory routes, nesting and feeding grounds from trawlers. A total of 1,000 reef ball were deployed from 2013 to 2014. Another 500 reef balls will be deployed in Similajau National Park waters in 2015.

SARAWAK FORESTRY Corporation has identified Miri-Sibuti Coral Reef National Park in the North and Tanjung Datu National Park-Samunsam Wildlife Sanctuary-Talang-Satang National Park Complex in the Southern part of Sarawak waters as two most critical marine habitats that need to be protected using reef ball. These locations will require 20,000 reef balls to protect and enhance marine life and habitat. We are looking for both public and private organizations to collaborate with us to realize this dream.

References

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- Reef ball Foundation (www.reefball.org/index.html).
- Tisen O. B & Bali J. (1999). Reef Ball as Marine Turtles Conservation Tool in Sarawak. Paper presented during Malaysian Science & Technology Congress 1999 on 8th-10th November 1999 at Kuching Hilton, Sarawak.
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Attachment



Figure 1. Reef Ball loaded on the vessel and ready for deployment



Figure 2. Reef ball being lowered down into the sea at the deployment site

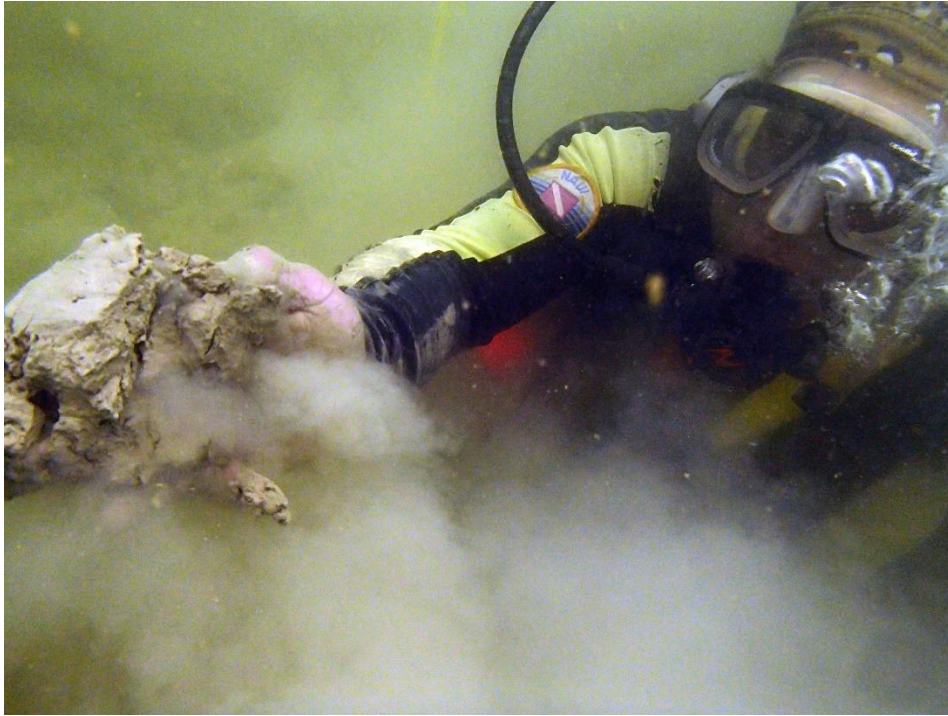


Figure 3. Bottom substrate survey during pre-deployment site inspections



Figure 4. Vessel deck pre-deployment safety and work operating procedures briefing to all involved staffs



Figure 5. Installation of deployment sling and buoys on a reef ball



Figure 6. Reef balls deployment under BEACON Project for Similajau National Park waters



Figure 7. Fishes and other marine life growth occurs on deployed reef balls



Figure 8. Exceptional coral recovery using reef balls in Tunku Abdul Rahman Park, Sabah



Figure 9. Various species of corals growing on reef balls after 10 years



Figure 10. Reef ball construction site visit by client



Figure 11. Reef ball mould quality inspection