A Beginner's Handbook

DIVING Scuba

In Louisiana Waters

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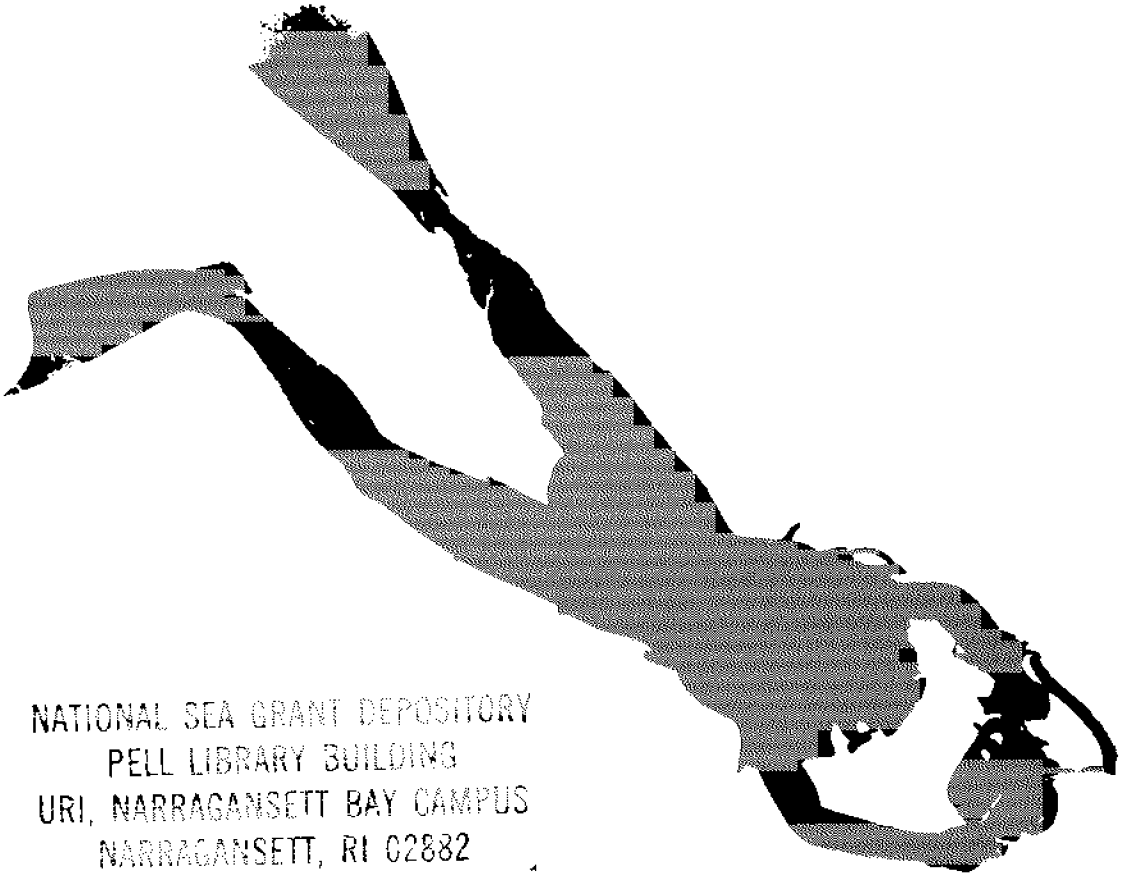

Louisiana Sea Grant College Program

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Contents

Beginning to Dive

What are the various forms of diving?

There are three basic types of diving: skin diving, scuba diving, and surface-supplied diving.

Skin diving, also called free diving, is the act of swimming freely under water. Skin diving is normally done in shallower depths, with the aid of a face mask, swimming fins, and a snorkel.

Scuba stands for "self-contained underwater breathing apparatus." With the aid of this equipment, staying under water can be prolonged.

Surface-supplied diving, in which air is pumped to the diver from the surface, is used in commercial diving and requires extensive training. With surface-supplied diving, divers are able to go deeper and stay under for longer periods of time.

The questions in this booklet deal with scuba diving for recreational divers.

What is the purpose of scuba?

Scuba gear is designed to deliver air to the diver from a tank worn on the back at the same pressure as that exerted on him by the surrounding water.

Record setting dives of over 300 feet (91 meters) have been made with scuba gear, although careful scuba divers do not go below about 130 feet (40 meters).

Do I need to be a good swimmer before I learn to scuba dive?

Not necessarily, but you should be a reasonably proficient swimmer. It is important to feel comfortable and relaxed in the water.

What are the physical prerequisites of learning to dive?

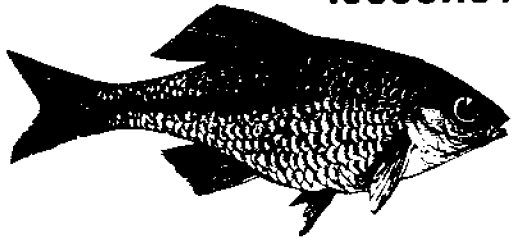
You should be in good physical shape. A medical exam before taking a course is recommended and may be required with some lessons. Scuba diving requires good circulation and respiration.

Don't ever dive with a head cold, a chest cold, sinus congestion, swollen or plugged air passages, or any other serious illness. Diving

with a head cold can result in a ruptured eardrum, while diving with a chest cold can lead to embolism (blocking of blood vessels by an air bubble). Avoid diving while under any type of medication. Never push yourself beyond your physical limitations.

Mental condition is also important to the diver. Don't ever dive if you feel emotionally under par. A diver should also possess a mature attitude, good judgment, and self discipline.

Where can I go to get lessons?



Because of its popularity, scuba diving is taught in nearly every state and most large towns.

Before signing up for any course, make sure there is a certified scuba instructor running the class. Only an instructor who belongs to one of five national training organizations can issue a diver's "C-card," or training certification card. Nearly all dive stores and charter dive boats insist that a customer have a C-card. The five certifying organizations are the National Association of Underwater Instructors (NAUI), the National Association of Skin Diving Schools (NASDS), the Professional Association of Diving Instructors (PADI), Scuba Schools International (SSI), and the YMCA.

The best instructor is one who is understanding and patient. Avoid the "super macho" teacher who pushes students too hard and spends class time telling how he kills sharks with his bare hands. The best way to find a good instructor is to talk with several *active,* confident divers who were happy with their instructors.

How much time and money is involved in learning to dive?

All beginning diving courses vary as to cost and number of classes. However, there are three standard areas of training: classroom, pool (or sheltered water area), and open water. A typical course meets for a series of five to ten lessons and at least four qualifying dives. Course costs can range from $60 to $200 depending on the number of students and the equipment provided. If extended dive trips are included in the cost, the price will be higher.

What does it mean to be "certified"?

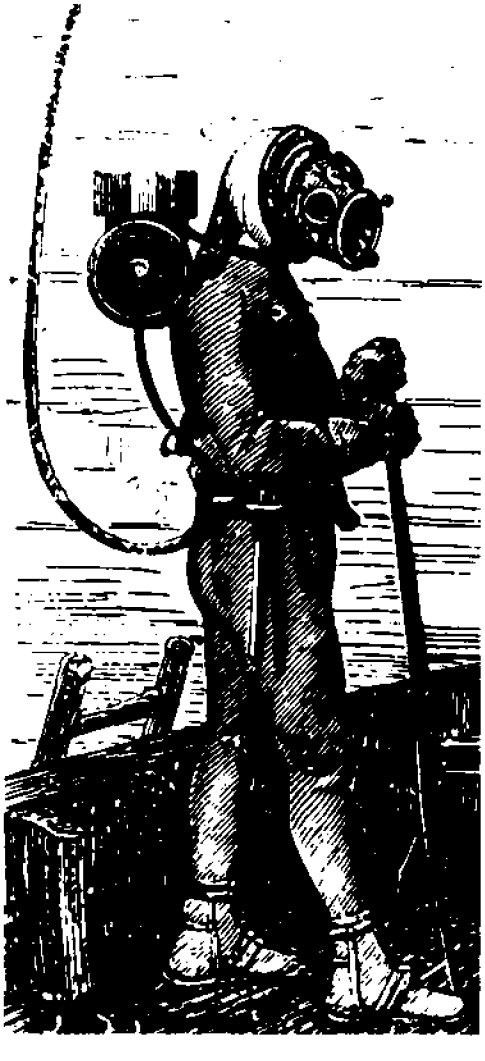
To be certified means you have successfully completed the minimum requirements set by a nationally recognized organization. It also means

that you are ready to be introduced to the underwater world by an experienced instructor. You will need to show your certification card to buy or rent gear, to get air for scuba tanks, and to dive at some locations.

Repetition is the key to successful diving. Even upon successful completion of a diving course, beginners should not try cave, ice, or wreck diving unless with an experienced instructor.

What About Equipment?

Exactly what equipment is involved in scuba diving?



The following equipment list includes the basic type of gear required for safe scuba diving.

Mask—maintains air space in front of diver's eyes. Basic features include a noncorrosive band, tempered glass, equalizer (covers nose to permit exhalation into mask for pressure equalization during descent), and a wide field of view.

Snorkel—allows the diver to breathe at the surface without lifting his head out of the water. The snorkel also conserves scuba air at the surface. Check the snorkel for ease in breathing, and avoid long, skinny tubes that may hinder breathing.

Fins—allow more efficient propulsion through the water. The two types of fins are the full foot and open heel. Avoid large, stiff blades, as more strength is needed to use these.

Buoyancy control device (BCD)—a mandatory inflatable bladder which can be inflated (either orally or mechanically) with air to increase buoyancy. The BCD provides surface support when resting or swimming and is used to assist or maintain neutral buoyancy under water. The basic features include a large inflation/deflation hose, pressure release valve (prevents ruptures), and easy-to-use controls. The vest should be comfortable (won't "ride up") on the diver.

Scuba tank—a metal container that stores compressed air. An optional feature is a boot to fit on the bottom and protect the tank from nicks and scratches. The tank valve is also essential as it regulates the flow of air to the regulator.

Backpack—holds the tank on the back of the diver and has a quick-release shoulder. It is considered an integral part of the BCD.

Regulator—controls flow of air to diver. The single hose type is required for recreational divers. An essential component is the submersible pressure gauge that monitors air supply.

Weight belt—some people are naturally buoyant and require several pounds of weight so they won't have to constantly struggle to stay under water. A wet suit will always require the use of weights to offset the buoyancy of the suit.

Wet suit—prevents loss of body heat and provides protection from minor injuries (i.e., scrapes and stings). A wet suit that fits well allows water inside but does not allow the water to circulate, keeping the diver warm inside. For insuring warmth, the most important features of an exposure suit are fit and comfort.

Diving knife—a general-purpose tool that should not be used as a weapon. The knife can be used for cutting, prying, digging, pounding, and measuring. The knife should be sharp on one side and serrated on the other. A knife sheath to hold the knife to the leg is also necessary.

Gear bag—important for transporting diving equipment. The bag should be large enough to hold all gear except the tank and weight belt. Pack the gear in the reverse order of need (fins at bottom, wet suit at top).

Watch—used to keep accurate track of the time spent under water.

Depth gauge—keeps track of depth so diver will know how much time he can stay under.

Compass—lets diver know direction in which dive was started in relation to where the dive will end. Especially important in turbid, muddy water where visual reference is difficult.

Immediately after purchase mark all gear. This is to avoid confusion and also helps to identify you when under water.

Why aren't scuba tanks filled with pure oxygen?

Scuba tanks are filled with compressed air only—which contains only 20% oxygen. Pure oxygen under pressure is toxic and can lead to serious disorders. Compressed air is essentially a mixture of nitrogen and oxygen.

Do I need to buy my own scuba equipment, and how much will it cost?

A full set of new equipment ranges in price from $600 to $1200. It is recommended that you have your own basic equipment (mask, fins, snorkel). Textbook, log book, and dive tables are also needed for instruction and are often included in the registration fee. Most other equipment (e.g., tank, gauges) is usually included in the lesson cost. Often the equipment can be paid for on time to help defray the costs.

Avoid buying unnecessary equipment when first learning to dive. A good instructor will not try to convince you to buy optional equipment. Rental equipment is available at most dive shops by the weekend for about $50. Beware of buying used equipment, unless it has been checked and approved by an expert.

While Under Water

How will I be able to communicate with my fellow divers?

Voice communication beneath the water is nearly impossible without the aid of sophisticated communication systems. When the attention of another diver is wanted, several universal underwater hand signals are used to convey common messages.

An underwater slate is also available for more complicated messages.

There are also national standard hand signals used to communicate when on the surface of the water. A whistle should be carried for emergency surface signaling.

How will my vision be affected under water?

With the use of a mask everything under water should be clearly in focus. Objects under water are magnified approximately 25% making them appear larger and closer.

As you descend under the water the light becomes dimmer. Color is absorbed under water with reds and yellows disappearing first and blue lasting the longest. With the use of an underwater light these colors can be seen.

What if I wear glasses?

Since eyeglasses can't be worn under your face mask, you can have your particular lenses fitted by an optician in special frames or laminated on your face plate. You may also buy or order a mask with positive or negative correcting lenses already ground in. It is recommended that contacts not be worn because of possible eye discomfort and the risk of losing them if your mask is flooded.

How is body movement affected under water?

Resistance to body movement is much greater in water than on land. Slow, deliberate movements should be made under water rather than fast, jerky motions. Making yourself horizontal when swimming under water will help you to move faster.

Will it be cold under water?

When diving for extended periods in water below 78°F, it is recommended that a diver wear some type of environmental protection suit—usually a wet suit. A wet suit traps water

between the suit and the diver's skin, warming the skin and maintaining body temperature.

How deep will I be diving?

As a beginner, you will stay in the shallower ranges to 60 feet. After gaining experience, you may want to explore deeper areas. However, there are limits to the depths that you should dive, and deep diving adds unnecessary risks to sport diving. Much colorful underwater scenery exists in the first 30 feet of water.

What will I be able to do under water?

Once you have learned the basics of diving, a number of opportunities are available, including collecting shells, exploring and sightseeing, treasure hunting, underwater photography, spearfishing, and collecting lobsters and crabs.

What About Safety?

What is the "buddy system" and how important is it?

A major factor in diving safety is the importance of having a diving partner, called a buddy. The buddy can provide help when suiting up, checking equipment, or helping a partner in trouble.

Each person is responsible for his diving partner. For the buddy system to work properly, a diver and his partner must discuss the dive plans beforehand, decide who will be the leader, and have their signals worked out in advance.

Always use the buddy system. Avoid being the odd-number buddy, and dive only in pairs.

What things should I consider before beginning a dive?

First, observe the conditions. Note wind, sea, current, tide, boat activity, piers, structures, and weather conditions. Don't dive if conditions are unfavorable.

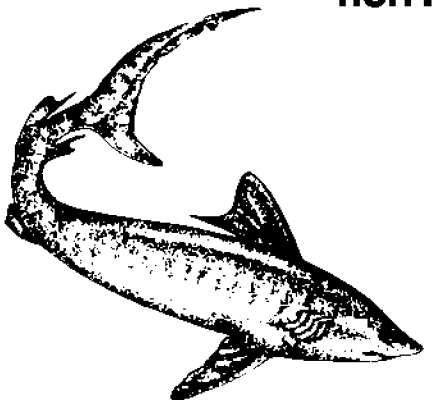
Next, plan your dive in detail with your buddy and other members of the group. Discuss all signals and plans, and check all equipment. To avoid underwater problems, decide in advance who is the dive leader.

Display the diving flag (red, rectangular pennant with a white diagonal stripe) when going underwater.

What, specifically, should I be careful of when diving?

The biggest threat to a diver is himself. Inexperience with underwater situations can lead to panic, the major cause of diving accidents. This can be avoided by proper instruction and careful dive planning.

What about sharks and other dangerous fish?



Movies like "Jaws" and "The Deep" have misled the public about these normally harmless creatures. In the water a diver is just another big fish to a shark. So long as the diver does not start thrashing around and drawing attention to himself, the shark and other fish will normally just swim on by.

The most common injuries occurring from underwater plant and animal life are puncture wounds from sea urchins, fish spines, and rays; stings from jellyfish and corals; and cuts and scrapes from rocks, barnacles, and crabs.

A good rule to remember is, "If you don't know what something is, don't touch it, and keep your hands out of cracks and crevices."

What are the bends and how can they be avoided?

The bends occur whenever someone who is breathing compressed air under water rises to the surface without allowing enough time for excess nitrogen to escape from his body.

The nitrogen comes from the compressed air the diver breathes. The longer the diver remains under water, the more time the body has to absorb nitrogen. Also, the deeper the diver goes, the greater the absorption rate of nitrogen into the body.

The bends cause an intense pain or dull ache, usually around the body's joints. Other effects of the bends are nausea, dizziness, disorientation, and unconsciousness.

A very tiny nitrogen bubble, which would have been purged from a diver's bloodstream by decompression stops, can form in the spinal cord and paralyze a diver.

To get rid of excess nitrogen, the diver must stop at predetermined depths for a specific amount of time during the ascent. The stops will provide an adequate amount of decompression time. The number of stops the diver should take is calculated by a diving table.

Getting the bends can be avoided by properly following the diving table and decompressing times.

What are air embolisms?

When a diver surfaces too quickly the compressed air can tear the small air sacs in the lungs. This allows air bubbles into the blood, which in the worst case can cause a stroke-like condition.

Air embolisms can occur in water as shallow as four feet. They can even be caused by burping while diving. To avoid embolisms, always exhale, don't panic, and don't extend your capability while underwater.

Divers with air embolisms should be given oxygen as soon as possible. Divers should also drink plenty of fluids to overcome "sticky" blood. Keeping a diver's head lower than his feet helps to prevent air bubbles from collecting in the head.

Are there other decompression sicknesses?

Sea Grant researchers in Wisconsin found an unexpectedly high number of spinal cord injuries, called "hits," in sport divers who made deep dives of short duration.

Hits are blockages of blood serving the central nervous system. The researchers also found that some post-dive deaths blamed on heart attacks may actually have been the result of "chokes," a decompression sickness that clogs blood vessels to the lungs with frothy bubbles.

All forms of decompression sickness occur when divers who have been breathing pressurized air under water surface too quickly.

The researchers concluded that decompression sickness may result from repeated, deep dives or from traveling to a higher altitude shortly after diving.

Finally, scuba divers who habitually practice inadequate decompression techniques run the risk of contracting bone necrosis or " bone rot"—even if they experience no pain or other decompression sickness symptoms.

Bone necrosis is the death of bone tissue caused by gas bubbles forming within the bone capillaries. The bubbles obstruct blood flow and

stop the oxygen supply to bone tissue. The condition can progress undetected for several years, or rapidly cause pain and limitation of movement in the affected areas.

The key to preventing all illnesses and effects from decompression sickness is to faithfully follow the decompression tables. All accidents and sickness can be avoided with proper diving practices.

Do alcohol and smoking affect divers?

Never consume alcohol or narcotics before diving. Drugs affect the body differently under water where pressure is increased. A diver's judgment may be dulled and he may be more prone to decompression sickness and other physical problems. Also avoid the use of alcohol the day before a dive because of alcohol's residual effects.

Smoking damages the heart and lungs—the organs that are stressed most by diving. The diver who smokes is therefore leaving himself prone to increased risks. One study revealed that smokers had up to two times greater resistance to breathing than nonsmokers. Divers who smoke should refrain from smoking for at least one hour before a dive, as some of the acute effects of smoking disappear within that time. (The longer a diver abstains from smoking before a dive, the better off he is.)

A cold is especially serious for a smoking diver because it leads to obstruction of small airways and the possiblity of further air trapping. (This may induce lung rupture when the diver is ascending.)

Smoking divers should use a conservative approach to the dive tables and a slower than standard ascent.

Is it safe to scuba dive during pregnancy?

This question is being asked more frequently with the increased number of certified women divers (about 30% of all divers).

Every woman diver who may become pregnant needs to know what the risks are. Good physical condition prior to the pregnancy is important, as divers often undertake strenuous exercise in entering the water and in their activity under water.

The main concern doctors have about a pregnant woman's diving is that bubbles can form in the circulatory tracts of both the mother and fetus. It does not necessarily follow that if you come up safely, the baby will too. Just as there is a transmission of drugs during pregnancy from the mother to the fetus, there is also the transmission of gases. As you descend, pressures of the gases you breathe increase, and the concentration of oxygen and nitrogen in the blood increases so that when you ascend, bubbles can form. The risk of this happening appears to be less in women who dive in shallower depths.

However, the latest Sea Grant-sponsored research at the University of Michigan Medical School recommends *no diving* for pregnant women.

Are there any emergency response courses recommended for divers?

All divers should be trained in first aid and cardiopulmonary resuscitation (CPR).

Where Can I Dive?

What opportunities are available to divers off the Louisiana coast?

Louisiana's coastal waters present different and exciting opportunities for the diver. Underneath the oil rigs, fish and other marine life flourish, providing the perfect environment for both the spearfisher and the underwater photographer.

There are certain hazards when diving in saltwater, and divers should pay careful attention to waves, surf, tides, currents, depth, coral, boats, marine life, and the remoteness of the area. To avoid problems, make sure you know the area before diving, and go with an instructor or someone with much experience in diving off the coast.

What about freshwater diving?

Louisiana's lakes and rivers can provide great diving opportunities. Problems to consider in the freshwater environment include currents, bottom composition, limited visibility, entanglements, fishermen, and boats.

In 1985, the Louisiana Wildlife and Fisheries Commission authorized a spearfishing season for Toledo Bend. The season is set for about a four-month period each year, allowing scuba divers to take certain game fish (black bass, crappie, and bream) along with catfish and other nongame species. Rules and regulations governing the scuba season at Toledo Bend are available through the Wildlife and Fisheries Department's Fish Division.