



Atlanta Underwater Explorers

AUE Bubbles

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Dive Training: Save Your Breath

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"Water is some 800 times denser than air, and your speed is proportional to the square of the energy it takes to produce it."

Diving Tips: Save Your Breath

During the surface interval, the divemaster makes his rounds, recording each diver's air consumption. You admit to having only 300 psi left, which is cutting it a little close, though you made a slow, safe ascent and a complete safety stop.

But most of the other divers have 600, 800 even 1,100 psi left! What's up with that? Are they hanging out at the surface for half the dive? Sipping from a hidden pony bottle? *Stealing from your octopus?*

More likely, they've learned not to waste air. But cheer up: We can get you back in the game and save you as much as 500 psi. You need only follow three simple diving tips: 1. Think slow. 2. Think slippery. 3. And act sleepy. Now, how hard can that be?

1. Think Slow

Water is some 800 times denser than air, and your speed is proportional to the square of the energy it takes to produce it. You already know how hard it is to wade across a swimming pool, even slowly. Doubling your speed requires about four times as much energy. Or turn that around: Wading across the pool half as fast takes one-fourth as much energy.

So go slow. Swim slow, turn slowly, reach slowly for your console-
-do everything in slow motion.

Several changes to your normal pattern will save energy and air, but swimming slowly is the obvious air-saver. Also, don't forget to move your hands, arms, head and torso slowly. Unless you pay attention, you'll try to make movements at "normal" speeds, which, having been learned in air, are too fast under water.

Dive Training: Save Your Breath – Cont.

Other Ways To Go Slow

Duck currents. They're usually weaker at the bottom or along a wall.

Use your hands. Where appropriate, pull yourself rock-to-rock, hand-over-hand, across the bottom. (Don't touch coral and other living things, of course.)

Stay warm. Your body burns calories and consumes oxygen to generate heat, so conserve it. Wear a hood or beanie, even in warm water.

Make short fin strokes. Besides finning slowly, keep the strokes short. Wide fin strokes move a lot of water but give only a little more propulsion.

Get better fins. Some fins are more efficient at translating muscle power into movement. A good pair means you'll kick with less effort, and less often.

Be physically fit. When even a slow speed is an all-out effort, you'll burn more energy than a fit diver for whom the same speed is easier. The more fit you are the more energy-efficient (and air-efficient) you'll be.

2. Think Slippery

Save energy and air by reducing drag. It's no coincidence that fish, whales and seals have smooth bodies with very few appendages. Divers, by contrast, start out with long, lanky appendages, then load themselves down with lots of bulky gear. Masks, BCs, tanks and the rest of it present rough, complicated shapes that cause lots of turbulence and drag.

There are many steps you can take to streamline yourself, but if you do only one thing, do this: Fine-tune the amount of lead you carry and where you carry it. Your goal is neutral buoyancy with minimum BC inflation and a perfectly horizontal position. This will allow your torso, hips and legs to follow through the "hole" made in the water by your head, shoulders and the end of your tank, while enlarging it as little as possible.

If you are negative, for example, you will have to fin yourself upward a little, as well as forward, to maintain a constant depth. You'll look like a "tail-dragger" airplane taxiing on the runway: Your feet and legs will be lower than your shoulders, enlarging the "hole" in the water and causing drag. If you are positively buoyant, you'll have to fin downward, with the same result.

Carrying the minimum amount of weight is important because if you are heavy (the usual case), you'll have to inflate your BC to compensate for the extra lead. The inflated BC is physically bigger and enlarges the "hole" you make in the water.

Once you have the right amount of weight, you'll need to distribute it so that, without moving or finning, your body will assume a horizontal position. That's correct "trim." Many divers are heavy at the head and shoulders and light at the hips and legs, so they swim in a bent-waist, butt-up posture or with their fins high to drive their hips down. In either case, they're pushing more water aside than necessary, causing drag and wasting air.

Dive Training: Save Your Breath – Cont.

Other Ways To Reduce Drag

Clip your console and octopus close to your body. Keep as much gear as possible in the slipstream of your body.

Adjust hose routings. Choose different ports and shorter hoses to keep hoses close to your body. Just don't make them so short they restrict your head movement or your ability to read your console.

Get a better BC. Look for the combination of fit and just the right amount of buoyancy. A BC that's too large or has excess lift will create a surprising amount of drag. An oversized model will also tend to shift, throwing off proper trim.

Fin with short strokes. Not only are shortened fin kicks more efficient, they keep your fins inside your slipstream.

Keep your hands to your sides. And keep them still.

Hide your snorkel. Strap it to your calf, tuck it under your BC, put a foldable snorkel in a pocket, or leave it behind.

Put small accessories in BC pockets. Small objects like lights, whistles and safety sausages cause disproportionate amounts of drag when fluttering in the "breeze."

3. Act Sleepy

Here, we're talking about your breathing pattern – not your sleeping habits. If you do only one thing to make your breathing pattern more efficient, do this: Breathe almost as if you were asleep – slowly and deeply. This saves air by promoting the most complete exchange of oxygen and carbon dioxide.

You might think that taking shallow breaths, as if sipping from your tank, would conserve air. In fact, it wastes air. Every breath first brings to your lungs the "dead air" that remained in your throat and trachea from your last exhalation. This dead air has a high concentration of carbon dioxide and a low concentration of oxygen. The high carbon-dioxide concentration triggers the urge to take another breath, even before you need more oxygen.

Deep breaths, on the other hand, dilute the dead air with fresh air and deliver more oxygen to the lungs. That not only promotes quicker gas exchange, it also delays the urge to take another breath. A tank lasts longer when you take deeper breaths because you need fewer of them.

Breathe slowly too. That increases your uptake of oxygen and your discharge of carbon dioxide simply because each breath stays in your lungs longer. It gives more time for gas molecules to pass between the air sacs in your lungs and your bloodstream.

Dive Training: Save Your Breath – Cont.

Other Ways To Breathe Sleepy

Exhale completely. This reduces the "dead air" volume and eliminates as much carbon dioxide as possible, thus delaying the urge to take another breath.

Pause after inhaling. Use your diaphragm to hold air in your lungs a few extra seconds while keeping your throat open. This allows even more time for gas exchange. Your breathing pattern should be: Exhale, inhale, pause. Exhale, inhale, pause.

Note: Every time we describe this breathing pattern, someone writes us, "Isn't this skip breathing?" It's not. Skip breathing involves holding your breath by closing your epiglottis (like when you grunt) and holding it for much longer. Closing your throat creates a closed air space that is vulnerable to embolism if you ascend. Keeping your throat open avoids that risk. Besides, skip breathing doesn't work. Holding your breath too long means retaining too much carbon dioxide, triggering the urge to breathe sooner than necessary and resulting in rapid shallow breathing. The net result: You use more air by skip breathing, not less.

Buy a high-performance regulator. With the best models, considerable engineering has gone into reducing the work of breathing induced by the regulator itself.

Comparing Gauges

If you finish the dive with less air than the next diver, does it really mean you aren't as skilled or experienced or in tune with nature?

Maybe, but it's just as likely you're bigger than the other diver. Or that you followed a slightly deeper profile or carried a camera. Or that you have different genes. It might even mean that somebody's pressure gauge is inaccurate, or that somebody's tank got a better fill.

Sure, if you use 1,000 pounds more than your buddy on the same profile, you've got a problem you should correct. But a 200- or 300-pound difference? It's meaningless.

And when faced with a choice between cutting into your 500-psi reserve or cutting short a safety stop--cut into the reserve. A safer profile is more important than a well-intentioned guideline. Just do a better job of gas management on the next dive.

Published in Scuba Diving Magazine: <http://www.scubadiving.com/training/basic-skills/save-your-breath?con=outbrain&src=related&con=outbrain&obref=obinsite>

Upcoming AUE Activities

- *DIVING WITH A PURPOSE CORAL REEF PROGRAM (SESSION 1) KEY LARGO, FLORIDA, JULY 16 - 18, 2015 PROGRAM CONTACT: KEN STEWART (615) 730-4906*
- *AUE GENERAL MEETING JUNE 2015 (DATE TBA)*
- *AUE Annual Cookout - June 13, 2015*
- *DIVERSe Orlando & NY Club Picnic, Rivera Beach, FL Dive & Snorkel @ Blue Herron Bridge - June 20, 2015*
- *AUE & DIVING WITH A PURPOSE TRAINING @ Pelham, AL June 2015 Exact Dates TBA*

Note: Not yet listed on the calendar are several upcoming local dive and social events planned during 2015. Stay tuned!!

Full AUE Calendar - view at link below:

<http://www.diveaue.org/newsletters/AUE%202015%20Dive%20&%20Social%20Calendar.pdf>

Recent AUE Activities

- *AUE Members and DWP/TAP Kids visit Georgia Aquarium - April 25, 2015*
- *AUE General Meeting April 18, 2015*
- *2015 NABS President's Meeting, April 17 - 19, 23015 - Hosted by Charm City SCUBA*
- *DIVING WITH A PURPOSE CORAL REEF PROGRAM (SESSION 1) KEY LARGO, FLORIDA, May 14, thru 16, 2015*

Member Announcements

Latest AUE Member Update:

Please join me in welcoming our newest members. John Brennan and his family join AUE during May 2015. We look forward to diving with John and his family soon.



See the AUE coral tree planted in coral nursery during the recent DWP Coral Reef Program in Key Largo, FL. View photos on Facebook.

<https://www.facebook.com/photo.php?fbid=10204136515509278&set=pcb.669019949864617&type=1&theater>



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Editor's Corner

Fellow AUE Members:

Welcome to the May 15, 2015 edition of *AUE Bubbles* newsletter. With the start of the dive season, this issue is devoted almost entirely to air consumption skills.

We hope you continue to find future editions informative. Your suggestions, comments and story ideas are welcomed.

Completed story submissions must be received one week prior to the publishing date (Bi-monthly on the 15th of the month). The next edition will be published July 15, 2015.

Please submit your story ideas and comments to my attention via email.

Dive safely,
Alex Adams,
Publisher & Editor