

Considerations for Winter Diving in New England

Wintertime diving can be some of the best of the year in New England – visibility is at its best, and there's far less boat traffic making sites that are inaccessible during the summer months great wintertime dive spots. However, both the air and water temperatures are considerably colder and this requires careful consideration before making any dive. It's important to ask yourself, "Am I really prepared for wintertime diving?" If you're not, you can find yourself in serious trouble.

Water temperatures begin to decline sharply in early December. The thermocline – a temperature gradient separating warmer surface temperatures from cool mid-water and bottom temperatures – nearly disappears. The water is cold from the surface to the bottom, with surface temperatures of around 45-46 degrees and bottom temperatures in the low 40s. As the winter progresses, the temperature continues to drop and by late January into February, surface temperatures will be around 37-38 degrees with bottom temperatures of about 35-36 degrees. It can still get colder than that depending on how many ocean storms come through, but it's a good rule of thumb.

When shore diving, the beaches will essentially be deserted unless you're at a very popular dive site on a nice day. The beaches and rocks may be covered with snow or ice. It is much easier to fall and become injured on slippery surfaces. Once in the water, you're on your own. If you surface far from your point of entry it may require a long surface swim back – and there will be few boats around except for commercial fisherman. On shore, there will be few people around who can assist. Beware of rough surf from left over storms or fast changing weather. And beware of freezing air temperatures before and after the dive, as this can cause equipment malfunctions or frostbite on exposed parts of your skin.

Finally, it's especially important during wintertime not to dive alone from shore and to make sure that you've notified family or friends of your plans and timeframe.

When diving from a boat, make sure there's always someone on board keeping a watch. Never leave a vessel unattended. If you're diving from a commercial dive boat, make sure the boat and crew are appropriately prepared for winter diving. Ask questions like, "Is there a warm dry place to go between/after dives?" and "Is there heat in the cabin?" Also be sure to ask the captain about sea conditions and what the boat will or won't run in – always beware of freezing spray if the air temperatures are very cold and the sea conditions are choppy. Freezing spray can affect the stability of the boat, it can make the deck surfaces very slippery, and it can turn your dive equipment on the deck into an ice ball.

Dive Equipment:

In order to dive from **GAUNTLET** after November 30 through April 1, which is what we consider the "winter" dive season, there are some requirements and considerations for both you and your dive equipment.

Required:

Drysuit – if you haven't used this in a while, ensure it's properly functioning, that all seals are intact and in good order. You must also wear appropriate thermal insulation underneath the suit. Drysuits only keep you warm if properly insulated underneath. A flooded drysuit is a serious problem during the winter season.

Regulators – these must be regulators intended to be used in cold water. We don't require environmentally sealed first stages, but your regulator(s) should be robust for cold water diving, otherwise you run a higher risk of free flows on the surface or underwater.

Suggested:

Pony bottle – We highly suggest a pony bottle set up in the wintertime as you are more likely to experience free flows in cold air or water, even with high performance regulators. Note - a pony bottle is required for single tank configurations on any dive within recreational limits with a hard bottom below 100 ft (e.g. Pug wreck, Reliance) regardless of season.

Extra Hoods and Gloves – if you are planning to do 2 dives we suggest having a second neoprene hood and set of gloves for the second dive. It will be much warmer and more comfortable to put on dry, warm hood and gloves each dive.

Dry Gloves – If you choose to wear dry gloves you should have a complete second set of gloves and liners available in the event of a leak or flood. Dry gloves have absolutely no insulating properties once they become wet.

Personal Preparation

Sea conditions tend to be more unsettled in the wintertime, creating rougher seas. Most often prevailing winds are out of the west-northwest, which results in cold blustery conditions. If you are prone to seasickness, you should take appropriate steps well in advance of the dive. Beginning the evening before the dive, begin taking sea sickness medication. We recommend Bonine or Triptone – both are over the counter medications you can obtain in any pharmacy. Dramamine tends to cause drowsiness and is best avoided when taken before diving. Other treatments are available such as patches, electrical stimulation watches, etc and these work to varying degrees.

Even though you may be diving from a boat and may have the opportunity to get into a warm cabin, the winter ocean environment is still very harsh. Keeping warm before, between and after the dives is critical – and can be hard to do. Unforeseen things may occur – you may have a drysuit flood during the dive or be splashed by water getting your clothing wet. It may even be snowing or raining out. If the boat experiences a mechanical problem that renders the engine or heat generating systems unusable, you could be at sea for several hours in an extremely cold and wet environment. You will need to be prepared for these scenarios, regardless of however rare they might be.

In addition to your long underwear and drysuit undergarment for diving, we require some additional items for your personal protection and comfort.

Required:

- Heavy winter coat
- Wool hat and gloves/mittens
- Heavy weight socks
- Appropriate footwear (e.g. water resistant shoes with a non-skid sole)
- Additional “back up” clothing stored separately – shirt, pants, socks, underwear, hat

Suggested:

- Heavy-weight sweater
- Windbreaker (nylon or water-resistant) pants
- Foul weather gear
- Boat deck boots

You should be well dressed with long underwear (polypropylene or silk) with wool/synthetic material sweaters and pants over it. Layering is essential. Avoid cotton clothing as it is a poor insulator and retains moisture. Additional clothing must be in a dry-bag or water resistant bag. If your extra clothing gets wet, it will be useless. "Seal Line" makes a number of affordable and versatile dry bags that are perfect for extra clothing.

As always, you should be well-rested and well-hydrated for diving.

We reserve the right to refuse to let any passenger board the boat, dive or remain outside on deck if we believe you are at risk to yourself or others. Wintertime diving is great fun but you must be prepared. Even with the best preparation, accidents can happen.

On a boat, each person's actions have a direct effect on everyone else. If you become injured or need immediate medical attention, the captains and crew will need to address and consider many issues – such as, can the boat leave or are there divers still in the water?, are there other boats around and available for assistance?, should the Coast Guard be called?, etc. Because of the complexity in dealing with medical emergencies at sea, we do our best to minimize risk. This is why it is so important to be responsible about your personal safety and preparation for the winter ocean environment.

Probably the greatest risk in wintertime diving is that of hypothermia, with frost-bite perhaps as the second greatest risk. The next several pages discuss the signs and symptoms of hypothermia and frost-bite, and appropriate treatment.

Hypothermia

It is important to recognize the signs and symptoms of Hypothermia so immediate treatment can begin.

RECOGNITION OF SIGNS AND SYMPTOMS

Impending Hypothermia:

Due to physiological, medical, environmental, or other factors the person's core temperature has decreased to 36 degrees Celsius. The person will increase activity in an attempt to warm up. The skin may become pale, numb and waxy. Muscles become tense; shivering may begin but can be overcome by activity. Fatigue and signs of weakness begin to show.

Mild Hypothermia:

The person has now become a victim of hypothermia. The core temperature has dropped to 35 - 34 degrees Celsius. Uncontrolled, intense shivering begins. The victim is still alert and able to help self, however movements become less coordinated and the coldness is creating some pain and discomfort.

Moderate Hypothermia:

The victim's core temperature has now dropped to 33 - 31 degrees Celsius. Shivering slows or stops, muscles begin to stiffen and mental confusion and apathy sets in. Speech becomes slow, vague and slurred, breathing becomes slower and shallow, and drowsiness and strange behavior may occur.

Severe Hypothermia:

Core temperature now below 31 degrees Celsius. Skin is cold, may be bluish- gray in color, eyes may be dilated. Victim is very weak, displays a marked lack of coordination, slurred speech, appears exhausted, may appear to be drunk, denies problem and may resist help. There is a gradual loss of consciousness. There may be little or no apparent breathing, victim may be very rigid, unconscious, and may appear dead.

TREATMENT FOR THE DIFFERENT LEVELS OF HYPOTHERMIA

Impending Hypothermia:

- Seek or build a shelter to get the person out of the cold, windy, wet environment.
- Provide warmth. Provide the person with a hot drink (no alcohol, coffee or tea).
- Halt further heat loss by insulating the person with extra clothes, etc. This person should recover from the present condition quite quickly.

Mild Hypothermia:

- Remove or insulate the patient from the cold environment, keeping the head and neck covered. This prevents further heat loss and allows the body to rewarm itself.

- Provide the patient with a warm, sweetened drink (no alcohol, coffee or tea) and some high energy food. Limited exercise may help to generate some internal heat, but it depletes energy reserves.

Moderate Hypothermia:

- Remove or insulate the patient from the cold environment, keeping the head and neck covered. Apply mild heat (*comfortable to your elbow*) to the head, neck, chest, armpits and groin of the patient.
- Use hot water bottles, wrapped Thermo-Pads, or warm moist towels.
- It is possible that you may have to continue this treatment for some time. Offer sips of warm, sweetened liquids (no alcohol, coffee or tea) if the patient is fully conscious, beginning to re-warm and is able to swallow. Patient should be seen by a physician.

Severe Hypothermia:

- Place patient in a prewarmed sleeping bag with one or two other people. Skin to skin contact in the areas of the chest (ribs) and neck is effective. Exhale warm air near the patient's nose and mouth, or introduce steam into the area.
- Try to keep the patient awake, ignore pleas of "leave me alone, I'm ok". The patient is in serious trouble; keep a close, continuous watch over the patient.
- Apply mild heat, with the aim of stopping temperature drop, not rewarming.
- If patient has lost consciousness be very gentle, as by now the heart is extremely sensitive. Always assume the patient is revivable, do not give up.
- Check for pulse at the carotid artery. If, after *two minutes* you find no pulse check on the other side of the neck for two minutes.
- If there is any breathing or pulse, no matter how faint, do not give CPR but keep very close watch for changes in vital signs.
- If no pulse is found begin CPR immediately, stopping only when the heart begins to beat or the person applying CPR can not carry on any longer without endangering himself.
- Medical help is imperative, hospitalization is needed.

Source: <http://www.sarbc.org/hypo1.html>

Frostbite

What is Frostbite?

Frostbite occurs when the body is so cold that ice crystals form in the space surrounding body cells. Damage to tissue occurs as the cells freeze. The areas mainly affected by frostbite are hands, feet, ears, nose and cheeks. As with burns, frostbite severity is measured in degrees.

First degree frostbite: Temporary tenderness and reddened skin. This probably wouldn't result in permanent damage.

Second degree frostbite: Blisters and some tissue and nerve damage. This can result in permanent hypersensitivity to cold and increase the risk of future frostbite.

Third degree frostbite: Tissue death, requiring skin grafting and amputation.

Symptoms of frostbite

- Tingling and burning are early symptoms and a warning to get out of the cold immediately. If this isn't possible, move around vigorously to increase circulation.
- The next stage is numbness. By this time you probably have frostbite.
- In the third stage skin may appear pale or white and cold to the touch.
- In final stages swelling, bleeding, and blisters may form after the skin thaws.
- A physician should examine all frostbite, regardless of severity, as soon as possible, as prompt treatment increases chances for complete recovery.

How to prevent frostbite

Keep your skin dry. Wet skin freezes more rapidly. Dress in layers of light rather than bulky, heavy clothes. There are three basic stages in layering: an inner, moisture-management layer, an insulating middle layer and a weatherproof outer layer.

First Layer-Moisture Management

- Your next-to-skin layer should be material other than cotton. Silk, wool and synthetic wicking fabrics such as Capilene®, Polartec®, PowerDry® and CoolMax® work to transport perspiration from the skin.

Middle Layer-Insulation

- The insulating layers help you retain heat by trapping air next to your body.
- Fibers such as wool, polyester fleece and down are all excellent insulators. Wool sweaters and shirts offer reliable warmth and insulate when wet, though they are bulkier than their synthetic cousins.

Your Outer Layer-Wind and Water Protection

- The shell layer protects you from wind, rain or snow. Properly designed, it holds in your body heat while allowing water vapor to escape.
- Tightly woven fabrics, waterproof coatings or laminated, technical membranes act as wind and water barriers.

- Waterproof/Breathable-These keep you comfortable in any weather and just about any activity. Fabrics include Gore-Tex®, Marmot's MemBrain(tm) and Mountain Hardwear's Conduit(tm) membrane laminates.
- Waterproof/Non-Breathable-Typically made of a durable, polyurethane-coated nylon, which is water and windproof; these economical shells are ideal for light activity in heavy precipitation.
- Water Resistant/Breathable-These are breathable outer layers from mild weather, light precipitation and high activity level. They're made of tightly woven fabrics (such as mini ripstop nylon) that block the wind and treated with a durable water-resistant outer finish to make water bead and roll off.
- Down-filled garments are warm but useless when wet; synthetics provide better insulation in adverse conditions.
- Wear a hat or at least earmuffs that cover your ears. The body loses the greatest amount of heat through the scalp, and the skin and underlying tissues of the ears are very thin, so ears are especially prone to frostbite. Use a scarf or ski mask to protect your face.
- The moisture management layer applies to your feet as well, so avoid cotton socks. Boots should be high enough to cover your ankles. Avoid boots that are too tight; they decrease circulation.
- Protect your hands with mittens rather than gloves so fingers can warm each other.
- Don't wear earrings outside in the cold. They increase frostbite risk as metal conducts cold.
- Be prepared for winter travel in your car. Carry an emergency kit, food, blankets, extra clothing, boots, matches, etc.
- Avoid contact with gasoline and metal, as it may be super-cooled.
- Avoid alcoholic beverages, which increase the rate at which the body cools and can cloud judgment and the sense of touch.
- Avoid smoking, which decreases circulation.

First aid for frostbite

- Avoid rubbing the area, especially with snow, which will worsen the injury.
- Don't walk on frostbitten feet or use a frostbitten area. If you must walk, the feet will suffer less damage if left frozen and padded. If feet are thawed, have someone carry you if possible.
- Avoid thawing an area if you are far from help or if there is a chance of re-freezing, as this will cause more damage.

If you are in a permanent shelter and can thaw the frostbitten area:

- Immerse area for 20-45 minutes in tepid (98 - 104 degree F) water. Avoid using hot water, which may burn the area, causing more damage. As the area thaws it will turn pink or bright red and sensation may return.
- Do not put salves or creams on the frostbite.
- Protect the frostbite area from re-freezing with towels and blankets and seek medical attention.

Source: <http://www.miller-dwan.com/pbfrostbite.htm>