

## Drowning Prevention for Water Race Events, Including Triathlons By Tom Leaird

I served as Water Safety Chairman for over twenty years at the annual Muncie, Indiana Endurathon. In addition, I have served in a similar capacity for several other races of that type where swimming in open water precedes the bike and run portions of a triathlon. I watched from the sidelines, as the Hawaii Iron Man race began – afraid that one of those hundreds of athletes would be lost without being noticed. Throughout all those years, with thousands of athletes, we have been extremely fortunate to not lose a swimmer where I have been involved. The greatest relief at every one of those races has been the announcement: “All the bikes are out of the transition area.” Now I can relax!

For most of the local, Muncie, Indiana races, I have had the job of setting up the water course and then briefing the lifeguard crew, boaters, kayakers, and other swim safety volunteers before the race. I have always tried to impress on as many as 50 water volunteers at the events, “We have an awesome responsibility.” Let me share with you some of my research findings to support those briefing points that I will list later in this article.

There is always a wide range of swimming ability among the participants in these outdoor race events that include triathlons. Several athletes have worked out in an indoor pool and have no concept of what it is to swim in the open water where surface wave action makes normal rhythmic breathing extremely difficult. Some athletes have been talked into racing and are perhaps good on bike and run portions but have no clue about swimming in open water. The range of ages and aquatic comfort also adds to the mix.

### A. Recognizing a drowning victim

So what are the potential problems? What is the water safety crew looking for?

1. A swimmer gulps water. This can be from water movement, contact with another swimmer, or being totally unprepared for the water conditions. This action is usually easy to spot and often occurs near the start of the race. This swimmer will go vertical, head held high, be coughing and complaining. Just go get them; they will be OK. If a kayak rescuer is present, this swimmer may hang on a moment, get relaxed, cough it out, and continue the race. This is an easy one but needs our prompt attention none the less.
2. A swimmer gets kicked in the head in a wave start. In our experience, this swimmer immediately goes vertical and head high and is easy to recognize very similar to #1 above. Water depth is usually over their head at that point and they may need some assistance.
3. A swimmer is in beyond his/her ability, totally wiped out, exhausted, and shifts the swimming pattern from a normal crawl or side stroke to an elementary back stroke. Given the chance, some will drop out if there is a support person/platform to help them out. If not, this situation might degrade leading to “actively drowning.”
4. Actively drowning. We all have been led to believe in the past, that these swimmers exhibit an outward appearance of drowning that can easily be recognized. Not true! From an article by Dr. Frank Pia titled *It Doesn't Look Like They're Drowning*:

“Except in rare circumstances, drowning people are physiologically unable to call out for help. The respiratory system was designed for breathing. Speech is the secondary or overlaid function. Breathing must be fulfilled before speech occurs. Drowning people’s mouths alternately sink below and reappear above the surface of the water. The mouth of a drowning person is not above the surface of the water long enough to exhale, inhale, and call out for help. When the drowning person’s mouth is above the surface, she exhales and inhales quickly as her mouth starts to sink below the surface of the water. Drowning people cannot wave for help. Nature instinctively forces them to extend their arms laterally and press down on the water’s surface. Pressing down on the surface of the water permits drowning people to leverage their bodies so they can lift their mouths out of the water to breathe. Throughout the instinctive drowning response, drowning people cannot voluntarily control their arm movements. Physiologically, drowning people who are struggling on the surface of the water cannot stop drowning and perform voluntary movements such as waving for help, moving toward a rescuer, or reaching out for a piece of rescue equipment. From the beginning to the end of the instinctive drowning response people’s bodies remain upright in the water, with no evidence of a supporting kick. Unless rescued by a trained lifeguard, these drowning people can only struggle on the surface of the water from 20 to 60 seconds before submersion occurs.”

As rescuers, we must recognize these actively drowning people and act quickly by going to them with supportive measures including a rescue tube or other positive floatation means. Here are some signs of actively drowning:

- Head low in water, mouth at water level
- Head tilted back with open mouth
- Hair over forehead or eyes
- Eyes glassy, empty and unable to focus
- Eyes closed
- Hyperventilating or gasping
- Not using legs
- Body is vertical and upright
- Trying to swim in a certain direction but not making progress
- Trying to roll over on the back
- Goggles are most often discarded
- Changes in rhythmic breathing and swimming position will be a sign to watch

5. The silent disappearance is our worst fear. This can be caused by exhaustion, “giving up,” or a medical event, perhaps cardiac in nature. In a competitive water event, having enough eyes on the participants at all times is certainly a challenge. Even if the water portion of the event is only 400 yards, watching every swimmer is difficult. When the swim extends to 1.2 miles, it is nearly impossible to watch every swimmer at all times.

#### B. Setting up the course

The following are ideas for setting up the swim for maximum swim safety coverage and the greatest swimmer comfort and safety. Every person on the water that is part of swim safety, regardless of job, should be wearing or have a personal floatation device (PFD).

1. If possible, set up the course to maximize the distance the athletes swim with the wind/waves. This might mean that the entrance and exit points are separated by nearly the distance of the swim. This arrangement is not always possible but should be considered in the course design.
2. Have enough buoy markers that swimmers can see the next objective and the turn buoys should be larger and different colored to easily see those objectives. Some races use a “waive-man” with fan, but that requires electricity that can be provided with a generator which is a challenge at a turn out in a lake. At the exit, that is fine.
3. Swimming into the sun is always a challenge for swimmers and makes it difficult to know the direction of the objectives. This often cannot be avoided.
4. In a lake environment, pontoon boats with a lifeguard crew aboard can be anchored at intervals of no more than 200 yards apart along the swim course. These stable platforms provide both an observation deck, as well as a place an exhausted swimmer can go to or be taken to. The pontoon boats can also support mask, snorkel, fin divers that can be rapidly deployed. A lifeguard entering the water without a floatation device, rescue tube, or fins is at risk of being unable to assist in a rescue properly and may put themselves in danger. This can and should be avoided.
5. Roving power boats can provide pickup and rescue service and should be spaced to cover a quadrant of the course. In a 1.2 mile swim, there should be at least four of these available. The pre-swim briefing will designate the visual signals that can call the boats into action. Care should be taken to keep exhaust down-wind from the athletes. Generally, these roving boats are on the inside of the course for easy access to all points. Radio communication between all the boats is certainly ideal, but not always possible.
6. Kayaks are the absolute best vehicle for swim safety. Having a trained lifeguard on each kayak would be preferred; however a person that is very familiar with their kayak can be coached to provide a lifeguard-like service. I recommend two pieces of equipment to be taken along. First, every kayak should have a separate throw-able floatation device that can be handed to a struggling swimmer. Second, a “throw bottle” should be on board to mark the spot of a suspected submersion. These items will be described at the end of this article. Kayak paddlers must be advised to maintain a close distance to the line of swimmers. See the suggested briefing notes later in this article. Kayaks are very maneuverable and can be paddled right in among the swimmers when necessary without disturbing the progress of those that are OK, to reach a struggling swimmer. Either sit-on-top or sit-inside kayaks will work. However, my preference is the sit-on-top style. Wearing a floatation jacket and carrying a cushion float between my knees, I can easily provide assistance – even roll off the kayak if needed to help an actively drowning swimmer. Kayakers must wear a PFD.

It is advisable to have one kayak at each major turn in a position so that swimmers that miss the turn will run into the kayak. This paddler will also be in a position to verbally try to redirect these swimmers before they run into the boat.

7. We recommend having scuba divers for rescue/recovery. These divers should ideally be placed on the roving power boats for rapid access. The divers must be

equipped with search equipment, lines, etc. and have the qualifications for the job and conditions. If a throw bottle has been deployed, that is the beginning point of a circle-search pattern. Finding and saving the life of a swimmer that has disappeared beneath the surface is difficult and the success rate low, but we do all we can to try.

8. A hand-held Global Positioning System (GPS) can be used to set up the course and repeat for future events. Typical GPS systems can locate an objective within 3 meters which is entirely adequate when setting up most swim courses.

Water vehicles that are not recommended include:

- Jet skis can move fast but have little ability to provide a safe stable platform for a struggling swimmer. Because they move so fast, it is impossible to watch problem swimmers and have little ability to assist once a problem is spotted.
- Canoes are not maneuverable enough to provide good service and if grabbed by a struggling swimmer can be over-turned creating an additional problem that must be dealt with taking away valuable resources from the safety crew. In addition, if any wind is present, a canoe is just terrible to keep in position.
- Sail boats under sail have no value, but if anchored on the outside of the course, they could provide some visible reminder to other boaters on the lake that a race is in progress.

### C. Weather and temperature

Weather considerations and water temperatures can certainly affect the outcome. Here are some:

1. Early morning fog can make visually seeing the next marker impossible. My recommendation is to wait until the entire course can be seen before beginning. This might mean delaying the race for an hour or more. Eliminating the water portion is an alternative that is usually not acceptable.
2. Wind that generates waves more than six or eight inches (the size of a person's head) in height makes it so the swimmers will not be able to see the course markers. Also, heavy winds will drag the markers off the correct spot if not well anchored. See anchoring methods later.
3. A light rain is ok but certainly no lightning-type thunder storms. If weather patterns indicate an impending thunder storm, a recall method must be communicated to all, including athletes, before the race begins. A person at race control must have the ability to watch weather radar and warn all involved. A smart phone is ideal for this. Radio communication to all roving and platform boats would work if the race must be called off, then sound horns to gather swimmers.
4. Traditionally, when water temperatures are cooler (below 78 degrees Fahrenheit) wetsuits have been permitted – even for those top athletes in competition. USA Triathlon rules are 78 degrees and say that exceptions exist to 84 degrees. Iron Man has a 76-degree rule. However, personally and professionally I would like to see every swimmer in a wetsuit in temperatures up to 88 degrees. Above that temperature hyperthermia and

dehydration is a concern. At least in a wetsuit, the unresponsive body floats taking away the “silent disappearance” issue. As a lifeguard, that is a huge concern.

D. Managing the race - Wave start or time trial start

I have worked many races that use wave starts where groups of 25 to 100 or more athletes are started in waves that are separated by several minutes between. This works well but having a kayak or two available in the first 200 yards is a good idea. Usually after that, the swimmers spread out enough to eliminate running together or getting kicked. Back to Iron Man Hawaii, the entire group started at once – Wow!

With the time trial start, swimmers are sent off every three to five seconds for a somewhat continuous flow. To me this is the safest and most fair method. This reduces the drafting that is common when a large group is swimming together, and nearly eliminates getting kicked as in a wave start. In a kayak, right in behind a wave, I hardly need to paddle to keep up with them. A lagging swimmer can almost ride the wave too.

E. Water Safety Briefings

Below are ideas for briefing notes for lifeguards, platform boaters, power boaters, kayakers, and other volunteers. These points generally relate to fresh water lakes. A briefing for an ocean race might require additional points.

1. The general briefing to the entire water safety team.

I like to hold this briefing near the entry point perhaps as much as an hour before the race starts. I use a write-on board with the race layout to position the crew throughout the course. Here are points I recommend be expanded on:

- a. “Thank each of you for volunteering”
- b. “Today we have an ‘Awesome Responsibility’”
- c. “We have \_\_\_\_ swimmers that are counting on us for safety”
- d. Describe the course layout including position of each boat/lifeguard
- e. Describe the distance each boat should be from the swimmers
- f. Give time to be in position (at least 20 minutes before race start)
- g. Job on the water is to watch swimmers continuously
- h. What to look for: tired, distressed, drowning response, silent disappearance
- i. Watch for: change in pace, arm movements, exhaustion, head high struggle
- j. Hand signals: all OK, emergency, need chase boat
- k. “Swimmers may not make forward progress holding onto a boat or float”
- l. “Swimmers getting out onto a boat are out of the race – report number to transition
- m. Communications available
- n. Rules: no smoking, no engine exhaust, no wake, horn or whistle are for emergency only
- o. Everybody wears a PFD, a rescue tube, or fins

2. The briefing to Pontoon boats (usually as a separate group after general briefing)

- a. Be kind to swimmers: no engine exhaust, smoking
- b. Anchor within 50 feet of the race line
- c. Horn or whistle are for emergency only
- d. Communication: radio, hand signals
- e. List the position to anchor within the course

- f. Swimmers taken out of the water are out of the race
- g. These swimmers remain on the pontoon and the pontoon remains in place until the last swimmer is past. If radio is available, call in the swimmer's number so the bike can be pulled from the transition area.
- h. If medical help is needed, transfer to roving boat or take to shore if CPR is being performed on deck.

3. Briefing for kayakers (separate group after general briefing)

"You are the backbone of our entire effort for swimmer safety. Your eyes must be continuously scanning the athletes as they pass." Additional points to cover:

- a. Position in relation to swimmers – not more than 30 feet
- b. Go to and redirect a swimmer heading off course
- c. Describe the method of visually scanning used in lifeguard training
- d. List objective for the turn kayakers
- e. Watch for swimmers cutting corners
- f. Hand off a float if needed and pick it up later
- g. Make no forward progress with a tired swimmer
- h. After brief rest, tired swimmers can continue the race
- i. Approach a struggling swimmer with the bow not the side
- j. Be aware of an "actively drowning" swimmer – quick action is needed
- k. Describe use of the throw bottles
- l. Go over specific hand signals used to pass a swimmer from one quadrant to another.

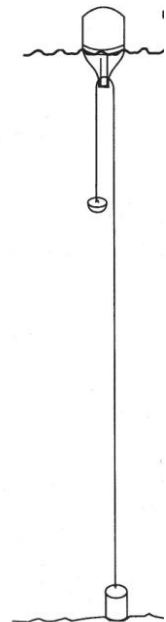
4. Briefing to roving power boats (separate group after general briefing)

- a. Be kind to the athletes – exhaust, smoking, wake action
- b. Be constantly alert within your sector for emergency signals
- c. Swimmers brought aboard are not taken to shore. You would vacate your position. These swimmers could be transferred to a pontoon.
- d. Assign roving quadrant
- e. Assign scuba divers and perhaps a lifeguard as crew
- f. If a diver is deployed, stay as surface support or send in a pontoon

F. Buoy anchoring methods

Buoys used to mark the race route are anchored using some amount of weight. Here I will describe methods that have worked in the past.

- a. A 400-meter race may only need one or two turn buoys. However, a 1.2 mile race will need several smaller buoys in between the turns to keep the swimmers directed.
- b. Large corner buoys (Four to six feet in diameter) must be well anchored depending on typical winds at the site. A well-attached full concrete block or two or equivalent works but with a pulley system with counter weight at the float to allow for wind shift. See the illustration at right. When the wind blows, the buoy is somewhat free to move and comes back over the weight when slack.
- c. When deploying the buoys, have as much rigging done as possible before heading out to the site.



- d. Use of a GPS to position turn points has been successful.
- e. Some shorter races run a buoy line with occasional markers out to one major turn buoy, thus keeping an easy line for swimmers to follow so kayakers/boaters can see both coming and going swimmers in a single view.

#### Terminology:

“Non-fatal Immersion” is replacing the term “Near Drowning”

A “Throw Bottle” is a plastic drink bottle – perhaps 12 to 16 ounce size – that is about ¼ full of water with cap on. A string is tied on the neck and wrapped around the bottle that is longer than the anticipated water depth. At the other end of the string is tied a small weight of perhaps one-pound. To deploy, the bottle, as a unit, is thrown to the site of a suspected disappearance and the weight will unwind the string and settle on the bottom. This marker then becomes the object of the diver search. If in shallow water (less than 15 feet in depth) a lifeguard with snorkel gear could also do a quick visual breath-hold search before the diver arrives on site.

Hand-off floats, suggested for kayakers, can be a floatation seat cushion, a ring buoy, a small inflated inner tube, or other similar device.

#### Summary

As water safety volunteers we do in fact have an “awesome responsibility” to create an environment that is safe for those athletes to enjoy and compete during these open water events. This paper is designed to make you think. Please take these recommendations and add your own thoughts, especially those that apply to different water conditions, and try to create the best possible circumstances for your own race.

#### Author credentials

Tom Leaird is CEO of Scuba Educators International, a scuba training agency with roots in the YScuba program where he served over 20 years on the advisory council. He has written over a dozen books on scuba training including search and recovery and scuba rescue. He has been a diver for 50 years, an instructor for 42 years, and has owned a full-service scuba training center for 40 years. He is a member of the board of directors of the Diving Equipment Marketing Association, DEMA, and past president of the Recreational Scuba Training Council, RSTC. He has attended the annual convention and consulted with the National Drowning Prevention Alliance, NDPA. At age 72, he feels that writing and sharing his experiences as guidance for others, is perhaps better than actually serving as a lifeguard out on a kayak at future events.

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