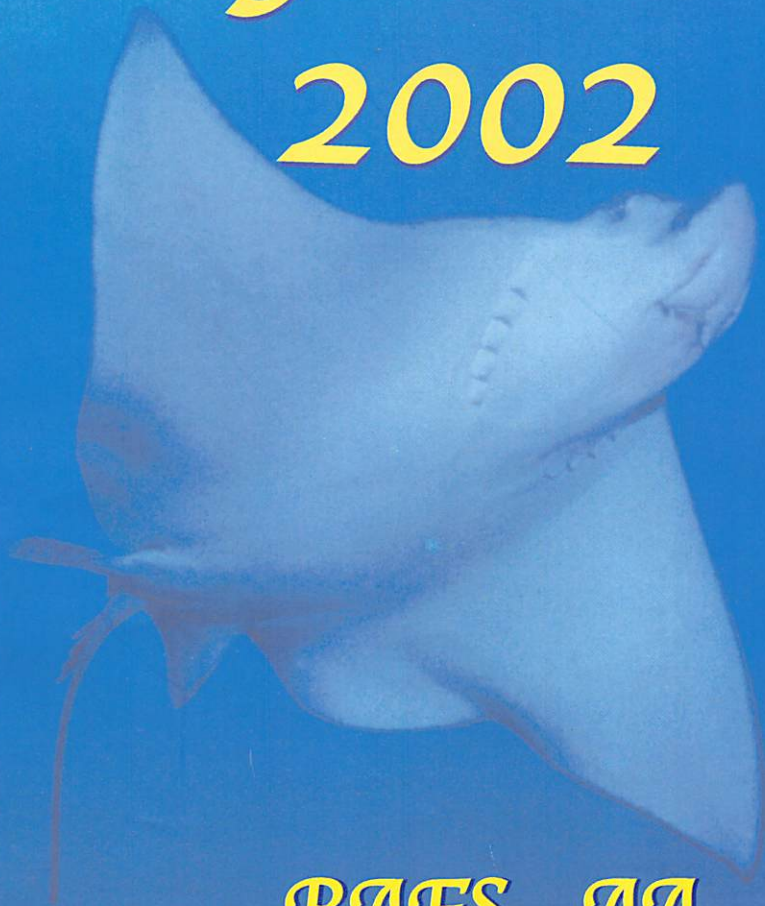
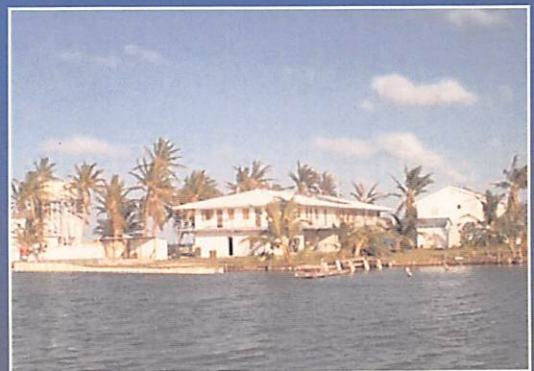


Exercise Mayan Finn 2002

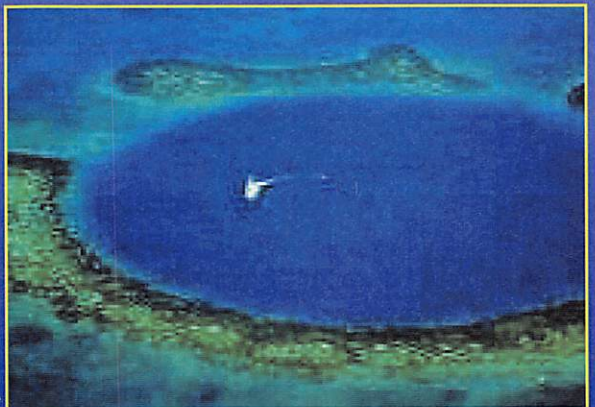
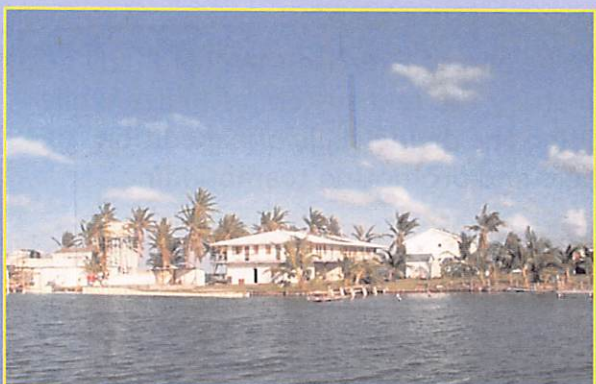


*RAFS - AA
Special Projects Expedition
St George's Caye Belize
19 Oct - 6 Nov 2002*



Contents

Introductory Comments and Report by Officer IC	Page 2
Remarks by Chairman RAFS AA	Page 4
Distribution	Page 5
Expedition Leader's Report	Page 6
Nominal Role and Duties	Page 11
Itinerary	Page 12
Income & Expenditure	Page 13
Contact Names and Addresses	Page 14
Diving Officer's Report	Page 15
Diving Statistics	Page 16
Training Officer's Report	Page 17
Equipment Officer's Report	Page 18
Equipment and Source of Supply	Page 19
Belize - A Brief Tour	Page 20
Hurricane IRIS - A History	Page 22
Survey Report	Page 23
Underwater Study of the Effects of Hurricane IRIS	Page 24
Coral and Wildlife Survey	Page 30
Diary of Events	Page 32



OIC'S INTRODUCTION

POST EXERCISE REPORT

EXERCISE MAYAN FINN 2002

RAF SUB-AQUA ASSOCIATION (MULTI-UNIT) SPECIAL PROJECT EXPEDITION

19 Oct – 16 Nov 02 TO BELIZE

References:

- A. AP3342 (Change 7).
- B. BFHQ Belize 3650 dated 29 Jan 01.
- C. Joint Service Diving Regulations (Jul 01).
- D. Special Projects Funding PTC/571435/PEd dated 4 Jul 02.
- E. DIP Clearance – Fax, BFHQ Belize 3650 dated 18 Feb 01.
- F. Expedition Authority – PTC/57412/PEd dated 12 Mar 02 Ser No HQPTC/91/PTC/AT2001.
- G. BSAC Safe Diving Practices, Sports and Advanced Diving Manuals.
- H. Deep Diving Approval – RAFS-AA/DO/00 dated 1 Aug 02.
- I. QRs Appendix 36A.

INTRODUCTION

1. In the past four years Belize has been struck by a series of three severe hurricanes. Exercise MAYAN FINN 2002 continued survey work which was begun two years ago to investigate damage to the reef systems of Belize caused by this series of natural disasters. Data was collected in a series of written reports and by the use of underwater photography. As well as assessing the extent of physical destruction to the marine environment a careful study was undertaken to determine whether the reef was showing signs of regenerating itself. There is an enormous variety of creatures that live on and around the reef and the presence of these creatures is a good indicator as to the condition of the coral itself, as the entire ecosystem is directly related to the health of the reef. Data collected was passed to the Coral Caye Conservation Project for more detailed analysis and also to the Royal Geographical Society.

2. The Exercise was also designed to promote leadership and teamwork skills and to

give expedition members the opportunity to carry out adventurous and challenging deep diving techniques from small and large boats. The expedition was cleared to dive to 50 metres in order to build as accurate a picture as possible of the uppermost portion of what is the second largest barrier reef on the planet. Diving to this depth required very careful planning and supervision.

AIM

3. The aim of Exercise MAYAN FINN 2002 was to study the reef system of Belize while improving the diving skills of expedition members and promoting teambuilding.

PLANNING

4. Planning for the Exercise began 12 months ago immediately after MAYAN FINN 2001. A wide variety of agencies and organisations were involved in order to arrange for the use of specialist equipment, the movement of personnel, booking of accommodation and catering requirements, and the provision of medical and recompression facilities to support the divers during the expedition. In addition, authorisation was required for Royal Air Force personnel to dive to 50 metres for research purposes. Planning for the expedition was further complicated by the arrival of Hurricane IRIS. This led to the sinking of one of the support vessels booked for the survey of the outer reefs. This vessel went down with the loss of 18 lives. All expedition members were reminded of the power of the hurricanes that effect this region.

COSTS

5. The overall cost of the expedition was £17379.57 and this was supported by grants of £2000 from HQPTC AT Special Projects, £1000 from the RAFS-AA. Participating Units on average contributed £698 per person and each expedition member made a personal contribution of £375. Flights were by Continental Airways from Gatwick to Belize via

Houston and an increase in personal baggage allowance was agreed with the Airline to cater for individual diving equipment.

Accommodation was provided at the British Forces Adventure Training Centre (BFATC) on St George's Caye.

TRAINING

6. The expedition programme included a variety of training and research dives. The main thrust of training was directed at enhancing and developing individual skills. Training included Dive Leader Demonstrations, Rescue Management Scenarios, Dive Leader Assessments. Expedition members took it in turn to act as Dive Marshall for the day, responsible for all aspects of dive planning and control of the research and training work to be undertaken. A duty Sub-Aqua Diving Supervisor (SADS) was also appointed on a daily basis.

RESULTS

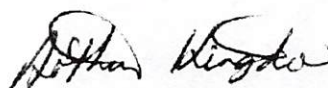
7. Exercise MAYAN FINN 2002 was a hugely successful venture in which all of the initial aims were met in full. This success was a direct result of the careful preparation and planning of all members of the team prior to and during the expedition. In all, 349 dives were completed during just 15 days of diving by a team of 12 divers, unfamiliar with each other on the first day of the expedition, in an area isolated from modern medical and communication facilities, and all entirely without diving incident. Reports from each of the specialist members of the Expedition outline in sections of this report their individual aims and results achieved, as well as making appropriate recommendations for future expeditions of this type. References A to I will be referred to in these reports. Many of the recommendations made are pertinent to any expedition associated with adventurous training.

CONCLUSION

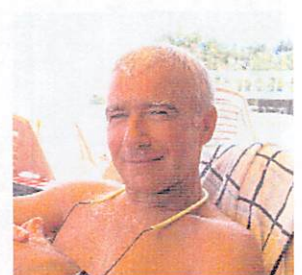
8. The benefits of adventurous training are enormous. As well as the hugely important research work that was carried out for Coral

Caye Conservation and the Royal Geographic Society, all the individuals that participated returned to the UK with new skills and experiences. Obviously, some of these skills were directly related to diving but also much was learned about working and living with others. The group consisted of people from very varied backgrounds but, common interests in the environment and diving, united all. As a result of hardwork, a formidable team was formed very quickly. This team developed and improved its performance constantly over the 2 weeks of the expedition while having fun and enjoying the challenges of deep diving in a remote region. All team members acknowledged the fact that they returned to the UK with a real sense of achievement and armed with information they will be able to use to improve their performance in the workplace and elsewhere.

9. My role as OIC the Expedition was made particularly easy by the high calibre of the individuals taking part; all were a credit to the RAF and displayed high standards of discipline and professionalism. Credit should also be given to the staff at BFATC who were exceptionally helpful; their 'can do' attitude was both welcome and refreshing. However, the success of the Expedition was largely due to the hard work and diligence of FS Goodwin, the Expedition Leader. He was able to use his extensive knowledge of the area, plus his excellent inter-personal skills to great effect. His high work rate and exceptional organisational skills combined to ensure a safe and trouble free expedition.



A KINGDON
Sqn Ldr
OIC

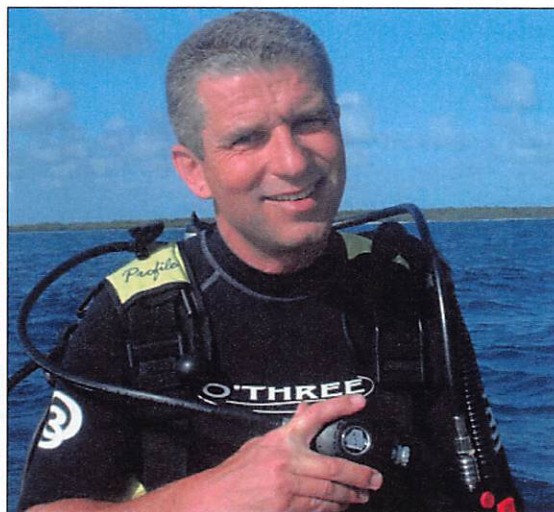


REMARKS BY CHAIRMAN RAFSAA

The Mayan Finn series of expeditions to Belize have consistently produced results of immense value to the Coral Reef protection agencies of Belize, the Royal Geographic Society, and the RAF Sub Aqua Association. This expedition is no exception. The scientific research opportunities afforded by reports on the coral reefs and associated marine life and its diversity, or lack of it in areas of damage caused by nature or man, are welcomed by marine biologists and scientists alike. The leadership and adventure training requirements inherent in organising and running such an expedition to a fairly remote part of the world, are challenging ones and must not be taken lightly by the individuals concerned. But this individual recognition of commitment is important in its own right and I take this opportunity to thank the flight, squadron, wing, and station commanders involved for recognising this in releasing the expedition members for duty on MAYAN FINN 2002. But we all benefit as the importance of providing such high quality adventure training is, to my mind as both Chairman RAFSAA and as an air rank officer, almost immeasurable. It

offers a priceless opportunity to see at first hand the results of leadership and management training and individual competencies that have been provided and hopefully nurtured by the RAF - these opportunities must not be treated lightly as lessons learned can feed directly into recruitment and training programmes

As this report details, the outputs achieved by the 12 divers of the Expedition speak for themselves and I am pleased to have been involved both on a personal level and as Chairman RAFS-AA. I can confirm that Exercise MAYAN FINN 2002 has fulfilled all of its objectives, as well as every single objective of adventure training within the RAF.



J P CHITTY
Air Cdre

DISTRIBUTION

External:

HQPTC, TPed(2A) x2
 RAF Sports Board
 HQ Land, SO3 G3 Trg
 BATSUB HQ x2 (OC, 2IC)
 BFATC Belize x2 (CI, Cox)
 RAFS-AA x3 (Chairman, Special Projects
 Officer, Competitions Officer)
 ASADA (Chairman)
 RNSADA (Chairman)
 JSSADC, Fort Bovisand
 Coral Caye Conservation Group, Belize
 Royal Geographical Society
 RAF Marham (Info Stn Cdr & PEdO)
 RAFC Cranwell (Info Stn Cdr & PEdO)
 RAF Saxa Vord (Info Stn Cdr & PEdO)
 RAF Lossiemouth (Info Stn Cdr & PEdO)

RAF Lyneham (Info Stn Cdr & PEdO)
 RAF Stafford (Info Stn Cdr & PEdO)
 Expedition Members (12 Copies)
 Offshore Express 2

Internal:

Stn Cdr
 OC Admin Wg
 OC Trng Wg
 PEdO



'Offshore Express II'

EXPEDITION LEADERS' REPORT

INTRODUCTION.

1. The expedition departed on 19th Oct with 12 personnel. Expedition members from RAF stations Halton, Cranwell, Lossiemouth, Stafford, Lyneham, Marham, and Saxa Vord, took part in the major RAF Multi-Unit Sub-Aqua Diving Expedition to Belize from 19 Oct 02 to 05 Nov 02. The nominal role of personnel, expedition duties and diving qualifications are detailed on page 11.

AIM.

2. The aim of this report is to describe the activities and achievements of the expedition.

THE EXPEDITION.

3. Ex MAYAN FINN 02 was authorised and conducted in accordance with References A to I.

GENERAL.

4. Mission and Aims. The mission and aims of the Expedition were to:

a. Study the recovery of the reef 1-year after the effects of Hurricane IRIS.

b. Give Expedition members the opportunity to carry out adventurous deep diving in tropical waters.

c. Gain small and large boat diving experience, including live-aboard.

d. To continue with and update projects for Coral Caye Conservation and The Royal Geographical Society.

e. Carry out underwater photography of coral reef and marine life.

f. Promote leadership and team-building skills.

5. Outcomes.

The Expedition was successful in achieving all of these aims.

6. Movement and Transport Arrangements.

Movement and Transport arrangements were as follows:

a. Authority to travel at public expense was authorised and finance was obtained from unit funds, AT8. Expedition personnel arranged transport to and from Gatwick Airport through their parent unit MT sections. Travel to and



Sunset St George's Caye

from accommodation at Houston was arranged through the Hotel courtesy coach. Transport between Belize Airport and St George's Caye was supplied by the Belize Garrison and British Forces Adventure Training Centre (BFATC).

b. Civilian flights with Continental Airways were booked through Continental Group bookings London. The outward journey necessitated an overnight stop at Houston prior to proceeding to Belize on Day 2. The return journey connects at Houston and negates the requirement for an overnight stopover.

7. Accommodations and Food.

a. Accommodation. On the outward journey the expedition made an overnight stop at Houston and was accommodated at a motel a few miles from the airport. The main part of our stay in Belize was at the British Forces Adventure Centre (BFATC), St Georges Caye. For 6 days the expedition lived onboard a purpose built dive boat "The Offshore Express II" which enabled the expedition to dive on the more distant sites at Lighthouse Reef and, in particular, Half Moon Caye and the famous Blue Hole and the Abyss.

b. Food. Food was supplied for the duration of the expedition by BFATC and, whilst on board the "The Offshore Express II", purchased out of expedition funds.

8. Finance. All Expedition members paid a personal contribution of £375 which represented one third of the total costs of the expedition. Expenditure detailed on page 13.

9. Medical. Medical facilities were available at Airport Camp; for an emergency, a doctor was on call. Limited First Aid facilities and equipment were available at BFATC. The nearest recompression chamber was at San Pedro and it was contacted on a daily basis, prior to diving, to ensure serviceability.

10. Diving Operations. All diving was carried out in accordance with Joint Service and BSAC Diving Regulations. A Deep Diving Application, to a depth of 50 metres, was granted by RAFS-

AA, which gave all expedition members the opportunity to take full advantage of the superb diving on offer. The Diving Officer's Report is covered on page 15-16.

11. Training. A full training programme, together with additional Skill Development Courses, was arranged during the expedition; the programme in the main was conducted in the evening and between dives. A comprehensive Training Officer's report, including roll of honour, is on page 17.

12. Equipment. BFATC provided diving cylinders, lead weights and fixed compressors; in addition, a boat with coxswain was provided for the duration of the expedition. It is worthy of note that the skiff will carry 12 divers and has space for 12 additional cylinders. The skiff has a range of 60 miles and allowed expedition members to dive at Turneffe Reef and other locations that have not been available in previous years; this was a great advantage in achieving the aims and objectives of the expedition. A breakdown of equipment and source of supply together with the Equipment Officer's Report is contained in page 18.

13. Survey Reports. A report of the study into the effects of Hurricane IRIS carried out during the expedition can be found in page 24-29.

14. Assistance to Others. Expedition members carried out the following assistance to other organisations and individuals whilst on the Ex MAYAN FINN 2002.

a. Expedition members carried out rubbish clearance at Half Moon Caye on the request of Belize Audubon Society and the Half Moon Caye warden.

b. Whilst diving the Blue Hole the skipper Clive received an emergency call to help a small diving boat in distress. It had smashed its drive shaft and was unable to power itself back to the resort in which it came from. We then assisted by towing the vessel 23 miles back to the Lighthouse Resort hotel, ensuring that all the crew and divers were rescued and put ashore safely.

RECOMMENDATIONS.

15. British Forces Adventure Training Centre (BFATC).

a. Administration. It should be noted that prior to any expedition arriving at BFATC, they are made fully aware of the tasks and duties at St George's Caye; dioxie cleaning at weekends and the daily cleaning of ablutions are required. Diving operations may have to be delayed to enable these duties to be completed.

b. Diving Operations at BFATC. The specific points are as follows:

i. Compressor Operation. The Centre at St George's Caye is equipped with 2 electrically powered Bauer compressors with 6 outlets. These were found to be in excellent condition and the previously unsatisfactory features of the external charging panel, which was earlier reported to be in an appalling condition, was vastly improved. The Centre staff should be congratulated on the improved facility. These excellent facilities would be enhanced by the construction of of a simple assembly bench outside the compressor room where equipment

can be assembled and set out to dry. The live-abroad boat "Offshore Express 2" does not have a working compressor and so the expedition had pre-positioned a RAFS-AA, petrol driven, Poseidon compressor. It is recommended that this procedure is employed by subsequent expeditions and that spares are taken from the UK. However, it is advisable to bid for the freighted move of the compressor at least 3 months in advance due to the infrequency of Service flights. Unfortunately, the compressor was dispatched without charging hoses and arrived without the air intake hose and petrol tank cap. The air charging hoses were hand carried and the air intake hose and petrol cap obtained locally to make good the deficiencies. The compressor was a little difficult to start but performed faultlessly otherwise. Compressor and engine oil can be obtained in Belize but spares are in short supply.

ii. Cylinders. The centre cylinders are low pressure (206 Bar), are not fitted with removal pillar valve inserts and are unsuitable for Din Fitting Regulators. The O-rings are US specification and are in short supply at the Centre. The dimensions of the rings are contained within the Equipment Officers' Report, page 18.



iii. Boats and Depth Finding Equipment.

The Expedition used the skiff "Georgie Girl", a 20 ft vessel with her own designated coxswain. This was large enough to take all of the expedition out at one time, reducing the amount of repeated wave diving and increasing the in-water time significantly. To enhance this capability, it would be beneficial to construct a simple spare cylinder rack in the well of the skiff in order to provide safe stowage for 12 cylinders to avoid having to return to the Centre for cylinder changing when diving remote sites. Although the skiff had a hand-held depth pinger that worked quite well, what is really needed is a mounted echo sounder to enable a better understanding of the seabed prior to diving.

iv. Oxygen Administration Kit. The current O₂ kit is sufficient for any expedition.

16. Diving Operations on "Offshore Express II".

The "Offshore Express II" is a live-aboard with basic facilities and has significant limitations. The major point to note when chartering the boat is that the on-board accommodation is basic and sparse. This is very important when females are on the expedition as the boat has shared facilities; the boat also has only one basic shower and toilet. Other limitations are as follows:

a. Power. There is a limited power supply as the boat only has a small petrol generator and is running normally evening only. Also, the charging of diving torches is limited due to minimum power outlets. It is recommended that torches with replaceable batteries be used.

b. Storage Space. General space for storage on the boat is at a premium, therefore only essential dive equipment and personal effects should be brought.

c. Diving Operations. Diving Operations on board the "Offshore Express II" are conducted in close liaison with the skipper, Clive and Divemaster Alan, and are second-to-none. The boat may offer limited comforts but the ability to dive in the best locations that Belize can offer, outweighs any hardships.

17. Future Expedition Leader's

Recommendations. It is a request that the following recommendations should be considered and implemented prior to any expedition departing to Belize.

- a. Liaison with last Expedition Leader is a must.
- b. A laptop computer is invaluable to compile reports whilst out on expedition. However, if expedition members require to download digital photos, ensure that the relevant software and leads are taken.
- c. Adaptors for electrical appliances to convert from 240V-110V.
- d. A BSAC training CD is a must as the facilities at BFATC are limited.

ACKNOWLEDGEMENTS.

18. Any expedition is only as successful as the help and co-operation it receives from many organisations and individuals. The Expedition would like to express its thanks to the following:

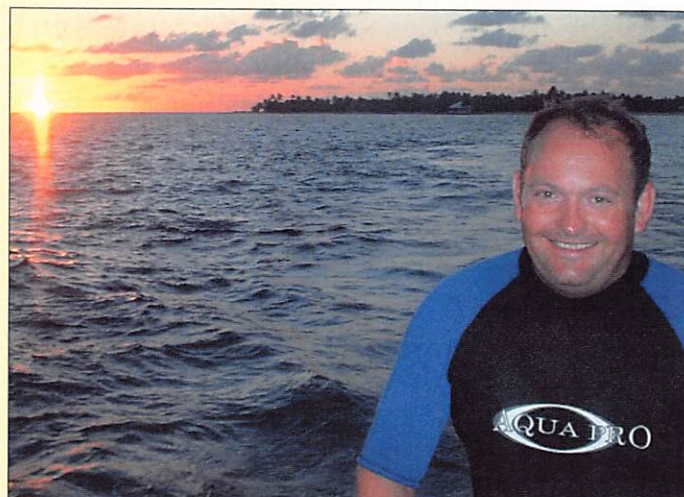
- a. HQPTC for the Special Projects Grant of £2000.
- b. RAFS AA for a grant of £1000.
- c. RAF(c) Cranwell, Halton, Lossiemouth, Lyneham, Stafford, Marham and Saxa Vord for their financial assistance towards the expedition.
- d. RAF Halton for their assistance in providing the administrative backup for the expedition.
- e. Major K E Bowkett, 2 IC BATSUB, for his assistance.
- f. WO2 John Wood, Chief Instructor BFATC St George's Caye, for his and his staff's help and assistance whilst expedition members were accommodated at the centre.
- g. Stn, Sqn and Flight Cdrs of all participating expedition members for permitting personnel to attend such a valuable and rewarding AT expedition.



CONCLUSIONS.

19. The Expedition was an outstanding success and achieved all of its aims and objectives. All Expedition members gained valuable experience in Sub-Aqua Diving, leadership, teamwork and organisational skills. Thanks go to all that took part for making the Expedition so successful.

P GOODWIN
FS
Expedition Leader



EXPEDITION NOMINAL ROLL, DUTIES AND DIVING QUALIFICATIONS

	Rank	Name	Station	Diving Quals	Duties
	Air Cdre	J Chitty	RAFC Cranwell	ADV	Dep OIC/PXR.
	Sqn Ldr	A Kingdon	RAF Lyneham	ADV	OIC, Photography, Special Projects Team.
	WO	R Bate	RAF Marham	ADV, Nitrox, Trimix	Special Projects Coordinator, Deputy Expedition Leader.
	FS	P Goodwin	RAF Halton	SADS, ADV, AI SDC Assessor	Expedition Leader, Imprest Holder, PXR.
	FS	G Crouch	RAF Stafford	SADS, ADV, AI	Diving Officer.
	FS	W Bate	RAF Halton	DL, TI	PXR, Deputy Imprest Officer.
	Sgt	D Corley	RAF Marham	DL, OWI	Dive Records Co-ordinator, Diary, Photography.
	Cpl	D Arnold	RAF Lossiemouth	ADV, OWI	Training Officer.
	Cpl	A Payne	RAF Halton	ADV, AI	Dep Diving Officer, Special Projects Team.
	Cpl	M Staunton	RAF Saxa Vord	ADV	Special Projects Team, Diary.
	Mr	D Ball	RAF Halton	ADV, AI	Equipment Officer.
	Mr	P Walton	RAF Halton	ADV, OWI	POL, Food & Accm, Assistant Dive Records & Diary.

ITINERARY

<u>Date</u>	<u>Venue</u>	<u>Activity</u>
19 Oct 02	Travel - Gatwick to Houston, Texas, USA	Overnight Houston
20 Oct 02	Travel - Houston to Belize City and (boat) to St George's Caye	Arrive BFATC 1600L
21 Oct - 24 Oct 02	St George's Caye, San Pedro, Turneffe Reef	Diving Activities
25 Oct 02	Travel to San Pedro	Accommodated "Spindrift Hotel"
26 Oct 02	San Pedro	Accommodated on live-aboard "Offshore Express II" prior to departure
27 Oct - 1 Nov 02	Join live-aboard - Lighthouse and Turneffe Reefs, Blue Hole, Abyss	Deep Diving work up Deep Diving activities
1 Nov - 3 Nov 02	St George's Caye for kit drop prior to move to San Pedro	Unload BFATC kit and personal, live-aboard organise, mandatory rest days
2 Nov 02	2 Team members have to depart early, San Pedro local flight to Belize City, then onward to UK via Houston	2 Team members RTU (Other commitments: Op Fresco)
3 Nov 02	Depart San Pedro for St George's Caye and onward travel to Belize mainland	Return expedition equipment, accommodation, etc. move to Price Barracks (Belize mainland)
4 Nov 02	2 Team members have to depart early to UK Gatwick via Houston, Texas, USA	RTU with further onward air travel within UK to outlying RAF stations
5 Nov 02	Final 8 team members depart Belize to UK Gatwick via Houston, Texas, USA	Arrival 0955L 6 Nov 02

SUMMARY OF INCOME AND EXPENDITURE

MAYAN FINN 2002

DETAILS	INCOME	EXPENDITURE
HQPTC RAFAT SPECIAL PROJECTS GRANT	£ 2,000.00	
PERSONAL CONTRIBUTION 11 x £ 375 1 x £275	£ 4,400.00	
RAFS-AA GRANT	£ 1,000.00	
RTS GRANT	£ 200.00	
CILOR 2 DAYS TRAVELLING 7 DAYS LIVEBOARD	£ 993.17	
Unit Contributions: RAF HALTON	£ 2589.30	
RAF LOSSIEMOUTH	£ 698.30	
RAF SAXA VORD	£ 698.30	
RAF CRANWELL	£ 698.30	
RAF STAFFORD	£ 300.00	
RAF BENSON	£ 698.30	
RAF MARHAM	£ 1396.60	
RAF LYNEHAM	£ 1000.00	
RAF BRIZE NORTON	£ 698.30	
	£ 8786.40	
CONTINENTAL AIRLINES 12 TICKETS @ £ 554.70		£6656.40
CHANGE FLT TICKETS		£ 600.00
RETURN MONIES CPL TRENHOLME & SGT TUIE		£ 650.00
EXPEDITION T/SHIRTS		£ 236.18
BALANCE C/F		£9,236.99
TOTALS	£ 17,379.57	£17,379.57
BALANCE B/F	£ 9,236.99	
OPENING BALANCE IN U/S Dollars @ \$1. 48	\$ 13,670.74	
OFFSHORE EXPRESS LIVABOARD		\$6,300.00
FOOD FOR LIVEBOARD 6 Days		\$1,310.00
WATER/SOFT DRINKS/ICE (20 DIVING DAYS)		\$ 875.00
HOTELS UK		\$ 85.00
WATER/SOFT DRINKS/ ICE (20 DIVING DAYS)		\$ 887.60
HOTELS UK		\$ 68.40
HOUSTON HOTEL OVERNIGHT STOP		\$ 392.10
HOUSTON MEALS/ DRINKS OVERNIGHT STOP		\$ 680.00
ST GEORGES CAYE BFATC HIRE CHARGES		\$ 100.00
HALF MOON CAYE AUDUBON SOCIETY		\$ 110.00
DEISEL / OILS COMPRESSOR		\$ 80.00
CORAL BEACH SAN PEDRO LIVEBOARD ACCOMODATION		\$ 780.00
TAXIS HOUSTON		\$ 65.00
COMPRESSOR CHARGING COST		\$ 75.00
BOATMAN OVERTIME PAYMENT		\$ 100.00
COMPRESSOR SPARES		\$ 65.00
DIVE KIT SPARES		\$ 39.04
ALTUN HA		\$ 450.00
SAN PEDRO TO BELIZE AIR TICKETS		\$ 100.00
FUEL CENTRE		\$ 229.00
FILM PROCESSING		\$ 148.00
PXR PROCESSING STATIONARY		\$ 77.60
BELIZE AIRPORT TAX		\$ 200.00
GRATUITIES BFATC		\$ 94.00
GRATUITIES OFFSHORE EXPRESS HARD BOAT		\$ 300.00
PHONE CARDS		\$ 60.00
TOTAL	\$13,670.74	\$13,670.74

CONTACT NAMES AND ADDRESSES

Service Booking Center	GPTN 95331 Ext 7936/7834
Quality Inn Houston	Tel No 0012 81 4469131 Fax 0012 81 4462251 Email: RED7596253@aol.com
2IC BATSUB BFHQ Belize	Tel No 00501 25 2024 Ext 202 Fax 00501 25 2362 Email: hqbatsub@btl.net
Chief Instructor St George's Caye	Tel No 00501 21 4019 Fax No 00501 21 4157 Email: bfatc@btl.net
Compressor Hire (Belize) - Mark Hyde	Tel No 0051 27 3294
Skipper 'Seasport' (Day Charter) - Francis Heusner	Tel No 00501 149780 Mobile Email: jaguar@btl.net
Owner Reef Beauty (Day Charter) - Mario	Tel No Mob 015 1155
Owner Offshore Express II (Live aboard/ Coral Caye Hotel) Allan Foreman	Tel No 00501 26 2013/3675 Fax No 00501 26 2864 Email: Forman@btl.net
The Marine Research Centre - Faustino Chi University of Belize West Landivar Belize CA	Email: fchi@UCB.edu.bz
Recompression Chamber San Pedro	Tel No 00501 262851
Taxi for shopping - Ernest Smith	Outside Seaview Store
Skipper 'Sea Boots' - Hustler Tours (Billy Leslie)	Tel No 00501 026 4137 Mob 014 8382 Email: hustler@btl.net



DIVING OFFICER'S REPORT

INTRODUCTION.

1. Exercise Mayan Finn 02 was a Royal Air Force Sub-Aqua Association (RAFS-AA) multi-unit diving expedition to Belize, operating from the British Forces Adventure Training Centre (BFATC) situated on St George's Caye.

2. As the Expedition Diving Officer, I was responsible for ensuring that all diving operations were carried out in accordance with Joint Service Diving Regulations and British Sub-Aqua Club (BSAC) Safe Diving Practices. In addition, clearance for qualified personnel to carry out dives to 50 metres was sought and obtained from the RAFS-AA Diving Officer.

3. The Expedition Leader and I had both previously served in Belize with the Royal Air Force, and participated in diving expeditions from the UK. During one tour, the Expedition DO was the Diving Officer for the British Forces Belize Sub-Aqua Club and the Expedition Leader was the Chief Diving Instructor at the Joint Service Adventurous Training Centre on St George's Caye in 1994/5. Both have had extensive knowledge of diving in Belize and the associated problems that the expedition was liable to be presented with.

DIVING OPERATIONS.

4. The first week of the expedition was day diving from St George's Caye at various locations on the barrier reef. This allowed all divers to gradually "work-up" to the deeper dives although all members were dive fit prior to the expedition. The underwater visibility in the area of St George's Caye and Gallows point was at times very poor due to coral blooms and wave action; a lot of the coral, particularly on the reef walls, was covered in sand. It was decided to dive a variety of other locations in the hope of better visibility and more colourful dive sites; this would also aid the expedition in conducting the marine life survey for the Royal Geographical Society.

5. The second part of the expedition was a

six-day live-aboard on the "Offshore Express II". This boat used to be called the 'Manta 4' and has been refitted, and provided plenty of room and comfortable accommodation. The Skipper Clive and Divemaster, Alan, were professional and ensured that our objectives were met and Norma the cook provided excellent food. The week was spent venturing to the outer reefs and islands where the most spectacular dive sites were to be found, including the famous "Blue Hole" and the "Abyss". Both of these dive sites required a depth limit of 50 metres to fully appreciate them. Future Diving Officers need to be aware that there are at least 15 reef sharks in the Blue Hole and the local Divemasters feeding routines are not regular. The sharks are active around divers. A 48-hour break was taken during the expedition to allow divers to completely eliminate excess nitrogen from the bloodstream.

6. Diving Statistics. Diving statistics are contained in Chapter 2. A small number of man-dives were lost due to minor ailments such as inability to clear ears and stomach upsets. 349 man dives were completed without incident.

7. Dive Computers. All expedition members used personal diving computers that gave a significant advantage over BSAC Decompression Tables, both in diving profiles carried out and time underwater. The majority of dives did not incur mandatory decompression stops however, for dives shallower than 30 metres a precautionary 1 minute stop at 6 metres was carried out and for dives deeper than 30 meters a precautionary 3 minute stop at 6 metres was carried out. Spare computers were taken for back up in case of failure.

RECOMMENDATIONS.

8. When diving from St George's Caye using BFATC boats, the following recommendations are made to make the diving safer and easier:

- a. An echo sounder is fixed to the dive boat
- b. All other major recommendations are

covered in the Expedition Leader's Report

CONCLUSION

9. The expedition was very fortunate in having superb weather conditions however underwater visibility in the area local to St George's Caye was at times disappointing. Without exception, all members of the expedition found it extremely rewarding and enjoyable. At times the diving routine was very demanding and long days were required. There was excellent camaraderie and team spirit within the expedition and every individual worked hard towards achieving the expedition's

aims and objectives. To conclude the report I would like to pass on my personal thanks to all those who contributed to an extremely successful and incident free expedition.

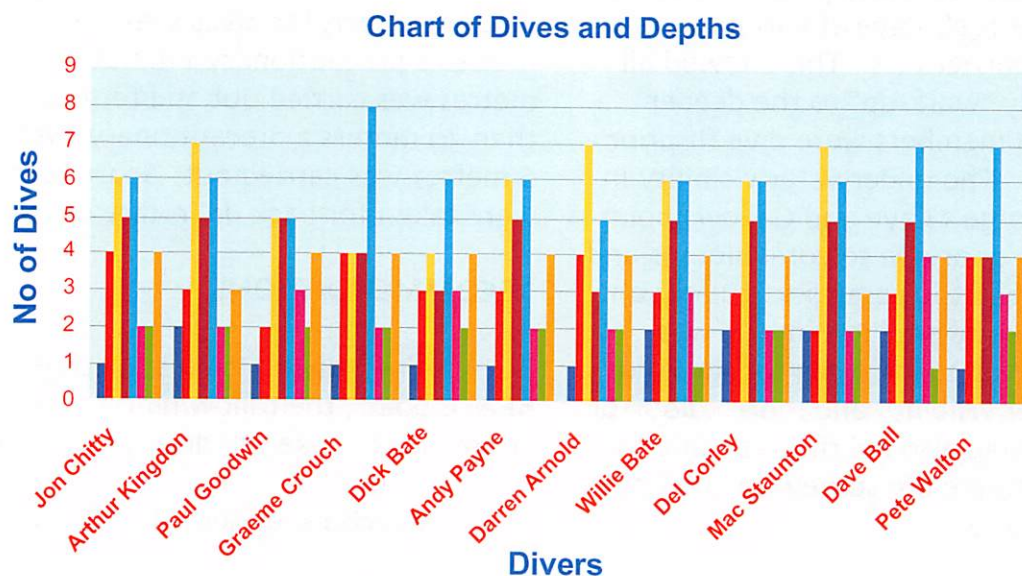


G Crouch
FS
Diving Officer



EX MAYAN FINN O2 - DIVING STATISTICS

Diver	0-15m	16-20m	21-25m	26-30m	31-35m	36-40m	41-45m	46-50m	Total Dives	Total Time
Jon Chitty	1	4	6	5	6	2	2	4	30	23hrs 56min
Arthur Kingdon	1	3	7	5	6	2	2	3	30	23hrs 21min
Paul Goodwin	1	2	5	5	5	3	2	4	27	21hrs 26min
Graeme Crouch	1	4	4	4	8	2	2	4	30	24hrs 09min
Dick Bate	1	3	4	3	6	3	2	4	26	21hrs 05min
Andy Payne	1	3	6	5	6	2	2	4	29	22hrs 43min
Darren Arnold	1	4	7	3	5	2	2	4	28	22hrs 28min
Willie Bate	2	3	6	5	6	3	1	4	30	22hrs 11min
Del Corley	2	3	6	5	6	2	2	4	30	23hrs 06min
Mac Staunton	2	2	7	5	6	2	2	3	29	21hrs 56min
Dave Ball	2	3	4	5	7	4	1	4	30	23hrs 57min
Pete Walton	1	4	4	4	7	3	2	4	30	23hrs 41min
TOTALS	17	38	67	55	74	30	22	46	349	271hrs59min



TRAINING OFFICER'S REPORT

TRAINING OFFICER'S REPORT

1. The Expedition comprised 12 personnel of whom one was a first class diver, 9 were advanced divers, 1 Dive Leader and 1 Sports diver. Therefore, due to the vast experience, it was decided that the Expedition concentrate on providing the Sports diver, (FS William Bate) with the BSAC Dive Leader training package, which in turn would enable him to undertake the diving required to fulfill the itinerary whilst in Belize.

2. The BSAC SDCs conducted and the results are shown below:

3. The type of diving to be undertaken at the Blue Hole and the Abyss necessitated additional instruction and practice for most of the team. To ensure safety through experience and familiarity, shot-line techniques, decompression drills, deep diving and redundant equipment training was conducted prior to deep diving.

4. The instructor team comprised:

- a. Paul Goodwin.
- b. Graeme Crouch.
- c. Darren Arnold
- d. Dave Ball.

Course	Date	Personnel
Dive Leader Demonstration	22 Oct 02	FS William Bate - Cpl Darren Arnold
Rescue Management Scenarios	23 Oct 02	FS William Bate - Mr Dave Ball
Dive Leadership Assessment 1	24 Oct 02	FS William Bate - Cpl Darren Arnold
Dive Leadership Assessment 2	24 Oct 02	FS William Bate - Cpl Darren Arnold
Dive Leader Rescue Assessment 1	25 Oct 02	FS William Bate - Cpl Darren Arnold
Dive Leader Rescue Assessment 2	25 Oct 02	FS William Bate - Cpl Darren Arnold

D W Arnold.
Cpl
Training Officer



EQUIPMENT OFFICER'S REPORT

1. *Situation.* Although the climate of Belize exposes all equipment to intense heat, high levels of humidity and bright sunlight, all of which are particularly damaging to the materials used in the construction of diving equipment, there were few theatre related failures during the expedition. Belize, with its remoteness and lack of commercial infrastructure, ensures that diving equipment spares, particularly for European equipment, and maintenance support are especially difficult to obtain, this is particularly so for European sourced diving equipment. Therefore, the expedition left the UK equipped with a substantial spares pack-up and comprehensive tool kits for the maintenance of both individual diving and team support equipment.

2. *Personal Diving Equipment.* All expedition members provided their own personal diving equipment and minor spares. Additionally, the Equipment Officer (EO) brought tools and spare equipment sufficient to conduct running repairs on regulators, buoyancy compensators and compressors. There were a few personal equipment problems with leaking regulators and swivel joints. Replacement regulators and seal changes returned all equipment back to a serviceable state.

3. *Compressors.* The centre at St George's Caye is equipped with 2 electrically powered Bauer compressors with 6 outlets. These were in excellent condition and the previously reported unsatisfactory external charging panel was vastly improved and the Centre staff should be congratulated for this. These excellent facilities would be enhanced by the construction of a simple bench outside the compressor room where equipment could be assembled and set out to dry.

The live-aboard boat "Offshore Express 2" does not have a working compressor and so the expedition had pre-positioned a RAFA-AA, petrol driven, Poseiden compressor. It is recommended that this procedure is employed by subsequent expeditions and that spares are taken from the UK. However, it is advisable to

bid for the freighted move of the compressor at least 3 months in advance due to the infrequency of service flights. Unfortunately, the Compressor was a little difficult to start but performed faultlessly otherwise. Compressor and engine oil can be obtained in Belize but other spares are in short supply.

4. *Boats.* The Expedition used the skiff "Georgie Girl", a 20ft vessel with her own designated cox'n. This was large enough to take all of the expedition out at one time, reducing the amount of repeated wave diving and increasing the in-water time significantly. To enhance this capability, it would be beneficial to construct a simple spare cylinder rack in the well of the skiff to provide safe stowage for 12 cylinders to avoid having to return to the Centre for cylinder changing. Although the skiff had a hand-held depth pinger that worked well there is a requirement for a mounted echo sounder to enable a better understanding of the seabed prior to diving.

The Expedition also spent 6 days on board the "Offshore Express 2". This enabled the team to reach the area surrounding Lighthouse and Half-moon Cayes, the famous "Blue Hole" and "The Abyss", which would otherwise have been impossible. Power sockets to charge batteries were inadequate on this boat so a plentiful supply of additional batteries is a necessity on this vessel.

5. *Cylinders.* BFATC made available 30 cylinders for the Expedition, these make use of American specification pillar valves which are not adaptable to Din fitting regulators, personnel with such equipment should take an international A clamp adaptor. These valves also use American O rings, these are nylon and the dimensions are:

External Dia: 5/8 inch (16.2 mm).

Internal Dia: 1/2 inch (12.6 mm).

Ring Dia: (x-Sect) 1/16 in (1.8 mm).

EQUIPMENT AND SOURCE OF SUPPLY

Mask, Snorkel and Fins	All Exped Members
Demand Valve, BC	
Knife, Wet Suit Boots, Gloves, Weight Belt	
Wet Suit 'Shortie' or Windsurf Suit or Overalls	
Spare 'O' Rings, fin/mask straps etc	
Diving Computer, Torch	
BSAC 88 Tables	FS P Goodwin
Joint Service Diving Regulations	FS G Crouch
BSAC Safe Diving Practices	FS G Crouch
Dive Report Forms / Logs	Sgt D Corley
Underwater Still Camera Equipment	Sqn Ldr A Kingdon, Sgt Corley (Digital)
Land Still Camera Equipment	Sqn Ldr A Kingdon
Digital Land/Underwater Still Camera Equipment	FS Bate, Sgt Corley
Fish, Shell and Coral Identification Cards / Books	FS P Goodwin
Maps, Admiralty Charts and VHF Marine Radio	Cpl A Payne
Selection of Diving Equipment Spares and Tools	Mr D B Ball
SMBs, Delayed SMBs and Dive Slates	All SADS
Underwater Writing Slates x6	FS P Goodwin
Diving Safety and Diver Recall Equipment	BFATC St George's Caye
Air Cylinder, Compressor	
Boats, Engines	
Weights	
Anchors, Lines and Shotlines	
Boat Fuel, Portable Compressor Fuel and Oils	
Oxygen Administration Equipment	
Portable Compressor	RAFSA-A



Mr D B Ball
Equipment Officer



BELIZE, A GUIDED TOUR

Belize (formerly British Honduras) lies on the east coast of Central America, bounded on the north and part of the west by Mexico and on the south and the remainder of the west by Guatemala.



Shallow coastal waters are sheltered by a line of coral reefs, with many small islands called Cayes.

Belize City is the main port and former capital city. It was twice destroyed by hurricanes and, as a result, a new capital, *Belmopan*, was built 50 miles inland to the west.



Total land area measures 8,866 sq. miles, including 266 sq. miles of islands, roughly the size of Massachusetts.

The Northern plains, once under water, are swampy near the coast and then rise to a slight plateau in the west.

Southwest from Belize City, the land begins to rise gradually towards the interior. Cayo District in the west is

home to the Mountain Pine Ridge at 305-914 meters above sea level.

The Maya Mountains and Cockscomb Range forms the backbone of the southern half of the country. *Doyle's Delight*, located in the Cockscomb Range is the highest point in Belize at 1124 meters above sea level.

Southern Belize, with its watershed to the southeast of the Maya Mountains, consists of many steep rivers carrying sand, clay, and silt, which have enriched the coastal belt over the years. This has allowed the area to develop significant agricultural products such as citrus and bananas.

Along with an annual rainfall of some 170 inches, southern Belize has a true tropical rainforest that is rich with ferns, palms, and tropical hardwoods.

History in Brief

Numerous ruins indicate that for hundreds of years Belize was heavily populated by around one million Maya, whose relatively advanced civilization

reached its height between AD. 250 and 900. Eventually the Maya civilization declined leaving behind a small population that still exists in Belize, predominantly in Toledo, the southernmost district.

The first reference to European settlement in the colony was in 1638. British logwood cutters, known as the Baymen, were the first Europeans to settle in the area. The Baymen were dependent on slave labor for their logwood operations. Logwood was used to produce purple and red dyes.



Mayan Settlement

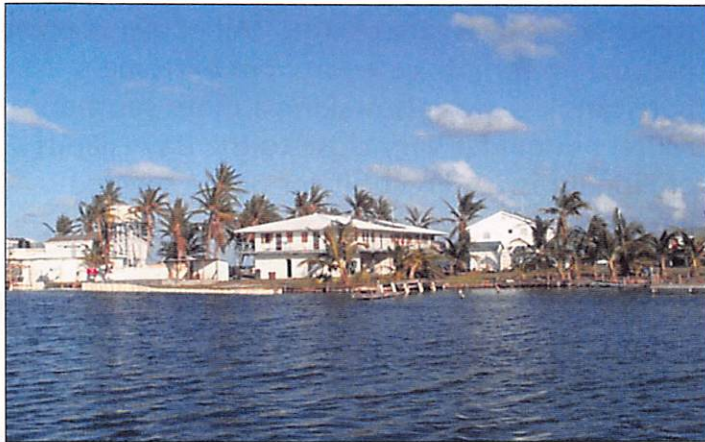


Belizean National Flag



Toucan – The National Bird

British settlers to engage in the logwood industry. But Spanish attacks continued until a decisive victory was won by settlers, with British naval support, in the Battle of St. George's Caye in 1798. After that, British control over the settlement gradually increased.



St George's Caye

Constitutional advances came in 1834 with the emancipation of slaves. In 1871 British Honduras was formally declared a British Colony. In 1954 came the introduction of Universal Adult Suffrage and an elected majority in the legislature. The Ministerial System was adopted in 1961, leading to Self Government in 1964. In 1973 the country changed its name from British Honduras to Belize.

Belize achieved full independence on September 21, 1981. Belize is now a member of the Commonwealth, the United Nations, OAS and the Association of Caribbean States.

People & Language

Estimates put Belize's population at about 220,000 with approximately 58,000 living in Belize City. A 1991 Population and Housing Census showed the main ethnic groups as

Mestizo (43.7%), Creole (29.8%), Maya (11.1%), and Garifuna (6.6%). Each of the other ethnic groups at the time accounted for less than five percent of the population (East Indian 3.5% and German/Dutch/Mennonite 3.1%). All the rest account for 2.2%. Ethnic groups, however, are heavily intermixed.

English is the official language and the language of instruction in the schools. Spanish is also widely spoken. In Orange Walk and Corozal Districts in the north and Cayo District border towns near Guatemala in the west, Spanish is spoken as a mother tongue by the majority of people.

For many in the southern districts of Stann Creek and Toledo, the first language is Garifuna or Maya. However, almost everyone speaks an English dialect, called Creole.

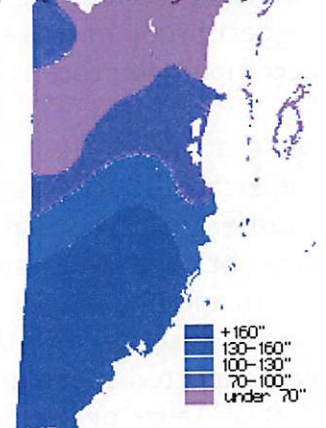
A recent census indicated 54.3% of the Belizean population to be very fluent in English, 22.5% not so fluent and 23.2% not fluent at all. 43.9% are very fluent in Spanish, 11.1% not so fluent and 45% not fluent at all.
Half Moon Caye

Climate

The climate is subtropical, tempered by trade winds. Temperatures in coastal districts range from about 10°C (50°F) to about 35.6°C (96°F); inland the range is greater. Rainfall varies from an average of 1,295 mm in the north to 4,445 mm in the extreme south. The dry season usually extends from February to May and there is sometimes a dry spell in August.

Hurricanes are regular visitors to these shores and often lash the coast during the late summer and autumn. Hurricane Mitch, Oct/Nov 98, was the fourth largest on record with Hurricane Keith arriving in Oct 00 and IRIS sweeping across the southern cayes in Oct 01.

Rainfall Patterns in Belize (inches/year)



HURRICANE IRIS - A HISTORY

On 24 Sep 01
The Caribbean
Hurricane
Network
reported the
following:

"Not much
happening in
the tropics
relevant to the
Caribbean but
still, don't let
the calm lull
your senses yet

as it appears that the Atlantic is becoming a little more "storm-friendly" albeit later in the hurricane season. As we all know, hurricanes can form under our nose's with alarming speed once in a favorable environment. The wave around 40W is interesting as is the one south of the Cape Verde Islands, although the Cape Verde season is about to come to a close as sea temperatures fall below the magical "80" mark. Time will tell".

5 Oct 01

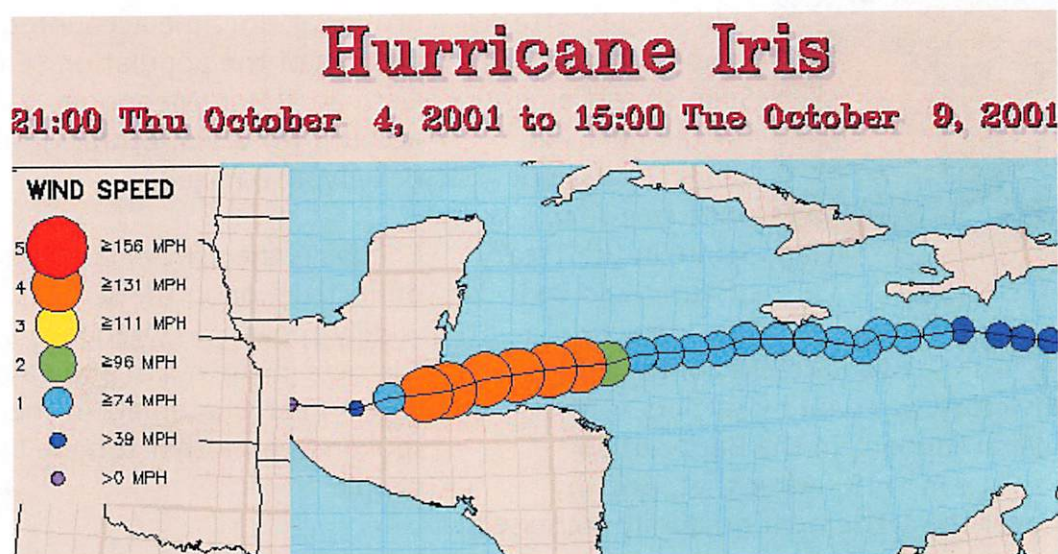
Things can change quickly! The latest advisory forecast is that IRIS would be a hurricane in 24 hours! The center of IRIS was forecast to stay south of Hispaniola and Cuba, but move straight over Jamaica and the Cayman Islands. The biggest problem was expected to be the accompanying torrential rains.

6-7 Oct 01

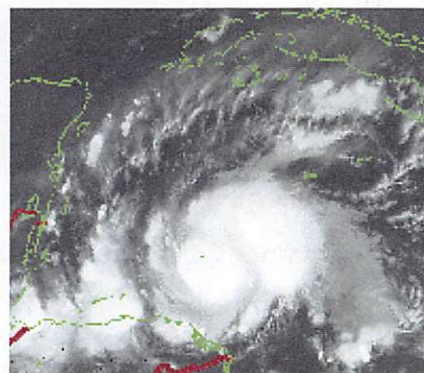
Jamaica was lucky that IRIS took a more southerly path so that instead of moving straight over the island it went well south. Hurricane IRIS was by now very near it's closest point of approach to the Cayman Islands. IRIS was expected to make landfall in the northern part of Belize or the Yucatan Peninsula. The 3-day forecast projected that the center would go straight over Ambergris Caye in the following 36 hours as a Category 2 hurricane.

8 Oct 01

The National Hurricane Center was not able to



forecast the intensity of IRIS. 'All of a sudden' it became a 140mph, category 4 or extreme, hurricane! It was also taking a more southerly route, bringing it very close to the Bay Islands of Honduras. A direct hit for Belize seemed inevitable.

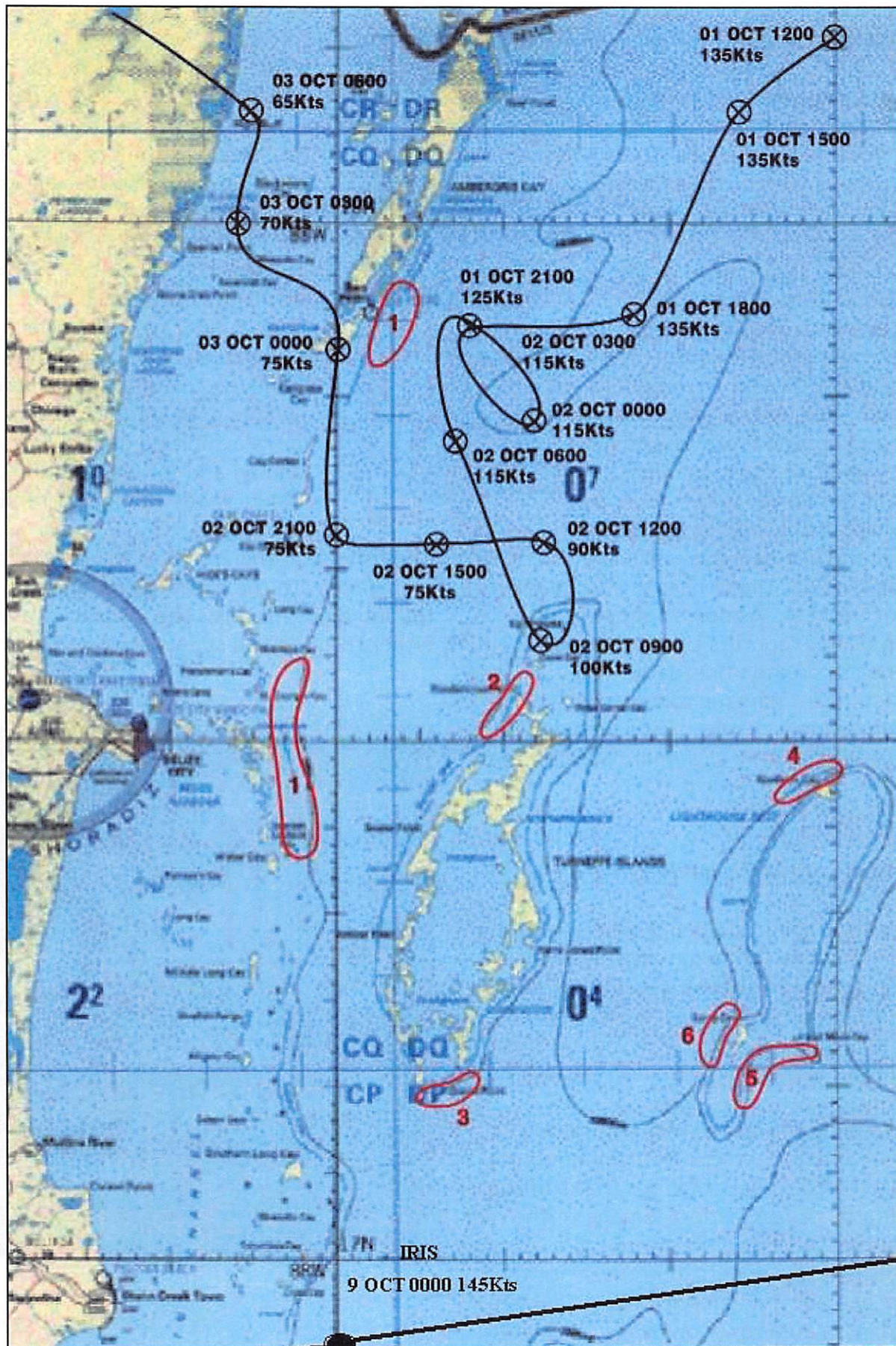


Satellite Picture 'Iris' 08 Oct 01

9 Oct 01

Bad news was reported. IRIS had made landfall as a Category-4 hurricane in Belize, close to the Monkey River area, with sustained winds topping 145mph; this was comparable with Hurricane Andrew. That night IRIS passed directly over Big Creek, a place where several boats were sheltering from the severe 145 MPH winds. As we now know, 'Wavedancer' was capsized, tragically killing 18 divers and 2 crewmembers – a graphic illustration of how destructive these hurricanes are. One survivor was picked up by the wind after falling overboard and thrown 200 metres into a mangrove swamp.

EFFECTS OF HURRICANE KEITH AND IRIS - SURVEY REPORT



Tracks of Hurricane KEITH (Top), 01 – 03 OCT 00,
Hurricane IRIS (Bottom), 08 – 09 OCT 01,
and Expedition Dive Sites

UNDERWATER STUDY OF EFFECTS OF HURRICANE IRIS

1. Introduction.

A large and complex system of individual reefs extends from the Yucatan Peninsular to South America. The largest of these reefs is the Belize Barrier Reef and is 185 miles long, stretching from the Mexican border in the north to its southern end at Hunting's Caye; to the east of the barrier reef are 3 separate atoll reefs; Turneffe, Lighthouse and Glover. The reef is a fragile ecosystem where all creatures living in and around it are essential to its wellbeing and sustainability. The aim of the survey was to look at southern areas of the Belizean Barrier Reef, to assess the damage caused by Hurricane IRIS and to look at the impact this has had on the life of the reef. As non-scientists, the intention of this report is to educate and inform, not to provide firm data. The hurricane caused significant damage to the reef, which was clearly evident, however, we were looking at small areas and only at a minute microcosm of time.



Belizean Barrier Reef

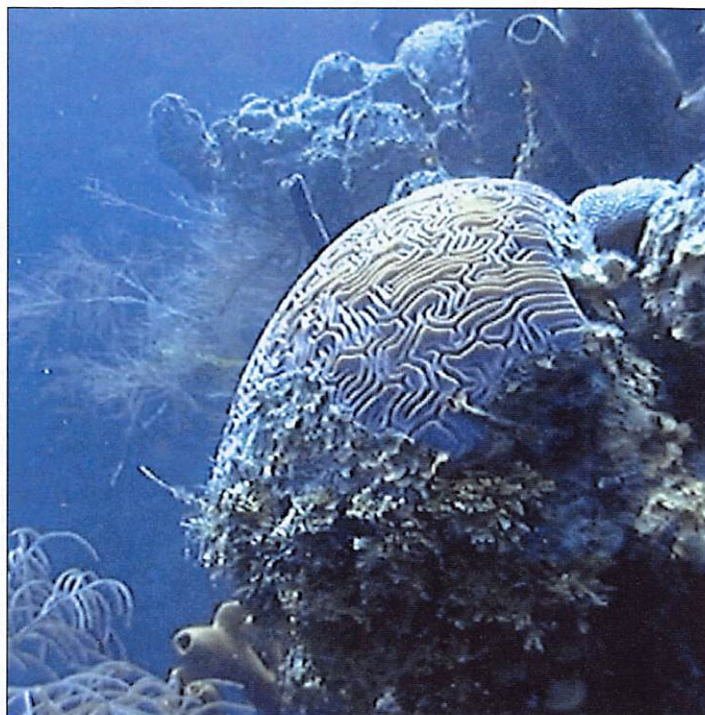
3. AREA 1. South Turneffe. Rendezvous Wall, Survey.

This area was the first dive of our liveboard phase of the expedition and was chosen as a convenient site whilst en route to Lighthouse Reef. The previous expedition had dived near to this site and had reported good conditions despite being close to the track of hurricane IRIS. However, this site had significant damage with staghorn, brain and fan corals exhibiting damage caused by sanding and /or wave action. Also in evidence was an algae resembling cotton wool.

The fish life in the area was not particularly abundant with the exception of shoals of mating blue chromis. The visibility was reduced either through fish spawn or coral bloom.

2. The Effects of Hurricane IRIS.

On 8 Oct 01, IRIS had suddenly developed from a category 2 into a 140mph, category 4 or extreme, hurricane! It took a southerly route and a direct hit on Belize was inevitable. The track of IRIS took it, very quickly, south of the cays and the barrier reef, to make landfall near Monkey River with tragic consequences. Fast movement, even with winds as strong as this, ensured major perceptible damage to the reef was avoided. It was obvious that shifting sand primarily causes lasting damage to the reef and, although this effect was noticeable to some extent in shallower waters, there was not the extensive damage evident with KEITH, which remained in an area for a long time. Damage was still evident however and shallower parts of the reef were damaged and visibility degraded in the southern cays.



Damaged brain coral

4. AREA 2. *South Lighthouse Reef Long Caye Survey.*

The condition of the coral around Long Caye in Southern Lighthouse Reef was mixed; in some areas the coral was in a superb condition but in other areas, there was evidence of sanding on the reef wall and, at all shallower depths, broken and damaged coral in gulleys and choke points. The explanation could be that this was the effect of Hurricane IRIS passing close to this end of the reef but there were also areas of older damage.



Healthy brain coral

At the Aquarium the coral was in good condition but there was evidence of damage to barrel sponges and brain coral with some sand in gullies. At Silver Caves the reef was in less good condition with heavy sanding below 20m and with varying conditions to the top of the reef. Torn sea fans and broken sponges suggest that the damage was caused by wave actions. However, green algae of "cotton wool" appearance was evident on much of the area.

The visibility was generally below what can be expected in this area, rarely exceeding 20meters. Coral bloom and fish spawn were the likely cause.

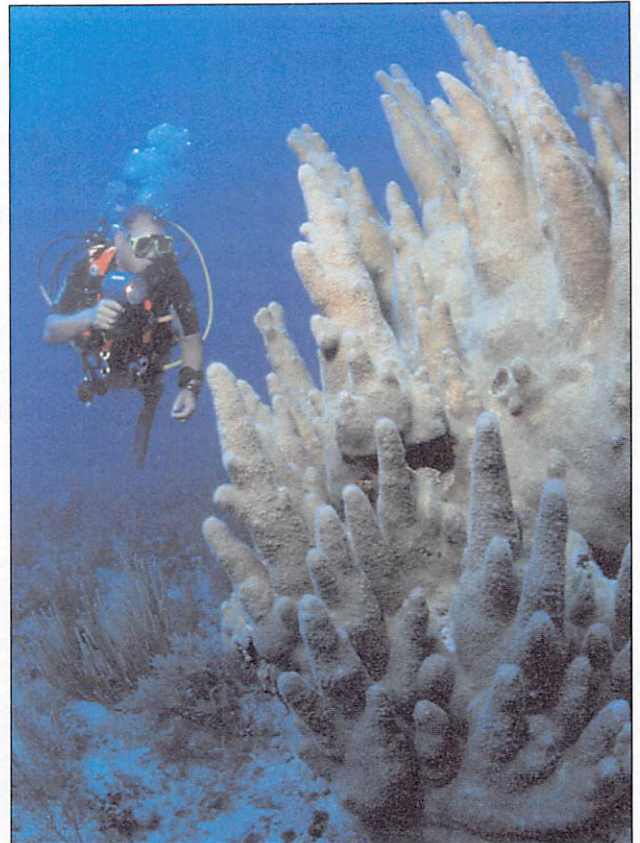
The amount of marine life varied across the area with the Aquarium sites (north and south) being the most prolific. Shoals of mating blue chromis were evident on most dives along with the normal complement of reef fish. No sharks were seen other than nurse sharks and only a few turtles were sighted. The grouper population seemed healthy with large black grouper and large grey grouper being regularly sighted. Few spiny lobsters were seen and no slipper lobster, although more crabs were seen than previous years. However, there were regular sightings of tarpon whose numbers seem higher than before.



Barracuda



Belize is famous for its sponges



Massive coral

5. AREA 3. *South Lighthouse Reef – Hat Caye Survey.*

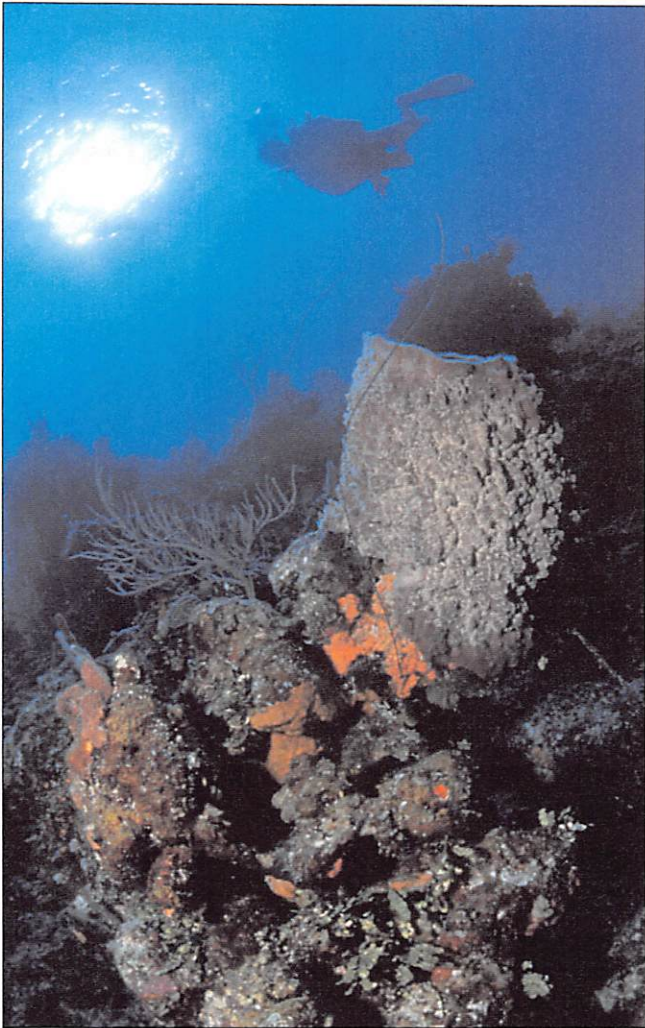
Although this area was the closest to the track of hurricane IRIS of those surveyed, the reef was in generally good condition. Indeed, it was better than areas of Long Caye which suggests that those areas were probably damaged more by hurricanes MITCH and KIETH. The damage was mainly confined to the reef top with not too much by way of sand deposits on the reef wall. However, the purple sea fans exhibited very little purple colouring and were quite brown in appearance. Visibility was around 20 metres and the marine life was plentiful. Overall, the area appears to have recovered well. What was noticeable while diving around Hat Caye was the amount of rubbish, particularly polythene bags/sheets, which drifted around the corner of the reef. We were advised that the polythene was likely to have been used as a covering for smuggled drugs.



Damaged soft coral

6.AREA 4 *South Lighthouse Reef - Half Moon Caye Survey*

It was encouraging to note an improvement in this area since last year's survey. The heavy sanding noted before had largely disappeared and the gullies were clear of debris. The brain coral was rejuvenating and new coral growth was evident throughout the area. However, there are still areas of old damage from earlier hurricanes.



Reef Scene

There are many magnificent sponges and the area is clearly recovering some of its earlier glory. The marine life is prolific and many of the fish seem unconcerned by the presence of divers. A great variety of fish were seen here including queen triggerfish and wahoo which had not been seen in other areas. However, the spiny lobster population seems quite sparse.



Trumpet Fish

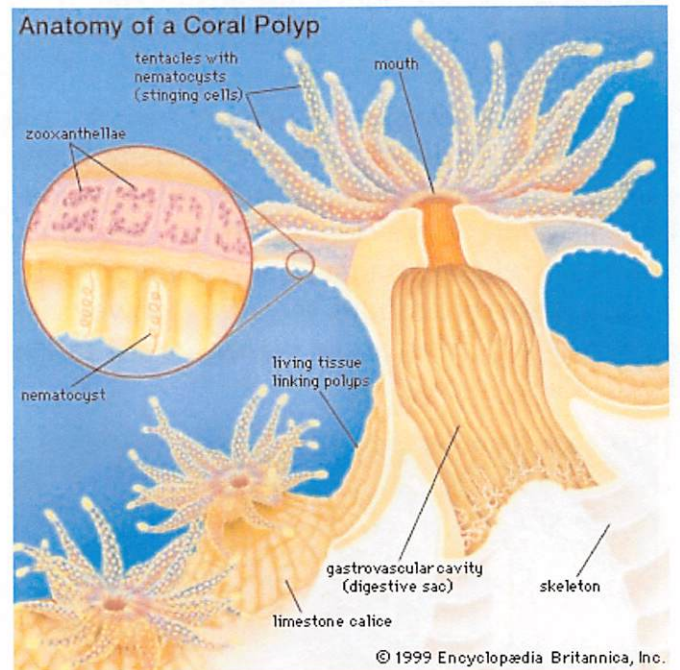
This was the most beautiful of the areas dived even though the visibility was reduced by coral bloom.



Moray

7. Conclusion

The coral reef is an association of ancient life forms that has been in existence for about 200 million years. Its structure is dependent on individual coral polyps that range in size from a pinhead to one foot across. Tentacles that may sting and trap food, surround the slit like mouth opening on each polyp. Cells on the lower sides and bottom of the polyps produce the limestone that builds reefs. Living within reef corals are minute plant cells called zooxanthellae; these organisms are the primary source of colour in reef coral. Each species of coral has its own growth pattern, forming the many varied shapes and structures of a complex reef system.



Anatomy of a Coral Polyp



Polyps Feeding

As last year, there were visible reminders to us that a coral reef is a fragile ecosystem where all creatures living in and around it are essential to its well-being and sustainability. It was clearly evident that the maintenance of the food chain is essential for all creatures concerned; take out a single link in the chain and the sustainability of all creatures is affected. When one considers the damage caused by hurricanes to the reef structure, whether it is by direct damage or sanding, one of the creatures at the lower end of the food chain, the polyp, is destroyed. It takes many thousands of years for a coral reef to form and one can't help wondering how long it will take, if ever, for these areas of outstanding natural beauty to recover.

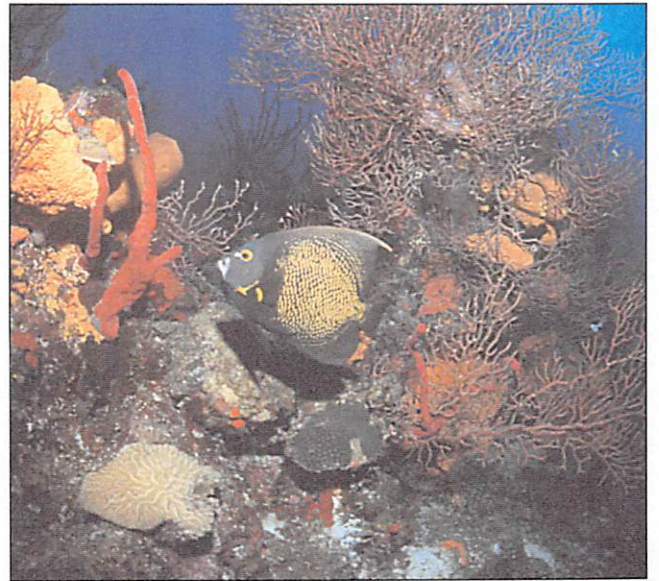


Orange Crinoid

The conclusions drawn are that hurricane IRIS did not have the same devastating effect of the two previous hurricanes. No doubt the recovery being made, of the damage caused by KEITH and MITCH, was slowed by the arrival of IRIS but the speed of her passing seems to have prevented extensive further damage. Nature has a way of correcting the balance; however, the Caribbean hurricane season appears to be getting longer, they are certainly more frequent and are generally more intensive. There will be much more hurricane activity, together with its consequent destruction of the Barrier Reef, in years to come.

Yet, the reef does recover. Evidence of this recovery was seen at Half Moon Caye, which

had received long-term damage. Any recovery will be short lived, should more hurricanes, such as IRIS, appear at regular intervals. Global warming is playing its part in increased hurricane activity in the Caribbean and, just like the links of the coral reef food chain, what we do has an effect on links in the chain that holds the natural world in balance.



French Angelfish



Octopus

CORAL AND WILDLIFE SURVEY

Dive	Date	Site	Area	Depth	Coral	Fish
1	27 Oct	Rendezvous Wall South Turneffe	1	35m	This area has significant damage. Much damage to staghorn, brain and fan corals. Green algae and brown algae of 'cotton wool' appearance noted in several areas during dive. Some coral bloom reducing visibility.	General reef fish though not particularly abundant with the exception of shoals of mating blue chromis. Several barracuda, no spiny lobster and very few grouper.
2	27 Oct	Cathedral Long Caye	2	30m	Brain coral, sea fans and whip corals all in good condition with very little dead coral. Plenty of sponges including vase, tube, and barrel varieties. A small amount of sanding but overall a healthy site. Some coral bloom.	Abundant fish life with general reef fish, barracuda, jacks, spider crabs, octopus, grouper, cow fish and puffer fish also reported.
3	27 Oct	Cathedral Long Caye	2	25m	As above.	A night dive; some spiny lobster, sleeping parrot fish, swarms of sea lice attracted by torchlight.
4	28 Oct	The Drop Off Hat Caye	3	45m	Generally in good condition although some damage to reef top. Plentiful soft coral and gorgonians, plus large tube sponges. Purple sea fans exhibit little colour. Some sand deposits in gullies. Coral bloom.	Plentiful small reef fish, particularly shoals of mating blue chromis.
5	28 Oct	Sandy Point South Lighthouse	3	35m	Good condition with large brain coral, plentiful soft corals and gorgonians. Some large barrel sponges and good tube sponges. Coral bloom. Overall, a good area.	General reef fish in abundance including large quantities of blue chromis.
6	28 Oct	Dos Cocos Long Caye	2	30m	Generally in good condition although a little damage was noted to some of the plentiful soft coral and gorgonians. Quantities of 'cotton wool' algae noted. Large tube sponges and vase sponges in good condition. Some coral bloom	Plentiful reef fish with gray, French, and queen angel fish. Feather stars, a nurse shark, grouper, a hawksbill turtle and two eagle rays were also reported.
7	28 Oct	La Que Brada Long Caye	2	20m	Generally in good condition although some anchor (?) damage was seen on sponges.	Plentiful general fish life, with several large tarpon also reported.
8	28 Nov	La Que Brada Long Caye	2	15m	As above	A night dive; some crabs but no spiny lobster. Hogfish, trumpet fish and parrot fish plentiful.
9	29 Oct	Silver Caves Long Caye	2	50m	Damage evident to reef with torn sea fans, broken sponges and dead coral. Green 'cotton wool' algae present on reef top. Sanding evident on coral and sand 'landslides' in several areas. Visibility reduced.	Less than average amount of reef fish

10	29 Oct	Aquarium South Long Caye	2	30m	Reef in better condition than previous site though still some damage evident. Some broken sponges, dead and broken soft coral in gullies. Fewer large sponges.	Average amount of reef fish, with shoaling blue chromis in large numbers. Barracuda, grouper and spiny lobster reported.
11	29 Oct	Eagle Ray Wall Long Caye	2	25m	Coral generally in good condition. Some signs of old damage and sand spread over site. Sea fans on reef top show some damage. Large barrel sponges in good condition.	No eagle rays but an average amount of general reef fish
12	29 Oct	Aquarium North Long Caye	2	20m	Coral as previous dive.	Abundant fish life including large grouper, green moray eels, shoals of Bermuda chub attracted to boat, barracuda, king mackerel, permit, and tarpon.
13	30 Oct	Manta Ray Wall Long Caye	3	35m	Corals generally in good condition with only slight damage. Evidence of rejuvenation. Lots of tube, vase and barrel sponges in mainly good condition.	Prolific reef fish population with several large grouper sighted.
14	31 Oct	Buoy 1 (Hammerhead) Half Moon Caye	4	40m	The best site to date although with some evidence of old damage to hard and soft corals. Some rejuvenation to damaged areas. No debris in gullies and no 'cotton wool' algae. Many large sponges in good condition. Visibility reduced slightly.	Plenty of reef fish which appear quite unconcerned over the presence of divers. Other species seen include: hawksbill turtle, eagle ray, peacock flounder, ocean trigger, queen trigger, grouper and wahoo. Large numbers of conch on sand on inner reef
15	31 Oct	Buoy 2 Half Moon Caye	4	30m	As Above	As above
16	31 Oct	Buoy 3 Half Moon Caye	4	20m	As above	As Above

Diary of Events

Day 1 - Sat 19 Oct 02

All twelve expedition members met at Gatwick at 0900. Two team members had traveled down from RAF Lossiemouth & RRH Saxa Vord the day before and stayed overnight at the Holiday Inn. Six had traveled from RAF Halton in a minibus, two more from RAF Marham, one from Brampton (via Folkestone) and one from RAF Lyneham. On boarding the aircraft we were told that our take-off was going to be delayed by 50 minutes due to confusion with take-off slots. Further to this, there was a strong headwind which made the already long-haul flight now 10 hours to Houston, Texas. Dave and Darren managed to negotiate themselves exit seats with plenty of legroom. On arrival at Houston we transferred by bus to the Quality Inn, where all 12 persons promptly donned clean clothing and headed out for an evening meal at the local Mexican and entertainment (watching the locals line-dancing to everything). Within a short period of time all expedition members had gelled well and were discussing the adventure that lay ahead of them.



The team at Houston Airport



Belize City

Day 2 – Sun 20 Oct 02

All got up bright and early after a good night's sleep and met at breakfast. All expedition members were still brimming with enthusiasm from the night before, ready for the second leg of our journey to Belize. We checked in at the airport and headed for Duty Free. We had a scary moment when we discovered that half of us were instructed to report to one gate and the rest to another. However, a check with the airline staff revealed that we were, after all, booked onto the same flight and there had been a gate change mid way through our check-in. This time the aircraft left on schedule arriving on time in Belize. Leaving the aircraft was like stepping into an oven. We then had a 40 minute wait for our transport and used the opportunity for a briefing. Once the transport arrived we then had a short boat ride from Princess Marina to St George's Caye where we took over our accommodation. At BFATC we quickly settled into our abode that was to be our base for the next week. The billet was made as comfortable as possible and after various admin briefs, equipment checks and fitting new gauges to the compressor, we all assembled our kit for the following day, various rosters were made up and then an early night was had by all.

Diary

Day 3 – Mon 21 Oct 02

The team awoke early and made the final preparations to their diving equipment before breakfast so as to make the most of the day ahead. Breakfast eaten and orderly jobs done, all 12 divers and our Cox 'Mac' assembled upon the jetty to load the boat (Georgie Girl) and head off on our first dives. Our first dive was a shakedown dive at a site called Gallows Point (South). This dive allowed the team to adjust individual dive kit and buoyancy.

After lunch at St George's Caye we returned to Gallows Reef but this time at Stingray Flats to continue our shakedowns and make any necessary adjustments. On return, admin and orderly duties were carried out, a swift beverage taken and most people headed off to their beds in need of a good nights sleep due to jet-lag from the long journey.

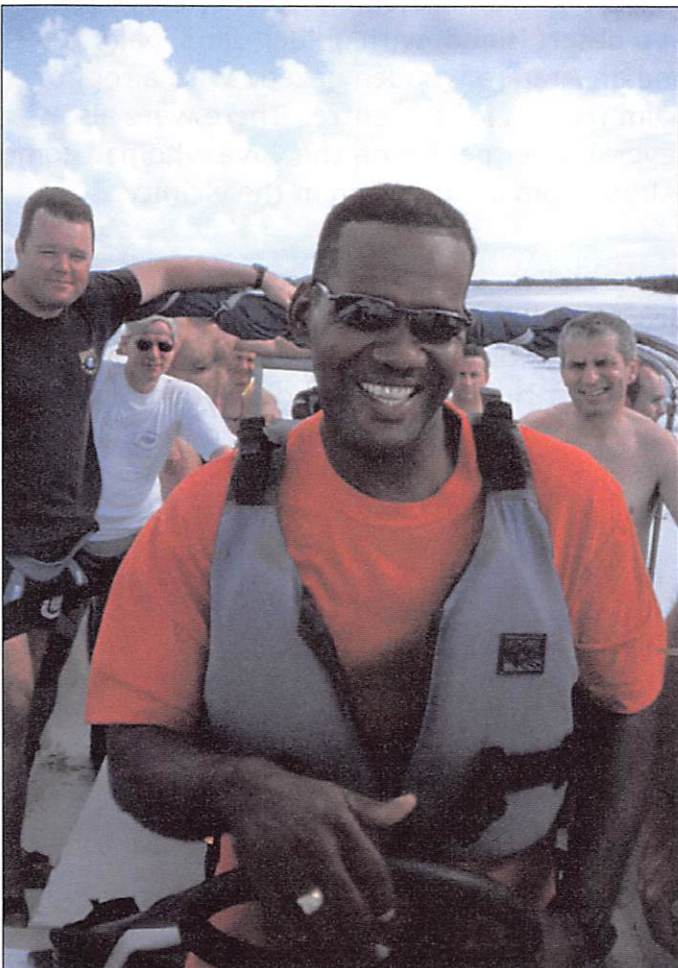


A friendly Nurse Shark at Hol Chan

Day 4 – Tues 22 Oct 02.

We all arose at 0600 to prepare the boat and equipment for the day's diving. All were readied before breakfast so that we could leave as soon as we had eaten. Graeme was so enthused by the early start that he omitted to take his wetsuit – deciding instead to dive in just his trunks. We headed towards San Pedro for our first dive but were beaten back by the waves in the reef break so we had no option but to abort. We then retreated to San Pedro to await a change in the weather and sea conditions. We set off again at 1030 for another attempt to get through the break but again we were foiled by the conditions and forced to reassess. We decided to go for our alternative site at the Hol Chan Marine Reserve as it is in relatively sheltered water. Many members of our party saw a nurse shark and several other species of marine life including tarpon, and grouper. A strong current through the break meant that we were unable to go all the way through to the open water and had to fight our way back to the boat against the flow.

After the Hol Chan dive we returned to San Pedro for a surface interval of 2 hours. As the sea conditions had not improved we purchased some sprats and went for our second alternative site at Shark Ray Alley where we snorkeled whilst feeding the nurse sharks and stingrays. This was a thoroughly enjoyable time for all and many photos were taken.



Mac the Cox of our skiff 'Georgie Girl'

Diary

Day 5 - Wed 23 Oct 02



Life on the Liveaboard



A shoal of Snapper near Bruce's Column

Several expedition members had taken to sleeping out on the balcony of the accommodation block. However, they had a rude awakening by a sudden torrential downpour that saw them all beating a hasty retreat to the leeward side of the building. It obviously took its toll on Jon because he turned green for the day (or was it the dye from his new shirt?).

The now daily routine of early rise, checking of kit and loading the boat was now in full swing. We took enough extra cylinders for our second dive and headed towards Goff's Caye for the first dive of the day. We had a maximum planned depth of 35 metres, although most only achieved 25 due to the difficulty in finding the deep water drop off.

Lunchtime was spent on Goff's Caye, which is a very small island resembling everybody's fantasy of a desert island; with golden sand, palm trees and an Atap (a wooden gazebo with a roof of palm fronds) in the centre. There were also several other people on the Caye who had come ashore from a cruise ship in the vicinity.

The 2nd dive was carried out in the vicinity of Bruce's Column (an Eiffel Tower shaped column). However the water was unusually murky for the area due to coral bloom and a lot of plankton around. Not all found the column named after Bruce. However, everyone enjoyed the dive regardless. We will return.



The Atap and 'cruisers' at Goff's Caye

Diary

Day 6 – Thurs 24 Oct 02.

The morning dive was carried out on a reef off San Pedro. Paul elected to dive without a wetsuit (after leaving it behind). Jon and Mac saw a coral grey shark. However, in their excitement they lost their way and could not find the boat at the end of their dive, they surfaced quite a distance from the boat and had to be picked up. Shortly after, whilst the last pair of divers (Paul and Pete) were still in the water, the boat broke its anchor and we were adrift. Picking them up was not a problem as they followed their plan and deployed their delayed surface marker buoy. This meant that the boat was waiting for them by the time they surfaced. During his dive, Willie passed his second Assessment to qualify him as a Dive Leader.

Lunch was taken at Caye Caulker followed by our second dive just out from the coast.

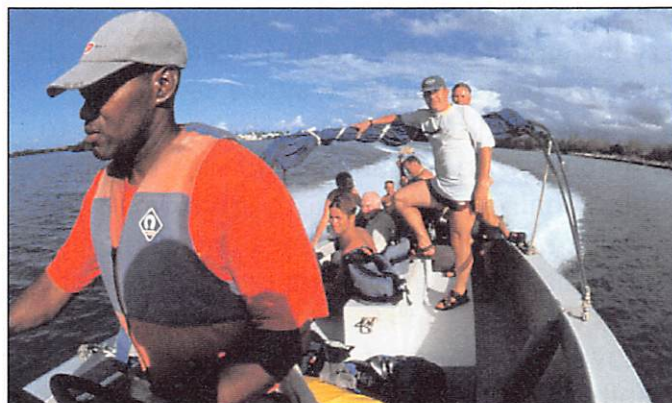
In the evening Jon donated a bottle of Southern comfort. However, he went wandering and never made it back to drink it with the rest of the team. Del did running repairs on his DV after suffering a free-flow.



San Pedro



Andy and Paul kitting up



Georgie Girl and the team

Day 7 - Fri 25 Oct 02.

We planned 2 early dives off Caye Caulker, as we were due to go to San Pedro in the evening for a night stop. The first dive went to plan with a maximum depth of 45m achieved by all qualified to do so.

After a brief break for lunch at Caye Caulker the second dive was carried out from a buoy that we found off the coast. We thought that there must be something interesting at the site for somebody to go to the effort of buoying it but, as it turned out, it was fairly shallow with a mostly sandy bottom. The last divers were out of the water at 1300 and once settled back into the boat, we headed back towards St George's Caye to pick up gear for the weekend and prepare extra kit for a week on a live-aboard. Shortly after 1500 all the baggage and kit was ready and we set off for San Pedro, checking into the Spindrift hotel for the night. With no diving the following day, we all had the chance to relax and develop some more team bonding.

Diary

Day 8 - Sat 26 Oct 02.

JSSADC regulations recommend a day off diving after several days deep diving. Because of this we took a much deserved rest day. Everyone was up for breakfast at 0700 in a restaurant overlooking the beach, in time for the 0830 boat for the start of our outing to the Mayan Ruin site at Altun Ha. The tour included a transit journey on a powerboat through the mangroves from San Pedro to a small village of 80 people called Bomba. The river water was a dirty brown due to chemicals released from the mangrove roots. On the way we saw much fauna and wildlife including 1" bats clinging to the mangrove trunks and an iguana. From Bomba a hairy twenty minute drive on single-track dirt road through villages that can only be described as third world, finally arriving at the ancient site of Altun Ha. This was a ceremonial site covering an area of 25 square miles and inhabited between 150 BC until 200 AD in which many thousands of people would have lived. From Altun Ha, lunch (including iguana and buffalo) in a tree top restaurant and a two-hour break was taken at a health resort called



The very 'Hot Tub' at Maruba resort

to San Pedro was the reverse of the way out. After the trip we returned to the hotel where we had reserved one room to enable us all to get showers before enjoying a few drinks at the reopening of Fidos, the local restaurant/pub. Everyone waited until 0330 when we were supposed to be picked up from the quayside. However, the boat crew was sleeping and Paul had to swim out to it to wake them.



The Offshore Express II

Maruba where the team had the use of the facilities, namely swimming and the use of the extremely hot, hot tub. Whilst waiting for the meal the resident monkey paid a visit and played around the tables. The monkey bit Paul and first aid was carried out but unfortunately, the monkey didn't survive. The return journey



The gang at the Spindrift Hotel

Diary

Day 9 - Sun 27 Oct 02

After the pandemonium of getting onto Offshore Express II, we finally attempted to break free from the mooring. However, the mooring rope caught around the prop and Alan (the Divemaster) had to don his dive kit to go to free it. We finally got underway towards St George's Caye at around 0430 when we were finally able to get a bit of sleep - but not for long. At 0730 we arrived at St George's Caye and, feeling worse for wear, picked up all the equipment and personal kit for a week on the live aboard. Despite being very tired, we still managed to carry out 3 dives, the third being a night dive. Dick did not dive because of ear problems and Darren missed the second dive, as he was not feeling well.

Day 10 - Mon 28 Oct 02.

We were woken early for the first dive at 0600. We had our brief and kitted up during the transit to the dive site. The first dive of the day was at Hat Caye Elbow at South Lighthouse Reef. All dived to 45 metres for the allotted dive time of 50 minutes. One or two had navigation problems and had to surface swim back to the boat. Breakfast followed the first dive, followed by the second dive at Sandy Point on South Lighthouse Reef. The visibility was not so good for the area although it was a very nice wall dive. A couple of the team saw 2 eagle rays.

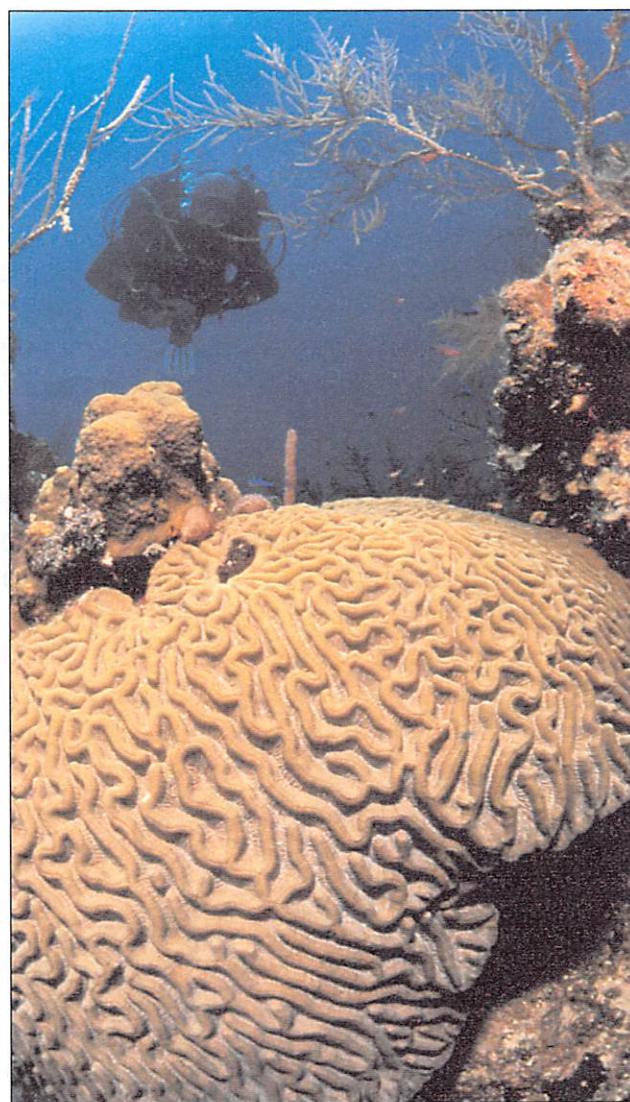
On transit to the next site the boat crew caught a large barracuda on a fishing line towed behind the boat.

The 3rd dive was carried out at Dos Cocos (2 Coconuts) at Long Caye. A few members of the team saw a nurse shark and Del managed to take a couple of photos of it before it disappeared into the great blue yonder.

The 4th dive was carried out at La Que Brada,

Silver Caye – Lighthouse Reef. Graeme showed a perfect example of a buddy brief before entering the water – without his mask. Paul took the carcass of the barracuda on the end of a gaff hook on his dive to see what fish life it would attract. As it turned out, it caught the attention of another barracuda and Paul came close to catching it on the end of the hook.

The 5th dive was a night dive on the same site where we also moored up for the night. All were in bed by 2130 due to the arduous nature of both the environment and the diving.



Dick examines the Brain Coral

Diary

Day 11 - Tues 29 Oct 02.

An early 0600 start saw everyone kitted-up to get in a dive prior to breakfast. The first dive was at Silver Caves at Lighthouse reef. This was a training dive to 50m in preparation for the Blue Hole dive and all bounced the set depth whilst staying within their no-stop limits. All were on the surface after 50 minutes after a good look around the caves at the top of the reef.

After breakfast the 2nd dive was carried out at North Aquarium. This was an aptly named site because there was an abundance of fish life to see with too many variations to mention.

The 3rd dive was carried out at Eagle Ray Reef but unfortunately it did not live up to its name as nobody saw an eagle ray. Even so, a good dive was had by all.

The 4th dive was carried out at South Aquarium and, as with the previous dive, the dive times were restricted to 30 to 35 minutes respectively as we were due to call in at Half moon Caye for the evening.

After mooring at Half Moon Caye, we paid the toll (which pays for the upkeep of the reserve), and had a quick tour of the bird sanctuary from Paul. Iguana, booby birds, frigate birds, to mention a few, were everywhere, which shows that the sanctuary is obviously working. Hurricane damage can be seen on Half Moon Caye in the form of coconut palms that have been ripped from the ground. After our tour the boat crew cooked a barbecue on the facilities at the island and we all took the opportunity to relax on land. After dark we organised a luminous hermit crab race, followed by a hilarious luminous dog chase supplied courtesy of the Half Moon Caye Lighthouse Keeper. After the racing most were in bed by 2030.



Graeme surveys the reef

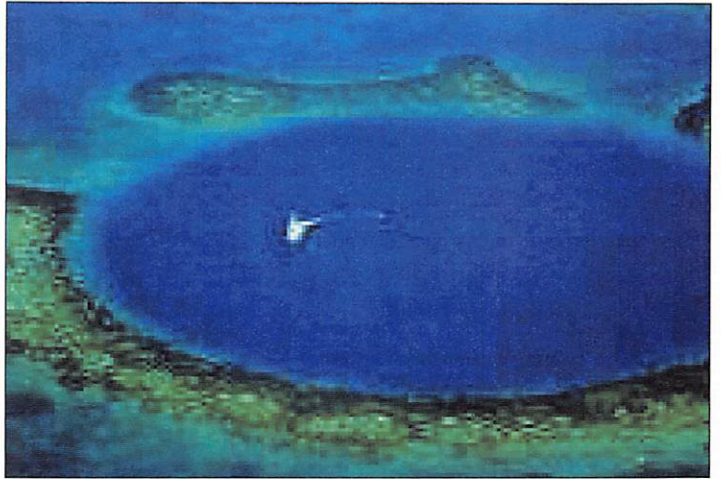


Hermit crab racing on Half Moon Caye

Diary

Day 12 - Wed 30 Oct 02

The Great Blue Hole beckons and, to top the occasion, it's Paul's 2000th dive. All 12 of us went down to 50m and swam through the caves with gigantic stalagmites and stalactites, some of which had joined to form columns. We then ascended to the 10 – 20m range where we were accompanied by a number of Caribbean reef sharks and a large grouper. Photos were taken by Arthur and Del and the rest of the dive was spent watching the sharks whilst decompressing.



The Great Blue Hole

The 2nd Dive was at Manta Ray Wall. We all surfaced wondering where the site got the name because nobody saw any. After the dive we heard a distress call over the boat's radio and, since we were the closest boat to the stricken vessel, we went to their rescue. When we arrived at their location we found a skiff with 3 American and Guatemalan couples and their rather embarrassed crew and dive guide who were very pleased to see us. We then took the passengers on board and towed their boat back the 23 miles to their resort at Two Cayes.



Descent into the Blue Hole

After the rescue we found that time was short and we were a long way from our planned destination. This meant that we had to adapt our plan to suit the situation by diving local and cutting down the time on the next 2 dives. It also meant that we had to change our plans for the night stop and moor at Two Cayes.

The following 2 dives were undertaken at Northern Wall and Two Cayes with timings limited to 45 and 30 minutes respectively. Finally, we moored at 1710, which was just before dark. After our evening meal on the boat we took up the invitation of the people we rescued and joined them at their bar on the island.



The rescue in progress

Diary

Day 13 – Thurs 31 Oct 02.

Everybody's body clock was now accustomed to an early start and we were all awake and up at around 0600. The 1st dive of the day was to be at The Abyss, which was a short transit away. Arthur and Mac did not dive as they had problems clearing their ears, so the remaining 10 of us descended into the vast blueness in search of the Abyss. We never actually found it, as the visibility was not good. We did however, find a nice wall to achieve our maximum depth of 50m. On the way back up the wall we all got to see a turtle at 35m. Next we had a short swim in the shallows whilst decompressing on the way back to our boat.

The 2nd dive of the day was at Hammerhead Reef off Half Moon Caye. Mac was actually kitted up and ready before his buddy! Again there were no hammerheads in sight although some saw a turtle and there was a large grouper on the reef near the boat.

The 3rd and 4th dives of the day were at two different locations on Half Moon Caye Reef. Both sites were great fun with lots of tunnels and caves to swim through in the 10 – 25m depth range. Stingray and a turtle were spotted on the reef along with an abundance of conch.

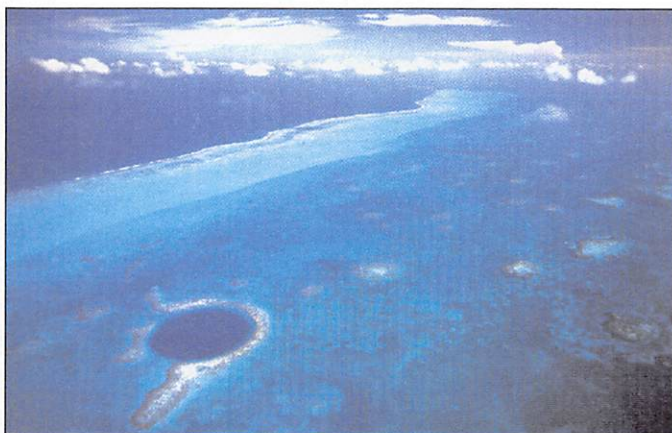
After the last dive we moored up at Half Moon Caye for a barbecue and a night stop.



Squirrelfish



Parrotfish



The Great Blue Hole



Tiger Tail Sea Cucumber

Diary

Day 14 - Fri 1 Nov 02. The Great Blue Hole

An awesome way to finish the expedition diving operations, in the one and only Great Blue Hole. Everyone was up bright and early at 0600 in anticipation of the last dive of Ex Mayan Finn.

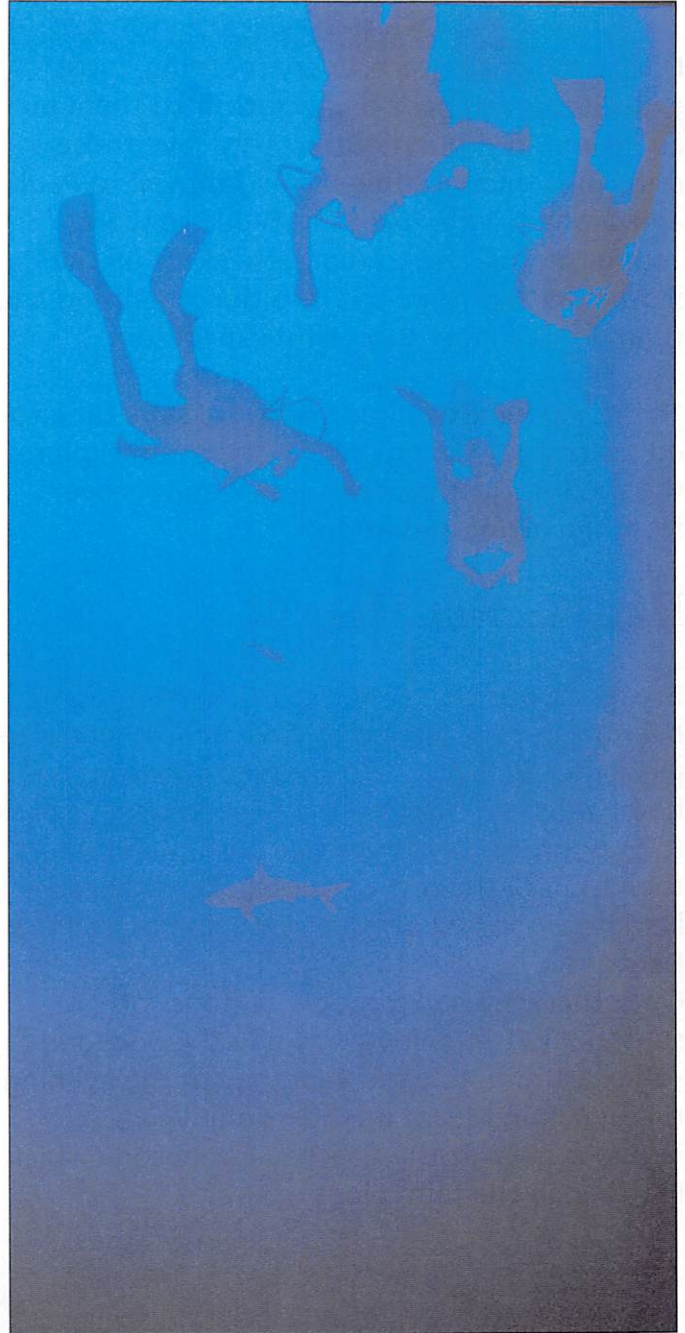
Final preparations were carried out during the short transit from Half Moon Caye to The Great Blue Hole. All were kitted up and ready when we moored up over the dive site. All expedition members entered the water together and descended into the eerie blue blackness watching the depth on our computers counting up to our goal of 50m. This brought us to the bottom of the swim through of gigantic stalagmites and stalactites. After going through we left the top of the cave area at 40m and ascended to the 10 – 20m range to watch the sharks and grouper swimming around us.

We took some team photographs at the bottom of the boat mooring. We spent most of the dive looking out over the reef edge into the blue of the hole; watching the inquisitive sharks coming up to take a look at the strange bubbling creatures that had come to invade their abode. Oscar the barracuda was there to greet us as we returned to the boat.

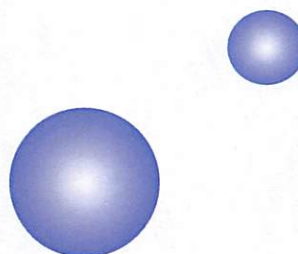
After our dive we stripped our dive kit and put our belongings into our dive bags. Once we had eaten breakfast, all equipment was secured ready for a long and rough journey back to our rendezvous with Georgie Girl off St George's Caye.

Back at St George's Caye, we had around 2 hours to tidy up enough kit for a weekend relaxing on San Pedro. This was to give us plenty of time to "fizz off" (to allow the nitrogen absorbed into our bodies to dissipate) after several days deep diving.

Friday night started with a quiet meal followed by a relax in Fidos.



Diver's meet sharks in the Blue Hole



Diary

Day 15 - Sat 2 Nov 02

Due to the early starts every morning, most expedition member's body clocks had them up and about at around 0800. This gave those remaining enough time to say farewell to Paul and Graham, who had to RTB due to work commitments, and to thank them for all the hard work that they put into the organising and running of a most successful expedition.

The remaining team members used the time to do some sight seeing on the island and explore the shops or just generally relax and recover from the diving activities.

Day 16 – Sun 3 Nov 02

Breakfast was on San Pedro in the restaurant overlooking the jetty that Georgie Girl would be picking us up from. We checked out from the hotel and then boarded the boat to take us back to St George's Caye. We had a couple of hours then to pack the rest of our belongings before being transported off the island and on to Price Barracks.

Once there we had a couple of hours of sunshine left to enjoy a swim in the pool and some last minute panic tanning. In the evening the remaining team members enjoyed a fabulous meal at the Chateau Caribbean (which featured in the film "Dogs of War").



St George's Caye

The team relaxing



Diary

Day 17 – Mon 4 Nov 02

There were some administrative tasks to complete for the team. A team had to organise the packing and air transportation of the compressor and associated equipment. We had to say goodbye to two team members Darren Arnold and Mac who had onward journeys to meet in the UK. The remainder of the day was spent checking flight and travel details and then relaxing where time allowed.

Day 18 – Tue 5 Nov 02

Last chance to top up on the tan in the morning then after lunch we were picked up by our transport and taken to the airport where we boarded our aircraft towards Houston and then our connecting flights thereafter. We all had separate arrangements for our return home from Gatwick.



Mayan Faces



