



October 5, 2003

**Sabah Parks**

Lot 3 Block K  
Sinsuran Complex  
88806 Kota Kinabalu  
Sabah, Malaysia

**Attention: Datuk Lamri / En. Fazrullah**

Dear Sirs,

**Re: Reef Ball Site Survey on 11<sup>th</sup> October 2003**

**Background**

Reef Ball Asia was invited to give a presentation to the Sabah Park director and his officials on Reef Balls. After the presentation, Sabah Parks Director Datuk Lamri concluded that reef balls could help rehabilitate coral reefs, and also sees the advantages of using Reef Balls as a Submerged Breakwater system and, as well as a trawler net deterrent system.

Datuk subsequently made arrangement for site visits to Turtle Islands and TAR Park to better illustrate the problems these islands are facing. Lawrence Cardosa from Reefball Asia graciously accepted the assignment and prepared the following observation report and recommendations.

The report of the Turtle Islands preliminary survey is posted on the web at <http://www.reefballasia.com/sabahparks/sabahparkssurvey.htm> and has we are awaiting feedback from our principal Mr. Todd Barber and associates who have indicated a slight delay in their reply due to the fact that they are in the middle of a reef ball project in Antigua in the Caribbean.

**Objective**

To survey and identify strategic locations to implement a designed artificial reef using Reef Ball® systems within the TAR parks boundary

**Observations**

- ?? The TAR park has a well equipped infra structure of jetties, restaurants, accommodation, swimming/snorkeling/diving zones, information displays, rest room facilities etc
- ?? However, ever since tropical storm Greg devastated the region in 1997 the recovery of the coral reef has been slow.



?? In view of the conservation fees for diving, snorkeling and fishing that visitors are charged for using the Park, this proactive reef conservation effort not only meet parks objectives but will also gain the approval from the visitors who pay towards the conservation fees.

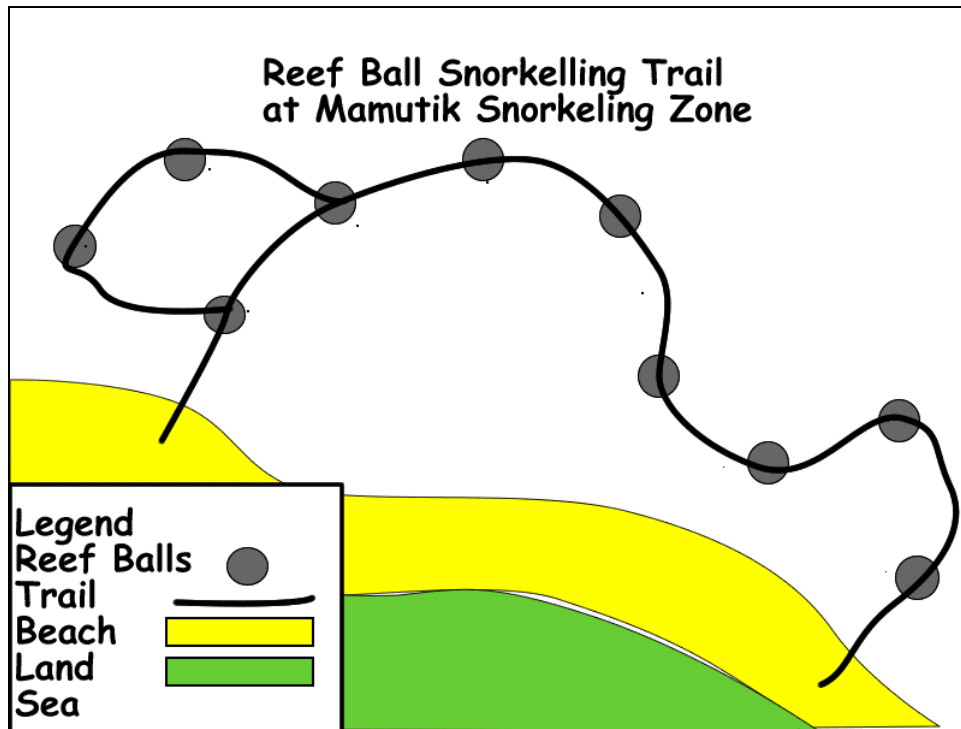
## **Recommendations**

### **1. Snorkeling Reef –**

It is recommended that 2 small snorkeling reef ball trails be designed in designated snorkeling areas of Mamutik and Manukan Island.

These snorkeling trails will be well publicised and act as a sign -posted underwater guide for snorkelers to look out for features of interest. Newly settled residents of the trail shall be the stars of these highlights. These newly created playgrounds for snorkelers and weekend crowd will not only generate excitement for the visitors, but more importantly, it will immediately alleviate the pressure on the healthy reefs where it is being throng by visitors repeatedly.

A programme that encourages public participation and donations towards building more artificial reefs and planting more coral plugs can be designed and promoted by Sabah Parks to arouse awareness and highlight its conservation efforts and directions. Education content and hands-on programmes presented with help from Reefball Asia will add colour and depth to subject and create strong emotional attachment to our long suffering beloved ocean.



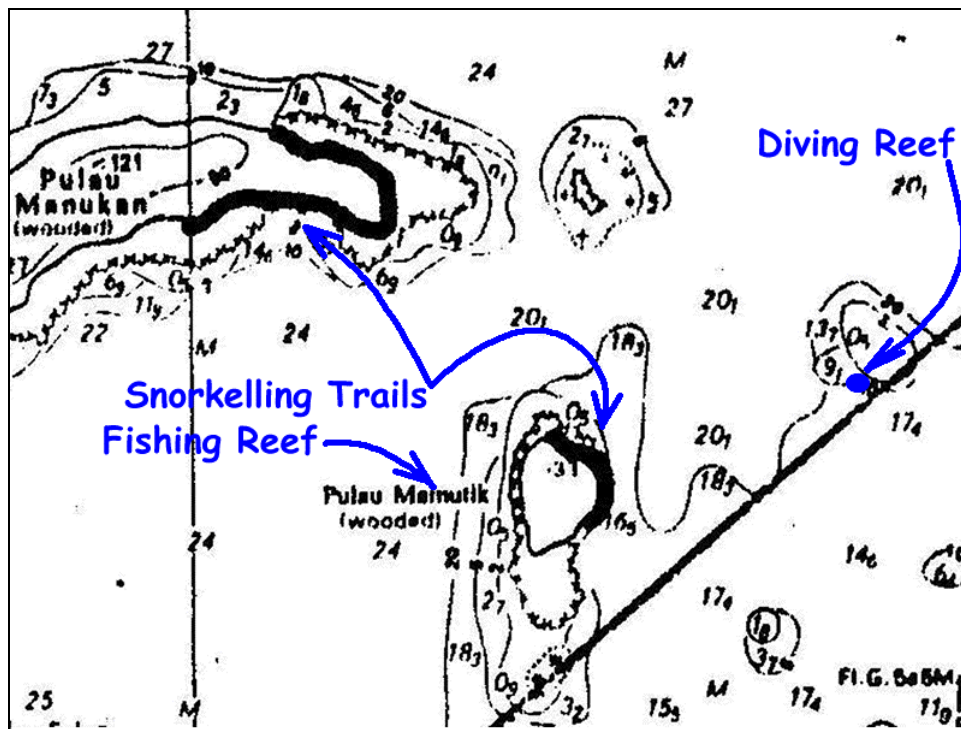


## 2. Diving Reef

It is recommended that a diving reef be created at the base of Mid-Reef. The mid reef was once thriving with thick branching corals, but after tropical storm Greg, these corals were badly damaged. Although there is signs of rejuvenation of the corals, the reef is shallow and not suitable for recreational divers. Therefore we propose the reef be constructed at its base, on a sandy bottom between 12-20meters. It is further recommended that the reef balls be laid at an area adjacent to the wreck of the fishing vessel that sank there some years ago.

*The area surveyed had the following characteristics :*

- i. Fairly shallow water thus allowing good penetration of sunlight
- ii. Fair visibility – further enhancing the penetration of sunlight
- iii. Close vicinity to both Mamutik and Manukan Islands
- iv. Firm sandy ocean bed that will further improve the stability of the reef balls
- v. Very mild seabed gradient – of approximately 5-10 degrees





### **3. Fishing Reef**

In view of the *one person one line, one hook* fishing policy at the TAR Park, we recommend a fishing reef be installed at a suitable area complete with mooring buoys anchored to the reef balls to ensure no anchors are dropped by the fishing boats. The fishing reef would act as a nursery and a fish aggregator. To kick-start the process, Sabah Parks could implement a feeding programme by selling the sport fishermen small packets of frozen trash fish to condition the fish to populate the area.

### **4. Trawler Net Deterrent**

We recommend that a trawler net deterrent reef ball system be implemented at areas of concern to discourage trawler boats from dredging their nets in the protected areas of TAR Park. This system of trawler net deterrents was found to be very successful in Sarawak in its effectiveness in stopping illegal trawling and creating marine habitat simultaneously. Immediate stoppage of reckless destruction of marine habitat is the corner stone of all good conservation efforts. Prompt decision to implement this effective counter measure will bring tremendous relief to our ocean nursery and greatly enhances our marine resources.

### **5. Coral and Giant Clam farming**

The Reef Ball system can be used to create a coral and giant clam farm to cultivate specimens that can be sold to the salt-water aquarist, both local and international. While in the case of the giant clams, it has the added market of food trade.

For coral cultivation, the concept is to use reef balls as a nursery to cultivate coral fragments and use these second generation cultivated corals as the brood stock for cultivating third generation corals on “reef ball ocean friendly concrete plugs” and sell these to the aquarist trade. By working with SITES and aquarium trade professionals from the onset, we will demonstrate to the world body and aquarist that these coral plugs are farmed and harvested in an ecologically sustainable manner, thus ensuring penetration into international marine aquarium trade. Reef Ball group has extensive experience in this field working with Caribbean and South American countries. Sabah Parks is welcome to access our pool of expertise and explore the possibilities of creating an eco friendly avenue to deriving direct economic benefit from farming corals for impoverished coastal inhabitants.

In the same manner, giant clams can also be cultivated on “reef ball ocean friendly concrete bases” making them suitable for the aquarist market by avoiding the necessity to harvest them by the normal method of slicing into the foot of the clam.



### **Conclusion**

The state of Sabah is blessed with beauty and natural resources. Its marine environment is the envy of all who had visited and dived within its magnificent gardens. Reefball Asia is impressed and encouraged with the pro-active outlook of Sabah Parks and is very happy to offer our expertise and products to assist in the restoration and conservation of our rainforest in the ocean. I have attached our Reef Ball® price list and a Project Costing projection on above recommendations for your reference and hope to work with your good office soon.

We hope the above recommendations are in line with your budget and plans for next year. Please do not hesitate to contact the undersigned for any clarifications whatsoever.

Thank you.

Yours Sincerely,

Lawrence Cardoso  
For Reefball Asia Sdn Bhd

**Reef Ball® Price List**

We are pleased to confirm that the price list below is valid for both Peninsular Malaysia and Sabah, and includes delivery to any port in the country. The prices are subject to the minimum quantities listed below:

<b>Reef Ball Type</b>	<b>Height in ft</b>	<b>Width in ft</b>	<b>Unit Weight</b>	<b>Unit Cost (RM)</b>	<b>Minimum Order</b>
<b>Super Ball</b>	6.50'	4.5'	~2200Kg	<b>1850</b>	50
<b>Ultra Ball</b>	5.50'	4.3'	~2200Kg	<b>1300</b>	50
<b>Reef Ball</b>	6.00'	3.8'	~2200Kg	<b>1300</b>	50
<b>Pallet Ball</b>	4.00'	2.9'	~800Kg	<b>1050</b>	50
<b>Bay Ball</b>	3.00'	2.5'	~300Kg	<b>750</b>	20
<b>Mini Bay Ball</b>	2.50'	1.75'	~130Kg	<b>600</b>	50
<b>Lo Pro Ball</b>	2.00'	1.5'	~50Kg	<b>500</b>	60
<b>Oyster Ball</b>	1.50'	1.0'	~20Kg	<b>450</b>	80



**Project Cost Projections**

Item	Description	Qty	Unit	Cost	Total
1	<b>SNORKELLING TRAIL</b>				
	Each Snorkelling Trail made up of 10 bay balls and 10 ultra balls per trail				
	Lo-Pro Ball	10	ea	500	\$ 5,000.00
	Bay Ball	10	ea	750	\$ 7,500.00
	total per snorkelling trail				\$ 12,500.00
	x 2 trails				\$ -
2	<b>DIVING REEF</b>				
	A mixed size diving reef made up of an assortment of various sizes of reefballs				
	Pallet Balls	40	ea	1050	\$ 42,000.00
	Bay Balls	100	ea	750	\$ 75,000.00
	Lo-Pro Balls	100	ea	500	\$ 50,000.00
					<b>\$ 167,000.00</b>
3	<b>FISHING REEF</b>				
	A mixed sized fishing reef made up of an assortment of various sizes of reef balls				
	Pallet Balls	30	ea	1050	\$ 31,500.00
	Bay Balls	50	ea	750	\$ 37,500.00
	Lo-Pro Balls	20	ea	500	\$ 10,000.00
					<b>\$ 79,000.00</b>
4	<b>AQUARIST CORAL CULTIVATION</b>				
	Lo Pro Balls	50	ea	500	\$ 25,000.00
	<b>Sub total of Cost of Various Reef Balls delivered to the jetty in KK</b>				<b>\$ 271,000.00</b>
	<b>BUDGET FOR DEPLOYMENT OF REEF BALLS</b>				
1	Hiring of barge	2	days	10000	\$ 20,000.00
2	Hiring of crane	2	days	450	\$ 900.00
3	Cost of 3 divers from Reefball Asia Sdn Bhd to assist with	4	days	400	\$ 1,600.00
4	Cost of Dive equipment rental and liftbags	4	days	1000	\$ 4,000.00
					<b>\$ 26,500.00</b>