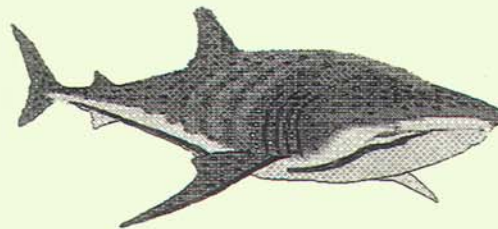


**REPORT ON THE
FIFTH WHALE SHARK TAGGING
AND SURVEY PROGRAM**

For the Period: May 1, 1997 to April 30, 1998

By:

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This report is dedicated
to the memory
of Dorke Long who was
tragically killed on
July 17, 1997.

REPORT ON THE FIFTH WHALE SHARK TAGGING AND SURVEY PROGRAM

A. INTRODUCTION

The time frame covered by this report commenced on May 1, 1997 and ended on April 30, 1998.

The Project continued to develop within the parameters prescribed in the original management plan and by the end of the period under review all of the primary and secondary objectives had been achieved.

B. MANAGEMENT STRUCTURE

1. The basic management structure has remained intact but on July 15, 1997 Dr. Chris Kilian joined the team by specific invitation. Dr. Kilian is not only a qualified veterinarian and marine biologist, he is also a pilot that is certified to fly a variety of aircraft and we have no doubt that his input will prove to be beneficial to the long term development of the project.
2. Mickey Biermann has also joined the team and his services as a qualified microlight pilot have proved to be invaluable in the airspace above both Ponta do Ouro in southern Mozambique and Cape Vidal in northern KwaZulu / Natal.

C. AERIAL SURVEYS

1. Due to budget constraints we were obliged to limit the number of aerial surveys conducted over the coastline of both KwaZulu / Natal and southern Mozambique.

i) Aerial Survey Flight Analysis Using Durban as the Base Station

No of Flights	Direction South	Direction North	Total Number of Flying Hours
14	17 Hrs 30 Mins	22 Hrs 45 Mins	40 Hrs 15 Mins

Survey Sightings (a) Elasmobranchs, (b) Mammals and (c) Reptiles.

(a) Whale Sharks	Other Shark Species	(b) Schools of Dolphin	Whales	(c) Turtles
65	Nil	5	Nil	Nil

ii) Aerial Survey Flight Analysis – Southern Mozambique

No of Flights	Areas	Total Number of Flying Hours
64	Ponta do Ouro to Ponta Momoli	89 Hrs 5 Mins

Survey Sightings (a) Elasmobranchs, (b) Mammals and (c) Reptiles

(a) Whale Sharks	Other Shark Species	(b) Schools of Dolphin	Whales	(c) Turtles
103	10	7	Nil	± 109

- iii) Trying to monitor possible migratory patterns from the air relative to the coastlines of KwaZulu / Natal and southern Mozambique proved inconclusive as 52% of the sharks surveyed appeared to be heading from north to south and 48% from south to north.

D. TAGGING PROGRAM

1. The slightly luminous green colour of the passive tag has not been changed
2. During the period under review a further 74 Whale sharks were tagged, of these 71 (96%) were tagged off the coastline of southern Mozambique and 3 (4%) off the coastline of northern KwaZulu/Natal.
3. The area of primary operation extended from Ponta Malangane (Mozambique) in the north to Cape Vidal (KwaZulu/Natal) in the south.

Sex Ratios:

Male	Female	Unsexed
38	36	Nil

4. Tagging Summary

Period	No. of Sharks Tagged	%
1993 / 1994	12	5.17%
1994 / 1995	21	9.05%
1995 / 1996	45	19.40%
1996 / 1997	80	34.48%
1997 / 1998	74	31.90%
Total to Date:	232	100%

5. Re-sightings

Tag No.	Date Tagged	Location	Date of Re-sighting	Location
274	Dec 31 1997	3km South of Millibangalala Mozambique	Jan 1 1998	Millibangalala Mozambique
371	Oct 18 1997	Ponta do Ouro Mozambique	Feb 8 1998	Ponta do Ouro Mozambique

Note:

- i) The resightings tabled above were reported by divers other than those who were responsible for implanting the tags

- ii) Several other sightings of tagged Whale sharks were reported but only the address reflected on the tag was recorded and not the tag number and it is clear that a more vigorous public / diver awareness campaign will have to be conducted.
- iii) On October 2 1997 we received a report that a diver had seen and logged a tagged Whale shark in Ponta do Ouro bay. In itself this was not an unusual event, except that the precise description of the colour configuration on the tag indicated quite clearly that it belonged to one of the 23 sharks that were tagged in the Seychelles during the month of November 1996. The relevant tag number was not recorded because the animal was apparently “skittish” and the diver did not realise that the tag was numbered.

In effect this means that the shark had moved in a west south westerly direction for approximately 1859 nautical miles (2939 kms) over a 12 month period.

The colour combinations used on tags for application on Whale sharks in different parts of the world is classified and unpublicised information that is known only to select members of the South African and American management teams.

6. Batch Tagging:

- i) From August 22, 1997 through to August 24, 1997 a total of 11 Whale sharks were tagged in the bay at Ponta do Ouro over an effective working time of six hours.
- ii) From October 17, 1997 through to October 19, 1997 a total of 13 sharks were tagged in the bay at Ponta do Ouro over an effective working time of three hours.

E. SATELLITE TAG DEPLOYMENT

On March 8, 1998 at approximately 11h00 the satellite tag, generously sponsored by the PADI Foundation, was successfully deployed on a seven metre female Whale shark off Cape Vidal on the coastline of northern KwaZulu Natal with the very professional assistance and infrastructural support of the Natal Parks Board.

The operation was a complete success and can be briefly summarised as follows:-

- a) The anchor tag was successfully implanted by Steve Hoseck (Natal Parks Board) at a depth of approximately 17 metres

(GPS co-ordinates S 27° 51' 856" - Tomarvo)
E 32° 32' 008"

The shark then rose to the surface which enabled Sue Smith (SRI) to attach the tether and the satellite tag.

- b) However the tether was designed for deployment on a Whale shark of at least 9 metres and in consequence it had to be removed and modified on board the support vessel provided by the Natal Parks Board and competently skippered by Terry Ferguson (NPB).
- c) The microlight, piloted by Mickey Biermann with Rob Allen as the observer, stayed overhead and kept the shark in sight. As soon as the required modifications to the tether had been completed, the support vessel was talked back onto the Whale shark by these two intrepid men on their flying machine. This resulted in the rapid re-deployment of the satellite tag on the same shark which in itself was a major achievement as there were several other sharks of similar size swimming in the same area.
- d) Both Sue Smith and Steve Hoseck stayed with the shark for approximately 20 minutes to make sure that she was comfortable and that the trailing satellite tag was not interfering with her natural swimming action. She was then left to her own devices.
- e) Whilst all of the foregoing action was taking place, Cuane Hall was in the water filming the underwater aspects of the operation and Victor Hugo was on the support vessel filming the surface activity.

Despite the tension, adverse weather conditions, rough seas, dirty water in places, blue bottles and a shortage of suitable accommodating large sharks the deal went down better than anyone could have expected thanks to the dedication, motivation, tolerance and goodwill of all of the participants in this particular aspect of the project.

F. SATELLITE TAG – SUBSEQUENT DEVELOPMENTS

- a) After transmitting data for approximately 8 days the signals from the tag, which at this point was located in an area very close to the coastal border between KwaZulu / Natal and Mozambique, became erratic and made no sense because the tag appeared to be moving inland. It was tracked along the border with Swaziland until it reached a town called Witbank in the province of Gauteng in South Africa where the signals appeared to stabilise and remain relatively constant.
- b) Using our own resources in the form of Dr. Chris Kilian (SRI) and Mr. Eddie Molier who is a personal friend of Cuane Hall (SRI) we managed to isolate the locality of the tag to the outskirts of Witbank. Back-up confirmation, relative to its approximate location was obtained from Mr. Quenten Harris who is a business associate of the writer.

- c) Because the SRI-SA does not enjoy any form of legal / judicial status and because the recovery of the tag was very important from both an environmental and a credibility perspective, it was decided to request the assistance of the Endangered Species Protection Unit of the South African Police Services. Sergeant Stephen Sander was appointed to the case and with the assistance of Captains André Rautenbach and Leon Smit from the South African Police Services Technical Support Unit the tag was located on April 14, 1998 in a cottage on a smallholding at a place called Blesboklaagte which is on the outskirts of Witbank. It was hanging from the ceiling above the bar in the lounge as a form of unusual room decoration. Mr. Freddie Potgieter, the occupier of the cottage, and Mr. Etienne Smuts apparently found the tag lying on the beach at Sodwana Bay on March 15, 1998 and not knowing what it was, they decided to keep it as a memento of their holiday, little realising that it was still signalling until the police arrived on the doorstep.

The tag sustained what we hope is only superficial damage to its outer-casing and it is currently in the process of being repaired and tested prior to re-deployment on another Whale shark.

G. EXPANSION OF THE TAGGING PROGRAM

- a) At a meeting held in San Diego, U.S.A. on October 22, 1997 and attended by Scott A. Eckert, Ph.D. of the Hubbs-Sea World Research Institute and Gerald L. Kooyman Ph.D. of the Scripps Institution of Oceanography, the feasibility of expanding the passive tagging operation to the Sulu Sea in the Philippines and the Sea of Cortez in Mexico was discussed in detail and based on the positive and constructive nature of these talks it is highly likely that the tagging of Whale sharks in these two environmentally important areas of the world could be implemented in the very near future.
- b) A second meeting held at The State University of New Jersey-Rutgers, Alex Antoniou, Ph.D. agreed to facilitate the expansion of the tagging program to Utila Island in the Caribbean and to achieve this objective he has been supplied with a tag-gun and ten specifically numbered tags.
- c) On October 30, 1997 we received a request from the Ministry of Tourism, Republic of Maldives for details of how the Whale shark tagging initiative could be expanded to their part of the world in order to more adequately research and conserve species.
- d) Mr. David Rowat of the Underwater Centre in the Seychelles has continued to make progress with his aspect of the research project but his efforts this season have apparently been frustrated by mechanical problems with the microlight, adverse weather conditions and a shortage of sharks.

H. EXPANSION OF THE PUBLIC AWARENESS AND EDUCATION PROGRAM

WHALE SHARK WEEKENDS

In keeping with the ongoing development of the concept of combining eco-tourism with actual scientific fieldwork we have redefined the operational parameters that apply to the functioning of typical Whale shark weekends.

- a) Selected commercial dive-tour operators, based in southern Mozambique, were invited to become officially associated with this project provided that they agreed to comply with all of the disciplines laid down and prescribed by the SRI-SA. Messrs. Blu International became affiliated on July 18, 1997 and Simply Scuba Mozambique Dive Charters on November 12, 1997 and to date a total of 238 divers have been exposed to controlled Whale shark encounters.

On April 7, 1998 Turquoise Horizons c.c., an East London based dive-tour operator, became affiliated to the SRI-SA. Christophe Beau, co-owner of the closed corporation, is a qualified and very competent diver who has thus far successfully tagged a total of 11 Whale sharks. His business specialises in bringing out smaller tour parties from Europe for purposes of diving with Great White sharks in the Cape and Whale sharks in Mozambique.

- b) A number of very successful Whale shark weekends were held in the Ponta do Ouro area of southern Mozambique and these resulted in 46 Whale sharks being tagged. Positive press reviews were published in newspapers such as The Sunday Times, The Star and Beeld. All of these reports were factual and accurate because each of the relevant reporters had enjoyed, first hand, encounters with Whale sharks.

- c) Working with Simply Scuba Mozambique Dive Charters, a program is in the process of development whereby one or preferably two disadvantaged children will be taken on every third Whale shark weekend. The cost of transporting the proposed participants to and from the Mozambique border will be carried by the Shark Research Institute-SA and the cost of accommodation, food and snorkeling facilities by Simply Scuba. In this way we hope to expose as wide a cross-section of the community as possible to the Whale shark experience.

The following strandings were reported to us and where possible investigated:-

I. STRANDINGS

No.	Date	Location	Size	Sex
1.	Aug. 21, 1997	Richardsbay, KwaZulu / Natal	Unknown	Unknown
2.	Aug. 23, 1997	Cape Vidal. KwaZulu / Natal	5,44m	Female
3.	Sept. 9, 1997	2,5km South of Cape Vidal, KwaZulu / Natal	8,7m	Male
4.	Sept. 22, 1997	6,6km North of Cape Vidal, KwaZulu / Natal	8m	Male
5.	Sept. 24, 1997	35km North of Cape Vidal, KwaZulu Natal	8,44m	Female
6.	Oct. 1997	Christmas Rock, East London	Unknown	Unknown
7.	Nov. 7, 1997	2km South of Cape Vidal, KwaZulu / Natal	7m	Male
8.	Nov. 10, 1997	Cape Vidal / KwaZulu / Natal	7,44m	Male
9.	Jan. 7, 1998	Mgwalana River Mouth, East London	8m	Male

- a) Skin tissue samples were taken from the stranded specimens numbered (4), (5), (7) and (8) for DNA sequencing.

Stranded shark No. 1 was cut-up and eaten by the local population before we could access its carcass for tissue sample collection purposes.

- b) Considerable speculation exists with regard to the reasons why Whale sharks strand. In this regard a number of informed observations have been made and these include the following:-

- i) During the course of feeding close inshore, in relatively shallow water, the sharks become entrapped between one of the numerous rocky

ledges that occur on the east coast of southern Africa and because of their size and the fact that they cannot swim backwards they inevitably strand as the tide recedes.

ROB ALLEN – SRI / DIVE FACTORY

- ii) According to Mr. Willie Maritz, curator of the East London Aquarium, the Whale shark that stranded near the Mgwalana River mouth on January 7, 1998 – “Probably died when the water temperature dropped suddenly at the Mgwalana River area from 21° C to about 16° C. This would have resulted in it being unable to regulate its body temperature”.

Report written by Heather Kopp and published in the Daily Despatch.

- iii) From the eye-witness description given by two anglers of the stranding that occurred on September 24, 1997 approximately 35 Km north of Cape Vidal, it would appear that the shark was in distress. “It was swimming between mid-break and backline and heading from north to south. It was being buffeted by the waves and appeared to be sick or disorientated. Eventually it washed ashore between two flat sandstone ledges and lay completely helpless on the beach. Apart from a few scrape marks on the skin that were probably caused when it was washed over the rocks, there were no other visible external injuries on the shark”.

Anonymous Anglers:- 18H35 September 24, 1997.

Because of the frequency and size of the sharks involved in each stranding it was decided to expand the tissue analysis program to include contaminants such as insecticides, pesticides and heavy metals.

1. Dr. Chris Kilian has spearheaded this part of the initiative and the analysis of tissue samples removed from the 8,44 metre female that stranded on September 24, 1997 revealed the following:-

- i) Liver Toxicology:

Lead >	100 ppm
Copper	3 ppm
Iron	35 ppm

- ii) Pesticides:

Organo Phosphate - no trace

Chlorinated Hydrocarbons - no trace

2. The analysis of a liver sample removed from a five metre female that stranded on December 25, 1996, nine kilometres north of Leven Point, Cape Vidal was done by Mr. B. Chetty of the University of Natal, Durban.

The tests required were for the following:- Fat, Moisture, Ash, Heavy Metals and Squalene.

Method of Test:

Fat	- M / F8
Moisture	- M / M2
Ash	- M / A4
Heavy Metals	- Food Chemical Codex 2 nd Edition, Page 920/1
Fatty Acid Composition	- M / F 101

Results:

- Fat	- 54.11%
- Moisture	- 35.96%
- Ash	- 0.93%
- Heavy Metals	- 11.37 μ g/g

Analysis of the fat using gas chromatographic techniques did not reveal the presence of squalene when compared to standard squalene.

J. TELEVISION COVERAGE

- i) Mr. Peter Lamberti's television production about the project, from a passive tagging perspective, has been completed and was screened three times on the Discovery Channel – Shark Week in America during August 1997.

The content of this video was good but its underlying message was marginally distorted by including promotional footage on both POD (Protective Oceanic Device) and a specific dive-tour operator who is only one of several important operators responsible for data input.

- ii) During the month of November 1997, SeaTek – a program on the Learning Channel in America – aired a short feature on the Whale shark project in the Seychelles.

- iii) From January 29, 1998 to February 2, 1998 we worked very closely with Segment Production de Films at Ponta do Ouro in Southern Mozambique where they obtained quality video footage of both the passive and satellite tagging aspects of our operation. They are based in Paris and the footage was required for a 26 minute documentary on Whale shark tagging for a 26 part series "Underwater Encounters" scheduled to be screened on a number of television channels in Europe later this year.

- iii) The deployment of the satellite tag was broadcast on KZN-TV News at 18h00 on March 10, 1998 and rebroadcast on March 11, 1998 on the GMSA-TV News at 07h30 and 08h00 and then again during the main news on TV3 at 20h00 and TV2 at 21h00. It also received coverage on CNN International a few days later.

- iv) The recovery of the satellite-tag from the smallholding at Blesboklaagte near Witbank received news coverage on TV1, TV2 and TV3 in at least four of the eleven official languages on April 16, 1998.

Note:

On March 12, 1998 at approximately 07h30, a short feature was broadcast on the Breakfast Club program of TV2 about the passive tagging of Whale sharks at Ponta do Ouro in southern Mozambique. It contained several gross inaccuracies and it must be placed on record that the SRI-SA played absolutely no part in this unauthorised production.

K. MAGAZINE COVERAGE

Several more articles were written about the project and published in a number of local and overseas magazines and periodicals and those that we know of include the following:-

- | | | |
|------|------------------|-----------------------------------|
| i) | Sport Diver | August 1997 Volume 5 No. 4 |
| ii) | Sharks & Divers | 1997 Premiere/Collector's Edition |
| iii) | Asian Diver | March 1997, Volume 5 No. 5 |
| iv) | Dive Safari News | Winter Issue 1997 |
| v) | VIA | Summer 1997 |
| vi) | Getaway | November 1997 |
| vii) | Shark News | January 1998 No. 10 |

The positive and constructive publicity generated by these publications was much appreciated because of their local and worldwide distribution which should make significantly more people aware of the need to intensify the research effort on these magnificent animals before they are commercially exploited to the point of possible extinction.

L. NEWSPAPER COVERAGE

During the period prescribed by this report the activities of the SRI-SA received a significant and unexpected amount of press coverage and we are aware of the following publications:-

- i) The Sunday Times – Singapore May 8, 1997
- ii) The Sunday Times (R.S.A.) February 22, 1998
- iii) The Star March 17, 1998
- iv) The Star (Front Page) April 13, 1998
- v) The Star (Front Page) April 15, 1998
- vi) Die Beeld April 15, 1998
- vii) Die Beeld April 16, 1998
- viii) The Mercury April 11, 1998
- ix) The Mercury April 15, 1998
- (x) Die Beeld April 18, 1998

The news items detailed in terms of sections (i) to (iii) and (x) focussed on the research initiative being conducted on Whale sharks and those nominated under sections (iv) to (ix) on the loss and subsequent recovery of the satellite tag.

M. RADIO COVERAGE

Because of the newsworthy significance of the deployment, loss and subsequent recovery of the satellite tag, live interviews were conducted with a number of local radio stations.

- | | | |
|------|-------------------------|----------------|
| i) | SABC – Spectrum Program | April 13, 1998 |
| ii) | Punt Radio | April 13, 1998 |
| iii) | Radio 702 | April 13, 1998 |
| iv) | SABC – SAFM | April 13, 1998 |
| v) | SABC – PM Live | April 14, 1998 |
| vi) | Radio 702 | April 15, 1998 |
| vii) | Punt Radio | April 15, 1998 |

N. BEHAVIOURAL AND OTHER OBSERVATIONS

i) August 22 and 23, 1997:

Several Whale sharks were observed in the bay at Ponta do Ouro hanging motionless in the water with their heads just below the surface and their bodies angled at about 45 degrees from the horizontal.

Chris Kilian and Andrew Gifford

ii) October 13, 1997:

A Whale shark was observed close inshore off Vetches pier which is just north of Durban's harbour entrance. The animal remained in the area for several days and tolerated the presence of numerous curious divers with equanimity.

Natal Mercury October 13, 1997

iii) February 12, 1998:

A delegation from the South African press corps, guests of Simply Scuba Mozambique Dive Charters, snorkelled with a shark that was accompanied by Dolphins.

Mickey Biermann

iv) February 14, 1998:

The same delegation from the South African press corps were afforded a second opportunity to swim with a 10 metre Whale shark accompanied by a pod of approximately 15 Dolphins just north of Ponta Malangane. The interaction of this group was of particular interest because whilst 60% of the dive party focussed their attention on the Dolphins and 40% on the Whale shark 20% of the Dolphins were curious about the humans and popped-up behind the snorkellers to watch their somewhat confused and clumsy activity.

Mickey Biermann and Andrew Gifford

v) March 4, 1998

A Whale shark measuring approximately 4 metres in length was trapped in the inlet basin of the Koeberg Nuclear Power Station near Blouberg Strand on the Cape West Coast.

13h00 SAFM News Broadcast

ACKNOWLEDGEMENTS

(IN ALPHABETICAL ORDER)

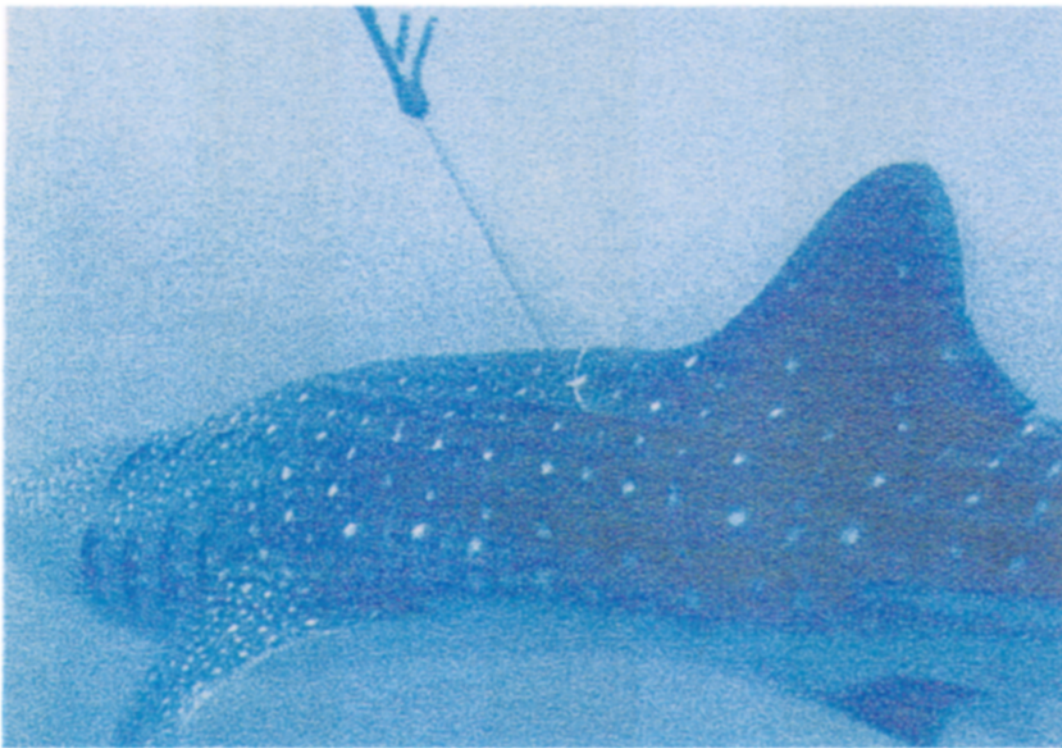
We would like to express our appreciation and thanks to:-

1. Blu International: Grant Golombick for his positive and direct involvement in the expansion of the passive tagging initiative.
2. Blue Wilderness Dive Expeditions: Mark and Michele Addison for their ongoing assistance in the promotion of the project in southern Mozambique and Barry Skinstad for his consistent and accurate tagging of Whale sharks.
3. Endangered Species Protection Unit of the South African Police Services:- Sergeant Stephen Sander who co-ordinated the recovery of the satellite tag from the smallholding near Witbank in association with Captains André Rautenbach and Leon Smith of the S.A.P.S. Technical Support Unit.
4. Linda Levendag for her long suffering patience during the course of compiling this report.
5. Natal Parks Board: Warden Terry Ferguson and Senior Ranger Steve Hoseck for their co-operation and assistance with the successful deployment of the satellite tag off Cape Vidal.

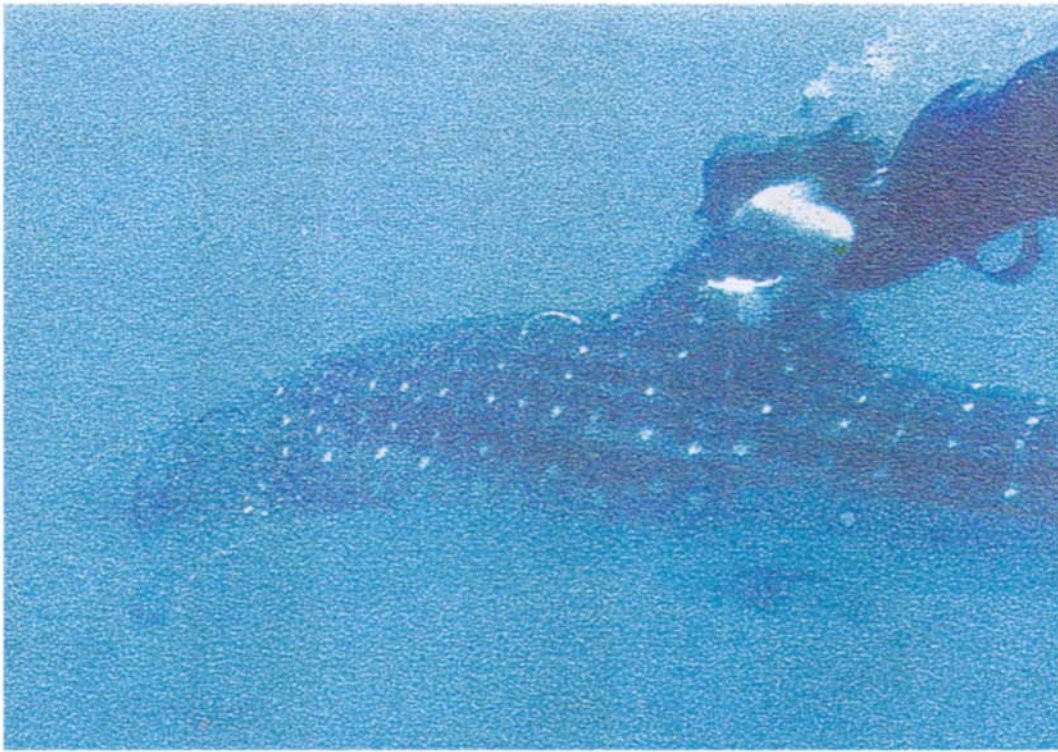
6. PADI Foundation for very generously sponsoring both the satellite tag and the satellite time.
7. Simply Scuba Mozambique Dive Charters for sponsoring a Whale shark weekend that generated very positive publicity for the project in both the press and a number of magazines. The service that they provided was excellent.
8. The Director, Instituto de Investigacao Pescuaria, Mocambique.
9. The immediate family, friends and relatives of Yorke Long who contributed so generously to this research initiative. In this regard special mention must be made of the unstinting co-operation received from both Dr. and Mrs. Susan Long.
10. Tissue Sample Analysis:
 - i) Bedfordview Veterinary Hospital – Dr. Chris Kilian
 - ii) University of Natal – Mr. K. Devchand and B. Chetty
11. Turquoise Horizons c.c.: Mr. Christophe Beau for successfully deploying 11 passive tags and for assisting us in testing the technique used to deploy the satellite tag.



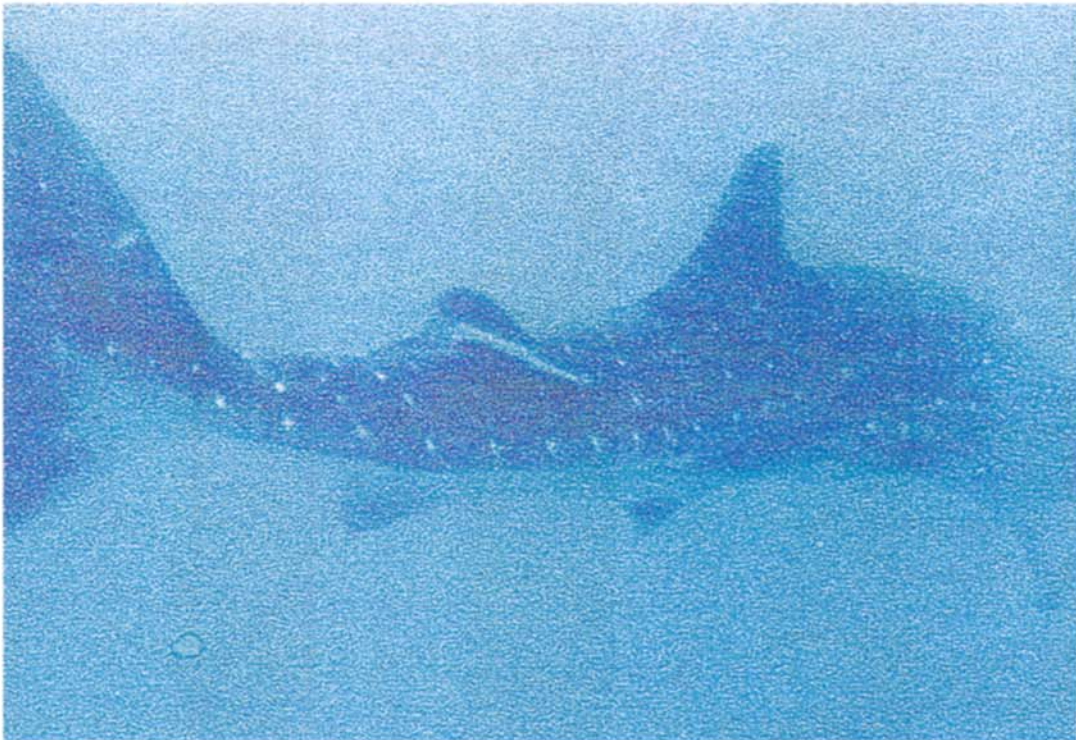
1. Sue Smith examines the whale shark



2. Anchor tag being applied with speargun

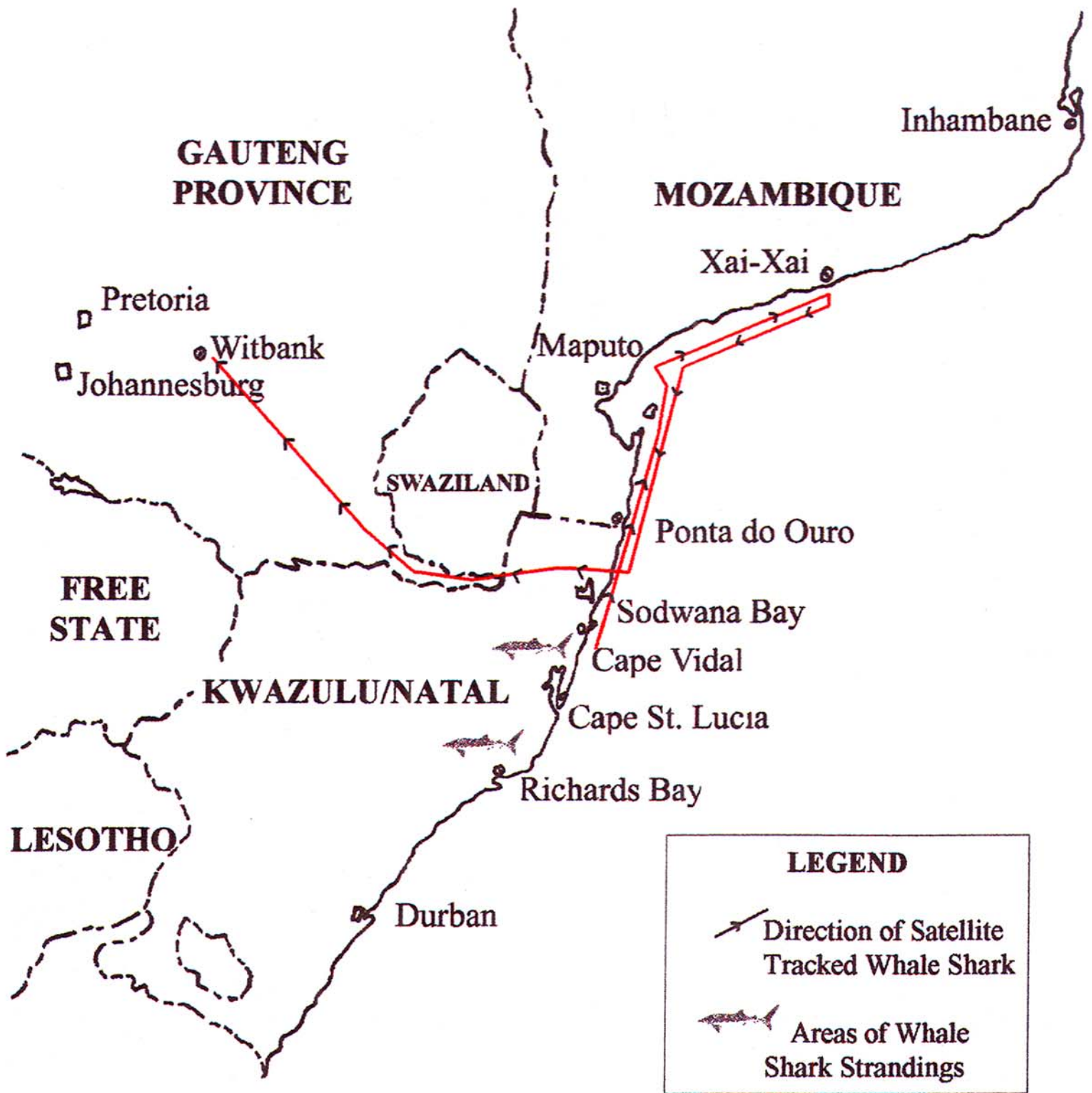


3. Sue Smith attaches satellite tag



4. Whale shark with satellite tag in tow

MAP OF NORTHERN KWAZULU/NATAL AND SOUTHERN MOZAMBIQUE



**** MAP NOT DRAWN TO SCALE**