Issue 6
U.S. $7.50

ADVANCED DIVER MAGAZINE

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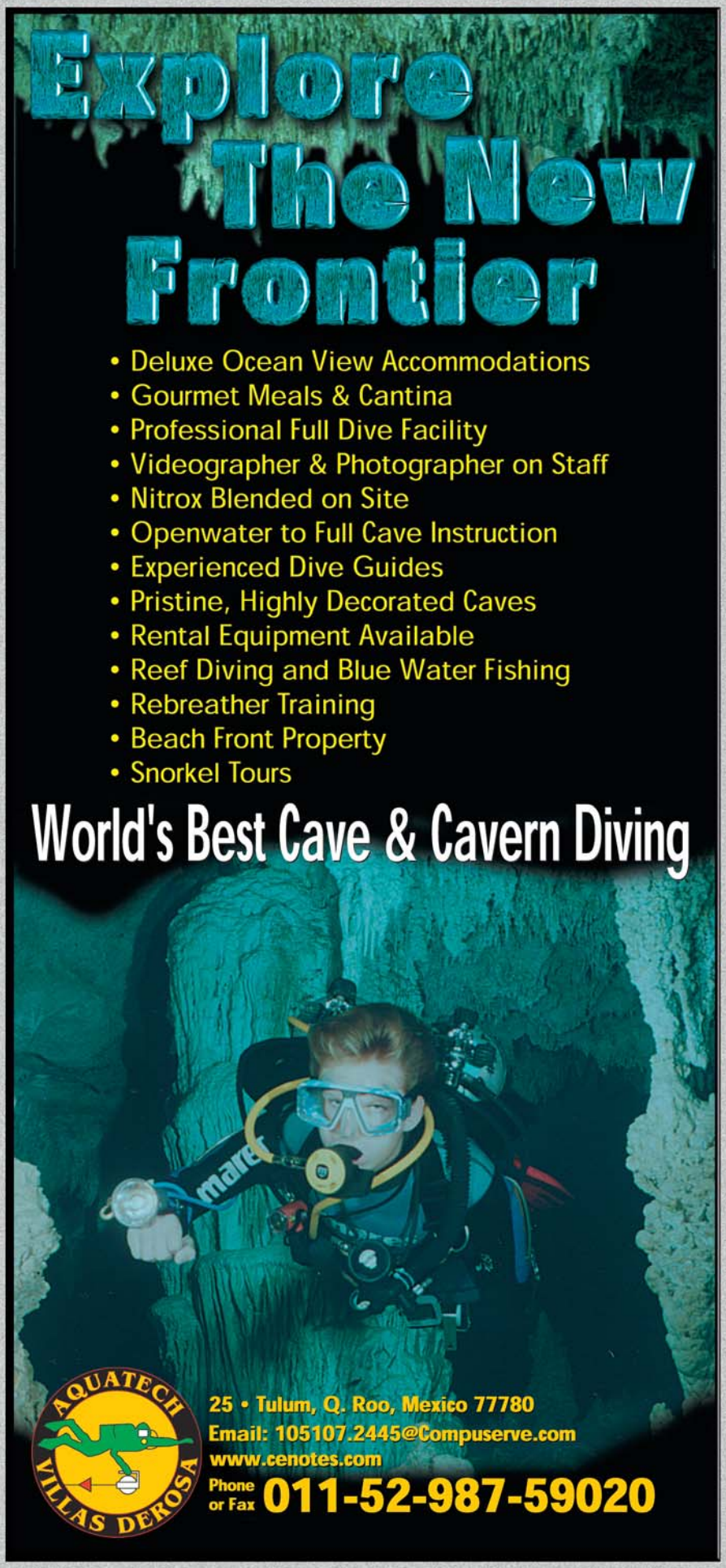

Publishers Notes

As divers we are explorers who look closely, examine carefully, and investigate fully. Our travels take us to the vast unexplored space beneath the waters surface. For many, this space is also a New Frontier filled with the joy, wonder, richness, and possibilities that will support the future of humankind.

As we push into the 21st century, we find ourselves in the presence of the most up-to-date advanced technology for underwater exploration.

We recognize, applaud, and better yet, use this equipment to assist in this never-ending exploration. With the advent of inventions such as the new mixed gas decompression computers, allowing extensive dives using helium-based breathing gases; high intensity discharge arch lights with extremely long burn times; deep set DPVs, capable of higher speeds and long penetration distances; and high end photography and digital video equipment capable of extreme depth ratings, the ocean's once dark unexplored world is now alit with its awesome magnificence.

All this new technology allows the diver to visit and document what was once visions just ten years ago.

As our underworld explorations expand, so will ADM expand to include all this new breathtaking up-to-date technology and what it brings to today's advanced diver and his or her world. Additionally, readers can now look forward to a sixteen-page increase filled to the brim. ADM widens its horizons by highlighting photographers and their underwater exposures. ADM is also adding a section that will focus on trend-setting new equipment.

We look forward to sharing more with you as we also look forward to you submitting your ideas, comments, and articles.

Curt Bowen / Publisher

ADVANCED DIVER MAGAZINE

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Advanced Diver Magazine is published quarterly in Bradenton, Florida.

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WARNING

Diving is a potentially dangerous activity. Neither Advanced Diver Magazine, its contributors nor its staff accept liability for diving related injuries by our readers. All materials within Advanced Diver Magazine are for informational purposes only and not a substitute for dive training.

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Cover: Divers Jim Rozzi, Dave Townsend, and Michael Blitch completing their required decompression after a dive on the shipwreck Lowrance, located in 210 fsw out of Pompano Beach, Florida. Photo: Curt Bowen
TOC Background: Divers descending through the shaft entrance into the "Ballroom" of the Eagles Nest cave system.

Background Photo: Curt Bowen

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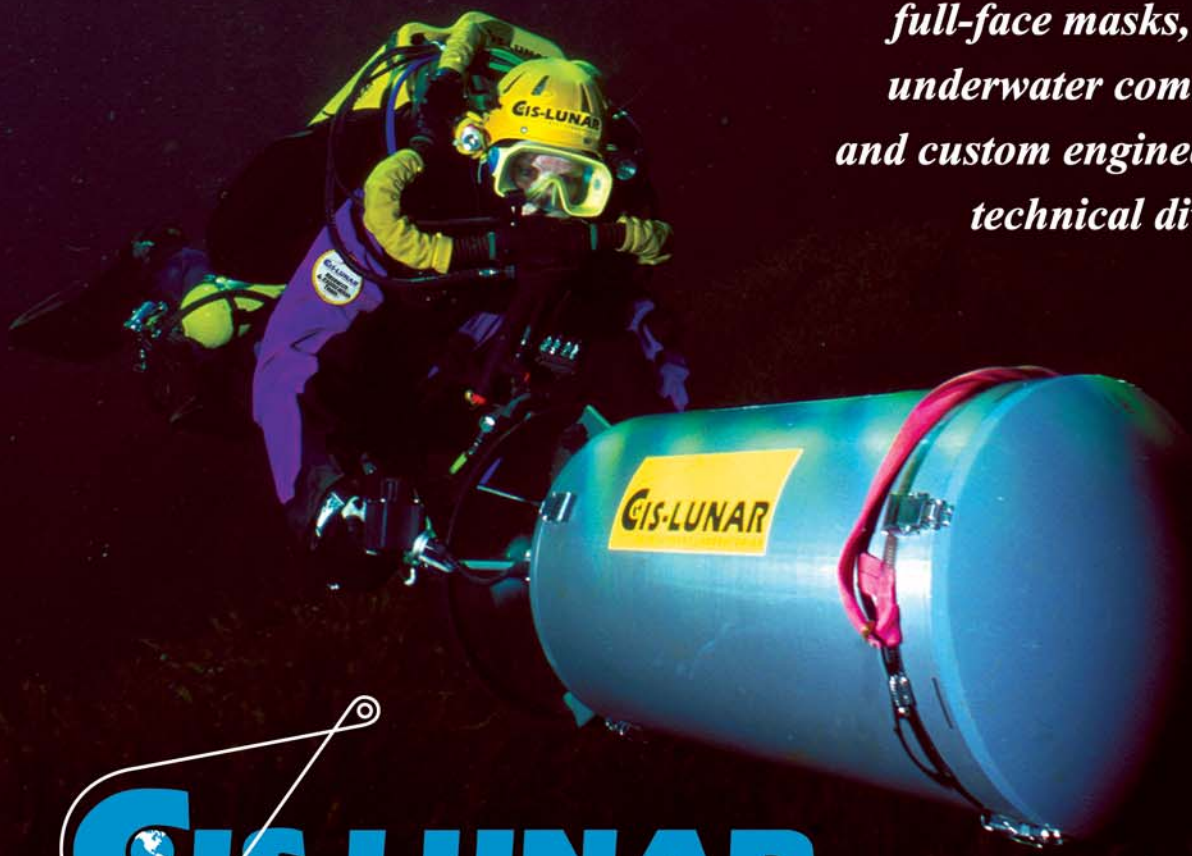

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THE "PIT"

Sistema Dos Ojos

By Jill Heinerth

It began as a typical fall day of exploration in 1994 for Dan Lins and Kay Walten. Hours were spent prepping their gear of Tekna scooters, back-mounts, and several stage bottles. They continued their work in Sistema Dos Ojos and its neighbor, No Hoch Nah Chich, something of an obsession for both of them.

As the caves sprawled into becoming the two longest underwater systems in the world, exploration had an easy blueprint. Each outing, divers would carry another stage bottle, drop another scooter, attempt to find a new opening, and continue to watch the map grow. The most limiting factor was experience. There was no room for nagging thoughts of being far from home base. Divers needed to be comfortable with six to eight hour dives and tough hikes with little or no support. Buddy Quattlebaum was coordinating exploration efforts from a roadside shanty dive shop. Although it looked crude from the outside, this shop housed a tremendous amount of local knowledge and ability. If Buddy couldn't come up with the money necessary to build something, he would manage with baling wire and bubble gum.

It was in that setting of bare bones basics and long jungle treks that one of the most tremendous underground discoveries of the decade took place. The Eastern Yucatan Peninsula was known for its shallow and inviting caves. The thirty to fifty-foot deep passages allowed long-bottom times and minimal decompression; however, in September 1994, the stage was changed forever.

Kay and Dan set off from Cenote Tikim Ich in search of virgin corridors. Specifically, they were checking an area which held a lot of hope for connecting Sistema No Hoch Nah Chich to Dos Ojos. They swam for almost a mile, at an average depth of 34 feet in narrow passages of fragile china shops of delicate formations. Instead of discovering the coveted connection, they found something much more astonishing.

Suddenly Kay found her light completely absorbed by a mysterious blackness. She said," Once at the Pit, we hung over the edge for ages. We were in awe. Without lights, the faint glow of daylight from the Cenote gave an eerie effect. The sun over the hydrogen sulfide made the Pit look like a cauldron." She swam ahead cautiously into the familiar glow of a distant surface pool. As she swam

Illustration: Curt Bowen
Photography: Paul Heinerth

Right: Paul Heinerth's camera captures the immense size of the underwater cavern zone in the "PIT."

to the light, she was expelled from the womb of Mother Nature and thrust into a brave new world for the Yucatan cave divers. She and Dan floated in a vast chamber. The floor disappeared below them in a fog of hydrogen sulfide. Tiny pinnacles of rock poked through the haze like mountain peaks in the clouds. They were in a room larger than either one had ever seen.

The pair chose to plumb the depths of the darkness and dropped to a mind numbing 246 feet of depth on the far side of the opening. They soon found themselves in silty breakdown with no way onward. Thus, they slowly began their ascent. There was no way to climb out of this new sinkhole since the sheer rock walls rose to the jungle floor. They had no choice but to swim back the way they came and pay the price of a lengthy decompression.

In June of 1995, Dan and Kay made the trip from Tikim Ich once again, while Quattlebaum and others chopped an exhausting trail to the opening. With the location now

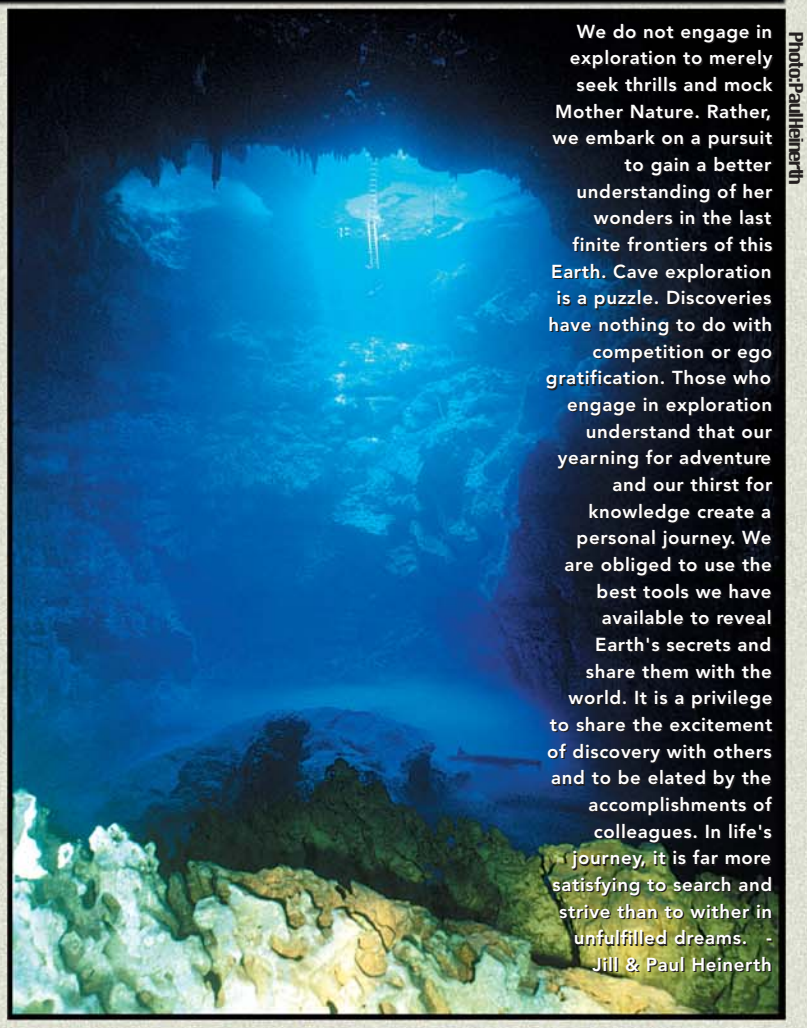
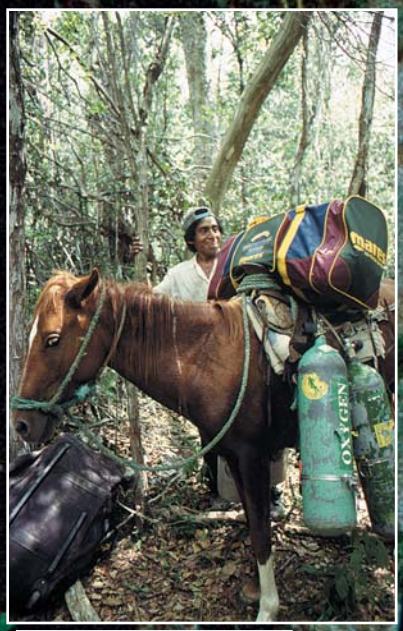


Photo:PaulHeinerth

We do not engage in exploration to merely seek thrills and mock Mother Nature. Rather, we embark on a pursuit to gain a better understanding of her wonders in the last finite frontiers of this Earth. Cave exploration is a puzzle. Discoveries have nothing to do with competition or ego gratification. Those who engage in exploration understand that our yearning for adventure and our thirst for knowledge create a personal journey. We are obliged to use the best tools we have available to reveal Earth's secrets and share them with the world. It is a privilege to share the excitement of discovery with others and to be elated by the accomplishments of colleagues. In life's journey, it is far more satisfying to search and strive than to wither in unfulfilled dreams. - Jill & Paul Heinerth



Above: Carrying the load for exploration is no easy task. Long distances and rouged jungle terrain makes the "PIT" impossible to access without the help of sherpas, horses, and pack mules.

Background Photo: Steve Bogaerts cools off in the "PIT" from the hot humid Mexican jungle.

Below: Paul Heinerth gets lowered into the water with his Cis-Lunar MK-5 rebreather ready for another exploration dive into the "PIT".

known over land, exploration would be easier. Later that fall several more dives were conducted in the Pit before Hurricane Roxanne put a wash on further efforts.

In 1996, during an expedition at Dos Ojos, I took a hike to see the much-fabled Pit. I stood poised on the lip of the Cenote with a camera in hand and dreamed of my chance to look at this wondrous cave. Finally in 1997, my husband Paul and I were given the opportunity. Buddy Quattlebaum asked us to gather depth data and flow stone samples for an ongoing study at the University of Texas. Although the Pit was now believed to be a terminal sink, we were anxious to have a look for ourselves and take some photographs. During our examinations we found a gaping chasm at 180 feet that beckoned us to have a look. Never imagining that the cave would delve downward, we returned the following day with Kay Walten and copious air supplies.

During that dive we discovered that the cave proceeded to drop and was exceptionally vast. We needed to launch a very quick gas dive for further reconnaissance. With Quattlebaum's help, we scrambled together enough cylinders and mix to scarcely supply Paul, Kay and Gary Walten and myself. It was difficult to gather the necessary ingredients for a technical dive on such short notice. Between gas supplies and sherpas, we had stretched our pockets, making this the most expensive dive of our lives. The trail to the Pit was still extremely rough, machete-bearing guides cleared the path and helped bear the loads. They waited patiently atop a rough Mayan ladder while we decompressed and launched empty buoyant cylinders up the shot line. Wakulla Room, our name for the cave's continuing passage, was thrilling, however, we recognized that we needed better technology to properly work this cave.

Over the next few years, the Pit continued to capture our imagination. Several divers sustained the search, but the remote location coupled with the expense and logistics of the dive kept most divers away. Matt Matthes, Dan Lins, and Mike Madden discovered a new passage, "Beyond Main Base (BMB)," that proved to be a source of ancient flow in the system. Although desperately silty and soft, it was the lead that continued to provide going passage.

Meanwhile, Quattlebaum upheld his passion for the Pit. He fought to retain access agreements, built roads and supported all that dared venture to the Pit. He had a reluctant obsession with its majesty and also a fear that it might take a life. However, curiosity overcame him as he continued to push for our return to the Pit with our rebreathers. Along with more tourism, bigger hotels, and a six-lane highway, the millennium also brought new diving technologies to the "Riviera Maya." Quattlebaum's staff completed a rough road to the Pit that made jeep access difficult but possible. They established a jungle Base Camp, trucked in a generator,

The "PIT"
Continued on Page 25

ADM GAS STATION

Nitrox PO2 & EADs

DEPTH fsw		Percent Oxygen																			
		25%	26%	27%	28%	29%	30%	31%	32%	33%	34%	35%	36%	37%	38%	39%	40%	50%	60%	70%	80%	90%
30	PO2	0.48	0.50	0.52	0.53	0.55	0.57	0.59	0.61	0.63	0.65	0.67	0.69	0.71	0.73	0.74	0.76	0.95	1.15	1.34	1.53	1.72
	EAD	27	26	25	24	24	23	22	21	20	20	19	18	17	16	16	15	7	0	0	0	0
40	PO2	0.55	0.58	0.60	0.62	0.64	0.66	0.69	0.71	0.73	0.75	0.77	0.80	0.82	0.84	0.86	0.88	1.11	1.33	1.55	1.77	1.99
	EAD	36	35	34	34	33	32	31	30	29	28	27	26	25	24	23	22	13	4	0	0	0
50	PO2	0.63	0.65	0.68	0.70	0.73	0.75	0.78	0.80	0.83	0.86	0.88	0.91	0.93	0.96	0.98	1.01	1.26	1.51	1.76	2.0	
	EAD	46	45	44	43	42	41	39	38	37	36	35	34	33	32	31	30	20	9	0	0	
60	PO2	0.70	0.73	0.76	0.79	0.82	0.85	0.87	0.90	0.93	0.96	0.99	1.01	1.04	1.07	1.10	1.13	1.41	1.69	1.97		
	EAD	55	54	53	52	51	49	48	47	46	45	44	42	41	40	39	38	26	14	2		
70	PO2	0.78	0.81	0.84	0.87	0.91	0.94	0.97	1.00	1.03	1.06	1.09	1.12	1.15	1.19	1.22	1.25	1.56	1.87			
	EAD	65	63	62	61	60	58	57	56	54	53	52	50	49	48	47	45	32	19			
80	PO2	0.86	0.89	0.92	0.96	0.99	1.03	1.06	1.10	1.13	1.16	1.20	1.23	1.27	1.30	1.34	1.37	1.71	2.05			
	EAD	74	73	71	70	69	67	66	64	63	61	60	59	57	56	54	53	39	24			
90	PO2	0.93	0.97	1.01	1.04	1.08	1.12	1.16	1.19	1.23	1.27	1.30	1.34	1.38	1.42	1.45	1.49	1.86				
	EAD	84	82	81	79	78	76	74	73	71	70	68	67	65	64	62	60	45				
100	PO2	1.01	1.05	1.09	1.13	1.17	1.21	1.25	1.29	1.33	1.37	1.41	1.45	1.49	1.53	1.57	1.60	2.02				
	EAD	93	92	90	88	87	85	83	81	80	78	76	75	73	71	70	68	51				
110	PO2	1.08	1.13	1.17	1.21	1.26	1.30	1.34	1.39	1.43	1.47	1.52	1.56	1.60	1.65	1.69	1.73					
	EAD	103	101	99	97	96	94	92	90	88	86	85	83	81	79	77	76					
120	PO2	1.16	1.21	1.25	1.30	1.34	1.39	1.44	1.48	1.53	1.62	1.67	1.72									
	EAD	112	110	108	106	105	103	101	99	97	95	93	91									
130	PO2	1.23	1.28	1.33	1.38	1.43	1.48	1.53	1.58	1.63	1.68											
	EAD	122	120	118	116	113	111	109	107	105	103											
140	PO2	1.31	1.36	1.42	1.47	1.52	1.57	1.63	1.68													
	EAD	131	129	127	125	122	120	118	116													

Nitrox PO2 & EADs

The above chart demonstrates the Equivalent Air Depth (EAD) in feet sea water and partial pressure of oxygen (ppO2) in atmosphere's absolute for various nitrox mixtures at depth.

To use this chart, find the desired maximum depth (fsw) in the left column. Then, follow the column to the right until the desired pO2 or EAD is located. Next, follow that column upward to the top row to find the percentage of oxygen required to give the desired results.

Please note that the red squares indicate a partial pressure greater than 1.6 ATA and that these percentages should be avoided due to the increased risk of oxygen toxicity.

Oxygen Fill Pressures for Nitrox

Desired Fill Pressure	Percent Oxygen																					
	24%	25%	26%	27%	28%	29%	30%	31%	32%	33%	34%	35%	36%	37%	38%	39%	40%	50%	60%	70%	80%	90%
2200	83	111	139	167	194	222	250	278	306	334.	362	389	417	445	473	501	529	807	1086	1364	1643	192
2300	87	116	145	174	203	232	262	291	320	349	378	407	436	465	494	524	553	844	1135	1426	1717	2008
2400	91	121	151	182	212	243	273	303	334	364	394	425	455.	486	516	546	577	881	1184	1488	1792	2096
2500	94	126	158	189	221	253	284	316	348	379	411	443	474	506	537	569	601	917	1234.	1550	1867	2183
2600	98	131	164	197	230	263	296	329	362	394	427	460	493	526	559	592	625	954	1283	1612	1941	2270
2700	102	136	170	205	239	273	307	341	375	410	444	478	512	546	581	615	649	991	1332	1674	2016	2358
2800	106	141	177	212	248	283	318	354	389	425	460	496	531	567	602	637	673	1027	1382	1736	2091	2445
2900	110	146	183	220	256	293	330	367	403	440	477	513	550	587	624	660	697	1064	1431	1798	2165	2532
3000	113	151	189	227	265	303	341	379	417	455	493	531	569	607	645	683	721	1101	1481	1860	2240	2620
3100	117	156	196	235	274	313	353	392	431	470	510	549	588	627	667	706	745	1137	1530	1922	2315	2707
3200	121	162	202	243	283	324	364	405	445	486	526	567	607	648	688	729	769	1174	1579	1984	2389	2794
3300	125	167	208	250	292	334	375	417	459	501	543	584	626	668	710	751	793	1211	1629	2046	2464	2882
3400	129	172	215	258	301	344	387	430	473	516	559	602	645	688	731	774	817	1248	1678	2108	2539	2969
3500	132	177	221	265	310	354	398	443	487	531	575	620	664	708	753	797	841	1284	1727	2170	2613	3056
3600	136	182	227	273	318	364	410	455	501	546	592	637	683	729	774	820	865	1321	1777	2232	2688	3144
3700	140	187	234	281	327	374	421	468	515	562	608	655	702	749	796	843	889	1358	1826	2294	2763	3231
3800	144	192	240	288	336	384	432	481	529	577	625	673	721	769	817	865	913	1394	1875	2356	2837	3318
3900	148	197	246	296	345	394	444	493	543	592	641	691	740	789	839	888	937	1431	1925	2418	2912	3406
4000	151	202	253	303	354	405	455	506	556	607	658	708	759	810	860	911	962	1468	1974	2481	2987	3493

Oxygen Fill Pressures for Nitrox:
The above chart provides the amount of oxygen to add (in psi) to an empty cylinder to create the various nitrox mixtures. To use the chart, intersect the row containing the desired ending cylinder pressure (at left), and the column containing the desired percentage of oxygen (at top).

Cut out, laminate and hang above fill station for a quick reference guide.

WARNING: Gas blending should be conducted by a certified blending technician only.

ADM

Depth fsw		Heliair Mix (O2% / He%)												
		18/14	17/19	16/24	15/28	14/33	13/38	12/43	11/49	10/52	9/57	8/62	7/67	6/72
100ft.	PO2	0.72	0.68	0.64	0.60	0.56	0.52	0.48	0.44	0.40	0.36	0.32	0.28	0.24
	END	81	74	68	62	56	49	42	34	30	24	17	10	4
120ft.	PO2	0.83	0.78	0.74	0.69	0.64	0.60	0.55	0.51	0.46	0.41	0.37	0.33	0.27
	END	98	90	83	77	69	61	54	44	40	32	25	17	9
140ft.	PO2	0.94	0.89	0.83	0.78	0.73	0.68	0.62	0.57	0.52	0.47	0.41	0.35	0.31
	END	115	107	98	91	83	74	65	54	50	41	32	23	15
160ft.	PO2	1.05	0.99	0.93	0.87	0.81	0.76	0.70	0.64	0.58	0.52	0.46	0.38	0.35
	END	133	123	113	106	96	86	76	64	59	50	40	30	20
180ft.	PO2	1.16	1.09	1.03	0.96	0.90	0.83	0.77	0.71	0.64	0.58	0.51	0.45	0.38
	END	150	139	128	120	109	99	88	74	69	58	47	37	26
200ft.	PO2	1.27	1.20	1.12	1.05	0.98	0.91	0.84	0.77	0.70	0.63	0.56	0.49	0.42
	END	167	155	143	135	123	111	99	84	79	67	55	43	31
220ft.	PO2	1.38	1.30	1.22	1.15	1.07	0.99	0.92	0.84	0.76	0.69	0.61	0.52	0.46
	END	184	171	159	149	136	123	111	95	88	75	63	50	37
240ft.	PO2	1.48	1.40	1.32	1.24	1.15	1.07	0.99	0.91	0.82	0.74	0.66	0.58	0.49
	END	201	188	174	163	150	136	122	105	98	84	70	56	43
260ft.	PO2	1.59	1.50	1.42	1.33	1.24	1.15	1.06	0.97	0.88	0.79	0.71	0.63	0.53
	END	219	204	189	178	163	148	133	115	107	93	78	63	48
280ft.	PO2	1.70	1.61	1.51	1.42	1.32	1.23	1.13	1.04	0.94	0.85	0.75	0.65	0.56
	END	236	220	204	192	176	161	145	125	117	101	85	70	54
300ft.	PO2	1.81	1.71	1.61	1.51	1.41	1.31	1.21	1.11	1.00	0.90	0.80	0.70	0.60
	END	253	236	219	207	190	173	156	135	127	110	93	76	59
320ft.	PO2	1.92	1.81	1.71	1.60	1.49	1.39	1.28	1.17	1.06	0.96	0.85	0.74	0.64
	END	270	252	235	221	203	185	168	145	136	118	101	83	65
340ft.	PO2	2.03	1.92	1.80	1.69	1.58	1.46	1.35	1.24	1.13	1.01	0.90	0.89	0.67
	END	288	269	250	236	217	198	179	155	146	127	108	89	70
360ft.	PO2	2.14	2.02	1.90	1.78	1.66	1.54	1.42	1.31	1.19	1.07	0.95	0.83	0.71
	END	305	285	265	250	230	210	190	165	156	136	116	96	76
380ft.	PO2	2.25	2.12	2.00	1.87	1.75	1.62	1.50	1.37	1.25	1.12	1.00	0.88	0.75
	END	322	301	280	264	244	223	202	176	165	144	123	102	82
400ft.	PO2	2.36	2.23	2.09	1.96	1.83	1.70	1.57	1.44	1.31	1.18	1.04	0.92	0.79
	END	339	317	295	279	257	235	213	186	175	153	131	109	87

The above chart gives the Equivalent Narcosis Depth (END) in seawater and partial pressure of oxygen (ppO2) in atmospheres absolute for various heliair mixtures at depth. To use this chart, find the desired maximum depth (fsw) in the left column. Next, follow the column to the right until the desired ppO2 or END is located. Then, follow that column upward to the top row to find the percentage of oxygen and helium (O2/HE). See the below chart for mixing instructions.

Helium Fill Pressures for Heliair

Heliair Mix (O2% / He%)	Desired Fill Pressure																					
	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000	3100	3200	3300	3400	3500	3600	3700	3800	3900	4000
18/14	280	294	308	322	336	350	364	378	392	406	420	434	448	462	476	490	504	518	532	546	560
17/19	380	399	418	437	456	475	494	513	532	551	570	589	608	627	646	665	684	703	722	741	760
16/24	480	504	528	552	576	600	624	648	672	696	720	744	768	792	816	840	864	888	912	936	960
15/28	560	588	616	644	672	700	728	756	784	812	840	868	896	924	952	980	1008	1036	1064	1092	1120
14/33	660	693	726	759	792	825	858	891	924	957	990	1023	1056	1089	1122	1155	1188	1221	1254	1287	1320
13/38	760	798	836	874	912	950	988	1026	1064	1102	1140	1178	1216	1254	1292	1330	1368	1406	1444	1482	1520
12/43	860	903	946	989	1032	1075	1118	1161	1204	1247	1290	1333	1376	1419	1462	1505	1548	1591	1634	1677	1720
11/49	980	1029	1078	1127	1176	1225	1274	1323	1372	1421	1470	1519	1568	1617	1666	1715	1764	1813	1862	1911	1960
10/52	1040	1092	1144	1196	1248	1300	1352	1404	1456	1508	1560	1612	1664	1716	1768	1820	1872	1924	1976	2028	2080
9/57	1140	1197	1254	1311	1368	1425	1482	1539	1596	1653	1710	1767	1824	1881	1938	1995	2052	2109	2166	2223	2280
8/62	1240	1302	1364	1426	1488	1550	1612	1674	1736	1798	1860	1922	1984	2046	2108	2170	2232	2294	2356	2418	2480
7/67	1340	1407	1474	1541	1608	1675	1742	1809	1876	1943	2010	2077	2144	2211	2278	2345	2412	2479	2546	2613	2680
6/72	1440	1512	1584	1656	1728	1800	1872	1944	2016	2088	2160	2232	2304	2376	2448	2520	2592	2664	2736	2808	2880

The above chart provides the amount of helium to add (in psi) to an empty scuba cylinder to create the various heliair mixtures. To use this chart find the intersection point between the row containing the desired ending cylinder pressure (at left), and the column containing the desired heliair mixture (at top). The number located at the intersection is the amount (in psi) of helium required for the mixture.

Trimix Best-Mix (END 80 ft.) Fill Pressures

Best Mix Defined as ppO^2 = 1.4 ATA, END = 80 fsw

© Advanced Diver Magazine				Desired Ending Cylinder Pressure															
DEPTH				2400	2500	2600	2700	2800	2900	3000	3100	3200	3300	3400	3500	3600	3700	3800	3900	4000
130ft	Oxygen	28%	Psi O2	330	344	358	372	385	399	413	427	441	454	468	482	496	510	523	537	551
	Helium	17%	Psi He	405	422	439	456	472	489	506	523	540	557	574	591	608	624	641	658	675
140ft	Oxygen	27%	Psi O2	311	324	337	350	363	376	389	402	415	428	441	454	467	480	493	506	519
	Helium	22%	Psi He	520	542	564	585	607	629	650	672	694	715	737	759	780	802	824	846	867
150ft	Oxygen	25%	Psi O2	294	306	319	331	343	356	368	380	392	405	417	429	442	454	466	478	491
	Helium	26%	Psi He	623	649	675	701	727	753	779	805	831	857	883	909	935	960	986	1012	1038
160ft	Oxygen	24%	Psi O2	279	291	302	314	325	337	349	360	372	384	395	407	419	430	442	454	465
	Helium	30%	Psi He	715	745	775	804	834	864	894	924	953	983	1013	1043	1073	1102	1132	1162	1192
170ft	Oxygen	23%	Psi O2	265	276	287	298	309	321	332	343	354	365	376	387	398	409	420	431	442
	Helium	33%	Psi He	798	831	864	898	931	964	997	1031	1064	1097	1131	1164	1197	1230	1264	1297	1330
180ft	Oxygen	22%	Psi O2	253	263	274	284	295	305	316	327	337	348	358	369	379	390	400	411	421
	Helium	36%	Psi He	873	909	946	982	1019	1055	1091	1128	1164	1201	1237	1273	1310	1346	1383	1419	1455
190ft	Oxygen	21%	Psi O2	241	251	261	272	282	292	302	312	322	332	342	352	362	372	382	392	403
	Helium	39%	Psi He	942	981	1020	1059	1099	1138	1177	1216	1256	1295	1334	1373	1413	1452	1491	1530	1570
200ft	Oxygen	20%	Psi O2	231	241	250	260	270	279	289	298	308	318	327	337	347	356	366	376	385
	Helium	42%	Psi He	1004	1046	1088	1130	1172	1213	1255	1297	1339	1381	1423	1465	1506	1548	1590	1632	1674
210ft	Oxygen	19%	Psi O2	221	231	240	249	258	268	277	286	295	305	314	323	332	342	351	360	369
	Helium	44%	Psi He	1062	1106	1150	1194	1239	1283	1327	1371	1416	1460	1504	1548	1593	1637	1681	1725	1770
220ft	Oxygen	18%	Psi O2	213	222	230	239	248	257	266	275	284	293	301	310	319	328	337	346	355
	Helium	46%	Psi He	1114	1161	1207	1254	1300	1347	1393	1440	1486	1533	1579	1625	1672	1718	1765	1811	1858
230ft	Oxygen	18%	Psi O2	205	213	222	230	239	247	256	264	273	281	290	299	307	316	324	333	341
	Helium	48%	Psi He	1163	1212	1260	1309	1357	1406	1454	1503	1551	1600	1648	1697	1745	1794	1842	1891	1939
240ft	Oxygen	17%	Psi O2	197	205	214	222	230	238	246	255	263	271	279	288	296	304	312	321	329
	Helium	50%	Psi He	1209	1259	1309	1360	1410	1460	1511	1561	1612	1662	1712	1763	1813	1863	1914	1964	2015
250ft	Oxygen	16%	Psi O2	190	198	206	214	222	230	238	246	254	262	269	277	285	293	301	309	317
	Helium	52%	Psi He	1251	1303	1355	1407	1459	1511	1563	1616	1668	1720	1772	1824	1876	1928	1980	2033	2085
260ft	Oxygen	16%	Psi O2	184	191	199	207	214	222	230	237	245	253	260	268	276	283	291	299	306
	Helium	54%	Psi He	1290	1344	1397	1451	1505	1559	1612	1666	1720	1774	1827	1881	1935	1989	2043	2096	2150
270ft	Oxygen	15%	Psi O2	177	185	192	200	207	215	222	229	237	244	252	259	266	274	281	289	296
	Helium	55%	Psi He	1326	1382	1437	1492	1548	1603	1658	1714	1769	1824	1879	1935	1990	2045	2101	2156	2211
280ft	Oxygen	15%	Psi O2	172	179	186	193	201	208	215	222	229	236	244	251	258	265	272	279	287
	Helium	57%	Psi He	1361	1417	1474	1531	1588	1644	1701	1758	1815	1871	1928	1985	2041	2098	2155	2212	2268
290ft	Oxygen	14%	Psi O2	166	173	180	187	194	201	208	215	222	229	236	243	250	257	264	271	278
	Helium	58%	Psi He	1393	1451	1509	1567	1625	1683	1741	1799	1857	1915	1974	2032	2090	2148	2206	2264	2322
300ft	Oxygen	14%	Psi O2	161	168	175	182	188	195	202	209	215	222	229	236	242	249	256	263	269
	Helium	59%	Psi He	1423	1482	1542	1601	1660	1720	1779	1838	1898	1957	2016	2076	2135	2194	2254	2313	2372
310ft	Oxygen	13%	Psi O2	157	163	170	176	183	189	196	203	209	216	222	229	235	242	248	255	262
	Helium	61%	Psi He	1452	1512	1573	1633	1694	1754	1815	1875	1936	1996	2057	2117	2178	2238	2299	2359	2420
320ft	Oxygen	13%	Psi O2	152	159	165	171	178	184	190	197	203	210	216	222	229	235	241	248	254
	Helium	62%	Psi He	1478	1540	1602	1663	1725	1787	1848	1910	1971	2033	2095	2156	2218	2280	2341	2403	2464
330ft	Oxygen	13%	Psi O2	148	154	160	167	173	179	185	191	198	204	210	216	222.	229	235	241	247
	Helium	63%	Psi He	1504	1567	1629	1692	1755	1817	1880	1943	2005	2068	2131	2193	2256	2319	2381	2444	2507
340ft	Oxygen	12%	Psi O2	144	150	156	162	168	174	180	186	192	198	204	210	216	222	228	234	240
	Helium	64%	Psi He	1528	1592	1655	1719	1783	1846	1910	1974	2037	2101	2165	2228	2292	2356	2419	2483	2547
350ft	Oxygen	12%	Psi O2	140	146	152	158	164	170	176	181	187	193	199	205	211	217	222	228	234
	Helium	65%	Psi He	1551	1615	1680	1744	1809	1874	1938	2003	2068	2132	2197	2262	2326	2391	2455	2520	2585

Cut out, laminate and hang above fill station for a quick reference guide.

The above chart provides the amount of helium and oxygen to add (in psi) to an empty scuba cylinder to create the best-mix for a given depth. The above listed mixtures yield a ppO2 of 1.4 ATA and an END of 80 fsw.
To use the chart, first, locate on the left, the maximum planned depth. Next, locate the desired ending fill pressure of the cylinder at the top of the chart. The intersecting point between the two will designate the amount of helium and oxygen to use to create the best-mix for the planned depth.

Partial Pressure Blending Instructions:

1. Empty scuba cylinder of any previous gas.
2. Locate and add the required psi of helium from the bank cylinders into the scuba cylinder.
3. Allow ample time for the scuba cylinder to cool to room temperature. After cooling, adjust helium back to desired psi.
4. Allow cylinder to cool. Add the required psi of oxygen on top of the helium. Cool and adjust oxygen to desired psi.
5. Allow cylinder to cool. Top the scuba cylinder to the ending pressure with filtered air from a scuba compressor.
6. Allow cylinder to cool and adjust ending pressure.

WARNING: Gas blending should be conducted by a certified blending technician only.

Trimix Best-Mix (END 130 ft.) Fill Pressures

Best Mix Defined as ppO^2 = 1.4 ATA, END = 130 fsw

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DEPTH

Desired Ending Cylinder Pressure																				
				2400	2500	2600	2700	2800	2900	3000	3100	3200	3300	3400	3500	3600	3700	3800	3900	4000
150ft	Oxygen	25%	Psi O2	156	163	170	176	183	189	196	202	209	215	222	228	235	242	248	255	261
	Helium	4%	Psi He	105	109	114	118	122	127	131	136	140	144	149	153	157	162	166	171	175
160ft	Oxygen	24%	Psi O2	148	155	161	167	173	179	186	192	198	204	210	217	223	229	235	241	248
	Helium	9%	Psi He	224	233	242	252	261	270	280	289	298	308	317	326	336	345	354	364	373
170ft	Oxygen	22%	Psi O2	141	147	153	159	165	171	176	182	188	194	200	206	212	218	224	229	235
	Helium	13%	Psi He	331	345	359	372	386	400	414	428	441	455	469	483	497	510	524	538	552
180ft	Oxygen	22%	Psi O2	134	140	146	151	157	162	168	174	179	185	191	196	202	207	213	219	224
	Helium	18%	Psi He	428	446	464	482	499	517	535	553	571	589	607	624	642	660	678	696	714
190ft	Oxygen	21%	Psi O2	128	134	139	144	150	155	161	166	171	177	182	187	193	198	203	209	214
	Helium	22%	Psi He	516	538	559	581	603	624	646	667	689	710	732	753	775	796	818	839	861
200ft	Oxygen	20%	Psi O2	123	128	133	138	143	148	154	159	164	169	174	179	184	190	195	200	205
	Helium	25%	Psi He	597	622	647	672	697	722	747	772	796	821	846	871	896	921	946	971	996
210ft	Oxygen	19%	Psi O2	118	123	128	133	137	142	147	152	157	162	167	172	177	182	187	192	197
	Helium	28%	Psi He	671	699	727	755	783	811	839	867	895	923	951	979	1007	1035	1063	1091	1119
220ft	Oxygen	18%	Psi O2	113	118	123	127	132	137	141	146	151	156	160	165	170	175	179	184	189
	Helium	31%	Psi He	740	771	801	832	863	894	925	956	986	1017	1048	1079	1110	1141	1171	1202	1233
230ft	Oxygen	18%	Psi O2	109	113	118	122	127	131	136	141	145	150	154	159	163	168	172	177	182
	Helium	33%	Psi He	803	836	870	903	937	970	1004	1037	1071	1104	1138	1171	1204	1238	1271	1305	1338
240ft	Oxygen	17%	Psi O2	105	109	114	118	122	127	131	135	140	144	149	153	157	162	166	171	176
	Helium	36%	Psi He	861	897	933	969	1005	1041	1077	1113	1149	1184	1220	1256	1292	1328	1364	1400	1436
250ft	Oxygen	16%	Psi O2	101	105	109	114	118	122	126	131	135	139	143	148	152	156	160	164	169
	Helium	38%	Psi He	916	954	992	1030	1068	1107	1145	1183	1221	1259	1297	1336	1374	1412	1450	1488	1526
260ft	Oxygen	16%	Psi O2	98	102	106	110	114	118	122	126	130	134	138	142	147	151	155	159	163
	Helium	40%	Psi He	966	1007	1047	1087	1127	1168	1208	1248	1289	1329	1369	1409	1450	1490	1530	1571	1611
270ft	Oxygen	15%	Psi O2	94	98	102	106	110	114	118	122	126	130	134	138	142	146	150	154	158
	Helium	42%	Psi He	1014	1056	1098	1140	1183	1225	1267	1309	1352	1394	1436	1478	1521	1563	1605	1647	1690
280ft	Oxygen	15%	Psi O2	91	95	99	103	107	110	114	118	122	126	130	133	137	141	145	149	152
	Helium	44%	Psi He	1058	1102	1146	1190	1234	1278	1322	1367	1411	1455	1499	1543	1587	1631	1675	1719	1763
290ft	Oxygen	14%	Psi O2	88	92	96	100	103	107	111	114	118	122	126	129	133	137	140	144	148
	Helium	46%	Psi He	1099	1145	1191	1237	1283	1329	1374	1420	1466	1512	1558	1604	1649	1695	1741	1787	1833
300ft	Oxygen	14%	Psi O2	86	89	93	97	100	104	107	111	115	118	122	125	129	133	136	140	143
	Helium	47%	Psi He	1138	1186	1233	1281	1328	1376	1423	1471	1518	1566	1613	1660	1708	1755	1803	1850	1898
310ft	Oxygen	13%	Psi O2	83	87	90	94	97	101	104	108	111	115	118	122	125	129	132	136	139
	Helium	49%	Psi He	1175	1224	1273	1322	1371	1420	1469	1518	1567	1616	1665	1714	1763	1812	1861	1910	1959
320ft	Oxygen	13%	Psi O2	81	84	88	91	94	98	101	105	108	111	115	118	122	125	128	132	135
	Helium	50%	Psi He	1210	1260	1311	1361	1412	1462	1513	1563	1613	1664	1714	1765	1815	1866	1916	1966	2017
330ft	Oxygen	13%	Psi O2	79	82	85	89	92	95	98	102	105	108	112	115	118	122	125	128	131
	Helium	52%	Psi He	1243	1294	1346	1398	1450	1502	1553	1605	1657	1709	1761	1812	1864	1916	1968	2020	2071
340ft	Oxygen	12%	Psi O2	77	80	83	86	89	93	96	99	102	105	109	112	115	118	121	125	128
	Helium	53%	Psi He	1274	1327	1380	1433	1486	1539	1592	1645	1698	1752	1805	1858	1911	1964	2017	2070	2123
350ft	Oxygen	12%	Psi O2	75	78	81	84	87	90	93	96	100	103	106	109	112	115	118	121	125
	Helium	54%	Psi He	1303	1357	1412	1466	1520	1575	1629	1683	1738	1792	1846	1901	1955	2009	2064	2118	2172
360ft	Oxygen	12%	Psi O2	73	76	79	82	85	88	91	94	97	100	103	106	109	112	115	118	121
	Helium	55%	Psi He	1331	1386	1442	1497	1553	1608	1664	1719	1775	1830	1886	1941	1997	2052	2108	2163	2219
370ft	Oxygen	11%	Psi O2	71	74	77	80	83	86	89	92	95	98	100	103	106	109	112	115	118
	Helium	57%	Psi He	1357	1414	1471	1527	1584	1640	1697	1754	1810	1867	1923	1980	2036	2093	2150	2206	2263
380ft	Oxygen	11%	Psi O2	69	72	75	78	81	84	86	89	92	95	98	101	104	107	110	113	115
	Helium	58%	Psi He	1383	1440	1498	1556	1613	1671	1729	1786	1844	1901	1959	2017	2074	2132	2190	2247	2305
390ft	Oxygen	11%	Psi O2	67	70	73	76	79	82	84	87	90	93	96	99	101	104	107	110	113
	Helium	59%	Psi He	1407	1465	1524	1583	1641	1700	1759	1817	1876	1934	1993	2052	2110	2169	2228	2286	2345
400ft	Oxygen	11%	Psi O2	66	69	71	74	77	80	82	85	88	91	93	96	99	102	105	107	110
	Helium	60%	Psi He	1430	1489	1549	1608	1668	1728	1787	1847	1906	1966	2026	2085	2145	2204	2264	2324	2383
410ft	Oxygen	10%	Psi O2	64	67	70	72	75	78	81	83	86	89	91	94	97	99	102	105	108
	Helium	61%	Psi He	1452	1512	1573	1633	1694	1754	1815	1875	1936	1996	2057	2117	2178	2238	2299	2359	2420
420ft	Oxygen	10%	Psi O2	63	66	68	71	73	76	79	81	84	87	89	92	95	97	100	103	105
	Helium	61%	Psi He	1473	1534	1595	1657	1718	1779	1841	1902	1964	2025	2086	2148	2209	2270	2332	2393	2455
430ft	Oxygen	10%	Psi O2	62	64	67	69	72	74	77	80	82	85	87	90	93	95	98	100	103
	Helium	62%	Psi He	1493	1555	1617	1679	1741	1804	1866	1928	1990	2052	2115	2177	2239	2301	2363	2426	2488
440ft	Oxygen	10%	Psi O2	60	63	65	68	70	73	75	78	80	83	86	88	91	93	96	98	101
	Helium	63%	Psi He	1512	1575	1638	1701	1764	1827	1890	1953	2016	2079	2142	2205	2268	2331	2394	2457	2520
450ft	Oxygen	10%	Psi O2	59	61	64	66	69	71	74	76	79	81	84	86	89	91	94	96	99
	Helium	64%	Psi He	1530	1594	1658	1721	1785	1849	1913	1977	2040	2104	2168	2232	2295	2359	2423	2487	2550

The above chart provides the amount of helium and oxygen to add (in psi) to an empty scuba cylinder to create the best-mix for a given depth. The above listed mixtures yield a ppO2 of 1.4 ATA and an END of 130 fsw.
To use the chart, first, locate on the left, the maximum planned depth. Next, locate the desired ending fill pressure of the cylinder at the top of the chart. The intersecting point between the two will designate the amount of helium and oxygen to use to create the best-mix for the planned depth.

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Diving into the Kauhako Crater Lake

By Michael Garman with Sherry Garman

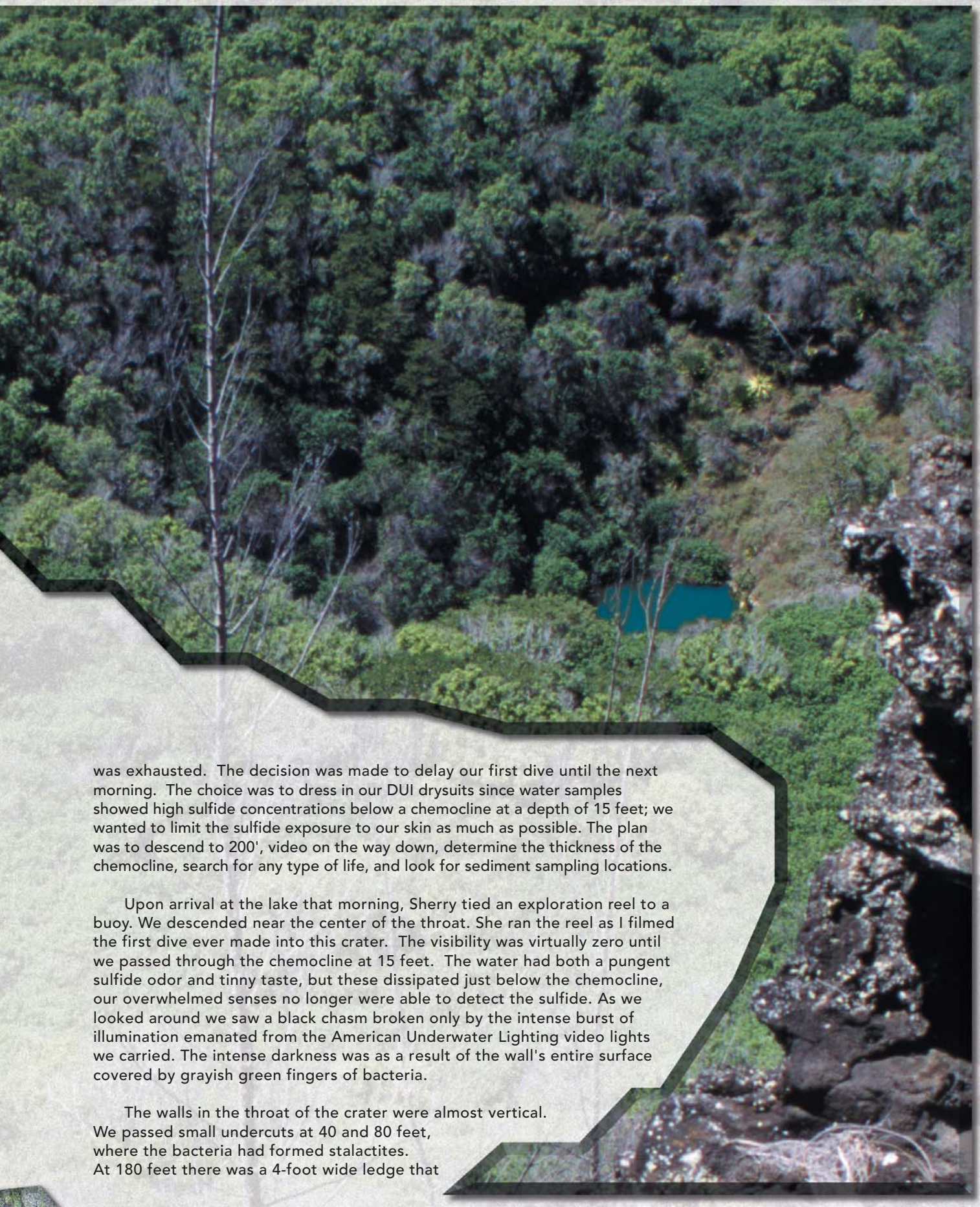
Kauhako Crater is located on north side of the island of Molokai in the Kalaupapa district of the Makanalua Peninsula. This is a land of geologic extremes. The southern edge of the Peninsula consists of dramatic sea cliffs, the tallest in the world. Additionally, with a surface area of less than an acre and a depth in excess of 800 feet, the crater lake is proportionately (surface area to depth ratio) one of the steepest and also, deepest lakes in the world. Unfortunately, Kalaupapa is best known for its reputation as home to patients with Hansen's disease, more commonly known as leprosy. This remote peninsula was the location to which King Kamehameha exiled Hawaiians suffering from the disease.

Plans for our trip to Kauhako Crater actually began 7 months prior to our departure from Tampa, Florida. During a NSS conference in Idaho in July of 1999, my wife, Sherry, and I began discussing the possibility of exploring the lake with Dr. Stephan Kempe, a professor at the University of Technology at Darmstadt, Germany. Special permission to dive the Kauhako Crater had to be obtained from the National Parks Service, which oversees the National Historical Park where the crater is located. Stephan and I put together a proposal for the exploration of the crater, which was accepted. We now had to transport 1,000 lbs. of dive gear to the remote location. Pat Johnson from the Deep Ecology Dive Shop on the North Shore of Oahu graciously lent us the double and single tanks that would be needed for this expedition. Air Liquide helped us to obtain the helium and oxygen that needed to conduct deep dives safely.

We were met in Honolulu by Dan Morse from Deep Ecology who was to have joined the expedition, but could not due to bronchitis. Nevertheless, Dan arrived ready with a truck full of tanks, to which we added five bags stuffed with dive gear. We arrived at Kamaka Air where the gear was loaded onto a pallet to be flown to Kalaupapa on a World War II era cargo plane, while we flew on a small Cessna.

Approaching the Kauhako peninsula was breathtaking as the small plane dropped over the sea cliffs and the pilot flew directly over the crater. We could see the lush vegetation, extremely steep walls, and a small, water-filled opening about the size of a football field. Stephan, Jeff Trainer and Dean Alexander of the National Parks Department met us at the airport. Jeff drove us to a Quonset hut that would be home for the next few days. We immediately began unpacking, organizing our gear, and talking with Dean about the plan for getting the gear down to the lake. At that time we learned from Jeff that the lake was 400 ft. below the spot where we would park our vehicles and that the footpath down to the lake was rocky, rugged, and steep. Lester Delosreyes, a firefighter on the peninsula, soon arrived to pull out backpacks, ropes, and other necessary gear.

As we began the expedition from the top of the trail, no lake was visible, only an extremely steep, rocky hill. A wire had been placed strategically along the twisting path as a handhold. Additionally, Jeff and Lester rigged climbing ropes to a tree to negotiate the heavy tanks down the last 80-foot drop. It took five hours to transport all of the gear down to the lakeshore. Everyone

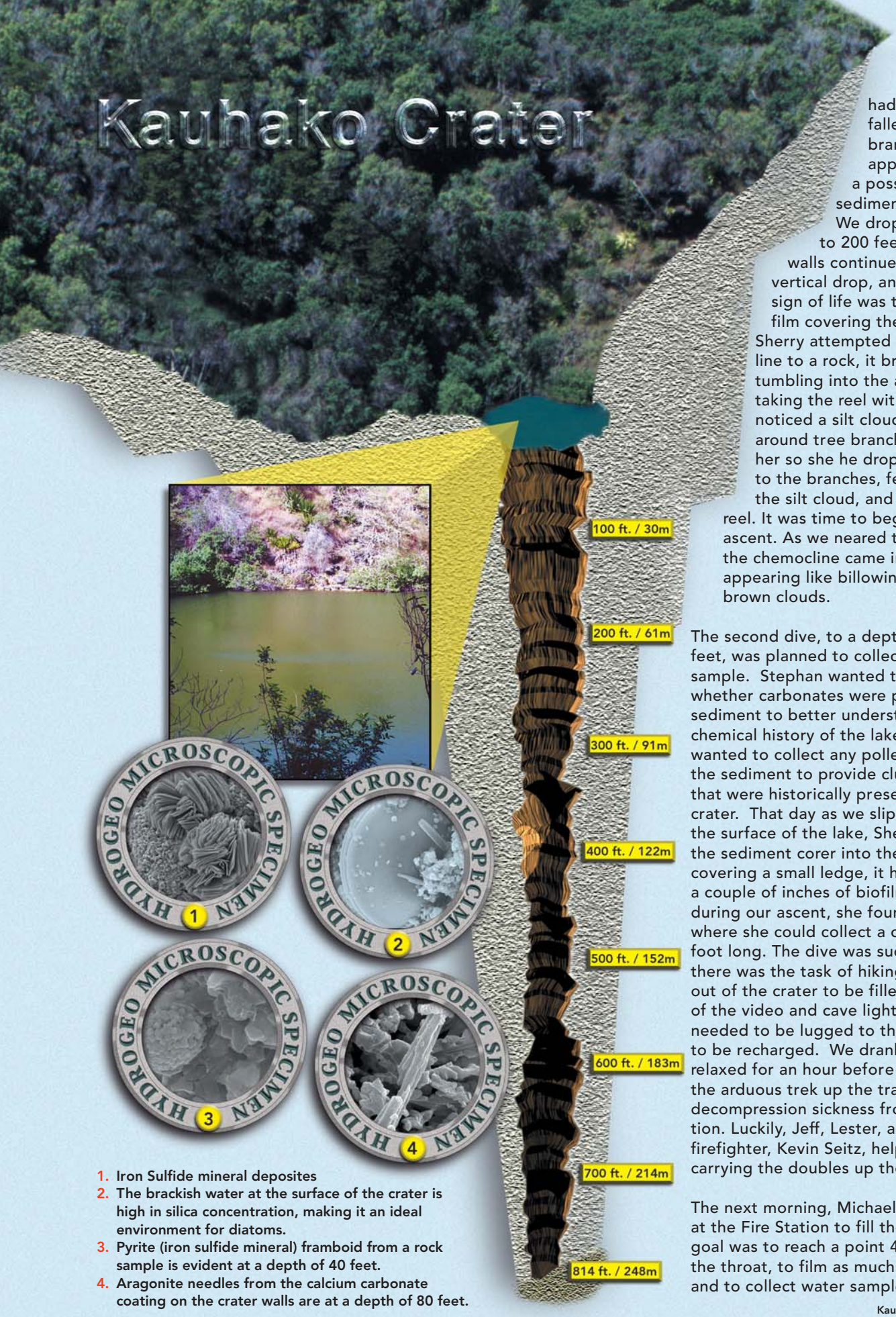


was exhausted. The decision was made to delay our first dive until the next morning. The choice was to dress in our DUI drysuits since water samples showed high sulfide concentrations below a chemocline at a depth of 15 feet; we wanted to limit the sulfide exposure to our skin as much as possible. The plan was to descend to 200', video on the way down, determine the thickness of the chemocline, search for any type of life, and look for sediment sampling locations.

Upon arrival at the lake that morning, Sherry tied an exploration reel to a buoy. We descended near the center of the throat. She ran the reel as I filmed the first dive ever made into this crater. The visibility was virtually zero until we passed through the chemocline at 15 feet. The water had both a pungent sulfide odor and tinny taste, but these dissipated just below the chemocline, our overwhelmed senses no longer were able to detect the sulfide. As we looked around we saw a black chasm broken only by the intense burst of illumination emanated from the American Underwater Lighting video lights we carried. The intense darkness was as a result of the wall's entire surface covered by grayish green fingers of bacteria.

The walls in the throat of the crater were almost vertical. We passed small undercuts at 40 and 80 feet, where the bacteria had formed stalactites. At 180 feet there was a 4-foot wide ledge that

Kauhako Crater



had captured fallen tree branches and appeared to be a possible site for sediment collection. We dropped down to 200 feet, but the walls continued their vertical drop, and the only sign of life was the bacterial film covering them. As Sherry attempted to tie the line to a rock, it broke, tumbling into the abyss and taking the reel with it. She noticed a silt cloud forming around tree branches below her so she he dropped 5 feet to the branches, felt around in the silt cloud, and found the reel. It was time to begin our slow ascent. As we neared the surface, the chemocline came into view, appearing like billowing greenish, brown clouds.

The second dive, to a depth of 200 feet, was planned to collect a sediment sample. Stephan wanted to determine whether carbonates were present in the sediment to better understand the chemical history of the lake. Jeff wanted to collect any pollen trapped in the sediment to provide clues to plants that were historically present in the crater. That day as we slipped beneath the surface of the lake, Sherry pushed the sediment corer into the bacteria covering a small ledge, it hit rock below a couple of inches of biofilm. Finally during our ascent, she found a location where she could collect a core over a foot long. The dive was successful, but there was the task of hiking the tanks out of the crater to be filled. Also, all of the video and cave light batteries needed to be lugged to the crater rim to be recharged. We drank water and relaxed for an hour before beginning the arduous trek up the trail to avoid decompression sickness from overexertion. Luckily, Jeff, Lester, and another firefighter, Kevin Seitz, helped us by carrying the doubles up the trail.

The next morning, Michael met Lester at the Fire Station to fill the tanks. Our goal was to reach a point 400 feet into the throat, to film as much as possible, and to collect water samples from the

1. Iron Sulfide mineral deposites
2. The brackish water at the surface of the crater is high in silica concentration, making it an ideal environment for diatoms.
3. Pyrite (iron sulfide mineral) framboid from a rock sample is evident at a depth of 40 feet.
4. Aragonite needles from the calcium carbonate coating on the crater walls are at a depth of 80 feet.

Kauhako Crater
Continued On Page 25

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Covered with soft corals and a variety of marine life, the Lowrance lower stern deck is captured on film with the use of multiple slave strobes.

Photo: C. Bowen

The Southeast Coast of Florida provides some of the best reef and wreck diving in the United States. Pompano Beach is located in the heart of wreck country, laden with sunken ships of wooden galleons to massive steel freighters. All Pompano dive facilities offer wreck diving within the recreational dive limits. Only a couple offer technical charters to the deeper, less visited wrecks.

Boarding the 38-ft. charter vessel Aquanaut, from South Florida Diving Headquarters, we prepared our equipment for the short 30-minute drive to the wreck of the Lowrance. Sunk in 1984, the 420 foot long Lowrance was originally intended for a sport fishing artificial reef. However, with the advances in technical diving, the Lowrance has become a standard decompression dive for techies.

Yet, not all is so simple and easy in the warm waters off Pompano. The Gulf Stream, the world's second largest moving body of water, passes very close to the beaches. This giant river constantly batters the deeper reefs and wrecks, making them a gamble to dive. With currents ranging from one half to 7 knots, the Gulf Stream can make diving any of the deeper wrecks very difficult to near impossible. Additionally, the Atlantic Ocean along the Pompano Beach area becomes deep quickly. Located just a couple miles from shore, the Lowrance is just a 15-minute boat ride from the pass and lies in 210 feet of water. The surface current can be misleading. A slow to minimal current on the surface does not mean a ripping current is not washing across the wreck. Divers need to be prepared for drastic current changes, not only at different depths but also during the dive. Without warning, the currents can change in direction and force, possibly ripping the unprepared diver from the wreckage.

Since the Lowrance was designated as an artificial reef, most of its superstructure has been dismantled or cut away. Fished hard for many years, thousands of yards of monofilament cover almost every inch of the wreckage. Extreme caution and a good set of cutting tools are a requirement for this dive.

Moving into position above the wreckage, Capt. David Heaney estimates the current's force and direction. He maneuvers the boat upstream of the wreck and calls out, "Dive dive dive." They call this type of diving, bombing the wreck. As the captain gives the command to dive, divers quickly exit off the dive platform and plunge 210 feet to the sand floor.

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On their descent, the divers search the deep blue waters for the emerging wreckage to come into sight. Time is of the essence. If the descent is too slow in a strong current, the divers will blow past the wreckage, causing a missed dive. A missed wreck also causes the unlucky diver to drift away in the blue water as he/she ascends back towards the surface. Time is also of the essence for the unlucky diver who delays returning to the surface by attempting to search for the wreckage. This may cause the diver to drift dangerously far from the searching eyes of the dive vessel.

If all goes as planned, on the descent, the divers will drift into the massive structure. The Lowrance sets upright on a flat sandy floor. After the planned bottom time is reached, the team gathers at the upline or a

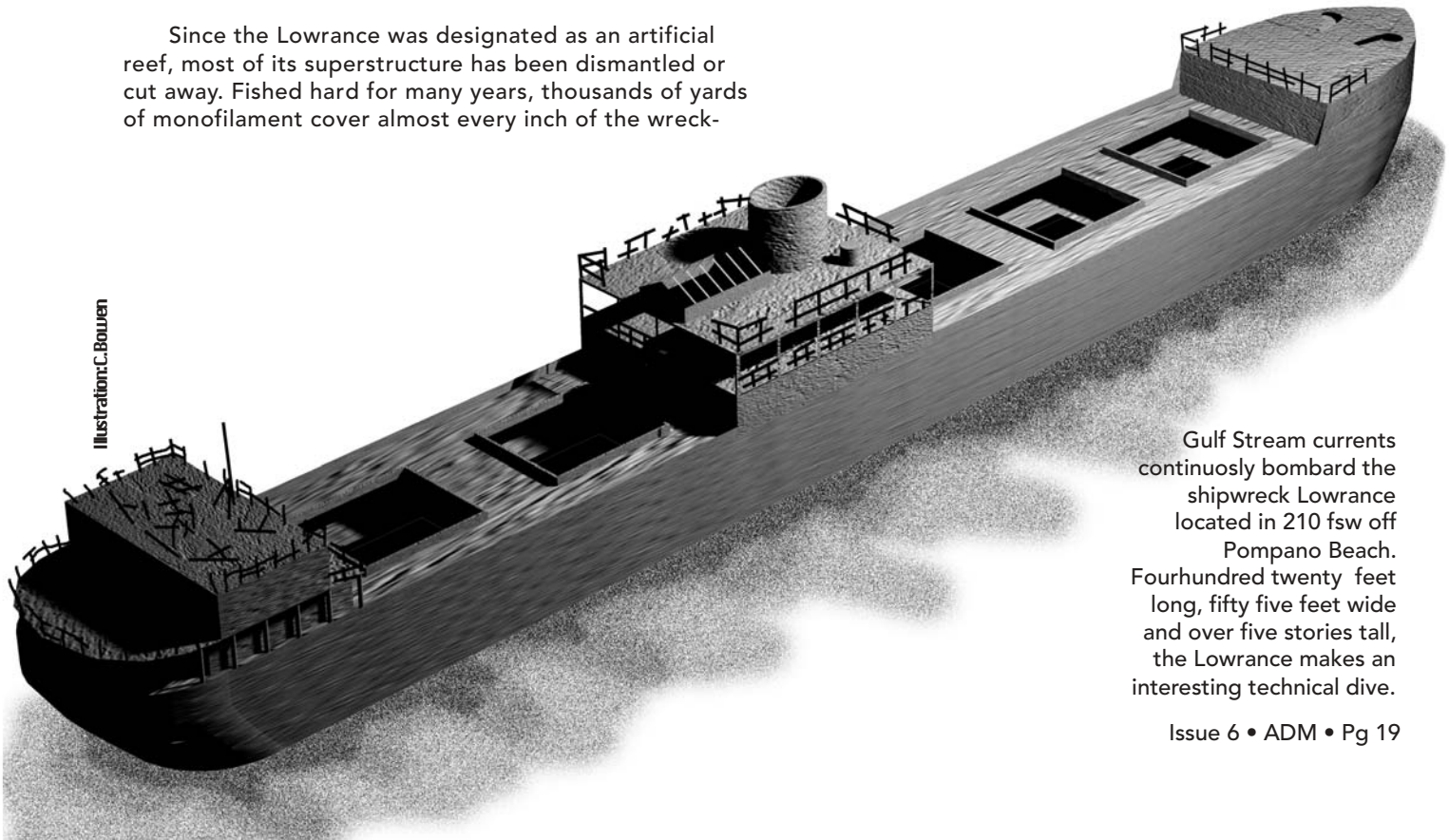

Illustration: C. Bowen

Gulf Stream currents continuosly bombard the shipwreck Lowrance located in 210 fsw off Pompano Beach. Fourhundred twenty feet long, fifty five feet wide and over five stories tall, the Lowrance makes an interesting technical dive.

designated place on the wreckage. It is best to attempt to keep all divers together for safety reasons. This allows the divers to police each other during the decompression and prevents the team from becoming separated, surfacing into dangerous shipping lanes.

The massive ship's structure stands over five stories tall, a football field and a quarter long and 55 feet wide. Once on the wreck, divers can tuck into or behind the wreckage to escape the grip of the current. Three large cargo holds, two levels deep filled with scrap pipe and debris can be explored just behind the bow. A two story amidships structure housed the engine, equipment rooms, and pilothouse. Just behind the amidships structure are two more cargo holds, then the stern cabins and crews quarters. The force of the current on the wreck will dictate how easy exploring will be. Strong currents will cause the divers to constantly seek protection from the current by moving from cargo hold to cargo hold inside the wreck and darting around the backside of the wreckage to evade being blown off. Slow currents will allow divers to leisurely explore the upper decks and have an easy dive.

With depths ranging from 15 feet to over 275 feet and warm crystal clear water, Pompano Beach offers divers, no matter their experience, a chance for wreck exploration. The Lowrance offers technical divers an exciting dive, a challenge, and good photo and video opportunities. To dive the Lowrance or other wrecks within the Pompano Beach area contact the following charters.

American Dive Center
900 East Atlantic Boulevard
Pompano Beach, Fl 33060
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In 1935, the Federal Shipbuilding Company, located in the northern New Jersey town of Kearney, completed the construction of a large oil tanker known as the R.P. Resor. She belonged to the Standard Oil Company, presently the Exxon Corporation. On November 13, 1935, Mrs.R.P. Resor performed the task of christening the new tanker as she was launched from her dry dock. Her freshly painted hull displayed the name of the petroleum company's treasurer, Reuben Perry Resor.

Her sleek hull extended 445 feet with a beam measuring 66 feet across. Along with a displacement of 7,450 tons, she was the first ship built in America to sport the new "Isherwood Arcform Hull." Combined with improved propulsion and steering, these modifications made for a faster, more responsive vessel.

Towards the end of February 1942, the R.P.Resor was on her way north toward the port of Fall River, Massachusetts. Several days earlier, she parted the great state of Texas with her holds containing over 78,000 barrels of black gold, Texas tea, oil that is. Captain F. Marcus manned her helm. Despite the ongoing world war, Resor's passage north was a calm and uneventful one. It was just another day at sea for the crew of the doomed tanker. None aboard were aware of the events that would violently unfold later that night.

Making way off the coast of New Jersey, a lookout reported seeing a set of lights from a fishing vessel off Resor's port bow. It was the German U-boat 578, commanded by Fregatten Kapitan Ernst-August Rehwinkel. Spotting the huge prize, Rehwinkle initiated an immediate attack. Within minutes, the sub quickly closed in on the Resor and unmercifully pumped two torpedoes into her steel sides. A tremendous explosion ripped open her hull and quickly ignited the flammable cargo inside. Her fiery innards spilled out into the sea and quickly engulfed the fatally wounded tanker. The surrounding ocean was now a sea of intense fire. All hands desperately fought to save themselves as the blazing inferno consumed everything in its reach. Tragically, fifty men perished during this hellish attack. Later, members of the United States Coast guard cutter Picket responded to the scene and managed to pluck two oil-laden survivors from the sludgy sea. Both of these men were barely alive and almost died during the dangerous rescue.

Out on the horizon, Resor continued to burn. The USS Jacob Jones arrived on station the following day to assist with the search for survivors. Hours upon hours of combing the seas for signs of life met negative and tragic results for the Jones. Not only were there no survivors found, but the deadly U578 managed to surprise the well-armed naval ship and sent her to a watery grave, too. Chalk two up for the Nazis.

For the next two days, hoards of curious onlookers from the Asbury Park waterfront watched the clouds of thick black billowing smoke as the flames continued to incinerate Resor's carcass. After an unsuccessful salvage attempt, she finally slipped below the surface and now rests in 130 fsw, approximately 35 miles offshore. According to Captain Dan Berg of Aquaexplorers, the granddaughter of Rueben Resor contacted him by mail. She explained in detail how her grandmother christened the R.P. Resor and that she still retains the broken champagne bottle that was used to perform the christening back in 1935.

With such an exciting history, my curiosity and overwhelming desire to venture out into the Atlantic Ocean to dive this wreck would be made possible by contacting my friend and fellow wreck diver, Gene Holmes. Earlier this year, Gene and I had met on a dive trip to the Yankee (G&D) wreck and managed to exchange telephone numbers. Knowing he was running a trip to this site, I called him to see if there were any extra spots available for a friend and myself. He replied, "yes," and after a brief summary of the wreck site, kindly penciled each of us in a spot. Gene plans and runs many exciting dive charters to all types of wrecks throughout the year. His primary goal when running any trip is safety first, most important issue when booking any dive adventure.

Our journey out to the R.P. Resor would be made on the well-known dive boat, Seeker. Captain Dan Crowell and Jenn Samulski own and operate this deep explorer out of Brielle, NJ. Her large 65 by19 foot hull is beautifully outfitted with all of the creature comforts of home, including a full-service galley, air- conditioning, shower, large head, TV / VCR, and 18 comfortable bunks for those long days at sea. She's also loaded with an arsenal of the latest marine electronics, enabling her to handle just about any type of deep adventure. Additionally, she has made 70 trips to the Andrea Dorea and numerous other deep expeditions. She is definitely a leader in deep wreck explorations.

We arrived the day before our charter and prepared to stay overnight aboard the spacious boat. With all our gear stowed, we settled in for the night. Seeker's friendly operators will gladly allow a diver to stay overnight before any trip, free of charge! You need only to call the day before and they will gladly open up the boat for you and your wreck diving cronies. Make sure to bring personal bedding, including blankets or a sleeping bag, and pillows.

Below: The burnt out remains of the vessel Resor has blossomed into a life flourishing ecosystem for marine life.

With a good night's sleep under my belt, I awoke to the sounds of other divers coming aboard. An ample amount of twin tanks, 02 bottles, and other wreck diving gear were being loaded in a quick and deliberate manner. At 5 am sharp, Captain Crowell fired up the Seeker's diesel power plants and slowly eased her away from the dock. The morning sky revealed a glimpse of light as we left the security of the inlet and entered the Atlantic Ocean. The wind was out of the south and seas were in the two to four foot range.

Emerald seas and warm sunshine created a pleasant backdrop as we ventured further out into the choppy abyss. In a short period of time, the New Jersey skyline was replaced with open ocean as we continued further east. Our trip to the Resor would take approximately two and one half to three hours. With less than an hour to go, I observed Gene Holmes and Bill Schmoldt busy planning the recovery of a previously located porthole. They were intent over a sketch of an area on the wreck that yielded Bill four other ports in the past. I was amazed at the depiction and how familiar these two die-hard wreck divers were with the Resor's layout.

Seeker's engines throttled back as we finally arrived on site. Captain Crowell quickly appeared from the bridge and proceeded to give us a very thorough dive briefing. Upon logging our run times, we started gearing up. Terry Martzall knee-rolled over the gunnell and disappeared below choppy sea to secure Seeker to the wreck. Several minutes later, we all followed suit. Current on the sloppy surface was minimal as I finned my way towards the downline. Grasping the line, I pulled myself down into the light green liquidity. During my descent, the mild ocean current sent small particulate and jellyfish animals floating lazily past me. Streaming upward were cascades of divers' air bubbles as I continued deeper towards the wreck. At about 95 feet I could start to recognize the outline of the torpedoed tanker. As I gently touched down on the mammoth wreck, my computer read 124 feet. After a careful check of my gear, I headed off to explore her ghostly remains. It was a little dark, but clear on the bottom. Temperature was in the low 40's and depending on with whom you talked, visibility pushed at around 40 feet. The wreck site was filled with a large array of fish, anemones, mollusks, invertebrates, and crustaceans. Every square inch of the now silent tanker supported some type of healthy marine life. Large amounts of the weird looking Ocean Pout thrived immensely. Too bad they are inedible. In every possible direction hull plates and twisting beams were seen, along with structure supports lying strewn across the white sand bottom. Describing this site is large would be an understatement.

With a plan in mind, I slowly finned over the rusting metal wreckage, looking in every possible opening for lobster and artifacts. Some sections of the wreck were cavernous and layered, while others were covered in sand and feathery sea anemones. There were so many places to inspect and with the infinite amount marine activity, I failed to cover but a mere fraction of the area. I remained near the hook conducting a search of the massive metal jumble. This first dive resulted in returning to boat empty-handed, but the dive was great. While I satisfied my deco commitment, I started planning my strategy for the second dive. There's not much else to do while waiting for the computer to clear.

Back aboard Seeker, owner Jenn Samulski was busy cutting up fresh fruit, tending to other divers, checking run times, and smiling ear to ear, all in a single bound. If I didn't know better, I would tend to believe that she loved her job. Captain Crowell kindly drew a sketch of the wreck site and showed me the location of where we were hooked in. This was quite helpful in planning my next dive.

After a relaxing two-hour surface interval, I was happily on my way back to the bottom. With the presence of more ambient light, visibility seemed to improve. Hooking off my reel, I slowly sculled out and away from the hook. Approximately 150 feet from the hook was Resor's stern, where the aft gun was located. It was quite picturesque and subtle as it quietly poised muzzle down. I would not like to be on the business end of that baby.

With my mask in the sand, where it usually is, I finally spotted a lone arthropod (lobster) peering out from under a small overhang. I quickly extracted him from his abode and into the bag he went. My gages indicated that I should start heading back to the line. As I slowly reeled my way back, I scanned over the labyrinth of wreckage in search of his next of kin. It wasn't until I arrived at my starting point that I luckily spotted his brother. Being in such close proximity to the hook, I was surprised that he was still there after two dives. As I placed the second bug in my bag, reuniting the two brothers brought tears to my eyes,

Slowly I ascended the line, stopping at the prescribed depth to hang for 10 minutes. The line was occupied with several gear-infested divers utilizing accelerated deco gases to shorten their hangs. I love those tekkies. One by one divers exited the water. Impressively, Seeker's crew was always at the stern assuring safe boarding. They further assisted in the stable seating of their frog-footed passengers.

With everyone safely back aboard and accounted for, Terry returned to the bottom and popped the hook. Within minutes he reappeared on Seekers new sturdy ladder and quickly climbed aboard. Captain

Above: Returning to the surface loaded with fresh lobster and scallops snagged from the protective cover of the shipwreck Resor.

Crowell punched in his return coordinates and steered his vessel towards home. On the long ride back, the majority, including myself, hit their bunks for a little snooze. The quiet hum of the engines put me fast asleep.

Many lobsters were brought to the surface. A couple of divers had caught their legal limit of six, along with a couple of large delicious ocean scallops. Back at the dock, we combined our catches and snapped a group photo. Even the lobsters seemed to smile for the shot. Such a nice big pile of freshly harvested New Jersey lobsters and what an excellent trip aboard the Seeker. You can bet I'll be back!

Seeker also provides commercial diving services and Professional video production. You can reach the Seeker by calling Captain Dan or Jenn at (732) 836-0729 or visit them on the World Wide Web at www.Deepexplorers.com

The "PIT"
Continued From Page 8

and brought all the equipment necessary to make diving easier. Decompression could now be finished in a ceiling-mounted tank. The first rebreather used in the Pit was an English-built Buddy Inspiration owned by cave diver Steve Bogaerts. Quattlebaum, Lins, and Bogaerts began attacking the Pit with rebreathers in early 2000, adding line in several deep passages and bottoming out at 390 feet of depth in the Alph and Skid Row passages.

Just prior to our return trip in March, we received an E-mail that read, "To do any of this will take more money than any of us have. So I think we need to rethink this project. It looks like a lifetime job to explore this cave, and you need a large fortune to spend on it. We were all very broke and worn down physically." Before any exploration can be done, there were months of chopping trails, making camps, and negotiating access privileges. It is easy to overlook the efforts of the people that make access possible for others.

Paul and I drove from Florida to Tulum in March 2000. As soon as we were settled at Base Camp, we concentrated on surveying previous finds and pushing the BMB Passage. Quattlebaum's current goal was to make a decision as to whether further exploration had merit. We were uncertain about either task until the waning hours of our project when Paul surfaced from his last dive. He recalled.

"I arrived at the end of the line that Jill and I had installed two days earlier. I was taking a water sample for Sam Smith from the University of Bristol. Noting the 81° temperature on my slate, I heard a little voice calling me to look closer at the restriction that had terminated our previous dive. I stared at it for several long seconds and envisioned my seven-year-old nephew, Hawk-Ming, being able to squirm his way through like a contortionist, I realized that if I twisted left and then right and left again, I might fit through, rebreather and all. I slid through and the cave started to rise, looking up, I saw a blue void. I inflated my wings and popped into the third chamber. I hastily surveyed the line and counted the knots. I was swimming with my compass and slate in one hand and the water-sampling tube in the other."

Paul tied the line facing a prominent tunnel heading south at a depth of 305 feet. He later reflected, "It is times like those, that I feel like a tiny spec in the cosmos. There is absolutely nothing like looking into the face of Nature and knowing that you are the first human to view a place." He aptly called the beckoning tunnel, "The Next Generation."

As we departed for a long drive home to Florida, Quattlebaum regained his vigor and was already sorting parts to fabricate a redundant Inspiration rebreather. In his new tidy dive store, filled with customers seeking snorkel tours of the Frontier, I realized the simple days were lost. At times I yearn for the jungle adventures without laptops, radios, and contact with the outside world, but as exploration evolves, so do the tools that best solve its mysteries. It appears that exploration will continue at the Pit. Beans, burros, and back-mounts are likely to be replaced with Sofnolime, SUVs, and scooters. Quattlebaum and Bogaerts are continuing the quest and, whether or not I engage in further exploration there, I will be rapt by their efforts to uncover the mysteries of the Pit.

Kauhako Crater
Continued From Page 16

deepest depth possible. Stephan wanted us to bring back rock and sediment samples as well. We chose to use a heliair mix 10/50/40. Each diver used one set of doubles isolating the two tanks; one tank held the heliair and one held air. Additionally, we would use the air down to 200 feet, then switch to the heliair mix. Then, when we reached 200 feet on the ascent, we would switch back to air. Next, we would switch to EANX 56 at a depth of 70 feet and switch to EANX 80 at 30 feet.

As we descended, the walls seemed even steeper past 250 feet. There were no ledges or undercuts, just vertical walls covered by slowly swaying bacteria fingers. As soon as our depth gauges read 400 feet, we stopped our descent and Sherry handed the reel to me. She wanted to attempt to take a water sample but our descent was slower than planned, so I started reeling up. Sherry tried to locate a mesh bag attached to her DUI BC but couldn't find it. Evidently, it had floated behind her head, out of her sight. Deciding to concentrate on the ascent and not the sample bottle, Sherry finally located the bag and collected the sample at 300 feet. She also grabbed a rock sample from the wall, covered with white, brittle carbonate deposits below the bacterial coating.

Our regulators became difficult to breathe as we approached 200 feet. The computer-generated air management tables we were using had led us to believe that we would have a more than an adequate gas supply. However, we had not calculated using gas to keep two sets of wings inflated with all the video lights and sampling equipment we carried. We switched to air and began our decompression schedule.

At decompression stops, Sherry collected rock and sediment samples and made measurements of the crater diameter. Our last decompression stop was above the chemocline, where the shrimp living in the brackish surface water continually nibbled at our hands. Finally, we reached the surface 90 minutes after our descent into the throat. A great deal was accomplished during this dive - we had reached our desired depth and collected a deep-water sample, several rock samples from various depths, a sediment sample, and took some measurements, video taped the dive, and obtained continuous depth versus temperature profiles from our Cochran computers. We felt good. We rested for about an hour

before even beginning to think about the hike ahead. Our last dive complete, we were happy with what we had accomplished but wanted to return to the site to further explore the crater.

Special Thanks to Dean Alexander, superintendent Kalaupapa National Historic Park Assistance on Molokai (those not already mentioned) Dr. Horst-Volker Henschel, Philip Stankiewicx, and Mark Haskins.

The following organizations and manufacturers supported this expedition:
American Underwater Lighting • Cochran Undersea Technology • National Association for Cave Diving
Deep Ecology Dive Shop - Oahu, HI
Depth Perception Dive Shop - Brandon, FL
Air Liquide - Honolulu, HI • DUI • Liquid Fit • Mares.

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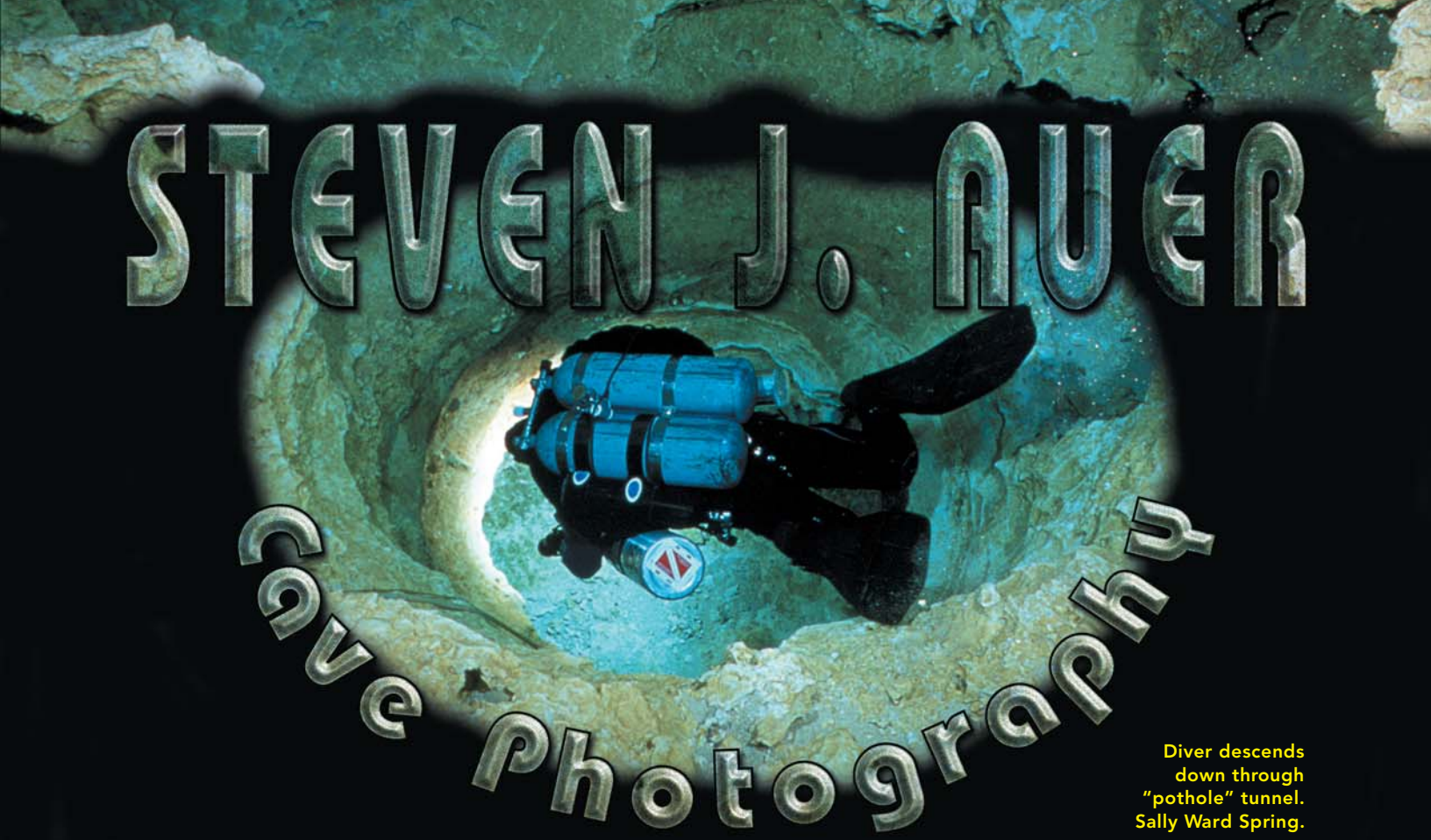
STEVEN J. AUER

Cave Photography



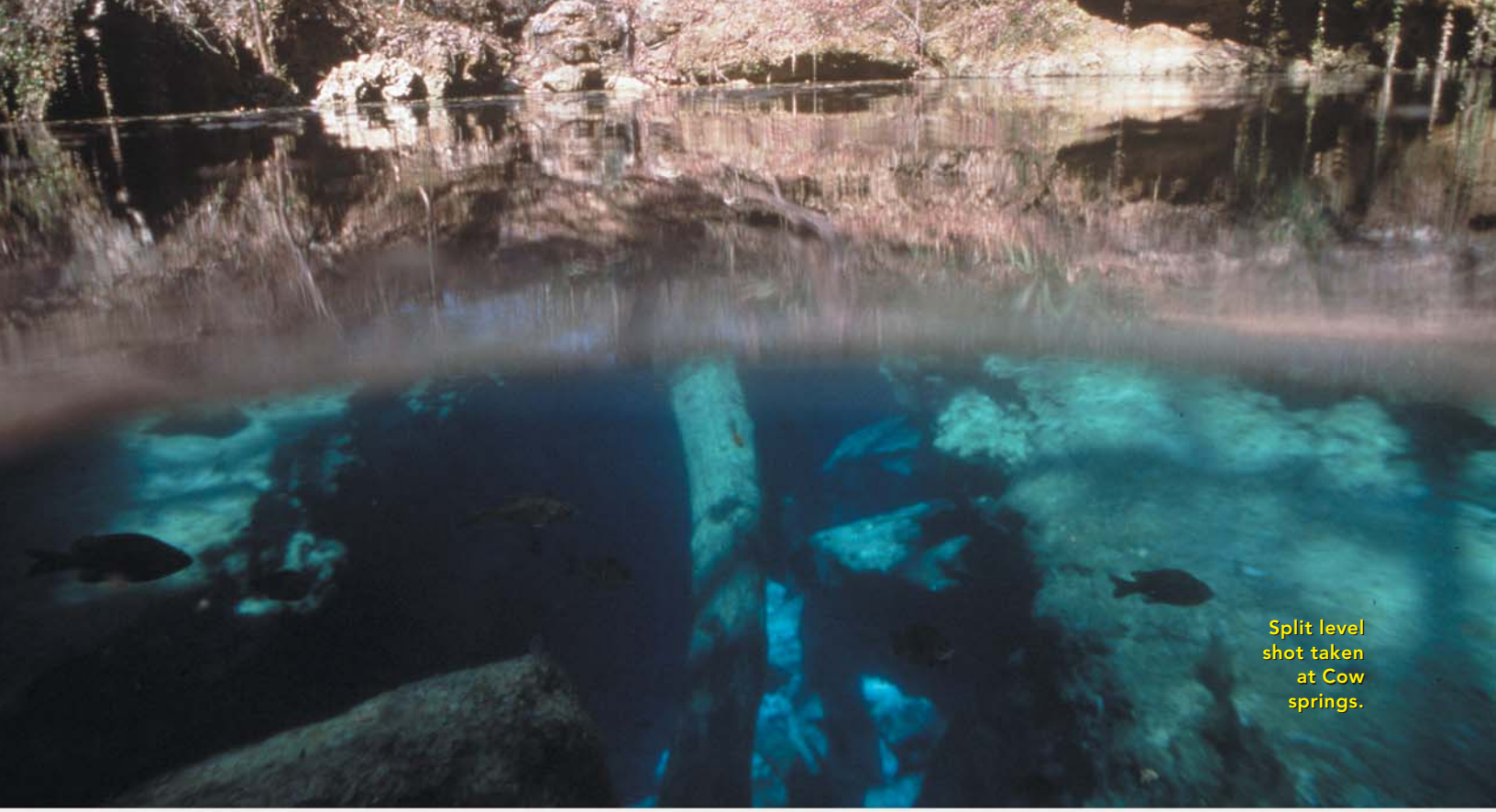
Diver descends down through "pothole" tunnel. Sally Ward Spring.

In August of 1997, my wife Elizabeth and I moved from the Florida Keys to Tallahassee, Florida, where much of my free time was spent diving around the Suwannee and Madison County area springs. With the absence of a rocking boat, blowing winds, poor visibility, and the corrosive effects of saltwater, this area appeared to be the perfect site to play with a camera. It took me a short time to become hooked and develop a passion for cave photography after seeing the crystal clear passages, breakdown rooms, and other wondrous cave features.

That first year, I was equipped with only a Nikonos-5 camera, 15mm lens, and a single 100-watt strobe. At that time, only one or two shots per roll of 36 was worth "a look. " The remainder of the photos wound up in the trash. I was not satisfied with just a "look," and so, I continued to work at becoming skilled until I created images worthy of peoples' attention. Eventually, I refocused my diving and I gave up diving along with a camera, to diving always with a camera. I no longer was getting just those two shots a roll. I was able to capture three great shots per roll and not trashing the remainder of the photos.

The more I became committed to creating great shots, the more satisfying I found the results. I understood the photographic process. I first needed to mentally compose the image, then figure out how to properly light the cave. The only place to get away with one or two camera strobes in the cavern is with the use of sunlight. Two camera strobes can be shot in the cave, but the result would be a two-dimensional image.

Natural sunlight creates a beautiful shot of Wakulla springs cavern.



Split level shot taken at Cow springs.

TAKING THE NEXT STEP

At this next step, photography becomes tough and expensive. Arnold Jackson told me how to backlight a cave diver and produce stunning results. I purchased my first pair of 400-watt Ikelite strobes, complete with remote sensors, and custom length sensor cables. While the idea of backlighting sounded cool, the preparation and planning involved many steps. For example, first, locate a cave shoot. Next plan for gas, stage bottles, deco gas, bring the camera, rig-up the back lighting strobes, and swim all this into the favorite high-flow cave. Additionally, it is important to not silt out the shoot site or all those steps were wasted.

Have I mentioned task loading? It goes without saying the effort is worth the extra trouble. I never do a cave shoot without at least 2-400 watters for backlighting. It is important to note the orange hard wires slave sensors versus the clear underwater pluggable ones. While hard wired sensors with a 4 to 6 foot cable will accommodate most applications, the underwater pluggable (E.O. cables) connectors offer greater flexibility. They can be mixed and matched on the fly during the shoot and also, interchanged with other underwater pluggable equipment in an equipment inventory. The complete backlight strobe package is comprised of: strobe, sensor cable, slave sensor, two-pound weight, rubber band (from 14" car inner tube) length of line, and bolt snap. I usually swim 3 strobes clipped off on my

Table rock and adjoining Mud tunnel in Little River cave.

chest with my camera and two camera strobes in my hands. I place the 2-pound weights in my bellow's pocket; however, the weights can be skipped. Hopefully, rocks can be found to hold the strobes in place where the shoot is planned but it is important to not silt out the shoot site as a result of disturbing rocks from the cave floor. Personally, I swim with the weights.

THE STUDIO SETUP

The idea is to place the strobe in a section of cave passage or feature that is to be highlighted. With the strobe pointing away from the camera, secure the strobe in place with the 2-pound weight. Then bring the slave sensor and remote cable as far foreword as possible. Make sure the face of the sensor containing the photo electric cell points toward the camera. This will ensure the tripping of the backlighting strobe when the shutter releases. Next, repeat the procedure with the second, third, and/or fourth backlighting strobes. Keep in mind to try to carefully place the sensor cables in cracks and crevices of the cave conduit since they will stick out like sore thumbs in the final shot. Placing one of the strobes on one's models can vary this technique. Secure 2 lengths of surgical tubing around a set of doubles "hosestuffer" style. This will easily hold one of the 400-watt strobes in place. Now with a 4-foot section of sensor cable, drop the sensor over the shoulder of a diver and have him/her hold with light hand. The PVC helps keep the sensor aligned with the camera. I have often lost a great shot because the diver was cupping the sensor and the strobe failed to fire.

This is by far the most time consuming technique. Swim to the site, set up the strobes, and shoot until satisfied. Then pick everything up and set-up in the next section of cave in which your are shooting. Bring a couple of stage bottles since the extra gas comes in handy and will save time and a trip to the dive shop to fill doubles.

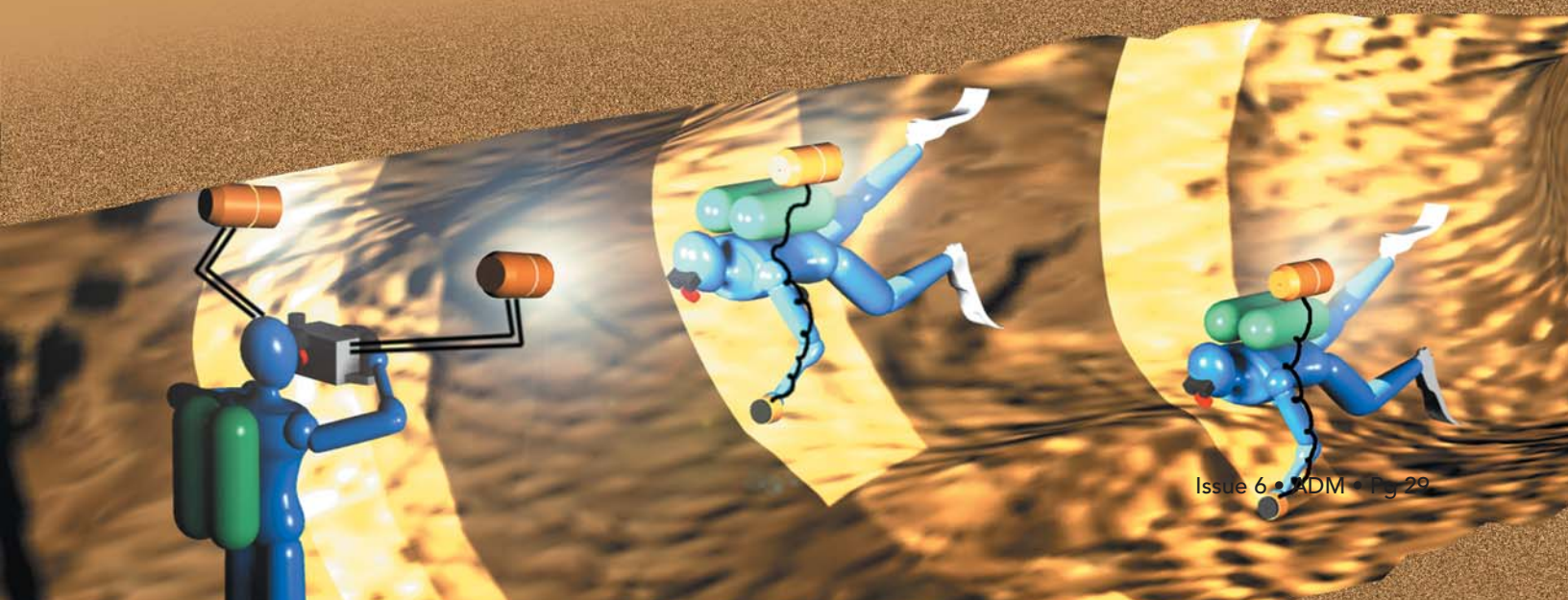
Descending from a depth of 60 feet to 90 feet through the "chimney" at Little River Spring.

Top Left Page: When possible, the use of natural sunlight and the cavern zone can produce excellent photography.

Bottom Left Page: This is an example of backlighting the diver and the tunnel. A slave strobe was placed on the diver's back and another one was placed farther back, facing away from the camera. The camera strobe lights up the foreground tunnel and the model's face. The model's strobe lights up the tunnel directly behind, and the last, farthest strobe helps create a three-dimensional tunnel effect.

Below: The illustration demonstrates how multiple strobes can create special effects with underwater photography.

Above: This is an excellent example of a multiple strobe effect. The camera strobe lights up the foreground tunnel. The first slave strobe seen at the bottom of the cave, lights up the model's face. The strobe on the model then lights up the tunnel from behind him, creating a long distance image.



ACTION SHOT:
Site: Large cave tunnel
Models: two divers on scooters
Equipment:
Cameraman - Nikonos-5 15mm lens; two 200watt Ikelite strobes
Models - one 400-watt Ikelite strobe on each diver, slave sensor in light hand.
Divers' scooter towards cameraman making repeated passes. My camera strobes light the foreground of the cave along with the faces of the models and the models strobes creates stunning backlighting of the cave passage behind the models.

PAINTING:

This technique is fairly simple, requiring at least two divers with the addition of a tripod. On camera strobes are not used. The camera is placed on a tripod, with the shutter speed selector on "B" for bulb. This enables the cameraman to keep the shutter curtain open for as long as the shutter release is depressed. The model in this case swims around the perimeter of a large room, while tripping the strobe at regular intervals, "painting" the room. The cameraman steadies behind the camera, keeping the shutter open throughout the exposure.

FILM:

I only use print film when I am doing a photo shoot for a client, unless they request slides. Print films are more economical to work with regard to reprints and enlargements. Additionally, they are far more "exposure friendly" during the shoot and in the lab. It is hard to go wrong with selecting a print film, even films with higher ASA's produce sharp images with outstanding grain quality. Personally, I use Fuji's Superia 200 when using print films. Superia 400 is also an outstanding film. Both films have beautiful color rendition and grain quality, but I tend to lean towards the 200. I find it is more resilient to hot spots created from outcroppings of rock nearest the camera. By far, slide film is my favorite and Fuji's Provia 100F is the winner with hands down.

QUANTUM LEAP:

At the time of this writing, I have finally completed my first prototype 1200-watt underwater strobe. With a five-second recycle time, it carries like a stage bottle and is only one-quarter pound negative in the water. This is the first of a series of three prototypes I plan to build. The other two are 2400-watt units. They have been in the water only once, however, the results have been very impressive.

Good luck, be safe, and have fun! Check out my site at **www.aquatography.com**

Divers squeeze through the entrance restriction at Sally Ward spring on their way to the giant Cube Room.

NEON PHOTOGRAPHY

Shedding New Light on the Reef

Photos: Charles H. Mazel

Now available: a new frontier of underwater exploration and photography for night divers. Photographers can literally see the undersea world in a different light through the use of specialized lights used at night to stimulate fluorescence. Shine a blue light on most objects and one gets blue light back. Shine the right blue light on many corals and greens, yellows, oranges, or reds are seen. Fluorescence is an almost magical effect that transforms one color of light into another. NightSea is a new company in the dive industry, founded to build on underwater fluorescence research and offer lighting and photography products to the general dive community.

Many have probably seen 'black light' posters at a party, or a display of fluorescent minerals at a museum. That's just what this is about - using a special light to bring out intense colors that can not be seen any other way. It may appear to be a trick, but it is an optical effect, just as real as what is seen during daylight or with an ordinary dive light. It is just DIFFERENT.

Fluorescence can be seen in the daytime with no equipment at all. If you have seen corals or anemones that appear orange or red at depths greater than about 30 feet or corals that were so green they appear to be glowing, you have seen fluorescence. Actually, the corals are absorbing blue and ultraviolet light from daylight and emitting it as different colors. However, the few corals and anemones that appear fluorescent during the day are more the exception than the rule. It is usually the ones that are the most 'normal' during the day, drab browns and grays giving absolutely no hint of fluorescence, that reveal the most spectacular displays with the right light at night. They are fluorescent in the daytime, but can not be seen in the bright daylight. After all, the full effect of a black light poster in a well-lit room is not possible, and the same is true underwater - fluorescence is best seen in the dark.

There is often confusion between fluorescence and bioluminescence. Just about everyone who night dives occasionally turns off their light, moves around, and sees glowing green sparks. In tropical waters divers have seen brilliant blue streaks of light and flashlight fish with red-glowing pouches under their eyes. These are all examples of bioluminescence, not fluorescence. Various life forms in the sea, and of diverse types and sizes, have the internal chemistry to make their own light. For example, it is unnecessary to shine lights on fireflies to alight them. Most of the single-celled glowing species in the water only glow when a passing diver or fish disturbs them. Some, like flashlight fish, will simply light up or not in the presence of stimulus. However, corals and anemones do not light up by themselves, because they are not bioluminescent. Splashing water or blowing bubbles at them will not cause them to alight. Nevertheless, many are fluorescent, glowing as the right light is pointed at them. Some alight brightly, others not; some alight in near pure intense colors, others in muted pastels. Sometimes the specie will alight all over its surface, sometimes it may alight only from polyp mouths or other identifiable body parts, or other isolated points on its surface.

Corals and anemones are the most prevalent sources of fluorescence on the reef, but they are not alone. Fish do not tend to be fluorescent, no matter how colorful they might appear in the daytime. Although, a small fish in the Bahamas with a pale blue glow under ultraviolet light has been discovered, and another diver reported that a small frog fish in the Red Sea had orange-pink fluorescent spots. Octopi we have looked at are colorful under normal white light but did not glow under the ultraviolet. Most shrimp fluoresce a distinct pale blue, and green nudibranchs, yellow tunicates, orange-red cowries, and bristleworms with glowing green heads and yellow fluorescent bars on their backs have been seen.

Neon Photography
Continued on Page 47

Photos: Charles H. Mazel

EXPEDITION DZONOTE MAYA

Photo: The beauty of Cenote UCIL's cavern zone and her crystal clear blue waters is breathtaking.

Photo: Curt Bowen Nikon N90 / Provia 100F

For several years, Mexico's Caribbean coastline, south of Playa Del Carmen, has been considered by many to be the new frontier for cave exploration. Some of the world's largest underwater caves with surveyed passages of over 200,000 feet (60 miles) can be found there. The topography and geology of Mexico changes vastly once leaving the coastline and entering the interior of Mexico. Caves are no longer small to medium-sized shallow passages stretching over long distances, but rather, giant sinkhole type pits that drop deeply into the Earth

Advanced Diver Magazine's staff member, Jim Rozzi, questioned Tony DeRosa, during a previous cave diving trip to Villa DeRosa's, about any deeper systems that may lie further inland. Tony introduced Jim to Hilario Hiler, who has lived and breathed the Mayan culture for the last 32 years. Fluent in Spanish, English, and Mayan, Hilario has escorted many cave explorers, photographers, and archeologist throughout the Quintana Roo and Yucatan peninsulas in search of new discoveries. Jim quickly hired Hilario for a quick pre-exploration look into Mexico's deeper interior and its hidden secrets.

Hanging from the cave ceiling, vampire bats await the darkness of night to feed. Blood-stained vampire puncture wounds can be seen on the cattles' backs every morning.

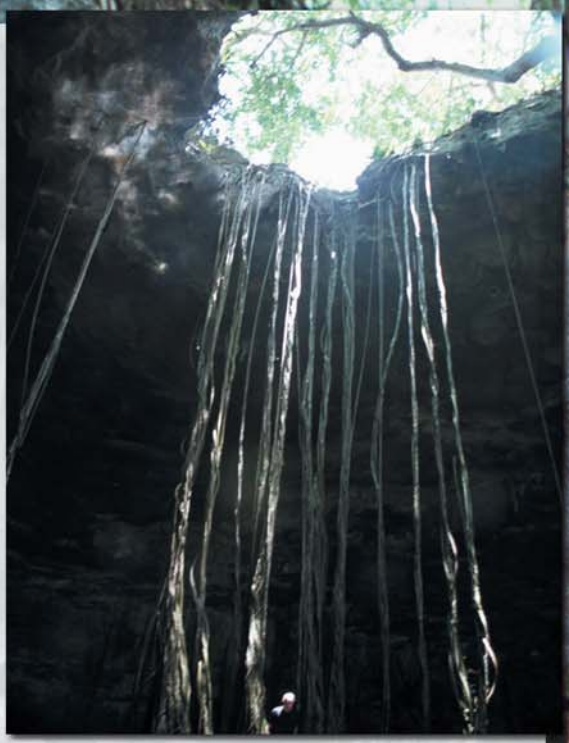
After returning from Mexico, Jim contacted me to describe his findings. He described places of immense beauty, Mayan folklore, and hundreds of previously unexplored cave systems awaiting discovery. Full of enthusiasm, Jim began the immense task of organizing a large expedition to these remote, unexplored locations. Tanks, oxygen, helium, dive gear, video cameras, photography equipment and climbing / repelling equipment all needed to be gathered, filled, transported, analyzed, and setup.

Jim contacted Tony DeRosa again and organized access to over sixty scuba cylinders, sixteen sets of doubles, four large helium bank cylinders, and four large oxygen cylinders. A large van was also provided to transport divers and personal dive/photography equipment. Additionally, a large flat bed truck was secured to transport the large amounts of scuba cylinders into the Mexican interior.

Jim arrived at Villa DeRosa two days prior to my arrival to organize, mix cylinders with trimix and decompression gases for expected depths of up to 400 ft /122m. Joining us on the dive were Hilario Hilar, as a personal guide and translator; Gonzolo Vaccalluzzo, as a safety diver and explorer; Montano, as the van driver and equipment guard; and Linda Bowen as a surface photographer. By the time I arrived, all the work had been completed; there was nothing left to do but dive.

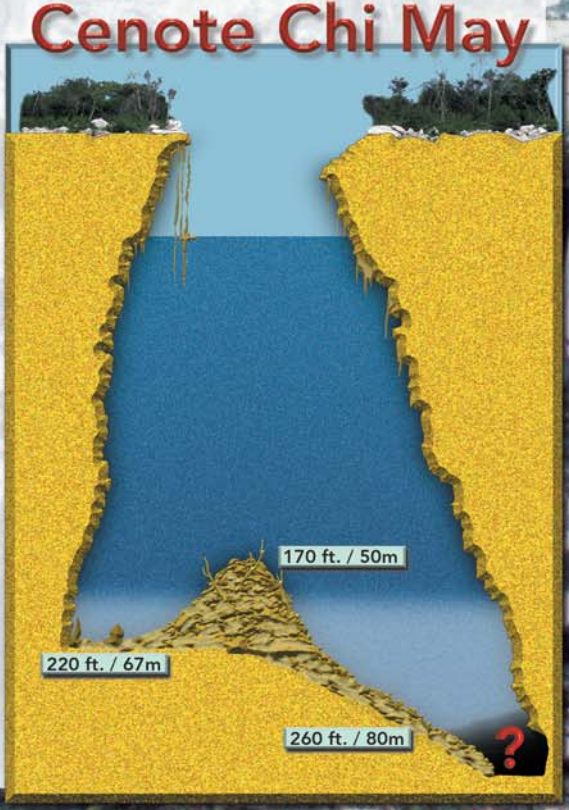
As we maneuvered into the Northwest of Mexico's Yucatan, the transition was made from that of the coastal tourist to that of a jungle denizen. The Mayans who dwelled in these remote locations, although quite poor, were rich in spirit, always eager to assist us.

One of the most challenging obstacles these pits provide, besides the extreme depths, is difficulty in accessing the water since they typically have a 30 to 50 foot straight vertical



Above: Tree roots snake their way down to the water's surface of Cenote Chi May. Once having reached the water, the roots spread out, creating large root islands that sometimes reach a depth of over 40 feet.

Below: Displayed is an artist's rendition of the Cenote Chi May. Exploration reveals a debris cone starting at 170ft./52m. and sloping down to an undetermined depth. Maximum depth explored was 245ft./75m.



Photography©LindaBowen
Illustration©C.Bowen

Far Left: Project coordinator Jim Rozzi prepares to be lowered into cenote Chi May for a quick exploratory look.

Left: Hanging just above the water's surface makes for an excellent vantage point for cavern zone photography

Cenote Ucil

Left: Cenote UCIL was originally explored by Sheck Exley, Paul Deloach, and Hilario Hiler in 1989, and then later explored by Andreas Matthes to a maximum depth of 385ft./118m. ADM divers, Jim Rozzi and Curt Bowen, explored the opposite side of the sink to a maximum depth of 345ft./105m.

"World Class Diving" Sheck Exley.

Right: A small cave entrance allows easy access to the beautiful cavern zone and the deep cobalt blue waters of Cenote UCIL.

drop to the water level. The only way to gain access is to either repel or be lowered into the pits by ropes and pulleys. Being the very first person ever to explore the depths of any untouched cave is of itself extremely thrilling. Prior to this expedition, only one system out of a dozen had been before explored. On most systems, it was difficult enough lowering doubles, stage cylinders, and divers totally equipped for deep exploration into a deep pit. However, for most dives, we chose to lower a single diver with aluminum 80 to do a quick exploration check to get a better idea as to the cave configuration. This procedure saved time and needed gas for the systems that actually went deep.

After determining the potential of the cave, the deep divers were lowered into the water, followed by their equipment. Floating around on the surface they would gear up, perform an S drill, tie off their cave reel, and descend into the depths. As each diver descends, his decompression cylinders are lowered on pre-measured ropes into the water and down to their designated depths. Later, as the diver ascents, he retrieves his stage cylinders and completes the required decompression stops. Upon returning to the surface, the diver would complete a short surface decompression, then prepare for the cylinders to be hoisted from the pit by a rope master and several Mayan sherpas. After all the cylinders have been retrieved, the difficult task of retrieving the divers follows. A harness is lowered on a 2-1 mechanical advantage pulley system for the diver to strap on. Once tightly into the harness, the verbal command to hoist the diver out of the water is given, and the grunting and groaning begins until the diver is hauled to the surface.

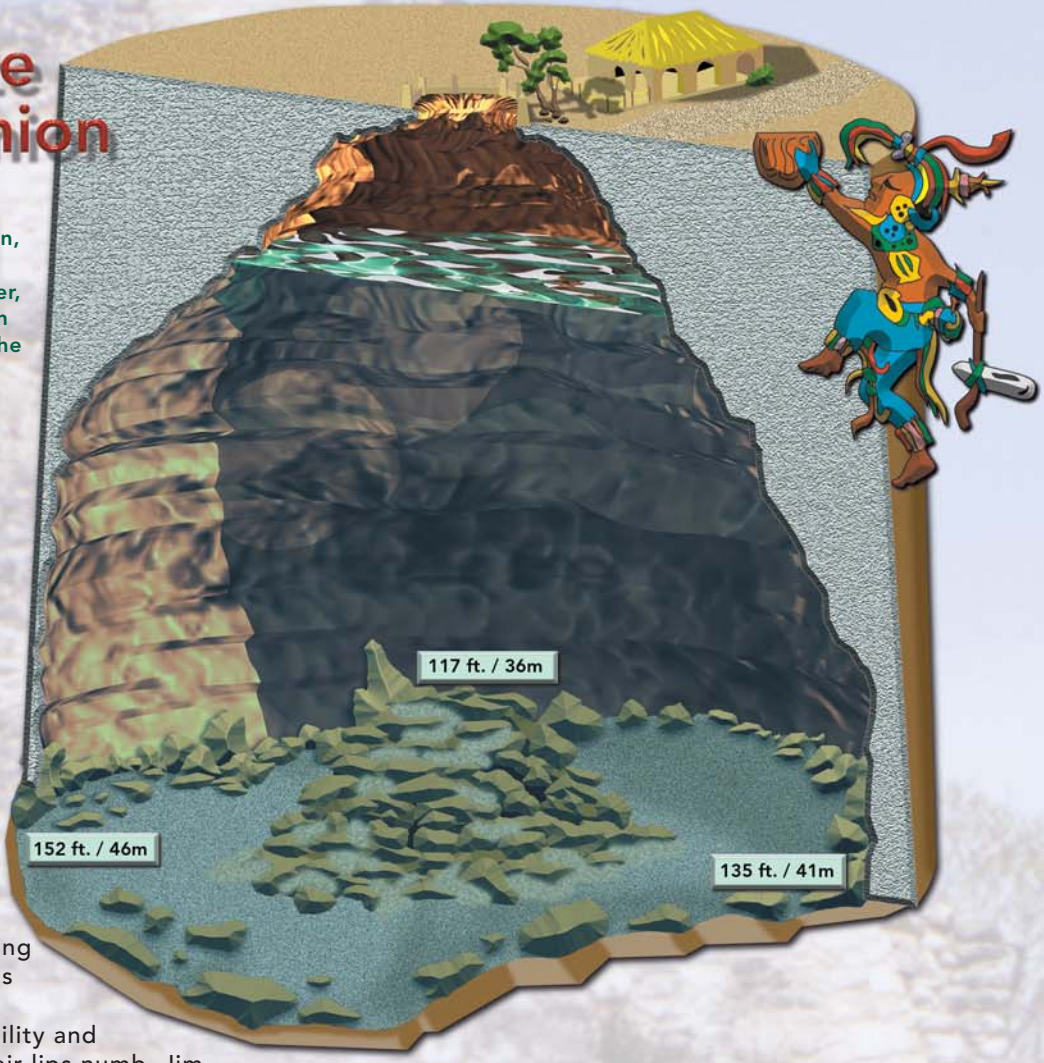
Cenote Chi May

One of the most beautiful cenotes of the exploration project was located beside the main road, just outside of the village of Libre Union, called Chi May. As illustrated on the far-left page, Jim and Gonzolo explored this system down to a depth of 245 ft./75m. During the descent the white walls were seen covered with beautiful stalagmite formations to a depth of around 150 ft./46m. The top of a tallis cone was encountered at 180 ft./55m and a

Native to the area, large iguanas can be seen sunning themselves along the jungle paths and roadways.

Cenote Libre Union

Left: In Libre Union, local Maya boys watch cartographer, Curt Bowen sketch the unfolding of the mysteries of the Cenote.



Right: An artist's rendition portrays the Cenote Libre Union, located along the main road that passes through the small village of Libre Union, Yucatan. Pictured beside the Cenote is a small local restaurant, which provides hungry divers with outstanding local dishes.

heavy halocline at 200 ft./61m. Dropping deeper in hopes of making it through the hydrogen sulfide gas layer, they dropped to a depth of 245 feet. With the decreased visibility and the hydrogen gas layer making their lips numb, Jim turned the dive. It appeared that the silt mound continued down at a 45-degree angle and the nearest wall was at least 70 feet away. An estimated maximum depth of the cenote could be around 300 ft./92m.

Cenote UCIL (Illustration page 35)

First explored in the late 80's by Sheck Exley, Paul Deloach and Halario Hiler, this cenote is a must see for any visiting cave diver. Just the dry cavern zone's beauty alone is worth the time and effort (see page 33). A small cave entrance leads down through an impressive cavern zone to the mineral cobalt blue waters of Ucil. Descending into the cenote, the white walls quickly widen to over 200 ft./61m across. At a depth of 300 ft./91m, we discovered the top of the tallis cone. Tying off to a tree branch on the top tallis cone, we descended down the rocky cone to a depth of 345 ft./105m, where the floor levels out and we encounter the wall. The opposite side of the system was pushed to 375 ft./114m by Sheck Exley and then later by Andreas Matthes to a maximum depth of 385 ft./117m.

This Red Kneed Tarantula, common to the area, can be found lurking around the jungle. One should check sleeping bags before turning in, in the evening and check their boots in the mornings. Tarantulas also like wet suits and diving booties!

Cenote Libre Union (Illustartion above)

Located in the middle of the village Libre Union is a unique cenote where the village draws their water. Hundreds of Mot Mot Birds fill the air as the fly in and out of the cenote's cavern zone. The Mayans have built a wall around the cenote to prevent any accidents from occurring. According to Mayan rumor, they believed that this cenote was connected to another cave located on the other side of the village.

I geared up and was lowered into this cenote for an exploration dive. Looking down on the water's surface,

During the Expedition Dzonote Maya, many unexplored cave systems were discovered as well as Cenotes that didn't pan out. Yet, each one had its own unique beauty and discoveries. Linda Bowen poses as the sun's light rays produce a magical view of this cave the Mayans call Muulchen (mound of the well). Only a small shallow pool of water lies in the bottom of the cave.

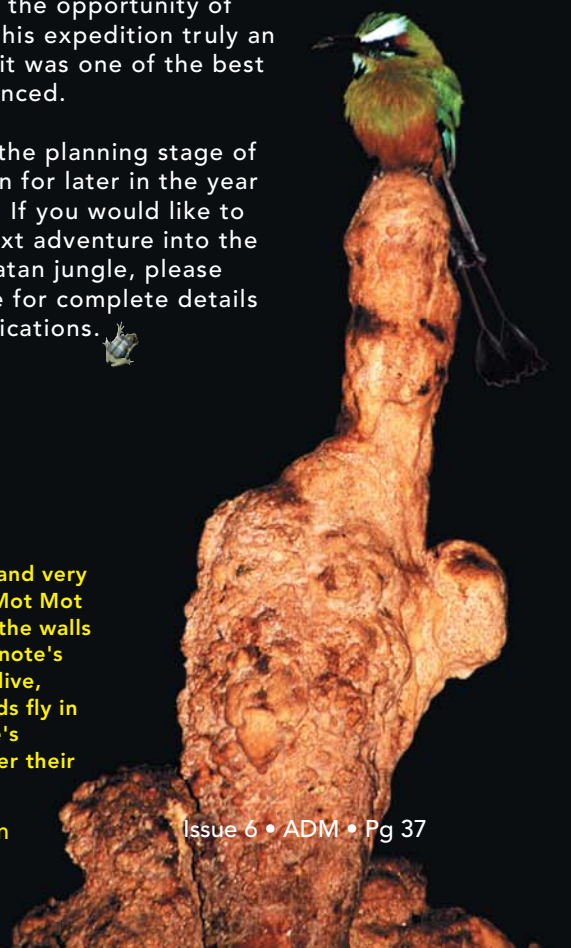
I could faintly see the top of the tallis cone. Tying off my cave reel to the well pipe, I descended to the top of the tallis cone at a depth of 117 ft. Re-tying to a tree branch, I headed down over the cone and the far wall came into sight. With visibility of over 100 feet, exploration was easy and I had reached a maximum depth of 152 feet. Tying off again at the wall, I made a sharp left turn and followed the wall all the way around the sink until I had returned to my line. At no time did I see any passage that appeared to continue off from the cavern zone. Due to over one hundred years of human involvement this system, it had collected lots of discarded trash. Later on some of us tried to explain to the local Mayans how throwing trash into this cenote was detrimental to their health and their clean drinking water. As we were leaving we noticed the local school teacher had all the kids out picking up all the trash from around the cenote.

Although not all of the cave systems we discovered were deep (several were only 30-60 feet), each had its unique beauty and offered the opportunity of discovery, making this expedition truly an adventure. In fact, it was one of the best I have ever experienced.

We are now at the planning stage of a second expedition for later in the year 2000 or early 2001. If you would like to join us in on our next adventure into the cenotes of the Yucatan jungle, please access our web site for complete details and required qualifications.

Photography Curt Bowen & Linda Bowen
Illustration C. Bowen

Left to right:
Curt Bowen
Linda Bowen
Gonzalo Vaccalluzza Montano
Jim Rozzi
Filemon Lopez
Irvin Valente
Halario Hiler
Felipe Aqvilar



This unique, colorful, and very noisy bird called the Mot Mot Bird builds its nest in the walls and ceilings of the Cenote's cavern zone. On any dive, hundreds of these birds fly in and out of the Cenote's entrance as they gather their daily food.

JOURNEY BENEATH JURASSIC PARK

Michael Salvarezza & Christopher P. Weaver

It was raining again. Not a light springtime rain echoing sweet fragrances of wildflowers, but a heavy earthy rain, permeating everything in continuous torrents. We had just surfaced from the final dive of the expedition. The waves rose and fell in large windblown swells as we waited patiently for the Zodiac to retrieve us. With the Okeanos Aggressor far in the distance and no sign yet of the Zodiac, minutes grew into hours.

Finally the sound of the zodiac could be heard. As it grew louder, we turned and took our last look at Coco Island... still hearing the sounds of nature filling the air, we gazed for the last time upon her fog-draped peaks, her many white shimmering waterfalls, and her lush green foliage.

Costa Rica's fabled Coco Island is far from the mainland in distance and time. From the sleepy town of Puntarenas, it is a 35-hour crossing by boat often through rough seas. Yet, just when the crossing seems endless, the sound of water gently lapping at the hull is heard. Except for two small manned Ranger Stations, the first glimpse of Coco Island from the porthole is of a lush, uninhabited island. The heart begins to beat faster in anticipation of the adventure to come.

In 1526, Coco Island was discovered by Captain Joan Cabezas, and in1556, Nicholas Desliens mapped it under the name of "Isla del Coco." On September 15, 1869, the island was officially taken over by the Costa Rican Government.

Despite its isolation, Coco Island is steeped in history. Rumor has it that the richest treasure in the world, consisting of two loads of gold and other valuables is buried on Coco Island. The first load belonged to the pirate Benito Bonito who raided cities along the Pacific Coast before arriving on the Island. In 1821, Captain Thompson is said to have brought the wealth of Lima to the island after being entrusted with its safekeeping by the Lima Government. Over 300 hundred expeditions, including those by Sir Malcolm Campbell and Teddy Roosevelt, have been conducted in search of these treasures. All have failed.

Perhaps, the real treasure of Coco Island is not to be found in gold and jewels but in the natural flora and fauna. Thankfully, Costa Rica has recognized this and has designated the island, as well as a 5-mile radius surrounding it, as a National Park.

PhotoEco-PhotoExplorers

Because of the difficulty in getting here and the harsh conditions, the environment remains, for the most part, unaltered. However, humankind has left its mark. Feral pigs, goats, rats, and white-tailed deer were introduced to the island during unsuccessful colonization attempts in the early part of the century and all have impacted the environment in various ways.

Like others who viewed the island before us, the initial reactions to the hospitality of the island was a strange feeling of rejection. "I hated the island from the first day on," wrote Elmer Pallister during his 19th century visit. Besides the arduous crossing from the mainland, large swells, choppy water and swift currents make exploring the surrounding seas difficult. Coco Island seems to do everything possible to push visitors away. Rain washes over the island almost continuously. In fact, the island receives an average of 26 feet of rain per year! Visitors who attempt to land on the island are greeted with rocky shores and dense, almost impenetrable jungles. Indeed, before one is accepted by this wild place, perseverance is required.

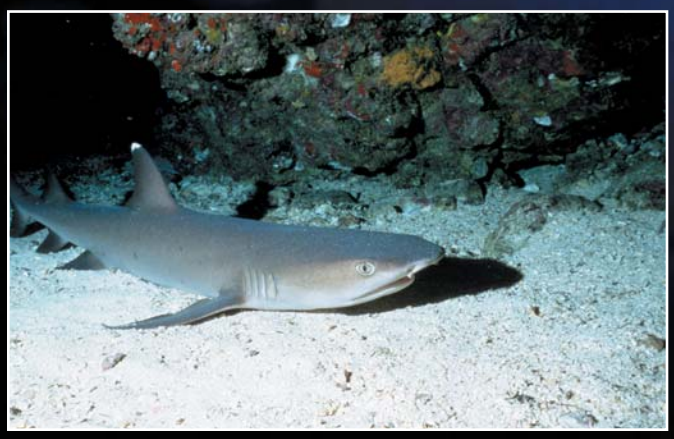
Our initial anchorage was in the placid Chatham Bay, which is considered the most protected area on the island. Water fell from several cliffs (Coco Island boasts over 200 waterfalls), while flocks of Red-Throated Boobies and Frigate Birds rode high above on the thermal air currents. In our minds, this was a visual picture of a prehistoric setting, and indeed must have been the inspiration for the novel and then movie, Jurassic Park. We couldn't help but wonder what mysteries were hidden within the jungle, those overgrown tracts of tropical foliage. Our imaginations flew as we envisioned seeing a Pterodactyl fly out from among the fog-draped mountain valleys. Indeed, if one listens carefully, the sound of a Tyrannosaurus Rex could be heard making its way through the tree. The island was very much alive for all of us.

Of course, today, most visitors come to Coco for the high-voltage diving; nobody leaves disappointed. There are numerous dive sites to explore, and each gets the adrenaline pumping. Our checkout dive was at Manuelita Island, no ordinary "checkout dive." As we descended to the bottom, hundreds of White-tip Reef Sharks, large Marble Rays, and schools of colorful reef fish greeted us. We also were fortunate enough to encounter a school of graceful Eagle Rays.

For our second day of diving, we moved west to Wafer Bay, at the dramatic Dirty Rock. Here, underwater pinnacles rise from the depths to create an impressive undersea topography. Circling these pinnacles are the world famous Scalloped Hammerhead Sharks of Coco Island. These powerful looking animals are wary of the air bubbles expelled by scuba divers and are often difficult to approach. However, with patience and a little luck, divers may be able to observe schools of these impressive creatures. Divers anxious to witness this spectacle should find a rock to hide behind, learn to control breathing, and wait patiently for these animals to appear. Live-abroad dive boats that visit Coco now offer properly trained divers a chance to use rebreathers, which provide divers with the greatest opportunity for observing these marvelous creatures. For untrained divers who would like to embrace this technology, a rebreather course may be offered, which usually takes about three days to complete.

Dirty Rock holds other surprises for the observant diver. While diving between the pinnacles, we discovered a massive school of big-eye jacks. This gathering numbered in the thousands and was a most impressive sight. We watched as the entire school moved gracefully in unison in the swaying currents, behaving almost as one single living organism. The school parted ever so gently as we slowly approached, almost welcoming us. Within minutes, we were enveloped in a wall of life and felt as if we had achieved a perfect communion with the ocean. As we schooled with these creatures, those initial feelings of rejection from the island began to fade. It was replaced with a sense of awe that it had begun to reveal its secrets to us.

The diving at Coco is not for the faint hearted and is not recommended for casual divers. Difficult surface conditions consisting of large swells, gusty winds, and heavy rain are considered the norm. Zodiacs or small launches are used to ferry divers from the mother ship to the dive site. Dive guides strategically place divers in the water. Due to heavy surface currents, divers are instructed to descend upon entering the water. Once underwater, divers may drop to a maximum depth of 120' with a fifty-five minute bottom-time limit. Decompression diving is not allowed, so the dive is planned within the no-decompression limits. With the ability to make four deep dives a day, a dive computer is a must.



At depth, divers generally contend with some sort of bottom current, which may be accompanied by heavy surges. The water is warm, around 78-83° F (26-28 °C), with visibility between 80-100 ft (24-30 m) on average. A thermocline is usually present beneath which the temperature drops, the visibility decreases, but the action picks up. In these colder, nutrient rich waters rising from the deep ocean surrounding the island, large pelagics roam in search of food.

We chose the Okeanos Aggressor for our expedition vessel. From bow to stern she measures 120' long, is diesel-powered, can cruise at 10 knots, and weighs 200 tons, making her more than qualified to handle the rigors of this journey. She was constructed in Italy in 1972, and was designed as an ocean-going expedition vessel. Later, she was converted into a fishing boat before serving as a private yacht, complete with helicopter. The Okeanos Aggressor is unsurpassed in amenities and luxuries, with comfortable accommodations for 21 passengers. Each of the nine double cabins and one triple cabin provide private heads and showers, and a spacious salon is fully equipped with TV/VCR and stereo equipment.

Several other spectacular dive sites can be found in the waters around Coco. Submerged Rock and Lone Stone are on the north side of the island and here we encountered a 15-foot Manta Ray, large schools of Jacks, White-tip Sharks, and more Hammerheads. Subsequent dives at Dos Amigos, Punta Maria, and Bajo Alcyone all offered the exhilaration of close encounters with animals rarely seen elsewhere in the world. At Coco, the unusual actually becomes the usual. In fact, the White-tip Sharks are so numerous here (hundreds are seen on most dives) that divers quickly begin to ignore them in search of even more dramatic encounters.

In between dives, visitors are often given the option to either relax aboard ship or go ashore to explore the lush jungles and numerous waterfalls of this impressive island (weather permitting). The shores of Chatham Bay can be considered a time capsule. Many large rocks that litter the low tide area contain chiseled inscriptions from previous visitors to the Island. Some of these carvings date back to the late 18th century and are fascinating to read. In the 1980s, a team from the Cousteau Society inscribed their insignia into one of these rocks as well. The island of Coco is uninhabited except for a handful of park rangers who reside in small camps in Chatham and Wafer Bay. Coco Island has a circumference of about 14 rugged miles and a land area of 18 square miles. The highest point (Cerro Iglesias) measures roughly 1968 feet above sea level. Hiking on the island is difficult. The dense jungle, rain soaked mud, and steep inclines all make for treacherous walking. However, for the persistent explorer, these hikes can offer spectacular views of the surrounding waters and many small islands that dot the coast.

After diving and exploring Coco Island, it was finally time to pull anchor and head home. Our initial impressions of rejection had been replaced with deep respect and a feeling of warmth and closeness to the island. In spite of its harsh appearance, it has indeed welcomed us by revealing its many secrets and showing us its myriad beauties both above and below the sea. Coco Island is one of nature's special places.

Here, when the rains come, the forest springs up in wet whispers, every leaf painted fresh with water. Clouds of rain, like veils in the sky, envelop each other high in the cliffs along the shore. When the rains are over, the clouds move on to unveil a blue sky and shafts of golden sunshine that bathe the island in warmth. Beneath the sea, clouds of fish circle about, riding the underwater currents as flocks of sea birds ride the air currents above. Large predators come to feed in the vast richness of the ocean. And as we leave this remarkable outpost, we bid farewell to an island almost lost in time. One can only imagine if her raw prehistoric beauty will remain untouched by humankind's attempt to tame and exploit. Only time will tell.

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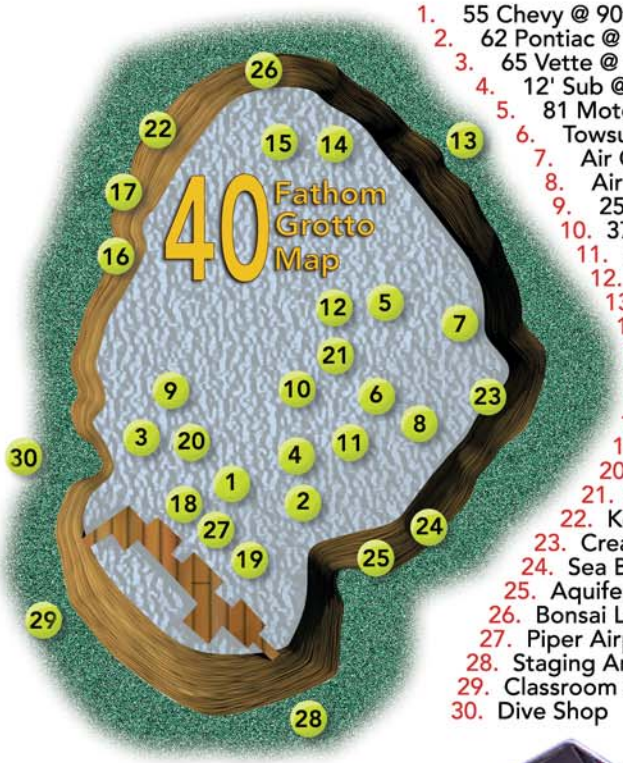

1. 55 Chevy @ 90ft.
2. 62 Pontiac @ 100ft.
3. 65 Vette @ 110ft.
4. 12' Sub @ 80ft.
5. 81 Motor Cycle @ 40ft.
6. Towsub @ 60ft.
7. Air Chamber @ 35ft.
8. Air Chamber @ 32ft.
9. 25' Cabin Cruiser @ 110ft.
10. 37 Chevy @ 140ft.
11. Falcon/Nova @ 150ft.
12. Chevy Van @ 150ft.
13. 28 Chrysler @ 200ft.
14. 53 Dodge @ 175ft.
15. 64 Corvair @ 187ft.
16. 62 Olds @ 200ft.
17. VW Bug @ 210ft.
18. 8 x 16 Platform @ 15ft.
19. 8 x 16 Platform @ 30ft.
20. 8 x 16 Platform @ 40ft.
21. 8 x 16 Platform @ 60ft.
22. KeyHole Cave @ 236ft.
23. Creature Cave @ 55ft.
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NEW DIVE EQUIPMENT

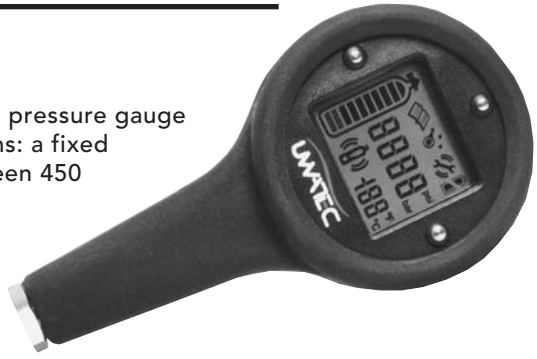
ScubaPro / Uwatec Aladin Pro Ultra

The Aladin Pro Ultra expands the diving experience for divers who want to plan and conduct decompression dives, whether breathing air or nitrox. This instrument features the advanced Buhlmann ZHL8 ADT (Adaptive) algorithm, which considers any microbubble build up resulting from diver behavior. The effects of repetitive, diving in cold water, decompression and ascent rate violations are all considered, and if required, included in a revised decompression schedule.

The Aladin Pro Ultra allows a diver to dive on 21% (air) or any level of nitrox from 22% to 50% selectable in 2% increments. It monitors and warns on oxygen toxicity limits-both the accumulated CNS clock and the current partial pressure of oxygen.

Once out of the water, the power of the Aladin Pro Ultra can be combined with a personal computer and DataTrak software. This enables the diver to critically analyze diving performance to enhance future diving experiences.

ScubaPro / Uwatec Digital Pressure Gauge



The UWATEC Digital Pressure Gauge is far more than a simple pressure gauge with easy to read graphics. This instrument has two low pressure alarms: a fixed alarm of 750 psi and a user-adjustable alarm which can be set at between 450 psi and 1500 psi. When the divers cylinder pressure reaches either of these alarms, the diver is given a visual and acoustic reminder that it's time to head for the surface.

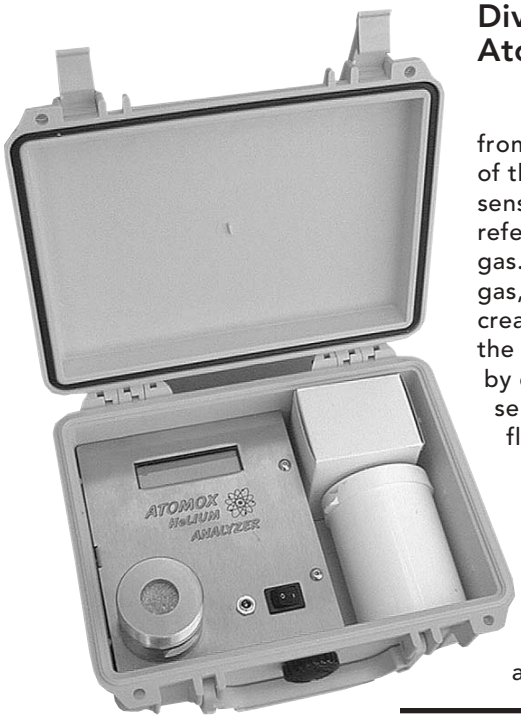
In addition, the UWATEC Digital Pressure Gauge measures and displays the temperature during the dive. Its logbook also stores the opening and final pressure of a dive and displays the pressure difference.

Diverite Tank Wraps

When diving multiple gas mixtures, among the worst possible errors one can make is switching to the wrong mix at the wrong depth. One very effective way to avoid such potentially deadly mistakes is to make certain that each cylinder's Maximum Operating Depth (MOD) is clearly marked where both the diver -- and his or her buddy -- can see. This is what Dive Rite's new Tank Wraps are designed to do.

Each Tank Wrap consists of a black fabric sleeve that slips over the end the tank. (An elastic section ensures the wraps will fit cylinders in a variety of standard sizes -- plus, there is a special "small" size available for 40-cubic-foot and smaller cylinders). When in place, divers can read the large, white numbers identifying the MOD from either side.

Tank Wraps are available with MOD markings of 70 and 130 feet. There is also a special green wrap with the word "oxygen" appearing on both sides.



Diverite
Atomox Helium Analyzer

This unit assesses the helium content of gas mixtures in ranges from 5 to 95 percent. It operates by comparing the thermal conductivity of the sample gas with that of a reference gas (in this case air). A heated sensor is mounted so that it is exposed to the sample gas while the reference sensor is enclosed in a sealed compartment of the reference gas. If the sample has a higher thermal conductivity than the reference gas, heat is lost from the exposed element and its temperature decreases, if the thermal conductivity is lower than that of the reference, the sensor heats up. The temperature changes are normally monitored by electrical resistance changes in the sensing element. Because these sensors run quite hot to increase sensitivity, they are mounted in a flameproof sintered block.

The technique is remarkably sensitive and is often used to measure hydrogen, helium, methane, neon, freon, and carbon dioxide. These are normally measured in a background gas of air, but the sensors operate just as well in a background of nitrogen or when monitoring two inert gases (often referred to as a binary mixture) such as the concentration of methane in carbon dioxide or helium in air (primarily O2/N2).

The Cave Divers by Robert Burgess

Veteran diver and journalist Robert Burgess takes the reader on a fascinating journey from the earliest pioneering expeditions into submerged prehistoric caves to some of the most recent record-setting cave dives in the Yucatan and Florida.

In 24 action packed chapters, you'll read about archaeological finds, including a 10,000-year-old skull in Florida's Warm Mineral Springs; the underwater passages feeding Bahama's blue holes; record depth and horizontal penetrations in Mexico and Florida; and explorations in France, the United Kingdom and elsewhere.
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Sartek / 50 Watt HID Lighting System

Sartek Industries is proud to announce the introduction of the HID-50 series, to its' line of High Intensity Discharge Arc Lights. This product is truly an underwater photographer/videographers' dream come true. Some of the HID-50's features are:

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- 2 hours burn time on a standard 14 AH battery

The HID-50 with 091 Reflector and Wetmate connector Retails for: $1295.

For more information about other Sartek products: lighting, video and technical dive gear, please contact Sartek Industries Inc. at (631) 924-0441, web www.sarind.com or email sarind@idt.net

WKPP EXPLORATION UPDATE

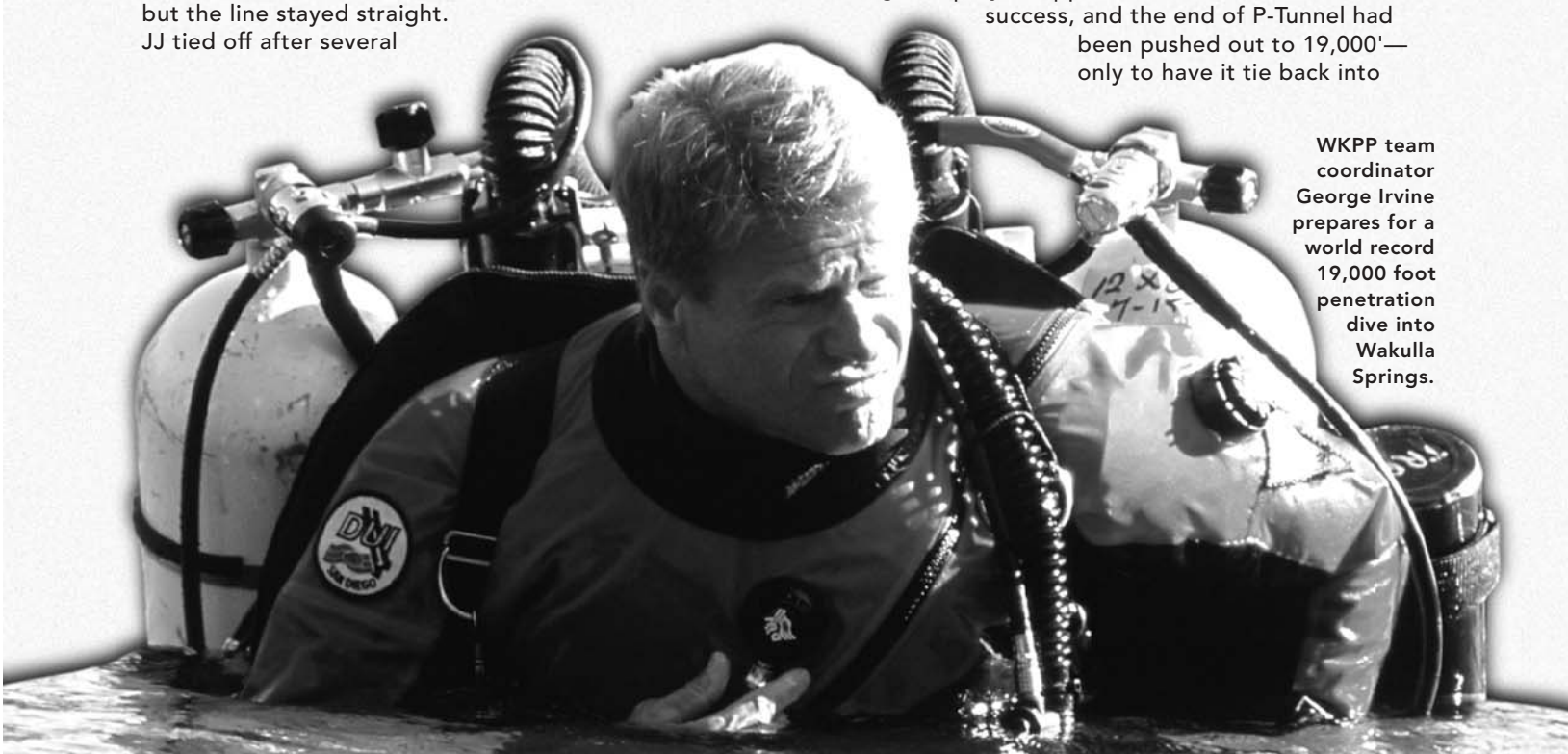
The Woodville Karst Plain Project completed yet another world record exploration push into the Wakulla Springs cave system. After having extended the previous "end of the line" in O-Tunnel beyond 18,000 feet at depths in the 250-300' range in June, the WKPP initiated exploration in a series of side tunnels for new leads. The first weekend of July the lead team of Jarrod Jablonski (JJ) and George Irvine started down a (relatively) small siphon tunnel only to discover a new major conduit into the system— now known as P-Tunnel. George Irvine describes the thrill of opening up a significant new passage in Wakulla:

"Jarrod Jablonski and I ran from 4500' to 14,000', each of us with four scooters initially. We dropped one scooter at 9,000' and another at 14,000'. Of the remaining scooters, one had "Mini Mee" attached. Mini is a ten-inch long device that snaps onto the end of our scooters with a special nose cone that holds two HID lights and one digital camera pointing out of the nose lens. When we hit the end pf the existing line at 14,265', I took Mini Mee and gave JJ my scooter. I looked at the old end and there was a Halcyon patch hanging from the end of the line, which was blowing strongly in the "breeze" of this whipping siphon. The tunnel was extremely small, and I remembered pulling on the rock floor to get out the last time due to the heavy flow. The vis was nasty and smoky.

JJ tied in and took off into the no floor, no walls, and no ceiling room that suddenly appeared out of this little tunnel. We had hit the Mother Lode of the cave. It was larger than the beginning of Wakulla, about in the 120 by 60 range. JJ followed one wall. At first we thought we were just in an enormous room, but the line stayed straight. JJ tied off after several hundred feet on one shot, and then swerved to the other wall to be sure it was there, and then back. The depth came up to the 220-250 range and the vis became a tad better. The tunnel was indeed massive. It had rooms in it with huge breakdown piles, but never any evidence of a surface connection."

P-Tunnel is monster cave, heading WSW, with massive rooms and incoming tunnels everywhere. Most noticeable as the team moved through incredible rooms with breakdown piles and huge boulders scattered across the floor were the leads that appeared to head north towards the Leon Sinks system. The team added 2,640 feet of new line and worked the left side of the passageway first, scootering into darkness for several minutes to hit the right wall and then back left. The system shallowed up a bit and appeared to level off in the 220-240 ft depth range, which is average for the Leon Sinks system far to the north. Jarrod commented not only on the immense size of the passageway, but the "look" of the tunnel. P-Tunnel bears more of a resemblance to the Leon Sinks system than the Wakulla system. Wall color appears different as did the limestone features, with visibility described as "fair."

Although timing and conditions would prevent the teams from making significant progress in P-Tunnel on July 15, both the primary and secondary rebreather teams were able to stage equipment into the system that would allow for a big push into P-Tunnel on the 22nd without the need for additional setup. Just over seven hours after leaving Wakulla beach on the morning of July 22, JJ and George were spotted downstream from the 190 stage drop by a support diver. The dive had been a success, and the end of P-Tunnel had been pushed out to 19,000'— only to have it tie back into



WKPP team coordinator George Irvine prepares for a world record 19,000 foot penetration dive into Wakulla Springs.

O-Tunnel just short of the old 18,000' record. Although P-Tunnel wasn't the direct link to Leon Sinks, as had been hoped, it does have several promising leads that cut back to the north. Wakulla is still wide open, and the WKPP is certain to set the standard in deep cave exploration again as they approach dives of 20,000 feet each direction/eight hour bottom times at depths of 205-300'. In-water deco for this dive was in the 7-8 hour range.

Complete coverage of recent WKPP exploration can be found at www.wkpp.org and www.gue.com/research/wkpp/reports/.

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Continued From Page 57

and harness with crotch strap assembly, and hip-mounted light canisters. These are just the very high points of a complete system that your GUE instructor will go over in detail during classes.

Whether you see yourself dabbling in nitrox to gaze a bit longer at those gorgeous reefs or emptying the line off an exploration reel miles underground, GUE can meet and exceed your goals. As Purdon says, "It is obvious that the passion for diving and the improvement of the dive training as a whole are the highest priority for everyone involved with the organization and it certainly 'rubs off' on their students." Inevitably, the letters on your c-card mean very little. It is the education received that makes all the difference. Remember that the goal of a diving career should not be having the largest c-card collection, but rather should be the pursuit of excellence in the aquatic arena. Jablonski says it best. "GUE was not formed to take over the diving industry. However, it is my hope that the dissemination of this information will assist individuals around the world, regardless of their agency affiliation." Choose your instructors wisely and settle for nothing less than the absolute best.

See Page 50 for GUE contact information

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Neon Photography
Continued From Page 32

There is no single best way to stimulate fluorescence. What is seen depends upon how one views it. The 'Black lights' often used to light up posters at parties or exhibits in museums emit what is called longwave ultraviolet light, the light just beyond the blue end of the visible spectrum. Nevertheless, ultraviolet is not always the best way to produce fluorescence in the sea. Many or most, corals fluoresce better when hit with the right shade of blue than with ultraviolet. The blue fluorescence of shrimp, though, is brought out by ultraviolet but not blue. As for other critters, only time and more observation will tell. NightSea offers a small dive light, the UltraBlue, especially designed for coral fluorescence, and the higher-power HID light, the UltraMax, with intense ultraviolet output.

Fluorescence can reveal what otherwise would be difficult to see. A diver using the NightSea UltraMax in the Red Sea reports that he is easily finding some corals and other forms of underwater life that are well camouflaged in normal light. Fluorescence can make very small critters show up clearly. Fluorescent corals and anemones as small as 1 mm (1/25 of an inch) against busy backgrounds from several feet away have been found. The key is that the fluorescent object glows, while the surroundings remain dark, making the objects easier to spot.

To take fluorescence photographs, as the ones illustrated in this article a filter is needed over the flash that restricts its output to just the wavelengths needed to stimulate fluorescence. Also needed is a filter in front of the camera lens to block the fluorescence-producing light from reaching the film. (Remember that the fluorescence colors are different than the color of the light that brings them out). Film is normal color film, but depending on the flash intensity and other factors, it may need to be high-speed film (ASA 400 or even faster). Very few people have taken fluorescence photographs underwater, and its potential for artistic expression is almost completely untapped. NightSea is offering the filter combinations to do either ultraviolet or blue-light fluorescence photography.

Besides opening up a beautiful new way of seeing the reef, looking for fluorescence underwater is true exploration. The fluorescence of corals has been known (by a few) and written about (a little) for over forty years, but the little that has been documented was done in aquaria, with samples collected at random during the day. Very, very few divers have swum around at night with the right lights to stimulate fluorescence. A diver has an excellent chance of being the first person ever to fluorescence-dive a location and to see some never-described example of this magical effect.

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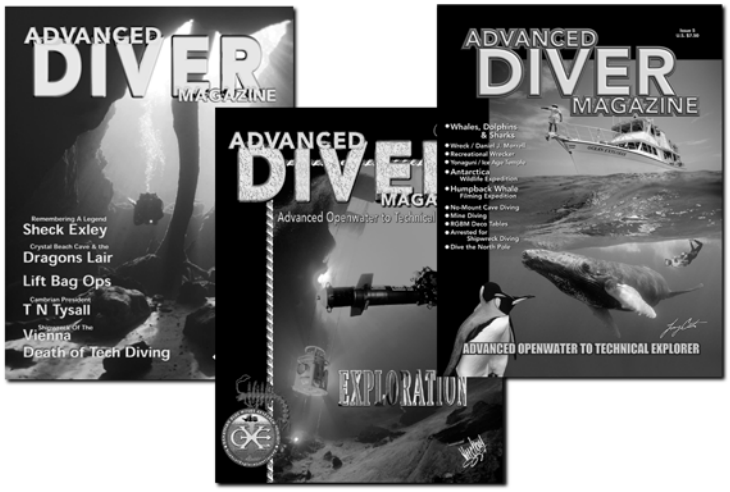

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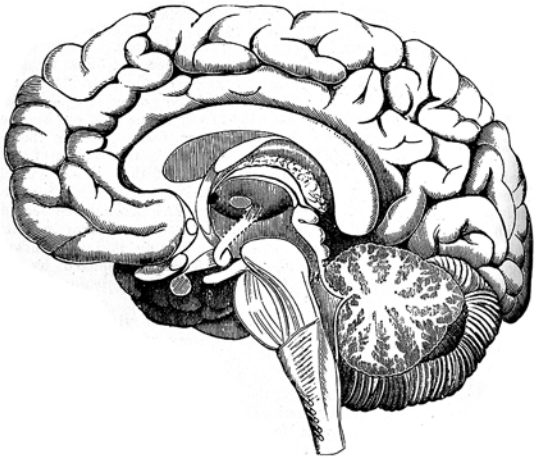

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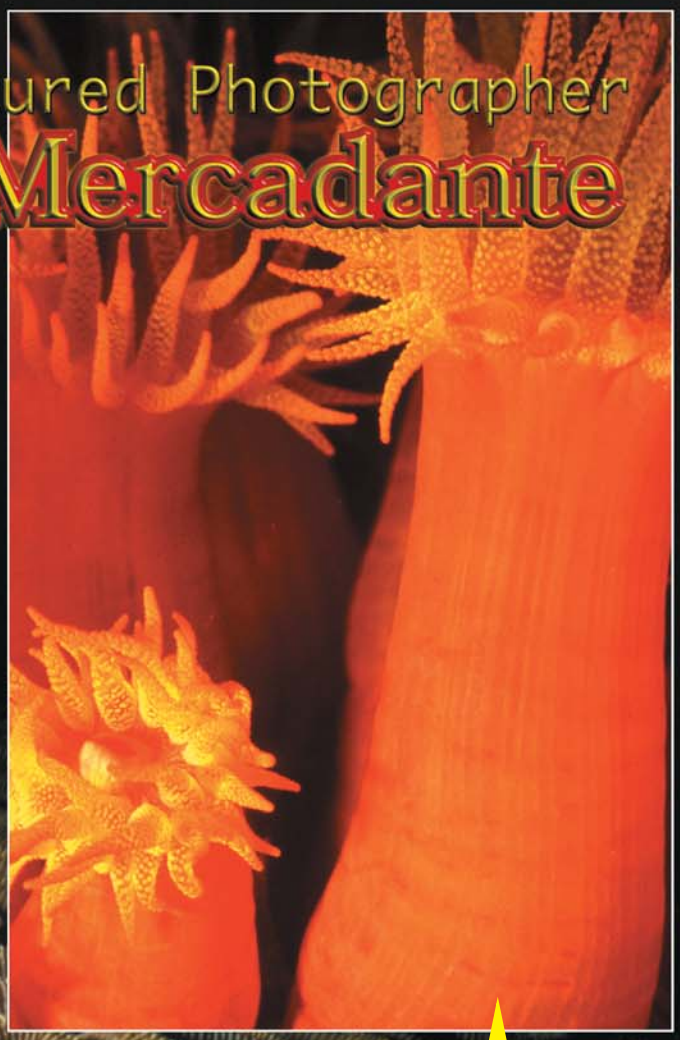
Featured Photographer

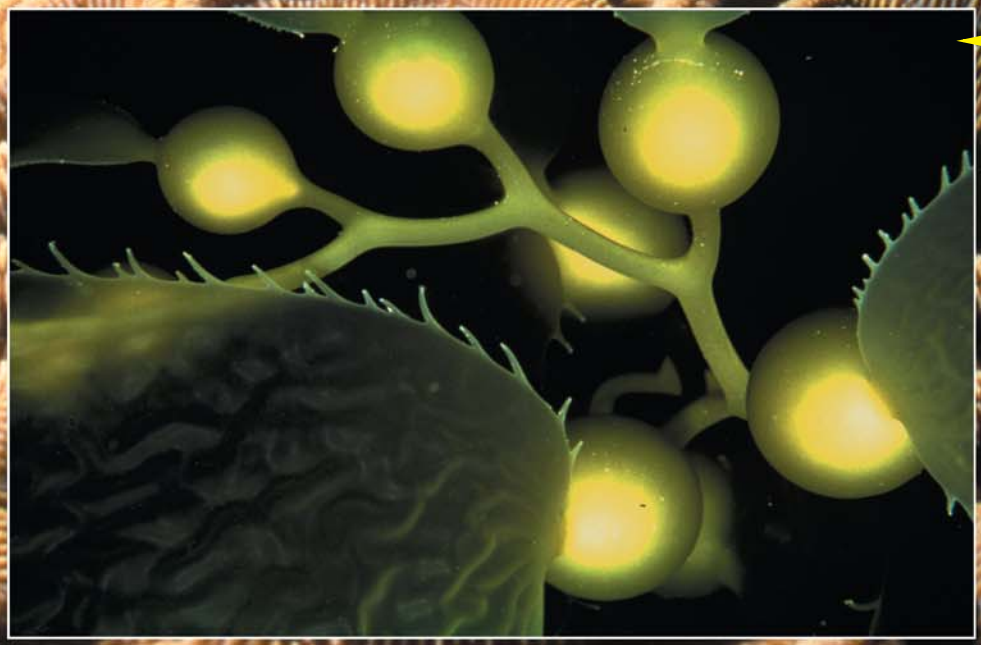
William M. Mercadante

Diving and capturing the beauty of the underwater world in photography are not only enjoyable endeavors, but will facilitate in the recovery of our oceans in the years to come.

While scientists study phenomenon in the laboratory, they are often unable to take the next step to assess the validity of the results in an uncontrolled natural environment. As a photographer, I hope to impact the scientific community, by conducting experimentation in a controlled environment, and then substantiating the results through observation in the natural environment. I have been an observer of the natural underwater world through the use of scuba diving for fifteen years. Moreover, for the past ten years, I have been documenting observations on film and video. My images have been featured in Nature Conservancy, Divers Alert Network, Performance Diver, Photo Techniques, as well as other nature-oriented publications and organizations.



Orange cup coral
Bonaire - Town Pier
Nikonos 5
Nikon Nikkor 35mm lens
Aperture F-22
1:1 framer
Nikonos SB 103 Strobe
Fujichrome Sensia ASA 100 speed film



Giant Kelp
Santa Catalina Island - Casino Point
Nikonos 5
Close Up Kit
Nikon Nikkor 35mm lens
Aperture F-22
Nikonos SB 105 Strobe
Kodak Extra Color Elite Chrome
ASA 100 speed film

Background:
Boulder Brain Coral
Grand Cayman Island
Nikonos 5
15mm Nikon Nikkor Lens
Aperture F-16
Nikonos SB 103 Strobe
Fujichrome Velvia ASA 100
Speed Film

With a scientific background in pharmaceutics, knowledge of marine science, and skills in underwater photography / videography, I feel prepared to assist the scientific community. I believe it is important to educate the public about marine life through precise and accurate imagery, since visual learning remains the greatest influence in the development of long-term memories. The population of the Earth will double within the next 30 years, placing more stress on the oceans' resources. I plan to use the visual tools available to me, along with my life experiences, and formal education to impact as many people as possible about the marine ecosystem and the anthropogenic influences on this ecosystem.

Currently I am gathering images off the coast of Santa Catalina Island for my graduate thesis project, as well as for the development of the Marine Science Department's first web-based course. Other current projects include: the development of a Macrocystis lifecycle video; consulation about a multimedia technology for the distance-education program at the University of South Carolina; consultation regarding Hydrogeo Environmental as per cave systems; conducting scuba equipment tests; worked on publications depicting underwater images entitled,

Garibaldi
Santa Catalina Island, CA
Casino point
Nikonos 5
15 mm Nikon Nikkor Lens
Aperture F-16
Nikonos SB 105 Strobe
Kodak Extra Color Elite Chrome ASA 100 speed film

Giant Kelpfish
Santa Catalina Island, California
Nikonos 5
Nikon Nikkor 15 mm lens
Aperture F-8
Nikonos SB 105 Strobe
Kodak Extra Color Elite Chrome ASA 100 speed film

Christmas Tree Worm
Grand Cayman Island
Nikonos 5
Nikkor 35mm lens
Aperture F-22
1:1 framer
Nikonos SB 103 Strobe
Fujichrome Velvia ASA 100 Speed Film

Background:
Diver Scenic
Grand Cayman Island
Nikonos 5 / Nikon Nikkor 15mm lens
Aperture F-16 / Nikonos SB 103 Strobe
Fujichrome Velvia ASA 100 Speed Film

Stareyed Hermit
Grand Cayman
Nikonos 5
Nikkor 35mm lens
Aperture F-22
1:1 framer
Nikonos SB
103 Strobe
Fujichrome Velvia
ASA 100
Speed Film

Red Night Shrimp
Bonaire
Nikon N-90S in Aqua Vision Housing
Nikon 105mm lens
Aperture F-22
Nikonos SB 105 Strobe
Fujichrome Velvia ASA 100 Speed Film

Background:
Giant Anemone
Grand Cayman
Nikonos 5 / Nikon Nikkor 15mm lens
Aperture F-22 / Nikonos SB 103 Strobe
Fujichrome Velvia ASA 100 Speed Film

"Dynamic Undulation - Life Beneath the Waves;" worked on advanced video techniques, and much more. Highlights of past projects include: documentation of spawning activities of Mutton snappers, whale shark behavior, and scientific investigations conducted at Gladden Spit off Belize; filming student interaction with professors during underwater Caricomp investigation; and documentation of marine laboratory investigations of students.

William M. Mercadante Photography

1.
Spotted Cleaner Shrimp
Periclimenes yucatanicus
Bonaire

2.
Christmas Tree Worm
Spirobranchus giganteus
Grand Cayman Island

3.
Boat Scenic
Casino Dive Park
Santa Catalina Island, CA

4.
Giant Spined Star
Pisaster giganteus
Santa Catalina Island, CA

5.
Spotted Cleaner Shrimp
Periclimenes yucatanicus
Bonaire

6.
Golden Zoanthid
Parazoanthus swiftii
Bonaire

7.
Sponge Brittle Star
Ophiothrix suensonii
Grand Cayman Island

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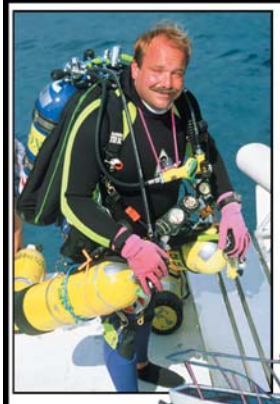

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G·U·E

GLOBAL UNDERWATER EXPLORERS

By Tina Rhea

What the world needs now is a... Well, most divers were not probably thinking that a new training agency is needed. With the plethora of agencies vying for our business, we are simply bombarded with acronyms. Keeping up with them can be difficult. Why then are agencies forming all the time? Furthermore, what distinguishes them from one another?

Global Underwater Explorers was founded by a group of dedicated divers committed to providing the highest quality of teaching. As sound environmentalists, their goal is to help train the best divers in our waters. Founder Jarrod Jablonski gains his rewards from "...fostering a stewardship of the environment and the development of and adherence to more stringent and responsible training." Evidence of this can be seen in GUE's desire to make a positive difference in the diving community by building upon Cousteau's efforts of exploration, research, and conservation. GUE does this by extending those efforts, while remaining a voice for uncompromising standards in the diving industry.

When enrolling in a GUE class, students must register for classes online and complete a detailed application for enrollment. Prerequisites have nothing new to scuba classes. For example, only nonsmokers are permitted to attend classes. Additionally, students must be able to swim a predetermined distance in an allotted time (400 yards in 14 minutes without stopping for Level 2 cave). Furthermore, alcohol drinking is curbed. A healthy life-style is an integral part of GUE, for instructors and students.

GUE is decidedly one of the premier training agencies available worldwide. Their website, www.GUE.com is truly an education in itself. The instructor database is rather small and with good reason. Diving students should feel confident in their instructors knowing the rigorous training each one has experienced in order to be a GUE instructor. Cayman's Ocean Frontier's GUE instructor, Fraser Purdon recalls his instructor training. "In April of this year, I was accepted for GUE instructor training. This was the most intense instructor course I have ever gone through. We were diving everyday and when we were not, I was lecturing, even during surface intervals. Not just a couple of topics, but nearly every topic in the curriculum."

Longer, more detailed courses are the norm for GUE classes. Both the technical and the overhead courses require substantially more dives and classroom activity than most students are accustomed. Typical classes include 10 or more dives with the instructor. Orlando GUE instructor, David Rhea says, "I was personally looking for new challenges in my teaching. Not only has becoming a GUE instructor greatly improved my teaching skills, but I also know that I am now producing an even better student. With GUE I can offer a considerably more detailed class, limit my teaching to only those seriously seeking the best training, and guarantee a safer, more confident diver as the end result."

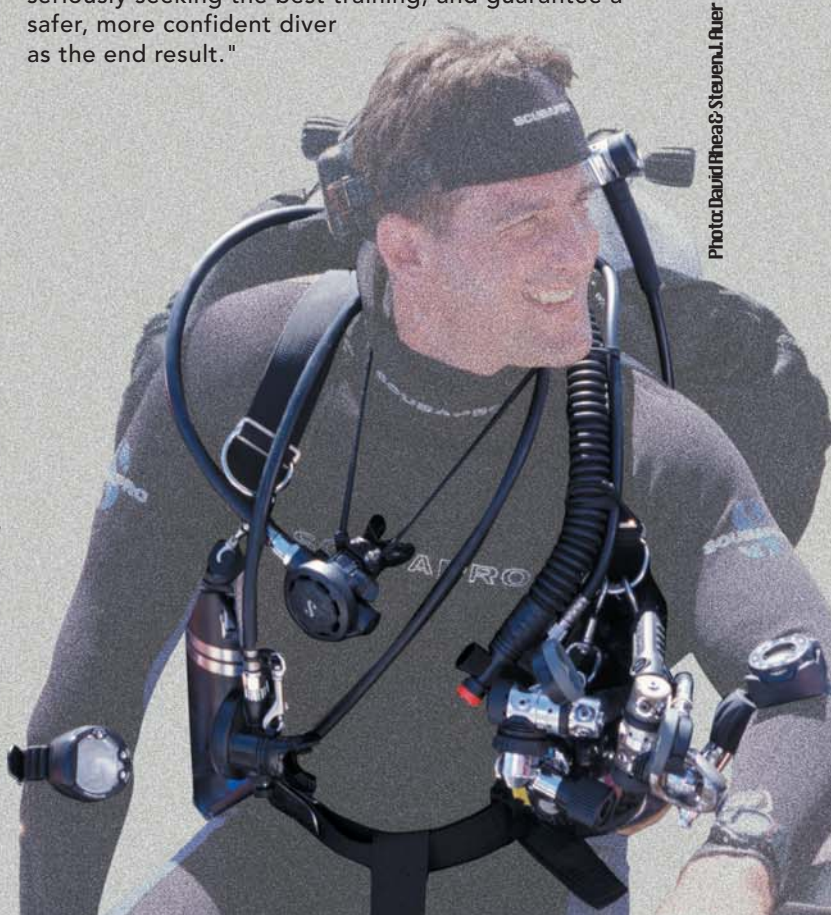


Photo: David Rhea & Steven J. Auer

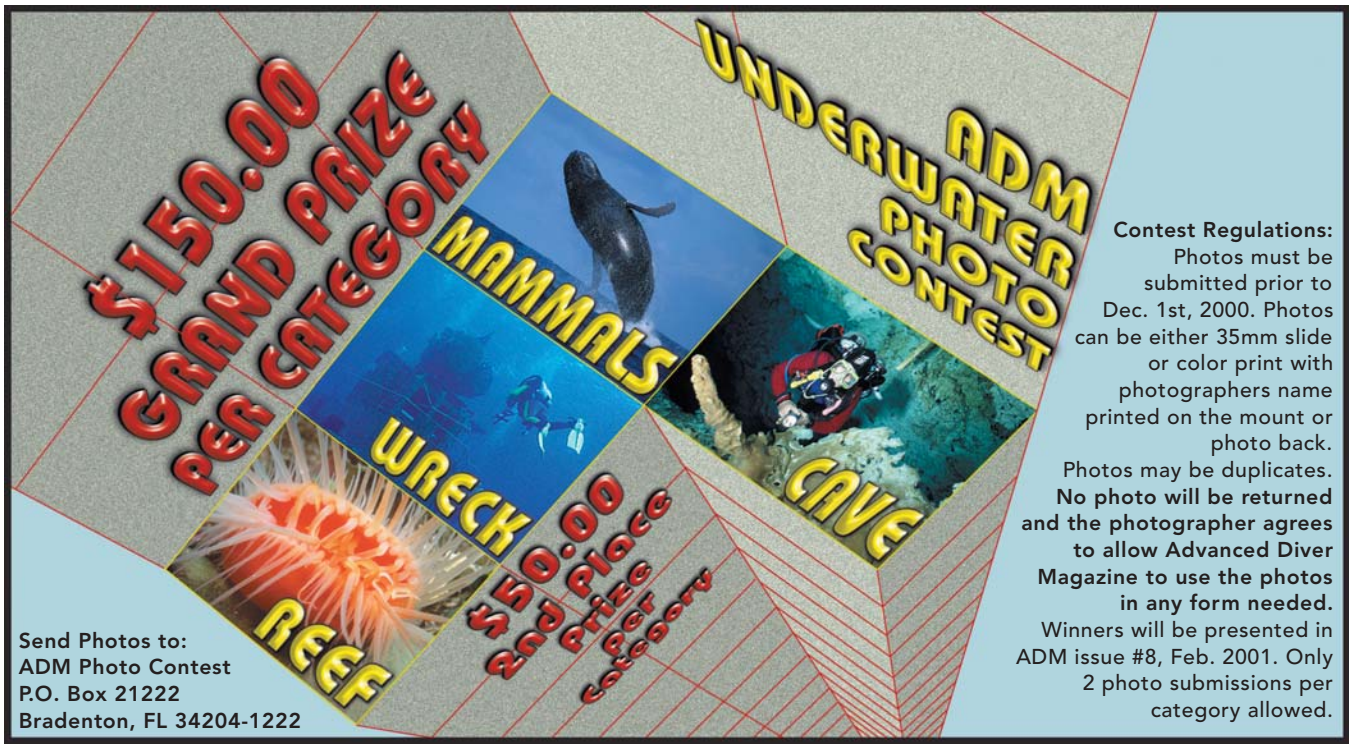
Giving students a solid base to continue their diving with the most up-to-date information is part of the GUE way. Technical classes are centered on gas diving, with deep air courses being nonexistent. Thomas Tukker, a Ft. Lauderdale GUE technical instructor says, that "What is nice about teaching GUE classes is that we get everyone on the same page with equipment and procedures from the very beginning. Using trimix from 100' and below gives the student a definite measure of safety and prepares them for future, more technical diving. We get tremendous results from the rigorous GUE course curriculum and the raised standards." At GUE, students don't pay for a certification, but rather an education. Thomas adds, "Students love the techniques I teach them for ocean wreck diving. A great deal of the material for tech is exactly the same for our cave courses, and having similar technique and equipment all along the different GUE curriculums, makes for an excellent follow through when the student gets interested in different areas of diving."

The certification cards at both the instructor and student level remain the property of GUE. This implements the system of checks and balances that has never before been a part of diving. Similar to flight training, GUE believes in the concept of being a safe, competent diver on a technical level requires active, continuous participation and continuous honing of skills. Typical GUE cards expire after a two year time period. Renewing can be simple, provided the diver stays active and has proof of diving experience at the current level.

Equipping students properly builds a firm foundation. From the members of WKPP, the world record holding cave exploration team, and the experience and expertise of the instructors worldwide, a simple and clean configuration emerged. Rarely is there room for personal preferences in the kit, each outfit should be a mirror image of the next. Why? If the student is fully aware of the location and procedures in dealing with his or her own equipment, then the same level of comfort will exist in dealing with the dive partner's gear. Fraser Purdon recalls a class he witnessed in the UK. "Before my GUE crossover, I was teaching a technical nitrox course and was impressed by another group of students I saw getting into the water. These guys had all their equipment configured in the same manner and looked like a well-prepared dive team. Why were my students not like that?" GUE instructors have discovered that training all divers with standardized equipment has been widely successful, whether it is for open water classes or highly technical diving. Standard operating procedures include breathing the 7' hose, utilizing backplate, wing

G•U•E
Continued on Page 47

Photo: Sandra Edwards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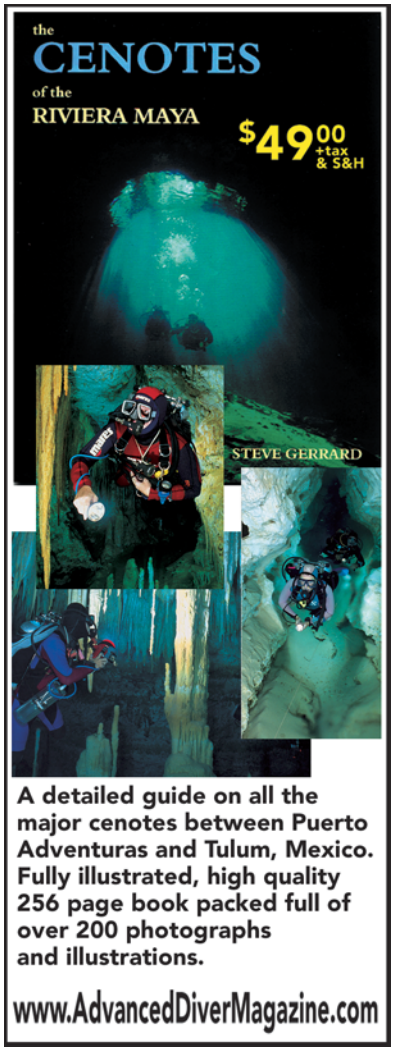
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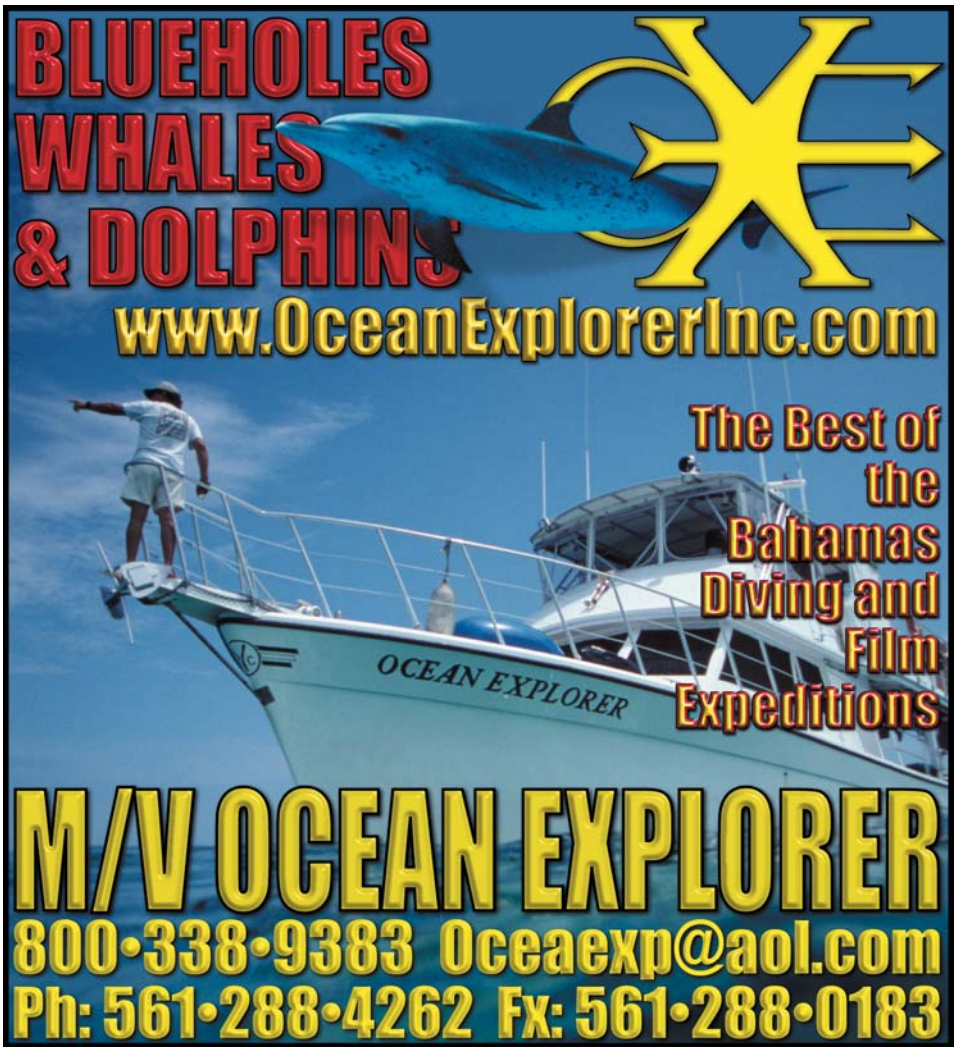
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BEACON WOODS CAVE EXPLORATION

By: Tony Hyatt

An extensive cave system with an extensive history, Beacon Woods has been explored for more than 20 years. In fact, many of the great early explorers showed interest in this system.

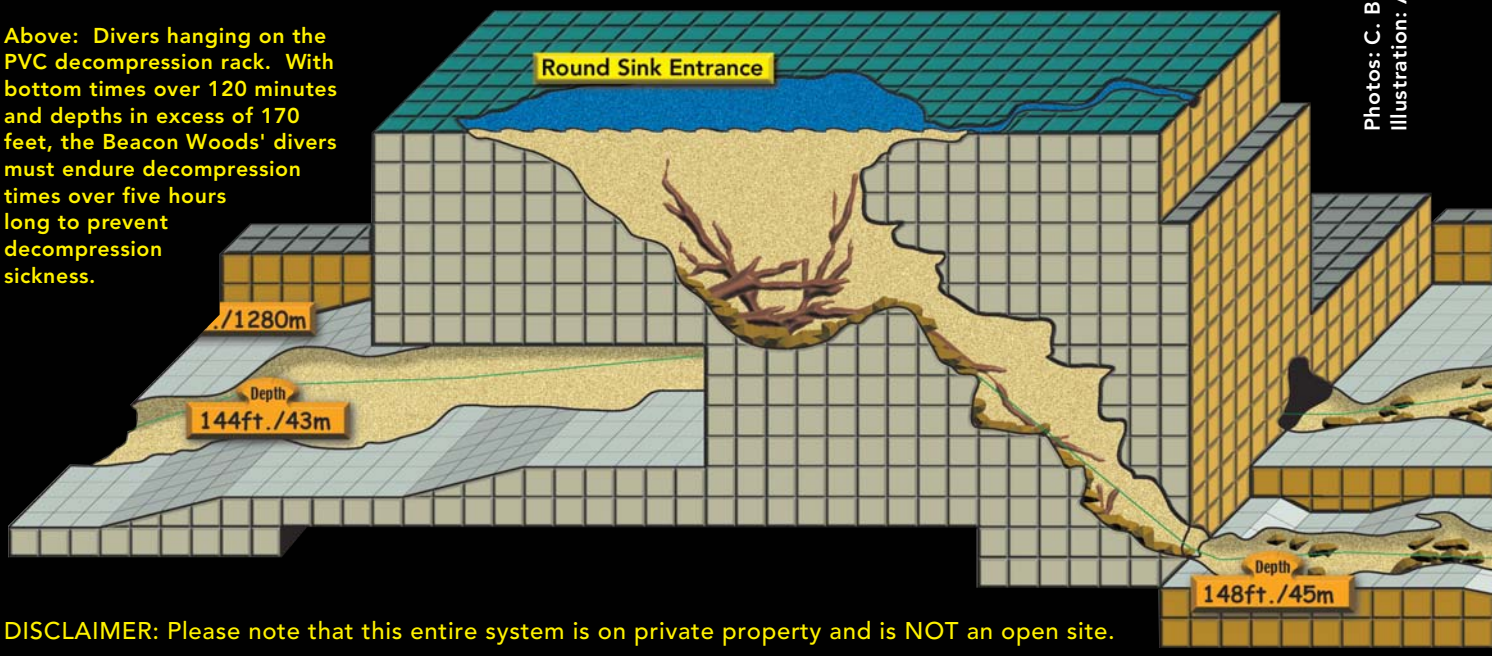
Exploration History

In Pasco County, early 1978, Will Walters, cave explorer in the Tampa Bay area, discovered a series of small sinks in the Beacon Woods housing development. For the next year, Jay Friend, Bob Gomez, Paul Heinreth, Bill Fehing, Walthers, and a few others made exploratory dives in these sinks. The first surface entrance, located next to the housing development clubhouse and pool, was named Nexus. The exploration of this sink led to the discovery of both an upstream and downstream passage. U.S.G.S. research material on "Spring and Sink Reconnaissance" showed a further upstream sink, which the team explored and subsequently named Round Sink. The same U.S.G.S. material also indicated that Round Sink had been dye traced to the Gulf of Mexico.

As 1978 ended and the exploration subsided, the connection between Round and Nexus Sink had not been found but, five surface entrances, Round, Nexus, Briar, Golf Ball, and Smokehouse Pond, had been discovered.

Photos: C. Bowen
Illustration: Alex Warren

Above: Divers hanging on the PVC decompression rack. With bottom times over 120 minutes and depths in excess of 170 feet, the Beacon Woods' divers must endure decompression times over five hours long to prevent decompression sickness.



DISCLAIMER: Please note that this entire system is on private property and is NOT an open site.

Jon Bojar, Beacon Woods' diver, inspects a group of prehistoric, petrified Dugong bones imbedded in the limestone wall, located 700 feet from the Round Sink entrance. Dugongs are extinct ancestors of the modern day Manatee, still prevalent on the coast of West Central Florida.

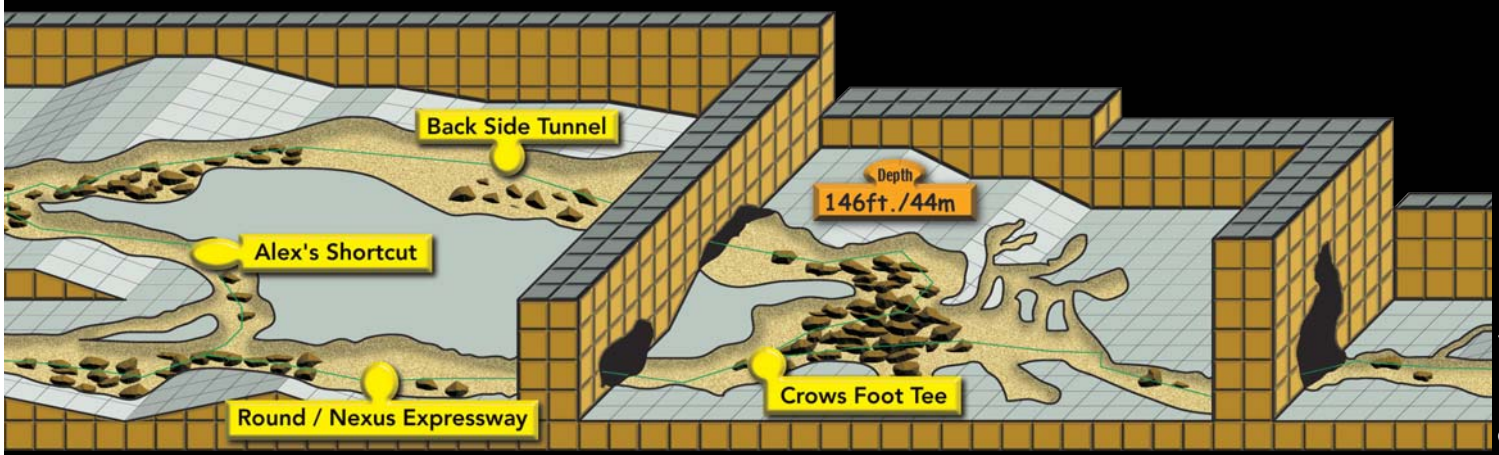
Explorer Alex Warren prepares at the surface of Round Sink for another push into the far reaches of the Beacon Woods' cave system.

The furthest downstream sinks, Briar, Golf Ball, and Smokehouse were connected via a 400-foot traverse at a depth of 50 to 60 feet.

In October of 1980, Steve Straatsma and Vaughan Maxwell entered Round Sink for their first dive in the system. Visibility was its usual tannic 5 to 15 feet, and they continued for 600 feet, passing the fossilized skeleton of a Dugong, the ancient ancestor of the Manatee. On one notable dive, the two explorers swam to the end of exploration line from Round Sink, taking a mere 2 feet to connect the Nexus passage to the Round passage since visibility was not ideal.

In 1981, as Straatsma and Maxwell explored a 600- foot upstream traverse from Briar Sink, Stratomax Sink was found. This same year revealed yet another passage, which led off the Round to Nexus tunnel towards Bear Creek. The divers continued their exploration until the summer rains closed the system.

In the relentless desire to explore, some divers looked again to Beacon Woods. There was no map of the system. A few attempts in the mid 1990's to survey the passage and create a map of the system failed due to poor visibility, silty passage, and moderate depth. Straatsma and Jeff Petersen began



Cave continues on next page

John Schuchman emerges from the tannic water and into Round Sink after conducting a photo shoot dive in Beacon Woods.

exploring the system again in the late 1990's. The tunnel discovered in 1981 was found to head due south, but the heavy rain in the late 1990's again closed this system for exploration.

Current Exploration

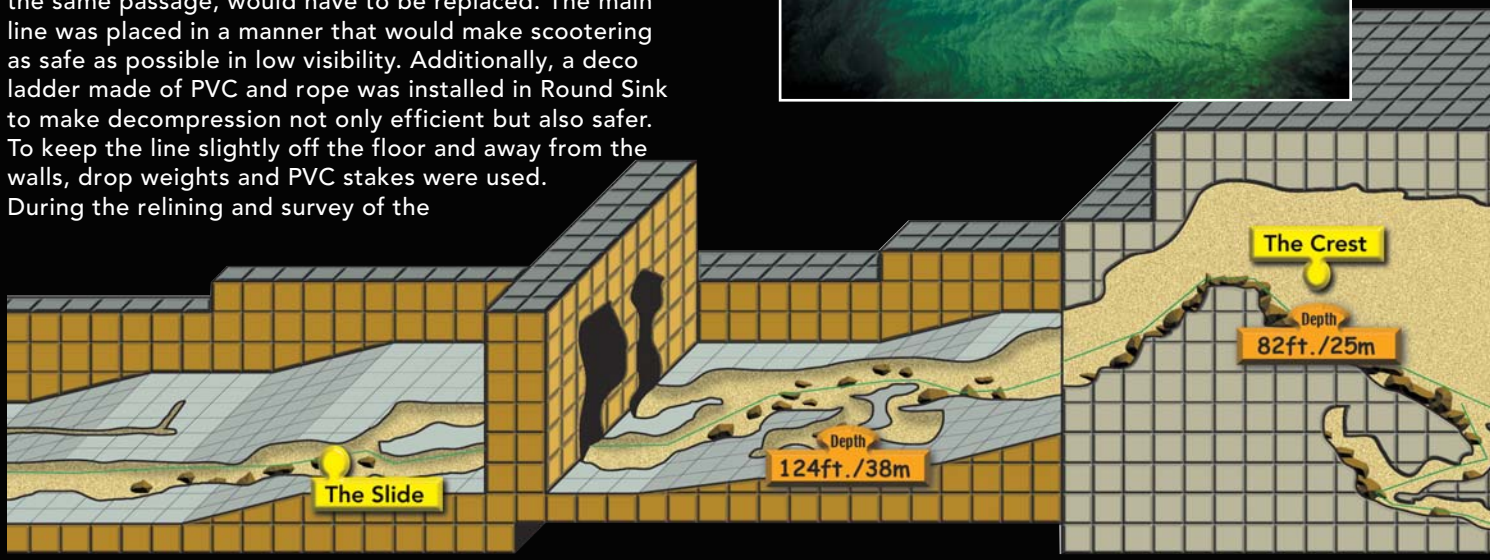
In 1999, the quest was revived. The exploration resumed as dives by Jon Bojar, Brett Hemphil, and Alex Warren, with assistance from Drew Glasbrenner and Mike Blitch pushed the South Tunnel to a distance past 3000 feet, at a depth of 160 feet. At this point it became apparent that a staging area would have to be setup and support divers would have to be recruited. John Schuchman and Tony Hyatt were the first recruits. Next, the exploration lines in the system, sometimes 2 or 3 in the same passage, would have to be replaced. The main line was placed in a manner that would make scootering as safe as possible in low visibility. Additionally, a deco ladder made of PVC and rope was installed in Round Sink to make decompression not only efficient but also safer. To keep the line slightly off the floor and away from the walls, drop weights and PVC stakes were used. During the relining and survey of the South Tunnel, a side passage was discovered, which proved useful since it intersected the South Tunnel and decreased linear penetration by 400 feet.

A staging area was created in a room of crystal clear water at 3000 feet. Float balls were brought back and inflated in the dome room to ensure the stage cylinders and scooters would be kept off the cave floor and walls. Further exploration revealed the South Tunnel continued past the 4,000-foot mark, after which the water turned tannic and passage narrowed.

The relining and survey was conducted throughout the South Tunnel and then to Nexus and beyond. Due to the poor visibility in the system, over-sized line arrows were created and placed at 100-foot intervals. The survey was conducted using tape for accuracy and survey information was gathered, compiled, and downloaded to Warren's computer. The first official map of Beacon Woods was underway.

Further pushes have been made in both directions and the system currently stretches for more than 9,000 feet. Although there seems to be two main conduits, there are many side passages. The South Tunnel is the deepest passage, reaching a depth slightly over 160 feet. Due to the depth and less than ideal visibility, standards have been made for all team members. All dives are conducted using a trimix to ensure a PPO2 of no more than 1.4 and an END of no deeper than 90 feet. A typical mix is 25/25 for shorter dives and 21/25 for

Photos: C. Bowen
Illustration: Alex Warren



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longer dives. Decompression, utilizing 50% and 100% oxygen, typically takes the same amount of time as the bottom time. For a 60-minute bottom time, a total time of approximately 120 minutes would be a safe dive schedule. This cave is hard on equipment; four scooters have failed, two of which imploded. The only piece of equipment that has not failed is the American Underwater Lights.

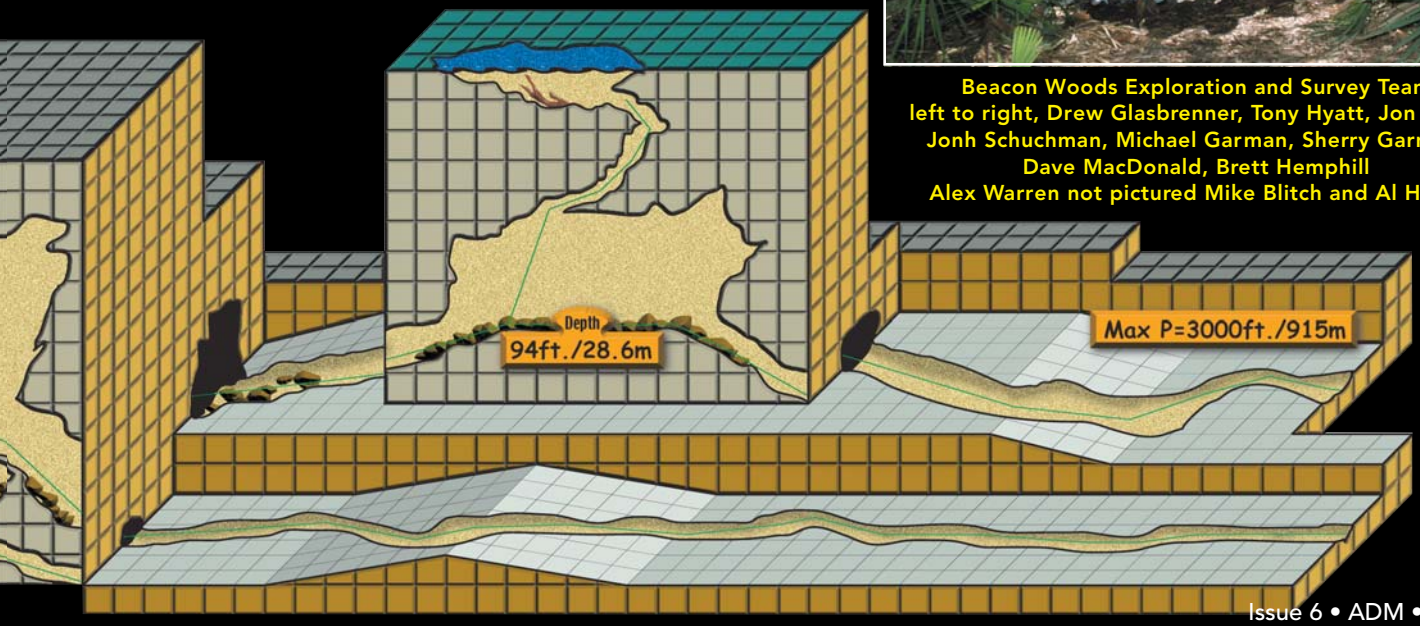
Of the six known sinkholes, all but two have been connected: Nexus to Stratomax. Downstream Smokehouse Pond has been explored to 800' where the passage loses vertical relief and becomes side mount. Stratomax and Briar are completely filled in with debris. The dye tracing from Round Sink to a sinkhole in the Gulf of Mexico is assumed to have traveled via the South Tunnel.

Geology of Beacon Woods Cave System

The Beacon Woods cave system has many karst windows, allowing access to the underground world. It would seem that Round Sink is the most upstream connection to the underground, but this is not the case. First mentioned in 1964 by W.S. Wetterhall in Report of Investigation #34, Florida Geological Survey, Bear Sink lies in the streambed of Bear Creek, about a mile to the southeast of Round. Wetterhall found that not all of the flow into the sink leaves the sink. Rarely visited by divers, Bear Sink is not known to lead to any diver passable cave, but it does drain underground a large quantity of CO2 rich water, which is highly effective in dissolving limestone.

The effect of this large cave on the hydrogeology of the area is profound. Examining a map of the potentiometric surface of the aquifer shows a large depressed area centered on Beacon Woods. The contours of this surface should run parallel to the coastline, which is the ultimate discharge point where fresh water meets salt water. Water flows down gradient, from high to low, perpendicular to these surface contours. Yet in this depression formed along the coast, there is a large area where the flow is in a northern direction, coincident with the direction of the cave passage. Since conduit flow is much more efficient than flow through solid limestone, the surface of the aquifer water is much lower here. Obviously, the cave system is draining a huge area! This would explain the large cave passage that so

Beacon Woods Exploration and Survey Team
left to right, Drew Glasbrenner, Tony Hyatt, Jon Bojar, Jonh Schuchman, Michael Garman, Sherry Garman, Dave MacDonald, Brett Hemphill
Alex Warren not pictured Mike Blitch and Al Heck.



uncommonly defines Beacon Woods in relation to other cave systems on the central West Coast of Florida. As Bear and Round Sinks pirate nearly the entire flow of Bear Creek, they route highly corrosive CO2 rich water underground. Also, due to the presumed connection to the Gulf established by Wetterhall's dye traces from Round Sink to Heart Spring offshore of Hudson, there is also the mixing of fresh and salt water. Due to a peculiarity of the saturation curve of calcium carbonate in relation to salinity, brackish water will more aggressively dissolve limestone than either fresh or salt water, and the combination of these two factors result in the large passages within Beacon Woods cave system.

Biology of Beacon Woods Cave System

The Beacon Woods cave system contains abundant stygobitic (water dwelling, cave adapted) fauna when compared to other systems in the same part of Florida. The diversity is not extraordinary, as two species of amphipods and one species of crayfish have been identified in the system. The numbers are staggering, some locations contain more than 10 individuals per linear foot of cave, creating crustacean blizzards in the water column.

The numerous karst windows providing divers access to the system also provide access for organic debris. In fact, leaves and other debris cover the floor of the system for several hundred feet from the Round Sink entrance. Not only does the decaying plant material provide food for the stygobites but it is also an energy source for sulfur-reducing bacteria (SRBs). During the metabolism of organic carbon, the SRBs convert sulfate from the saltwater at the bottom of the tunnels in the system into sulfide. When the sulfide contacts oxygenated freshwater, it reacts to form sulfur crystals. The reaction may be spontaneous or mediated by sulfur-oxidizing bacteria. The result is clouds of minute white sulfur crystals and bacteria in the water column, creating "white clouds" in the water and very poor visibility in Round Sink and in the cave system within the first few hundred feet of Round Sink.

The Exploration Continues

Today the exploration continues and the Southeast Exploration Team has grown. Once again the explorers are racing the coming rains of the wet season to find a possible connection to the Gulf of Mexico or perhaps to the nearby Wayne's World Sink cave system. A video of the system is being created, and the survey map will soon be over-laid on a topography map. Alex Warren, Jon Bojar, Brett Hemphill, Tony Hyatt, John Schuchman, Drew Glasbrenner, Al Heck, Dave MacDonald, and Sherry and Michael Garman will explore tomorrow's new passages.

Special Thanks to
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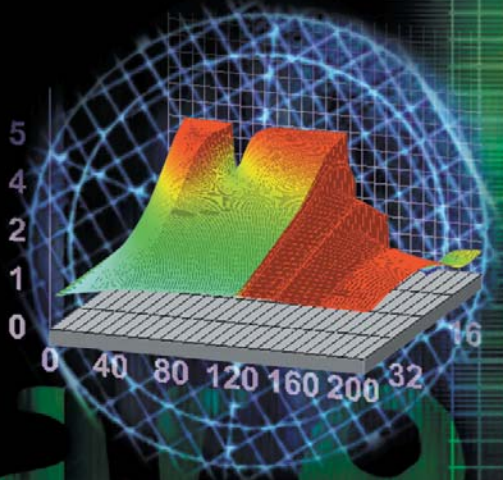

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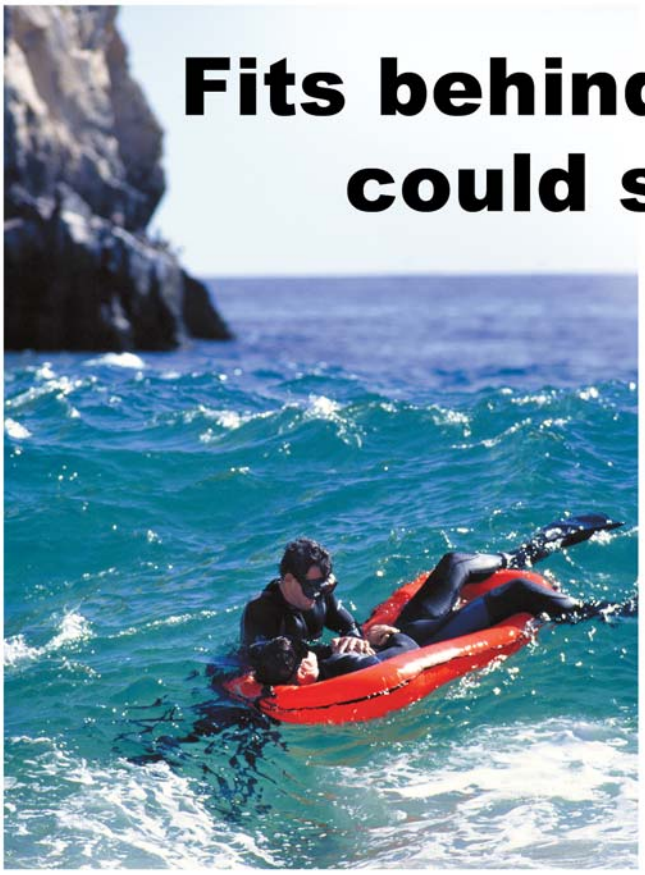

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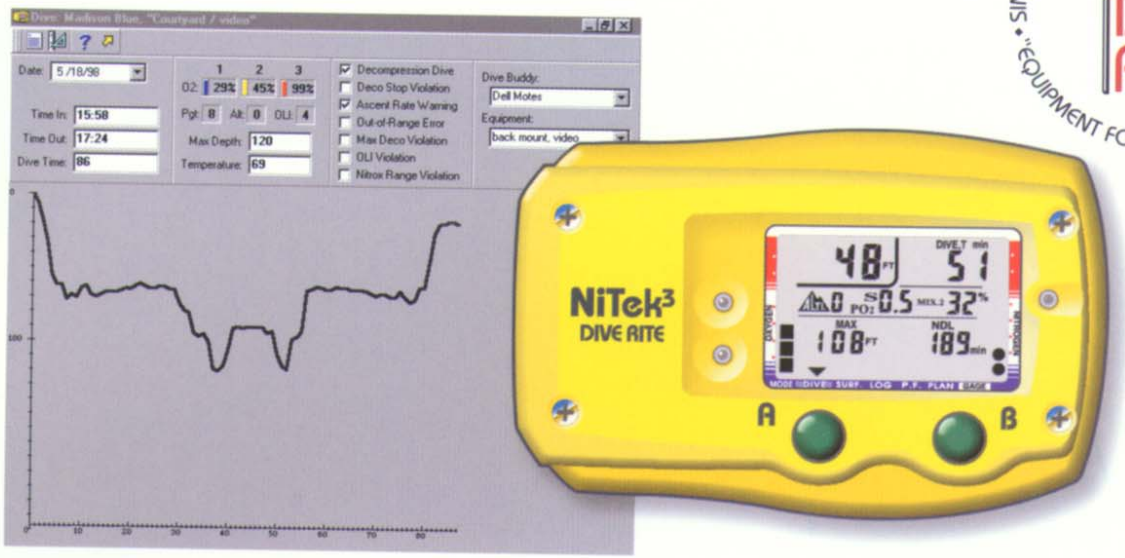

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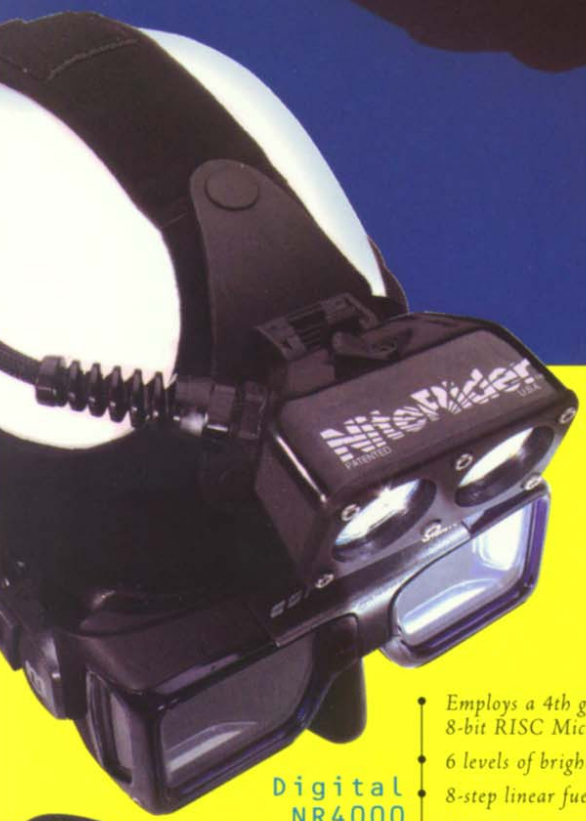

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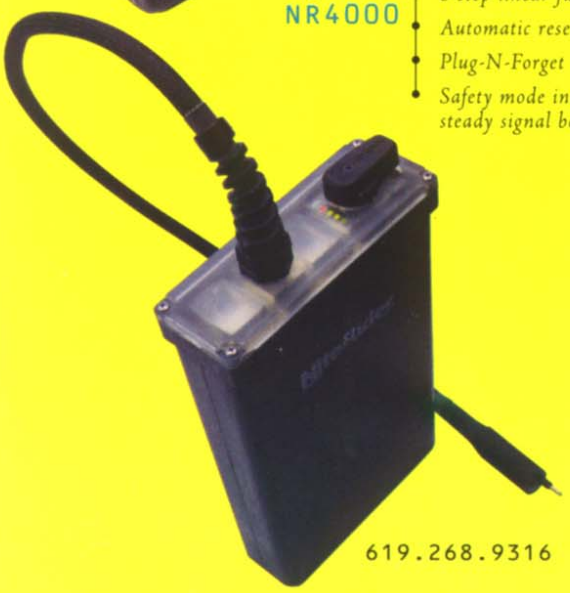

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