

Flush Drowning



Flush drowning is when a swimmer isn't held in place but generally moving downstream through rough water. Repeated dunking and/or being hit by waves causes the swimmer to aspirate water compromising the airway. Eventually, getting enough oxygen in the lungs proves too difficult and they pass out and drown. Flush drowning is common on large swollen rivers and high gradient streams, often at flood stage. Another concern is that flush drownings are almost always a fatality.

To show how common this is, I summarized the top incidents from the American Whitewater Safety Database and grouped by Novice, Intermediate, and Advance/Expert runs listing the top 5 accident causes from 2000 - Present.

Novice (Class I-II) Top Accidents

No PFD	Flush Drown	Swim into Strainer	Boat Pin Strainer	Low Head Dam
98	66	42	26	15

Intermediate (Class III-IV) Top Accidents

Flush Drown	No PFD	Swim into Strainer	Boat Pin Rocks	Heart Attack
152	70	37	30	27

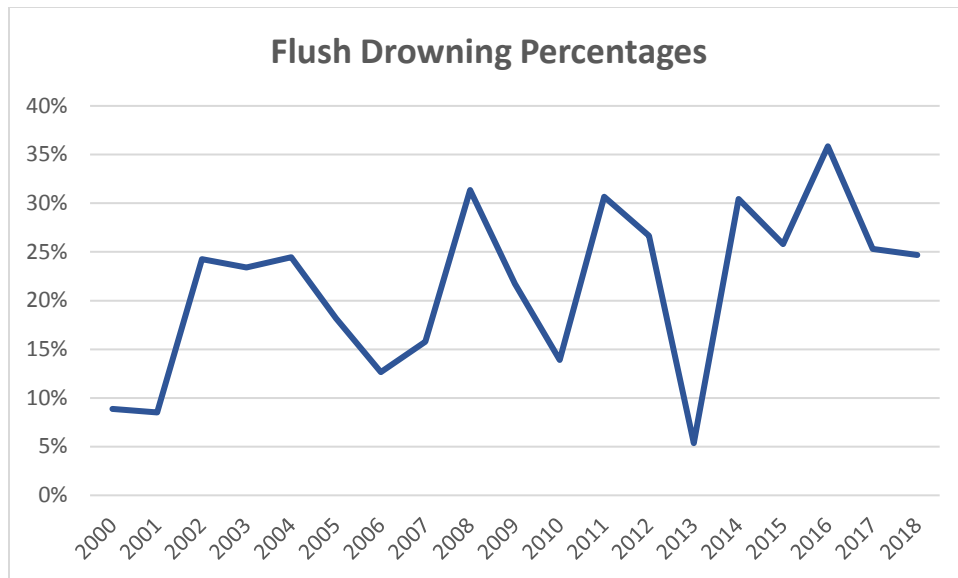
Advanced/Expert (Class IV-V) Top Accidents

Flush Drown	Boat Pin Rocks	Swim into Strainer	Swim into Undercut	Bad Hydraulic
106	41	26	24	23

One would expect a high number of incidents caused by not wearing a PFD for novices, many are very new to the sport. Flush drowning is still the second leading incident cause. For the rest (intermediate/Advanced) – flush drowning incidents are by far the most common accident cause.

Flush drownings are a very significant proportion of all incidents as the following trend line shows.

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Prevention

There are many contributing factors leading to flush drownings:

- **Judgment/Planning:** All paddlers should get in the practice of creating a Float Plan. Float plans gather data on river levels, weather, water temperature, stream beta, potential hazards. All of these are common factors in flush drowning incidents. Set a cut-off level BEFORE traveling to your destination, write it down and stick to it. This is just like an auction, its far too easy to exceed your risk tolerance if you don't set a limit.
- **Cold Water Immersion:** Cold water really saps energy making you lethargic and less capable of self-rescue. Dress for full immersion, even if you have a bombproof roll.
- **Situational Awareness:** Pay close attention to rising streams and have an exit strategy ready should this be necessary. This also means keeping a close eye on your paddling buddies in case they swim.
- **Conditioning:** Many of us are desk jockeys. As we age, our cardio conditioning degrades. Aggressive swimming in rough water is exhausting. Besides cross training, I highly recommend practice swimming drills in deep rapids.
- **Swiftwater Rescue Training:** Flush drowning is just one of the topics covered along with lots of practice swimming, wading, boat-based rescues, rescue vests, scouting, etc. All of these are valuable components in any prevention strategy.
- **Gear:** Pay close attention to your Life Jacket & Helmet. Make certain they fit well and are properly secured. Test your life vest annually to ensure adequate buoyancy (your whole head out of the water in a calm pool). Rescue vests have extra buoyancy and are worth the extra price.

Drowning

Understanding what happens when a person drowns is key to understanding why flush drowning claims many lives. Drowning is considered to be a process:

1. **Breath Holding** – a small amount of water can enter the lungs. Up to 6 teaspoons.

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2. Unconsciousness, Aspiration or Laryngospasm come next. Laryngospasm may take place which is a sudden blockage of the airway, this is quite rare 3-5% of drownings. This is what we used to call Dry Drowning. Rales, is a spasm of the vocal cords can in some cases allow more water to enter the lungs. Rales diagnosis requires a stethoscope, something rarely carried in the field.
3. Unconsciousness. The body still works to keep water out of the lungs by coughing or swallowing. A fair amount of water may end up in the stomach. This instinctive defense continues for several minutes.
4. Loss of oxygen transfer (hypoxemia) and an increase in acidity (acidotic). At this stage foam (pulmonary edema) is produced in the lungs.
5. Brain damage due to lack of oxygen.

There are 6 grades of drowning:

Grade	Signs/Symptoms	Mortality (%)
1	Cough, no foam at mouth/nose	0
2	Small amount of foam in mouth or nose. Also labored breathing (Rales)	0.6
3	Large amount of foam, normal BP	5.2
4	Large amount of foam, low BP	19.4
5	Respiratory arrest	44
6	Cardiopulmonary arrest	93

Wilderness EMS, Seth Hawkins

Keep it simple, any lingering symptoms especially any foam coming from the mouth or nose – get them to the hospital ASAP!

Rescues

First, try to stay with your boat. A capsized boat has an enormous amount of buoyancy. You can rest your chest on the upside-down hull getting the head way out of the water and gaining an additional 18” of visibility. Stay on the upstream side of the boat to prevent entrapment. You can use your legs for propulsion quite effectively in this position and clearly see where you are going. Practice this skill in a safe stream.

Look for the nearest stabilization point. These are often eddies or nice rounded boulders. You don’t have to get to the bank quite yet, midstream eddies or convenient boulders will do just fine. Once stable, gather your wits and assess your situation. Take a few minutes to catch your breath, swimming can be exhausting. Hopefully your paddling party can get a boat to you or a throw rope. If not, look for the next waystation on your journey to the easiest river bank to reach.

Defensive swimming (Feet downstream on the surface, head lifted a bit to see where you are going) can save energy but eventually (and soon) you need to identify where you need to be and make certain you get there. This is where aggressive swimming techniques come into play. Once again, frequently lift your head to watch where you are going and make any necessary corrections.

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Time your breathing. In large wave trains, grab breaths frequently generally on the backside of waves and scout at wave tops where visibility is best. It's generally a good idea to keep the mouth closed while swimming and breath through the nose (less likely to gulp water).

When scouting, watch out for hydraulics, strainers, and undercuts/sieves – do what's necessary to steer clear of these features. If necessary, that water logged boat can be used as a launch platform.

Know your run/rapids. Many large streams have very dangerous undercuts/sieves along the shoreline. With that in mind, riding tongues to a pool below may be your best option.

Be very careful with your feet, keep them on the surface to avoid foot entrapments which are very deadly and exceptionally challenging for rescues. Swim until your hands touch bottom and the water is slowed down by an eddy.

Pay attention to those close by assisting you. They have a huge height advantage, so they can see a great deal you can't. If they ask you to temporarily let go of their boat, they probably have a very good reason. Boats get stuck in holes much easier than swimmers thank goodness.

Rescue parties should give priority to the swimmer/s, not their gear. Get the swimmer to the nearest stabilization point pronto – time is not your friend.

After the rescue you must treat the patient. It's vital for all paddlers to maintain CPR and Wilderness First Aid training competency. Drowning victims will definitely require full CPR: Compressions and rescue breaths. It's vital to get oxygen to vital organs like the brain as quickly as possible. Compression only CPR isn't effective with true drowning victims.

Conclusion

For most experienced paddlers, knowing the triggers for flush drowning accidents and having the knowledge/maturity to prevent these accidents is vitally important. Two very good videos well worth watching are:

- [The Time that Mike Almost Drowned \(NRS\)](#)
- [Staircase Swim](#)

The first video is an excellent demonstration of professional teamwork in rescuing a swimmer. This also showcases all the common factors for flush drowning: high & cold water, high gradient, continuous rapids, ...

The second video shows a very experienced and level-headed paddler, the thoughts he went through, and the use of a midstream stabilization point when he couldn't overcome reactionary waves preventing him getting to shore.

Get the necessary SWR Training, practice your skills, and get in the practice of preparing a float plan – one of the most valuable tools for paddlers.