

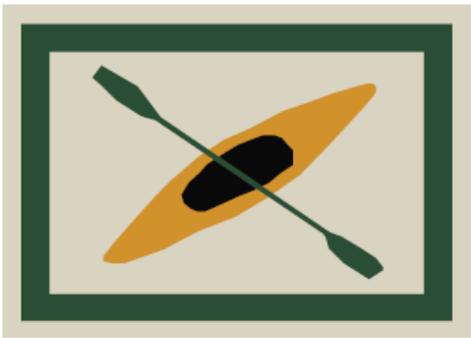


**BADGE COURSE MANUAL**

---

**CANOEING SCOUTCRAFT BADGE**  
*AND*  
**CANOEIST INTEREST BADGE**

---



<i>Name</i>	
<i>Troop</i>	
<i>Course Date</i>	

# CONTENTS

Section	Page
1. Canoeing Scoutcraft - Badge Requirements	3
2. Canoeist Interest - Badge Requirements	4
3. Choosing the right boat	5
4. Kayak Material	9
5. Kayak Construction	10
6. Parts of a canoe	13
7. Parts of a paddle	13
8. Equipment	15
9. How to read a river	17
10. Universal River Signs	21

# Canoeing Scoutcraft - Badge Requirements

1. Pass or have passed the requirements of the Swimming Scoutcraft Badge. .
2. Show knowledge of canoeing as a sport, and its value for healthy exercise.
3. Show knowledge of canoeing accessories, such as buoyancy, paddles, clothing items, rudders, seats, splash covers, etc. Discuss the advantages of the different types of accessories, and how to select these.
4. Discuss the various types of canoes available, the materials used in their construction, and how these apply to various forms of canoeing. Name the main parts of a canoe.
5. Demonstrate sound safety measures when canoeing, including the correct use of personal floatation devices, buoyancy, pre- check items, rules of the road and the buddy system.

## DO EITHER POINT 6 OF POINT 7

6. Take charge of a Canadian canoe, with a bow paddler, in which you perform the following manoeuvres, using single paddles:
  - a) Handle the canoe into water and make fast.
  - b) Board the canoe from the bank or in shallow water.
  - c) Demonstrate correct paddling techniques, including posture and paddling grip, forward stroke, J-stroke, backwater stroke emergency stop, draw strokes.
  - d) Paddle 100 metres on a straight course.
  - e) Paddle 100 metres on a slalom course, around 8 to 10 buoys to demonstrate the above strokes.
  - f) Correctly disembark onto the bank.
  - g) Dressed in normal canoeing gear, capsize in deep water at least 50 metres from the bank. Right the canoe, climb into it and paddle the submerged canoe back to the bank. Empty the water without assistance.
7. Perform the following manoeuvres in a single-seater kayak, using double-bladed feathered paddles:
  - a) Handle the canoe into the water and make fast.
  - b) Board the canoe from the bank or in shallow water.
  - c) Demonstrate correct paddling techniques, including posture and paddling grip, forward stroke, emergency stop, draw strokes.
  - d) Paddle 100 metres on a straight course.
  - e) Paddle 100 metres on a slalom course, around 8 to 10 buoys to demonstrate the above strokes.
  - f) Correctly disembark onto the bank.
  - g) Dressed in normal canoeing gear, capsize in deep water at least 50 metres from the bank. Perform a deep-water rescue with assistance from your buddy and paddle back to the bank.

## **Canoeist Interest - Badge Requirements**

NOTE: The standard required for this badge is to handle a canoe on a grade 2 river of medium to normal fullness. It is essential that the candidate be physically strong enough to handle a submerged canoe on a flowing river.

1. Have passed the Swimming Scoutcraft Badge or complete all the requirements for it.
2. Pass or have passed the requirements of the Canoeing Scoutcraft Badge.
3. Discuss the design features of canoes or kayaks (length, width, etc) and how these impact on the boat's performance.
4. Demonstrate how to maintain a canoe or kayak in good condition and carry out simple repairs to it.
5. Show a knowledge of the dangers and precautions to be taken against waterborne diseases (Bilharzia, Typhoid, Cholera), and against hypothermia and hyperthermia.
6. Demonstrate sound safety measures when paddling on rivers, including paddling on unfamiliar routes and approaching hazards.
7. Demonstrate your competence to paddle a canoe or kayak on a flowing river, including:
  - a) General knowledge of paddling on moving water.
  - b) How to read the river.
  - c) Launching from the bank, and entering the mainstream.
  - d) Turning around and paddling upstream.
  - e) Ferry glide facing upstream and downstream.
  - f) Successfully shoot a fair-sized rapid or weir.
  - g) Approach the bank and climb out onto the bank.
  - h) Capsize in the current and swim the canoe to a shallow or safe place, empty the water and re-board.
8. Show a knowledge of the following obstacles and hazards to be encountered on rivers, how to avoid them, and emergency procedures:
  - a) Eddies, holes, stopper waves, standing waves, backwaters and contra-flow currents at weirs or similar man-made constructions.
  - b) Rocks and rapids.
  - c) Bridges.
  - d) Trees and low branches.
  - e) Fences.
  - f) Other boats and paddlers.
9. Take part in a river expedition of at least 5km. Before starting, be aware of the weather and the potential for a river to flood due to upstream rains. Present a reasonably detailed log of the journey, noting major hazards, important or interesting features and any wildlife encountered. The log should cover a fair description of the river, with sketch maps showing the general course of the river, weirs, rapids, bridges, and important natural features passed on route.

# Canoeist Course

## (1) Choosing the right boat

A kayak's hull size and shape greatly determines its performance characteristics. Here are the most useful design considerations for choosing a boat.

### ***Length***

As a rule, short kayaks (4 meters) turn easier while longer boats (4.5 meters and over) track and glide easier. Keep in mind that it's actually the length of a boat's **waterline** (the line where a boat actually sits in the water) that is most important. A boat's waterline may be significantly shorter than its overall length.

<u>Shorter Kayaks</u>	<u>Longer Kayaks</u>
Easier to turn and manoeuvre.	Easier to paddle over long distances than shorter boats (once you get them up to speed).
Able to make quicker turns.	Able to hold a straight line better to stay on course.
Best for estuaries, small lakes, rivers, less suitable for long trips.	Best for open water; good on smaller bodies of water.
Weigh less.	A bit heavier.
Less affected by winds.	Able to carry heavier loads with less performance loss.
Less cumbersome to transport.	Glide farther per stroke for greater efficiency.
A bit slower.	Move faster.
Good for children and smaller people.	Hold more gear.

### **Width (or Beam)**

Wide boats offer more initial (primary) stability in calm conditions while narrower boats go faster and offer better secondary stability if the boat is leaning on its side. **Initial stability**, this refers to a canoe that sits steady in the water and does not roll from side to side easily.

**Secondary stability** refers to a canoe that can be rolled from side to side and back upright again with relative ease. **Draft** is how deep it sits in the water and **efficiency** is how smoothly it moves through the water.

<u>Narrow</u>	<u>Wider</u>
More tippy.	More stable.
Easier to roll upright after capsizing.	Easier to get in and out of.
Less room for gear.	More room for gear.
Lighter weight.	Heavier.
Tracks better.	The wider it is, the slower it is.
More efficient to paddle through the water.	Requires more effort to paddle because it's pushing more water and heavier.

**Tip:** When looking for a kayak, try getting in and out of the cockpit to see how easy (or hard) it is. You also might want to wear the clothes you'd be wearing while kayaking to fine-tune the fit.

### **Depth**

A touring kayak's depth—the height from the hull to the top of the deck—can be 30 to 40 cm. On sit-on-tops, depth can measure from 25cm to 40cm. Larger and taller paddlers should check for ample depth to ensure enough space and legroom. Taller sides help also deflect water and may help provide more storage space. The downside is that they catch more wind which can slow you down.

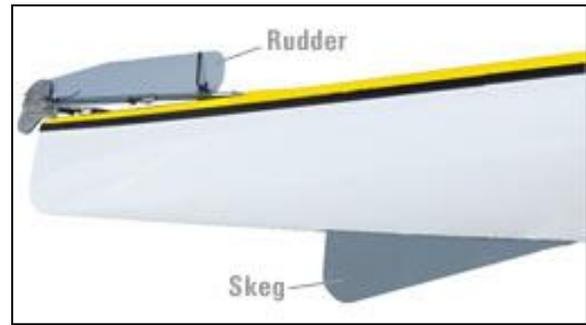
### **Skeg**

This is a triangular, metal plate under the stern that can be raised or lowered. A skeg improves tracking in crosswinds and cross-currents by reducing the weathercocking effect of a boat in the wind. Hand controls near the cockpit or a hand lever is used to adjust it to different

positions. While not real intuitive for beginners, a skeg is a popular feature with kayaking enthusiasts.

### **Rudder**

This is essentially a paddle that attaches to the top of the kayak's stern and is lowered into the water with a hand lever. It goes up and down, left and right. Pushing the foot levers in the cockpit determines which direction the rudder goes to make turning easier.



### **Weight Capacity**

Every boat has a recommended weight limit. Some questions to keep in mind:

- Will your boat be carrying 1 or 2 paddlers?
- Will it be used for day trips or multiday outings?
- Will you be carrying gear for others?
- How much weight will you be carrying besides yourself?

### **Cockpit Comfort**

Once you've decided on a category of kayak, the next consideration should be your comfort in the cockpit. A good-fitting cockpit is one where you sit comfortably but have firm contact everywhere your body touches the boat: feet, knees, thighs, butt and lower back. Here's what to consider.

- **Cockpit size**

A small cockpit holds you inside the kayak better and helps you maneuver efficiently in rough conditions. A large cockpit is easier to get in and out (best for larger or taller paddlers) and allows you to put larger items in the boat. Whenever possible, try out a cockpit for size. Is it big enough for comfort? Or is it too big and you're wiggling around inside it?

- **Seat**

Most seats, especially those on touring kayaks, are padded and can be adjusted up or down and forwards or backwards. Some have adjustable tilt angles. When shopping, sit in the seat and be sure you can adjust it to suit your comfort needs.

- **Foot pegs**

Bracing your feet on foot pegs that are attached to the inside hull helps keep you centered, trim and level. Adjustable pegs give more options for positioning, and they are good for multiple users or if you sell the kayak later. Not all kayaks have foot pegs or braces, but they can be added later.

- **Thigh braces**

These offer foam-padded points of contact between your thighs and the boat. They can be easily adjusted to meet your comfort requirements.

## **(2) Kayak Materials**

These affect the durability, weight and price of a boat.

### ***Polyethylene (PE)***

This is the most popular kayak material used today. It supports a variety of moulding processes. Most common is **rotomoulding** (short for rotational moulding), a process in which plastic pellets are heated in a mould to melt. As it cools, it is rotated to get an even thickness. Polyethylene is inexpensive, easily repairable and wonderfully impact- and abrasion-resistant. It does, however, have a lifespan, and years of sun can eventually cause it to become brittle. Two popular types of polyethylene:

- **Linear:** This is also known as **single-layer polyethylene**. It offers good performance at an affordable price.
- **Superlinear:** This is also known as **high-density polyethylene**. It is considerably lighter, tougher, stiffer and more UV resistant than linear PE, and it costs more as a result.

### ***PolyLink3/Triple Tough***

This material is also referred to **3-layer polyethylene** or **cross-linked polyethylene**. All of these constructions consist of a foam core sandwiched between linear polyethylene layers. The foam core adds insulation, flotation and stiffness. A newer variation of these is called **variable-layer polyethylene**. This strategically places varying layers of foam-core thickness throughout the hull for improved paddling efficiency.

### ***Thermoformed ABS***

The fabrication of acrylic over ABS plastic creates a glossy kayak similar to composites in appearance and performance. Though a bit heavier than composites, thermoformed ABS costs much less. It is lighter than polyethylene and is more resistant to gouges. If it does get a ding, it's repairable.

## **Composites**

This high-end category includes fibreglass, synthetic and carbon blends that are extremely durable and lightweight. Composite boats are more expensive than polyethylene or thermoformed ABS boats.

**PVC (Polyvinyl Chloride):** This flexible, cloth-like thermoplastic material is used to make inflatable kayaks and rafts. It comes in a variety of thicknesses. It is generally tough and resistant to punctures and abrasion.

## **Other Materials**

While **fibreglass** is seldom used by itself anymore, it is an ingredient often featured in high-end composite boats. **Nitrylon** is a trademarked material used in a few inflatables. It features a tough combination of nylon and a Nitrile/natural rubber coating.

The following elements of kayak design are less important for novices to know when looking for a boat, but they do help explain how a kayak works.

## **(3) Kayak Construction**

### **Chine**

The point at where a kayak bottom turns upward and becomes the kayak's side is called the chine. There are 2 types:

- **Soft chine:** Its smooth, rounded shape provides good secondary stability and easier bracing and rolling. The rounded shape also enhances your speed. "Multi-chines" are a type of soft chine.
- **Hard chine:** Its sharper, more pronounced shape enhances tracking and initial stability. A hard chine can also help when hitting a wave and making a turn.

### **Sides**

The sides of a kayak—from the waterline to the deck—affect stability and the ability to right a flipped boat.



- **Flare**

This is the angle of a kayak's sides outward from the hull. The greater the flare, the greater the stability is because the boat sits deeper in the water. Kayaks with flared sides have greater stability but are more difficult to turn rightside-up.

- **Tumblehome**

Associated mostly with canoes, this term can apply to wider kayaks where the sides can curve inward as they come up. This creates a narrower deck which makes it easier to paddle yet still offer good stability.

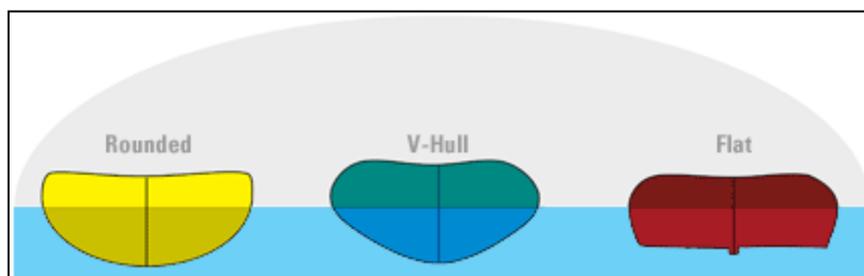
- **Straight**

This shape is in-between a flare and tumblehome.

### Hull Shape

This, the body of the kayak, is another determining factor in how a boat handles on the water.

- **Rounded hulls:** Have less forward water-resistance and thus greater speed.
- **V-shaped hulls:** Provide the least initial stability but offer better secondary stability and straight-line paddling.
- **Flat-bottom hulls:** Have the most initial stability in flat-water conditions.



### Hull Rocker

This is the curvature of a boat's hull running the length of the boat (keel line) from the centre to the ends.

- **More rocker:** The easier it is to turn.
- **Less rocker:** Tracks better in wind and strong waters.

## Symmetry

**Asymmetrical kayaks** have a front and back of different shapes. They track well, but do not turn as fast. Two types:

- **Swede form:** The bow is longer and more slender so paddling strokes may be more efficient. The widest part is behind the paddler.
- **Fish form:** There is more volume in front of the paddler to give better tracking. It's popular on surf (whitewater) boats.

**Symmetrical kayaks** are the same shape front and back. They manoeuvre well in whitewater or small waterways.

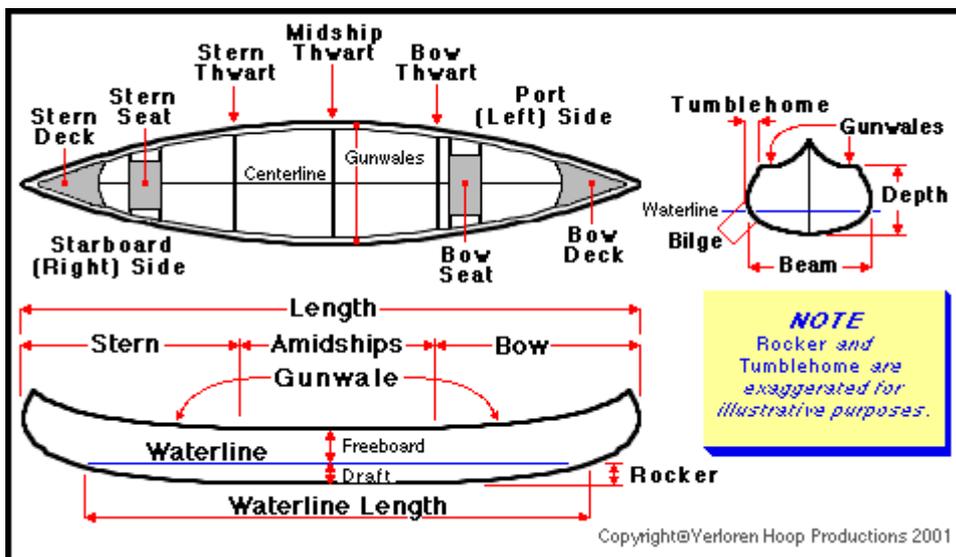
## Entry Line

This refers to the edge of a kayak's hull where it cuts through the water. Sharp entry lines cut through the water for better speed and easier paddling. Blunt bows ride up slightly on incoming waves for better buoyancy and drier paddling in windy, rough conditions.

## (4) Parts of a canoe

When two paddlers are seated in a tandem canoe, they both face the front end of the boat, or the **bow**, and the bow paddler has to squeeze his legs into a narrow, tapered space. So his seat has to be pushed back. The paddler in the rear of the boat—that's the **stern**—has a much easier time of it. They've got all the room in the world for their legs. So their seat can be closer to their end of the boat. If the seats are placed right, the result is a well-balanced boat. Canoes are usually happiest when they're *trimmed*, or balanced, more or less level. In a solo canoe, the single seat is usually placed just *aft* of **amidships**. That makes for good balance and easy paddling.

You'll notice that the canoe in the picture has three **thwarts**. Thwarts stiffen the canoe and prevent the sides from pulling apart under load. Not all canoes have three thwarts. Some canoes have two; others, only one. A few really large canoes have more than three.



## (5) Parts of a paddle

### **Paddle Length**

Paddle length varies based on the type of kayaking you will do, your height, and the type of kayak you paddle.

### **Paddle Shaft**

The shaft is the part of the paddle that you place your hands on. Most people don't realize that there is actually a lot that goes into designing a paddle shaft.

**Shaft Type:** Straight or Bent Shaft. Straight shafts are more common, lighter, and cheaper. Bent Shaft paddles put less stress on your joints, promote proper stroke alignment, and are more comfortable.

**Shaft Size:** Most people don't know that there are different shaft diameters. As hand size increases so does the thickness of the needed paddle shaft. The choice here is primarily based primarily on comfort.

### **Paddle Blade**

The blade is the part of the paddle that enters the water and propels the boat. Similar to the paddle shaft, the design features related to the paddle blade are important.

**Blade Shape:** Symmetrical or Asymmetrical. An asymmetrical shape provides for a smooth entry into the water. A symmetrically shaped blade is able to be paddled with either hand since the blades are exactly the same on both sides.

**Feather:** The feather of a paddle refers to the angle that each blade is offset from each other. The feather of one blade to another is usually measured in 15 degree increments with the most common being a 45 degree feather.

### **Construction**

**Blade and Shaft Materials:** There are many materials that paddles are made from such as: aluminium, plastic, carbon, fibreglass, reinforced

## **(6) Equipment**

When going on expeditions it is critical to pack the right equipment to suite the conditions you are expecting, as well tacking to consideration the possibility of extreme conditions.

### Personal kit

- Sports Bottle for water
- Hat for the sun
- Sunscreen & Lip Balm
- Sunglasses with Strap
- Tents w/rain fly & ground sheet
- Sleeping Bags
- Sleeping Pads
- Insect repellent
- Bathing suit
- Towel
- Hand towel & washcloth
- Quick drying shorts (1 or 2 pair)
- Long pants
- T-shirts (1-3)
- Wool sweater, fleece or Polypro jacket (for cooler weather and/or evening)
- Lightweight rain gear
- River sandals (on & off river)
- Lightweight hiking shoes (for off river)
- Wool or polypro/fleece socks
- Synthetic thermal underwear (top & bottom)
- Large plastic bag (for dirty or wet clothes)
- Favourite Book & games
- Personal Hygiene Items (please choose biodegradable soaps)
- Medications (if needed)

## Boat equipment

- Boat
- Paddle/s
- Lifejacket
- Splash cover
- Buoyancy
- Riper kit (one for group)

## Group kit

- Pots/pans
- Gas cookers
- Food
- First aid kit
- Throw ropes
- Route map
- Lights
- Small tables
- Cooking utensils

## **(7) How to read a river**

Each river is highly complex and dynamic. Some are friendly. Some less so. Sitting in a raft or kayak and cascading down the rapids is only part of the fun. The real thrill comes from utilising one's experience and skill to read and figure out the best course to tackle the river. Since the white water rafter must work with the current rather than fighting it, understanding water flow is essential to having a successful river experience.

### **The International River Grading System**

The first and basic step in understanding a river is knowing what previous rafters have said. This is why the International River Grading System was introduced. The system is a quick and simple guide which rates the difficulty of a particular stretch of river. However, it is just that - a guide. It is the responsibility of each rafter or group leader to decide on the day whether or not a section is appropriate for their personal experience and skill level.

#### *Grade I: Easy*

Rivers with long, flat stretches of slow moving water with occasional simple rapids, or ripples. Waves are low, with obstructions obvious and easy to steer. No technical training needed and self-rescue is easy.

#### *Grade II: Novice*

Fairly frequent rapids, usually with moderate regular waves or easy eddies, which are evident without scouting. Manoeuvring may be required but obstructions easily avoided with some training. Swimmers are seldom injured and group assistance, while helpful, is not needed.

#### *Grade III: Intermediate*

The proficient white water rafter will seek out this grade of water. The main distinguishing factor of Grade 3 water is that the paddler will have to follow a recognisable route to avoid major obstacles and hazards. Rapids numerous with fairly high irregular waves, broken water, and eddies. Often a series of steps with a steep gradient. Course not always easily recognisable. Inspection from the bank advisable for

inexperienced parties. Large waves can be avoided and tight and complex manoeuvring is required. .

#### *Grade IV: Advanced*

Very difficult, long extended stretches of rapids with high irregular waves, difficult broken water, eddies and holes - course often difficult to recognise. Much of the grade will be because of waterfalls or drops up to 3m high.

Channels often narrow and steep sided. Scouting necessary the first time down. May have high unavoidable waves and some rapids may require 'must' moves to avoid dangerous hazards. Rescue requires group skills.

#### *Grade V: Expert*

Water features are similar to Grade IV but they are larger, more violent, and less predictable. Drops may contain holes or steep, congested chutes. Course always complex and very difficult to choose and will involve significant risk to the canoeist and equipment. Scouting is mandatory but often difficult. There will always be a need for bank support for safety and rescue is difficult even for experts.

#### *Grade VI: Extreme*

This is at the extreme limit of white water. Definite risk to life. Rescue may be impossible. This does not include suicidal unrunnable drops (eg. Niagara Falls) but may include drops only occasionally run at favourable water levels, after close inspection, with a team of experts as bank support.

### **Drawbacks to the Guide**

Naturally, rivers do not fit easily into a single category, and individual interpretations can vary. For a more accurate assessment of a river's danger and difficulty it is important to learn details about the nature of that particular river's rapids, its hazards and potential consequences. Take into account the river's volume, velocity and depth - a river's difficulty often rises with its water level. Also, rafters should note the potential danger or likely consequences involved to both themselves and equipment if something goes wrong.

Danger increases dramatically if for example, the river is remote, rocks are sharp, there are trees or obstructions in the water, or the water is extremely cold. A Grade V rapid may be far less dangerous than a Grade I river full of crocodiles.

## Reading Rapid Features

To truly assess a river's friendliness, experienced white water rafters read its basic features by looking for visible signs on the river. This is done both while rafting, concentrating on where to go, and while scouting ahead overland to gauge a run. The signs to look for include visible rocks, water features and hazards. Of course, reading a river isn't simply as easy as reading this article.

It takes proper training, experience and practice. However, here is a short introduction to some of the things experienced rafters look for.

### Visible Rocks

Experienced rafters know that rocks rarely pose a significant threat. They can be spotted easily and avoided. If they are hit, the river current pushing against the rock creates a cushioning effect that slows the boat.

Then, with a little paddle work, it is simply a matter of pushing the boat back into the current. What rocks can do is indicate which way the current is headed. Figuring out why the current is deflected and which way it goes is the key to reading a rapid.

### Chutes

Chutes are features of smooth water flowing through a channel, characterised by V-shaped ripples pointing downstream. They indicate good course. On the other hand, a course where the V-ripples point upstream is not a chute, but a rock, and should be avoided.

### Eddies

An eddy results from water curling to fill the void behind a rock or other obstacle. Often the current in an eddy is very calm and sometimes even flows upstream. It provides a peaceful rest stop before preparing for the next rapid.

### Holes

Submerged rocks can be recognised by either the smooth dome of water flowing over them, or if they're deeper, the turbulent water created just downstream. This turbulence is called hydraulics or holes.

The friendliest shallow holes create waves in front of the rock. However, there are numerous different types and names of hydraulics, some very dangerous, depending on the gradient, volume of water, and size of the rock. Common names include: ledge hole, souse hole, wave, stoppers, reversals, keepers, and pour-overs. If the water pouring over the rock has only a horizon line and little frothy waves, chances are it is a deep ledge hole or souse hole. With these holes water pores in from all sides and also back on itself, creating a backwave. In large ledge holes, the backwave can be very powerful and hard to escape. These holes are dangerous and should be avoided.

### Hazards

Anything in the water is dangerous: trees, branches, old cars, bridge pylons. The experienced rafter continually scans the river, watching for anything unusual. A strainer is an obstruction, usually a tree branch, that is lodged in the river but allows water to flow past. These are among the most serious trapping hazards for rafters.

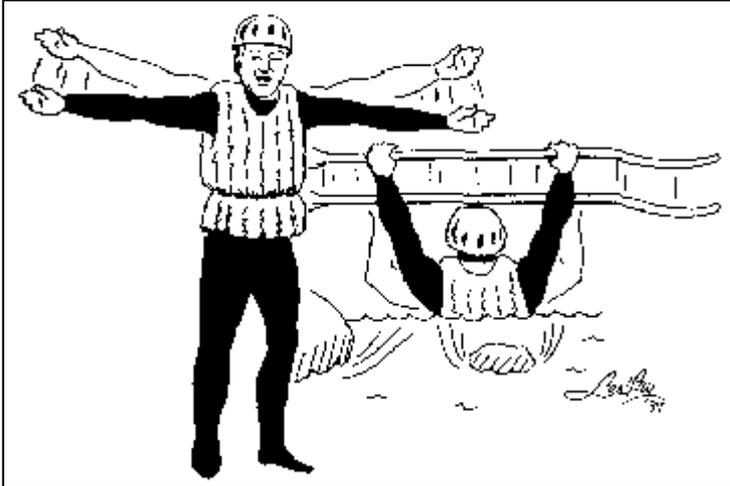
### Health risks

Any time one enters the water there are a number of health risks.

<u>Risk</u>	<u>Prevention</u>
Drowning	Lifejacket, follow safety rules on the river
Waterborne diseases (diarhorrea, typhoid, cholera)	Do not drink river water without purifying
Hyperthermia	Correct clothing and sun protection
Hypothermia	Correct clothing
Hypoglycemia / dehydration	Good nutrition / drinking
Cuts, scratches getting infection from pollution	Clean cut and scratches with disinfect as soon as possible

## (8) Universal River Signs

- *These signals may be substituted with an alternate set of signals agreed upon by the group.*



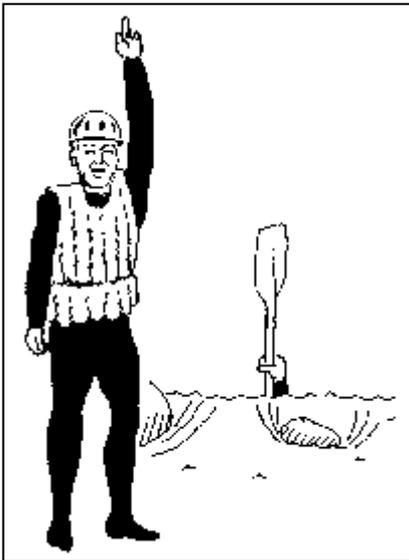
### Stop

Potential Hazard Ahead. Wait for “**all clear**” signal before proceeding, or scout ahead. Form a horizontal bar with your outstretched arms. Those seeing the signal should pass it back to others in the party. -



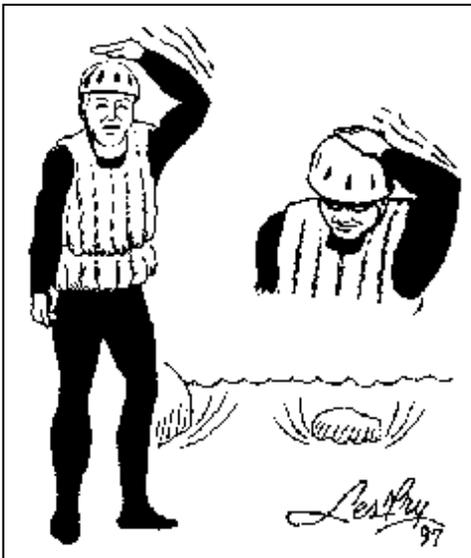
### Help/Emergency

Assist the signaler as quickly as possible. Give three long blasts on a police whistle while waving a paddle, helmet or life vest over your head. If a whistle is not available, use the visual signal alone. A whistle is best carried on a lanyard attached to your life vest.



### **All Clear - Come ahead**

(in the absence of other directions proceed down the center). Form a vertical bar with your paddle or one arm held high above your head. Paddle blade should be turned flat for maximum visibility. To signal direction or a preferred course through a rapid around obstruction, lower the previously vertical “all clear” by 45 degrees toward the side of the river with the preferred route. Never point toward the obstacle you wish to avoid.



### **I'm okay**

I'm okay and not hurt. While holding the elbow outward toward the side, repeatedly pat the top of your head.