

River Hazards

Holes The novice is often surprised to learn that not all surface water in a river flows downstream. Powerful upstream currents and waves in the form of eddies, hydraulics, and “holes” can be serious hazards under certain conditions. An eddy is an upstream current that forms behind a surface object in the river or behind a riverbank. As water flows around the object it piles up on the upstream side and then flows inward behind the object, creating a reverse current. The line between the upstream and downstream currents is the eddy line. Larger and faster flows produce a marked difference in height between the upstream and downstream currents. Eddy lines in large, swift rivers can themselves be a hazard as bad as any you may find on the river: they may be several feet wide and studded with cross currents and whirlpools. Water also forms a reverse current when it flows over a submerged object such as a ledge or boulder, creating one of the most enjoyable but dangerous features of the river, the hole. There are many words for it (poulover, hydraulic, vertical eddy, stopper, reversal, sousehole), but in this book we’ll use “hole” to mean the general phenomenon of a reverse current that tends to trap and hold a buoyant object. Small holes are great fun to play in with a decked boat. Boaters love to see who can go into the biggest one, stay in the longest, and do the most tricks. But there are a few things to remember: don’t stay in until you’re exhausted, because getting out is harder than getting in. And look downstream before you go in: what’s down there if you have to come out of your boat? Large holes can be deadly and are capable of holding boats and boaters for extended periods of time. Smooth ledges with no breaks in them and low-head dams form the worst holes. This type of hole is often called a hydraulic. A hydraulic is frequently hard to see from upstream, and the regular nature of the back wash makes it nearly impossible to get out without help. On bigger rivers, breaking waves can also form holes as the tops of the waves fall back upstream. Large ones are quite capable of flipping rafts and giving boats a thrashing, but they are generally less dangerous than hydraulics, since an upside-down raft, a swamped boat, or a person will usually flush through. However, mishaps like this often set the stage for worse things on a large, cold, continuous river.

Undercuts and Potholes It’s sometimes sobering to see a river at low water and realize what you have been paddling over when the water was high. The geological reasons for undercuts (large rocks that are narrower at the bottom than the top) and potholes (smooth, eroded depressions in rocks; sometimes the rock will be worn right through to form a tunnel) are not important to the paddler, but their existence and location are. At higher water undercuts can often be recognized by the lack of an upstream pillow of water, and frequently they will have water boiling up behind them. The danger of an undercut is that a boat or a person can be pushed under it and trapped by the force of the water,

pinning of the boat, or entrapment of an extremity. Undercuts also collect logs and other river debris, which form strainers and increase the risk of entrapment. The most dangerous undercuts are the ones on or near your line through a rapid, the ones the current pushes you directly into.

Entrapment One of the biggest dangers of an unplanned swim in whitewater is entrapment, a general term for getting any body extremity, usually a foot or a leg, caught against the river bottom by the force of the current. Often a person unfamiliar with whitewater will attempt to stand on the river bottom and walk to shore. This is an invitation to get a foot caught in a tapered crack between two rocks or in an undercut ledge. Once the limb is caught, it is held there by the force of the current. Escape is difficult and it is likely that the person will drown. If the river is fairly deep (more than about 4 feet), the chance of foot entrapment is smaller, unless the drops are very steep—in vertical or near vertical drops a swimmer is forced from a horizontal position to a more or less vertical one, which increases the risk of entrapment in a boulder sieve or rock crevice at the bottom of the drop. Left Crack of Crack-in-the-Rock Rapid on the Chattooga is a good example of a place where entrapment is a danger. The opening is very narrow and tapers down to less than the width of a person’s body at the bottom. At higher water the crack fills in and the water will carry a swimmer over the deadly tapered section; at very low levels there is not enough water to carry a swimmer into it; at medium levels it is a killer: the water carries the victim directly into the taper and wedges him there with the full force of the current.

Strainers Fallen trees and accumulations of debris can form strainers: water flows through but a solid object like a boat or person won’t. A strainer can completely block a narrow river. Strainers are particularly dangerous because they look so innocent. Frequently they are also hard to see, especially when a fallen tree trunk is stripped of branches and partly submerged. Not only trees are dangerous, though: smooth, water-worn boulders pushed down from a side creek can form boulder sieves at low water and trap boats and people or, at high water, form a series of holes.

Debris In addition to all the hazards nature has put in our way, there are man-made ones to contend with. Especially in the East, many rivers have all sorts of debris left over from the days of mills, dams, and logging that can pin or spear a boater. Bridge pilings are particularly likely to pin boats, since they have little if any upstream water cushion.

Big Water Even without the dangers of hydraulics and holes, big and continuous whitewater is a hazard for a person out of a boat or raft. Breathing, no matter how good your lifejacket, is difficult, and so is any kind of rescue. Swimming in this kind of water can lead to “flush drowning.”

from *River Rescue*: by Les Bechdel and Slim Ray