



Chapter 1

Introduction: Ice Diving— An Operation

Some divers ice dive for fun; others do it as a job. Those who ice dive professionally may do so as ice diving instructors, scientific divers, or public safety divers. This book is for the sport diver, dive instructor, non-polar scientific diver, military diver, and public safety diver.¹ Although these diver communities perform very different kinds of ice dives, and therefore have different needs, every community needs safe diving practices.

Unfortunately, many of the standards, practices, and guidelines used today are relatively arbitrary. Except for military divers and for the polar diving scientists who meet in polar diving AAUS (American Academy of Underwater Scientists) conferences to discuss standards, the other ice diving communities use standards presented by their certification agency or their particular public safety department. These standards are typically created by one or two sport diving instructors who are ice divers, or by a public safety diver who learned how to ice dive from a sport instructor. These standards are generally not tested and are not discussed in conferences with panels of experts. Especially for public safety divers, these standards often do not meet the needs of the job.

In 1986, the Ontario Underwater Council stated, “Perhaps the only definite statement that can be made at this time is to recognize the need for a study of ice diving procedures by the various training agencies; with the intention of developing agreed upon procedures that will

only add to the safety of divers participating in ice diving.”² It is now 2002, and after many needless ice diving deaths, we are not much closer to achieving this goal.

One of the primary missions of this book is to demonstrate the need for tested and proven safety, life saving, and training standards and practices that are universally accepted. Standard operating procedures and guidelines that can readily be implemented in public safety sport diving and training programs are also provided.

Although ice diving is technical diving, it is not the recreational technical diving associated with mixed gas and untethered deep diving. Rather, it is technical because it requires advanced specialized training, formal procedures, special equipment, and well-trained surface support. Public safety ice diving operations require even more highly advanced training and equipment.



Photo 1-1 Ice diving operations require specialized equipment, procedures, and highly trained surface support.

In certain parts of the world, for four months a year or more, divers descend below the ice roof. Ice diving is without a doubt severe overhead diving. Due to there being usually only one way in and one way out, ice diving is also confined-space diving. Divers in 10ft (3m) of water cannot push through a 1¹/₂in to 2in (4cm to 5cm) piece of ice. They cannot dig their way out, and at depth, the darkness can be euphoric and incredibly disorienting.

Ice diving is highly equipment- and personnel-dependent, and has environmental difficulties that supersede almost every other type of diving. The simplest elements can become major difficulties. Ice itself changes in density and character as continuously and as much as the weather. Unexpected temperature changes are frequent under the ice, as is cold stress for both divers and tenders. Cold hands can prevent divers from performing the most basic tasks. Cold stress can cause irrational thinking, the inability to make decisions, and an incapacity for self-rescue. Cold stress can be compounded by cold and abnormal functioning of equipment and unexpected weak ice. Without sufficient contingency planning, training, and continued practice, such variables can rapidly intensify the severity of small problems and create an escalating chain of events that can lead to injury or death.

When performed correctly, recreational ice diving enables year-round diving and offers new experiences within a unique dimension full of exciting underwater dynamics. Ice diving is exhilarating, akin to how fresh powder is for advanced snow skiers. Ice divers can explore a familiar summer diving site and experience it in a new way. Diving beneath ice brings a new beauty to the underwater world, while fostering improved personal diving skills and knowledge. In the realm of public safety diving, ice diving operations may offer better chances of victim survival due to both cold water and the ability, in most cases, to know exactly where the victim entered the water.

There are three major differences between recreational ice diving and ice diving that is performed during a rescue mission:

- Recreational divers pick their dive days and sites, whereas in public safety diving, the situation picks the site and time. Recreational divers have time to set up a site that may include shelters, warm-water buckets, and other support tools. Public safety divers responding in a rescue mode do not have access to these advantages. Furthermore, public safety diving is not restricted to 6 in (15 cm) or more of ice as recreational diving is. Public safety divers typically work on ice that is too thin to support a single standing individual, let alone a group of people with gear.
- In recreational ice diving, two divers are normally in the water at any given time, diving as a buddy-team, whereas the public safety diver is most often diving alone. Solo ice diving is safer and easier to conduct. Hence recreational divers have to learn the skills necessary for ice diving with buddies.
- The mission for recreational divers is simply to have fun, while public safety divers are there to search for a drowning victim or to find evidence.



Photo 1-2 Public safety dive teams do not choose dive times or locations.

In the world of public safety diving, there is no “safe” ice. If ice was safe, chances are that public safety divers would never need to be called. If a child fell through the ice, responding personnel will not be able to walk, stand, kneel, or sometimes even crawl on

the ice. Rescuers often start falling through the ice long before reaching the victim's point of entry. Lacking sufficient training and equipment, the average ice diving operation begins to fall apart before it even gets started.



Photo 1-3 Dive team members learning how to work in unsupportive ice. Tenders and contingency divers stationed in the water.

Often, drills and training do not prepare public safety divers for the realities of thin ice. Consider the majority of ice training dives you may have observed or in which you may have participated. Divers and tenders probably walked out to a pre-cut hole, and tenders stood on the ice to tend. A bucket of warm water was almost certainly at hand to manage free-flow problems. By comparison, in actual ice dive calls divers and tenders often push themselves to severe states of exhaustion just

trying to reach the victim's hole, because the ice is too thin to support them. Frequently, when the team finally reaches the victim's location, the ice is so broken that they are unable to identify the original hole. In addition, tenders and divers, now in the water, are forced to work on self-survival. The *American Heat* video shows such an ice diving incident. It seriously risked the lives of fire personnel because they were not properly trained to work on thin, non-supportive ice.³ Training should prepare students for the types of situations they may actually face, including the worst ice conditions, too many or too few responding personnel, storms, equipment freeze-ups, nighttime conditions, and more.

Public safety divers will sometimes respond to winter and ice emergencies without proper preparation or equipment. When a team is in the rescue mode, they are more likely to violate safety standards. Although the benefits of quick response may be higher during an ice situation than during warm weather, the risks are nevertheless far greater.

Public safety divers are not alone in being unprepared. It is not uncommon for sport ice diving classes to give students ice diving certification cards without having taught them how to cut holes safely (or at all) or how to tend. Often, students do not understand that a true redundant air source, such as a pony bottle, is mandatory. Furthermore, some divers are not taught how to manage an accidental disconnect or entanglement hazard, how to transport an injured diver to shore, or how to manage other ice-related problems.

In rescue modes, public safety divers must be capable of rapid deployment professional motion that includes the following procedures:

- Dressing in less than three minutes
- Rapidly securing the scene
- Setting up an incident command system
- Performing a risk/benefit analysis
- Creating a plan of action
- Rapidly and safely executing the plan
- Rapidly and gently transporting the victim from the bottom to the shore
- Preparing proper incident documentation
- Cleaning up and maintaining equipment
- Debriefing personnel

Recovery teams should be capable of moving like rescue teams. Even strict recovery-only teams will respond in a rescue mode when the chief's little girl falls through the ice a few blocks from where the team is conducting a drill. Recovery teams need to be capable of professional rapid deployment motion to save their own team members. It is crucial to have strict and stringent safety standards during rescue modes, because that is when noreadrenaline levels are high, and greater risks are more likely to be taken for a perceived greater potential benefit. Recovery-only teams are at greater risk than rescue-recovery teams in such operations because they are not trained, nor accustomed, to moving rapidly.

With so much controversy and discussion surrounding recreational technical diving, ice diving is often ignored. Divers, diving instructors, and dive teams need to fully understand all the parameters of safe ice diving. Ice diving, and especially public safety ice diving, is extreme technical diving. The results of the lack of proper training are unfortunately demonstrated every year.

Cave diving is another form of overhead diving. An important difference, though, between cave diving and ice diving is that cave divers have strict, universally accepted, tested, and well thought-out standards. Cave divers understand that they need extensive formal training. Before setting fin in a cave, they obtain cavern certification through a series of advanced cave certification classes.

A basic cave diver in Florida will use similar, or identical, procedures and standards as a cave diver in Mexico. This consistency does not exist in ice diving, as one certified ice

diver may use significantly different procedures, equipment, and standards from another ice diver on the same lake. Two ice instructors on that same lake may conduct classes completely differently. One instructor may cut a single round hole prior to the class, exert himself to pull the circle of ice out of the hole and stack it on the ice roof, use octopuses, put divers down on separate lines, and put the lines in the hands of tenders with insufficient training. Another instructor may teach students how to use chainsaws to safely cut three triangular holes with ice screws, straps, and carabiners screwed into each triangle. These triangles are pushed under the ice roof where highly trained tenders will be standing. The latter instructor may also teach the divers and dive students to equip themselves with pony bottles, harnesses, and multiple cutting tools. The divers may also be tethered on a yoked line with harnesses.

When cave deaths have occurred, they have almost always befallen divers who entered caves without cave certification. A certified and experienced cave diver might die in a natural disaster, such as a cave collapse, but the death will not be attributable to poor safety standards or training. Trained cave divers and instructors are rarely found in cave fatality statistics. Moreover, in many ways cave diving has fewer risks than ice diving. Cave diving does not have dangerous free-flow problems that can empty a diver's tanks in seconds; cave divers do not experience the same risks of cold stress and hypothermia; and cave diving does not rely on surface support to the same degree as ice diving.

Sadly, the majority of divers who die under the ice had previous ice training, or, much worse, were in the process of being trained by a certified ice instructor. There are too many headlines reporting "Instructor and Student Die under the Ice." The low standards of ice diving training and diver education that allow those deaths to occur is completely unacceptable!

Does ice diving belong in the advanced technical realm? Yes. Can ice diving be dangerous? Yes. Should any of these deaths have happened? No. In every case, the death was clearly a result of improper procedures and equipment.

The following case histories clearly illustrate that insufficient ice diving training, poorly trained surface support personnel, and improper or missing equipment play roles in these deaths. Let us all learn from these tragedies so that the mistakes are not repeated. The cases can serve as excellent topics of discussion during drills and training programs.

After reading the histories, we recommend that you make a list of each error, broken safety standard, and poor procedure that you recognize. After reading the entire book, return to the case histories, compile a new list, and compare it with your first one.

Case Histories

The first four case histories were selected for review because one or more Lifeguard Systems, Inc. (LGS) instructors participated in the recovery. Consequently, in these cases, we did not rely exclusively on newspaper information or hearsay. No LGS instructors were present at the recovery scenes of the remaining cases, and information was obtained from television, newspaper, and witness reports.

Two divers vanish under the frozen waters of Lake Kiamesha, New York (1994)

A dive instructor and advanced student entered the water through an onshore opening approximately 20ft × 25ft (6m × 8m). Three hundred feet (91m) to the left was openwater, approximately 250ft × 100ft wide (76m × 30m). Four hundred feet (122m) directly out was 5in (13cm) of solid black ice, which from the shore looked like openwater. To the right was approximately 1,000ft × 400ft (305m × 122m) of white ice.

The buddy-pair descended to look for a valve stem with an attached buoy. The divers had a buddy-line approximately 20ft (6m) in length, 68ft³ (2m³) tanks, drysuits, and a compass course. There were no alternate air sources, no line to shore, no backup divers, no emergency protocol, no emergency observers to call for help, and no surface personnel of any kind.

The job was seemingly simple: swim the buddy-line until they caught the buoy, then close the valve stem and follow the reciprocal compass course back to shore.

Approximately two hours after their descent, near closing time for the factory that owned the valve stem, someone realized the divers had never returned. A call for help was made. The bodies were retrieved approximately 400ft (122m) offshore and 70ft (21m) to the left. Their knives and masks were missing, and it appeared they had attempted to dig their way through the impossible black ice. The day of the dive was the student's eighteenth birthday.

The recovery effort further demonstrates the need for ice diving standards. When we arrived, most of our time, along with the state police's, was spent trying to keep a multitude of volunteer dive teams from going in, especially after the white ice became somewhat broken up. These teams were going to submerge without lines, harnesses, pony bottles, drysuits, or even a plan. Several of the teams were ice certified. They were little more prepared than the uncertified teams, who saw nothing wrong with going in without ice certification.

This disaster had only one positive outcome, which resulted when restraint prevented others from dying as well. Some typical comments of the day included: "The ice is broken

up, why can't we just come up under it?" "We're not stupid. We're not going to come up under the black ice, and if we do, we will just turn right or left to come out."

Two seasoned divers drown in the Oneida River, New York (1994)

A dive instructor and his student attempted to perform a dive in an area of open water with an overhead ice roof a short distance away. They were not tethered, had no buddy-line, no harnesses, no tender, no pony bottles, and no designated area for diving. They had planned to stay in the open water area. They descended for a short period and gently went up under the ice cap to have a look. One or both of the divers caused a disturbance and an instantaneous blackout occurred. Miraculously, the student found his way out from under the ice roof. A divemaster onshore proceeded to descend and search for his instructor and friend. Both the instructor and divemaster died.

The bodies of the divemaster and instructor were removed from under the ice roof. One of the divers was only 10ft (3m) from the open edge of an ice roof and freedom to surface. Incidents like these make us all the more passionate about teaching instructors how to teach and conduct ice diving safely and knowledgeably. Ice divers should survive because of proper procedures, not because of luck.

Our plan is not to die when we perform an ice diving operation. Our plan is not to go under the ice with the attitude of "we're just going to take a look" or "I know this bottom like I know the back of my hand." If you have ever thought that, try putting your hand in your pocket and describe *exactly* what it looks like. Disorganization, lack of planning, lack of air, and sudden panic can create instantaneous chaos. Compound these with the thought that "I must save my friend, my instructor," and another multiple death is only seconds away.

Instructor and divemaster drown under the ice, Pennsylvania (1993)

This next case illustrates not only the lack of safe standards for ice diving and ice diving instruction, but also the critical importance of ice dive tender certification. The instructor and divemaster planned an ice dive and brought along an observer in case something went wrong. A member of the local public safety dive team told us, "These divers were extremely experienced and dove this spot many times." They tied their tether line to the bumper of their vehicle near shore and entered the ice. They had a line, they were tethered, but there was no tender or backup diver, and there was no concept of the maximum amount of line that should be used. They did not have pony bottles, and had no emergency plan. Since the observer left the scene for some unknown reason, there was not even someone to go for help. The water was relatively deep for ice diving and was black. There were rumors that a tender had been present. He perhaps became chilled and tied the tether line to the bumper and left the scene to get warm.

The bumper severed the line. The divers were found several days later, out of air and entangled from end to end in their very long tether line. The recovery dive was so technically difficult and dangerous due to the area, depth, and possible size of the search zone that rescue divers decided to wait a few days, until the ice was gone, before recovering the bodies. The press had a heyday with that delay. We were very pleased that the public safety divers agreed with our advice that public safety divers should never be put at risk unnecessarily for rescues or recoveries.

Ice deaths in Canada

Diver drowns under ice in Canada. At Christmas, two sport scuba divers entered the ice-covered lake—only one went home. From Christmas Day 1986 until New Year's Day 1987, the local fire department dive team and the local RCMP (Royal Canadian Mounted Police) dive team attempted to locate the missing scuba diver. Though numerous holes had been cut throughout the surface of the entire lake and many dives were conducted, both teams were unsuccessful in locating the missing diver. Attempts were made using volunteers walking the surface of the solid lake, in hopes of spotting something through the thick ice. A helicopter search of the lake also produced no results.

Eventually, on New Year's Day, the aid of Canadian Navy clearance divers was requested. Upon arriving at the lake, the Navy divers summoned the surviving diver. The diver admitted that he and his partner had not intended to actually dive under the ice. They had entered where the water was flowing out of the lake and was thus still ice-free. No lines were used, and there were no support personnel onshore. Probably no one knew that they were trapped under the ice. Somehow, the two divers found themselves “lost” under the overhead environment of a frozen lake! For some reason, when they arrived at the shoreline under the ice with no apparent way out, they separated. One diver went to the left; the other went to the right—a better guess. The latter diver was now being interviewed. Apparently, by going left, the other diver proceeded along the shoreline moving farther away from the unfrozen water.

After the interview, a dive location was chosen by the divers who had the necessary training. A full dive team was assembled, complete with all necessary safety equipment and surface support. One triangular-shaped hole was cut and the dive station manned. Only meters from the hole, the second recovery diver found the missing scuba diver. The victim was located wedged against the shoreline and the ice roof with mask off, second-stage regulator out, air still in the single cylinder, and knife missing.

Lake Simcoe: one diver drowns while making a video on ice diving procedures. A diver died after an ice dive in Lake Simcoe, Ontario in 1988. According to the Ontario Underwater Council, “This fatality marked the fourth consecutive year that ‘ice diving’ had contributed to fatalities in our province and the findings of the Coroner’s Jury again seemed to re-emphasize the lack of consistent standards between the training agencies towards

preparing divers for this activity.”⁴ Keep in mind that each year Canada has on average zero to five diving deaths, a high percentage of them due to ice diving. In addition, when one considers how few divers ice dive, the chances of dying under the ice are astronomically higher than dying during other dives.

Six divers met on Lake Simcoe for an ice dive. Three of them were experienced cave and ice divers. The other three divers were there only to make an educational video about ice diving procedures. Five of the divers were certified diving instructors. The victim was a certified divemaster.

They cut a hole large enough for one diver. One diver took a cave-diving reel with 1/8 inch (3mm) nylon line and attached it to a 50lb (23kg) crowbar that he wedged into the bottom just below the hole. The other two divers followed along by holding onto the line. According to one account, “After ten minutes into the dive, and with about 150ft (46m) of line out, the first diver turned around to check on the second diver; but he came face to face with the third diver instead.” The two divers returned to the crowbar and found the second diver 10ft to 15ft (3m to 4.5m) from the hole, up against the ice roof hanging face down with his regulator out.

He was pulled out of the hole and onto the ice. The other three divers and a nurse stripped his gear off and began CPR. Emergency medical personnel were told he had had a diving accident, but because he had a bruise on his head, he was sent to a hospital that specialized in head injuries. Hours later he was transported to a hyperbaric center. Police investigation showed that his tank was empty, and his primary regulator was full of ice and contained vomit. After five months in a coma, he was removed from life support and allowed to die.

Unlike the other two divers, the deceased had worn only a single cylinder, no pony bottle, and had an octopus. No buddy-checks were done prior to the dive. Air pressure and other information were not recorded prior to the dive. “Likely the buddy checks were missed because everyone participating was qualified at leadership level. It is easy to fall into the trap of believing that one is above the ‘law’ as it were.”⁵ Sadly, ice diving is even less forgiving when the “laws” are broken than almost any other kind of diving.

As you read the case descriptions, you may be saying to yourself, “How could they have done that?” Keep in mind that the red flags are being highlighted here, but were not so obvious when viewed along with everything else that occurred during the day.

Two divers drown in Trout Lake, Canada, during training. Four divers met to conduct an ice dive as part of an advanced diver course. One diver wore a harness with a tether line. The second diver held a buddy-line with the first diver. No pony bottles were used. Two to three minutes into the dive, the line went slack and the tender pulled the line in. No divers were attached. A third diver entered the water with a longer rope and swam a circle, but was unable to locate the divers. Upon his surfacing, a call for help was made. The divers were found after two days of searching. Both divers’ tanks were found empty.

“The Inquest found a lack of consistency, regarding standards for ice diving, between certifying scuba agencies.”⁶ The possibility has been suggested that the divers purposely disconnected because they thought they knew the underwater area well and wanted to go beyond the length of the tether line.

Instructor and student have life-threatening near miss under the ice. Television exploited the “heroics” of a team of ice divers who categorically did just about everything wrong. An ice diving instructor took his student on an ice training dive. The student was tethered, while the untethered instructor planned on diving free near the student. No pony bottles were used. The backup diver was not dressed; his gear was left lying on the ice. The tender did not know anything about tending. The tender was not told a maximum line length to let the divers out, and the line was not marked for distance. The only underwater contingency plan they seemed to have had was that the instructor was going to rely on an untested plan, that buddy-breathing was a feasible skill, and that a first-stage free-flow would not ensue. The untethered instructor probably never even considered what he would do if the student ended up on the bottom, causing a blackout or a whole host of other problems.

The instructor ran out of air. Octopus breathing with the student did not work, so the instructor grabbed the student’s primary mouthpiece out of his mouth and put it in his own. The air-starved student pulled himself back on the line causing the tender to give additional line. The more the student pulled, trying to get back to the hole before he drowned, the more line the tender gave.

Meanwhile, the now unconscious instructor became caught in the line and was brought back to the point-of-entry by sheer luck. The hole was too small for a rescue since a rescue had never been planned. The radio topside did not work.

The only thing that went right, most likely by accident, was that the dive instructor’s wife, who had medical training, performed basic life support that saved the instructor’s life. They still believe they did almost everything right and this incident was just something that could not have been helped. We believe the media often promotes the reoccurrence of such situations by confusing ignorance and heroism.



Photo 1-4 Well-trained tenders, proper tethering, and the right equipment are keys to a safe operation.

In summary, the above fatalities occurred because of a lack of safe, hard-tethering, lack of true alternate air sources, poorly trained or no surface support, and the absence of effective, practiced contingency plans.

Definitions

Overhead environment

Overhead environment applies to any dive in which there is no direct access to the surface due to overhead obstructions along the route between the points of entry and exit. The entry and exit points are the same—the ice hole through which the diver's tether line extends. Overhead obstructions or roofs found in ice, caves, caverns, or wrecks, as well as any obstruction that prevents divers from being able to go directly to the surface qualify as overhead environments. Confined space is defined as an area that has only one way in and one way out.

Advanced diving

An advanced dive is any dive that requires greater than basic dive skills, preparation, planning, and equipment. All advanced diving requires a strong foundation of basic diving skills, including:

- mask clearing
- buoyancy control
- emergency regulator retrieval
- air consumption planning
- contingency planning
- self-rescue skills
- basic gear checks

Divers should not attempt advanced dives without having at least fifteen fully successful basic dives under their belts and without having the necessary training for the particular advanced dives they are attempting.

Tethered diving

Any dive requiring divers to be attached by a line back to shore is a tethered dive. Tethering in ice diving refers to a line that is securely attached to a diver's harness that extends to a trained tender and then back to an ice screw or other non-moving object and often all the way back to shore. Tenders are also often tethered to the ice screw to prevent accidental immersion/submersion under the ice roof. In sport diving, divers are typically tethered on a yoked line, or line that splits at the end into a "Y".

Technical diving

Technical diving requires special planning, training, and equipment. Depths beyond normal recreational diving, penetration, zero visibility, overhead environments, or other concerns such as moving water, rough seas, and ice are conditions requiring technical diving. Special equipment needs may include:

- ropes or lines
- harnesses
- signals or underwater communication tools
- mixed gases
- redundant air sources

Certified shore personnel are often necessary.

There are two primary types of technical diving—recreational and professional. Public safety diving and commercial diving fall under the professional technical diving umbrella. Technical diving is not done for fun. Professional technical diving may have federal standards regulated by the Occupational Safety and Health Administration (OSHA) and national guidelines such as those found under the National Fire Protection Agency (NFPA) Technical Rescue Standards Document 1670.

If you are a public safety diver, it is recommended that you read *Public Safety Diving*⁷ prior to reading this book. *Public Safety Diving* is also recommended for ice instructors and serious ice divers. If you are an ice instructor or a public safety diver, it is also recommended that you read *Surface Ice Rescue*⁸. Ice diving instructors must be capable of taking care of everyone, both topside and under the ice. Because someone can accidentally fall through the ice during training, surface ice rescue skills are necessary when teaching ice diving.

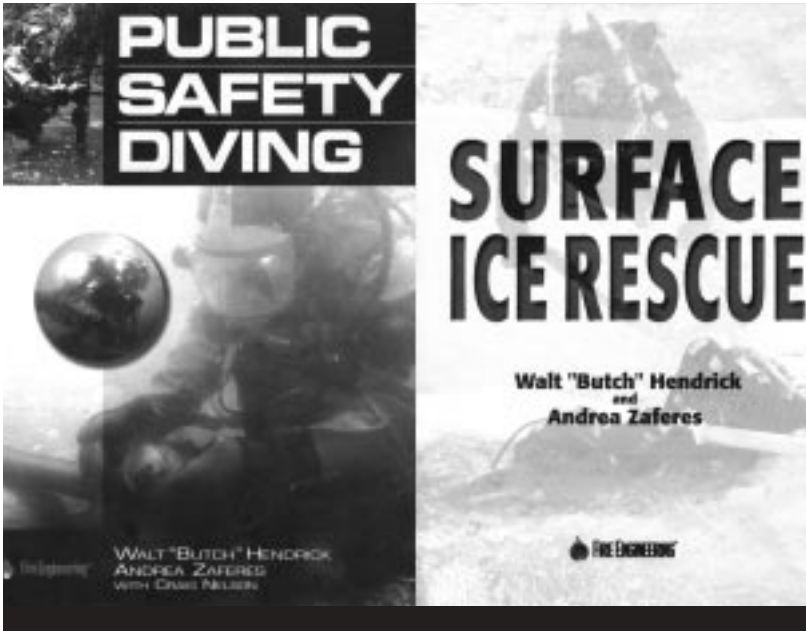


Photo 1-5 Public safety personnel and ice instructors should first read *Public Safety Diving*. *Surface Ice Rescue* is recommended complementary reading.

Summary Questions

1. List three major differences between recreational and public safety ice diving.
2. If a public safety team is called to save a drowning victim, the ice is probably _____ since it did not support the victim.
3. List at least eight duties performed during ice diving rescue operations.
4. Ice diving training and operations do not employ universally consistent, proven standards and procedures like those in cave diving. True or False?
5. List four specific, common causes of ice diving fatalities (lack of training or poor procedures are too general).
6. Define overhead environment diving.
7. Define advanced diving.
8. Describe diver tethering in ice diving.

Notes

- ¹ Polar ice dives are often conducted without tethers due to their extremely high visibility. All the diving in this book will be based on tethers. Polar ice divers can gain much valuable information from this book about other ice diving topics.
- ² Ontario Underwater Council, *A 10 Year Summary of Sport Diving Fatalities in Ontario*, (1979-88): 86-5.
- ³ *American Heat*, 1303 Marsh Lane, Carrollton, TX 75006.
- ⁴ Ontario Underwater Council, *A 10 Year Summary of Sport Diving Fatalities in Ontario*, (1979-88): 86-5.
- ⁵ *Ibid.*, 88-4.
- ⁶ *Ibid.*, 86-4.
- ⁷ Hendrick and Zaferes (PennWell Publishing, 2000)
- ⁸ Hendrick and Zaferes (PennWell Publishing, 1999)