

## The 120° Rule

### A rule to live by or die from?

By Rich Stevens

This supposed rule, formerly the 100° rule, says that cold water gear, such as a wet suit or dry suit, is not necessary if the sum of the air and water temperature adds up to 120° or higher. This “rule” has absolutely no scientific basis but has long been promulgated by the [American Canoe Association \(ACA\)](#). The ACA was founded in 1880 in Lake George, NY, and for many years has been considered the leading authority for information regarding safety for canoeing, kayaking, and the operation of other manually propelled small craft. Until a few years ago the 120° rule could be found throughout their web site and in many brochures and other publications regarding safety on the water that they made available.

Unfortunately, this rule and others like it have been widely adopted by many other organizations including the [United States Coast Guard \(USCG\)](#). When I queried the USCG on this issue, they cited ACA as the source and said that they are starting to review their publications. Trying to get the USCG to modernize their publications is like trying to do a U-turn with a supertanker and the same can be said for the information that is available on the web from many other government and state agencies, not to mention outfitters and other well-meaning sources. It’s a zombie rule that seemingly won’t die.

I spent a fair amount of time trying to research the origins of



Swimming your gear at a CPA Cold Water Workshop photo by Rich Stevens

the 120° rule without success, thinking that there must be some sort of study that formed its basis. But the earliest mentions seem to come from ACA. I contacted ACA and a number of people there looked into it. Robin Pope, the immediate past president, eventually got back to me and said it may have started with rafting companies on the Nantahala River in North Carolina. The Nantahala River, one of the most popular

rafted rivers in the US is a dam-controlled river. The water is being pulled from the bottom of Lake Nantahala about 250 feet below the surface. The temperature is about 48°-52° year around. This rule must be used only by the guides because none of the outfitters that I looked into make any mention of the water temperature or suggest that their clients dress for it. This origin story is anecdotal at best and if anyone else has another possible origin for the 120° rule I’d like to hear it.

Finally, this is starting to change and ACA has pretty much removed all mention of the rule from their website and hopefully all of their current publications. The ACA, having moved their headquarters in 2008 to Fredericksburg, Virginia and not far from the Chesapeake Bay, should have known better sooner than they did. Every year there are a number of deaths resulting from people subjected to sudden immersion in cold water on the Bay, surrounding rivers, and beyond.

The leading contributing causes of death for kayakers, canoeists, paddleboarders, and other small craft operators are the failure to wear a lifejacket (PFD) and cold-water immersion, often in combination. The Chesapeake Bay, especially in the Spring, is infamous for having water temperatures on the 40°s or 50°s while the air temperatures can be in the 80°s or higher. Once you are in the water, the air temperature is completely irrelevant.

This so-called rule would have you believe that if the air temperature is 80° and the water temperature is 45° it’s perfectly safe to go out on the Bay or other bodies of water wearing shorts and a t-shirt. Unfortunately, many people do. If they capsize or otherwise fall in the water, the results can be tragic. At the [Chesapeake Paddlers Association](#) cold water gear is mandatory for water temperatures below 60° in most cases and may be required for higher water temperatures depending on location and conditions.

There are several causes of death from sudden cold-water immersion. The first is the “gasp reflex”. When suddenly immersed in cold water with no protective gear there is a totally involuntary reaction by the body that causes one to take a sudden and very deep breath. If this happens while the head is under water, that’s it, the person is essentially dead unless immediately rescued and resuscitated. This is the cause of what is known as “sudden disappearance syndrome” where a perfectly healthy person is seen to fall in the water and never resurfaces. If one survives this, it is generally followed by a period of uncontrollable and severe hyperventilation, which can be prolonged. This can take away valuable time that a person could use to attempt to rescue themselves.

The next cause of death is from what is known as “swim failure”. When a person is immersed in cold water the peripheral blood vessels in the hands, arms, and legs immediately begin

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to constrict as the body shunts blood to the core to protect the brain, heart, lungs, and other vital organs. The result of this is the person loses strength and coordination in the hands, arms, and legs. This can quickly interfere with a person's ability to rescue themselves by reentering their boat, swimming to shore, or even holding onto their boat. If they are not wearing a PFD as they lose the ability to tread water or hold onto their boat, they soon drown. Even if wearing a PFD, if they are unable to keep their head out of the water and waves, they will drown. In 45° water, swim failure can start to occur in as little as ten minutes.

A third factor is "cold shock". The sudden constriction of the peripheral blood vessels due to cold water immersion is accompanied by a dangerous spike in blood pressure and heart rate. This can cause heart failure or stroke in some susceptible people.

Many people have at least heard of hypothermia; however, it is a less common cause of death in small craft incidents. It takes a while for the body to fall to dangerous core body temperatures, generally below 95°. It can take an hour or more even in fairly cold water. If in the water and you are not wearing a PFD, other effects of cold-water immersion generally cause death first.

It still can be a factor if you manage to get back in the boat or to shore and do not have access to dry clothing and a way to warm back up. As the core cools, mental confusion is common, further complicating things. Hypothermia is not limited to very cold water, although water can cause a loss of heat up to twenty-five times faster than air. It can occur at any water or air temperature where it is below body temperature and the cooling effect exceeds the body's ability to warm itself. It's often a factor of time. Serious hypothermia almost always requires medical intervention as treatment is complicated. Rubbing the extremities or placing a person in a hot shower are not advised. The sudden return of chilled blood from the extremities to the core can cause a dangerous drop in blood pressure and heart failure. This is often called circum-rescue collapse. This phenomenon is complex and not completely understood.

A dry suit by itself in most cases is not enough. It has the insulating properties of a shower curtain. It requires that proper insulating layers be worn underneath it, generally a wicking fabric, wool, or fleece. Never cotton.

For a wetsuit, these work best when you are actually in the water. It must fit snugly to prevent water from flushing in and out. It is suggested that nothing more than a bathing suit or a rashguard be worn under a wet suit. The thickness of the neoprene is important to consider with a wetsuit to keep you warm enough. Be aware that a wetsuit can be too warm when paddling vigorously but not warm enough when not paddling or taking a break on the beach. Having windbreaker or fleece top available is recommended with a wetsuit.

When out on cold water always dress for immersion and dress for the water temperature, not the air temperature. It is

recommended that you swim test your gear before setting out to determine if what you are wearing is suitable for the conditions. Just wading out into the water can tell you if you will be warm enough and that there are no problems with your gear. Think about how long you might be in the water if things go wrong. Rescue can take a lot longer than you might think unless you get lucky.



CPA Cold Water Workshop 2015 photo by Catriona Miller

Solo cold water paddling on big open water is not really recommended.

For a comprehensive resource on the dangers of cold water I highly recommend checking out the [National Center for Cold Water Safety](#).

*Launch of the Month (Continued from page 6)*

5. [Reeses Landing](#) 38.8393811N 75.9286925W **Address**– End of Reese Landing Road Near 10591 Tuckahoe Bow Dr Cordova- MD 21625 **Type**- soft launch **Parking**- Small Restroom - No Fee– No Ownership- Talbot County - Department of Parks and Recreation County- Talbot **Comments**-
6. [New Bridge Landing](#) 38.8309922N 75.9145536W **Address**- 10300 Tuckahoe Landing Rd Easton, MD 21601 **Type**-ramp **Parking**-Moderate **Restroom**-No Fee-No Ownership-Talbot County - Department of Parks and Recreation County-Talbot **Comments**-
7. [Ganey's Wharf](#) 38.8051311N 75.9091369W **Address**– End of Ganey's Wharf Road, near 7139 Ganey's Wharf Road Preston, MD 21655 **Type**-ramp **Parking**-Yes **Restroom**-Yes Fee-No Ownership-Caroline County - Recreation and Parks County-Caroline **Comments**– Choptank River