

*Exploring the
Ocean Planet*

In this Year of the Ocean, the options range from visiting a maritime museum or aquarium to swimming with sharks, sleeping in an underwater hotel and visiting the Titanic

by Michael Menduno

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ith El Niño kicking up a storm and the motion picture *Titanic* setting box-office records, public awareness of the ocean may have reached an all-time high in 1998. But those whose knowledge about the marine realm comes mainly from television meteorologists and Hollywood are missing the boat (if you'll pardon the expression). The ocean is far more complicated, compelling, critical and—unfortunately—threatened than they may have been led to believe. A few alarming facts:



- Fifteen out of 17 of the largest fisheries on this planet are so heavily exploited that reproduction is not sustaining them.
- Sixty percent of the world's coral reefs, known as the rain forests of the ocean because they contain so much biodiversity, are threatened by pollution, sedimentation and bleaching (which is believed to be caused primarily by rising water temperatures).
- Two thirds of the world's population live within 60 kilometers (37 miles) of the coast (in the U.S., the proportion is just over 50 percent). As the global population swells toward six billion, pollution and coastal development are overloading ecosystems along vast stretches of shoreline. In the U.S. alone in 1996, these pressures led to more than 2,600 beach closings, 2,200 fishery advisories and dozens of documented "dead zones," in which large areas of ocean become largely and suddenly devoid of life.

"We have shown very little regard for the management of these resources," says Jean-Michel Cousteau, the California-based conservationist and filmmaker, who represented the U.S. at the EXPO '98 World's Fair in Lisbon. "We're gobbling up our capital instead of living off the interest." The exposition is the centerpiece of the United Nations's International Year of the Ocean observance, intended to raise public awareness and initiate the changes needed to sustain the marine environment. The problem is that despite a wealth of scientific information about the ocean, many, if not most, people remain unaware of the fundamental mechanisms at work in the sea.

What can you do? To borrow the slogan of promoters of the International Year of the Ocean: "Get into it!" Set aside a little

MARINE MENAGERIE (opposite page) mills about near a model of an offshore oil rig at the Aquarium of the Americas in New Orleans. Bullfrog (above) is part of the Discovery Falls gallery in the Tennessee Aquarium in Chattanooga, which has the most extensive freshwater exhibits in the U.S.

time, whether next weekend or your next vacation, to do some exploring. The following pages offer a collection of unique adventures and links to help you and your family take the plunge.

Winnowing down the possibilities was no easy task. To come up with this list, I queried dozens of educators, tour operators, conservationists and adventurers for their recommendations and reviewed

hundreds of brochures, World Wide Web sites, videos, CDs and trip reports. The result is an eclectic blend of offbeat experiences ranging from peering through the portals of a top-notch aquarium to descending almost four kilometers on board a Russian submarine to the deck of the *Titanic*—for a mere \$32,500!

Windows on the Underwater World

Nose-to-nose with about 100 circling sharks, tuna and toothy barracuda, the safety of the 17-meter-wide, seamless acrylic viewing wall—all that stands between me and mealtime—offers little comfort. I'm peering into a four-million-liter (one-million-gallon) indoor ocean, part of the new \$57-million Outer Bay Exhibit at the Monterey Bay Aquarium in Monterey, Calif. Since it opened two years ago, the exhibit has enabled more than four million people to experience a world that few of them would otherwise have seen.

The Outer Bay display is an excellent example of how far aquariums have come since the 1960s, when aquarists seemed to be taking their cues from staid museum curators. Today, in a more competitive environment, aquariums are producing technologically sophisticated, Zen-like experiences unabashedly designed to provoke and amaze.

"There's something utterly primal about the direct contact," explains architect Peter Chermayeff, whose groundbreaking designs are redefining the aquarist's art. "To look a fish in the eye ... is a spiritual experience," he says.

Last year more than 35 million visitors flocked to U.S. aquariums. And given numbers like that, some names more identified with entertainment than with education are getting involved. Believe it or not, Ripley's Believe It or Not just opened a new \$43-million aquarium in Myrtle Beach, Fla., to the dismay of some purists. Like other institutions, aquariums are struggling to find the right balance of education and entertainment, to elucidate everything from the thought-provoking social relationships of big-brained cetaceans to the strange harems formed by transsexual reef fish called wrasses.

Take Chermayeff's latest creation, the Oceans Pavilion (now

called Oceanarium) at EXPO '98. It presents the world as a single ocean by combining four distinct habitats: tropical corals, the Antarctic, a Pacific kelp forest and the rocky North Atlantic coast—one in each quadrant of a 5.3-million-liter wraparound tank containing more than 15,000 animals. “It may provoke controversy among those who say it isn’t a strictly scientific presentation,” admits Chermayeff, who explains that he strove to show “the unity of the world’s oceans.”

If you can’t get to Lisbon, don’t despair: there is probably a pretty good aquarium within reasonable driving distance. Choice destinations include California’s Long Beach Aquarium of the Pacific, which opened this past June, and the National Aquarium in Baltimore, whose current killer exhibit is entitled *Venom: Striking Beauties*. And although landlocked Tennessee might not be the first place that springs to mind in this context, the Tennessee Aquarium in Chattanooga has perhaps the country’s best exhibits on freshwater ecosystems. In Mystic, Conn., the Mystic Aquarium has already attracted attention with a planned deep-sea exploration exhibit that will open next year.

Of course, aquariums aren’t the only windows on the underwater world. Filmed with dual cameras enclosed in a single, 408-kilogram waterproof housing, IMAX 3-D is the closest you’ll come to a

diver’s-eye view without actually getting wet. To date, 10 underwater IMAX films have been produced, featuring subjects such as great white sharks, the migration of whales and the majestic underwater kelp forests of southern California. The most recent, *Dolphins—The Ride*, filmed by Bob Talbot of *Free Willy* fame, will take you on a dizzying undersea ride with a pair of Atlantic bottlenose dolphins.

Time and Tide

Less flashy perhaps than a cinematic dolphin ride, but no less stirring to the historically inclined, are the treasures on view at a first-rate maritime museum. As a group, these institutions chronicle our heritage as a seafaring nation and serve as time capsules for great voyages of trade and discovery, epic sea battles and the development of maritime technology.

More than 100 maritime museums are scattered throughout the U.S. seaboards and around the Great Lakes. Most of them are small and built around a single collection or historical event as an outgrowth of community or family interest. Notable larger museums include Independence Seaport Museum in Philadelphia, which specializes in turn-of-the-century industrial maritime and Delaware River history; the Mariner’s Museum in Newport News, Va., featuring one of the largest general-

interest maritime collections in the world; Mystic Seaport, which is home to a 65,000-volume research library and a unique seven-hectare re-creation of a working 19th-century Connecticut village; and the San Francisco Maritime National Historical Park, which includes nine historical ships, several exhibits and an extensive research library. And don’t miss the Bay Model Visitor Center in nearby Sausalito. The center showcases an indoor 6,100-square-meter, computer-controlled hydraulic model of the San Francisco Bay and surrounding waterways, which runs through a complete tidal cycle every 15 minutes.

Whales and Other Marine Mammals

Although the U.S. whaling industry is now the stuff of maritime history, whale-watching is a burgeoning enterprise, one that brings in an estimated half a billion dollars a year worldwide. This segment of adventure tourism was nurtured significantly by the passage of the Marine Mammal Protection Act of 1972, which outlawed the killing of cetaceans and protected other mammals in the territorial waters of the U.S. “Keeping whales alive is more economically beneficial than killing them,” says Greenpeace co-founder Paul Watson, now president of the Sea Shepherd Conservation Society in Marina del

DOLPHIN (below) is the main attraction at the Dolphin Quest program at resort hotels. The underwater trail (right) at Trunk Bay, off St. John in the U.S. Virgin Islands, was one of the first in the world and has been so heavily trafficked that most of the coral has suffered. The underwater IMAX 3-D camera (above right) weighs more than 400 kilograms on land and requires two skilled operators. The whale shark (top right) is a gentle plankton eater; this one was photographed off Mozambique.

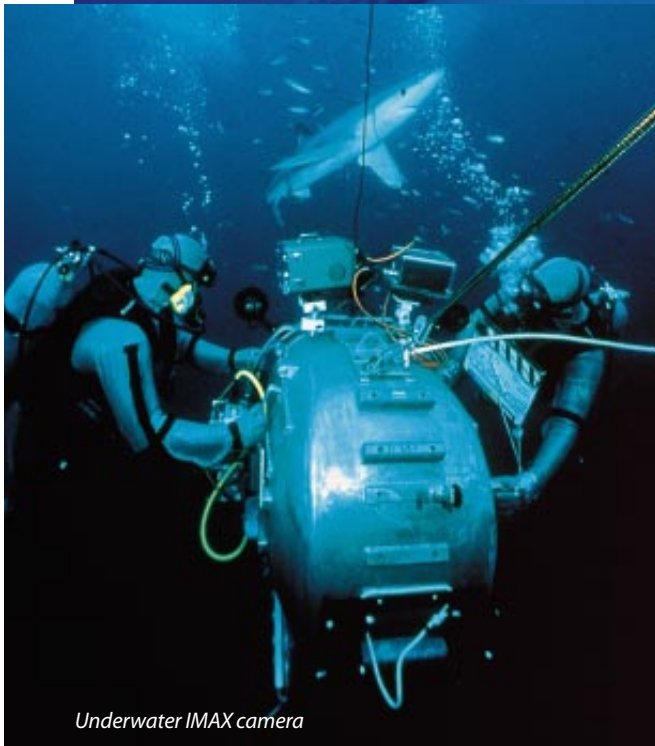
LEN KAUFMAN Dolphin Quest (below); JOHN BROOKS U.S. National Park Service (right)





Whale shark

PAUL A. SUTHERLAND/OtherWorld Images



Underwater IMAX camera

TOM CAMPBELL/AM/Imax Corporation

in habitats ranging from Florida's Crystal River Refuge to South America's Patagonia.

Intimate encounters with wild dolphins are the specialty of a small outfit in Cayucos, Calif., which conducts six-person, six-day trips for \$1,700 a person. The trips, led by writer and naturalist Carlos Eyles, depart from Miami Beach, cruising to the dolphin grounds 80 kilometers off Grand Bahama. Participants eat and sleep on board the boat, spending up to five days swimming and cavorting with small groups of wild Atlantic spotted dolphins.

You can also encounter a dolphin without leaving your hotel. Dolphin Quest in Middleburg, Va., operates three dolphin research facilities at resort hotels in French Polynesia, Hawaii and Bermuda that feature interactive programs. Their latest arena, a \$1.6-million, 1.2-hectare habitat at the Southampton Princess resort in Bermuda, offers daily personal encounters with these captivating creatures.

If you're in the western U.S., it's not even necessary to go to an island to learn about dolphins. Las Vegas might seem like the last place you would go for enlighten-

ment about cetaceans (or anything else), but the Mirage Hotel houses a 9.5-million-liter dolphin facility where naturalists conduct daily tours and lectures.

Encounters of the Frenzied Kind

Those who crave higher adrenaline levels may get their fix by participating in an activity often portrayed as the ultimate in undersea excitement: the shark dive. To get the full effect, you'll need to be scuba-certified.

My first shark dive, in the summer of 1987, took place off southern California's Channel Islands. The crew lowered a "chum box" full of ground mackerel over the transom, and we waited about 20 minutes before the arrival of the first blue shark. Before long, half a dozen fins were slicing through the water. Our dinner guests had arrived, and it was time to lower the steel shark cage into the water.

The door to the cage was located below the water (who designed this thing?), requiring those of us who were going to occupy it to make a leap of faith. I took a deep breath through my scuba regulator, eyed the circling fins one last time and made a giant stride off the boat. I swam into the cage alongside our guide, who wielded a piece of pipe to keep the sharks at a distance.

I can assure you that watching from the safety of a cage as a dozen hungry sharks tear into chunks of chum will give you a fresh new perspective on food-chain dy-

Rey, Calif. If you live near a coast, you don't have to go far to encounter one of these magnificent leviathans. Information on whale watching is available through a site maintained at the University of Helsinki in Finland (see URL list on the next page).

For more in-depth encounters with whales and other marine mammals, naturalist-led tours are the way to go. Founded in 1972, Oceanic Society Expeditions in San Francisco offers more than 30 guided natural-history and research expeditions to observe whales, dolphins and manatees

namics. There are a number of dive operators more than willing to help you in your quest for this kind of awakening.

Snorkle with Sharks

Cruising off the Channel Islands, Hydrosphere in Pacific Palisades, Calif., specializes in shark and marine encounters for nondivers. A two-and-a-half-day trip, including food, lodging and one dive, costs \$259; bring your own mask, fins and snorkel. Certified divers can get closer to the fray on the three- to five-day excursions led by San Diego Shark Expeditions. Priced at about \$300 a day, trips range from the Channel Islands and Costa Rica in the Americas to a great white shark expedition off the coast of South Africa. Mike Ball Dive Expeditions in Townsville, Australia, also conducts five- to eight-day great white shark trips led by naturalist Rodney Fox at a cost of \$2,800–\$4,160, excluding airfare.

There are also opportunities for those who want to do more than just watch during their wildlife encounters. Conservation-minded expeditioners will find a

wealth of ongoing research programs in which they can take an active role.

The Shark Research Institute in Princeton, N.J., operates a worldwide tagging program for whale sharks designed to help scientists learn more about these gentle, plankton-eating giants, which can reach 20 meters in length. In recent years, whale sharks have come under pressure from Asian fishers who hunt them for their fins and to make fertilizer out of their remains. The program is dependent on volunteer sport divers and snorkelers who tag the sharks and take DNA samples. The information is used to investigate their reproductive habits and migration patterns and to devise and implement effective conservation measures.

Activist-minded volunteers are also needed at the Sea Shepherd Conservation Society. Formed in 1977, the society investigates and enforces international laws and agreements that protect marine wildlife. Its fall campaign seeks to prevent the Makah Indians from killing gray whales in the Olympic National Marine Sanctuary. Under an 1855 treaty, the Washington State-based tribe is exempt from a feder-

al regulation prohibiting whaling and is reportedly planning to begin its hunt in October.

Coral reefs are also being threatened. Experts estimate as much as 36 percent of the world's hard corals have been destroyed over the past 40 years. Coral Cay Conservation in London conducts year-round, two- to 12-week working eco-expeditions to help protect endangered coral reefs and coastal rain forests in Belize, Indonesia, Australia and the Philippines. In the U.S., interested community groups and dive clubs can help restore the reefs through the assistance of the Reef Ball Development Group in Sarasota, Fla.

Immerse Yourself

Although the beauty of a coral reef is apparent to anyone who has been snorkeling on one, to appreciate the splendor of these complex ecosystems fully, you will need to be scuba-certified. A typical course, which costs several hundred dollars, includes a series of classroom sessions and supervised dives. Home-study multimedia materials such as CD-ROMs and videos

Exploring the Ocean Planet: Links

International Year of the Ocean (IYO)

United States IYO: 888-4YOTO98 or www.yoto98.noaa.gov
United Nations IYO: <http://ioc.unesco.org/iyo>
American Oceans Campaign: 800-8-OCEAN-0 or www.americoceans.org
U.S. National Park Service: 505-988-6750 or www.nps.gov/scru/home.htm
National Marine Sanctuaries: 301-713-3145 or www.nos.noaa.gov/ocrm/nmsp
Ocean 98: www.ocean98.org/ocean98.html

Aquariums

Aquarium links: www.aza.org
Aquarium of the Americas: 800-774-7394 or www.auduboninstitute.org
Long Beach Aquarium of the Pacific: 562-590-3100 or www.aquariumofpacific.org
Monterey Bay Aquarium: 408-648-4800 or www.mbayaq.org
Mystic Aquarium: 860-572-5955 or www.mysticaquarium.org
National Aquarium in Baltimore: 410-576-3800 or www.aqua.org
New England Aquarium: 617-973-5200 or www.neaq.org
Oceans Pavilion: www.expo98.pt/en/pavoceanos.html
Tennessee Aquarium: 423-266-3467 or www.tennis.org
IMAX: www.imax.com

Museums

Bay Model Visitor Center: 415-332-3871
Independence Seaport Museum: 215-925-5439 or www.scot.temple.edu/seaport
The Mariners' Museum: 757-596-2222 or www.mariner.org
Museum of Man in the Sea: 850-235-4101
Mystic Seaport: 860-572-5315 or www.mysticseaport.org
San Francisco Maritime National Historical Park: 415-556-3002 or www.maritime.org
Graveyard of the Atlantic: 919-986-2995
Maritime museum links: www.bobhudson.com/Smiths/index.html and <http://pc-78-120.udac.se:8001/www/Nautica/Pointers/Museums.html>

Reefs

Coral Cay Conservation: 44-171-498-6248 or www.coralcay.org
Reef Ball Development Group: 941-752-0169 or www.reefball.com
Reef education guide/links: www.reef.org
Project AWARE: 714-540-0251 or www.projectaware.org

Scuba Diving

NAUI: 813-628-6284 or www.naui.org
PADI: 800-729-7234 or www.padi.com

SSI: 970-482-0883 or www.ssiusa.com
YMCA: 770-662-5172 or www.ymcascuba.org

Sharks

Great white shark stories: www.greendivers.com
Hydrosphere expeditions: 310-230-3334 or www.hydrosphere-expedition.com
Mike Ball Dive Expeditions: 888-MIKEBALL or www.mikeball.com/great_white.html
San Diego Shark Diving Expeditions: 888-SDSHARK or www.sdsharkdiving.com
Shark bytes and links: www.sharkbites.com
Shark Research Institute: 609-921-3522 or www.sharks.org
Stuart Cove's Dive South Ocean: www.stuartcove.com

Submersibles, habitats and space

Aquarius undersea habitat: www.uncwil.edu/nurc/aquarius
Atlantis Submarines: 888-732-5782 or www.goatlantis.com
Clips of deep-sea vents: www.pmel.noaa.gov/vents/geology/video.html
Jules' Undersea Lodge: 305-451-2353 or www.jul.com
Ocean from space: http://eosps.gsfc.nasa.gov/eos_homepage/images.html
U.S. submarine tourist information: <http://ussubs.com>
Zegrahm DeepSea Voyages: 888-772-2366 or www.deepseavoyages.com

Whales, dolphins and manatees

American Cetacean Society: www.acsonline.org
Dolphin Quest: 540-687-5958 or www.dolphinquest.org
Manatees: www.wclyde.com/manateejunction and www.adventurequest.com/adven/nature.htm
Mirage Hotel: 800-627-6667 or www.mirage.com
Oceanic Society Expeditions: 800-326-7491 or www.oceanic-society.org
Sea Shepherd Conservation Society: 310-301-7325 or www.seashepherd.org
Whaleclub: www.whaleclub.com
Wildquest: 800-326-1618 or www.wildquest.com
World Wide Web Virtual Library—Whalewatching: www.physics.helsinki.fi/whale

YOUTH

ExploraMar: 415-389-6644 or www.exploramar.com
JASON Project: www.jasonproject.org
Jean-Michel Cousteau Institute: 805-899-8899
Outward Bound: 914-424-4000 or www.outwardbound.org
School for Field Studies: 978-927-7777 or www.fieldstudies.org
Sea Education Association: 800-552-3633 or www.sea.edu



DAVID SILVERBERG

For the Young

Young people are the hope of tomorrow," says Jean-Michel Cousteau, who represented the U.S. at the EXPO '98 World's Fair. His foundation, the Jean-Michel Cousteau Institute in Santa Barbara, Calif., specifically focuses on exposing young people to the ocean realm. "It's faster that way. The decision makers who are running the show have no time."

STUDENTS get their feet wet at the School for Field Studies in Beverly, Mass.

The institute hosts a series of marine education programs, including a family camp on the island of Catalina off San Pedro, Calif., a snorkeling discovery trip in the Bahamas, Project Ocean Search and an annual gray whale expedition off Baja California.

ExploraMar in Mill Valley, Calif., offers a 12-day, \$2,400 marine biology sailing program for teens ages 13 to 17 in the Gulf of California on board a 15-meter sailing yacht. Environmental stewardship, survival skills, sailing and sea kayaking are part of the curriculum at Outward Bound in Garrison, N.Y., which conducts a variety of one- to four-week programs on both coasts priced between \$80 and \$110 a day.

Students interested in expanding their environmental education should contact the School for Field Studies in Beverly, Mass. Founded in 1980, the school conducts college-accredited semester and summer field-study programs in places such as Mexico, the British West Indies and Pacific Northwest Canada designed to provide hands-on environmental training. The Sea Education Association in Woods Hole, Mass., also offers semester and summer interdisciplinary ocean-studies programs. After completing six weeks of classwork, students head for the open sea on board one of the association's tall ships—the *Westward* and the *Corwith Cramer*—to conduct ocean research. Financial aid is available for both programs. —M.M.

are also available. Another way is to complete the classroom part locally and then travel to a tropical destination for the required open-water dives. Most dive destinations offer a one-day Discover Scuba program, complete with a closely supervised diving experience that will let you get your feet wet but won't conclude with the awarding of a certification ("C") card, which would enable you to go on escorted dives, rent gear and fill air tanks.

There are dozens of agencies that provide dive training and can help you with dive travel. The four largest in the U.S. are the National Association of Underwater Instructors (NAUI) in Tampa, Fla.; the Professional Association of Diving Instructors (PADI) in Santa Ana, Calif.; Scuba Schools International (SSI) in Fort Collins, Colo.; and the YMCA Scuba Program in Norcross, Ga.

Once you're certified, the more than 800,000 hectares of underwater parks managed by the U.S. National Park Service can become your playground. A description of the parks and their diverse ranges of habitats, which include coral reefs, kelp forests, historical shipwrecks and underwater caves, is detailed in a new 344-page guidebook, *Underwater Wonders of the National Park System*, by Daniel J. Lenihan and John D. Brooks (Random House, \$19.95). The U.S. National Oceanic and Atmospheric Administration also manages 12 National Marine Sanctuaries encompassing 4.7 million hectares and offers a variety of discovery programs in partnership with local organizations.

As a recreational scuba diver you will, with experience, be qualified to dive as deep as 39 meters. It is unlikely that you'll run out of things to see at these depths, within which live almost all the world's

hard corals and most of its reef life. Nevertheless, there are options for going even deeper: more advanced ("technical") dive training or submersible craft. Of the two, the submersibles will expose you to less personal risk.

Once accessible only to research scientists and filmmakers, deep-sea submersibles are now being operated by adventure travel companies to provide unique educational experiences. Zegrahm DeepSea Voyages in Seattle is kicking off its 1998–1999 expedition series with a 3,800-meter dive to the *Titanic* on board the two Russian *Mir* submersibles used by James Cameron to film his blockbuster motion picture. The roundtrip fare is \$32,500 a person.

Subsequent expeditions, priced from \$4,000 to \$10,000, will take well-to-do adventurers to the wreck of the HMS *Breadalbane* 107 meters beneath Canadian Arctic ice or on a search for nine-meter six-gilled sharks inhabiting the seafloor 200 meters down off Vancouver Island. Also planned is a series of dives to the deep-sea vents off the coast of Mexico.

Submariners on a budget can take the plunge with Atlantis Submarines in Vancouver, which operates a total of 14 tourist submarines in the Caribbean, Mexico, Hawaii and Guam. Priced at around \$60 for an hourlong dive, these smallish subs (which carry from 28 to 64 people) are rated to 46 meters and offer large viewing ports and lectures by specialists on marine ecosystems. The company also operates a two-passenger submersible that makes 300-meter dives off Grand Cayman in the Caribbean.

Years ago when someone suggested that you might be sleeping with the fishes, it was cause for alarm. Today, if you're a certified diver, it can be something to look

forward to. What is it like to be on the other side of the aquarium glass, to wake up and see a parrot fish peering *in* at you? You can find out for as little as \$175 a night. Jules' Undersea Lodge, operated by Key Largo Undersea Park in Florida, sleeps groups up to six and offers amenities that you might not expect from a nine-meter-deep, converted research habitat. Gourmet meals, air conditioning, hot showers, cable television and even Internet access are all part of the package.

If any of these journeys have piqued your interest, by all means log on to the Internet (use the URL list on page 110 to get started), talk to friends or your travel agent, or visit a library. There are myriad other adventures besides the ones described in this tiny sampling. Any one of them could change your worldview.

Having explored the ocean all his life, Jean-Michel Cousteau explains it this way: "The second you put your head underwater, you become a different person. Some transformation takes place. It goes beyond just having a good time. You end up becoming an ambassador."

Use this newfound status wisely. The future of the oceans may depend on it. **SA**

The Author

MICHAEL MENDUNO is a freelance writer based in Santa Cruz, Calif., who specializes in ocean-related subjects. He was the founder, publisher and editor in chief of *aquaCorps*, the first magazine devoted to technical diving, which was published from 1990 until 1996. A diver since 1977, he has completed upward of 500 dives, mostly in the U.S. and Mexico, and has cave-exploration as well as technical certifications.
