



CHAPTER

16





Watercraft Adventure Safety

“Boat smart from the start. Wear your life jacket.”

—North American Safe Boating Campaign slogan



Rivers and their environments are always changing. Water levels, current speeds, temperatures, and the presence or absence of obstacles can vary from one hour to the next. The same is true of open water where, in a matter of minutes, wind can transform mirror-smooth lakes and salt water into maelstroms. That tremendous variety brings with it magnificent opportunities for setting out in human-powered watercraft to enjoy streams, rivers, lakes, and the sea. With those opportunities comes the responsibility to do all you can to maximize your safety and that of the people around you.

Some concerns are easy to address. You're likely to get wet. You will often be out in the sun. You might get thirsty and hungry. Having the Outdoor Essentials with you (and knowing how to use them) will allow you to deal with those situations in the same ways on water as you would on land. (For more on the Outdoor Essentials, see the chapter titled “Gearing Up.”)

Water also carries with it the potential of more serious danger. Conditions ideal for hypothermia lurk in the chill of rivers, lakes, and oceans. Possibilities of impact injuries hide against boulders in a rapids and at the foot of cliffs pounded by the surf. Every year, several hundred Americans drown, many while taking part in watercraft activities. From the quietest pond to the roughest sea, managing risks begins by following the guidelines of the Boy Scouts of America's Safe Swim Defense plan and those of Safety Afloat.



SAFE SWIM DEFENSE AND SAFETY AFLOAT



The BSA promotes safety on the water through the guidelines of Safe Swim Defense for people involved in swimming activities, and of Safety Afloat for those setting out on watercraft. Reviewing these guidelines and then adhering to them while on the water are important steps for anyone taking part in aquatic activities.

For links to the full texts of the BSA's Safe Swim Defense and Safety Afloat, see the *Fieldbook* Web site.

Watercraft Adventure Safety Equipment

Personal Flotation Device

People participating in watercraft adventures will, from time to time, find themselves in the water. If that happens to you, a personal flotation device (PFD) will keep you afloat.

Properly fitted U.S. Coast Guard-approved PFDs must be worn by all persons engaged in activity on the open water (rowing, canoeing, sailing, boardsailing, motorboating, waterskiing, rafting, tubing, and kayaking). Type II and Type III PFDs are recommended; Type III PFDs can be more comfortable for persons involved in strenuous watercraft activities.

Wear a PFD *all the time* while in watercraft, and while scouting rapids, loading gear, or lining a watercraft from shore (holding ropes attached to a watercraft that is allowed to float).

A personal flotation device is lifesaving equipment deserving of good treatment. Never sit on a PFD or leave it lying around in camp. Secure it when you have come ashore so that wind cannot carry it into the water. At the end of a trip, allow each PFD to dry, and hang it in a sheltered storage area.



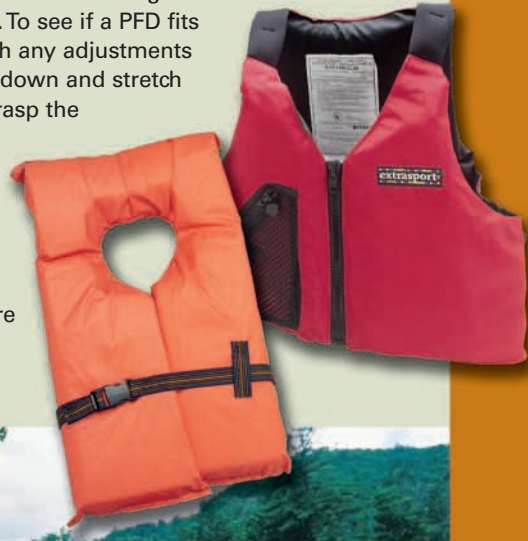
Emergency Whistle and Rescue Knife

Since you will be wearing your PFD at all times, emergency items attached to it will be close at hand if you need them:

- Clipped to a loop on the PFD, a loud, sturdy whistle can be used if you must signal your position. (Don't attach the whistle to a PFD's zipper; currents pulling on a whistle might loosen the zipper and cause you to lose your PFD.)
- Advanced watercraft adventurers often attach a sheathed rescue knife to their PFDs. The knife must be sharp and used only for emergencies—cutting free a tangle of lines, for example.

Testing the Fit of a PFD

Never set out on a watercraft unless you are wearing a personal flotation device that fits well. To see if a PFD fits well enough to use, put it on and cinch any adjustments until it is tight but comfortable. Kneel down and stretch your arms overhead. Have a buddy grasp the PFD at the shoulders or by the shoulder straps and try to tug it up over your head. If the PFD slips upward very far, it is poorly fitted or simply too large for you. A PFD that can be pulled out of position while you are on dry land will slip even more readily if you are being tossed about by currents, white water, or waves.





Double bowline on a bight

Boats and Ropes

Ropes are a necessity around watercraft, but every line on a canoe, raft, kayak, or sailboat must be there for a reason. It should be of the correct length and must be stowed so that it is readily available but will not become an entrapment hazard if the boat capsizes. The ideal choice for line used with boats is floating polypropylene rope, soft laid, in diameters of $\frac{3}{8}$ inch, $\frac{5}{16}$ inch, or $\frac{7}{16}$ inch.

For more on stowing ropes, see the chapters titled “Canoeing,” “Kayaking and Rafting,” and “Sailing.”

Clothing for Canoeing, Kayaking, Rafting, and Sailing

The clothing you choose for watercraft adventures should be quick-drying and should help you stay warm even when the fabric is wet (and it *will* become wet)—in other words, layers of nylon, fleece, and wool. Choose clothing based on the temperature of the water rather than the temperature of the air, keeping in mind that bodies of water often are much colder than the air above them. Cotton clothing should be avoided altogether because it provides no insulation when it is wet, even in midsummer heat. Hypothermia can be a serious danger, and wet cotton is no defense.

Rain gear and spare clothes are a must, even on short watercraft trips. Stow extra clothing in a waterproof bag or a watertight compartment so that it will stay dry even if your boat capsizes.

For more on selecting outdoor clothing, see the chapter titled “Gearing Up.”

Watercraft Footwear

The shoes you wear while boating should provide traction and comfort, especially while you are moving about on shore, along portage trails, and on the sometimes-slippery decks of sailboats, or when you are wading as you load and launch canoes, kayaks, and rafts. Shoes also should protect your feet from the sun and from insect bites as well as from glass, thorns, fishhooks, sharp stones, and other unpleasantnesses underfoot. A pair of old tennis shoes or running shoes can be just right.

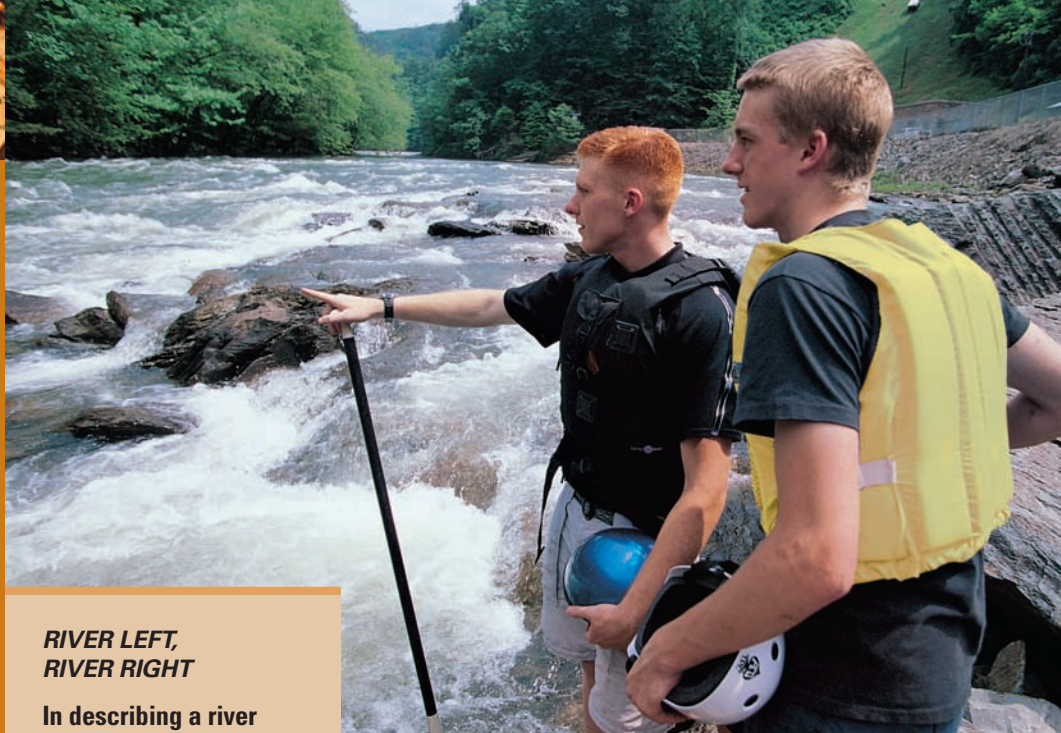
*Shorty wet suit**Dry suit*

Wet Suits and Dry Suits

Cold water poses a real danger for kayakers, rafters, and canoeists, especially when they are likely to capsize or to be soaked by waves, rapids, and spray. Wet suits and dry suits provide maximum protection and make possible watercraft adventures in conditions conducive to hypothermia.

- A *wet suit* traps a layer of water next to the skin where it can be warmed by body heat. Among the most popular styles is the sleeveless “Farmer John” two-piece wet suit with overalls and a jacket.
- A *dry suit* serves as a barrier that keeps water away from the skin. It does not insulate; a boater wears fleece insulating layers under a dry suit. Dry suits must be protected from abrasion and tears that could cause leakage.
- Neoprene booties and paddling gloves can extend the coverage of wet suits and dry suits to include boaters’ feet and hands.

*Neoprene booties and paddling gloves*



RIVER LEFT, RIVER RIGHT

In describing a river and its features, boaters refer to *river left* (the left side of the river as one faces downstream) and *river right* (the river's right side, as seen from upstream).

Characteristics of Rivers

The power of a river can be astounding, especially if the current is squeezed between narrow banks. An obstacle such as a boulder will force the water to go around and sometimes over it, causing turbulence downstream where the river becomes whole once more. A series of obstructions can create the standing waves, eddies, and holes that are the sources of delight and of potential danger for whitewater enthusiasts.

The key to kayaking, rafting, and canoeing these

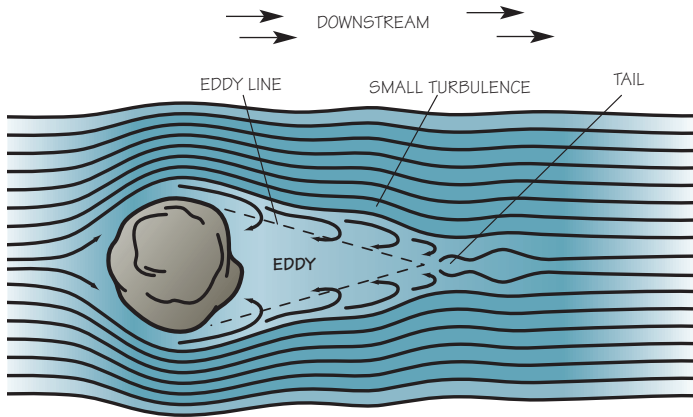
waters safely lies in understanding the dynamics involved as a river tumbles along, and then managing a boat so that it works with the stream rather than fighting against it.

When in Doubt, Scout

Before running a section of white water, a blind corner, or a potential drop of any sort, land your boat and scout ahead along the shore to ensure that there are no upcoming obstacles that might be beyond your ability to navigate. As a rule of thumb, don't try running any stretch of water that you wouldn't feel confident about swimming.

Scouting ahead also will allow you to pick a route through rough water. Begin by identifying the end of the run, then work your way back upstream. (There's a hole to avoid on the left, for example, and above that is an eddy that will slow the boat and give you a chance to rest, and above that are three rocks to skirt on the right, and to make that happen you'll need to enter the rapids just off the right shoreline.) In this way, a section of river that at first appeared to be an imposing plunge of foam and spray can be broken down into a series of controlled maneuvers.

If you can, walk the shore next to a section of white water so that you can see how it appears up close. Identify alternative routes to use in case the chaos of the rapids overwhelms your route planning midway through a run. Careful inspection of the river also could reveal features and obstacles that you otherwise might not have noticed. In addition to the standing waves that give white water much of its drama, watch for eddies, strainers, heavy hydraulics, and drops.



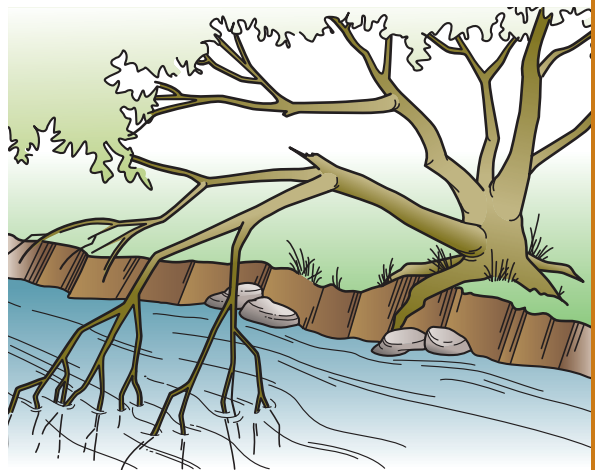
An eddy can form on the downstream side of a boulder.

Eddies

A boulder in the water or a stream bank jutting out will absorb the brunt of the river's force on its upstream side. Just downstream, the water swirls back toward the obstruction, forming a quiet pool called an *eddy*. Proficient boaters can slip into eddies to take momentary refuge from the full impact of the current, and they sometimes run a rapids by moving from eddy to eddy rather than racing the full length of the wild water in a single dash.

Strainers

Strainers are among the most hazardous river obstacles. A *strainer* is created when a tree leans over the water with its trunk or some of its branches submerged, or when the current flows through a fence, logjam, junked automobile, industrial debris, or other obstacles in the stream. Water can flow under, around, and through a strainer, but it will snare and trap



A strainer can be caused by low-hanging tree branches.

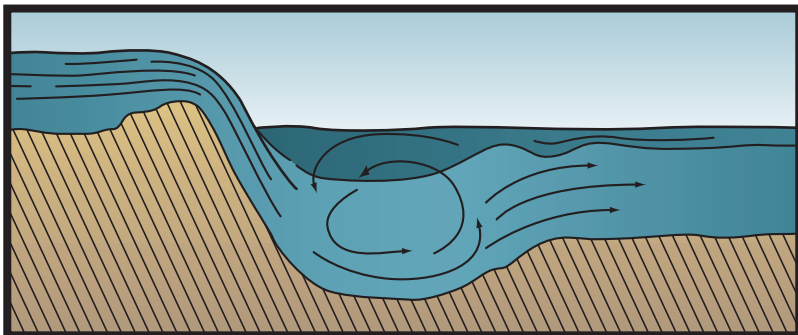
anything or anyone the current draws in. Cracks in rocks also can act as strainers, allowing water to pass but trapping unwary paddlers.

When you see a strainer up ahead, plot a route that will keep you far away, a maneuver that might involve leaving the stream's main current. If that's not possible, paddle ashore and carry your boat, or *portage*, around to safer water farther downstream.



Heavy Hydraulics

The standing waves, whirlpools, and holes that make up the *heavy hydraulics* of white water can be a paradise for rafters, kayakers, and canoeists playing out the best of their sport. The key to enjoying hydraulics is to take on stretches of water that are within your level of skill and your degree of preparation.

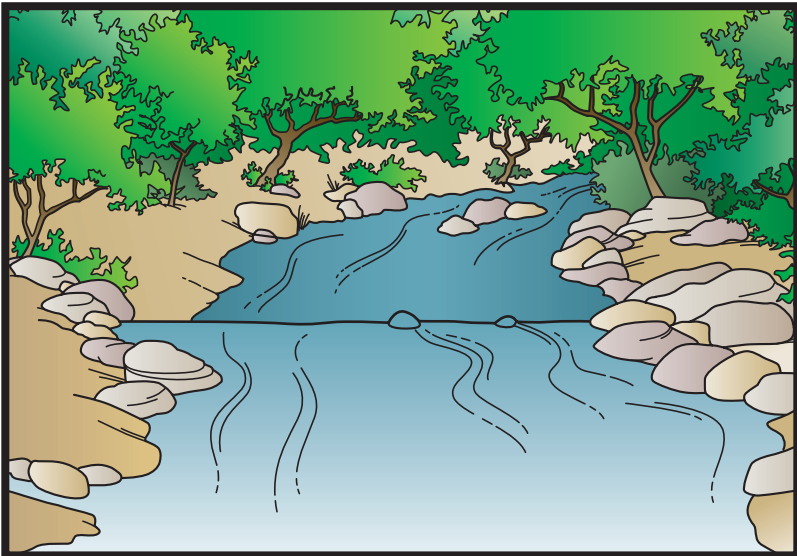
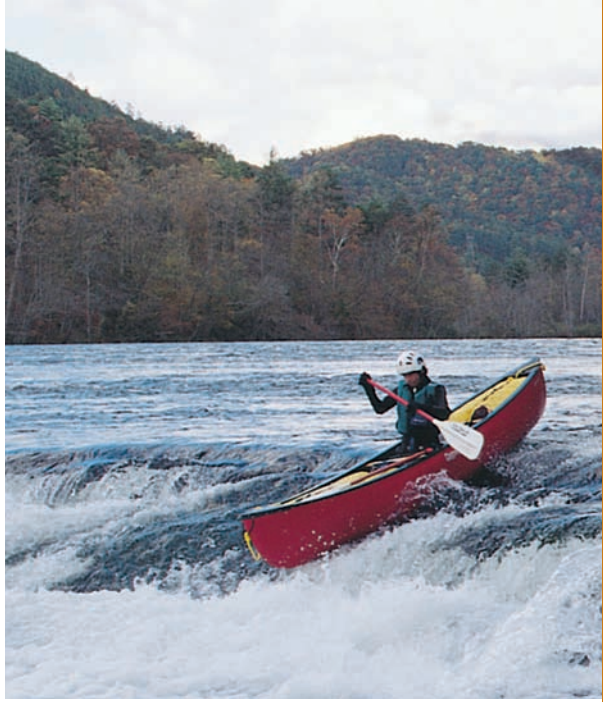


Currents moving over and around boulders form the heavy hydraulics typical of white water.

Drops

The *drops* that occur when a stream goes over a ledge or a dam might seem like obvious dangers, but even experienced boaters can be surprised by them if they haven't scouted their routes. As with strainers, changing water levels might expose drops that were not present even a few hours before.

Drops no more than a few feet high can force a river into a spinning reversal of current that could be all but inescapable for boaters who wander into it. An unbroken horizontal line on the water (an almost certain sign of an upcoming drop) should be a shrill warning to get ashore, scout ahead, discover its cause, and plan the portage around it.



A horizontal line on the water is a warning of a dangerous drop ahead.



Broaching and Wrapping

Broaching happens when a strong current traps a raft, kayak, or canoe against the upstream side of a boulder or other river obstacle. If a broached boat capsizes, tons of pressure from the river's current can literally *wrap* it around an obstacle.

Make every effort to keep your craft far from anything upon which it could broach. If despite your best efforts you cannot avoid crashing into a boulder, logjam, strainer, or other obstruction, lean into the obstacle to help prevent your craft from being flipped over. Try to get past the barrier by pushing the boat around one side or the other. Failing that, climb as high as you can and await the assistance of rescuers using throw ropes. Never lean upstream—that can cause the boat to tip far enough into the current to be flooded and wrapped.

Rating the Difficulty of Rivers

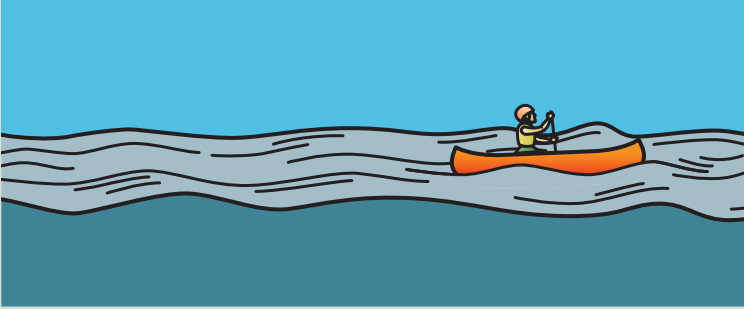
The International Scale of River Difficulty provides a standard classification system for rating the difficulty and gauging the risks of running rapids. The scale is at best a rough estimate; it will vary depending on who does the evaluation, when the rating applies (during spring runoff, summer low water, etc.), and the condition of the stream. Bank erosion, fallen trees, flooding, and other factors can significantly affect the difficulty of a particular stretch of river. (Increase each rating by one class if the temperature of the water or the air is below 50 degrees Fahrenheit, or if your trip is an extended trek in a wilderness area.)

Use the scale to help decide whether to embark on a section of a river. Remember, though, that the scale is useful only if you understand your own capabilities and limitations, and those of others who will participate in a watercraft outing. The most important rating still will be the one you base on your firsthand observations.



International Scale of River Difficulty

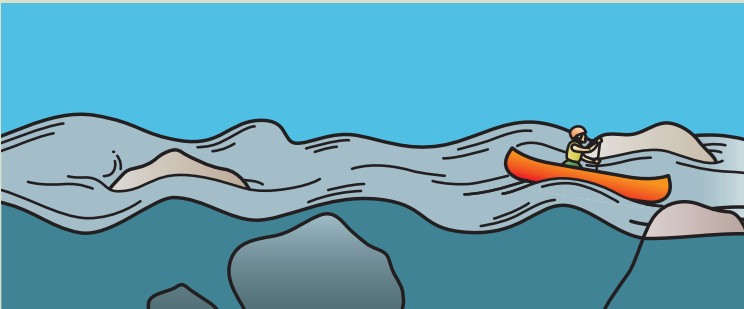
The International Scale of River Difficulty distinguishes six classes of difficulty:



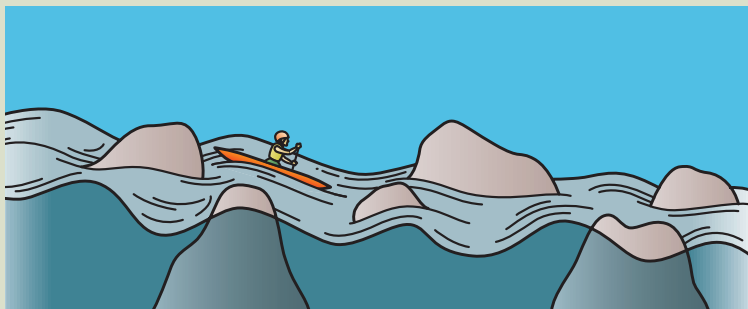
Class I. Moving water with a few riffles and small waves. Few or no obstructions.



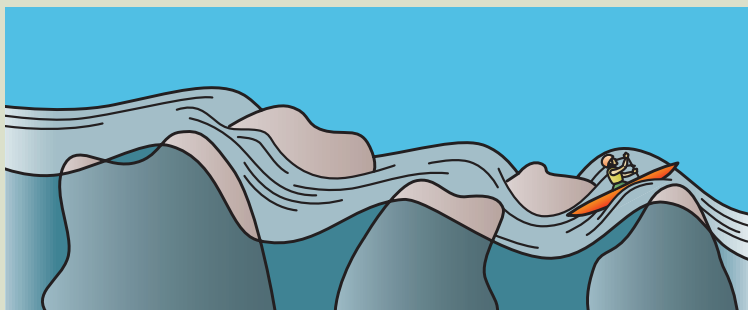
Class II. Easy rapids with waves up to 3 feet, and wide, clear channels that are obvious without scouting from shore. Some maneuvering required.



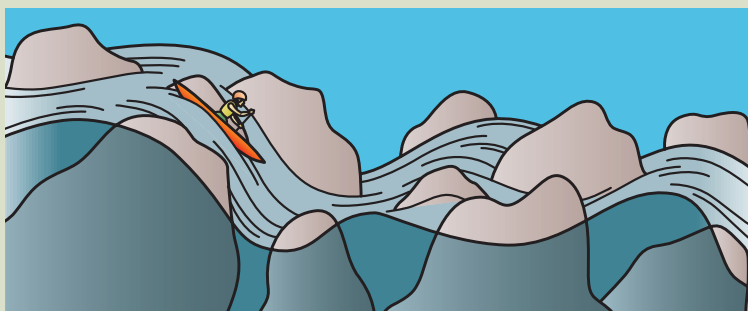
Class III. Rapids with high, irregular waves capable of swamping an open canoe. Narrow passages that often require complex maneuvering. Might require scouting from shore.



Class IV. Long, difficult rapids with constricted passages that often require precise maneuvering in very turbulent waters. Scouting from shore is often necessary, and rescue could be difficult. Generally not possible for open canoes. Boaters in covered canoes and kayaks should know how to Eskimo-roll.



Class V. Extremely difficult, long, and very violent rapids with highly congested routes that nearly always must be scouted from shore. Rescue conditions are difficult, and there is significant hazard to life in the event of a mishap. The ability to Eskimo-roll kayaks is essential.



Class VI. Difficulties of Class V carried to the extreme of navigability. Nearly impossible to negotiate and very dangerous. For teams of experts only, after close study and with every precaution taken.



River Runner Signals

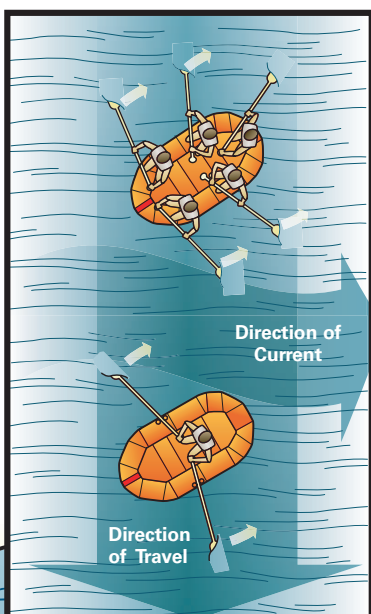
River runners scouting a river downstream from their fellow boaters or going first on a stretch of water can use signals to let those behind them know important information about what awaits them. Before beginning a day on a river, a group should agree upon the signals they will use and then practice them so that there will be no confusion later on.



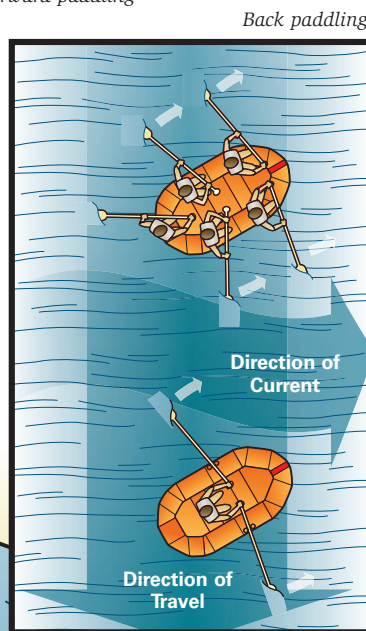
Ferrying

Much of the maneuvering employed by river canoeists, kayakers, and rafters involves *ferrying*—moving a boat laterally as those at the paddles or oars seek out optimum routes. Here's how ferrying works:

A craft going straight down a river generally will hold that course. If you turn the boat at an angle to the current and paddle against the flow, however, the boat will begin to move across the current. Boaters can row or paddle to maintain the correct ferrying angle and to move more quickly toward different portions of the stream. Ferrying can be used to position a boat to miss an upcoming obstacle, to tuck into an inviting eddy, or to catch a tongue of smooth water for a fast, easy ride through the rapids. There are many fine points to the art of ferrying, some applying to all kinds of boats, others specific only to kayaks or canoes or rafts.



Forward paddling



Back paddling



Watercraft Emergency Procedures

Every kayaker, rafter, and canoeist capsizes now and then. Whenever that happens, the safety of people comes first. You can always retrieve watercraft and equipment after everyone has been brought ashore. Arranging for competent leaders trained in coping with watercraft emergencies is an important preparation for groups setting out on trips into challenging waters.

(Dinghies and other sailboats also can capsize. For additional guidelines on what to do when that happens, see the chapter titled “Sailing.”)

THINGS CAN BE REPLACED; YOU CAN'T

Life is more valuable than gear. Regardless of what happens to boats and equipment, always focus your efforts on ensuring the safety of yourself and everyone else.



When You Capsize

When you do capsize, follow these steps:

- 1 If you can, stay in your righted boat even though it is flooded. The hull of the craft can protect you from banging into obstacles, and you might be able to paddle to shallow water. (Experienced kayakers often right their craft using an Eskimo roll.) Whitewater canoeists may be able to right the canoe in less turbulent water.
- 2 If you have been tossed into the water, hang onto your boat. It will stay afloat, and it will be easy for rescuers to spot. Quickly work your way to the upstream end of the craft to shield yourself from being slammed or pinned against upcoming obstacles.



- 3 In the following situations, swim aggressively for shore:
 - a. You have been thrown clear of your boat.
 - b. The water is very cold.
 - c. You are approaching worsening rapids.
 - d. No rescue is imminent.
- 4 If you must ride out a rapids before swimming to safety or catching a rescue line, go downstream feetfirst with your legs acting as shock absorbers to fend off rocks. Use a backstroke to maneuver past obstacles, and watch for eddies that might protect you.
- 5 Do not stand up in swift-moving water. You risk foot entrapment in the rocks on the river bottom, which could pull you under.
- 6 When rescuers are trying to assist you, do all you can to help them help you.



Using a Throw Rope

A rescue line, or *throw rope*, is floating rope 60 to 70 feet in length. When stuffed into a *throw bag*, the rope will pay out neatly when the bag is tossed. Whether in a throw bag or coiled, a throw rope should be secured to the floor of your canoe, kayak, or raft in such a way that in case of an upset it cannot ensnare people in the water or snag on obstacles and trap the boat.

In rapids where upsets are likely, station people with throw ropes on shore or in boats at the end of the section of rough water. If a boat capsizes, follow these steps:

- 1 Get the attention of people in the water by yelling or blowing your emergency whistle.
- 2 Grasp the free end of the throw rope and toss the throw bag or the coiled rope directly at the boater in the water. If you miss, coil the rope and try another throw.
- 3 Pull in the line to bring the person to safety, but take great care not to be pulled into the water or otherwise get yourself into a situation where you must be rescued, too. Walking along the shore as you haul in line might help the person you are rescuing cope with the current.



Advanced techniques of watercraft rescue require practice and qualified instruction. Find out about good training courses by checking with your BSA local council service center and with organizations such as the American Red Cross, American Whitewater Association, and American Canoe Association. (Links to boating organizations and to other information about rescue on the water can be found on the *Fieldbook* Web site.) ↙



Characteristics of Open Water

Boaters on large lakes and salt water will encounter many of the same safety challenges as do kayakers, rafters, and canoeists on rivers. Additional concerns include navigating, encountering marine traffic, and changes in the weather while a group is afloat.



Sea kayakers who have spray skirts to keep rain out of their boats and rain gear to keep themselves dry might not be discouraged by wet weather as long as the water remains calm and the visibility good. Making headway into the wind can be difficult, however, rain or shine. Wind also can pile up waves, increasing the challenge of getting anywhere. Kayakers and open-water canoeists might find that their best course of action in foul weather is to get ashore and wait until the wind dies down or changes direction.



Tides can be the friend or foe of sea kayakers, sailors, and canoeists. In regions such as Puget Sound or the coast of Maine with many small islands and inlets, an incoming tide creates strong currents through channels and passes. Six hours later, the outgoing tide forms currents of equal power running in the opposite direction. Boaters can time their saltwater travels to use those currents, knowing full well it can be all but fruitless to paddle against the tide.

Local forecasts often are available from commercial radio and television stations. Weather information also is provided by the National Oceanic and Atmospheric Administration over AM/FM radios with a weather frequency, and via VHF marine weather and distress radios.

For more on weather, see the chapter titled “Monitoring Weather.” For more on open-water concerns, see the chapters titled “Canoeing,” “Kayaking and Rafting,” and “Sailing.”

*“Swift or smooth, broad as
the Hudson or narrow enough
to scrape your gunwales,
every river is a world of its
own, unique in pattern and
personality. Each mile on a
river will take you further
from home than a hundred
miles on a road.”*

—Bob Marshall, wilderness advocate,
mountain traveler, and principal
founder of the Wilderness Society