HUDGSON

REEF CHECK 2000 SURVEYS IN BAHRAIN, ARABIAN GULF

K. Roger Uwate,

Hani Bader*,

Moh'd Torabi*,

Scott Bailey*,

and

Patrick Keenan*

Directorate of Fisheries and Marine Resources
Ministry of Works and Agriculture
State of Bahrain

November 2000

*volunteer divers

SUMMARY

In 2000, Bahrain once again participated in the global Reef Check program. This program started in 1997 and is coordinated by the University of California at Los Angeles (UCLA) in the USA. The Directorate of Fisheries and Marine Resources coordinates Bahrain's Reef Check team. Volunteers from both the Directorate of Fisheries and Marine Resources and the public participated in this program.

In 2000, two reef sites were surveyed: Fasht Al Adhom, and Abul Thama. The protocol developed in 1997 was followed in 2000. This protocol basically followed that outlined by Reef Check with slight modifications to fit Bahrain conditions. Surveys completed at each site included: (1) point surveys of substrate composition, (2) counts of key invertebrate species, and (3) counts of key fish species. In addition, specific site information was recorded. Photo and video records were made at each survey site.

The main finding of the Reef Check 2000 surveys were that: (1) small colonies of live coral are now present at both Fasht Al Adhom sites; (2) live coral on Abul Thama account for between 20 to 15 percent of the bottom substrate; (3) short spine urchins were the only key invertebrate found on Fasht Al Adhom; (4) the long spine urchin was the only key invertebrate species found on Abul Thama; (5) key fish species were much more abundant and diverse on Abul Thama than on Fasht Al Adhom.

Reef Check 2000 results from Fasht Al Adhom and Abul Thama were then compared with results obtained from 1997 to 1999. Between 1997 to 2000, major trends were that: (1) live corals on Fasht Al Adhom have gone from 30 to 40 percent to zero, but now have started to re-establish themselves; (2) percentage coverage of live corals on Abul Thama is also down from 30 to 40 percent to 10 to 15 percent; and (3) the diversity of key invertebrates species on Fasht Al Adhom and Abul Thama have declined to one species.

INTRODUCTION

Reef Check is a global program involving recreational divers and marine scientists. There are two objectives of Reef Check. The first is public education and the second objective is the annual assessment of coral reefs in the world based on data collected by volunteer divers.

The global Reef Check program stated in 1997. Bahrain has fielded Reef Check teams every year since the beginning of the Reef Check program. The 1997 survey results were documented in Uwate et al (1998), 1998 results were documented in Uwate et al (1999), and 1999 results were documented in Uwate et al (2000).

In 2000, Bahrain once again fielded a Reef Check team. Reefs surveyed included Fasht Al Adhom and Abul Thama. This report documents 2000 Bahrain Reef Check fielding efforts and results.

METHODOLOGY

Reef Selection – The two reefs surveyed in 1997 (see Uwate et al 1998), 1998 (see Uwate et al 1999) and 1999 (see Uwate et al 2000) were again selected for Reef Check surveys. Two sites on Fasht Al Adhom and Abul Thama were surveyed in 2000.

Key Species - Key invertebrate and fish species surveyed in 2000 were the same as that in 1999 (see Uwate et al 2000). No new key species were added for the Reef Check 2000 surveys.

Field Survey Procedures – The Reef Check 2000 field survey procedures followed those presented in Uwate et al (1998). These are based on the Reef Check internet home page at "http://www.reefcheck.org/methods.html". There are really four separate surveys within Reef Check. These include: (1) site description, (2) fish belt transect, (3) invertebrate belt transect, and (4) substrate line transect. Electronic datasheets (Excel format) were provided by Reef Check. These data sheets were adjusted to better fit local conditions (see appendices 1 to 4 in Uwate et al 1999).

Fasht Al Adhom Surveys - On 7 July 2000, the Bahrain Reef Check team visited Fasht Al Adhom. One shallow-water (3-4 m deep) site and one deep-water (8 m deep) site were surveyed following the procedures outlined in Uwate et al (1998). At the shallow site (Fasht Al Adhom site 1), the previously deployed submerged marker float could not be located. However, divers were able to locate a portion of the 3 mm diameter 100 m line. Therefore this year's survey line is close to the 1999 line. At the deeper site (Fasht Al Adhom site 2), divers were able to locate the previously deployed submerged marker float. However, divers could not locate the 3mm diameter 100 m line that was deployed in 1999. The starting point of the 2000 survey line is the same as in 1999.

Abul Thama Surveys - On 14 July 2000, the Bahrain Reef Check team surveyed Abul Thama. Two surveys were completed at 9 m depth following the procedures outlined in Uwate et al (1998). At Abul Thama site 1, the previously deployed submerged marker float and the 3mm diameter 100 m line could not be located. Using the GPS, the start of the transect line for

2000 was near the starting point of the 1999 line. At Abul Thama site 2, the previously deployed submerged marker float could not be located. However portions of the previously deployed 3 mm diameter 100 m line were found.

Reef Check Data Transmission - As in past years (Uwate et al 1998, 1999, and 2000), data collected was inputted into Excel spreadsheet format and emailed to Reef Check coordinators at the Reef Check Foundation at the University of California at Los Angeles, USA.

Data Analysis - Data input and analysis here follows that in Uwate et al (1998, 1999, and 2000).

RESULTS

Descriptions of Fasht Al Adhom sites 1 and 2 are provided in Appendices 1 and 2. Information on Abul Thama sites 1 and 2 are combined and provided in Appendix 3.

Results of the bottom substrate point surveys are provided in Table 1. Results of the invertebrate belt transects are provided in Table 2. Results of the diver coral damage ratings for each site are provided in Table 3. Finally, results of the belt transect for key fish species are provided in Table 4.

DISCUSSION

2000 Reef Check

In 2000, there were no major problems fielding the Bahrain Reef Check surveys. This was primarily because many of the volunteer divers had previously participated in these surveys.

Percentage coral cover (as identified by the substrate survey) at Fasht Al Adhom site 1 was zero, and at site 2 it was almost zero (see Table 1). However, divers did observe small coral colonies at both of these sites. However, these small colonies were not along the transect line measuring points. Most of the substrate at the shallow site (site 1) is now dominated by coralline red algae.

Coral cover at both Abul Thama sites was between 10 to 15 percent (see Table 1). Much of substrate at both sites is rock, sand and rubble (broken coral pieces).

At both of the Fasht Al Adhom sites, the short spine urchin was the only key invertebrate species observed (see Table 2). Short spine urchin density was almost twice as high at site 1 than site 2. At both Abul Thama sites, the only key invertebrate species observed was the long spine urchin (see Table 2).

There was no coral damage for both the Fasht Al Adhom sites as there was very little live coral at these sites (see Table 3). However, there were some ropes and fish traps damage of corals at both Abul Thama sites (see Table 3).

Table 1. Bottom Substrate Composition (Mean Percentage for four 20 m Transects) at Reef Check 2000 Sites

	Hard coral	Fleshy Seaweed	Rubble	Other	Soft Coral	Sponge	Sand	Dead Coral	Rock	Silt/Clay
Fasht Al Adhom Site 1										
Mean	0.0	0.0	0.0	**54.4(*1)**	0.0	0.0	0.0	0.0	**45.6**	0.0
Var	0.0	0.0	0.0	426.6	0.0	0.0	0.0	0.0	426.6	0.0
Fasht Al Adhom Site 2										
Mean	0.6	0.0	1.3	0.6	0.0	0.0	**30.6**	0.0	**66.9**	0.0
Var	1.6	0.0	6.3	1.6	0.0	0.0	447.4	0.0	405.7	0.0
Abul Thama Site 1										
Mean	12.5	3.1	**23.8**	0.6	0.0	0.0	**26.9**	0.0	**33.1**	0.0
Var	62.5	5.7	43.8	1.6	0.0	0.0	43.2	0.0	176.6	0.0
Abul Thama Site 2										
Mean	11.9	3.8	**23.8**	0.6	0.0	0.0	18.8	0.0	**41.3**	0.0
Var	9.9	6.3	152.1	1.6	0.0	0.0	35.4	0.0	22.9	0.0

*note: coralline red algae

Table 2. Abundance (Organisms/m^2) of Key Invertebrate Species at Reef Check 2000 Sites

	Banned Coral Shrimp	Long Spine Urchin	Short Spine Urchin	Pencil Urchin	Collector Urchin	Sea Cucumber	Crown Of Thorns	Spiny Lobster	Cowry
Fasht Al Adhom Site 1									
Mean	0	0	**0.88**	0	0	0	0	0	0
Var	0	0	0.0186	0	0	0	0	0	0
Fasht Al Adhom Site 2									
Mean	0	0	**0.4275**	0	0	0	0	0	0
Var	0	0	0.105492	0	0	0	0	0	0
Abul Thama Site 1									
Mean	0	0.0025	0	0	0	0	0	0	0
Var	0	0.000025	0	0	0	0	0	0	0
Abul Thama Site 2									
Mean	0	0.0025	0	0	0	0	0	0	0
Var	0	0.000025	0	0	0	0	0	0	0

Table 3. Coral Damage Rating* at Reef Check 2000 Sites					
	Coral Damage			Trash	
	Anchor	Dynamite	Other	Nets	Other
Fasht Al Adhom Site 1					
Mean	0	0	0	0	0
Var.	0	0	0	0	0
Fasht Al Adhom Site 2					
Mean	0	0	0	0	0
Var	0	0	0	0	0
Abul Thama Site 1					
Mean	0	0	0.5	0.25	0
Var	0	0	0.333333	0.25	0
Abul Thama Site 2					
Mean	0	0	0.25	0	0.25
Var	0	0	0.25	0	0.25
*note: based on diver rating of none=0, low=1, medium=2, and high=3					

Three key fish species were observed at Fasht Al Adhom site 1 (see Table 4). Four key fish species were observed at site 2. Small orangespotted grouper, *Epinephelus coioides* (hamoor) were observed at both sites. Abul Thama site 1 had eight key fish species, while site 2 had six key fish species (see Table 4). This is about twice the number of key fish species compared with the Fasht Al Adhom sites (see Table 4).

Historic Trends (1997 to 2000)

Comparisons of substrate percent composition, key invertebrate species, coral damage rating, and key fish species between 1997 and 2000 are presented in Tables 5 to 8.

At both Fasht Al Adhom sites, live coral cover has declined from about 30 to 40 percent to zero between 1997 and 2000 (see Table 5). Recent dead coral has now been covered by coralline red algae or is now classified as "rock". At the deeper Fasht Al Adhom site (site 2), several small coral colonies were observed and were detected in the substrate survey in 2000. This suggests that coral colonies are re-establishing themselves in this area.

For the Abul Thama sites, live coral cover has declined from about 30 to 40 percent to about 10 to 15 percent (see Table 5). Coral that has been dead for more than 1 year is classified as "rock". The high percentages of recently dead coral (from 1998) are now classified as rock or rubble.

For Fasht Al Adhom, key invertebrate species diversity has been limited to only the short-spined urchin (see Table 6). Key invertebrate species diversity has declined at Fasht Al Adhom site 2 from three to one species, the short-spined urchin. A similar situation has occurred at both Abul Thama sites where key invertebrate species diversity has declined from three or four key species to only the long-spined urchin (see Table 6).

Table 4. Abundance (fish/m^2) of Key Fish Species at Reef Check 2000 Sites

	Butterfly Fish			Grunts			Orange-spotted Grouper		Other Groupers		Parrot Fish
	Black	Arabian	Black	Grey	Black Spotted	Spotted	<30 cm	>30 cm	<30 cm	>30 cm	
Fasht Al Adhom Site 1											
Mean	0.0075	0	0	0.0025	0	0	0.0025	0.0025	0	0	0
Var.	9.17E-05	0	0	0.000025	0	0	0.000025	0.000025	0	0	0
Fasht Al Adhom Site 2											
Mean	**0.03**	0	0.005	0.0075	0	0	**0.0125**	0.005	0	0	0
Var.	0.000467	0	3.33E-05	0.000225	0	0	9.17E-05	0.0001	0	0	0
Abul Thama Site 1											
Mean	**0.015**	**0.03**	0.005	0	**0.0475**	0.0075	0	0.005	0.0075	0.0025	**0.0575**
Var	0.0003	0.001467	3.33E-05	0	0.003025	0.000225	0	3.33E-05	9.17E-05	0.000025	0.006692
Abul Thama Site 2											
Mean	0.0025	0.005	0.005	0	**0.0375**	0	0	0	0.0075	0.005	**0.065**
Var	0.000025	0.0001	0.0001	0	0.001492	0	0	0	0.000025	3.33E-05	0.003233

Table 5. Bottom Substrate Composition (Mean Percentage for four 20 m Transects) at Fasht Al Adhom and Abul Thama Reef Check Sites, 1997 to 2000										
	Hard coral	**Fleshy Seaweed**	**Rubble**	**Other**	**Soft Coral**	**Sponge**	**Sand**	**Dead Coral**	**Rock**	**Silt/Clay**
Fasht Al Adhom Site 1										
2000	0	0	0	**54.4(*1)**	0	0	0	0	**45.6**	0
1999(*2)	0	0	0	0	0	0	0	**52.5**	**47.5**	0
1998(*3)	16.9	0	0	0	0	0	6.9	14.4	**61.9**	0
1997(*4)	**43.1**	0	0	0	0	0	0.6	**21.2**	**35.0**	0
Fasht Al Adhom Site 2										
2000	0.6	0	1.3	0.6	0	0	**30.6**	0	**66.9**	0
1999(*2)	0	0	0	0	0	0	18.8	**38.1**	**43.1**	0
1998(*3)	4.4	0	0.6	0.6	0	0	**66.9**	0	**21.3**	6.3
1997(*4)	**33.8**	0	1.3	0.6	0.6	0	**36.3**	14.4	13.1	0
Abul Thama Site 1										
2000	12.5	3.1	**23.8**	0.6	0	0	**26.9**	0	**33.1**	0
1999(*2)	**45.6**	11.9	0	0	0	1.9	10.6	**29.4**	0	0.6
1998(*3)	**24.4**	17.5	**29.4**	0	0	0	**21.3**	0.6	6.9	0
1997(*4)	**20.0**	**27.5**	5.6	0	0	0	9.4	**27.5**	10.0	0
Abul Thama Site 2										
2000	11.9	3.8	**23.8**	0.6	0	0	18.8	0	**41.3**	0
1999(*2)	**25.0**	7.5	0	0	0	10.6	**21.9**	**35.0**	0	0
1998(*3)	**36.3**	1.9	0	0	0	0	**26.9**	6.3	**28.8**	0
1997(*4)	**26.2**	**29.4**	1.3	0	0	0	13.1	16.3	13.8	0

*notes: (1) coralline red algae; (2) source: Uwate et al (2000); (3) source: Uwate et al (1999); (4) Uwate et al (1998)

Table 6. Abundance (Organisms/m^2) of Key Invertebrate Species at Fasht Al Adhom and Abul Thama Reef Check Sites, 1997 to 2000									
	Banned Coral Shrimp	**Long Spine Urchin**	**Short Spine Urchin**	**Pencil Urchin**	**Collector Urchin**	**Sea Cucumber**	**Crown Of Thorns**	**Spiny Lobster**	**Cowry**
Fasht Al Adhom Site 1									
2000	0	0	**0.88**	0	0	0	0	0	0
1999(*3)	0	0	**0.67**	0	0	0	0	0	0
1998(*4)	0	0	**1.17**	0	-	0	0	0	-
1997(*5)	-	0	**1.05**	-	-	0	0	0	-
Fasht Al Adhom Site 2									
2000	0	0	**0.4275**	0	0	0	0	0	0
1999(*3)	0	0	**0.27**	0	0	0	0	0	0
1998(*4)	0	0.005	0.07	0	-	0.0025	0	0	-
1997(*5)	-	0.0025	**0.35**	-	-	0	0	0	-
Abul Thama Site 1									
2000	0	0.0025	0	0	0	0	0	0	0
1999(*3)	0	0.025	0.0025	0	0	0	0	0.0025	0.005
1998(*4)	0	0.005	0	0	-	0	0	0	-
1997(*5)	-	0	0.0025	-	-	0.0025	0	0	-
Abul Thama Site 2									
2000	0	0.0025	0	0	0	0	0	0	0
1999(*3)	0	0.0325	0	0	0	0.02	0	0	0.0225
1998(*4)	0	0	0	0	-	0	0	0	-
1997(*5)	-	0	0	-	-	0	0	0	-

*notes:
(1) New categories for 1998, not included in 1997; (2) new categories for 1999, not included in 1997 or 1998; (3) source: Uwate et al (2000); (4) source: Uwate et al (1999); (5) source: Uwate et al (1998)

Damage to live coral on Fasht Al Adhom has decreased to zero (see Table 7). This is primarily because there is no (or extremely little) live coral on Fasht Al Adhom now. Damage to live coral at the Abul Thama sites have increased over the years. This damage is primarily from ropes, nets, and fish traps. During the Reef Check 2000 survey of Abul Thama, 50 to100 fish trap floats were observed on Abul Thama. Five years ago, only a few trap floats were typically observed on Abul Thama (first author personal observation).

Diversity of key fish species has remained rather stable at all sites (see Table 8). Fasht Al Adhom sites have three to five key fish species, while Abul Thama sites have six to nine key fish species. Overall density of key fish species is much higher on Abul Thama sites than on Fasht Al Adhom sites.

Table 7. Coral Damage Rating at Fasht Al Adhom and Abul Thama Reef Check Sites, 1997 to 2000

	Coral Damage			Trash	
	Anchor	**Dynamite**	**Other**	**Nets**	**Other**
Fasht Al Adhom Site 1					
2000	0	0	0	0	0
1999(*1)	0	0	0.25	0	0
1998(*2)	0	0	0	0	0
1997(*3)	0	0	0.0425	0	0.01
Fasht Al Adhom Site 2					
2000	0	0	0	0	0
1999(*1)	0	0	0	0	0
1998(*2)	0	0	0	0	0
1997(*3)	0.05	0	0	0	0.005
Abul Thama Site 1					
2000	0	0	0.5	0.25	0
1999(*1)	0	0	2	0.25	0
1998(*2)	0.25	0	2	0.5	0
1997(*3)	0	0	0.025	0.0025	0.0075
Abul Thama Site 2					
2000	0	0	0.25	0	0.25
1999(*1)	0	0	2.5	0.25	0
1998(*2)	0.25	0	2	0	0
1997(*3)	0	0	0	0.0025	0.0025

*notes:
(1) source: Uwate et al (2000);
(2) source: Uwate et al (1999), from 1998, summary statistics above were based on diver rating of none=0, low=1, medium=2, and high=3;
(3) source: Uwate et al (1998), for 1997, "other" was coral damage from nets and rope and summary statistics above were based on mean number of occurrences.

Table 8. Abundance (fish/m^2) of Key Fish Species at Fasht Al Adhom and Abul Thama Reef Check Sites, 1997 to 2000

	Butterfly Fish			Grunts			Orange-spotted Grouper		Other Groupers		Parrot Fish
	Black	Arabian	Longfin	Grey	Black Spotted	Spotted	<30 cm	>30 cm	<30 cm	>30 cm	
Fasht Al Adhom Site 1											
2000	0.0075	0	0	0.0025	0	0	0.0025	0.0025	0	0	0
1999(*2)	0	0	0	**0.0275**	0	0	**0.01**	0	0	0	0
1998(*3)	**0.0125**	0	0.0025	0	0	0	**0.015**	**0.01**	0	0	0
1997(*4)	0	0	**0.015**	0.0025	0	-	0	0	0	0	0
Fasht Al Adhom Site 2											
2000	**0.03**	0	0.005	0.0075	0	0	**0.0125**	0.005	0	0	0
1999(*2)	**0.015**	0	0.0025	**0.0825**	0	0	**0.01**	0	0	0	0
1998(*3)	0.0075	0.005	0.0075	0.005	0	0	0.0025	0	0	0	0
1997(*4)	**0.05**	0	**0.015**	**0.0125**	0	-	0	0	0.0025	0	0.0075
Abul Thama Site 1											
2000	**0.015**	**0.03**	0.005	0	**0.0475**	0.0075	0	0.005	0.0075	0.0025	**0.0575**
1999(*2)	**0.0225**	**0.01**	**0.01**	**0.015**	**0.0425**	0.005	0	0	0.005	0	**0.0925**
1998(*3)	**0.065**	**0.0125**	**0.015**	0.005	**0.01**	0	0	0	0.005	0	**0.0425**
1997(*4)	0.005	**0.015**	0.0025	0.0075	**0.02**	-	0.0075	0	**0.01**	0	**0.0125**
Abul Thama Site 2											
2000	0.0025	0.005	0.005	0	**0.0375**	0	0	0	0.0075	0.005	**0.065**
1999(*2)	**0.0275**	**0.0125**	0.0025	0.005	**0.0125**	0	0	0	0.0025	0	**0.0625**
1998(*3)	**0.025**	**0.035**	**0.01**	0.005	**0.025**	0.0025	0.0025	0	**0.0325**	0	**0.0425**
1997(*4)	**0.03**	**0.02**	0.0025	0	0.005	-	0	0	**0.03**	0	**0.03**

*notes: (1) New categories for 1998, not included in 1997; (2) source: Uwate et al (2000); (3) source: Uwate et al (1999); (4) source: Uwate et al (1998)

Photographic and Video Records

For all Reef Check surveys in Bahrain (1997 to 2000), photographic and video records were made. Copies of these records were sent to the Reef Check Foundation at the University of California at Los Angeles, USA. Original Hi-8 video tapes and photo negatives are archived at the Directorate of Fisheries and Marine Resources.

Future Reef Check Surveys

For the past 4 years, Bahrain had fielded Reef Check teams. This program is an effective and inexpensive means of monitoring conditions of coral reefs in Bahrain. In addition to collection of scientifically valid data, Reef Check provides an opportunity to inform the public and policy makers about the conditions of Bahrain's coral reefs.

Bahrain now has 4 years of Reef Check data. This is a good time series of data on coral reef conditions in Bahrain. This information can be the basis for management of coral reefs in Bahrain. As such, it is recommended that Bahrain continue to participate in the global Reef Check program and continue to monitor the coral reefs of Fasht Al Adhom and Abul Thama.

REFERENCES CITED

Uwate, K.R., J. Almeshkhas, A. Albaggal, B. Al-Alawi, H. Almaghani. 1998. 1997 International year of the coral reef, Reef Check surveys in Bahrain. Directorate of Fisheries, Ministry of Works and Agriculture, State of Bahrain. 19 pp.

Uwate, K.R., H. Bader, P. Dakin, and G. Burnham. 2000. 1999 Reef Check surveys in Bahrain, Arabian Gulf. Directorate of Fisheries and Marine Resources, Ministry of Works & Agriculture, State of Bahrain. 27 pp.

Uwate, K.R., S. Bailey, H. Bader, H. Bader, and E. Bader. 1999. 1998 Reef Check surveys in Bahrain. Directorate of Fisheries, Ministry of Works and Agriculture, State of Bahrain. 24 pp.

ACKNOWLEDGEMENTS

Reef Check is a global volunteer diving program to assess coral reefs around the world and is coordinated by the Reef Check Foundation that was originally based in Hong Kong, but moved in 2000 to the Institute of the Environment at the University of California at Los Angeles (UCLA), California, USA.

Directorate of Fisheries and Marine Resources staff mainly involved included: Jassim Al-Qaseer, and Dr. Roger Uwate.

Volunteer divers from the public who participated in Bahrain's Reef Check 2000 surveys included: Dr. Scott Bailey, Anwar Ramadan, Hani Bader, Dr. Paul Dakin, Isa Bumtaia, Abdulnabi Helli, Mohammed Torabi, Sayed Mansoor, Yousef Al Maloud and Patrick Keenan.

Bahrain's Reef Check 2000 dive team was supported by Mustafa Awadi of Marine Services and Dive Force.

Data input and analysis were completed by Dr. Roger Uwate. An earlier draft of this manuscript was reviewed by Dr. Abdulredha Shams and Abdul-Karim Radhi.

APPENDIX 1 – FASHT AL ADHOM SITE 1 INFORMATION

Site name	**BAHRAIN, FASHT AL ADHOM SITE 1**
Date	7/7/00
Time of day that work started	0930 HRS
Time of day that work ended	1230 HRS
Longitude of transect start point	26° 07.469'N
Latitude of transect start point	50° 45.859'E
From chart or by GPS? (If GPS, indicate units)	GPS Magellan 3000XL with DBR
Orientation of transect	N-S XX NE-SW E-W SE-NW
Distance from shore	8 m (13 KM)
Distance from nearest river	240 km
River mouth width	Mand River, Iran, width unknown
Weather	sunny XX cloudy raining
Air temperature	37 degrees Celsius
Water temperature at surface	37 degrees Celsius
Water temperature at 3 m	33 deg ; Celsius
Water temperature at 10 m	degrees Celsius DEPTH 4-6 M
Distance to nearest population centre	13 km (8 miles)
Approximate population size	500 x 1000 people
Horizontal visibility in water	5 m
Why was this site selected?	Near Half Tanker wreck
Is this site -	sheltered XX or exposed
Any major coral damaging storms in past years?	yes no XX unknown
How do you rate this site overall in terms of anthropogenic impact?	none low moderate XX heavy
What types of impact do you believe occur?	
Dynamite fishing	none XX low moderate heavy
Poison fishing	none XX low moderate heavy
Aquarium fish collection	none XX low moderate heavy
Harvest of invertebrates for food	none low XX moderate heavy
Harvest of invertebrates for curio sales	none XX low moderate heavy
Tourist diving	none XX low moderate heavy
Sewage pollution	none XX low moderate heavy
Industrial pollution	none XX low moderate heavy
Other forms of fishing? FISH TRAPS, NETS, HOOK/LINE	none low moderate XX heavy
Other impacts? (Specify)	none XX low moderate heavy
Is there any form of protection (statutory or other) at this site?	yes no XX
If yes, what type of protection?	
Other comments	MANY BOATS TRANSIT AREA, FOUND 100 M 3 MM LINE, BUT NOT SUBMERGED MARKER FLOAT.
Submitted by (enter TL/TS and your name)	K. ROGER UWATE

APPENDIX 2 – FASHT AL ADHOM SITE 2 INFORMATION

Site name	**BAHRAIN, FASHT AL ADHOM SITE 2**
Date	7/7/00
Time of day that work started	1300 HRS
Time of day that work ended	1530 HRS
Longitude of transect start point	26^0 08.541'N
Latitude of transect start point	50^0 45.188'E
From chart or by GPS? (If GPS, indicate units)	GPS Magellan 3000XL with DBR
Orientation of transect	N-S XX NE-SW E-W SE-NW
Distance from shore	8 m (13 KM)
Distance from nearest river	240 km
River mouth width	Mand River, Iran, width unknown
Weather	sunny XX cloudy raining
Air temperature	37degrees Celsius
Water temperature at surface	36.5 degrees Celsius
Water temperature at 3 m	32.5 degrees Celsius
Water temperature at 10 m	degrees Celsius ONLY 9 M DEEP
Distance to nearest population centre	13 km (8 MILES)
Approximate population size	500 x 1000 people
Horizontal visibility in water	9 m
Why was this site selected?	NEAR FIFI WRECK DIVE SITE
Is this site -	sheltered or exposed XX
Any major coral damaging storms in past years?	yes no XX unknown
How do you rate this site overall in terms of anthropogenic impact?	none low moderate XX heavy
What types of impact do you believe occur?	
Dynamite fishing	none XX low moderate heavy
Poison fishing	none XX low moderate heavy
Aquarium fish collection	none XX low moderate heavy
Harvest of invertebrates for food	none low XX moderate heavy
Harvest of invertebrates for curio sales	none XX low moderate heavy
Tourist diving	none low moderate XX heavy
Sewage pollution	none XX low moderate heavy
Industrial pollution	none XX low moderate heavy
Other forms of fishing? FISH TRAPS, NETS, HOOK/LINE	none low moderate XX heavy
Other impacts? (Specify)	none XX low moderate heavy
Is there any form of protection (statutory or other) at this site?	yes no XX
If yes, what type of protection?	
Other comments	MANY BOATS TRANSIT AREA, FOUND OLD REEF CHECK FLOAT, BUT NO 100 M 3 MM LINE.
Submitted by (enter TL/TS and your name)	ROGER UWATE

APPENDIX 3 – ABUL THAMA SITES 1& 2 INFORMATION

Site name	**BAHRAIN, ABUL THAMA SITES 1 AND 2**
Date	14/7/00
Time of day that work started	(1) 0930 HRS; (2) 1330 HRS
Time of day that work ended	(1) 1300 HRS; (2) 1600 HRS
Longitude of transect start point	(1) 26^0 53.027'N (2) 26^0 53.253'N
Latitude of transect start point	(1) 50^0 58.349'E (2) 50^0 58.274'E
From chart or by GPS? (If GPS, indicate units)	chart GPS XX
Orientation of transect	(1) EW (2) NW/SE
Distance from shore	45 m 75 km
Distance from nearest river	140 km
River mouth width	Mand River, Iran, width unknown
Weather	sunny XX cloudy raining
Air temperature	(1) 37^0C (2) 37^0C
Water temperature at surface	(1) 34^0C (2) 34^0C
Water temperature at 3 m	(1) 34^0C (2) 33^0C
Water temperature at 10 m	(1) 33^0C (2) 32.5^0C
Distance to nearest population centre	75 km (45 miles)
Approximate population size	500 x 1000 people
Horizontal visibility in water	13 m
Why was this site selected?	best coral in Bahrain
Is this site -	sheltered or exposed XXX
Any major coral damaging storms in past years?	yes noXXX unknown
How do you rate this site overall in terms of anthropogenic impact?	none low moderate XXX heavy
What types of impact do you believe occur?	
Dynamite fishing	none XXX low moderate heavy
Poison fishing	none XXX low moderate heavy
Aquarium fish collection	none XXX low moderate heavy
Harvest of invertebrates for food	none low XXX moderate heavy
Harvest of invertebrates for curio sales	none XXX low moderate heavy
Tourist diving	none low XXX moderate heavy
Sewage pollution	none XXX low moderate heavy
Industrial pollution	none XXX low moderate heavy
Other forms of fishing? FISH TRAPS, NET	none low moderate heavy XXX
Other impacts? (Specify)	none low moderate heavy
Is there any form of protection (statutory or other) at this site?	yes no XXX
If yes, what type of protection?	
Other comments	ABOUT 30 FISH TRAP FLOATS NEAR SITE 1, ABOUT 50 FISH TRAP FLOATS NEAR SITE 2, SEVERAL LOST FISH TRAPS (GHOST FISHING), LOST NETTING, ROPES ON CORALS/ROCKS
Submitted by (enter TL/TS and your name)	ROGER UWATE