

Lake Diving

Mike Ault, Copyright 5 July, 2006

Generally speaking there are three types of dives, a lake dive, a quarry dive or an ocean dive. Lake dives of course are in anything from a pond to the great lakes where the visibility can range from less than 2 feet to over 100 depending on the time of year, type of lake bottom (generally the rockier or sandier the better the visibility) and amount of time since the last rainfall. A quarry dive can be very similar to a lake dive but generally the water tends to be clearer and usually, deeper, overall than a typical lake dive. Of course in most cases ocean diving gives the best visibility and usually isn't prey to the problems with rain fall, bottom type or time of year.



Figure 1: Lake, Quarry and Ocean

What I want to talk about in this article is a typical lake or quarry dive, what to expect, what equipment to use, and when it may be the best time to dive.

In the temperate region (from mid-Georgia up to Northern Virginia) lakes generally will be mud or sand bottom and will have seasonal changes in visibility. The changes in visibility are due to the seasonal growth and death of the fresh water algae. Usually the colder months provide for better visibility while in the summer months, where the algae is growing like crazy, visibility is worse. In many lakes good visibility is in the range of 10-20 feet, while some, such as Lake Thurmond in South Carolina and Lake Joacassi in North Carolina sometimes report up to 50-100 feet of visibility even in the summer months. The major lakes near where I live, Lake Lanier and Lake Allatoona generally have only 5-10 feet of visibility in the summer months and 10-20 (Maybe 30 on a good day) feet of visibility during the winter months.

All bodies of water beyond 20 or so feet in depth will also have a thermocline, a depth at which there is a marked decrease in temperature. The thermocline will vary in depth depending on the visibility of the water, the less visibility, the shallower the thermocline will be and the more marked the temperature profile. A thermocline can also result in either an increase or decrease in visibility. For example, in one quarry I dive in there is a thermocline at about 15 feet that has a temperature difference of about 5 degrees (from around 82 degrees to 77) and then one at 22 feet that drops from 77 down to 69 degrees. Finally there is a third layer at about 41 feet that runs around 52 degrees. Depending on

the layer you are in, visibility can be good (10-20 feet in the top 20 feet) to poor (5-10 feet or less below 20 feet).

Unless you plan to stay in the top 20 feet of water (or wherever the thermocline is in your lake or quarry) you need to plan for proper thermal protection. In the thermal profile described in the previous paragraph, a 3mm wetsuit would probably be fine for the 0-25 foot depth, any deeper and at least a 5mm may be required. If you wanted to go deeper then 40 feet for any length of time, then a dry suit with proper under suit (usually fleece or some sort of long underwear) would be required. For contrast, I have dove in the ocean where the thermocline didn't occur until 60 feet deep and then was only a couple of degrees, of course the visibility was over 100 feet!

From the previous paragraphs you should figure out that before going to dive in a lake or quarry you are unfamiliar with, you should contact a local dive shop or even talk to local divers or fishermen to determine at what depth the thermocline resides and how much of a temperature drop to expect. There are usually good online resources for this such as the regional diving forums on www.scubaboard.com where you can ask local divers about conditions. By knowing the subsurface conditions you can make sure you bring or obtain the proper thermal protection. Nothing is more frustrating than having to call a dive because you are near hypothermia or being unable to do a second dive because you are just too cold!

Before you dive you should also try to determine if there is anything interesting to see, for example, in Lake Lanier where we do practice dives there is only mud, tree stumps, the occasional rock and more mud. In many man-made lakes there are still structures that may be divable, for example, in Lake Murray, SC, there is a old iron bridge that was left intact. Many times cemeteries (as morbid as that sounds) will have the bodies relocated but unless the family pays, not the headstones. Makes for an interesting Oct 31st dive to explore a flooded cemetery. Other things of interest may be old railroad trestles, wrecks, or intact/partially intact buildings. One of the most interesting fresh water dives (I haven't done it yet but really want to) is the Bonne Terre abandoned lead mine in Missouri, all of the equipment was just left in the mine when it flooded. In the quarry I dive (Dive Haven, White Georgia, www.divehavenga.com) there are several wrecked/partial cars and an old fashioned crane/shovel, there maybe more as the bottom is at 150 feet, but those are what has been found so far at recreational depths.



Figure 1: Partially buried remains of a car – Dive Haven Quarry

So what is a typical lake or quarry dive like? Of course you start by working out the dive plan with your dive buddy or buddies, what you want to accomplish, how deep you are planning to go, review of hand signals, etc. Once everyone is clear on the plan you may want to get the bearings of the features of interest (general bearings from a specific point such as a buoy or a land feature visible from the water).

Once all of the pre-dive planning is complete you check out and assemble your equipment. One simple memory trick I use when assembling gear is to remember “air-to-hair”, make sure the outlet of the tank is pointing toward where your head will be. At a minimum you need to check the functioning of all gauges (pressure, temperature, dive computers) and the inflator/deflator for your BC and maybe drysuit, and the proper function of the regulator, both the main and spare air (or octopus as it is called.) At 60 feet down is not the time to discover that your BC fill valve sticks open or the spare air doesn't work. You should record initial air tank pressure and perhaps check for Carbon Monoxide (I use a CO-Cop for this) and if using Nitrox (EAN32 or EAN36 for example) verify the oxygen concentration and your dive computer (if it is Nitrox capable) O2 settings.

You should also familiarize yourself with your buddies gear, how does his weight release work? Where is his octopus located? For example, I don't have an octopus on my regulator setup (see the yellow regulator cap on the fill hose on the right side of my BC in Figure 3? That's it), instead I have an integrated BC inflator/spare air so instead of looking for my octopus my buddy needs to know to ask for my primary (the hose on the left side of the BC) and then I use the spare air (because it is too short to pass to a buddy.)

Once the equipment is checked out and you understand your buddies set up, it is time to gear up.



Figure 3: Me All Geared up in Wetsuit

Depending on the type of exposure suit (either none, a wetsuit or drysuit) you may need to have a buddy assist you. For example, my dry suit is a rear entry, meaning the zipper is across the back of my shoulders, I need someone else's help to close it properly. A drysuit zipper is what forms the main seal (generally speaking) to keep the water out (the other seals are at your neck or face (or both), the wrists (if you don't have integrated gloves), and maybe the ankles (if you don't have integrated boots) so the zipper has to be properly closed without anything getting caught or you dry suit becomes a wet suit, it just makes sense to have a buddy zip it closed and properly park the zipper in the closure seal. Your buddy should also make sure your hoses and attachments aren't tangled and maybe help you on with your BC. Of course you help them also! And don't forget to make sure the air valve on you and your buddy's tank are fully open. A good practice to prevent forgetting to open your tank valve is when you do your pressure check upon initially attaching the regulator to the tank, leave it all the way open.

Once the gear is on and checked you carefully make your way to the water. Now, if you are shore diving you will generally carry your fins and mask to the waters edge and enter the water up to about waist high, then you can (well relatively) easily put on your fins by inflating the BC and using it as a "chair" to lean back on while you pull on the fins and attach the straps. Spring type straps make this easier as does using full foot fins, however, not all exposure suits lend themselves to full foot fins, spring straps may not be available so the standard latching strap may be what you are stuck with.

Make sure your mask has had proper defogging gel applied and rinsed off or use good old spit...one of my dive buddies swears by Johnsons Baby Shampoo...so whatever works for you. Then put on your mask and either use your regulator or your snorkel and wade/swim out to where you can safely submerge. Before submerging check your bearing so you know where you will be going when you get to depth. Usually the dive leader will signal using the thumbs down submerge hand signal and everyone will submerge together. Also appoint someone to tow the dive buoy. The dive buoy is required by law and features a clearly visible dive flag or a “Diver Down” message (if it is a dive sausage type.)

Taking a bearing before submerging in limited visibility water is critical because even though it may look like you are submerging straight down, sometimes in limited visibility you may spiral and end up facing a completely opposite direction to what you started at on the surface.

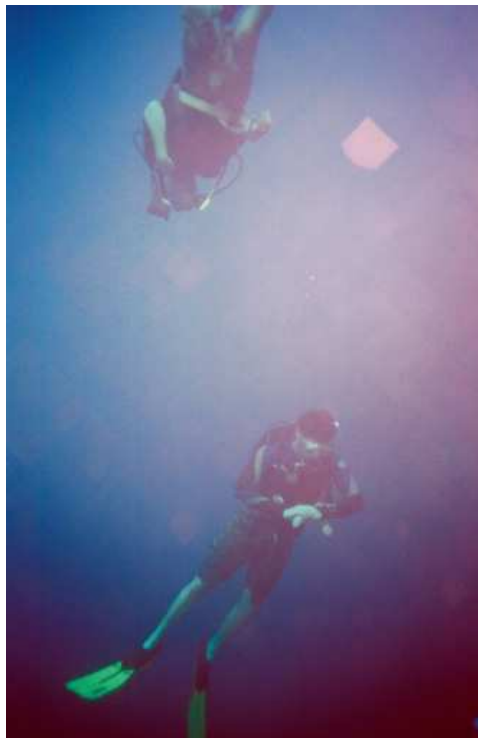


Figure 4: Sometimes Your Orientation May Change when Descending

You submerge by taking the BC inflator in your left hand and holding it straight up, or, pressing the release valve on some BCs with your body vertical. When all of the air is out of the BC and you exhale, you should begin to sink if you are properly weighted. If you have to go head down and power down using your fins, you are probably weighted too light, and if you are too light at the beginning of the dive, you will be way too light at the end of the dive when you have used a good deal of your air.

Usually I rotate to the “Superman” position or if you prefer the “skydiver” position when I am submerging. This allows me to watch the depth indicator on my console of my dive computer and watch for the bottom. I start giving small bursts of air to my BC a few feet before depth to slow down the descent rate, I can get neutral just at or slightly below

desired depth using this method. Of course if you are diving a dry suit you may also have to give a short burst or so to your suit in order to prevent squeeze (where the suits hugs too tightly to your body due to water pressure) I have heard one dry suit diver claim to have been bruised by squeeze when he didn't add a bit of air to the suit. Even moderate to light squeeze may cause bruises if it is maintained for 30-40 minutes. Adding a bit of air just makes it more comfortable and provides insulation between you and the cold water outside the suit. Descending down a line or with other buddies in sight can help prevent vertigo due to lack of visual references during low visibility dives, also watching your compass can help.

It is a good practice to not "land" on the bottom in a lake unless the lake has a sand or rock bottom. Most lakes will have a silt bottom and the second you touch it that will cause it to cloud the water making good visibility poor and poor visibility into no visibility. Generally speaking (of course depending on visibility) you want to stay at least 3-4 feet off the bottom if it is silt and use a modified butterfly or even a frog kick to prevent disturbing the silt and causing poor visibility for those around you. I had to learn this the hard way when I lost my buddy due the cloud of silt I kicked up.

Once you get to depth, you may or may not need a light. I do not suggest the use of a mask mounted light, with a mask (strap) mounted light as soon as you look up at your buddy you blind him. You should always carry a main and a backup light in situations where one is needed. At depth form up the group (of course if it is just you and your buddy, just get together) the dive leader should take a bearing and then lead the other divers to the objective. In poor visibility you may only be able to see the fins of the diver in front of you, if the conditions are poor, make sure any OK sign is passed back and you get acknowledgement from whom ever is behind you in the chain of divers. Establish a noise signal (a series of tank bangs with a knife handle for example) for when divers in the rear of the formation need to get the attention of those in the lead.

In most multi-diver situations I have been in, the lead diver and his buddy take up the lead and "wingman" positions. The wingman is usually to the right and slightly above the lead diver, and the other divers follow wither in pairs or single file behind them. In a three diver configuration there may be a left and right wingman.

Of course if at anytime a diver is lost, the entire group, or just his partner (decide on this before the dive begins) will look for them for a prearranged number of minutes and then will do a safe ascension to the surface. This prevents someone from getting lost or forgotten during the dive.

In the following photograph the visibility was around 5-10 feet. The dive platform was in 20 feet of water and I was using a strobe. In this shot I was about 5 foot from the edge of the platform.



Figure 5: 5-10 Feet Visibility at 20 feet down

In a low visibility dive the compass is your most important pieces of dive equipment after your depth and pressure gages. The compass is the only way to ensure you travel in a straight line underwater when there are no visual clues. Without a compass you will end up going around in circles, usually to the left, because for most of us our right leg is the strongest so we kick with just a little more force with that leg, pushing us to the left. Of course some may have left legs that are stronger. By using a compass you can stay on bearing. Remember to place the lubber line in the direction of travel (usually pointing directly away from you) and the bearing indicators on the needle (orienting them to North and South) this makes doing a reciprocal bearing easy to do, you come around until the needle end that was in the top or left bearing indicator is in the opposite one.

If an object is fairly far away from your entry point it may be beneficial to stay near the surface (15-20 feet down) until you think you are near the object, that way one of your party can do an ascent with little penalty to get a firm final bearing. Only submerge on a deep object when you are sure you are near it. A depth of 15-20 feet will keep you below any danger from overhead recreational boat traffic. Remember that many boaters have never seen a divers flag and may have no idea of the “rules of the road” when boating. Indeed, sometimes it seems that they deliberately try to get as close as possible to the flag. On one dive I was on we nearly caught a pontoon boat using a diver down lure...how do clean one of those?

Make sure everyone in the group knows the signals for half-way (usually the timeout signal) share air and no-air (a slashing motion across the throat). The general rule of thumb is to turn back when any diver gets to half of their air.

Usually the allure of lake or quarry diving is the challenge of the limited visibility and dramatic thermal profiles. A navigation dive means quite a bit more when you do it in 5-

10 feet of visibility vice 100 plus feet of visibility. Also having to plan for proper thermal protection for a range of temperatures from 80+ down to 51 degrees for a single dive makes it a bit more of a challenge.

Of course returning to your exit point means reversing your compass bearings and swimming a reciprocal course, this where having the needed data written on your dive slate comes in real handy. If you want to save time at the end of the dive, come to $\frac{1}{2}$ your max depth for half of the return, then to $\frac{1}{2}$ again for the rest of it or 15 feet this can reduce or eliminate your needed safety stop. Many divers with much more experience than me state that the final 15 feet can be the most critical as far as the speed of ascent, that you may want to ascend those last 15 or so feet at less than the 30-60 FPS recommended by many certification agencies. Generally to ascend you stop, go vertical in a heads up position, put your BC deflator over your head and empty it as you slowly ascend, always look up, I once almost cracked my head open on the bottom of a dive platform by not looking up during a limited visibility ascent. Never use your BC as an elevator! By the time you reach the surface your BC should be empty, you should be using your legs for propulsion to the surface, not buoyancy! Once you are on the surface you can fill the BC to provide buoyancy.

Of course with drysuit diving be sure your purge valve is set properly so that the suit vents properly during ascent or you could end up on the surface faster than you really wanted looking like the Pillsbury Dough Boy who got left in the oven too long (since most dry suits are black.)

Usually I like to swim in until I can't swim any more (about waist deep) this keeps the boats from being a concern. If you are swimming back to a boat consider getting a receiver/pinger the pinger is hung from the boat and you take the receiver with you. The receiver listens for the pings and shows you, by way of a row of lights, the relative strength of the pinger and thus the distance. Using a receiver/pinger pair you can come up directly beside the boat, again helping to eliminate possible hazards from other boats. I use a DiveTracker Receiver/Pinger myself.



Figure 6: DiveTracker Receiver/Pinger (Pinger on right)

All things being equal however, I will take a nice, warm, tropical drift dive with only a light weight lycra dive skin between me and the water over a limited visibility, dry suit required, need lights in the daytime lake dive any time, but I do enjoy both.