

Assessment of Coral Reef Communities At Abu-Dabab, North of Marsa Alam Egypt

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تقييم مجاميع الشعاب المرجانية في أبودباب مرسى علم بمصر

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تم تقييم الحالة الراهنة لمجاميع الشعاب المرجانية الموجودة في منطقة أبو دباب و التي تقع في شمال مرسى علم و ذلك باستخدام طريقة التقييم التحت مائية السريعة. تم تطبيق الدراسة علي ثلاث مناطق شعب متجاورة لتقييم الآثار البيئية لهم و حجم التدمير الذي الحق بهم. تم رصد مجاميع الأسماك الموجودة. أوضحت الدراسة الحالية أن معظم التدمير كان نتيجة استخدام المخاطيف إلي جانب الأنشطة التحت مائية مثل استخدام طرق غير مشروعة للصيد. و الخلاصة أن هذه المنطقة الجميلة تحتاج إلي تركيب سريع للشمندورات التي سوف تقوم بحماية الشعاب المرجانية من التدمير مع زيادة الوعي البيئي من أجل الحفاظ علي منظومة بيئة الشعاب المرجانية.

Key Words: *Coral reef assessment; Hard corals; Soft corals; Fish families; Abu-Dabab; Red Sea;*

ABSTRACT

The coral reef communities in the area of Abu Dabab, north of Marsa Alam were assessed using rapid underwater technique. Three adjacent reefs were studied to reveal the actual status of the reefs and its damaged parts. Abundant fish families were recorded. The results showed that high impact due to anchoring and other diving-related activities were mostly responsible for much of the damage. It is concluded that this area needs mooring buoys and/or top reef pins to prevent anchoring to the reefs and to increase public awareness for the protection and conservation of coral reef communities.

Introduction

Coral reefs of the Egyptian Red Sea are tremendously important economic and environmental resources [1]. They provide habitats of different marine species including fishes [2,3]. Reefs protect harbors and beaches from the heavy wave action of coastal storms, keeping shorelines from being washed away, thus providing an important recreational and aesthetic resource for people visiting or living in coastal areas [4]. People use coral reefs for fishing, underwater photography, scuba diving, and snorkeling. Reefs yield biological treasures that are increasingly being recognized as natural sources of biomedical chemicals.

Fish and invertebrate predators, such as parrot fish, snails, and sea stars, feed on coral and can inflict damage on reefs. Coral diseases, including white and black band disease, can also damage or kill coral. Corals must compete for space with algae, sponges, and other sedentary, benthic (bottom-living) organisms [5].

Anthropogenic (human-caused) sources of reef mortality include global warming, pollution, physical impacts and overfishing. Land based runoff, including excess nutrients, pollutants, and sediments, can harm coral, particularly when these impacts are ongoing. Coral reef habitats are also sensitive to physical disturbance. Ship groundings, which destroy reef structures, create coral rubble that can do further damage when storms pound the reef. Large debris, from shipwrecks or other sources, can have similar impacts [6].

Along the western coast of the Egyptian Red Sea, tourism and coastal developments are proceeding rapidly without an active marine management plans and as a result, the coral reef ecosystems have been under considerable stress [7]. The southern coastal area of the Egyptian Red Sea coast north of Marsa Alam is being under stress by the increasing number of diving vessels that are operating in a free region without any environmental protection. The result was considerable physical damage of the coral reefs, mainly through the indiscriminate use of the vessel's extensive anchoring to the reefs, dynamite and diver-related damage through the large numbers of divers that exceed the carrying capacity of different diving sites [8,9].

The study area comprises three adjacent near shore sites of coral reefs that are daily visited by considerable number of diving boats that use anchors and destroy a considerable part of the reef. The present work is an attempt to describe the coral reef communities and fish species in a beautiful diving area that needs protection from the continuous anchoring of different diving boats and other impacts.

Materials and Methods

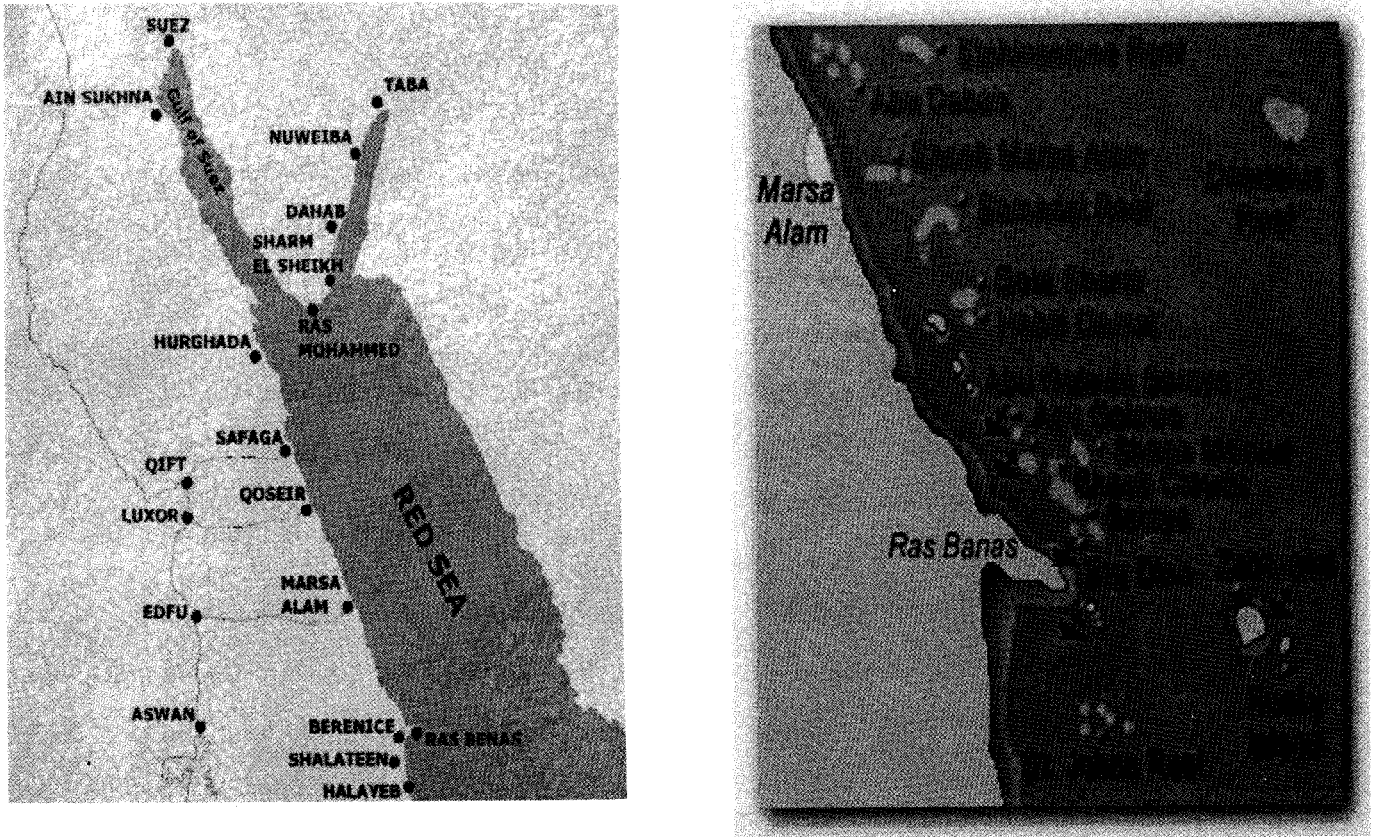


Figure (1): The study site along the Egyptian Red Sea coast.

During Spring, 2002, the rapid underwater assessment (RUA) method [10] was used to evaluate the present status of the coral reef communities in three adjacent sites, located about 35 km north of Marsa Alam named Abu Dabab1, Abu Dabab2 and Shabroun Abu Dabab (Fig 1).

These sites are considered as near shore sites that are daily visited by different diving boats that use their anchors on the reef and destroy the reef. A total of 8 replicates of quadrant with a surface area of 2mX2m were used to estimate the percentage cover of different life form categories at a fixed depth (4m.) at the three adjacent diving sites.

At each quadrant, the percentage cover of different life form categories was estimated and recorded on a plastic slate. The percentage cover of coral reef communities was estimated with the abundance of hard and soft coral species being recorded. RUA form categories recorded included:

HC- Hard Corals: all species of hard corals

SC- Soft corals: fleshy soft corals, fan corals, and octocorals

RK- Rock: reef pavement including limestone boulders, granite, and volcanic rocks

R- Rubbles: unconsolidated coral fragments

DC- Recently unbroken Dead Corals, white or dirty white

S- Sand: all types

SP- Sponges: all types

TA- Turf Algae: All species

RK, R, DC and S represent the others (OT).

Mostly, the reefs were subjected to human impacts (spear and dynamite fishing, anchoring damage, snorkeling and diving impacts). The raw data, after being collected from each dive, it was immediately copied from the slate into the data sheet on board of the vessel.

Different reef fish populations were recorded underwater along a depth gradient between 2 and 8 m. depth. The fish families were recorded in rate of abundance. For example, how many groupers, snappers, mullets, etc., with the aid underwater plastic fish catalog and using underwater photography.

Results

The percentage covers of coral reef categories at the three sites of Abu-Dabab are given in Table 1.

Table (1): Percentage cover of coral reef categories at the three adjacent sites of Abu Dabab (AD1=Abu Dabab 1; AD2=Abu Dabab 2 and SAD=Shabrouh Abu Dabab; Quad # = Quadrant number) (HC=Hard Corals, SC=Soft Corals and OT=Others).

Site	Quad #	1	2	3	4	5	6	7	8
AD1	HC	35	35	15	20	30	55	15	25
	SC	5	20	5	5	10	15	10	5
	OT	60	45	80	75	60	30	75	70
AD2	HC	75	80	70	75	55	65	70	65
	SC	0	5	5	0	5	0	5	0
	OT	25	15	25	25	40	35	25	35
SAD	HC	25	40	35	35	55	50	10	15
	SC	15	20	15	10	5	25	45	35
	OT	60	40	50	55	40	25	45	50

At Abu Dabab 1, the average percentage cover of hard corals was about 29%, while it was about 9% for the soft corals and about 62% for other substrates (Fig. 2). These percentages reveal that the hard

corals are under great impacts with respect to the percentage of the other substrates and the low percentage of the soft corals. The abundant species of hard corals at Abu Dabab 1 were *Acropora sp.*, *Millepora sp.*, *Echinopora sp.*, *Goniastrea sp.*, *Montipora sp.* and *Porites sp.* The abundant soft coral species were *Sinularia sp.*, *lobophytum sp.* and *xenia sp.* and *Heterxenia sp.* The abundant fish families were *Labridae*; *Scaridae*; *Anthiatidae*; *Acanthuridae* and *Chaetodontidae*.

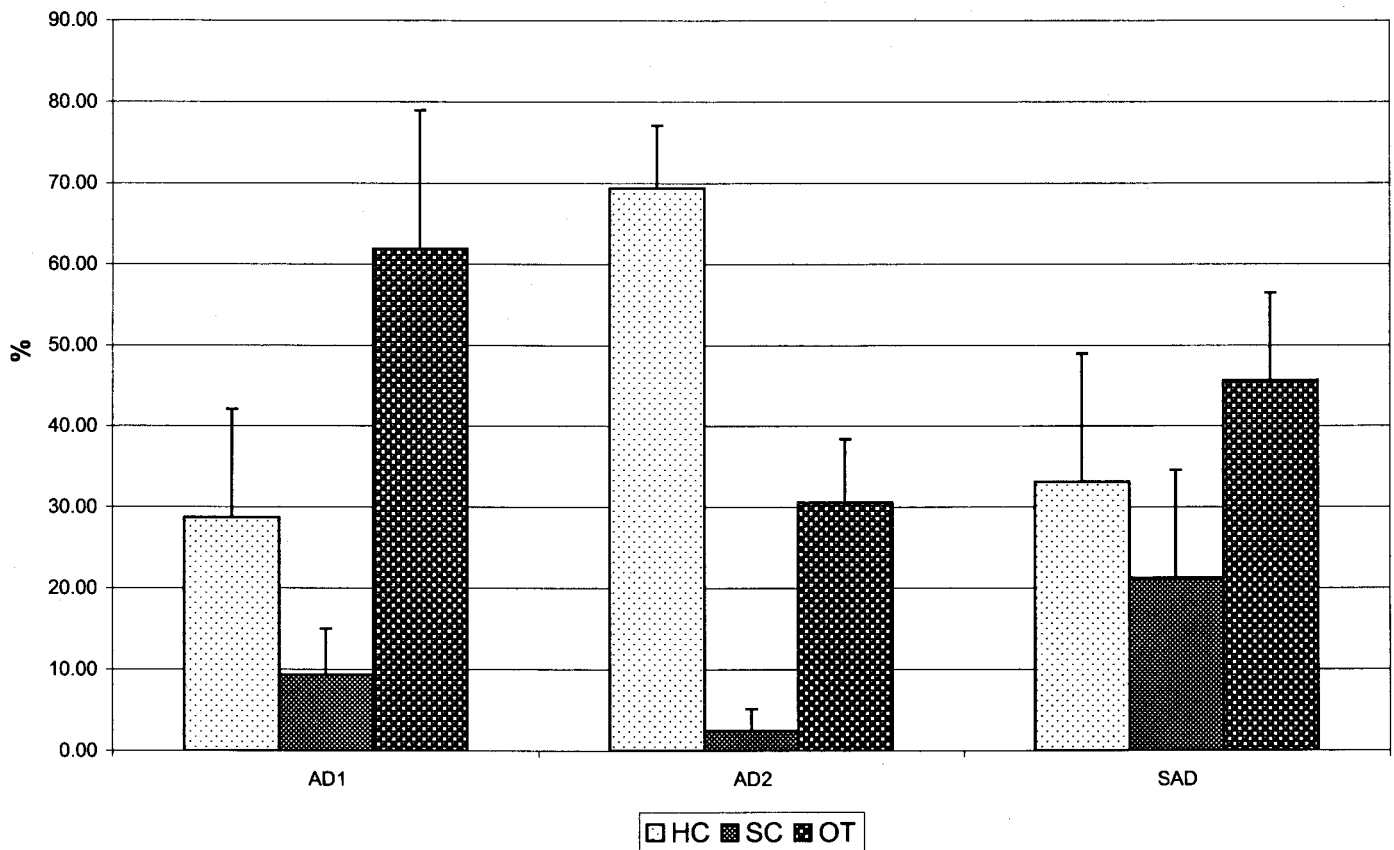


Figure (2): The average percentage cover of coral reef categories at the three adjacent diving sites of Abu Dabab (AD1= Abu Dabab 1, AD2= Abu Dabab 2 and SAD= Shabroun Abu Dabab) (Hc= Hard corals, SC= Soft corals and OT=Others)

At Abu Dabab 2, the average percentage cover of hard corals was extremely high, representing about 70%, while that of soft corals was low (2.5%) (Fig. 2). The average percentage cover of other substrates was about 27%. These percentages reveal that the hard corals are still healthy with respect to Abu Dabab 1. The abundant species of hard corals at Abu Dabab 2 were *Porites sp.*, *Acropora sp.*, *Synaraea sp.*, *Millepora sp.*, *Montipora sp.* and *Pocillpora sp.* The abundant soft coral species were *xenia sp.*, *Heterxenia sp.*, *Sinularia sp.*, and *lobophytum*. The abundant fish families were *Acanthuridae*, *Labridae*; *Scaridae*; *Anthiatidae*; *Pomacentridae* and *Chaetodontidae*.

At Shabrour Abu Dabab, the average percentage cover of hard corals was about 33 %, while it was about 21% for the soft corals and about 46% for other substrates (Fig. 2). These percentages reveal that the hard corals are under great impacts with respect to Abu Dabab 2. The abundant species of hard corals at Shabrour Abu Dabab were *Acropora sp.*, *Millepora sp.*, *Goniastrea sp.*, *Montipora sp.*, *Favia sp.* and *Porites sp.* The abundant soft coral species were *Sinularia sp.*, *Sarcophyton sp.*, *lobophytum sp.*, *Litophyton sp.*, *xenia sp.* and *Heterxenia sp.* The abundant fish families were *Pomacentridae*; *Labridae*; *Scaridae*; *Anthiatidae*; *Caesionidae*; *Acanthuridae* and *Chaetodontidae*.

Discussion and Conclusion

The rapid underwater assessment technique is considered to be a good and reliable method for evaluating the actual status of the coral reefs. The area under investigation showed that two of the three adjacent diving sites of Abu Dabab, namely AD1 and SAD were under high pressure that was reflected through their low average percentage of hard corals with respect to the damaged area represented by OT at both sites (Fig.2). On the other hand, the site AD2 was still healthy as reflected by the average high percentage of its hard corals (Fig.2). The reason of this high percentage of hard corals at the middle AD2 (lies between AD1 and SAD) could be mostly related to the fact that most of the diving boats anchor to either AD1 or SAD and they dive through AD2. As a result, the least affected diving site from the impact of anchoring is the middle reef (AD2). These reefs are mostly affected with the impact of anchoring in addition to other related diver activities (spear and fishing gears). This is most probably could be related to the fact that the three sites are near each other and that there is no moorings at the area of Abu Dabab.

It could be concluded that this area represents very beautiful diving sites that need protection and conservation. It is the duty of the Egyptian Environmental Affairs Agency (EEAA) to help install several mooring buoys and/or top reef pens that could prevent the diving boats from using the reef as an anchoring zone. Another important part that could be initiated by EEAA is a good campaign to increase the public awareness for the protection and conservation of the coral reef communities.

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