Marine Life Society of S.A. Inc.

2008

JOURNAL

mlssa
marine life society of south australia

"understanding, enjoying & caring for our oceans"

NUMBER 18
DECEMBER 2008

ISSN 0813 - 7404
NON MEMBERS $5.00
(plus postage and packing)

THE MARINE LIFE SOCIETY OF SOUTH AUSTRALIA Inc.

Are you interested in any aspect of marine life? Do you want to learn more about the underwater world? Are you concerned about pollution of our oceans and destruction of reefs and seagrass beds? If so MLSSA is for you.

Our motto is "~~~ understanding, enjoying and caring for our oceans ~~~". These few words summarise our aims. Members seek to understand our ocean, derive enjoyment from observations of marine life and are committed to protection of the marine environment.

Become a Society member and enjoy contact with others with similar interests. Our members include divers, marine aquarists and naturalists.

Our activities include:-
-Studying our local marine environment
-Community Education
-Underwater photography

Established in 1976, MLSSA holds monthly meetings and occasional field trips. We produce various informative and educational publications including a monthly Newsletter, an Annual Journal and a beautifully illustrated Calendar showing only South Australian marine life. Our library is a source of helpful information for marine enthusiasts.

Through our affiliation with other organisations (eg Conservation Council of SA and the Scuba Divers Federation of SA) we are kept up to date with relevant issues of interest. MLSSA also has close ties with appropriate Government organisations, e.g. various museums, universities and libraries.

Everyone is welcome to attend our General Meetings which are held on the third Tuesday of every month (except January and December). We meet at the clubrooms of Adventure Blue on the Patawalonga Frontage at Glenelg (see page 51 for a map showing how to get there). We begin with a guest speaker. After a short break there is the general business meeting and this may be followed by a slide show if time permits. The atmosphere is friendly and informal.

We welcome new members. We have subscription levels for students, individuals, families and organisations. We invite you to complete the membership subscription form on our website at:- http://www.mlssa.asn.au
Or you may wish to contact the Society for a form, or to complete the one on Page 52 of this Journal (or a photocopy) and send it with your payment to MLSSA.

The postal address of the Society is:-

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c/o Conservation Council of South Australia
Level 1, 157 Franklin Street,
ADELAIDE 5000.

OUR LOGO

The MLSSA logo on the front page features a Leafy Seadragon which is unique to southern Australian waters. The Leafy was South Australia's first totally protected fish and is the State marine emblem. Its beauty surpasses that of any creature found in tropical waters and, once seen by divers, is amongst the most remembered of their diving experiences.

Male Leafy Seadragon carrying eggs

Photograph courtesy of MLSSA member David Muirhead.

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EDITORIAL

This year we have only two articles but I think you will all agree that the quality established in previous years has been maintained.

The first is by MLSSA member Steve Reynolds and is based on a series of dives made way back in 1981 by MLSSA members in support of a marine fish survey by the SA Museum. This was back in the days before insurance problems and I remember the expedition because at Giles Jetty I almost lost my life. If it had not been for Phill McPeake I would probably not be writing this editorial. It was at his insistence I made another dive that afternoon. If this had not occurred then I would probably never have dived again.

The second is a fascinating article by Peter Horne on a series of dives in the Blue Lake at Mount Gambier. If you are unable to dive there or have never done so then this article and its associated pictures are the next best thing (almost). These are fresh water dives and not our usual salt water reports but in the present drought times (the spin masters are wrong, it is not a "dryness" event!!) the freshwater diving areas of the South East are also in dire straits and the more publicity they receive the better even by a "Marine Life Society".

It just remains for me to wish you all happy reading and to wish you a Merry Christmas and a safe and happy New Year. I hope to see you all at one or all of our meetings in 2009.

DISCLAIMER

EDITING:	Philip Hall
HARD COPY PRINTING:	Phill McPeake
CONTRIBUTORS:	Steve Reynolds
	Peter Horne
PHOTOGRAPHY etc:	As credited in each article

A Summary of Our Society's Involvement in the SA Museum's Fish Survey of 1981 (and two books published as a result of that survey)

by Steve Reynolds

As I stated in our June 1995 newsletter (No.212), our Society participated in a survey of SA's marine fish in 1981.

The SA Museum had received a grant in that year (1981) from the Australian Marine Sciences and Technologies Advisory Council.

AMSTAC had provided the grant to enable the museum to carry out a survey of marine fish in SA's coastal and offshore waters.

The aims of the survey by the museum were to update and increase the museum collection of local marine fish in order to provide an adequate regional reference collection.

The provision of this collection would assist to more fully document SA's fish fauna and assist identifications and fisheries studies.

Information gathered during the survey was also to be used in the preparation of a (then) new book to be titled "The Fishes of Australia's South Coast". Our Society's participation in the survey involved a series of sampling dives.

The primary purpose of this new article is to bring together (summarize) all of the information about our Society's involvement in the survey.

In April and May1981, several members of our Society (then MARIA(SA)*) did a series of sampling dives around Yorke Peninsula as part of the museum's fish survey.

* (Marine Aquarium Research Institute of Australia – SA Branch)

Two trips were made to the Yorke Peninsula for the sampling dives. The first trip was to Wardang Island in Spencer Gulf from 17-20th April 1981.This trip was first reported in Phill McPeake's article titled "Easter Field Trip To Wardang Island" in our May 1981 (MARIA) newsletter (No.48). Sampling dives were made around Wardang Island at sites such as White Rock, Seal Rock, the *Moorara* wreck and the *Songvaar* wreck.

It seems that all collecting was done by hand net at depths of between 6m (at the *Moorara* wreck) and 10m (at the *Songvaar* wreck).

Thirty-nine fish of about twelve species were collected during the trip. The museum's staff only identified some of the 39 fish collected to family level i.e. wrasses (Labridae), weed-whiting* (Odacidae) and bullseyes (Pempheridae).

* (There were at least two species of weed-whiting.)

The fish collected during the trip were also discussed in my article titled "Marine Life On Wardang Wrecks" which was published in our January 1992 (No.174) MLSSA Newsletter. This article also discussed marine life, including fish species, sighted on the wreck of the *Moorara* by Society members in 1979. Evan John's article titled "Report On The Wreck *Moorara*" in our "MARIA Journal, Vol.1, No.1, October 1979 also discussed the marine organisms sighted by our members that year (1979).

The records of the survey that the SA Museum provided us did not provide actual dates for dives conducted at Wardang Island, only the duration of the trip i.e. April 17-20 (1981). Philip Hall, our President, fortunately kept a log of his dives around Wardang Island during the fish survey trip there.

I was able to determine, by reading both Philip's logbook and Phill McPeake's article "Easter Field Trip To Wardang Island" (May 1981 newsletter), that at least five divers, possibly as many as nine, participated in the diving around Wardang Island. Phill McPeake's article reported that the first dive was held on the *Moorara* (on Good Friday - 17th April). It seems, however, that Philip Hall did not do the *Moorara* dive. The SA Museum's records report that a magpie perch, banded toadfish, pygmy leatherjacket, coral fish (Talma), ornate cowfish, four bullseyes and three weed-whiting were caught during the *Moorara* dive.

Two dives were made on the west side of Wardang Island on Saturday 18th April. The first dive, however, was held on a barren sandy area in low visibility and a second location was then sought out.

The second dive was held at rocks (around Goose Island?). Philip's logbook suggested that it was 'Goat' Island but the SA Museum's records say "White Rock and Seal Rock". I believe that these rocks are close to Goose Island.

Phill McPeake reported that some specimens were collected at the northern end of Seal Rock during this dive. The SA Museum's records, however, are not too clear about the specimens

collected there.
Phill McPeake reported that large schools of different fish were recorded during the 30-minute dive there. He said that there were strong currents and swells. Philip Hall's logbook reported "much to & fro movement" on a "bottom broken & rocky with much weed". Philip apparently sighted (and photographed) many fish, including a harlequin fish, and some sweep, weed-whiting, moonlighter and leatherjackets. Harlequin fish, weed-whiting, moonlighter and leatherjackets, however, were not caught for the Museum.
The next day, Sunday 20th April (Easter Sunday), a dive was held on the *Songvaar* wreck. Phill McPeake reported that "The fish life (on the wreck) was extensive and in large numbers". Philip's logbook reported seeing a "multitude of fish" and the capture of weed-whiting, coral fish and wrasse. The SA Museum's records confirm this (at least) but details are sketchy, with another dive being held on the *Songvaar* the next day.
A second dive was held at Seal Rock on Sunday 20th April but Philip Hall apparently didn't do that dive. Phil McPeake reported that seals joined the divers on this site. Geoff Mower filmed the seals with an underwater movie camera. (Geoff had also recorded the earlier *Moorara* dive with his movie camera.)
Over the two dives held at Seal Rock (and White Rock?), an unidentified wrasse was caught there and possibly a banded sweep, two trachinops, two bullseyes and a coral fish (Talma).
On Easter Monday (20th April), a second dive was held on the *Songvaar* wreck. Philip Hall described it as a "fish-feeding dive". He reported seeing much the same species of fish as his first dive there the day before (weed-whiting, coral fish and wrasse) plus a globe fish. The SA Museum's records include all of these species from the wreck, plus magpie perch and bullseyes.
All up, 39 fish of about ten species were collected during the trip to Wardang Island.
The second trip to the Yorke Peninsula was made from 20-24th May 1981. This trip was first reported in Phill McPeake's article titled "Museum Trip To Yorke Peninsula" in our June 1981 (MARIA) newsletter (No.49).
Sampling dives were made at Point Turton jetty and Corny Point (Spencer Gulf), Stenhouse Bay jetty (Investigator Strait) and Edithburgh and Port Giles jetties (Gulf St Vincent).

Pipefish at Edithburgh jetty
(Taken by Dennis Hutson – source http://home.iprimus.com.au/dghutson/)

Phil McPeake reported that the first dive was held in the bay on the NE side of the Corny Point lighthouse on Wednesday 20th May. He said that some large fish specimens were caught during the dive. Several more specimens were then caught by dragging a net in the area.

Corny Point lighthouse
(Taken by Noeleen & Steve Reynolds)

Philip Hall's logbook indicates that four divers made a "rocky/beach entry" from "lighthouse beach". He reported seeing "Many fish in crevices in west side cliffs".

The SA Museum's records list just 19 fish caught whilst diving. This included a velvet leatherjacket, horseshoe leatherjacket, rough bullseye, magpie perch, long-snouted flounder, dragonet, common stingaree, two dusky morwong, three globefish and six banded sweep.

The second dive was made at Stenhouse Bay jetty on Thursday 21st May. The same four divers entered the water from the seaward ladder on the jetty. The SA Museum's records indicate that thirty fish were caught during the dive, including a coral fish, globe fish, banded sweep, slender wrasse, magpie perch, common stinkfish, rainbow cale, four ornate cowfish, nine silverbelly, two common bullseye, two rough bullseye and six pygmy leatherjacket.

Whilst they were at Stenhouse Bay jetty, our members found a big mass of invertebrate life on the land. The mass was mainly comprised of

Stenhouse Bay jetty pile
(Taken by Dennis Hutson – source http://home.iprimus.com.au/dghutson/)

gorgonian coral fans and ascidians. It had apparently been knocked off of a jetty pile by an (unknown) diver some days earlier. Our members took a photo of the mass at the top of the road leading down to Stenhouse Bay jetty, before returning it to the seabed.

Mass of gorgonians & ascidians found at Stenhouse Bay by our members (Taken by Philip Hall)

A dive was held at Port Giles jetty on Friday 22nd May. The four divers apparently caught a "fair number of specimens". The SA Museum's records report that a wavy grubfish, pygmy leatherjacket, ornate cowfish, silverbelly, six coral fish, three magpie perch and two mosaic leatherjacket were caught during the dive.

A second dive was held at Point Turton jetty that same day. The four divers apparently sighted and captured many fish. The SA Museum's records show that 55 fish were caught during the dive, including several Smooth anglerfish and southern cardinalfish.

Point Turton jetty (Taken by Steve Reynolds, 2008)

Several dives were apparently held at Edithburgh on Saturday 23rd May, including the jetty there. Some collecting was also done at the "North area rocky edge" (towards the swimming pool?). Certainly, Philip Hall's logbook indicates that he and his buddy did separate collecting dives at both the "Pool and Jetty".

Phill McPeake, Philip's buddy, was stung by an SA cobbler, *Gymnapistes marmoratus*, at Edithburgh jetty when he "truly foolishly stuck his hand under a rock". Like a true professional though, he caught the culprit before aborting the dive in much pain. Evan John later reported the whole incident in his "Fish Profile" of the South Australian cobbler in our 1981 Journal (MARIA Journal Vol.2, No.2).

On Sunday 24th May, three divers did a final dive at Edithburgh jetty and several more fish were caught there. A fish spear was used to capture three silver drummer during this last dive.

A total of 53 fish were caught at Edithburgh during the two dives performed there. Twenty species of fish were ultimately identified within this total, including the SA Cobbler, a Cobbler Carpetshark and a Spotted Wobbegong.

Edithburgh jetty in 1980s (Taken by Steve Reynolds)

Head of wobbegong shark (Taken by Dennis Hutson – source http://home.iprimus.com.au/dghutson/)

Zebra fish and sweep beneath Point Turton jetty
(Taken by Steve Reynolds, 2008)

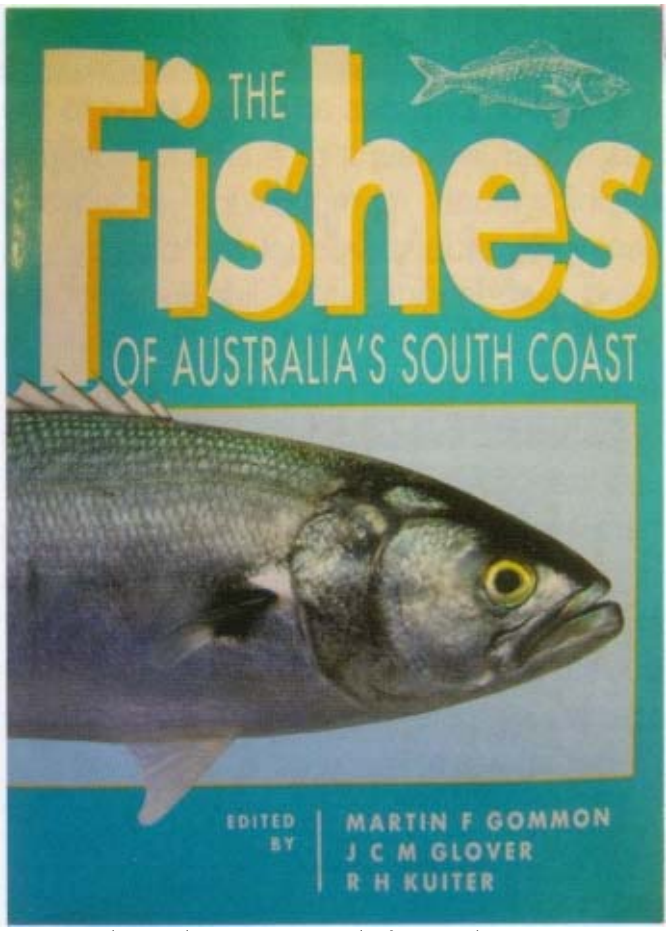
A total of 55 fish were caught at Point Turton jetty in Spencer Gulf. Seventeen species of fish were ultimately identified within this total.

A total of 19 fish were caught at Corny Point in Spencer Gulf. Eleven species of fish were identified within this total. One (large?) flathead caught at Corny Point was only offered to SA Museum staff for identification after its flesh had been eaten by some happy divers. The remains of it did not provide sufficient material for a thorough identification of the unfortunate fish.
A total of 30 fish were caught at Stenhouse Bay jetty in Investigator Strait. Twelve species of fish were identified within this total.

Basket star at Stenhouse Bay jetty
(Taken by Dennis Hutson – source
http://home.iprimus.com.au/dghutson/)

A total of 15 fish were caught at Port Giles jetty in Gulf St Vincent. Seven species of fish were identified within this total.
I wrote a short article, titled "1981 Museum Fish Survey", about the survey for our September 1982 (MARIA) Newsletter (No.64). The article reported that "Over 200 fish of over 40 species were caught for the museum's records" and "This included a new species of angler".
The 'new species of angler', along with other unidentified anglers, was said to be being studied by an 'Angler' expert in the USA. The other unidentified fish were said to be being studied by other experts around Australia and the world.
At the time, the museum had provided us with a list of the fish caught. I presented a summarized form of that list in my article.
My article "Museum Fish Survey", published in our November 1982 (MLSSA) Newsletter (No.66), was a follow-up article about the results of our Society's involvement in the survey. Further details were published in our May 1983 (MLSSA) Newsletter (No.72).
A complete report about the survey was published in our "MLSSA Journal", No.1, February 1985. The title of my report was "SA Museum Fish Survey".
According to the report, "Information gathered during the survey was also used in the preparation of a new book, "(The) Fishes of Australia's South Coast" which the museum hopes will be published late in 1984."
Subsequent newsletters published in October 1990 and August 1992 suggested that publication of the book was imminent. Our April 1994 (MLSSA) Newsletter (No.199) included my article titled "Fish Book Finally Published". "Fishes of Australia's South Coast" had finally been published (early 1994) after a 13-year wait.

"Fish Book Finally Published" reported that "(The) Fishes of Australia's South Coast" covered "727 species of fish from the waters between the Recherché Archipelago, WA to Wilson's Promontory in Victoria. There are many underwater photographs of fish and details provided by 23 scientists. The book was edited by John Glover, Rudie Kuiter and Martin Gomon*. A softcover version costs $49.95 and the hardcover version is $59.95."
* (The article actually said "Martin **Gommon**" which is the spelling used on the book's cover. The web page found at
http://www3.canterbury.nsw.gov.au/amlibweb/webquery.dll?v1=pbMarc&v4=8066&v5=3X&v8=8067&v9=0&v10=N&v11=938545&v13=4C&v20=4&v23=0&v25=Glover,%20C.%20J.%



The Fishes of Australia's South Coast
Courtesy of the June/July 2008 issue of "SA Angler" magazine ("What Fish Is That? (Part 2)" by Kate Hutson)

20M.&v27=110376&v35=%7B%5D0%5B%7D%7B%5D0%5B%7D%7B%5D0%5B%7D%7B%5D0%5B%7D&v40=4186&v46=8067
explains, however, that "On cover and spine : Editor incorrectly spelt as Martin F. Gommon" and also "J.C.M. Glover" when in fact it should read "Edited by Martin F. Gomon, C.J.M. Glover* & R.H. Kuiter".)
* (CJM Glover, Curator of Fishes at the SA Museum, went by the name John Glover.)
According to "What Fish Is That? (Part 2)" by Kate Hutson in the June/July 2008 issue of "SA Angler" magazine, "The Fishes of Australia's South Coast" "would have to be the top choice of books for fish identification from our region (SA)".
My article titled (you guessed it) "SA Museum Fish Survey", which was published in our June 1995 (MLSSA) Newsletter (No.212), mentioned that a magnificent boarfish photo taken by David Muirhead was included in "(The) Fishes of Australia's South Coast".

The main purpose of this latest article was to present an update regarding the previously unidentified species of fish from the survey. Terry Sim, the SA Museum's Fish Collection Manager at the time, had advised us that, "All of the anglers (family Antennariidae) were identified by TW (Ted) Pietsch, the recognized world expert on anglerfish. They were ALL smooth anglerfish, *Phyllophryne scortea*, so no 'new species of angler'.
(Janine Baker says that *Phyllophryne scortea* is highly variable in colour, markings and appearance of cutaneous appendages. Visit http://www.reefwatch.asn.au/pages/bin/view/Publications/SamsccANTENNARIIDAE) for further details regarding anglerfish.)
Professor Ted (Theodore) Pietsch is Curator of Fishes at the School of Aquatic and Fishery Sciences at the University of Washington in the USA. He has a website at http://artedi.fish.washington.edu/Staff/tpietsch.html.
David Muirhead wrote about "The Fishes of Australia's South Coast" in his article titled "Southern Slickheads and other funny fish" which was published in our MLSSA Newsletter, July 2000 (No.268). His article was mainly about some of the fish images in the book and a little bit about the details of some fish species.
It concluded by saying that StatePrint had printed the book in 1994 for the Flora and Fauna of South Australia **Hardbacks** Committee. According to the web page found at http://www3.canterbury.nsw.gov.au/amlibweb/webquery.dll?v1=pbMarc&v4=8066&v5=3X&v8=8067&v9=0&v10=N&v11=938545&v13=4C&v20=4&v23=0&v25=Glover,%20C.%20J.%20M.&v27=110376&v35=%7B%5D0%5B%7D%7B%5D0%5B%7D%7B%5D0%5B%7D%7B%5D0%5B%7D&v40=4186&v46=8067,
however, it is actually the "Flora and Fauna of South Australia **Handbooks** Committee (as per books such as "The Marine and Freshwater Fishes of South Australia".
David went on to say that the book (was) a fine example of what can be achieved locally by dedicated naturalists on a tight budget, although this comment may have simply been leading to his next comment about our own Society.
I, myself, wrote a follow-up article to David's. It was titled "The Fishes of Australia's South Coast" and was published in our MLSSA Newsletter, April 2001 (No.276). My article referred once

again to our participation in the SA Museum's fish survey in 1981.

I recently borrowed David Muirhead's copy of "The Fishes of Australia's South Coast" to finish off my research into this topic. A quick scan through the book revealed that the boarfish (Short Boarfish) photo taken by David is featured on page 630 (Fig.553). This is the same picture as slide number 1081 in our Photo Index. It also featured as the vertical format picture for January 2003 in our 2002 calendar. David took it at Port Giles jetty on Yorke Peninsula in the early 1980s. (The boarfish in both the calendar and the book picture is facing the opposite way to the way that it is facing in the slide in our Photo Index.)

David's friend, Paul Fitzgerald has provided a few fish slides to our Photo Index. Paul also took the Yellowspotted Boarfish photo on the opposing page (p.631) to David's Short Boarfish photo in "The Fishes of Australia's South Coast".

I was able to determine from David's copy of the book that the actual publishing date for it was 2nd March in 1994. I was also able to confirm that John Glover, one of the co-editors of the book, had unfortunately died before its publication. John had been the Patron of our Society from its founding in 1976. His death was mentioned in the book's preface, which gives the historical background about the book.

I have always stated that information gathered during our 1981 participation in the SA Museum's marine fish survey was used in the preparation of "The Fishes of Australia's South Coast".

John Glover's letter to our (then) Institute in early 1981 had indicated that the aim of the "fish fauna survey of South Australian coastal and off-shore waters" was "to rapidly build up the SA Museum's collections of local marine fish in order to provide an adequate regional reference collection, thereby fully documenting this fauna and assisting identifications and fisheries studies." He then added that, "One immediate practical use this is being put to is in the preparation of an updated revised edition of "The Marine and Freshwater Fishes of South Australia"."

The preface in "The Fishes of Australia's South Coast" confirms this by saying that Dr John Ling, then Director of the SA Museum, suggested the book in 1981. Dr Ling had suggested that, "the Flora and Fauna of South Australia Handbooks Committee sponsor a successor to its extremely popular publication *The marine and freshwater fishes of South Australia* . . . in the form of a handbook devoted to the marine fishes of Australian temperate seas without confinement to political (state) boundaries."

The preface goes on to explain why it was decided to exclude freshwater fishes from the new publication. It then explained that, "A meeting of interested parties . . . was convened by Dr Ling at the SA Museum in January 1982 to discuss the proposal. Following the development of ideas and recommendations at this meeting the Handbooks Committee agreed to sponsor this new publication."

I could see at a glance that "The Fishes of Australia's South Coast" was a great improvement on "The Marine and Freshwater Fishes of South Australia".

According to the web page found at http://museumvictoria.com.au/Collections-Research/Our-Research/Sciences/Marine-Biology/Museum-VictorianbspIchthyology/, "The most comprehensive field guide to temperate Australian fishes "Fishes of Australia's South Coast", published in 1994, will soon be replaced by an all new "Fishes of Australia's Southern Coast" treating the 865 species – 20% more than featured in the previous publication – known to occur between Wilson's Promontory, Victoria and the western edge of the Great Australian Bight in Western Australia. Edited by Dr (Martin) Gomon, Dianne Bray (Museum Victoria's Fish Collection Manager) and Honorary Associate Rudie Kuiter, the book will contain family treatments by 30 world authorities and provide descriptions, distribution maps and high colour images, wherever possible, for species treated."

According to the web page found at http://www.scubadoctor.com.au/diveshop/index.php?main_page=product_info&products_id=1458 , "Fishes Of Australia's Southern Coast ($125), edited by Dr. Martin Gorman, Dianne Bray and Rudie Kuiter, brings together the latest scientific knowledge on more than 860 species inhabiting Australia's temperate southern waters, from the Recherche Archipelago at the western end of the Great Australian Bight to Wilson's Promontory in the east, many found nowhere else. Those included range in size from tiny gobies and clingfishes less than 3 centimetres long, to the whale shark, the largest fish in the ocean, reaching a length of 12 metres. Thirty expert

ichthyologists from within Australia and overseas have written accounts of all species known to occur within the area. Each species treatment is accompanied by one or more images (most in high-quality colour), a distribution map and a description that includes information on recognisable body features, size attained, colouration, habitat and other common names, as well as anecdotal information of interest to the reader. Where relevant, counts for fin elements, scales, teeth, photophores* and other body parts are given. Illustrated keys are included at all levels of classification from sub phylum to genus and species. Introductory chapters outline the scope and geographical coverage of the book, describe the variety of aquatic habitats in southern waters, discuss conservation and other issues associated with human impacts on fishes, interpret fish classifications and provide detailed instructions on how to use the book. This book is the only recent Australian guide to comprehensively treat all fish species found within a region. It enables fishers, those interested in natural history, students and researchers to identify the fish fauna found along the southern coast."

* (According to the web page found at http://en.wikipedia.org/wiki/Photophore ,
"A photophore is a light-emitting organ which appears as luminous spots on various marine animals, including fishes and cephalopods.")

According to the web page found at http://www.andrewisles.com/AndrewIsles/search.cfm?UR=27626&search_stage=details&records_to_display=1 (and others), the book was (then) due to be published in September 2008.

"What Fish Is That? (Part 2)" by Kate Hutson in the June/July 2008 issue of "SA Angler" magazine said that the new 928-page hardcover publication (ISBN 9781877069185) would cover the same area as its predecessor. It will cover 20% more species that have "come to light" since the 1994 publication of "The Fishes of Australia's South Coast".

The new book apparently uses a larger format (260 x 186mm), which provides the same information in a more efficient manner. It also contains many improved images, which are all in colour. It is said to be a joint publication of New Holland Press and Museum Victoria and priced at $129.95.

Dr Martin Gomon, Senior Curator of Ichthyology at Museum Victoria and co-editor of "Fishes of Australia's Southern Coast", advised us that the book was officially published on 1st September 2008. He also reported that the book was being launched by New Holland Press at the Australian Society for Fish Biology Annual Conference on the 17th September. He added that the Museum Victoria bookshop would be offering the book at a discounted price (plus postage) for a limited time.

The taxonomic names of many fish species have changed over the years, and they continue to change. In 1982, the late John Glover, Curator of Fishes at the SA Museum explained this to me as follows: -

"the scientific names of animals, especially fishes, are in a constant state of flux due to continuing taxonomic research throughout the world. As more is known about the morphology of fish, so their relationships are constantly being redefined with more accuracy. Name changes are more prevalent in bigger and more complex groups of fishes (e.g. those of the family Labridae) than in smaller groups; also amongst those groups which are being studied more intensively."

John then referred me to an article of his titled "Fish Taxonomy And Identification". The article was apparently reproduced from "National Fisheries Officers Training Course 1979, South Australia: Course Records". The article is item mlssa No.2064 in our Society's library. I believe that John gave our Society several copies of the article following a talk on the topic that he presented to us many years ago.

John suggested to me that the article would give an introduction to the techniques and procedures in fish taxonomy. He said that specific and generic name changes are more common than family name changes.

And what is the relevance of all this to this article? The names of many fish species, both common names and scientific names, have changed since the fish survey in 1981 and my Journal report in 1985. I have attempted to use up-to-date names in this article. It seems, however, that many experts do not agree on the names for some fish species.

Table 1 on page 12 (Fish Collected During SA Museum Fish Survey 1981) is an updated version of the Table from my "SA Museum Fish Survey" report which was published in our "MLSSA Journal", No.1, February 1985.

There has been much talk recently about the

FISH COLLECTED DURING SA MUSEUM FISH SURVEY 1981										
Family	Genus	Species	Common Name	No.	C	E	T	G	S	W
Antennariidae	Echinophryne	crassispina	prickly anglerfish	1		1				
"	Phyllophryne	scortea	smooth anglerfish	5		2	3			
Apogonidae	Vincentia	conspersa	southern cardinalfish	5			5			
Arripididae	Arripis	georgianus	Australian herring (tommy	2			2			
Bovichtidae	Bovichtus	angustifrons	thornfish/dragonet	1	1					
Callionymidae	Foetorepus	calauropomus	common stinkfish	2		1			1	
Chaetodontidae	Chelmonops	curiosus	western talma	25		9	5	6	1	4
Cheilodactylidae	Cheilodactylus	nigripes	magpie perch	8	1		1	3	1	2
"	Dactylophora	nigricans	dusky morwong	2	2					
Diodontidae	Diodon	nicthemerus	slender-spined porcupine fish	8	3		4		1	
Enoplosidae	Enoplosus	armatus	old wife	5			5			
Gerreidae	Paraquula	melbournensis	silverbelly	10				1	9	
Gobiesocidae	Aspasmogaster	tasmaniensis	Tasmanian clingfish	4		4				
Gobiidae	Callogobius	mucosus	sculptured goby	3		3				
Hemiramphidae	Hyporhamphus	melanochir	SA garfish	4			4			
Heterodontidae	Heterodontus	portusjacksoni	Port Jackson shark	1		1				
Kyphosidae	Kyphosus	sydneyanus	silver drummer	3		3				
Labridae	Pictilabrus	laticlavius	senator wrasse	1					1	
"			unidentified wrasse sp.	2						2
Microcanthidae	Tilodon	sexfasciatus	moonlighter	1			1			
Monacanthidae	Acanthaluteres	brownii	spiny-tail leatherjacket	1			1			
Monacanthidae	Acanthaluteres	vittiger	toothbrush leatherjacket	1		1				
Monacanthidae	Brachaluteres	jacksonianus	southern pygmy leatherjacket	24		11	5	1	6	1
Monacanthidae	Eubalichthys	mosaicus	mosaic leatherjacket	5		2	1	2		
Monacanthidae	Meuschenia	hippocrepis	horseshoe leatherjacket	2	1		1			
Monacanthidae	Meuschenia	scaber	velvet leatherjacket	1	1					
Monacanthidae	Meuschenia	freycineti	six-spine leatherjacket	1			1			
Mullidae	Upeneichthys	vlamingii	blue-spotted goatfish	2		2				
Odacidae	Haletta	semifaciata	blue weed-whiting	11		1	10			
Odacidae			weed-whiting spp.	7						7
Odacidae	Odax	acroptilus	rainbow cale	1					1	
Orectolobidae	Orectolobus	maculatus	spotted wobbegong shark	1		1				
Orectolobidae	Sutorectus	tentaculatus	cobbler carpetshark	1		1				
Ophiclinidae	Ophiclinus	antarcticus	Adelaide snake blenny	1		1				
Ostraciontidae	Aracana	ornata	ornate cowfish	6				1	4	1
Parapercidae	Parapercis	haackei	wavy grubfish	8		7		1		
Pempheridae	Pempheris	klunzingeri	rough bullseye	5	1		2		2	
Pempheridae	Pempheris	multiradiata	common bullseye	2					2	
Pempheridae	Pempheris sp.		bullseye spp.	11						11
Platycephalidae			flathead sp.	1	1					
Plesiopidae	Trachinops	noarlungae	yellow-headed hulafish (trachinops)	9						9
Pleuronectidae	Ammotretis	rostratus	long-snout flounder	1	1					
Scorpaenidae	Gynapistes	marmoratus	South Australian cobbler	1		1				
Scorpididae	Scorpis	georgianus/georgiana	banded sweep	8	6				1	1
Syngnathidae	Hypselognathus	rostratus	knife-snout pipefish	1		1				
Tetraodontidae	Omegophora	armilla	ringed toadfish	4			4			
Tetraodontidae	Torquigener	pleurogramma	banded toadfish	1						1
Urolophidae	Trygonoptera	testacea	common stingaree	1	1					
			Totals	211	19	53	55	15	30	39

C = Corny Pt, E = Edithburgh, T = Pt Turton, G = Pt Giles, S = Stenhouse Bay, W = Wardang Island

common names of fish changing. A new fish database at
http://www.fishnames.com.au/
has been set up by the Fisheries Research & Development Corporation, which seeks to standardise fish names across Australia. The purpose of this website is to educate fishers, etc.. on the correct common names for fish across the different states.
The web page found at
http://www.seafood.net.au/page/?pid=292
describes "Requirements for using standard fish names" as follows: -
"The Australian Fish Names Standard AS SSA 5300 specifies the requirements for using *standard fish names* in Australia.
Fish sold to consumers (e.g., retail sales and restaurants) shall be identified at the point of sale by the standard fish name specified for that species in the Standard.
Fish sold other than directly to consumers (e.g., wholesale, export, import) shall be identified by either the standard fish name or scientific name for that species.
The Standard also specifies that a standard fish name that covers a group or family of species should only be used if:
The fish does not have a standard fish name which covers that species only, or
The fish is in a batch of different species of fish, all of which are from the same scientific group or family (e.g., a batch of fish consisting of dusky flathead and tiger flathead may be identified by the standard fish name flathead, which covers all species in the Flathead family), and
Using a SFN which covers the scientific group or family to which a fish belongs does not misrepresent or confuse the identification of the fish.
The Standard provides for the temporary use of a name that is commonly used for that species in Australia or overseas, only if:
The species of fish is not covered by a standard fish name specified in the Standard, and
The person or business using the temporary name notifies Seafood Services Australia of that use within 30 days, and
Seafood Services Australia is to include all such notices on the agenda of the next Fish Names Committee meeting at which time the committee may either initiate a proposal for a standard fish name to be assigned for that species, or require the person or business using the temporary name to submit an application for a standard fish name to be assigned for that species."

An online database of fish is available at
http://www.fishbase.org.
The web page found at
http://www.fishbase.org/Summary/speciesSummary.php?ID=12864&genusname=Diodon&speciesname=nicthemerus
says that our globe fish, *Diodon nicthemerus* , is known as the "slender-spined porcupine fish".
Underwater photographers are able to upload their fish photos to FishBase. They just have to complete a form and click 'Submit'. Successfully uploaded photos will be included in the photo page for the species. For example, the web page found at
http://www.fishbase.us/tools/UploadPhoto/start.php?speccode=12864
is the form for *Diodon nicthemerus,* the slender-spined porcupine fish.
The Fishbase website says that the scientific name for the cobbler carpetshark is still *Sutorectus tentaculatus* (as used in my 1985 Journal article). Visit
http://www.fishbase.org/Summary/speciesSummary.php?ID=761&genusname=Sutorectus&speciesname=tentaculatus
and
http://www.fishbase.org/Nomenclature/SynonymsList.php?ID=761&SynCode=23292&GenusName=Sutorectus&SpeciesName=tentaculatus.
The book "Sea Fishes Of Southern Australia", however, suggests the name of *Orectolobus tentaculatus*.
The topic of common names for fish came up in discussions within our Society recently. There has, for example, been some confusion regarding the full common name for our 'blue devil', *Paraplesiops meleagris.*
We had been using "western blue devil" in our Photo Index, as per "Sea Fishes of Southern Australia" by Barry Hutchins and Roger Swainston and "Australian Marine Life" by Graham Edgar. Our 2009 marine life calendar, however, used "southern blue devil", as per "Coastal Fishes of South-eastern Australia" by Rudie Kuiter.
Neither of these two names (western or southern) are used in FishBase. I suggested that perhaps we should resort to using just "blue devil".

Janine Baker's response was that, "Western is commonly used for *Paraplesiops meleagris*, but Southern is more correct, and avoids confusion, because the true Western Blue Devil, *Paraplesiops sinclairi* (see paper by Hutchins 1987) is endemic to Western Australia. I use Southern, in keeping with CSIRO's Codes for Australian Aquatic Biota: http://www.marine.csiro.au/caabsearch/caab_search.search_prepare?scitxt=Paraplesiops%7C."

Scoresby Shepherd, our Patron, agreed with Janine, adding (in shorthand), "The Commonwealth Style manual (which governs all government publications, and is the standard) recommends lower case for common names of plants, animals, etc..!"
This last comment took me by surprise. I had never been fond of using lower case for the common names of plants and animals. Although I would see use of "Rough bullseye" and "rough bullseye", I personally always preferred "Rough Bullseye", as per "Coastal Fishes of South-eastern Australia". At this stage, I still assumed that "Ornate cowfish" or "Rough bullseye" was acceptable, although I still had some issues with this when it came to names such as 'globe fish', 'harlequin fish' and 'coral fish'.
Scoresby soon put me right when he said, "The Commonwealth Style Manual states that common names of plants/animals should be lower case e.g. prickly anglerfish (unless it's the name of a country e.g. Canadian grizzly). So it's 'soursob', 'lemon-scented gum', etc..
The above details (and those in Table 1) have now been altered to the style recommended in the Commonwealth Style Manual.
As for our use of the full common name for the 'blue devil', it has been decided that our 2009 marine life calendar correctly used "Southern blue devil" (although "southern blue devil" would have been better). It has also been decided that we use that name in our Photo Index from now on.

Summary Of Articles About (Or Connected With) The Survey

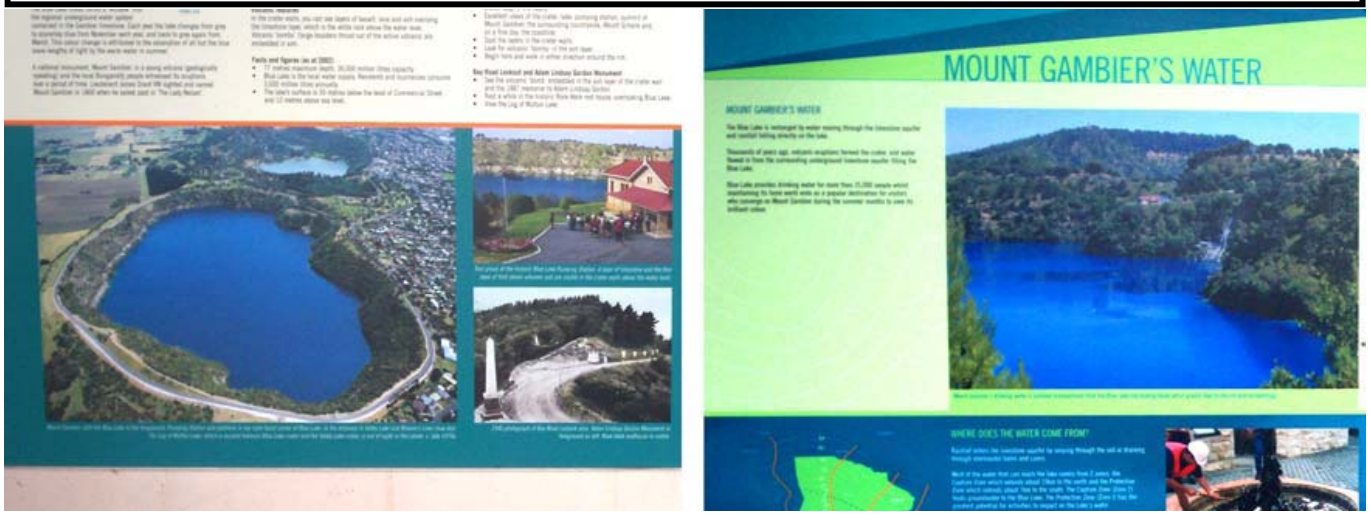
"Report On The Wreck *Moorara*" by Evan John, "MARIA Journal, Vol.1, No.1, October 1979.
"South Australian Museum Fish Survey" (Steve Reynolds, Editor) MARIA Newsletter, May 1981 (No.48).
"Easter Field Trip To Wardang Island" by Phil McPeake, MARIA Newsletter, May 1981 (No.48).
"Museum Trip To Yorke Peninsula" by Phil McPeake, MARIA Newsletter, June 1981 (No.49).
"Fish Profile - The South Australian Cobbler" by Evan John, MARIA Journal Vol.2, No.2, December 1981.
"1981 Museum Fish Survey" by Steve Reynolds, MARIA Newsletter, September 1982 (No.64).
"Museum Fish Survey" by Steve Reynolds, MLSSA Newsletter, November 1982 (No.66).
"SA Museum Fish Survey" by Steve Reynolds, MLSSA Journal, No.1, February 1985.
"Marine Life On Wardang Wrecks" by Steve Reynolds (Editor), MLSSA Newsletter, January 1992 (No.174).
"Fish Book Finally Published" by Steve Reynolds, MLSSA Newsletter, April 1994 (No.199).
"SA Museum Fish Survey" by Steve Reynolds, MLSSA Newsletter, June 1995 (No.212).
"Southern Slickheads and other funny fish" by David Muirhead, MLSSA Newsletter, July 2000 (No.268).
"The Fishes of Australia's South Coast" by Steve Reynolds, MLSSA Newsletter, April 2001 (No.276).

ACKNOWLEDGEMENTS
My thanks go to everyone who has assisted me with this article, including Philip Hall, Phill McPeake, Janine Baker, Scoresby Shepherd, David Muirhead and Dennis Hutson (for the use of his photographs).

Report on the Blue Lake Sediment Sampling & Research Programme February/March 2008 by Peter Horne

Report photos by Richard Harris, Craig Howell, Gerret Springer, Paul Harvey and the author.

Centre for Natural Resource Management Project 043714: Protecting the Blue Lake from Land Use Impacts (Project B).



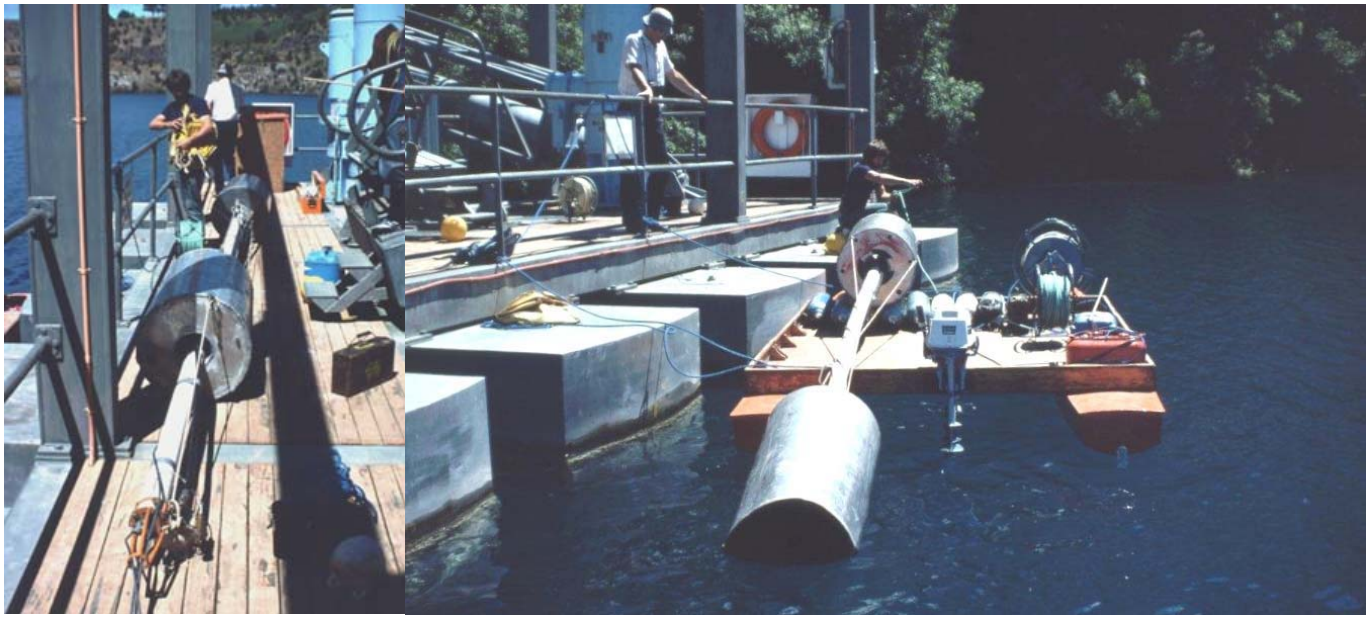
Information boards on the wall of the interpretive centre near the access driveway to the Blue Lake Pumping Station (PH & RH).

The Blue Lake Pumping Station building, with the crater lake in the background (GB). The white 30 metre-high limestone cliffs rising from water level are topped with a 60m thick layer of volcanic ash which is widely believed to have been deposited when the volcano was active just a few thousands years ago.

Introduction

This report outlines the major activities and findings of a sediment-collecting and research diving project in Mount Gambier's Blue Lake during two weekends in February and March 2008. The study was organised by environmental scientist and cave diver Grant Pearce for the purpose of supporting a number of South Australian Government agencies which were aiming to determine the impact of land-use practices to the Blue Lake and surrounding Groundwater Dependent Ecosystems (GDEs). Special emphasis was being placed upon the potential for stormwater to negatively impact the unconfined aquifer and the associated karst environment within the Blue Lake Catchment Management Zone.

A key method of assessing the localised history of water-borne pollutants is to analyse the accumulation of such substances in sediments, so the collection of well-preserved sediment cores from near the centre of Blue Lake was deemed to be important for quantifying inorganic and trace organic constituents as they are removed from the water-column during the annual cycle of calcite precipitation. Sediment cores have been collected from the centre of the Blue Lake on a number of occasions in the recent past using Mackereth corers and freeze-coring techniques (Leaney et al, Palaeo 118 (1995) 111-130, and pers. comm. Paul Harvey & Grant Pearce, 1980s/2008), but these are not exactly subtle and they tend to significantly disturb or compact the sediment's layers. In addition both techniques are inherently hazardous; freeze coring involves the handling of cryogenic material, and the method of operation of Mackereth corers presents significant handling and operational risks, especially to any surface-based personnel whose support platform or boat may end up in the path of a rapidly-ascending corer (the author is in fact aware of at least one report of a fatality that occurred as a consequence of such a collision).



A Mackereth corer being prepared for deep-water sediment sampling operations in the Blue Lake in 1981 (courtesy Paul Harvey, 2008).

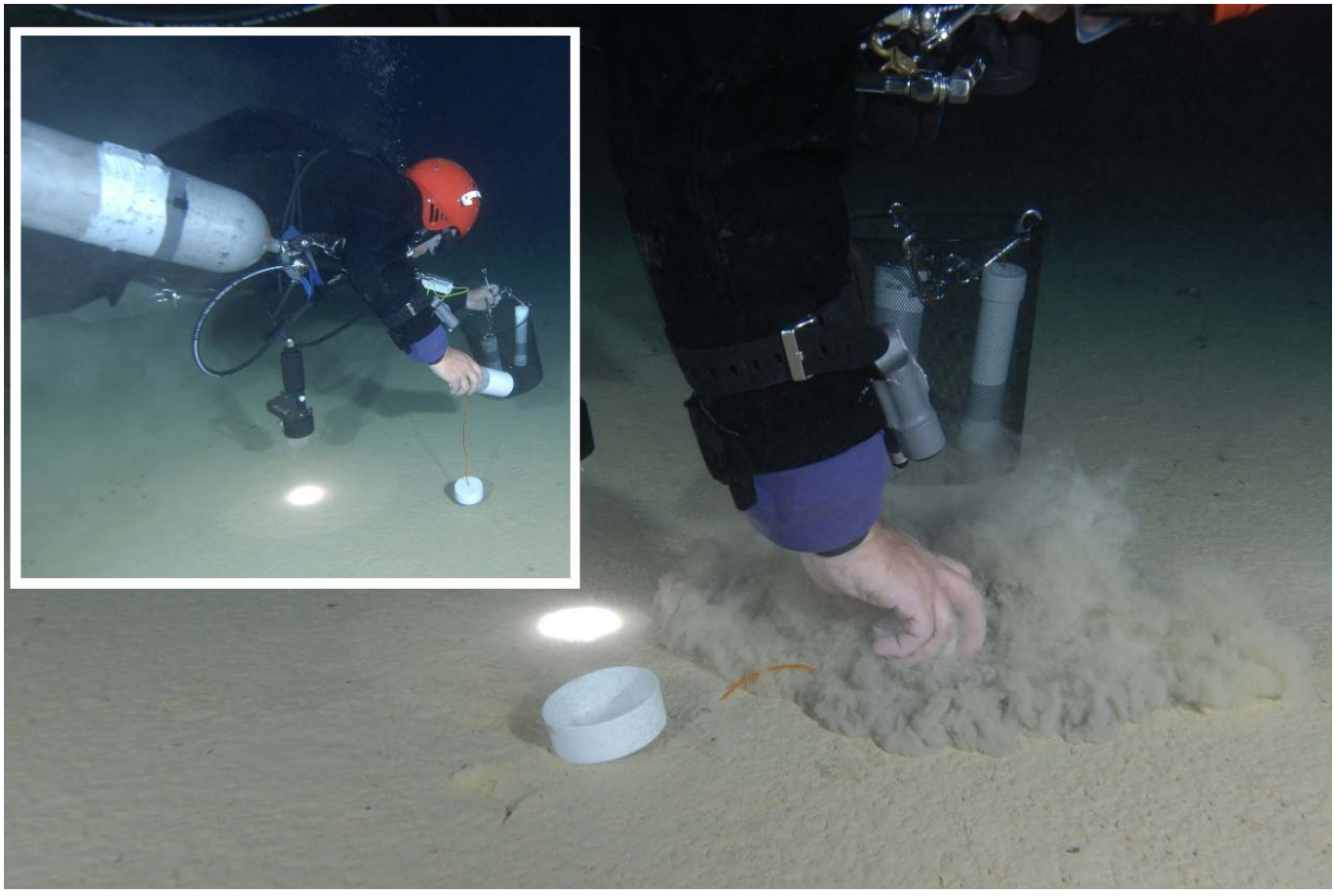
Blue Lake Mackereth corer in action in 1981; the dramatic way in which it bursts through the surface upon ascent is often likened to the launch of a Polaris missileI See this picture and the two on page 6. (courtesy Paul Harvey, 2008).

Deep-diving technology has been advancing in leaps and bounds during the past few decades, and today the Blue Lake's deepest known areas (around 75 metres) are well within easy reach of properly qualified and equipped "technical" divers. Since a careful diver utilizing a hand-held PVC tube corer can obtain an almost undisturbed sample of shallow, layered sediments compared with any current remotely-operated mechanical device such as a Mackereth corer, the main objective of this project was to utilize divers to collect a number of such core samples from deep areas around the centre of the lake so that the sedimentary layers could be analysed in 3mm-thick slices to determine whether they contained any trace contaminants as a potential legacy associated with surrounding land uses. In addition high definition digital underwater photography (both stills and video) would serve to verify the procedures and provide the first visual record of Blue Lake's deepest unexplored areas which could be used for both scientific and general-interest purposes.

The first trial sediment-coring dives for the 2008 project were undertaken during the weekend of the 9th and 10th of February. The team comprised trimix-certified cave divers Grant Pearce, Dr Richard "Harry" Harris and John Dalla-Zuanna and they were supported by air/nitrox diver Gerret Springer. Underwater visibility, especially on the bottom at 62 metres, was very good and the team collected several cores about 150m out from the pumping station pontoon. These first trials proved to be very successful as there was virtually no compaction of the sediment layers in the coring tubes, so the more comprehensive second phase was approved for the weekend of the 29th and 30th of March,

The trial dives of 9th and 10th February 2008 (GS/RH)

The first photographs of the silty bottom of the "bottomless" Blue Lake, taken by Richard Harris at a depth of 62 metres, served to verify the coring of the sediments out from the pumping pontoon. The short PVC coring tubes could easily be pushed into the soft powder-like silt.



Some very unusual (presumably stromatolitic) formations found by the first trial dive team, and (below) Grant opening the first core tubes, revealing the first 30cm or so of layering of the Blue Lake's bottom sediments (RH).

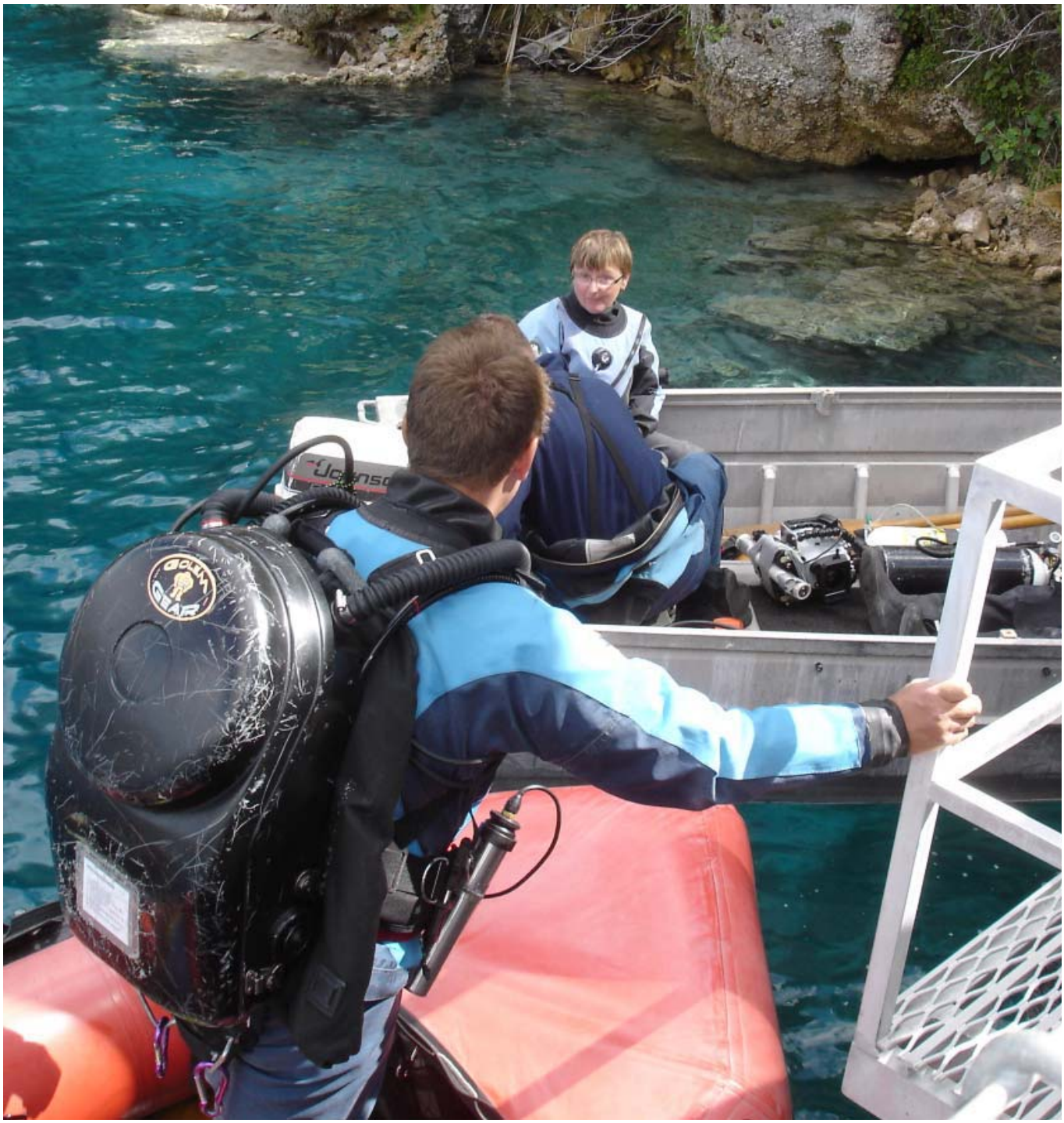
The personnel for the 29-30 March 2008 dives in Blue Lake comprised the previouslymentioned divers along with trimix-rated cave divers Chris Edwards, Craig Howell, Gary Barclay and Linda Claridge (the "deep team") and supporting experienced deep air divers Ian Lewis (geomorphologist) and the author (coordinator of the Blue Lake diving research projects of 1985, 1987, 1989 and 1991). A total of four dives were undertaken that weekend: three "deep team" trimix dives to the Blue Lake's floor (two out in the approximate centre of the lake to **72 metres** and one near the NW wall's "stromatolite field", where the water was only a few metres shallower at **67m)** and a single filming and exploration air dive to around 50 metres in an area where several deep air dives had originally been undertaken during the author's earlier projects.

The second phase of the study involved a considerable amount of effort to manhandle the masses of heavy and bulky equipment (e.g. dozens of scuba cylinders, several rebreathers and even an inflatable boat) onto and off the two skips – the first near the rim of the volcano's crater and the second close to the pump pontoon at the bottom (PH).

Because all previous research dives in Blue Lake had been undertaken only in the months of January (1985, 1987, 1989 and 1991) and July (1985 again), nobody knew for certain what conditions might be like on the bottom of the lake around the time that it begins to change from its internationally-renowned brilliant fluorescent summer turquoise colour to its colder steely blue-grey pre-winter appearance in March-April. This study was also undertaken at an exceptional time because the dives took place at the end of what turned out to be the hottest March on record in South Australia, as well as being at a time of extreme drought throughout the country; in fact during this project SA Water had employed some contractors to modify the water pumping pontoon and support structures because of the recent 3-metre drop in water level and to cater for any further such lowering of the regional water table.

Based on observations during the previous explorations of the lake, the team anticipated that the surface visibility would in all likelihood be around 20 metres or so and also that conditions on the bottom would be somewhat similar to those observed around the walls during the earlier studies, which would make for ideal sediment-collecting conditions. The first team was intended to comprise Grant (safety line and sediment-coring), JDZ (videography/safety) and Harry (photography/safety), but unfortunately Harry experienced a minor problem with his rebreather just after he entered the water so Grant and JDZ continued the dive while Harry returned to the pontoon to fix it. John videotaped the entire dive and he also wore a dive computer which was capable of recording such key dive parameters as dive time (seconds), water depth (metres) and temperatures (in degrees Centigrade) for later downloading and analysis if necessary.

Project Leader Grant Pearce (left), and John Dalla-Zuanna (aka JDZ) dons his rebreather while Gary Barclay and Harry Harris look on (PH).



Last-minute planning discussion between Harry and Linda (PH).

The first centre-of-the-lake deep team found that the surface visibility was indeed quite good, around 20-25 metres or so, and JDZ's dive computer registered a surface water temperature of around 25°C, although the reliability and accuracy of such dive computers when it comes to temperatures is unknown at this time. Naturally the water cooled during descent, but it seemed to be a relatively gradual drop without the same kind of significant thermocline layering which has always been encountered during summertime dives that were done in the past. The coldest temperature recorded during the dive was around 16°C.

About 25 metres into their descent, Grant and JDZ passed through a region of significantly reduced visibility before breaking through into a much clearer (but also darker) layer at around the 40m mark. They were both pleased to find such clear water and were optimistic that they

Gerret in SA Water's aluminium dinghy (with Linda and JDZ) prepares to tow Harry and Grant out to their drop zone in the middle of the lake, and (right) Harry doing final checks of his rebreather before hopping into the water. The pumping station pontoon can be seen in the background (PH).

would easily achieve their goals under such ideal conditions. However, as they approached the 60m mark they were surprised to see that the apparent "bottom" of the lake some 10 metres below had taken on something of a foggy, cloud-like quality.

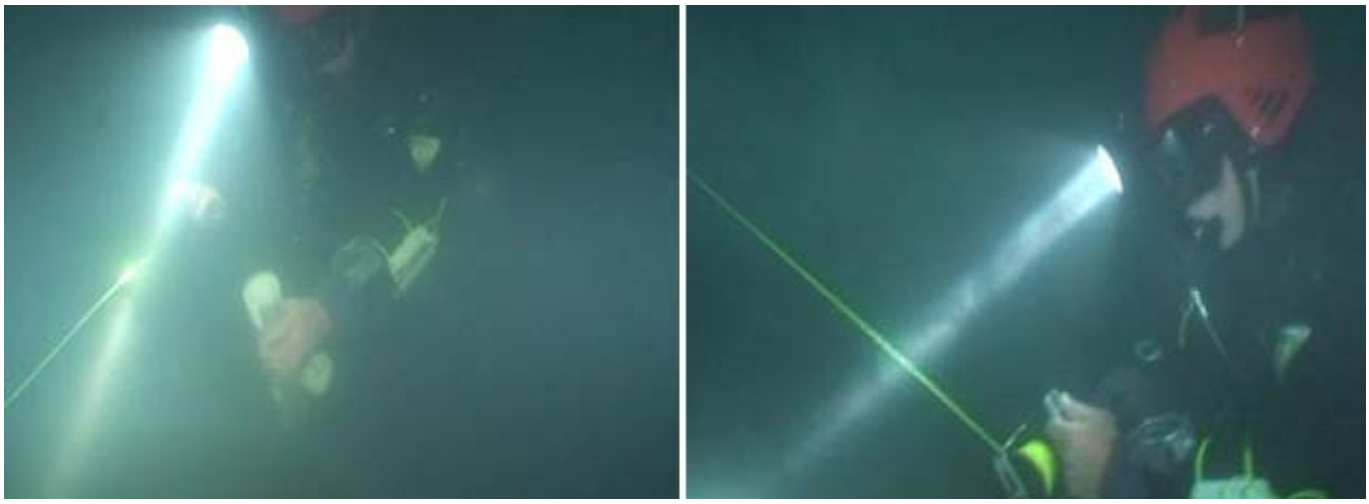
They didn't have a clue about what this unexpected phenomenon might be or what it could be hiding below, and as they descended through the interface into the murky layer they became a little concerned to find themselves encountering low-vis conditions at such a considerable depth (the visibility had dropped from 20-30 metres to only 1-2 metres in less than a second in the deepest known area of the Blue Lake!). Fortunately this layer turned out to be just a few metres deep, and they gently touched down on Blue Lake's flat and relatively featureless bottom a few moments later (thanks to Grant's relative lighting position JDZ was able to capture their approach to this layer on video – see the low-resolution framegrabs on P 13).

Grant and JDZ quickly re-established contact with each other before Grant deployed his cave diving jump-reel line by tying it to the bottom of their vertical shotline and commencing to swim off for several tens of metres in the hope of finding clearer water so that JDZ could video their silt-coring activities. He was however unable to find any clearer water, so he quickly set about getting his first core. This attempt was successful but unfortunately when Grant groped about in the murk to locate the basket so he could get another coring tube, he was unable to locate it and he was forced to turn the dive somewhat earlier than planned. It is highly likely that Grant's innovative core-tube basket (along with its PVC tubes and relatively-expensive stainless steel connecting clips) will now become a permanent feature of the Blue Lake; despite improvements in human technology, such activities can't be taken lightly or be considered to be simple and mundane … the awesome Blue Lake is still a force to be reckoned with!

The second "deep team" group consisting of Harry, Gary, Craig and Chris performed their dive soon after Grant and John returned and despite the atrocious bottom visibility conditions and some "interesting" in-water gear-management issues, they succeeded in collecting several excellent cores. Unfortunately Harry's auto-focus camera was unable to cope with the

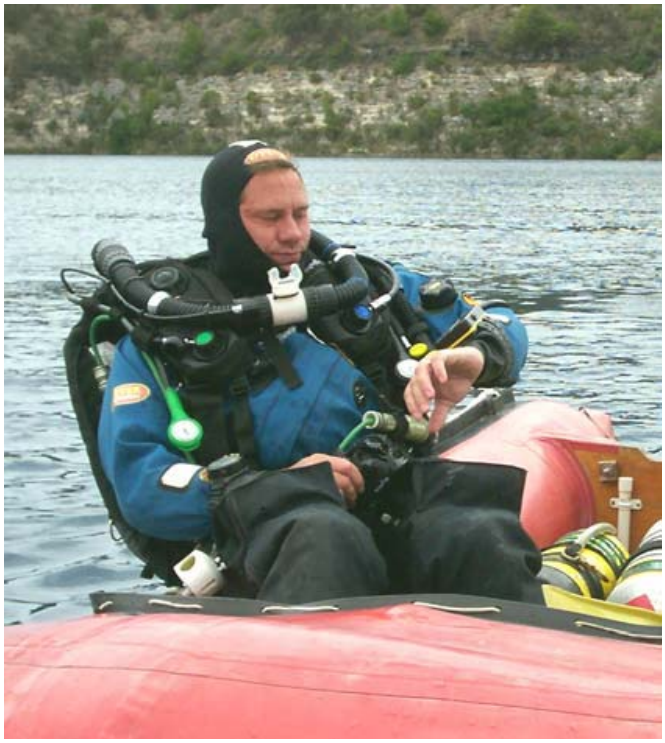
Images from John Dalla-Zuanna's high-definition video of the first-ever descent to the floor of the Blue Lake in its deepest known area, approximately halfway across the lake from the pumping pontoon. These shots record the moments when Grant's torch first reflected off the top of the weird "cloudy mist" layer just above the bottom at a depth of around 70 metres and shows the reduced visibility they experienced as they descended into this layer (frame-grabs by JDZ & PH).

Grant heads off into the gloom after tying off his jump-reel to the shotline in a fruitless search for clearer water in which to collect his samples. It was under these unhelpful conditions that he lost contact with his core-tube basket (and the tubes) forever!



(Above) Core tube in hand, Grant begins the laborious work of reeling in his safety line; (P 14) back at the shotline, another surprise: the "mist" had somehow mysteriously parted to reveal previously hidden bottom features under much clear visibility conditions.

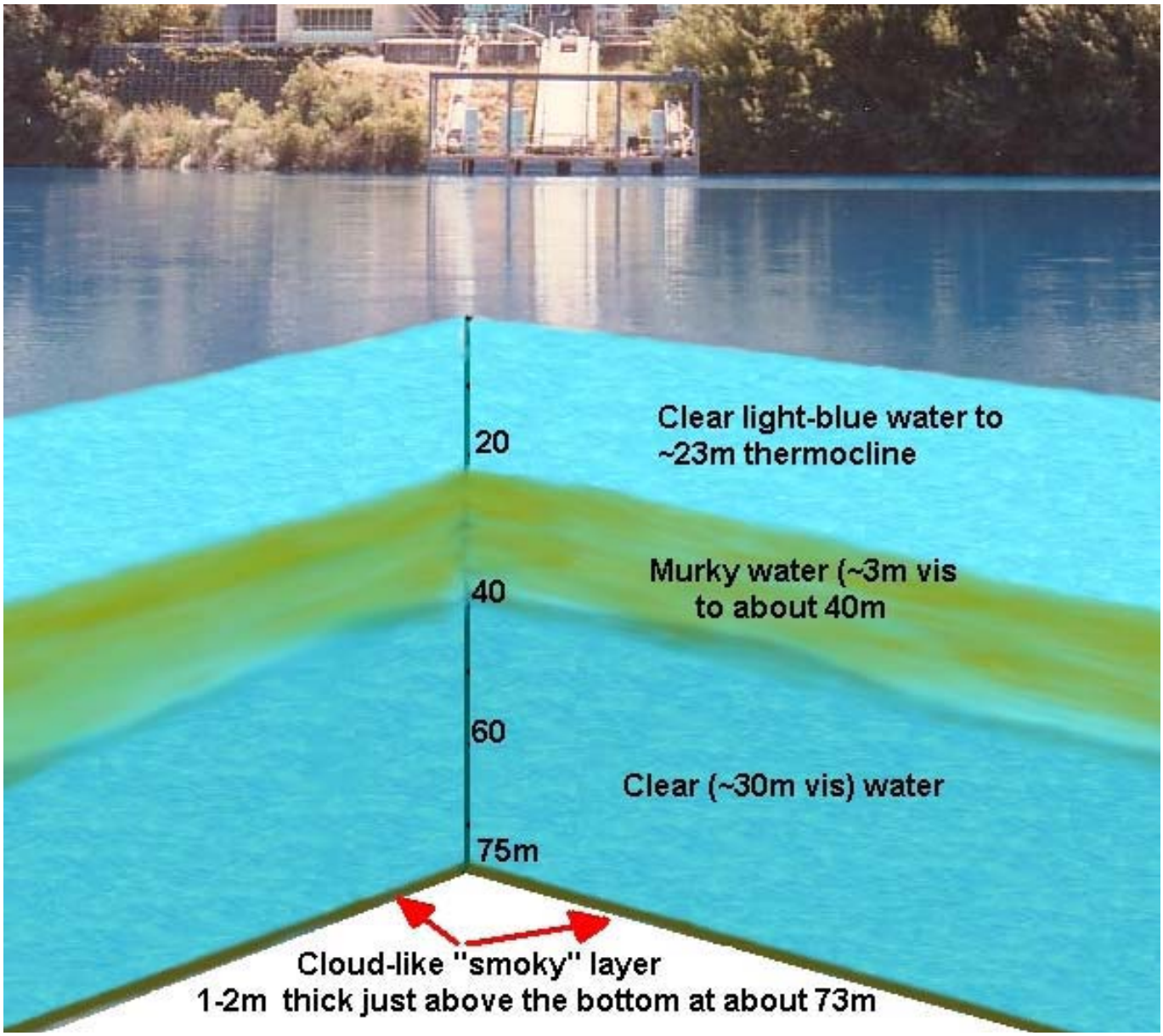
bottom silt cloud, so he could not take any photos of the team's activities during this dive.



(Above) Linda, Craig and Chris heading out for the second deep dive, and Craig doing some last-minute equipment checks; (P 15) 3D cutaway representation of the centre of the Blue Lake (PH).

The presence and possible makeup of the misty cloud-like layer at the bottom of Blue Lake prompted considerable discussion amongst team members back at the pontoon. Theories about its nature included it being suspended particulate matter from the placement of the divers' shotline a day or two earlier, some kind of "dead zone" in the centre of the lake (where gently-circulating water around the perimeter of the lake results in a centralised deposition of all kinds of matter, perhaps thousands of years of age), and the possibility that it may have been biological in nature, e.g. zooplankton which may migrate back towards the surface at night (this latter idea came about after the author observed JDZ's video and noted that the visibility around the divers' shotline improved dramatically after they had disturbed the bottom water there; this is a similar effect to planktonic movements that he had observed in shallower regions during earlier projects). At present the phenomenon remains unexplained, and it is the author's opinion that it should be more thoroughly studied in the future, particularly if it is a toxic gas such as hydrogen sulphide or involves a huge, previously-unaccounted biomass of some type.

In view of the poor visibility conditions that the deep teams encountered on their first two dives in the middle of the lake, it was decided to conduct the final core-sampling dive in an area



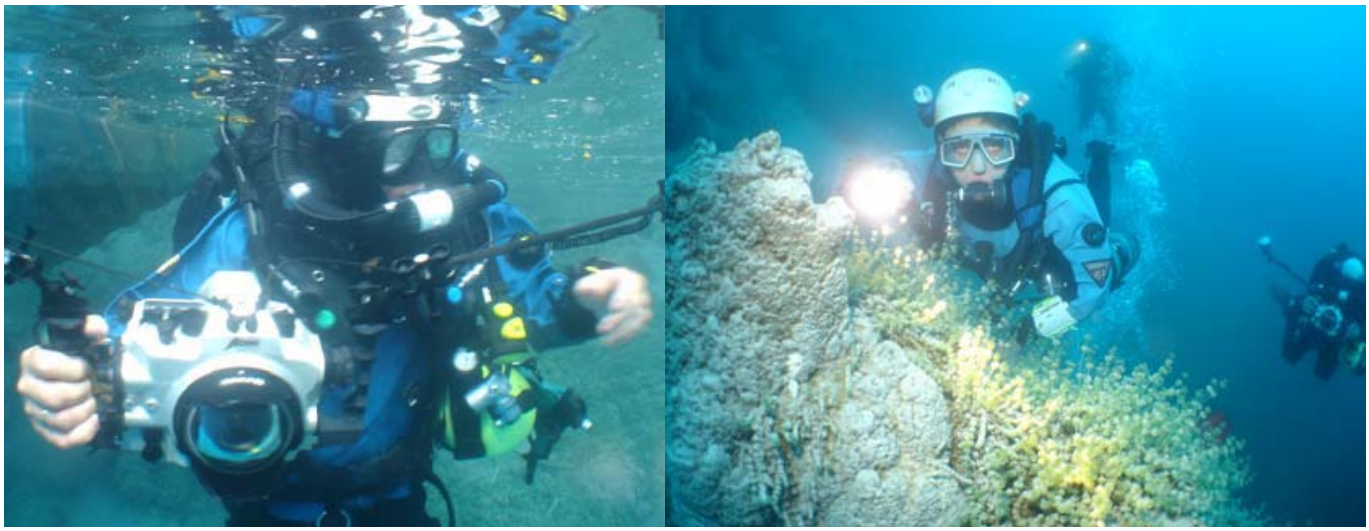
where past experience had afforded ready access to much clearer conditions at depth. For this reason the author suggested a sheltered bay-like area (known as the "stromatolite field" because of the vast array of very picturesque stromatolitic structures to be found there) near a fissure in the northern wall of the lake for this dive. Although the water on the bottom in this area was about 6 metres shallower than out in the centre of the lake, it was still a representative area of Blue Lake's floor and it was felt that a comparative sample from this location would be of considerable interest. Additionally the interesting stromatolitic features could also be assessed and recorded using more modern video and photographic techniques.

The shotline was retrieved from the centre of the lake and moved around to the stromatolite field bay, where it was re-dropped to a depth of about 65m about 50-80 metres out from the bank. The air divers assessed, photographed and recorded the environment and the stromatolites in that area while the third "deep team" divers prepared for their core-sampling and photo/video dive here.

Everyone was pleased to find that the underwater visibility in this area almost precisely mirrored all of the previous summer explorations of so many years before; at the surface horizontal visibility was again about 20 metres to the first main thermocline at a depth of around 23 metres, where vision faded into a foggy, greenish-grey haze of just 4-5m visibility.

The approximate areas explored and sampled during this study (photo courtesy City of Mount Gambier)

The "stromatolite field" air-dive team was taken to the area in the tinny by Chris (left) and was comprised of (L-R) the author, Gary, Gerret, Ian, and (in the red rubber-ducky) Craig, with Linda assisting (RH).



Craig with his underwater camera and Gerret observing stromatolitic formations and their accompanying Chara algaes (GB).

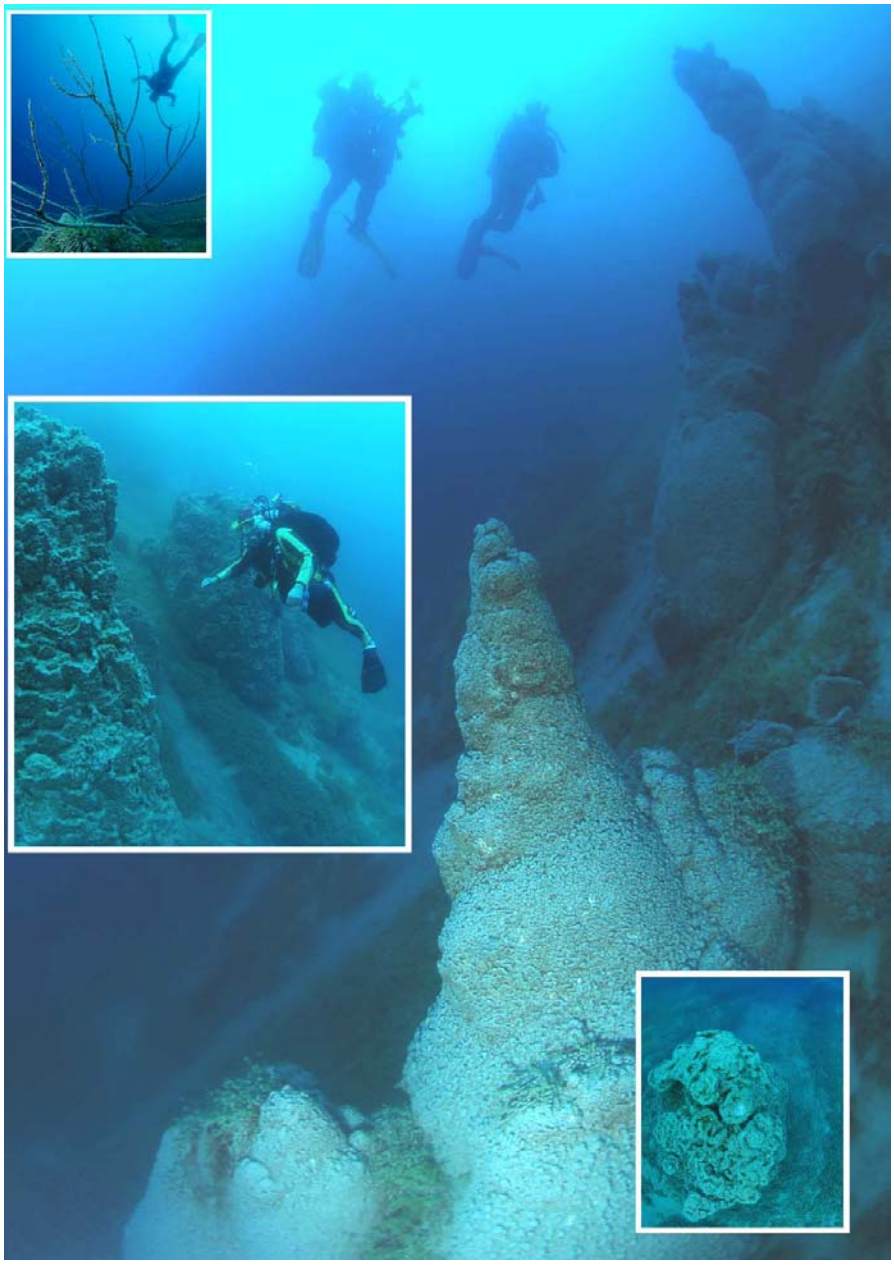
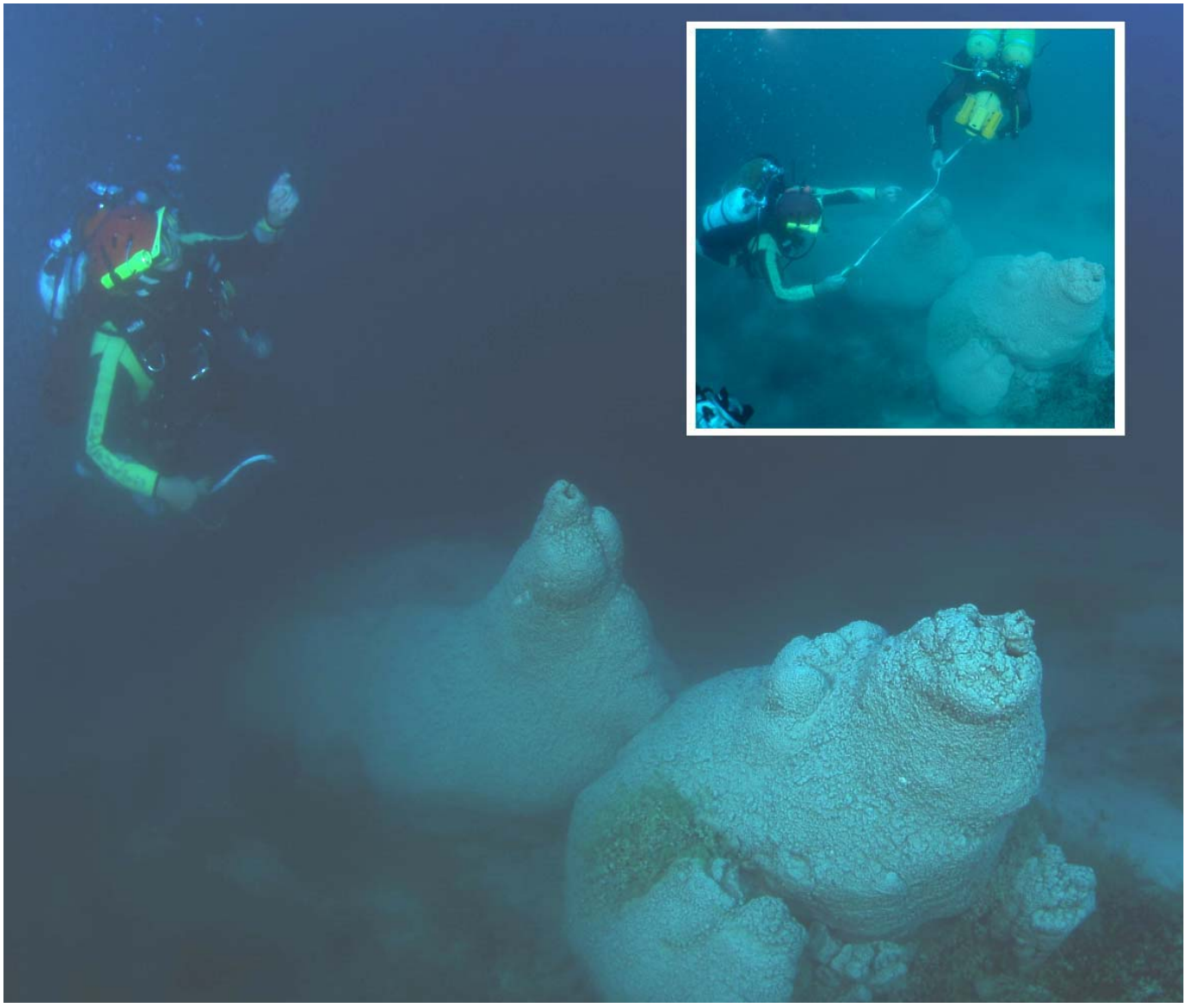


Photo-montage highlighting some of the spectacular views around the "stromatolite field" (CH).

The author and Ian checking out some of the stromatolitic features which covered branches and boulders down to about 25 metres (GB).



The change in visibility from 23 to 27 metres can readily be seen in these photos of the stromatolitic formation dubbed "The Seals" (CH & GB).

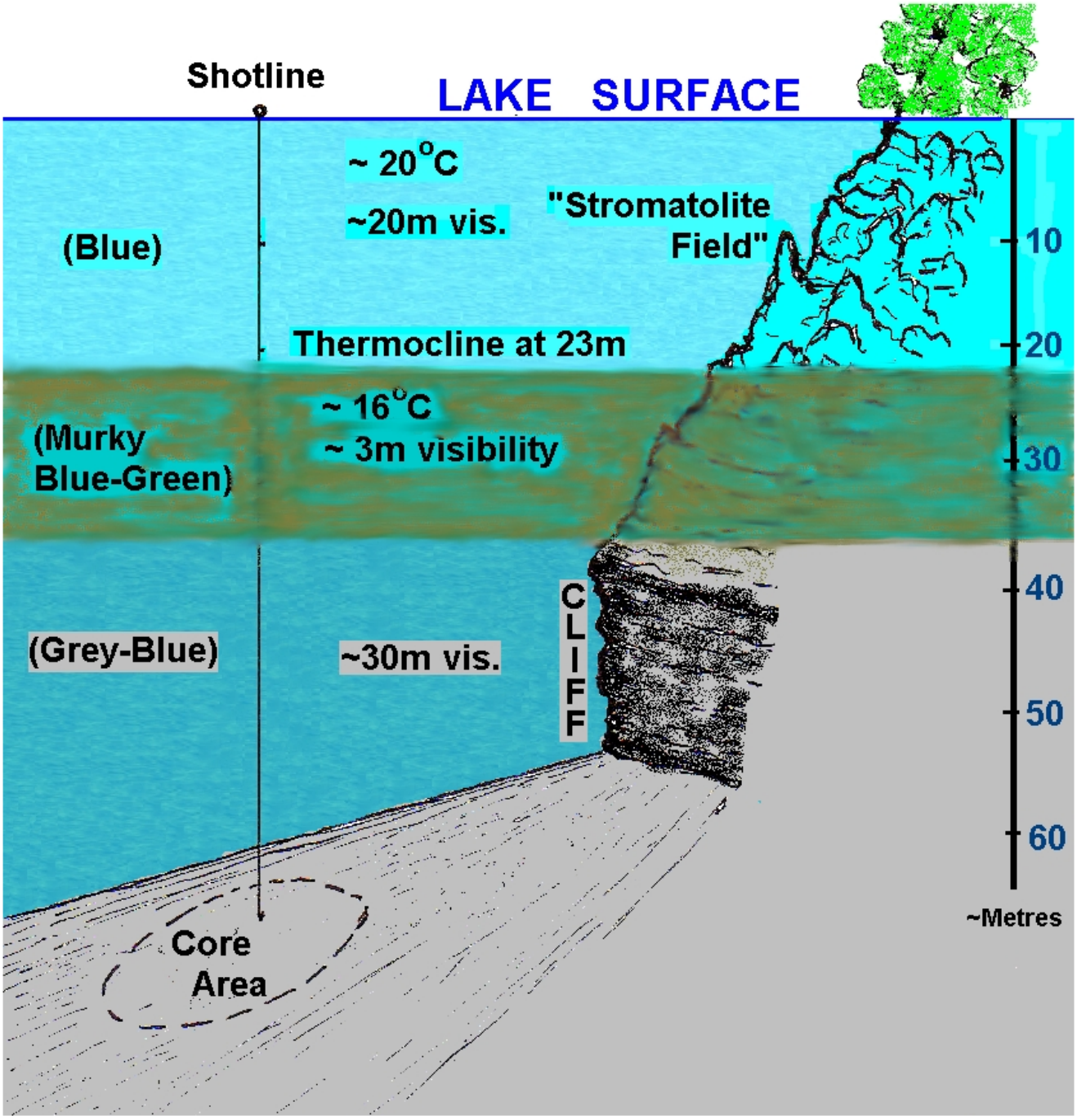
The overall condition of the Stromatolite Field was found to be very good, and Gerret also noticed some plants or algaes which reminded him of the type of smothering growth that periodically devastates Ewens Ponds. Gerret's keen eye for detail also led him to discover an unusual whitish filamentous-like object hanging from the top of a small alcove at around 38m; enhanced photos were sent to Associate Professor Keith Walker (Adelaide University) but unfortunately they did not provide enough information for a definitive identification (Keith's best guess was that it was a bryozoan or a fungus, but it would require a specimen to enable it to be identified). After the main dive was completed the team swam back to the pontoon, and Ian then spent another half hour or so snorkelling around the walls further to the NW, noting various geological features of interest (see Attachment A).

Shortly after the shallow team had completed its activities, the final deep team dive took place in ideal conditions; the bottom visibility was ideal for the photographic and video recording of their activities and the desired sediment core samples were successfully collected. JDZ and Harry had very successful filming dives (see the following representative photos on the following pages), and Harry also took special note of two interesting features he observed: several light brownish-coloured objects seen on the face of the visually-spectacular vertical cliff which are evidently some type of freshwater sponge growing in the perpetual-twilight region of Blue Lake, and filamentous-like strands seen to be apparently growing on submerged branches on the bottom that may be hydroids, as they appear similar to those that were observed on freshwater sponges which were collected during the author's January 1985

Gerret's discovery of an unidentified mesh-like feature in a small alcove at 38m (CH).

research project (refer to comparative photos). In addition the team's bright helmet-mounted cave diving lights, movie lights and strobes revealed that the normally-dark and gloomy face of the underwater cliff was actually extremely brightly coloured in complex patterns of green and red bands.

Sketch by the author (not to exact horizontal scale) showing the areas explored by the air and trimix teams at the "stromatolite field" wall on the NW side of the Lake, and (P 21) the first digital photos of the deep team's descent to the floor of Blue Lake at 65 metres (RH).



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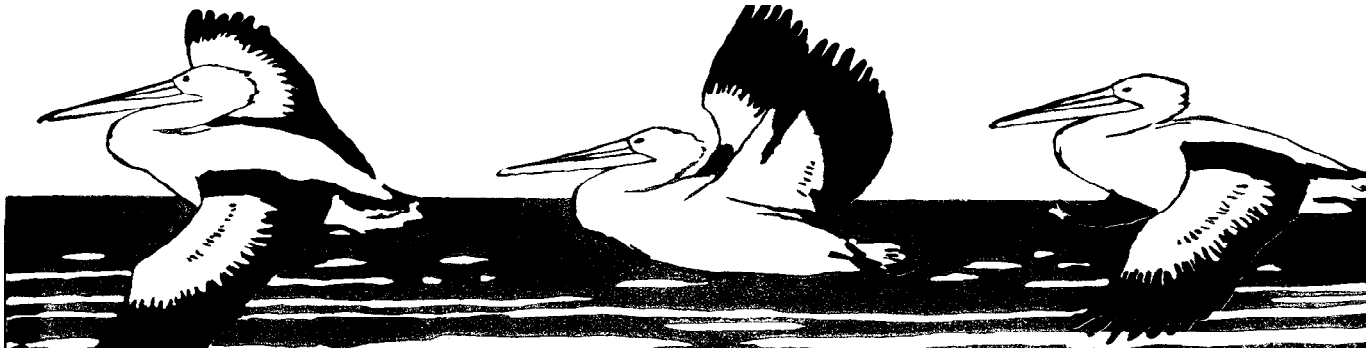

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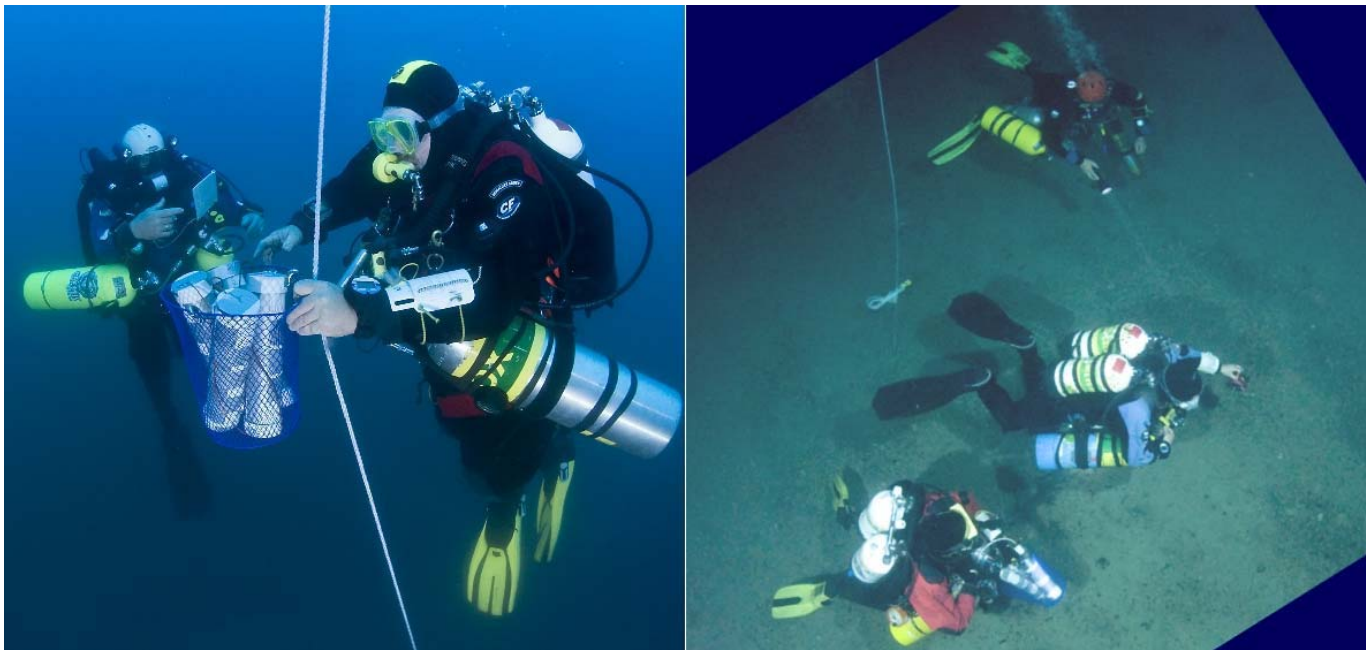
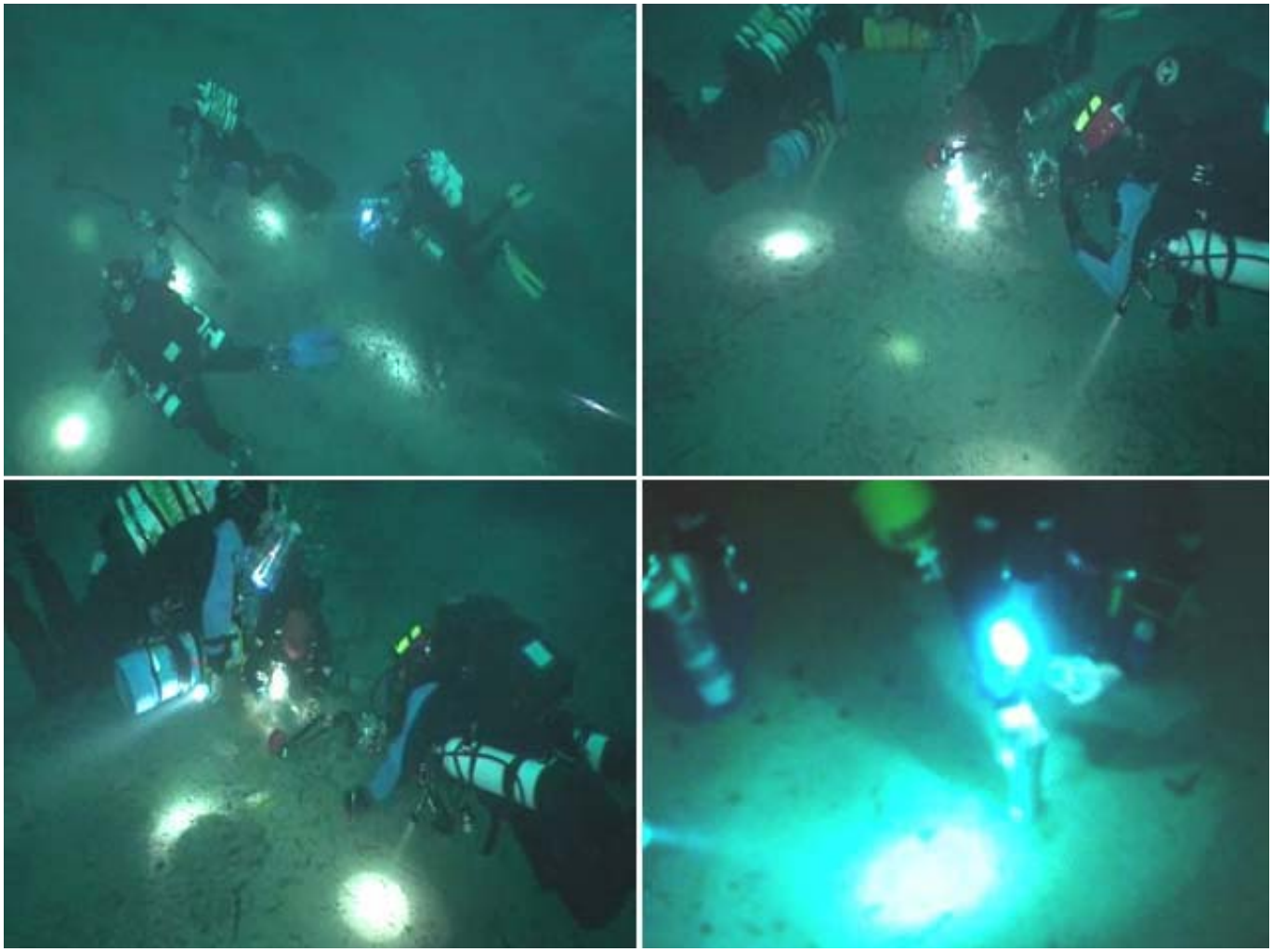
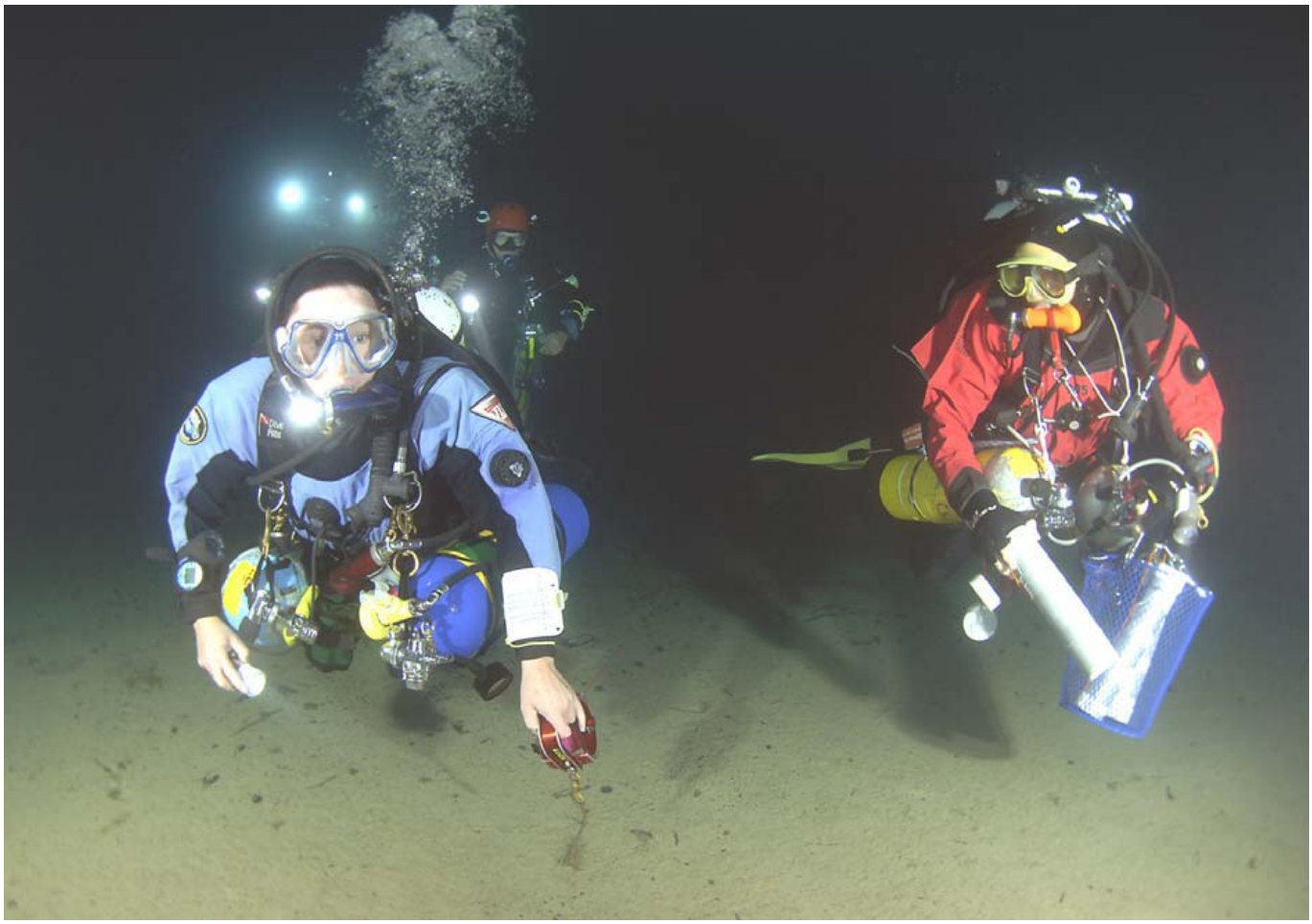
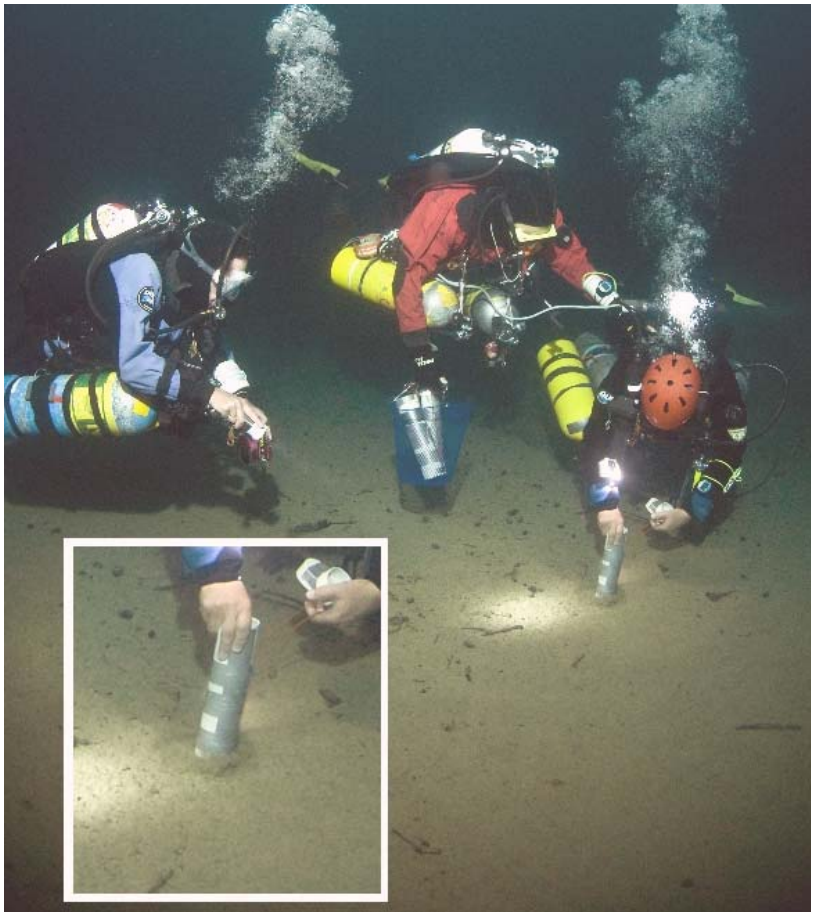
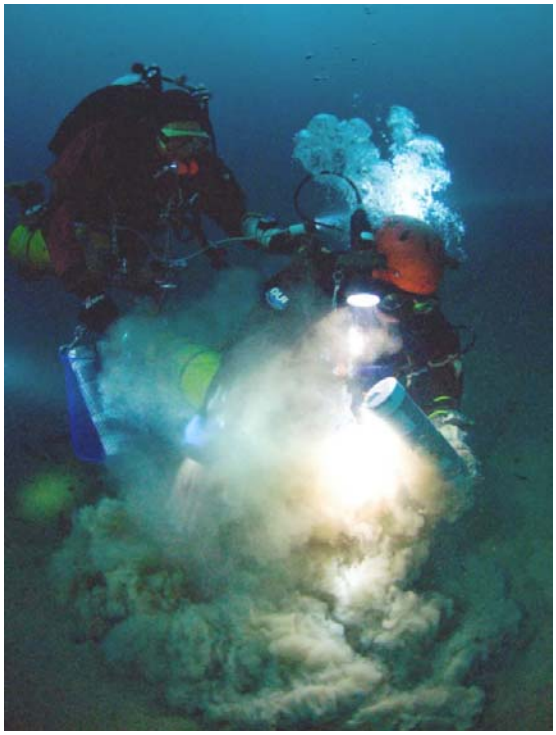


(Below): Video frame-grabs of the deep team's activities at this location (JDZ/PH), and (Top P 23) Linda runs out a safety and reference line while Chris handles the coring tubes at the "stromatolite field" sampling station (RH).



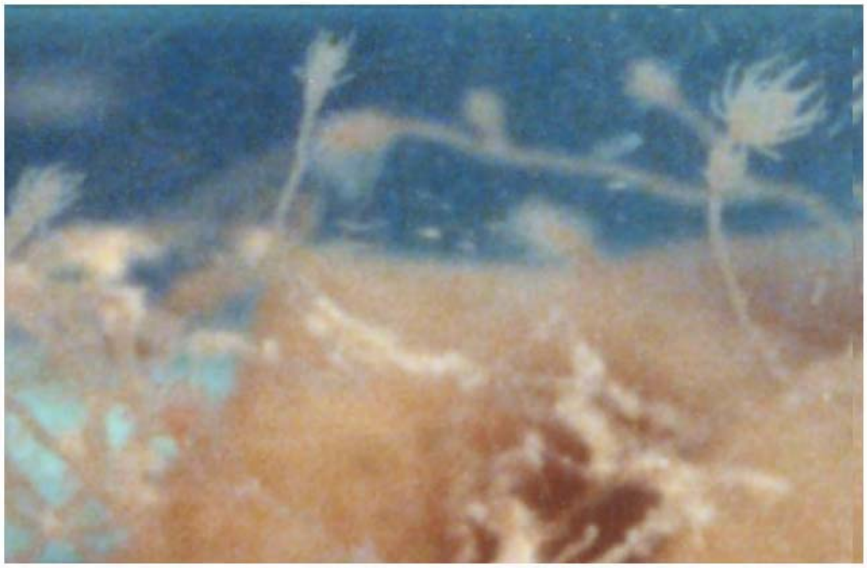


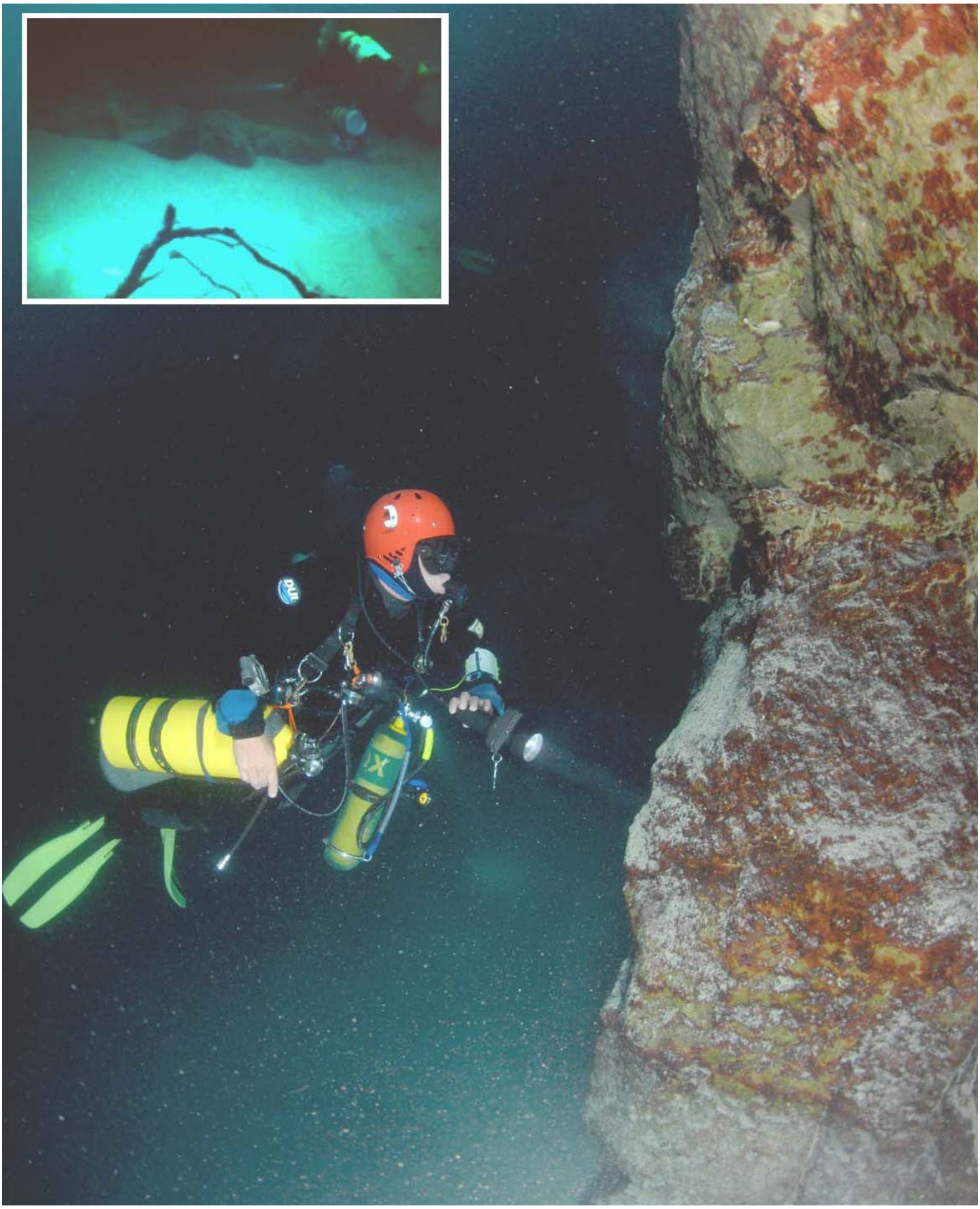




More photos of core-sampling activities by Grant, Chris and Linda (RH).

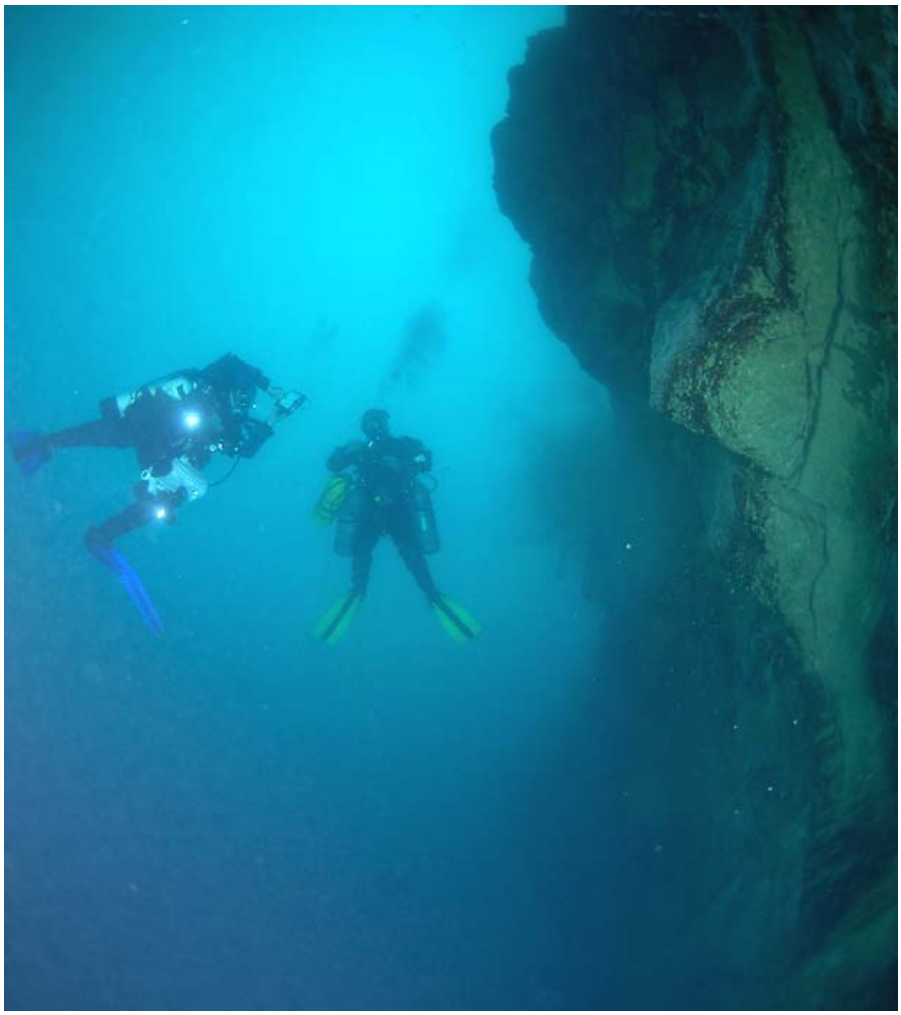
Fine hair-like filaments observed and photographed by Harry may have been hydroids (see comparative photo at bottom, taken by the author in 1985).



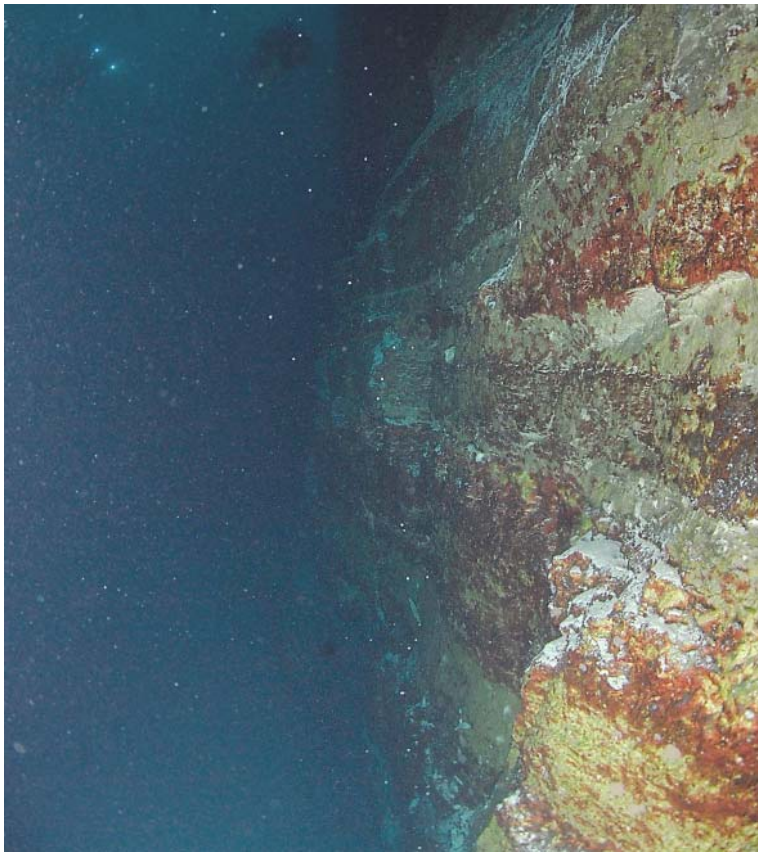


The area where the Blue Lake's relatively featureless, powdery floor meets the bottom of a sheer, 20 metre high underwater cliff (c. 55-35m) is very spectacular. In natural light there is no indication of the cliff-face's brightly coloured orange, yellow and greenish bands and patterns, and it was a real surprise to everyone involved when their lights revealed such beauty here, in the deepest areas of the lake (main photo RH; JDZ's frame-grab enhancement by PH).

View of the transition zone between the Blue Lake's flat floor and the 20 metre high vertical cliff, and sponges on the brightly-coloured wall a short distance from the bottom (RH).



More of Harry's excellent photos showing the nature of the underwater cliff and the colour banding on its face.



Some stromatolitic features in the shallows above the final sediment-coring sample point, and (below) hovering over a Chara bed (RH).

While Grant was at the 6 metre decompression stop with the others near the Stromatolite Field after the final deep dive, he made the interesting observation that small particles were drifting by, indicating the presence of a slight current moving towards the east (i.e. clockwise around the lake). To check this further, Grant stopped finning and stabilized himself relative to the water column by tucking in his arms and legs, and he was very surprised to find himself slowly drifting past Gary and Linda while they maintained their stationary positions at their decompression stops. Grant estimated that over the course of some 5 minutes, he drifted about 50 metres from the others, equating a current velocity of around 0.6 kilometres per hour! The cause of such a phenomenon in the shallower regions of Blue Lake is not yet known, but Grant speculated that surface winds may have influenced the formation of a shallow current or that the water movement may have been a precursor to the seasonal overturning of Blue Lake's water column which was due to occur within the coming days or weeks. Grant's observations are all the more interesting because no other divers had observed water movement in the Blue Lake before; indeed, some very basic attempts by the author to locate possible inflow areas on the northern side of Blue Lake during the January 1985 project (by similarly looking for movement of fine particles in wall fissures) did not reveal any apparent water movement at that time.

Discussion

The efforts of the Blue Lake 2008 diving project team resulted in a considerable amount of new scientific data being collected which we hope will serve to better protect this extremely important feature by identifying any significant pollutants which may have been caused by land use practices around Mount Gambier and the Blue Lake. An important flow-on effect of the study was the considerable media attention and public interest in the team's findings, and especially the videos and photos that were obtained of Blue Lake's floor for the very first time. Unfortunately a few aspects were incorrectly reported by the media (these were not in fact the "first dives in Blue Lake beyond 40 metres" or "the first dives to the bottom of the Lake"), but such aspects were unimportant in view of the overwhelmingly-positive stance the media chose to utilize for their reporting in this instance (see attached scans of relevant newspaper articles).

As has generally been the case during previous studies in Blue Lake, every project leaves us with more questions than answers: the identification of the sponges found on the vertical wall and the filamentous-like features which were found in various areas of the lake (including the bulbous structure Gerret discovered in the 38m alcove), the constitution of the fog-like layer near the lake's floor in its deepest-known area and its potential water quality impact/s, the cause/s and nature of the movement of water at various levels in Blue Lake and the numerous geomorphological question-marks that were raised as a result of Ian's dive in the lake (again refer to Attachment A) are all issues that require further detailed study.

Acknowledgements

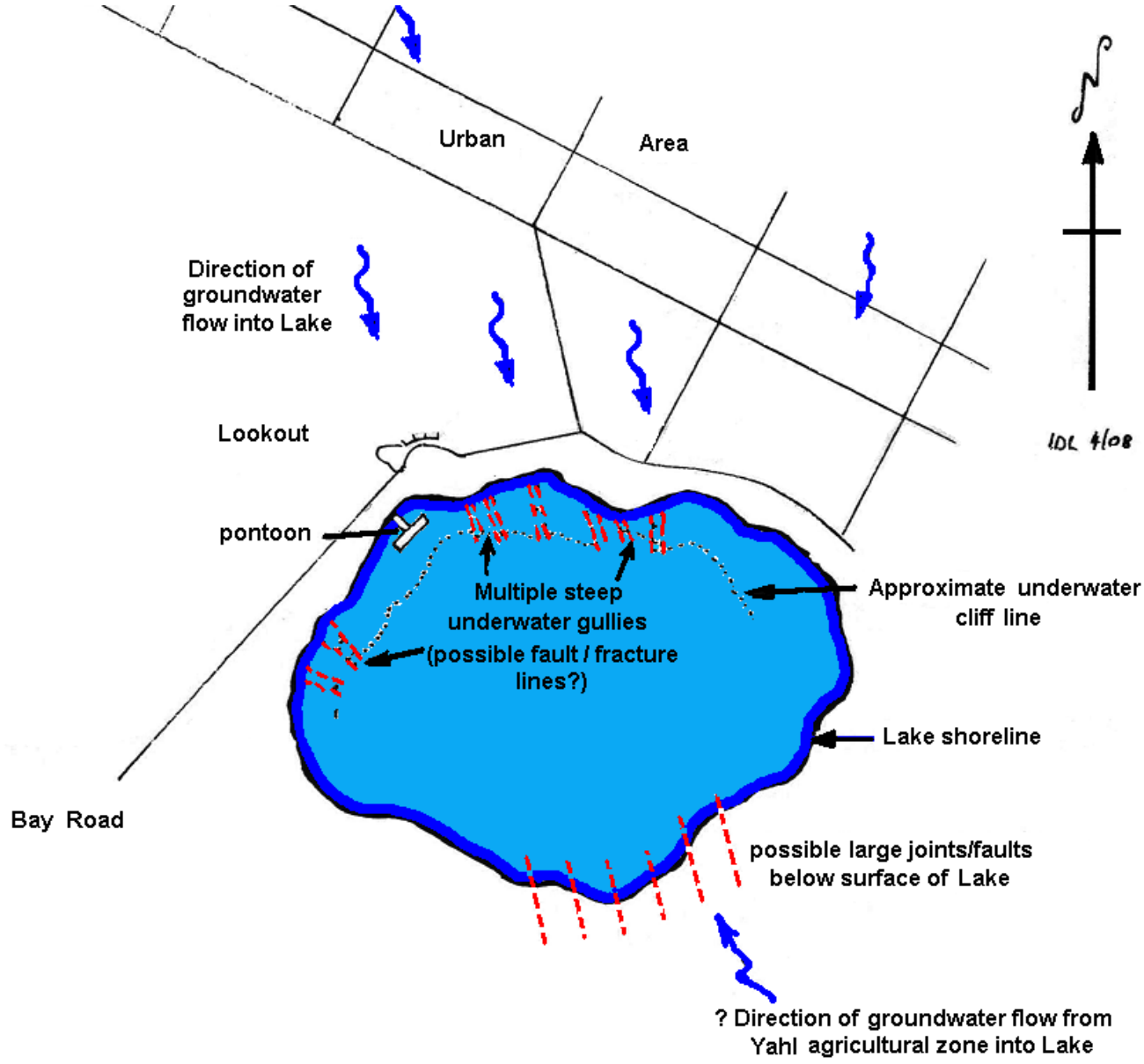
The Blue Lake 2008 study team would like to express its appreciation to the many individuals without whose support and interest this project would not have been possible. Andy McPharlin (South East Service Delivery Manager for SA Water and Chairman of the Blue Lake Management Committee) is especially thanked for putting in a considerable amount of additional off-duty time to assist at the site during the weekends involved. In addition the author would like to extend his personal thanks to Paul Harvey (Manager, Murray-Darling Systems, Department of Water, Land and Biodiversity Conservation, Adelaide) for providing photos and information about previous Mackereth coring work for this report as well as his invaluable ongoing support for Blue Lake research since the early 1980s.

Blue Lake 2008 Research Team Diving Members
Top photo, L-R: John Dalla-Zuanna (a.k.a. JDZ), Grant Pearce, Richard "Harry" Harris, Gary Barclay, Linda Claridge, Chris Edwards and Ian Lewis;
Bottom photos, L-R: Peter Horne, Gerret Springer and Craig Howell.
(photos by Peter Horne).

Attachment A
Geology and Geomorphology Report
Blue Lake Research Dives – 29/30 March, 2008

Overview

During the Blue Lake sediment-coring project of March 2008, Ian Lewis and Peter Horne (in the company of cave divers Gary Barclay, Craig Howell and Gerret Springer) undertook a preliminary assessment dive in an anticlockwise direction around the walls of the lake, commencing along the NW sector and terminating at the pumping pontoon. This scuba dive was followed by a lengthy snorkel inspection (IDL) of the upper submerged walls to the extreme western edge of the lake (Fig 1). This has been the first opportunity for a Geomorphologist to dive in the lake and prepare a geological report. Three main geofeatures were examined: steep-angled erosion slopes continuing below the water surface, a large sheer vertical cliff zone deeper down dropping into flat sediment, and a mid-slope stromatolite field (Fig 2). Other smaller features were noted during the dive and rock samples were taken from near the crater rim to the sediment at 53m depth.



Drawn by Ian Lewis; additional artwork by Peter Horne

Figure 1: Plan view of Blue Lake showing submerged incised gully patterns and possible fracture zones.

Vertical Profile

The top walls of the Blue Lake crater are a high-angle weathered slope of well-vegetated ash layers. These layers are easily erodible but the vegetation cover holds it together well and prevents further rapid erosion and a lowering of the slope angle. The ash layers rest on a thick solid layer of basalt topped with scoria; the strength of this layer resists easy erosion of itself and the limestone beds which it covers. This generates the vertical cliffs running right around the lake approximately 30m high and dropping sheer into the water.

trenches terminating at the submerged vertical clifftop line. In addition the tops of similar large gullies were observable during the snorkel dive from the pontoon to the westernmost point of the lake (again refer to Fig 1). It is possible that these submerged gullies are developed along large regional jointing patterns in the limestone. They may even be expressions of a former fault line complex existing either within the limestone before lava flows and eruptions began, or which were opened up by the volcanic forces when they were released, prior to the formation and opening-out of the lake.

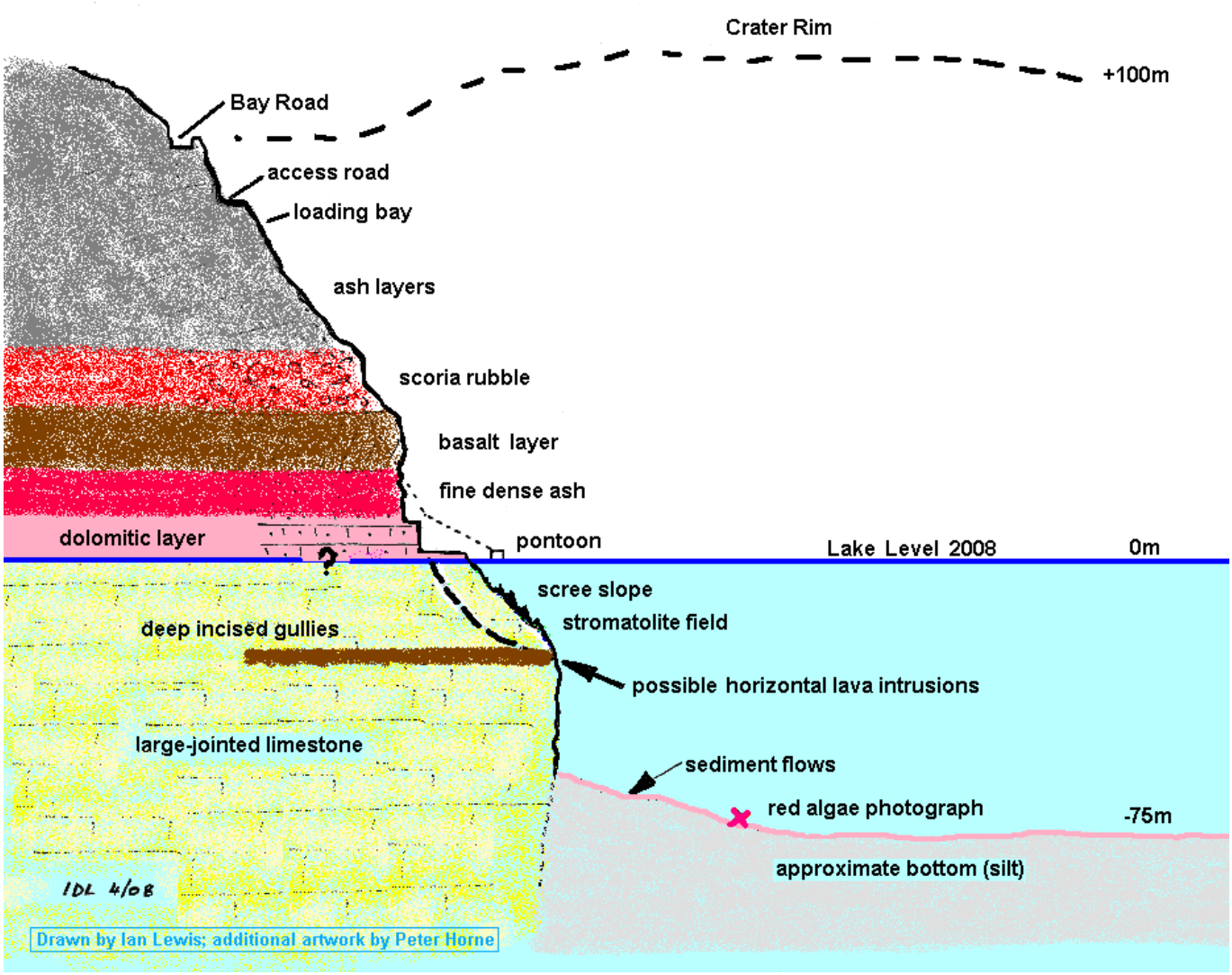


Figure 2: Northwest cliff geological profile.

Gullying

At several points around the lake, but particularly on the north-western and western sides, deep incised gullies have developed in the upper cliff slopes. During the dive a number of these were observed underwater continuing down the slopes in large, deep, steep-sloping

The underwater continuations may have been dry-land extensions at a time of much lower water level, for example during the last Ice Age some 18,000 years ago, when sea levels (and therefore the local groundwater table) were approximately 100m lower. Debate exists about the age of the lake, with estimates ranging from

about 4,600 years to 23,000 years (Sheard, 1978; Leaney, Allison, Dighton & Trumbore, 1993). If the younger estimates are correct, these deep gullies may not be erosive but associated with tectonic and/or faulting origins.

Groundwater Intake

The gullies referred to above may mark significant vertical fracture zones within the limestone, which at the north-western site would be areas of primary intake of the coastward moving groundwater. If so, these zones may be excellent points within the lake to measure intake quality of the groundwater from underneath the nearby city of Mount Gambier (which is "upstream" from the lake), with its issues of runoff into and pollution of the groundwater beneath.

Diagonally opposite the area which was dived are the south-eastern cliffs of the lake. Here also might be found continuations of the submerged gullies, joints and/or faults. Due to the peculiarities of the Blue Lake catchment basin and its flowlines into the lake, the southeastern submerged wall zone may also be a primary intake zone, although here the groundwater supply occurs from under agricultural land, not urban. Consequently, water movement/quality measurements under the SE wall would be of valuable comparison to a NW wall-monitoring programme.

Submerged Cliff Line

The deep vertical cliffs of the NW sector (approximately 30-55m depth) are massive-bedded, all within the limestone and show occasional large jointing very similar to the walls in the nearby cenotes (sinkholes) called Little Blue Lake, One Tree and Ela Elap some 12 kilometres south of Mount Gambier, near Mount Schank. Due to dive-time restrictions relating to depth and air supplies, and the low light conditions found at depth, these regrettably could not be examined in any detail. Of particular interest would be to closely examine the layering at the top of these cliffs to see why the slope change occurs here; there could be a resistant layer of limestone or chert (flints), or a thin band of lava which has forced itself horizontally into the limestone into a weaker bed at that level (refer to Fig 2). Such information would most likely be best obtained at the intersection point of one of the steep gullies where it cuts into the clifftop edge.

Stromatolites

Although stromatolitic formations have been found in many parts of the lake, the NW sector known as the "Stromatolite Field" (see Figure 3 on P 34) is currently the only area known where they appear in such numbers and varieties of form, as well as being found from just beneath the surface to a depth in excess of 25 metres (pers. comm. Peter Horne, 1985). This contrasts with the range and location of other stromatolites in the sinkholes of the region, which are richly-developed all around the sinkhole walls for 360 degrees. Possible explanations for the Blue Lake restricted zone may be:

- some factor of sunlight conditions in that corner (more shaded through the day)
- situated near the postulated jointing/faulting cluster in the NW walls where groundwater intake occurs
- factors of intake water freshness, chemistry and/or temperature at this point.

If the last point above applies, examination of the SE wall on the opposite side of the lake will provide interesting comparative evidence if stromatolites can be found there.

Other Observations

Dolomite

Engineering works at water level next to the pontoon have cut into the rock there. This appears to be a thick band of light pink dolomitised limestone which is evidence of "cooking" of the original limestone surface when the eruptions began. It is likely that initial emission rose up a large linear fault/joint system which already existed, and the dolomitic layer just above lake level suggests that the initial volcanic phase was not explosive but a slow flow leaking of lava across the limestone plain surface, "baking" the limestone as it covered it. Ash and steam eruptions would have therefore been a later phase.

Calcrete Growths

A small sample of black-coloured rock was found resting on the mid-slope, with the beginnings of stromatolitic or phytokarstic algal/ calcite crust developing on it to about 5mm thickness. Such growths are much more abundant and thick on limestone blocks and organic bases (eg drowned trees) but this sample was a flint block probably eroded out of a chert

band in the upper limestone layers near water level. Alternatively it may be a sample of very dense black glassy lava. It is an example of the capacity of the algal/calcite growths to develop on non-carbonate bases and on non-porous surfaces. At another point, similar growths were found developing on a discarded piece of ceramic pipe from earlier construction (1950's?). The deeper dives (70-75m) reported and photographed occasional dark stones resting in the white silt on the bottom of the lake which are likely to be lava blocks that have fallen from the cliffs above, but no samples were collected.

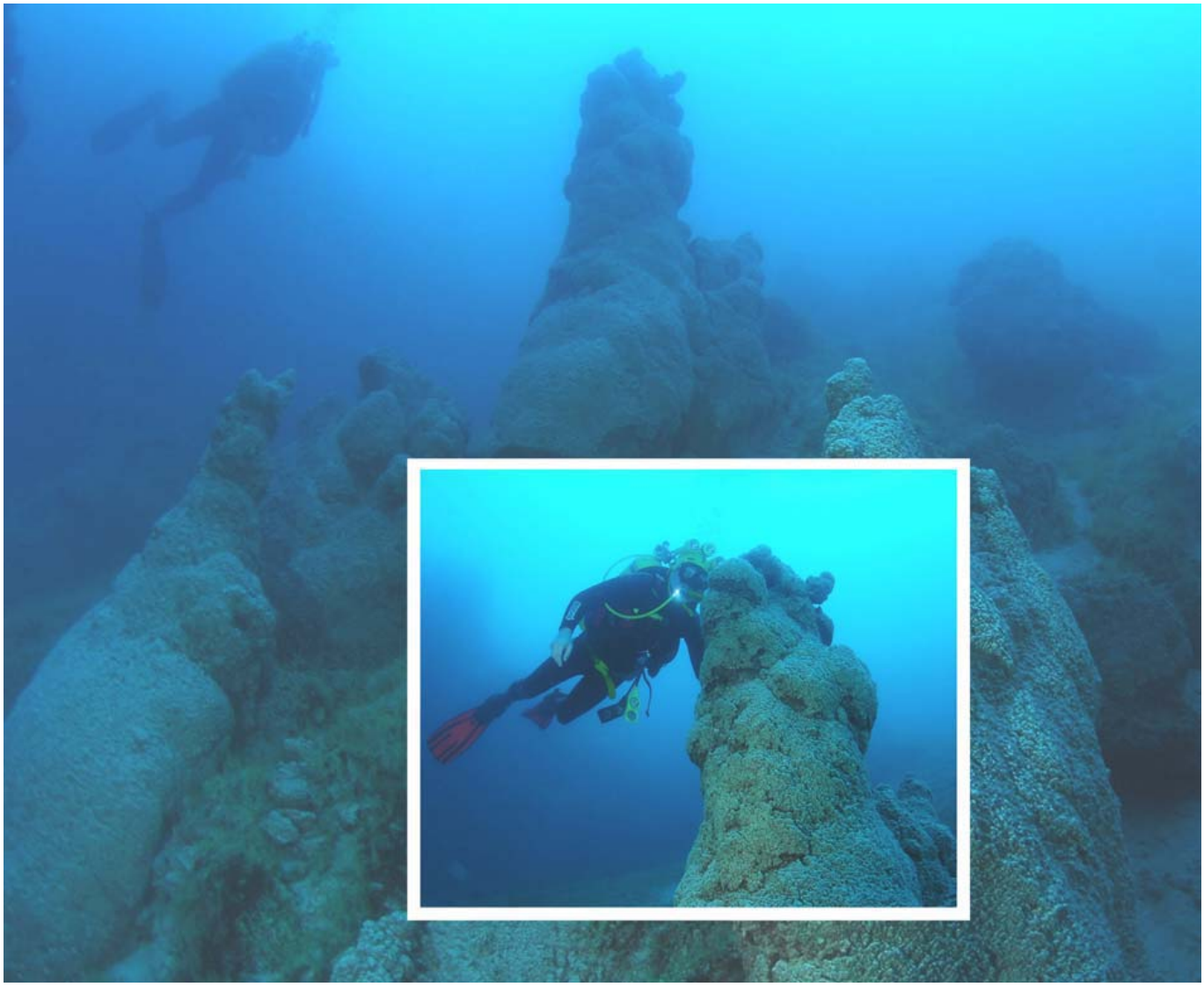


Figure 3: Typical view of the "Stromatolite Field" area on the northern walls of Blue Lake (courtesy Craig Howell).

Red Algae?

One set of excellent photographs by Richard Harris shows striking red colouration across the deep underwater cliff-face from about 45-60 metres. These initially looked like mineralization veins but may be an algal colouring. If so, this species has not been observed by divers in the region's sinkholes. Unfortunately there was no opportunity for taking samples on this occasion.

Sediment Slopes

Limited diving time also did not permit examination of an interesting series of deltaic sediment flows sloping at low angle into the lake bottom from the base of the submerged cliffs.

Comments and Context

From a geological point of view the dive was fascinating and it was a privilege to be allowed to participate. My thanks and acknowledgements go to Grant Pearce for including me in his team, to SA Water for the opportunity to do a geological assessment and observations, to Peter

Horne for acting as my scientific diving companion, and to the photographers – Gary Barclay, Craig Howell, Gerret Springer and Richard Harris – whose excellent photographic efforts allowed a lot more contemplation and analysis of this fascinating lake.

In closing, underwater scooters would be very helpful in assisting a lake transit and also for developing photo-mosaics of selected wall sections (such photo techniques are scheduled to be trialled in Kilsby's Hole later in 2008). They could then be applied to the three other sectors of the Blue Lake (NE, SE and SW) which await examination.

Ian D Lewis
BA Hons (Geomorphology), Flinders University, Adelaide
MA (Geomorphology), La Trobe University, Melbourne (in prep)
Life Member, Cave Exploration Group South Australia (CEGSA) Inc (Member #67/01)
Life Member, Cave Divers Association of Australia (CDAA) Inc (Member #258).

http://www.senrm.sa.gov.au/Portals/8/BlueLakeDeepDivers030408.pdf

Government of South Australia
South East Natural Resources Management Board

MEDIA RELEASE

3rd April 2008

Diving in the deep

Last weekend a team of technical divers successfully undertook a series of deep research dives to the bottom of the Blue Lake in Mount Gambier

The purpose of the dives was to take samples from the bed of the Lake at a depth of approximately 70 meters. These samples will be used to analyze for any potential polluting residues which may have entered the Blue Lake over time from storm water drainage areas within the Blue Lake Capture Zone. This is part of a larger project established by the South East Natural Resources Management (SE NRM) Board aimed at further developing our understanding of how land use influences the water quality of the Blue Lake. Funding is provided by the Centre for Natural Resources Management from the National Action Plan for Salinity and Water Quality.

Hugo Hopton, General Manager of the SE NRM Board said,

"We are continually looking to improve our knowledge of the region. Research of this type allows us to understand and better manage the impacts of humans on our natural resources. "

This is the first such diving event in the Blue Lake of this kind, as previous scientific dives in the Blue Lake have been limited to around 30 to 40m in depth. This has meant until now no person has dived to the absolute bottom of the Blue Lake. However, the team was able to do this through the use of modern technical diving methods, including Trimix gas (modified breathing air with Helium and Oxygen) and rebreathers. Trimix enables the dive team to safely dive to great depths by significantly reducing the effect of nitrogen narcosis. This is a drunken like symptom which increase when air divers go deeper - typically beyond depths of 30 meters

The dive team consisted of nine divers, three at the surface for shallow water support and six deep technical divers in two teams conducting the sediment sampling and underwater filming. The dive team members were all experienced at diving safely to depths beyond those required for this project; and are well versed in conducting mandatory decompression stops before returning to the surface.

The divers came from Adelaide and interstate and were headed up by experienced local research cave diving explorer Grant Pearce. All of the divers have conducted deep research dives in caves around the Mount Gambier region; and more recently achieved a New Zealand and Australian depth record of 182 meters whilst exploring an underwater cave on the South Island near Nelson. Also on the team in a support capacity was Peter Horne, who conducted important research dives in the Blue Lake during the 1980's.

Six sediment core samples were collected from the centre of the Blue Lake in plastic tubes. Special care was needed to ensure the integrity of the silt layers was not disturbed during the collection process.

Continues…Page 2

Mr Pearce described the experience as a great opportunity to add to the collective science currently being conducted.

"Once we arrived at the floor the visibility varied considerably." Mr Pearce said.

"In the centre where the samples were taken from it was only 1-2 m, but nearer the crater edge is was perfectly clear, very similar to twilight once the sun has just set. The floor of the Blue Lake looks like sprinkled icing sugar which is sparsely covered with a few large chocolate colored rocks. It reminds me that this place was once an active volcano responsible for shaping the landscape as we know it.

"Being the first at this depth we really got the feel of being explorers, as there is no indication of human kind being down here. It was a very special experience for the team."

Blue Lake Management Committee Chairperson Andy McPharlin said,

"The diving project is important on a number of fronts. As well as its primary purpose of providing core samples of the bed to analyse for pollutants reaching the Lake over time, it will provide an excellent photographic record of the health of ecosystems within the Lake and also assist with the understanding of the Lake's inflow and mixing mechanisms."

Full analysis of the samples will be conducted in Adelaide, with results expected later this year. The underwater footage taken by the dive team will provide an excellent resource for all water agencies involved with research and community education.

For more information contact -
Callena Rawlings
E. comms@senrm.sa.gov.au.
T. 0439 505 220
F. 8723 2965

The Border Watch
South Australia's Largest Regional Newspaper
Tuesday, April 1, 2008 | $1.00 Inc. GST

❒Diving team leader Grant Pierce holds the cylinders in which sediment core samples were taken during a 70m deep dive into the Blue Lake. Story page 7.
Picture: ANELIA BLACKIE.

Divers explore bottom of 'deep blue'

FOR the first time in history a team of divers descended 70 metres deep into the Blue Lake on the weekend.

The team of eight technical divers took samples of sediment cores from the bed of the lake to analyze for any potential pollution residues that may have entered the lake over time from storm water drainage areas within the lake's capture zone.

This was the first such diving event of its kind in the lake as previous scientific dives have been limited to 30 metres.

Diving team leader Grant Pierce said new dive methods and equipment made it possible to safely dive to the bottom of the lake.

"It took about 20 minutes to get to the bottom and an hour and fifteen minutes to do mandatory decompression stops to slowly come up again," Mr Pierce said.

The team comprised of divers from Mount Gambier, Adelaide and Victoria and were all experienced to dive to depths beyong those required for this project.

While two of the divers stayed in shallow water for support, six deep technical divers in two teams conducted the sediment sampling and underwater filming.

The dive was part of a larger project established by the South East Natural Resources Management Board aimed at further developing understanding of how land use influence the water quality of the Blue Lake.

The Border Watch
South Australia's Largest Regional Newspaper
Thursday, April 3, 2008 | $1.00 inc. GST

MID SOUTH EAST

Deep dive team project manager Grant Pearce views one of the formations lining the edge of the Blue Lake at a depth of 50 metres. Mr Pearce led a team of divers on the deepest dive in history in the lake on the weekend. Full story page 2.
Picture: DR RICHARD HARRIS

News

Blue Lake 'wonderland'

Deep dive team member John Dalla-Zuana takes photos of one of the formations in the Blue Lake, at a depth of about 30 metres.

BY AMELIA BLACKE
Email: news@bordertelegraph.com.au

DIVERS who descended a record 70m to the bottom of the Blue Lake on the weekend have described it as a wonderland.

Deep dive team project manager Grant Pearce said the floor of the lake looked like "sprinkled icing sugar which is sparsely covered with a few large chocolate coloured rocks".

"It reminded me that this place was once an active volcano responsible for shaping the landscape as we know it," Mr Pearce said.

Mr Pearce led a team of nine experienced divers on the deepest Blue Lake dive in history, using rebreathers and Trimix gas - modified breathing air with helium and oxygen.

Trimix gas enabled the dive team to dive to great depths, reducing the effect of nitrogen narcosis, which is a drunken like symptom which increase when air divers go deeper than about 30m.

Mr Pearce said visibility on the floor of the lake was only one to two metres but near the crater edge it was perfectly clear.

"It was very similar to a twilight zone the sun has just set," he said.

"Being the first at this depth we really get the feel of being explorers, as there are no indications of human kind being down there."

The dive team members were all experienced at diving safely to depths beyond those required for this project and were well versed in conducting mandatory decompression stops before returning to the surface.

The team collected six sediment core samples in plastic tubes from the lake's floor.

The samples will be analysed for any potential polluting residues which may have entered the Blue Lake over time from storm water drainage areas within the lake's capture zone.

Blue Lake management committee chairperson Andy McPharlin described the diving project as an important one.

"As well as its primary purpose of providing core samples of the bed to analyse for pollutants, it provided an excellent photographic record of the health of ecosystems within the lake and assisted with the understanding of the lake's inflow and mixing mechanisms," Mr McPharlin said.

The dive was part of a larger project established by the South East Natural Resource Management Board and funded by the Centre for Natural Resources Management.

Full analysis of the samples will be conducted in Adelaide with results expected later this year.

LEFT: Deep dive team project manager Grant Pearce inspects sediment core samples taken from a depth of about 70 metres.

Deep team member Dr Richard Harris uses his rebreather, resting during a decompression stop.

Deep dive team project manager Grant Pearce inspects sediment core samples taken from a depth of about 70 metres.

BLUE LAKE | Divers search floor for the first time

Deep in discovery

UNCHARTED WATERS: Deep Dive Team member Chris Edwards, left, helping Grant Pearce to place caps on the sediment sampling tubes at 72m; John Dalla-Zuana photographs a formation at 30m; and team project manager Grant Pearce on a decompression stop about 50m. Pictures: Dr RICHARD HARRIS

JORDANNA SCHRIEVER

MT GAMBIER

DIVERS last week delved 70m to the bottom of Mount Gambier's Blue Lake for the first time.

A team of nine took sediment core samples from the bed of the lake.

The samples will be analysed to see if any potential polluting residues have entered the lake from storm water drainage areas within the Blue Lake Capture Zone.

Divers previously only had been to depths of 30m or 40m to take samples.

Diving to the extra depth was possible because the divers used modern technical methods and modified breathing air with helium and oxygen. South-East Natural Resources Management Board general manager Hugo Hopton said the results would be used to develop the board's understanding of how land use influences water quality and lake management.

"We are continually looking to improve our knowledge of the region," Mr Hopton said.

"Research of this type allows us to understand and better manage the impacts of humans on our natural resources."

Divers from Adelaide and interstate conducted the research, led by local research cave-diving explorer Grant Pearce. He said visibility on the bottom of the lake varied and it appeared untouched.

"The floor of the Blue Lake looks like sprinkled icing sugar which is sparsely covered with a few large chocolate-coloured rocks," he said.

"It reminds me this place was once an active volcano responsible for shaping the landscape as we know it."

He said being the first to reach the bottom gave him a feeling of being an explorer. "There is no indication of humankind being there. It was a very special experience for the team."

Blue Lake Management Committee chairman Andy McPharlin said photographic evidence from the divers would be used to provide a record of the health of the lake's ecosystems.

Results of sample analyses are expected this year.

mlssa
marine life society of south australia

We thank Atkins Technicolour for the duplication of slides for MLSSA

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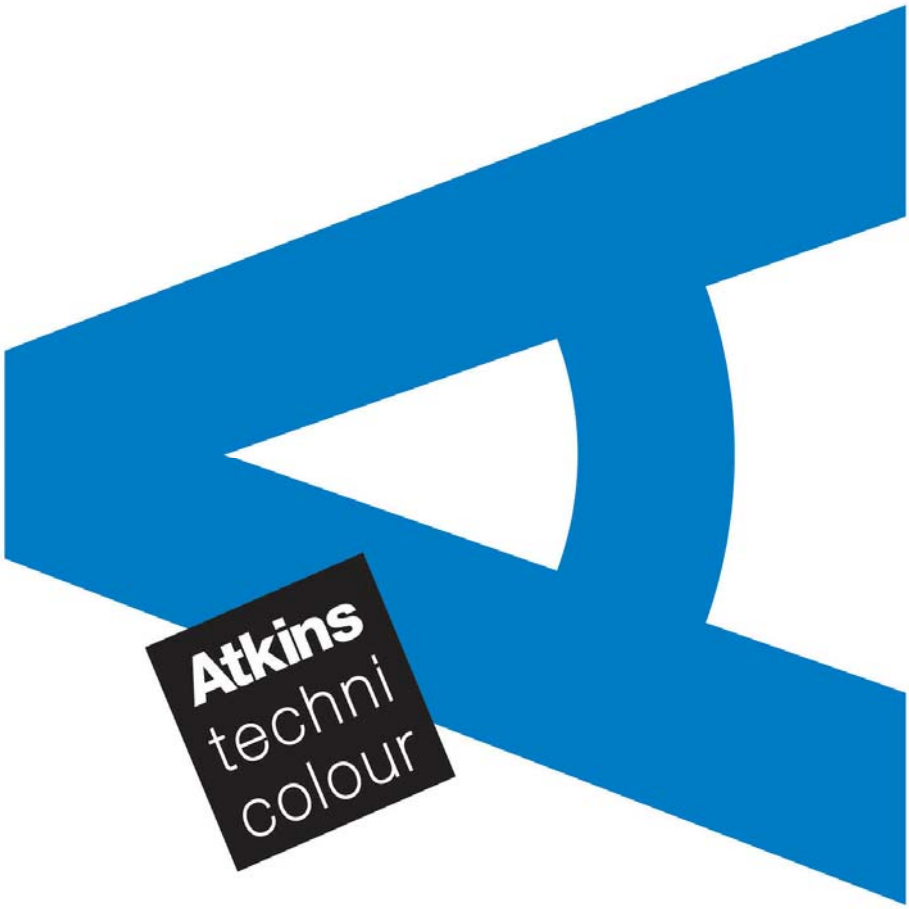

MARINE LIFE SOCIETY OF SOUTH AUSTRALIA Inc.

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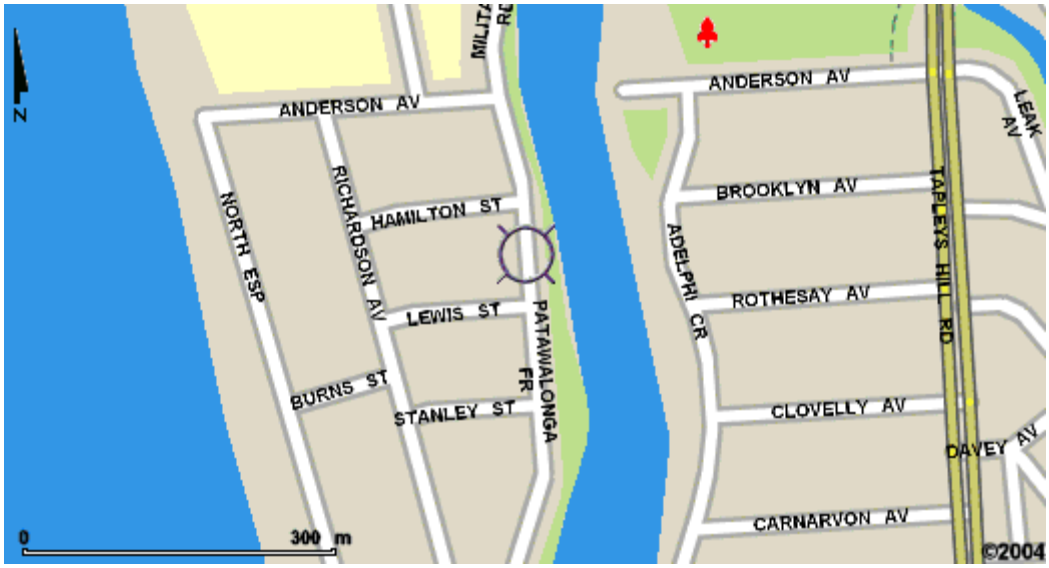
Meetings of the Society

General Meetings of the Society are held on the 3rd Tuesday of each month (except December and January) at 8.00 pm sharp.

We meet at the clubrooms of Adventure Blue on the Patawalonga Frontage at Glenelg.
You may also view the front page of our website at
www.mlssa.asn.au
To find out about the guest speaker.
Alternatively you may wish to phone one of the Committee Members listed above.



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MEMBERSHIP SUBSCRIPTION (please tick which category)
FEES : STUDENT □ $20 SINGLE □ $25
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(Fees become due on 1st April each year. New members who join the Society after 30th September only pay half fees. Concessional rates may be available, on application to the Treasurer, by eligible persons.)

A Corporate or Business membership application will be considered by the Committee and may need to be subject to confirmation at a General Meeting.
I agree to abide by the Constitution and any other Rules made by the Society. These may be downloaded from our Internet site or obtained from the Secretary.

Please find enclosed my payment of $ _____ for membership.

Signed _____

I wish to join MLSSA because

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Please post the completed form, or a photocopy, along with your payment, to -

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