

# RIVER-READING

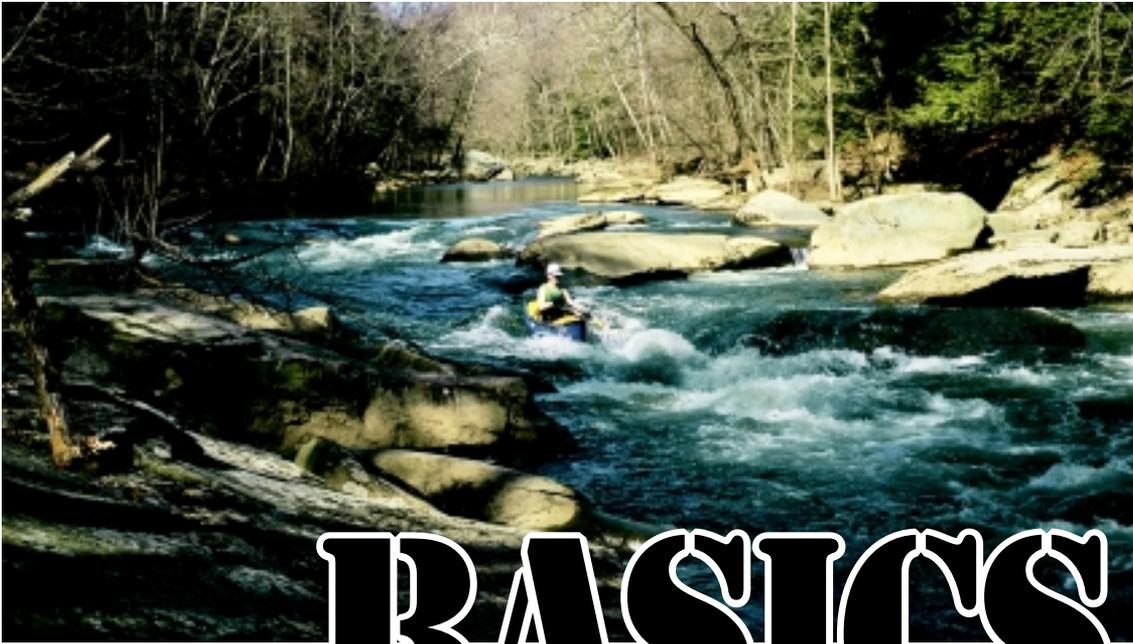


photo-Dudley Parr

## BASICS

by Cheryl Hornung

Did you ever watch canoeists and kayakers playing on a river? Did you ever wonder why you had a hard time motoring your boat up the river while these paddlers seemed to glide mysteriously across it? There is no magic involved. These paddlers just know the river. They use the river's forces to their advantage, instead of letting the river work against them. A large part of any river boating, especially canoeing or kayaking, is river reading. This is knowledge of which all river boaters should be intimately familiar.



photo-Dagger Boats

## Small-boat characteristics

River boating is not as easy as it looks. The best place to learn river boating is to start on a pond or small lake. Learn what your boat can do (after taking a boating course). All boats operate differently, especially on moving water. For example, compare a flat-bottom boat (john boat) with a utility boat (semi-V). These two types of boats are commonly found on our rivers. Flat-bottom boats were not designed to cut through large waves or strong currents. Their stability depends on their size. John boats less than four feet wide can capsize easily. Flat-bottom boats also have less carrying capacity than other boats of their size.

Semi-V, or utility, boats provide the best stability of all types of small boats. They provide the best handling of small boats and they have more weight-carrying capacity.

Regardless of which type of small boat you are in, remember that small boats are unstable, especially when boating in a strong current. If you stand up to pull in a fish, toss out an anchor or change places, you might be in for a surprise—when you hit the water. Always stay low in small boats and move around slowly to avoid capsizing or falling overboard.

River boaters must learn how to read the river's currents and how to operate in different kinds of currents.

Powerboaters cannot always motor through problem spots or rough areas on moving water. Sometimes, having a motor on a boat makes operators so overconfident that they can boat too close to hazards such as low-head dams. This is where the problems begin. In fact, look at some of our accidents on rivers. The Commission recorded an accident in which two men lost their lives when their 15-foot open motorboat went over a dam on the Susquehanna River. According to witnesses, one of the men on board shouted, "go faster" as they approached the dam. The owner was an experienced boater who knew the river well. It is possible that they intentionally tried to jump the dam.

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# BASICS



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photos-Art Michaels

## Moving-water characteristics

Consider the basics. Current occurs when water flows downstream. As water flows downstream, it seeks the easiest way—the steepest, most direct, clearest route. The current's speed (or velocity) is affected by the volume of water coming downstream, the river width and the gradient (slope).

The volume is the amount of flowing water. It is often expressed in cubic feet per second (cfs). The greater the volume of water, the faster it flows.

A narrow river width constricts the water, forcing it to pile up and move faster. The converging currents meet and often create some kind of turbulence. Wider rivers often have slower, calmer currents.

The gradient is the steepness of the riverbed. A rapid generally has a steep slope, fast-moving current and shallow water. A pool generally has a less steep slope, slower-moving current and deeper water.

Water moves slower near the bottom of the riverbed because of friction. The faster water is near the surface. This is called laminar flow. The edge of the river often shows a movement called helical flow from the friction of the banks. This contact with the banks produces a spiral current. The slower water around the banks is drawn into the faster surface water toward the middle of the river. This current then spirals down toward the river bottom and then toward shore—like a spring. Drop a twig in the water and look for this helical current to pull the twig downstream.

On a river bend, the water tends to move faster and is deeper toward the outside of the curve. The water piles up on the outside of the bend, cutting into the bank. Debris such as fallen trees and brush (called strainers) also piles up in these areas. Strainers trap solid objects such as overturned boats and people, while allowing water to pass through. Always avoid getting swept into the bank or into a strainer.



*Knowing how to read a river can save you much energy, prevent many problems, and increase your enjoyment on the water.*

The inside of the river bend commonly has the slowest-moving water. However, it is often very shallow. These are areas where novices put dings in those shiny new propellers or put scratches in the new paint job. Boaters become pushers, pullers or draggers. Avoid these shallows.

We know that water flows downstream by choosing the easiest route possible until it meets an obstacle and is diverted in another direction. The contours of the riverbed and the geology of the area define the local river. Rivers winding through farmlands are different from the raging rapids rushing over craggy rocks and through narrow hillsides.

Channels are created as water bounces off obstacles and flows around them. In channels with deep water, a downstream "V" is formed as the currents meet in the channel. Rocks or shallow areas are off to the sides, allowing a safe channel down the middle of the downstream V. However, watch the water carefully. Sometimes at the end of the chute, a rock might be hard to see.

An upstream V is formed when the water runs into an obstacle and is forced around it. When you see an upstream V in the river, avoid it. A rock or obstacle is waiting for you.

A rock just above the surface forces the current to flow around it, creating an area of calm water behind it. This calm water has really a slow reversal current. This calm water behind the obstacle is called an "eddy." These eddies provide resting spots for boaters out of the main current.

As water flows over the top of a rock just under the surface, it creates a small wave. This is called a "pillow" because of the smooth, glassy water pouring over the rock.

As water flows over a rock just under the surface in faster-moving water, it creates a standing wave, or haystack, just downstream. These waves are really just "standing water," moving neither upstream nor downstream. Canoeists and kayakers often "surf," or paddle, on these stationary waves.

A large obstacle in fast-moving water, forcing water to drop steeply over it, causes a hole, or hydraulic. This water gets trapped in the hole, or depression, and recirculates. As this water recirculates, it can trap and hold solid objects. Avoid these places in small boats. Their waves can easily swamp and capsize you.

Most people know the dangers of going over a low-head dam, but few realize the hazards of the waters below the dam. A dam does not have to be high to be dangerous. A dam with a waterfall only of 6 inches can kill. Water going over a dam creates a back current, or undertow, that can pull a boat into the turbulence and capsize it. This hydraulic can trap and hold a person or boat. Many dams are not marked and are almost impossible to see from upstream. Know the rivers you plan to travel and always scout ahead.

As you can see, knowing how to read a river can save you much energy and prevent many problems. All rivers are different, so take time to read the river and soon you'll be gliding effortlessly across the surface like some of those canoeing and kayaking experts. ☐

## COURSES

The best way to learn how to boat safely is to take a boating course. Approved classroom boating courses are available from the Commission, U.S. Coast Guard Auxiliary, U.S. Power Squadrons, and other organizations. The cost for these courses varies. To find a classroom boating course, check these resources:

Commission Boating Course Hotline: 1-888-PAFISH-1 (1-888-723-4741).

Commission web site: [www.fish.state.pa.us](http://www.fish.state.pa.us).

U.S. Coast Guard Auxiliary Hotline: 1-800-AUX-USCG (1-800 289-8724).

The Commission also has two approved boating courses for distance learning. Visit our web site to link to the new "Boat Pennsylvania" Internet boating course. To order the Commission's new video/correspondence course, call 1-800-460-9698.

Successful students in approved classroom and Commission-designated distance-learning courses are issued a Boating Safety Education Certificate.

All boaters should know that the International Scale of River Difficulty ranks moving-water segments from Class I to Class VI. Class I is the slowest and easiest for boating with few obstructions and small waves. Class II water can have waves up to 3 feet. The classes represent more difficult water conditions as the numbers increase. Class VI would be like boating over Niagara Falls. If you're a novice river boater, boat on Class I rivers.—CH.