Basic Sea Kayaking Course

Student Manual

Helping Hands

As a participant in the Mountaineers Sea Kayaking Course, you will have many opportunities to lend a helping hand.

- **Classroom session** – Help set up before class and take down tables and chairs after class. Help get all the cups, napkins, etc. in the trash. We try to leave the premises spotless.
- **At the pool** – Help out with the unloading of kayaks and equipment before class and loading it all back up after class.
- **On-the-water sessions** – there's always someone nearby that needs help with their equipment at both the beginning and end of the day. Stick around until everyone's ready to leave at the end of the day.
- **On field trips** – Unload or load boats and equipment, or help with cleanup; whatever needs doing.

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Required Equipment for Kayakers

The following items are the 20 essentials common to all sea kayaking activities under The Mountaineers auspices and required on all Mountaineers trips.

Kayaking Essentials for Trip Participants

Sea Kayak with floatation in both ends
Coast Guard-approved PFD
Paddle
Spray Skirt
Pump
Paddle float or self rescue float
Whistle or air horn
Chart in waterproof case
Waterproof compass
Sunglasses with strap
Waterproof 25 SPF+ Sunscreen
Drinking water
Extra food
Extra clothing in waterproof bag
Visual signaling device
Waterproof flashlight w/extra batteries
First-aid kit
Knife
Waterproof matches
Candle or fire starter

Additional Recommended Kayak Equipment

The following items may be may be required by the trip leader for certain conditions. Many of these items may make a trip more comfortable or safe.

Wet suit or dry suit
Waterproof jacket
Hat or Sun visor
Pogies or gloves
Nose clip
Waterproof wrist watch
Toilet paper, trowel and plastic bag
Spare paddle
Tow rope
Sponge
Rescue sling
FUD (feminine urinary director)
Insect repellent
Rear deck light
Tides/currents book
Duct Tape
Towel
Ground insulation
Repair kit
Weather radio
Extra change of clothes
Emergency shelter
Emergency blanket/ sleeping bag

A more in-depth discussion of equipment can be found on the following pages.

Sea Kayaking Equipment

The following kayak accessories are part of the required equipment; **however, they are not included in most kayak rental packages.** All students should either purchase or arrange to borrow these items before their first sea-kayaking trip with The Mountaineers (other than pool and open water sessions that are part of the course).

1. Kayak with floatation or bulkheads, plus deck lines

A good fit in your boat is essential; it affects your control and comfort. It is a boat's weight and size that may influence whether you can get it to and from the water. For more in-depth discussion, refer to Page 18.

Prices depend on the style of boat.

2. USCG approved PFD

Each person is required to carry an approved Personal Flotation Device (PFD) aboard his boat. Approval comes from the U.S. Coast Guard and the Canadian Department of Transport. Inflatable vest and divers' buoyancy compensators are not approved as PFDs for recreational boaters because they require maintenance to stay serviceable; some hybrid styles, which are part foam flotation and part inflatable, are approved although they must be worn, not just carried.

Many PFDs suitable for canoeing, rafting, or general boating do not fit kayakers because they are too long. Since the PFD is worn over the spray skirt, the PFD cannot extend down the body below the spray skirt's tunnel.

Most kayakers wear a Type III vest designed for canoeing and kayaking. The cut is short so the vest doesn't ride up when you're in a seated paddling position. Women now have the availability of PFDs designed for the female shape.

Pay particular attention to underarm comfort, especially with all the clothing layers you might wear. Constriction or excess bulk in this area may result in chafing.

Always wear your PFD every time you go paddling and keep it zipped. Don't just pack it - wear it. The buoyancy it provides is absolutely critical if you end up in the water. **Storing your vest behind your seat and assuming you can slip it on if you capsize or get into trouble is just plain stupid**.

The PFD should be brightly colored or at least adorned with bright tape patches for good visibility. Consider adding pieces of retro reflective tape to the top of the shoulders and upper back for increased visibility.

Some PFDs have pockets for carrying small items such as hiker's compass, knife, small aerial flares, or a basic shore survival kit. **Adding your own pockets or making other modifications to your PFD will void its official approval.** Adding a whistle on a short thin rope attached to a retaining ring, for instance, will not have an effect on its approval rating.

Remember you are dressing not only for comfort but also for SURVIVAL!

Prices: $80 to $250

3. Paddle

Buying a good paddle may have its rewards in the long run. Sea touring paddles come in a wide range of styles, materials, and prices. The differences in paddles may appear subtle at first but will become more obvious throughout the countless thousands of strokes in your paddling career. Refer to page 22 for further detail.

Prices: $60 to $500

4. Spray Skirt

The spray skirt is absolutely essential for safe and pleasant kayaking because it keeps waves from sloshing water into your boat. It is considered safety equipment and therefore is required equipment for paddling with the Mountaineers. A spray skirt is simply a device that fits over the cockpit of your boat. When fit to the boat correctly, it is held securely around the coaming by bungee cord sewn around its edge. A spray skirt must have a release strap, loop or toggle so that its removal can be quick and trouble-free in case of capsize. They can be made of nylon or neoprene, or a combination of the two materials. Nylon skirts generally have a looser fit and are cooler in warm weather. Neoprene will keep you warmer and drier.

When fitting a spray skirt there are two things to consider: the boat coaming size and your size. Not all cockpits are the same size, so be sure the spray skirt is the right size for your boat. Poor conformity to the coaming shape results in sag and water gathering on the skirt deck rather than running off. Nylon spray skirts are adjustable to fit all body sizes. Most neoprene skirts are sized for particular waist sizes (a few are adjustable to some extent).

Neoprene is the top of the line and most expensive spray skirt. They seal better, leak less, and fit more tightly on the deck because they are stretchy, and are warmer which offers no advantage in the summer. Nylon fabric spray skirts are economical and cooler in warm weather. A spray skirt made of a combination of the two materials has a snug fitting neoprene spray deck and coated nylon tunnel.

Most fabric spray skirts have an adjustable tunnel top that can be drawn tightly around your body or left loose for ventilation (one size skirt fits most paddlers, though it still needs to be fit to the coaming). Shoulder straps keep the tunnel high on your torso (without it being tight) to shed spray and keep deck water from running down into your lap. Nylon spray skirts do not seal as tightly as neoprene for rolling or bracing practice; you may find the shoulder straps a hassle to deal with.

Another type of spray skirt, though difficult to find, is one with a zipper. The main advantage is that they allow easy access to the cockpit and safe ventilation without having to remove the skirt from the coaming.

A small pocket on the front of the tunnel is convenient for carrying small items such as a hiker's compass or a folding knife. However, keep in mind that the spray skirt, thus the pocket, will be covered with your PFD and difficult to access. Pockets on your PFD are more usable with your equipment than one inside your spray skirt.

Prices: $50 to $250

5. Bailing Devices

During your ventures on the sea you will eventually need some method of removing accumulated water (and it WILL accumulate!). You will find a large sponge very useful as it comes in handy when you want to remove a small amount of water from the cockpit.

A bilge pump is used to pump out a large amount of water. There are several types or pumps from which to choose. The most economical is a hand-help type. Other types include the portable foot-operated pump, a boat-mounted hand or foot-operated pump, or one that is electrically or battery driven. If your boat has a built-in pump, always make sure it is operable before launching. Whichever type of pump you have, examine the pump diaphragm for cracks or holes and check the hose and exit ports for any obstructions or problems. Check it before each outing to make sure it is operating properly.

The cheapest and most popular pump is the hand-held type. It can be carried in your cockpit when not in use. Mechanically it has a low failure rate and it will remove large quantities of water in a short space of time. Hand-held pumps must have a flotation collar or it will sink.

Prices: $20 to $40

6. Paddle float or self-rescue float

A paddle float is simply a sleeve of flotation material that fits over your paddle blade. This float allows you to use your paddle as a buoyant outrigger to stabilize your boat as you re-enter it from the water. There are several styles of paddle floats on the market, but the most useful is a two-chambered inflatable version. If one side blows out or malfunctions, you still have another inflatable chamber to use. A paddle float can be folded flat for easy storage. It should have a strap or clip to prevent it from coming off the paddle blade when fully inflated.

Price ranges: $33 up

7. Whistle or air horn

The easiest and cheapest safety device you can carry is a rescue whistle. If you paddle in low-visibility conditions, carry a foghorn as another sound signal. When you find yourself paddling in the fog among boat traffic, use your foghorn to signal at least every two minutes.

Whistles of the non-pea type sound like the old fashioned policeman's whistle; those with a pea give a shrill piercing blast familiar to all school playgrounds. If you go with the version with a pea, make sure it is of the nonperishable type and waterproof, or you'll soon find yourself blowing through noiseless pulp.

Price: Pea-less whistle $5. Add a piece of cord for a neck strap.

8. Waterproof chart case

This is an envelope with a clear window on at least one side and a closing that will keep water out. You can slide your chart inside and clip the case to your forward deck rigging or stash it below. Keep it where it's always easy to refer to at a glance.

Prices: Waterproof chart case from a kayak shop: about $30; or a large Zip-lock Bag.

9. Waterproof compass

Every kayaker should carry a compass on anything beyond a backyard trip. Though you may only use your compass a handful of times in a dozen years of paddling, you could have

significant problems without it. There are now numerous small compasses on the market, which are suitable for the kayak paddler and can be fixed to the boat a variety of different ways.

Orienteering/hiking compasses are inexpensive and small enough to be slipped into a pocket fixed to the apron of the spray skirt, or your PFD pocket.

A marine compass is convenient, easier to use and generally more useful. Since it's mounted on your deck towards the bow, a marine compass is always available for use. One can take bearings on a feature in clear visibility to aid navigation simply by pointing the boat at it. Doing the same with a hiker's compass requires that you cease paddling and adjust the compass.

A hiker's compass is nearly as accurate in calm waters for course steering, though in rough seas the boat's movement may cause the needle to hang up occasionally. The most useful hiker's compass has a clear plastic card with a straight edge used to align it with the boat's bow for course steering.

Prices: $40 to $200 and up

10. Sunglasses with strap

Look for sunglasses that offer both UV-A and UV-B protection, and consider polarized lenses for the best glare protection. You'll need a floating retainer strap for your eyewear.

Prices: Sunglasses $20 and up; Strap $5 up.

11. Waterproof Sunscreen (SPF-25+ recommended)

Don't forget sunscreen on your face, the tops of your ears, your neck—even if you wear a hat with a wide brim, and the backs of your hands. Be aware that sunscreen can damage the latex gaskets on dry suits, so be careful how you apply it.

Price: Sunscreen $4 and up.

12. Drinking water

When your brain says, "it's time to drink something", you are already two pints into dehydration. Hydrate your body before you set off on a trip. Even on short trips, take a hot sweet drink of some sort in a thermos flask. The sugar will help to restore your blood sugar level after strenuous activity. A fact not commonly known is that a hot drink will keep you cool in hot weather. A good container for drinking water is a used 2-liter soda bottle or a camel back water bag.

13. Extra food

Carry extra food to be used only in the event of an emergency. Emergency food may lie in the container for an extended period so choose something will last indefinitely without refrigeration, such as barley sugar, glucose sweets or a granola or protein bar. It should be high in fat content since fats contain nearly 2 ½ times the energy per ounce of proteins or carbohydrates.

Health food shops sell blocks of concentrated compressed fruit and vegetable compounds, which last a long, time and are very tasty as well as filling. Mountaineering shops also usually carry a good line in emergency and dried food. The last factor is probably the most important: in a sea kayak emergency, staying warm is a prime concern. To stay warm, your internal fires must be kept stoked with fuel (calories).

14. Extra clothing in waterproof bag

Dry bags are usually made of coated nylon or vinyl, and all seams are welded for waterproofing. Nylon bags slide more easily in and out of kayak hatches but are slightly more expensive than vinyl ones. Always take extra clothing! You never know when you will need to change into warm or dry clothes.

If you stop to take a break, like lunch, you will want to have a jacket, extra gloves and a warm hat on cool days.

After paddling you will be in the same position as if you were exercising. Moisture from your body will start to cool you down. This can cause you to get cold quickly, especially when you are on the beach out in the wind. Often there are not many shelters around to keep you nice and warm.

Your extra clothing should consist of a wool shirt or sweater, jacket, rain pants, hat, gloves, & socks. Any fabrics you wear in the water must be quick to dry and they must continue to warm you even when wet. Synthetic fabrics such as pile or fleece also work well. Wool will continue to warm you when wet but it grows heavy in the water and is much slower to dry.

Your outer layers should be waterproof and provide wind protection. The layers next to your body should wick moisture away from your skin and provide warmth. Synthetic thermal underwear is the best thing to wear next to your body in cold-water situations. Don't forget to wear a hat to prevent heat loss from your head. Consider neoprene paddling gloves or pogies for your hands and neoprene booties for your feet. **Never wear cotton clothing on the water**; it gets heavy when wet and will pull heat from your body through evaporative cooling creating a dangerous situation.

Take a waterproof bag for extra clothes

Price: A kayak-type dry bag $15 or use two heavy-duty trash bags to double wrap clothes.

15. Visual signaling device (e.g. flares, mirror, dye)

For longer-range signaling, small handheld aerial orange flares send their signals as high as 500 feet. Most marine supply stores sell these flares in packs of three; however we suggest you carry more than one pack. They have low visibility on the open ocean, but can be seen from a reasonable distance for coastal and lake paddlers.

If you plan to paddle regularly on open water, well offshore, investing in some parachute flares or a flare pistol is a good choice. Both are significantly more powerful than the small, handheld versions. They are more expensive, but have the firepower to send brighter signals higher and for a longer duration.

Prices: Flares (Marine store: three pack of "Skyblazer" rocket flares, $18)

A small signaling mirror is useful on sunny days and can be directed at other vessels for effective signaling in emergencies.

Prices: Steel or plastic signal mirror $4 to $10 at marine or surplus stores.

A strobe worn on your life vest shoulder is a smart addition for nighttime paddling. Make sure to regularly check batteries, grease the gasket, and clean the contacts.

Prices: Strobe $35 or more at marine or kayak stores.

Signaling devices (with the exception of your whistle and flashlight) are to be used for specific signaling or emergency purposes. Under no circumstances should you use a flare or smoke canister unless you need immediate assistance. These are an irreversible signal indicating an emergency. Remember to carry a variety of signaling devices that will cover you in a range of light conditions, from full sun to dark, and make sure you strike a balance between the visual and sound devices you carry onboard. Check your signaling equipment regularly since you don't use them each time you go out. Check that all flares are within their expiration dates.

Radios & Cell Phones

VHF radios and cellular phones provide you the means to signal for help, and also allow you to relay information to an outside party about your situation and location. VHF radios are a means of onboard communication used by mariners and ships, and have different channels you can use for communication. Over the years VHF radios have gotten smaller and less expensive. Cellular phones are easily packed for a trip. A cellular phone can put you in touch with emergency services quickly, but it will not provide communication lines to other vessels or to weather information like a VHF radio will. Both of these will need to be put in waterproof bags.

Prices: Handheld versions are available for $150-$500.

16. Waterproof flashlight w/extra batteries and bulbs or chemical light stick

A flashlight can be used as a signaling device as well as a light source at night. You can stick a flashlight under your deck rigging for a running light, or use a headlamp which will free your hands and allow you to direct your beam of light with a turn of your head.

Price: Waterproof flashlight $12 or chemical light stick $3 at hardware stores.

17. First-aid kit

There are small inexpensive first-aid kits you can buy from almost any store. You can also make one yourself. A mountaineering -oriented first-aid kit must be carried on every trip. The kit should be compact and sturdy and in a waterproof container.

Prices: $30 to $150

18. Knife

When choosing a knife, make sure it is stainless steel. There are several kinds out on the market. Find the one that best suits your needs. These can be fixed to your PFD for quick release on a plastic sheath that keeps the knife locked away.

Prices: $35 to $70

19. Waterproof matches

Waterproof matches can be found at most outdoor center stores. These are very inexpensive and great to have when everything else is wet.

20. Candle or fire starter

These can be found at any store. Keep these in your repair kit as you never know when you will need them. Candles or fire starters don't take up a lot of space and can be a lifesaver.

Additional Recommended Kayak Equipment

1. Wet suit or dry suit

Wet suits are designed to keep you wet and warm. They are made of closed-cell foam called neoprene that insulates your body by trapping a thin layer of water next to your skin. This water is warmed by your body, and will buy you time if immersed in cold water. Popular styles are the Long John or Farmer John. This is a sleeveless one piece with roomy armholes and a vest type neckline.

Prices: $95 and up

Dry suits are designed to keep you dry and warm. They are made from thin waterproof fabric with thin latex gaskets at the neck and wrist. Look for dry suits made of waterproof breathable fabrics such as Gore-Tex to allow perspiration to escape. Make sure they have attached booties to keep feet dry, plus a "pee zipper". One or two pockets are a nice bonus.

Prices: $600 and up

Shoes routinely get wet while launching and landing. Plan to wear appropriate footwear such as kayak boots, aqua socks, water shoes, or old tennis shoes.

Prices: $5 and up; Rite Aid and Fred Meyers carry inexpensive aqua shoes.

A more in-depth discussion of wet suits and dry suits and what to wear under them will be found on page 24.

2. Waterproof jacket

This jacket is the primary defense against both wind and water. Either a raincoat or short sleeve paddle jacket will suffice.

Prices: $50 and up

3. Hat with visor:

Brimmed hats are very important for sun protection. (Baseball cap etc. – add strap to keep it on your head in the wind) Gore-Tex rain hats good for cool sunny days. A neoprene hood offers vital hypothermia protection. Half of the heat loss in water occurs through your head, whether you wear a wet or dry suit or not. A wool or synthetic hat may be sufficient.

Prices: $10 and up

4. Pogies or gloves

Medium thickness neoprene gloves for winter and thin gloves for summer are helpful for protection from the elements and to help prevent blisters on your hands. Look for gloves that do not have a seam between the fingers and are not so thick that you lose your dexterity. Pogies are mitts that seal over the paddle shaft and allow direct hand contact with the paddle, yet provide water and wind protection.

Prices: $10 and up

5. Waterproof wristwatch

(Discount-store digital kind is fine) Prices: $30 and up

6. Toilet paper, trowel and plastic bag:

It is your responsibility to properly dispose of your human waste. Further information can be found in the Additional Documents section, page 63.

7. Spare paddle

A spare paddle is essential because your main paddle can be broken or lost if you capsize in current.

Prices: $50 and up

8. Floating tow rope

Tow ropes should be 40 – 50 feet long, be made of a floatable material, have a large carabineer-type clip to attach to the towed kayak with, and a large pouch to easily store the rope in when not in use. They have a belt that fits around your waist and should have an "easy-release" pull to quickly remove the tow rope from your waist in an emergency

Prices: $18 to $40 and up

9. Sponge

A large sponge is nice for keeping up with spray skirt leaks or the water that inevitably comes in with your wading footgear. Secure it under or next to the seat.

Prices: $3 or less.

10. Rescue sling

It's best to get 25 feet of one inch wide nylon webbing from a climbing store. Thread webbing through a scrap of closed cell foam and tie webbing into a loop.

Prices: Vary with types of materials used

11. Nose clip

A nose clip is a steel or plastic spring which holds and presses two rubbed disc-shaped pads against both sides of the nose. This keeps water out of the sinuses when going through surf, or learning to roll. Water in the sinus can be uncomfortable, especially when the water is cold.

Prices: $9 to $18

12. Insect repellent

Choose a waterproof variety if possible.

Price: $5

13. Rear deck light

Often available at kayak shops is a type that attaches with a suction cup.

Price: $20

14. Tides/currents book

These may be purchase from marine stores or kayak shops. Please make sure yours is up to date.

Price: $5

15. Duct Tape

Duct tape is a kayaker's first line of defense for repairs. If you don't have room for an entire roll, wrap 10' to 25' on a toilet paper tube.

Duct tape, $3 or more

16. Towel

A hand towel works well for day trips. This will come in handy when everything else is wet and you just want to dry hands and face.

Price: Bring one from home

17. Ground insulation

This is nice to have when you stop for breaks and lunches. If you are wearing a wet/dry suit it will give protection from punctures to the suit. It also is a good insulation from the cold rocks you may have to sit on.

Prices: vary

18. Repair kit

A repair kit may be as simple as duct tape and Leatherman multi-tool or a pair of pliers and a screwdriver. It's a good idea to also carry some wire, moldable epoxy, a needle and heavy thread, and a stainless steel ¼ -20 nut and 1" bolt.

Prices: Leatherman tool, $30 to $60;

19. Weather/VHF radio

Price: $20 - $200 from marine supply stores

20. Extra Change.

Extra money for snacks at a marina or for emergency ferry rides if you need one is very helpful.

Priceless!

21. Emergency shelter

An emergency shelter can be a simple as a plastic tarp and some rope, or a more expensive bivy bag.

Price: Plastic tarp $7; bivy bag $120 an up

22. Emergency blanket/ sleeping bag

Anything from a plastic survival bag which is inexpensive and compact, to a more expensive synthetic-filled sleeping bag would work. Avoid down-filled bags as they take a while to dry when wet.

Prices: Survival bag $6; Sleeping bag $60 and up

23. FUD for women (feminine urinary director)

OK fellas, you can skip this section if you want….

Ladies, if your dry suit has a "pee zipper", then you will have the distinct advantage of being able to urinate using a FUD, without having to strip off your dry suit and undergarments. (Imagine yourself on a small beach with no cover and 11 other people…..). The most common FUD used is the Freshette brand which is a two piece model that fits easily into your dry suit or PFD pocket and is easy to use, with a little practice.

Price: $25 at REI and Kayak Academy

Gear Storage

Now that you've gathered all this gear, you need a proper place to store it. Kayakers most commonly use dry bags for this purpose. Dry bags come in different materials, such as vinyl and coated nylon. Vinyl bags offer low cost and can be see through which offers an easy way to determine the bag's contents; vinyl bags are neither as flexible nor as durable as nylon bags. Nylon bags can be more expensive and opaque, but have the value of being more compressible and slide easier against the hull and other bags. Choose the type that is in your budget.

As far as size, it's easier to find something by opening one small bag that has small number of contents than one large bag that has a large number of contents. It also makes it easier to get many smaller bags through the hatch cover of your kayak. Labeling dry bags also make finding an item much easier.

Your repair kit that may have sharp objects that can puncture a dry bag, so instead consider using a tough polypropylene water bottle – these are the white ones, not the clear ones.

Avoid buying too many dry bags until you find the brand and material that meets your needs. An assortment seems to be what most experienced kayakers own.

Boats and Paddles

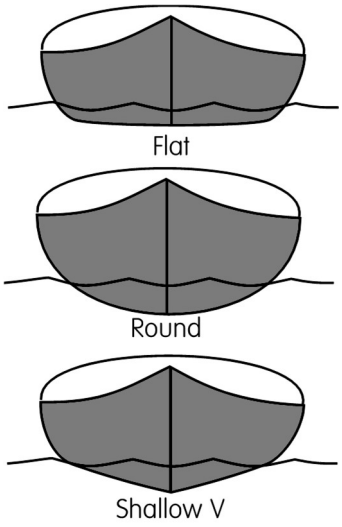
The Boat

Your requirements for a kayak are mostly based on where you go and the types of conditions you may find.

If taking long trips, you may want lots of storage space, low hull resistance for easier paddling, high secondary stability for the big waves, and a low profile for reduced wind resistance

On short relaxed trips, you will be more in control of your exposure to weather, thus avoiding heavy seas, wind and current. You might not be concerned as much about speed, distance and days of travel, so you might want to opt for the higher initial stability of a wider boat which may be more comfortable and may let you stop and take pictures while not paying as much attention to balance.

Your current skill level and anticipated skill levels also determine the type of boat to chose. If you anticipate a lot of paddling and rapid increase in skill level, you may want a boat that is above your present skill level. On the other hand if you have little interest in playing in currents, wind and waves, you might not need a high performance boat that *may* feel a bit unstable and cramped, and has expensive high-tech materials or designs.



Evaluating Boats

Try many boats and test them out before you invest in a boat. Here are some ideas on trying boats out:

Look for sea kayak symposiums. For a small fee, you can try out many different types of boats, as well as talk to manufacturers and designers.

When talking to any kayak shop, ask if they have a demo model of the boat or boats in which you are interested. Nothing beats trying out a boat before you buy it. A good rule of thumb is to paddle a boat for at least an hour before purchasing. Although a boat may have all the bells and whistles, comfort is key as you may spend hours kayaking in your boat.

Try switching boats with friends you make in this kayak class. Most instructors will be glad to have you try their boat out.

Hull Design

Hull design is a complex art and sophisticated science. Almost anything said about hull design can be shown to be wrong to some extent. Visit kayak designers web sites for more information.

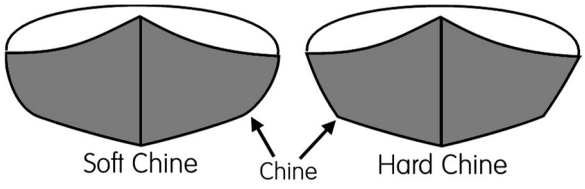
There are some essential trade-offs in boat design. High initial stability may mean lower *secondary* stability and less ease of paddling. A hard chine may mean superior tracking and turning, but possibly at the cost of greater turbulence and friction. A wide beam can mean high initial stability at the cost of a little less distance achieved for a given paddling effort.

Hull Section refers to the shape you'd see if you sliced through the boat, a cross-section. The most common shapes are flat, round, and shallow V.

The flat bottom boat will be very stable in calm water, but will rock with the waves as they build. A round cross-section will have less initial stability, but greater secondary stability, and will be tossed less by building waves. Finally, a shallow V cross-section, with a well-defined keel, will tend to track better than the other two. Also, as the boat is heeled over, or put on edge, the outer chine (see below) becomes a curved keel and creates a track that encourages the boat to turn.

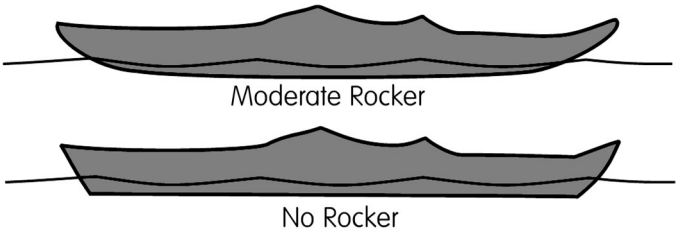
The section normally above the waterline is important too. The "shallow arch" section has a *tumblehome* deck, which allows a more vertical paddle position than otherwise would be possible. This can be important on a wide boat, and double-seat kayaks are often designed this way. The flared shape of the V-bottom section can enhance secondary stability.

The *beam*, or width at the waterline, has an effect on ease of paddling, stability and resistance. A wider boat will feel more stable in calm water, but will be difficult to keep your paddle near vertical. It creates more drag in water, and will be unstable in waves.



Chines describe the intersection between the bottom and the sides of the hull. A hard chine is angular, whereas a soft chine is rounded. A *hard chine* boat will tend to track better. If there is only a keel chine, the boat will track straightaway, and the hull provides little help in an edged turn. Chines will help turning when the boat is edged.

Rocker is the amount of upsweep of the keel line from the middle of the boat to its bow and stern. A boat with moderate rocker has a shorter waterline and thus less hull speed, but turns easier and tends to keep the bow of the boat up when encountering large waves and surf.



Hull Speed

The optimum design speed of the hull is based on the shape, dimensions, and smoothness of the hull. Hull speed expresses itself in very real terms in two ways.

1. There is a certain speed at which your boat will travel with the least effort. To go faster requires much more effort. To go **slower** requires more effort.

2. There is a certain top speed for each hull design. As you approach that speed, the drag becomes greater and greater, thus making any additional gain in speed very costly in energy. A racing boat that's long, narrow and very unstable paddled by an Olympic athlete can go eight knots. In a sea kayak, you might be able to go six knots but only briefly over a short distance.

There are at least two situations where top speed is important:

1. If you stop paddling for some reason, and your group keeps going, it will be hard to catch up if they're going three knots and you can only paddle four. If you paddle hard to catch them, you will be exhausted. Don't let yourself get very far behind. The Mountaineers policy is to paddle as slow as the slowest paddler, which makes for a more relaxed paddle

2. If you've struggled two hours against a head wind, stopped, had lunch, and now you're planning to get back with a great boost from behind in only 45 minutes, forget it! This isn't like hiking downhill; hull speed sets your top limit. It's a lot easier paddling "downhill," but surprisingly not that much faster.

"When the going gets tough, the tough get going." If you paddle directly against a two-knot current and if your boat speed is three knots, your "speed over ground" is one knot. If you paddle four knots, your speed over ground just doubled to two knots, which means that your time to cover this same distance is cut in half. So the rule is, "A little more effort means a lot less time."

Construction Materials

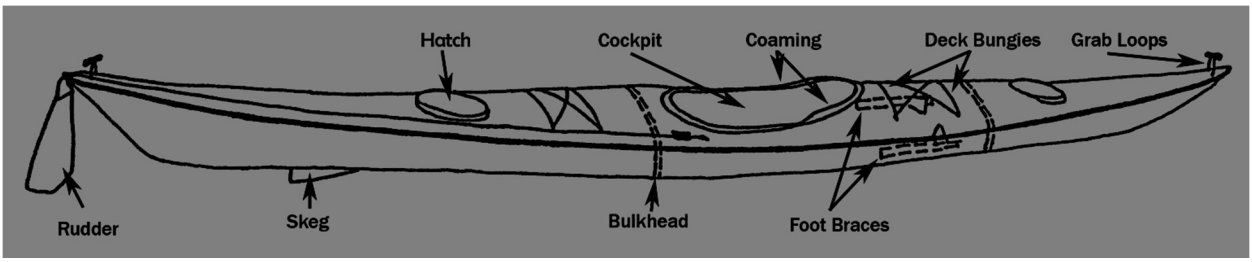
Plastic, usually polyethylene, has the advantage of lower cost and higher durability. It has the disadvantages of having higher weight which creates more drag, being difficult to repair, and having poorer workability, e.g., sharp corners, or "low radius curves", cannot be fabricated.

Fiberglass is very workable, which enables high performance shapes. It can be covered with gel coat to produce a wide range of colors. While it is easier to damage than polyethylene, temporary repairs are easier. Permanent repairs may require experience with handling fiberglass resins.

Kevlar has the positive attributes of fiberglass yet lighter for the same strength. Kevlar cloth is used in place of fiberglass mat in hulls. Kevlar is considerably more expensive than fiberglass for both construction and repair.

Wood boats can be the least expensive (as kits) or the most expensive (as works of art as well as high performance boats). Kit boats almost invariably have hard chines running the length of the boat, which can be a negative on performance. On the plus side, they are stronger and lighter than glass and at least equal to Kevlar. Non-kit wood boats are strong, light, with similar high performance in design as glass boats.

Fit and finish are obviously important. Check for pinhole leaks around bulkheads, defects in gel coat, smoothly working skeg or rudder, and general quality. For your part, gel coat requires regular maintenance. According to certain manufacturers, a year's worth of scratches can increase resistance 50%, wiping out the advantages of sophisticated designs.



Design Features

Bulkheads create compartments that provide strength, built-in flotation, and easier access to stowed equipment. However, these compartments also reduce the size of equipment you can stow, add to the weight of the boat, and can be a problem if leaks develop in the bulkheads..

Hatches should be large enough to get your gear through. Hatches on narrow boats may be oval to provide a wider opening in the fore and aft direction. A "day hatch" can provide access to a small compartment accessible from the cockpit for the limber paddler. If a hatch must be opened on the water, a small compartment offers less risk from flooding. Hatch covers should be water tight and perhaps fixed to the boat with a lanyard.

Seats should be comfortable, although for real comfort you'll have to "pad" out the cockpit. Mariner has a seat that can be adjusted fore and aft to trim the boat. A low seat is better than a high one; a low seat means a low center of gravity which creates better stability and reduces your exposure as a sail. If the back of the seat is high - higher than the coaming behind it - it may be difficult to lay back for certain kinds of Eskimo rolls and to re-enter the boat on wet exit recovery. If you don't plan to roll or get wet, then a high back seat may work but is not recommended.

Eyelets for deck rigging are less likely to gouge you as you climb onto the deck in a self-rescue if they are *recessed*. It is more expensive for the manufacturer to provide the recesses in the hull for this purpose. On the inside of the hull, note whether the eyelet fasteners are finished off cleanly so they won't snag stowed gear.

Foot pegs sliding on rails make it easier to adapt the boat for different people. Without foot pegs, you typically have fit the boat to your size by putting a foam block against the bulkhead. Of course if you have no bulkhead, foot pegs are mandatory. Look to see that they are sturdy and easily adjusted.

Rudders and Skegs are often provided to maintain control under adverse wind conditions. Some manufacturers choose not to add either. Rudders can be added by the consumer, but skegs are built into the boat by the manufacturer.

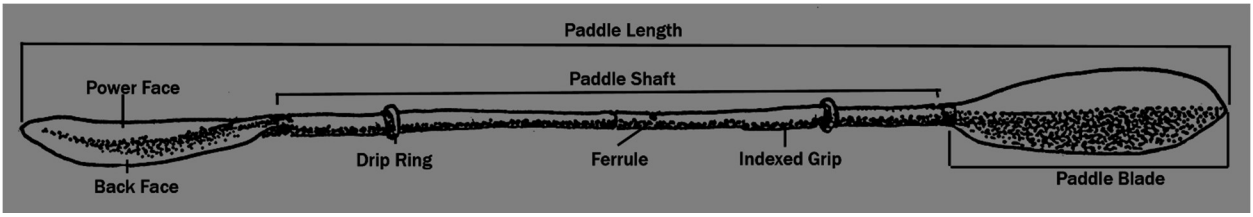
Rudders should not wobble from side to side, and should be easily raised and lowered from the cockpit. If you do need a rudder, a simple design is best and easiest to repair while underway. Any rudder will add to drag, and rudders on a hard chine boat are in a sense redundant.

Skegs should be easy to raise or lower from the cockpit and able to fine-tune the position for the conditions. A small movement of the line connecting to the skeg should not result in a huge movement of the skeg. Skegs are simpler and don't add as much drag as rudders, but don't allow for as much fine-tuning. A kayak will not have both a rudder and a skeg, but may have neither.

Compass recess may be useful if you plan on mounting one on your boat.

Spare paddle holder can be installed using your own system for protecting your deck from scrapes by your spare paddle.

Bow and Stern cleats are often used for tying down your boat on the top of a car. Toggles tied into these cleats make carrying your boat across a beach a whole lot easier. Small diameter toggle handles may be very uncomfortable. Check the toggles regularly for wear.



The Paddle

Next to your boat, a paddle is your most important choice. The beam, or width, of your boat and the type of stroke influence the style of paddle you choose.

Length: Choice is influenced by the beam of your boat and the style of your stroke. A wider boat requires a longer paddle. However, a more vertical stroke suggests a shorter paddle. Using a vertical stroke in a wide boat can be difficult.

Shaft diameter: To fit your grip properly, choose an appropriate diameter shaft. Some manufacturers make two different diameters to accommodate smaller hands. Some sort of indexing, such as an eccentric shaft, will help queue your hands as to position.

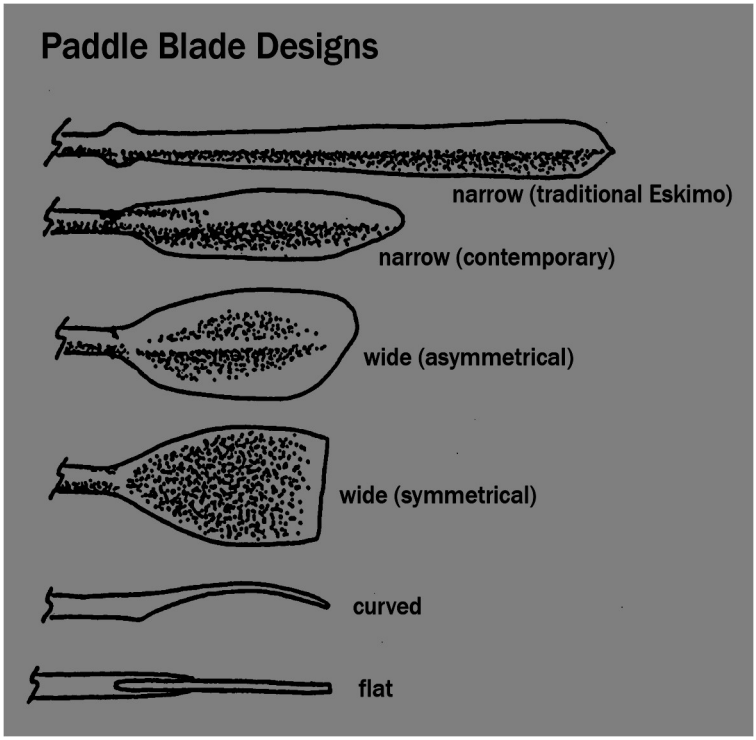
Weight: Light is less tiring. The very light, high-strength (and expensive) materials, like carbon fiber, are more fragile and easier to break, such as when bracing to enter a boat. A fiberglass is often suitable for beginners or as a backup paddle.

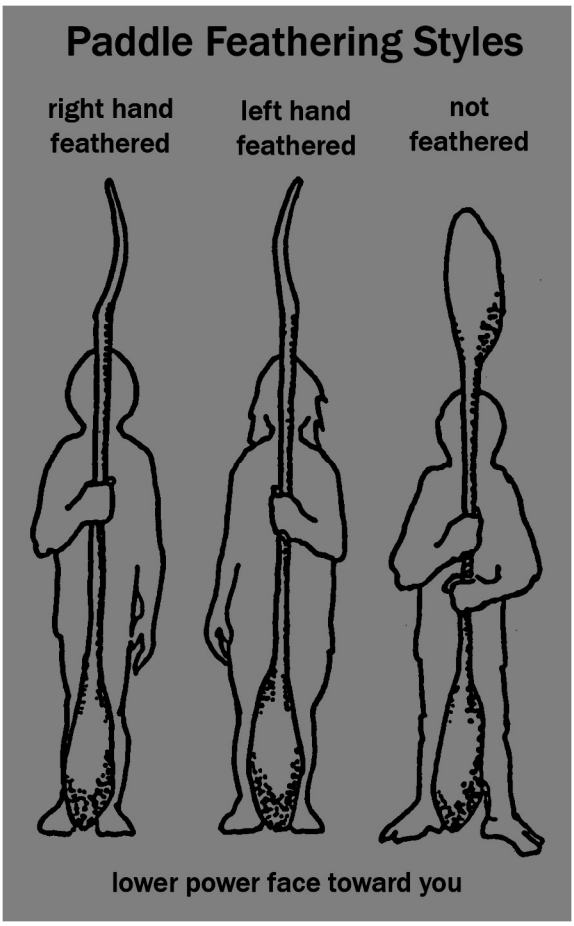
Blade size: A larger blade is going to move you faster - and tire you faster. Large blades are often used in a more-vertical stroke. Refer to the Paddle Blade Designs illustration for a list of the commonly used blade configurations.

Split shaft: A one-piece paddle is long and can be difficult to stow. Typical paddles break apart in the middle. Usually a spilt shaft paddle comes in 2 pieces, but some 3- and 4-piece paddles are available.

Right / Left Hand: One hand will be the dominant, or control hand while paddling. Personal preference will indicate whether a right or left-hand control is desired. Most paddlers are right-handed.

Feathering: Paddle blades oriented in the same plane are called 'un-feathered'. Paddles with blades oriented in different planes are called 'feathered'. Feather angles can vary, usually from 45º to 90º. Most often 2-piece paddles are designed for 0º (un-feathered) and a feathered angle, depending on the preference of the paddler, although newer models allow increments of 5° in either direction. The decision to go with a feathered or un-feathered paddle is based entirely on preference, and is determined simply by trial and error to see which you prefer. Some paddlers feel the advantage of a feathered paddle is reduced sail action on the out-of-water side.





Wet Suits and Dry Suits

Wet Suits

Wet suits are made of neoprene (generally 2 to 5 millimeters in thickness). The neoprene is covered with nylon on the inside. Newer style suits are covered with nylon on both the inside and outside.

Wet suits are available in many different styles, such as:

2-piece: short sleeve shirt top and shorts
2-piece: jacket top and pants
2-piece: jacket top and shorts
Farmer John or Jane which resembles a pair of bib overalls
1-piece: body suit, which is worn mostly by water skiers and wind surfers
1-piece shorty: body suit with arms cut at short sleeve length and legs cut at mid-thigh length

The Farmer John, unaccompanied by the jacket top is generally the wet suit of choice because it allows good arm movement and provides good core temperature protection. Farmer Johns work well with polypropylene layering and dry tops.

Dry Suits

Dry suits are made of either coated nylon or Gore-Tex® type material. Wrists and neck are fitted with latex seals with or without neoprene closures. A subcategory known as *Semi-dry* uses only adjustable neoprene at sleeve, leg and neck openings.

Dry suits are available in several different styles: The 1-piece body suit is the most common but they also come as 2-piece (jacket top and pants or jacket top and bib overalls). The 1-piece suit utilizes a waterproof zipper for entry and exit. Most kayakers opt for a front mounted zipper. Look for dry suits with Gore-Tex booties in place of the ankle gaskets so your feet stay dry. Also make sure your dry suit has a "pee zipper" and, ideally one or two pockets.

Dry suits do not keep you warm – they just keep you dry. You need to wear season-appropriate clothing underneath to keep you warm. In the summer this may be a layer or two of clothing made from synthetic materials. In the winter, this may be polypropylene long johns with a layer or two of fleece over that, a fleece vest and wool socks.

Local Rentals

Refer to the Kayak Equipment Suppliers list for location and phone numbers.

KAYAK ACADEMY — Wet suit and dry suit rental

Kayak Equipment Suppliers

Local Suppliers

BOSTON HARBOR MARINA
312 73rd Ave NE
Olympia, WA 98506
360-357-5670
http://www.bostonharbormarina.com/

WEST MARINE (SEATTLE)
1827 - 15th Ave W Ste A22
Seattle, WA 98119
206-926-0356
http://www.westmarine.com/stores/seattle-wa-1322

CAPTAIN'S NAUTICAL SUPPLY
1120 NW Ballard Way
Seattle, WA 98107
206-283-7242
https://www.captainsnautical.com

KAYAK ACADAMY
11801 188th Ave SE
Issaquah, WA 98027
206-527-1825
www.kayakacademy.com

NC KAYAKS
2911 S Chandler St
Tacoma, WA 98409
888-441-8582
www.nckayaks.com

REI (SILVERDALE)
10903 NW Myhre Pl
Silverdale, WA 98383
(360) 337-1938
www.rei.com

SHIP TO SHORE MARINE SUPPLY
3403 Harborview Dr.
Gig Harbor, WA 98332
253-858-6090
http://www.shiptoshoremarine.com

WEST MARINE (GIG HARBOR)
3119 Judson St., Suite A
Gig Harbor, WWA 98335
253-858-6250
http://www.westmarine.com/stores/gig-harbor-wa-5536

WEST MARINE (TACOMA)
3212 20th East
Tacoma, WA.
253-926-2533
https://www.westmarine.com/stores/fife-wa-24

VASHON WATERSPORTS
8900 SW Harbor Drive
Vashon, WA 98070
206-463-9257
http://www.vashonwatersports.com/

REI (SOUTH CENTER)
240 Andover Park W.
Tukwila, WA 98188
(206) 248-1938
www.rei.com

REI (TACOMA)
3825 S Steele St
Tacoma, WA 98409
253-671-1938
www.rei.com

REI (OLYMPIA)
625 Black Lake Blvd SW, Suite 410
Olympia, WA 98502
(360) 786-1938
www.rei.com

Internet Suppliers

ALTREC.COM
135 Lake Street South #1000
Kirkland, WA 98033
800-369-3949
www.altrec.com

CASCADE OUTFITTERS
P.O. Box 209
Springfield, OR 97477
800-223-7238
www.cascadeoutfitters.com

NORTHWEST RIVER SUPPLIES
P.O. Box 9186
Moscow, ID 83843
800-635-5202
www.nrs.com

KOKATAT WATERSPORTS
5350 Ericson Way
Arcata, CA 95521
800-225-9749
www.kokatat.com

SIERRA TRADING POST
5025 Campstool Road
Cheyenne, WY 82007
800-713-4534
www.sierratradingpost.com

Magazines

CANOE & KAYAK MAGAZINE
10526 NE 68th St, Suite 3
Kirkland, WA 98033
800-829-3340
www.canoekayak.com

WAVELENGTH
http://www.wavelengthmag.com/

Last Updated: January 2017

Classroom Session - Environment

Basic Navigation

Trip Planning

- Hazards
- Seamanship
- Sea Kayaking Trip Classification
- Weather Guide
- Conservation Principles for Kayakers

Basic Navigation

Navigation Aids

Like most human endeavors, to accomplish a task we use tools. Below you will find list of the most common tools used in navigation. Some are optional, other necessary.

Chart	Compass	Compass Rose	Dividers
Parallel rulers	Pencil	Art gum eraser	String

Latitude & Longitude

Lines of latitude and longitude compose a grid system that crisscrosses the globe. Lines of longitude extend vertically from the North to South poles and are seen on the top and bottom of the chart. Lines of latitude extend horizontally, parallel to the equator. Lines of latitude run along the left & right sides of your chart in degrees, minutes and 1/10 of minutes. One minute of **latitude** equals 1 nautical mile. Lines of latitude (on the sides of the chart) can be used for measuring paddle distance.

The Chart

The chart is an aerial symbolic view of land and water. It shows water depths, usually in fathoms (see below), much like a topographic map. Charts typically have less information on land features than maps. Types of shorelines are given along with prominent features. All the chart symbols for the charts are listed in a booklet called Chart One. The chart is usually printed with true North oriented towards the top. Chart information will be located near the title on the chart. Information such as sounding units (e.g. feet, fathoms, meters), the reference for depth soundings (e.g. mean low tide, mean lower low tide); a scale for measuring distances will be provided.

Units

Distance: 1 Nautical Mile (nm) = 1.2 statute miles = 1 minute of latitude
Speed: 1 Knot (kt) = 1nm/hour
Depth: 1 Fathom = 6 feet
In shallow spots, depth is shown in fathoms & feet
In Canada and other locations with metric system, depth is in meters or about 3 feet

Magnetic vs. True North – Using a Compass Rose

True North is centered at the top of the globe where it is bisected by the lines of longitude. Magnetic North is located approximately in the Hudson's Bay in northern Canada, and changes a small amount each year. This anomaly is due to surface iron deposits and the liquid iron core of the earth. Magnetic North differs with locations on the planet. In the Tacoma area, Magnetic North is currently about 18 degrees east of True North.

A compass measurement from a chart is based on True North. A compass measurement from a marine compass is based on Magnetic North.

A Compass Rose is a tool to help you make adjustments for the difference in True North (what you measure on a chart) versus Magnetic North (what you see on your marine compass). The compass rose is comprised of three rings: the outer ring is aligned to True North; the middle ring

and inner ring are based on Magnetic North for that area of the chart – the inner right uses an older form of navigation called points, such as Northwest. For all modern navigation, the middle ring is used to convert between True and Magnetic bearings.

Tides and Currents

Tides

Gravitational attraction of the moon and sun cause water from the ocean to flow in and out of waterways. This inward and outward motion occurs twice in each period of 24 hours and 50 minutes.

Tides are the vertical movement of water caused by the flow of the ocean in and out of a waterway.

It is important to know what tide height will be when paddling because you will likely be launching or returning to or from a beach and need to know that you will have enough water to launch in or paddle back to when it is low tide. Also, you may be paddling through an area that is high and dry at low tide levels.

Peak water elevations in the tide cycle are called **high tide;** minimum water elevations are called **low tide**. Tide levels for a given day mean that this is the height of the water (in feet) **above or below** the water level listed in your chart.

Tide levels and times for the area you are paddling may need to be adjusted from the tide tables. This is because water from the ocean reaches one area (ie, Seattle) sooner than it reaches another area (ie, Olympia). Instructions for making these adjustments will be in your tide table book and will be reviewed in our class.

Currents

Currents are the horizontal movement of water caused by the flow of the ocean in and out of a waterway. It is important to know if there will be currents in the area you are paddling so that you can avoid paddling against a fast current and to help you predict where back eddies and tide rips may be present.

Tidal current flowing into a waterway is called a **flood current** and when it flows out it is called an ebb **current**. The brief time between flood and ebb currents when no current flows, is called **slack** water, or sometimes just **slack.**

Starting from slack water, the current speed increases to a maximum value, called **maximum ebb or maximum flood**, and then diminishes as the next slack approaches. Maximum flow in each cycle occurs approximately halfway between successive slack water times. Just like the tide cycle, during one 24 hour period there are two maximum ebb and two maximum flood currents.

Currents are described by the direction they are going (ie, a southern current is traveling south).

Understanding currents in the area that you want to paddle involves becoming familiar with two types of resources: your yearly tide and current book plus a good current atlas. A tide and current book will list current speed, direction and time for waterways with significant current

(such as The Narrows). A current atlas is a picture representation of the currents using charts that show the direction of the current flow, back eddies, tide rips, etc, during various points in the current cycle. You can find recommended current atlases in the Table of Contents under "Sea Kayak Reading List".

Implications of Tides and Currents:

- Tide height must be known when planning to put in or land because the tide height determines how much beach will be exposed
- Knowledge of tide height can be critical for planning crossings over tide flats
- When approaching a rocky shoreline, it is also important to know the tides in order to avoid rocks that cover and uncover with the tides

However, whereas tide height need only be known in special circumstances, some knowledge of tidal current is needed at all times. You will need to know when the currents are strongest, weakest, and their speeds (in knots). You should also be aware that when currents flow against the wind, the result can be a dramatic increase in the steepness of the waves (see the article on Seamanship). Paddling downwind may become similar to paddling in surf. Paddling upwind, but with the current, may cause you to lose the boost you expected from the current. Strong enough winds may, in fact, move you backwards. Learn your limits (e.g. 15 - 18 knots).

Warning! Tides and Currents May Not Coincide

It is tempting to believe that slack water occurs at high tide and at low tide. However, this is an oversimplification of the general behavior of tidal currents and is usually wrong; it has gotten numerous kayakers into serious trouble.

In some places, this guess of tidal behavior may be fairly close to correct. In many other places, the guess could be seriously wrong and lead to danger particularly where currents are strong.

Guessing the time of slack water or peak flow, or even the direction of the flow, from the time of the tides is risky business without precise local knowledge acquired from your current atlas.

Wind

Wind is created when air flows from a high-pressure area to a low-pressure area, in an effort to balance the pressures. Because a low-pressure area is usually associated with rain and unstable weather, wind is often the first indication to kayaker that the weather is about to change.

Meteorologists describe wind from the direction from which it comes, e.g., a south wind blows from the south and is flowing north. Note that currents are described by the direction they are headed.

Wind is also formed between the land and the sea, especially during sunny weather. In the afternoon, the air above the land has been heated by the sun. The hot air rises, creating a low-pressure area, and the cooler air above the sea rushes in to balance the pressures. At night, the land cools faster than the sea, and wind then flows out to sea.

Beaufort Wind Scale

The Beaufort scale relates sea state to wind speed. Although developed during the era of sailing ships, the scale still has relevance to small craft such as kayaks. See the Beaufort Wind Scale chart below.

Wind and Land -- Fetch

The shape of the land affects the strength and often the direction of the wind. A wind blowing down a river valley, especially one with steep sides, is funneled offshore. Crossing a river mouth may expose you to this type of wind. You may want to go out to sea, where the wind has fanned out and become weaker, to cross in this situation. A key concept relating to wind is "fetch," which is the amount of open water area between you and where the wind is coming from. For example, the northern Hood Canal has a tremendous fetch for the common southwest wind, that is, wind coming from the southwest, but a very short one for a northwest wind. Longer fetch, means bigger waves. If you get an island between you and the wind, especially one that has high bluffs with tall trees, you get into the "wind shadow." The closer you get to land, the smaller the waves. You can use this "shadow" to sneak around a point by going a greater distance close to land, but using less energy. Don't use a wind shadow carelessly. (Read why in the section on Tide Rips on page 34).

	Wind speed		Estimating wind speed	
Beaufort Number	Knots	Seaman's term	Effects observed at sea	Effects observed on land
0	<1	Calm	Sea like a mirror.	Calm; smoke rises vertically.
1	1-3	Light air	Ripples with appearance of scales; no foam crests.	Smoke drift indicates wind direction; vanes do not move.
2	4-6	Light breeze	Small wavelets; crests of glassy appearance, not breaking.	Wind felt on face; leaves rustle; vanes do not move.
3	7-10	Gentle breeze	Large wavelets; crests begin to break; scattered whitecaps.	Leaves, small twigs in constant motion; light flags extended.
4	11-16	Moderate breeze	Small waves, becoming larger; numerous whitecaps.	Dust, leaves and loose paper raised up; small branches move.
5	17-21	Fresh breeze	Moderate waves, taking longer form; many whitecaps; some spray	Small trees in leaf begin to sway.
6	22-27	Strong breeze	Larger waves forming; whitecaps everywhere; more spray	Larger branches of trees in motion; whistling heard in trees.
7	28-33	Moderate gale	Sea heaps up; white foam from breaking waves begins to be blown in streaks.	Whole trees in motion; resistance felt in walking against wind.
8	34-40	Fresh gale	Moderately high waves of greater length; edges of crests begin to break into spindrift; foam is blown in well-marked streaks.	Twigs and small branches broken off trees; progress generally impeded.
9	41-47	Strong gale	High waves; sea begins to roll; dense streaks of foam; spray may reduce visibility.	Slight structural damage occurs; slate blown from roof.
10	48-55	Whole gale	Very high waves with overhanging crests; sea takes white appearance as foam is blown in very dense streaks; rolling is heavy and visibility is reduced.	Seldom experienced on land; considerable structural damage occurs.

Weather cocking

When your boat swings into the wind it is said to be going into the weather, or "weather cocking". This is probably the most common problem you will encounter in kayaking. Weather cocking is why rudders and skegs were invented. They "anchor" the rear of your boat (the stern) so that the wind cannot push it as easily downwind. A skeg however is not just strictly an on/off device. Getting just the right amount of skeg into the water is the key to success. Sometimes just a small amount of skeg is needed. Adjust the skeg and see what happens, then readjust the skeg some more until it works.

Another technique to deal with weather cocking is to "choke up" on the paddle. Move your grip off-center, away from the wind, to make the upwind side longer; this will allow a longer stroke, i.e. more of a sweep, on the upwind side. Also, using the paddle to give a slight stern rudder at the end of a stroke is an energy-saving tactic. It does slow you down a bit, but it is often easier and less tiring to make many small corrections instead of one or two large ones.

If you know at the beach that you'll have wind conditions causing weather cocking, you can pack your boat to counter-balance against the anticipated wind to minimize the effect. Just pack more weight in the stern to anchor it, and the wind will push the more exposed bow downwind. This is tricky to do because it's hard to get it right without actually testing it, and if the conditions change, you're stuck until you reach shore again.

Navigational Range

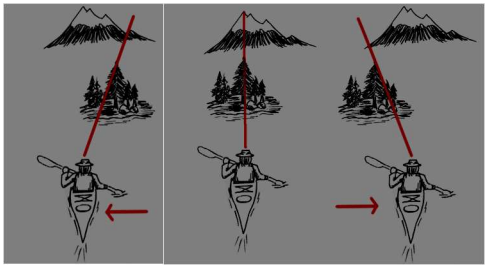
A range is formed by lining up two fixed objects to form a site. An example would be lining up a boulder on the beach with a tree on the ridge behind it. Another could be your eye lined up with a deck cleat focused on an on-coming vessel. A range is used to determine if your boat is moving on the intended line, to check a ferry angle, to see if you are making progress against an opposing current on wind, or to see if you are on a collision course with another boat. If the two objects stay positioned one on top of the other, you are maintaining your track. If the rear object drifts **left**, you are drifting to the **left**. The same applies if the rear object drifts right. See the illustration at the bottom of the page.

Collision Course

How do you know if that speedboat is going to run you down? Note the boat's position relative to your bow. Watch how the boat's position changes over the next few seconds while you keep paddling the same speed and direction. If the boat moves closer to your bow, it will pass in front of you. If it moves closer to your stern, it will pass behind you. But, if the angle doesn't change, you're on a collision course. Either slow down or change direction or both, but keep watching the boat because it may change direction as well. If there are multiple boats in the vicinity, prioritize them based on their proximity and speed. **Remember: In real life the largest boat has the right of way.**

Ferrying

Ferry angles are used to cross current streams that flow across your intended path. You will need the following information to calculate a ferry angle: the flow rate of the current you are going to cross, the distance across the current, and your paddling speed.

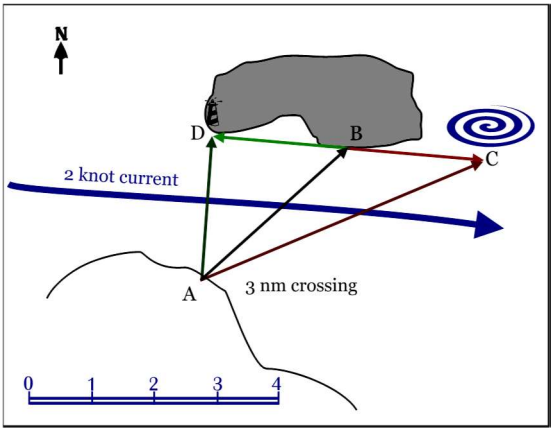


1. Calculate the time you will be exposed to the current: Time =Distance / Paddling Speed
2. Find the average current speed located in your current tables
3. Calculate the distance you will be displaced down current: Distance = Current Speed x Time
4. Lay out a course up current equal to the distance you would have been displaced down current

A more detailed discussion of calculation ferry angles follows.

Calculating Ferry Angles

Many times while kayaking, you end up having to cross a current, either straight across or at an angle. If you don't correct for it, you will end up somewhere down current from where you started. To compensate, you will need to point somewhere up-current. This compensation is called ferrying or using a ferry angle.



We'll use our diagram to the right in our example. We've looked in our Current and Tide Atlas and it indicates that the current is flowing east at 2 knots. You'll be crossing the 3 nm channel from Point A to Point B, which at an average speed of 3 knots, would take you 1 hour. If you don't compensate for the current, you could expect to find yourself 2 nm down current, at Point C, once you complete the crossing. If you are trying to hit a small island or rest area, you could miss it altogether!

How do you fix that? Since you know that you will be pushed 2 nm down current, your aim is a point that is 2 nm up current at Point D. When you paddle, the current will end up pushing you right to your destination.

Here's how it works, both without and with the correction. When you paddle without correction, you intend your route to be simple, from Point A to Point B. But with the current's influence, you actually travel along the route from Point A to Point C. Our correction fixes that by pretending we are traveling from Point A to Point D, and with the current's influence we end up traveling from Point A to Point B – just what we wanted.

Here's how it works:

1. Starting with your chart, draw a line from our starting point, A, to our ending point, B.
2. From our chart or current atlas, find the direction and speed of the current – we need to know this before we start. See the note below on finding that information on the Internet.
3. Draw a line that parallels the current flow through Point B; don't make the line start at Point B, rather have the line have Point B as the center (in our example from Point D to Point C). It's better to have the line too long than too short.
4. Determine how long it should take to make the crossing from Point A to Point B – this is the time we are exposed to the current. In our example, it is 3 nm from Point A to Point B and since our average speed is 3 knots, we will be exposed for an hour.

5. Determine how much the current will move us by multiplying the time we are exposed by the speed of the current. In our example, one hour multiplied by 2 knot (nm/hour) is 2 nm.

6. Set your dividers to the result you just calculated. Use the latitude lines for an easy scale – one degree of latitude equals one nautical mile.

7. Place one end of the dividers on Point B. With the other end, make a mark upstream, Point D, as well as downstream, Point C.

8. Draw a line from Point A to Point D. This is the heading you will use to make the crossing.

9. Use the compass rose to determine your magnetic heading. Keep your kayak set on this heading while you make the crossing to correct for the current. That's it.

10. It is better to overestimate the current than underestimate it. You can always float with it if you find yourself upstream of your destination.

Trip Planning

Introduction

Planning starts before you reach the water's edge. Practice these steps every time you go on a paddle, even if you are going on someone else's paddle. With time, it will get easy. Don't be caught by surprise if you can help it!

1. Check that your intended paddle route has suitable parking at the launch site, rest stop opportunities en route and available emergency exit sites en route, if needed.

2. Determine the distance to paddle: Use string or dividers to measure the length of the trip, transfer that length to the sides of your chart (the latitude measurements – one latitude minute = one nautical mile) or use the mileage scale located somewhere on the chart. Alternatively, you can use Google Earth on your computer to measure the trip distance.

3. Approximate the paddle duration: The following formulas are helpful for calculating the run.

Distance = Speed x Time Time = Distance / Speed Speed = Distance / Time

A beginning kayaker's average paddling speed is about 2 knots. Don't forget to factor in current into your approximation.

4. Check your chart and your tide tables to see if tide is a consideration. Check your current atlas and current table to see if current is a consideration. Calculate compass courses for each leg of your paddle, especially if you are planning to paddle away from land to cross open water.

Figuring out what the current is doing

When planning your trip, you will need to understand what is happening with the current (if any) in your area.

First, Use Your Current Atlas. Select your trip on the chart in your current atlas and get a basic idea of which way the currents flood and ebb in the waters in which you will be traveling.

Second, Check Your Tides and Currents book. Find the page for the Primary Current Station to see the time, speed and direction of the current at major current locations.

Option One: Use that day's currents information plus your current atlas to help you decide what the currents will look like when you plan on paddling. If necessary, use the formula described in your current atlas to make current speed adjustments.

Option Two: Find the page in the Tides and Currents book. You will see the Primary Station, such as The Narrows listed. Under The Narrows, look down the list until you find secondary stations that are in the area of your trip. Apply the data for the secondary station to the data you wrote down for the primary station. Now you know (in a general sense) what the water is doing in the area of your trip on the specific day of your trip.

Match Current And Trip Directions Now that you know how the water is running on the day of the trip, the question is whether it's any good or not! You don't want to run your trip against the current! Try to find a day on which you can ride the current to your lunch stop, wait for the change of current direction, and then ride the current back! Sure, it's not always that simple, but it's a good target!

Hazards

Tide Rips

Close to a big island, there's a nice shadow from the wind- easy paddling. Then you round the point and all of a sudden there is big wind, and waves! You had no idea they were there, because you can't see the whitecaps downwind in the distance –they're on the other side of wave crest! You were so focused on the water in front of you that you didn't see or hear the wind in the tops of the trees. This is bad, but it can get worse.

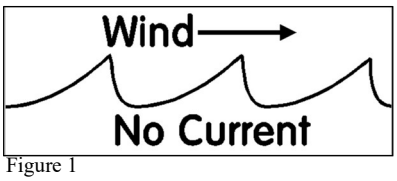


Figure 1

Suppose you have a wind that blows waves up that look something like Figure 1.

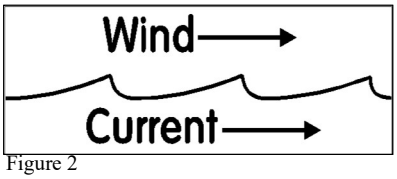


Figure 2

If the current and the wind happen to be going in the same direction, the results look like Figure 2. Notice the waves are flattened, and as you may guess the paddling is fairly easy and going is fast with the current.

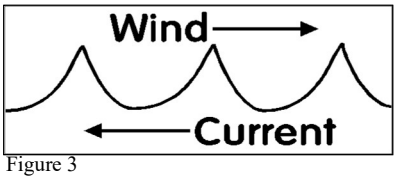
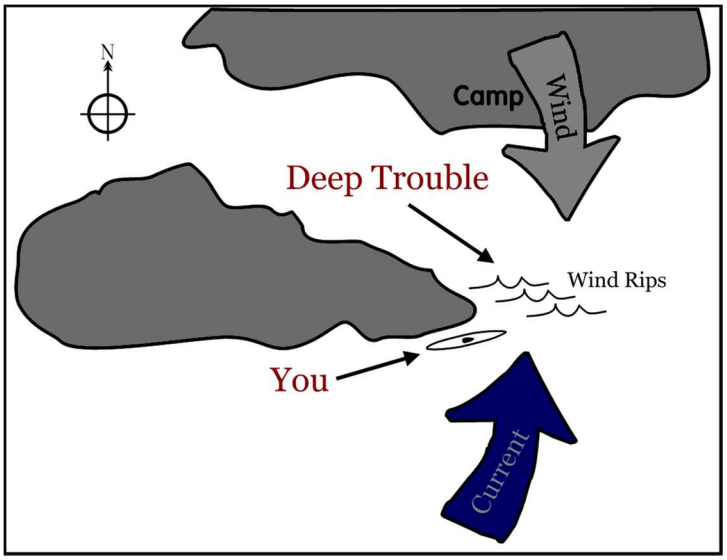


Figure 3

Now, what if the current goes in the opposite direction to the wind? These colliding forces change the waves dramatically, thus shortening the distance between wave crests and making them taller. They look like Figure 3. As you may guess, the paddling is rough, and the going is slow.



This is called *wind over tide*, or *wind rips*, and this is one of the most dangerous conditions out there. This is not great, but it can get worse!

Say you're paddling east, close along the south shore of an island towards a point. You intend to pick up a great northbound current pushing you past the island to your

destination 2 miles north. You're looking forward to a nice boost around the point, then an easy cruise on home. But there's a wind out of the north blowing hard and you didn't notice the wind because you were in the wind shadow. You round the point, and suddenly you're in "Deep Trouble."

The wind has kicked up major wind rips, with steep and tall waves, and the current sucks you straight into the worst part! You can't turn around because the current's too strong and it gets worse literally by the second. It will get better farther north where the current slows and eventually dissipates away from the point, but there are a couple hundred yards of **serious** water. Unless everyone in the group has really good paddling and bracing skills, someone's going to swim, and rescue will be difficult if everyone is just barely hanging in there themselves. The moral of the story is: watch out for wind rips, know the currents and weather report for wind direction. Look at the tree tops and **turn around immediately** at the first sign of trouble. Don't think about it- **turn around right then.** Get to a safe spot, and then think about it. Sooner or later the wind will change, the tide will turn, or you may steer a wide course around the point. You can often get out of difficulty if you act quickly.

Near-Shore Hazards

Psychologically, it's comforting to be near the shore. There are a few hazards, however, that are caused by the shore. Sometimes the current can be funneled across a shallow area, which may speed up the flow and/or build up some standing waves. These are called *tidal races*. A *boomer* is a rock that is **partially** submerged, being exposed at a low point in the swell. This is not a good place to paddle over. Keep a lookout by observing the water surface near shore. The waves may become steeper and break here, or just look "funny." Sunken rocks aren't the only things lurking beneath the surface. A sunken tree can snag you as well. A strong current flowing under a low-lying branch is deadly, especially if there's a section under water. This is called a *sweeper*. Smooth concrete bulkheads or steep seawalls are especially good at reflecting waves. This is called *confused seas* or *clapotis*. Mudflats are an underestimated danger. If you read the tide wrong, you can get stranded and have to wait 4 or 8 or 12 hours for the tide to float you again. You might be tempted to try walking. People have gotten stuck in mudflats and drowned when the tide came up. In the Pacific Northwest, hypothermia will probably get you before the tide does. It's almost impossible to pull someone out without plywood or planks, and the rescuer could easily get stuck too. Stay in the boat, take a nap.

River Entrances

When large rivers pour into the sea, very dangerous conditions can be created. There may be sandbars created by the entrance and any water traveling over them can be going very fast. The closer you are to the mouth of the river, the stronger the freshwater current. By staying offshore where the water is deeper, you can minimize the effect the river's current will have on you.

If you intend to enter the river, it is usually best to sneak in via the shallow water on each side of the entrance. Unless the wind is blowing straight upstream, one side of the mouth will receive some shelter from the nasty effect that wind-blown waves have on these currents. Travel up a river carefully as there may be underwater or overhanging obstructions.

Rivers in flood carry trees and other debris down to the sea. These hazards can lie just below the surface, either floating or imbedded in the muddy shallows. Keep a careful lookout when in this area, as the top of a snag could puncture your boat.

Rules of the Road

Maritime law is complex; however it boils down to this: A smaller, more maneuverable vessel shall keep clear of a larger, more encumbered vessel. Essentially, a kayaker's responsibility is to **stay out of the way of everything else that floats**. Larger, deeper draft vessels will stay within marked lanes or channels when entering a narrow waterway. This channel may be marked with buoys. The right side of the channel, as referenced by the direction that a flood tide would flow through the channel, is marked with red markers; conversely the left side is marked with green markers. A mnemonic that helps is "**Red to the right returning**". If you stay out of these channels, you can avoid most traffic. Commercial vessels are required to stay within the channel defined on your navigational chart; however **private-owned vessels are not**.

Seamanship

The Turbo-Turn

When you have waves, you can use them to turbo-charge your turn even more. This turn uses the sweep stroke with the "dip, kick and spin" technique. When you're on the top of a wave, the ends of your boat are out of the water; you have a shorter boat to turn! If you need to make a big correction, time your sweep with the top of a wave, dip towards your stroke, dig your paddle in and kick your boat around. I mean really **kick** it! Use your outside leg and your whole torso to twist the boat around while on top of the wave. It's a swift punch, over in a second, but you can get as much as a 3-foot swing this way.

Drifting

Try it! Stop paddling, just drift, and see what happens. If you have a skeg, try it with skeg up, and then put the skeg down. Totally different! See what direction you end up pointing, what direction you end up going, and how fast you are being blown. I'm not going to tell you what happens. Don't worry, you won't tip over. Your low brace will save you if you need it, but it's unlikely that you will.

Running With the Seas

It feels pretty scary at first, but it really doesn't get any better than this once you get used to it. Timing is everything, and a little stern rudder works great! You just cruise and the waves push you along with little effort on your part. If you're using the skeg, adjustment is very important here. When it's all the way down, it gives a big surface for the waves to push against and pushes you around in an uncomfortable manner. Some skeg in helps you maintain your downwind course. Small adjustments are in order here.

Sneaking Into a Bay against an Ebb Current

This is a common situation. Gig Harbor, Vaughn and Purdy are classic examples. Suppose that the tide's going out; because of the funnel shape of the bay, the current is strong, and you want to get into the bay. Approach the bay entrance from the side. With an asymmetric shoreline like Vaughn Bay, it makes a difference which side. Stay close to shore out of the current, and then

make a dash around the point paddling briskly against the current. Move off to the side after making the point, following the land closely. Usually when you're close enough to land that your landward paddle stroke almost touches the bottom, you will find a weaker current, both before and after rounding the point.

Entering or Crossing a Current

When you are entering a current from the side, it will hit you broadside and tend to push you over. The rule here is "moon the current." This means that you lean or edge **down**stream, lifting the **up**stream edge of your boat up. To maintain your balance, you simultaneously low brace **down**stream. The current slides under the bottom of your hull without catching any hard edges, and it pushes your paddle up to the surface. If you brace on the uphill side, your paddle will be pulled under your boat, and you will be sucked in right after it! This is called getting "tripped."

If you succeeded in staying upright, the next thing that happens is that if you've entered the current perpendicular to the flow and have just been spun about 70 degrees, and the current has got you headed exactly the wrong way! "Peeling out" can be fun if you feel like playing around, but if you're trying to go the other way it can be very discouraging. You need to enter the current almost parallel to the flow, paddle like crazy, and **turn** into the flow. The stronger the current the sharper the eddy line, and the closer to parallel you have to be to make it work.

Taking a Big Wave Broadside

Waves don't just go up and down; they also have a circular motion to them. The top moves towards you while the bottom moves away. A breaker shows this in the extreme, but plain old waves do it to a lesser degree as well. This means that the big boat wake that that maniac just kicked up will tend to roll you, pushing you away from the top of the wave. **LEAN INTO THE WAVE!** Lean in, stab the wave front with your paddle, duck your head if it's a really big one, and **keep paddling!** When your paddle's in the water, you've got a handle and an automatic brace. When it's out, you have nothing and you're unstable. In general, when in doubt, use short, fast strokes. In this case, timing is important. Stab that wave.

Using the Land

When forced to go against the current, move as close to the land as conditions will allow. Often there is an eddy running parallel to the shore against the main current that you can use to your advantage. If there isn't an eddy, the shore can create a shadow where the current is reduced. Look at your charts though because if you are going through a channel there may be a good side and a bad side to travel along.

It also works with wind as well; in fact on the Sound, the wind shadow effect is more used than the eddy effect. The wind won't actually eddy like the water does, but you can see by the wave height that it's diminished behind the headlands, especially tall ones. Keep your eyes peeled and you can save yourself a lot of effort.

Using a Low Brace

One more use of the low brace is when you stop for a break and you're just floating there. Keep your paddle across your lap, perpendicular to the boat, and you will be ready to grab it for a low brace if you need it. You can extend one blade more than the other and let it float on the surface.

Conclusion

The knowledge you gain from a course such as this is invaluable, but useless if you are unaware of your surroundings, especially changes. Be alert for changes in weather, wave pattern, currents, the physical and psychological state of your fellow kayakers, and anything else you can observe. Keep your eyes open, listen, feel the wind, smell the air, observe with all your senses. Turn on your awareness, let your body feel the feedback from your blade and your boat, combine that with the knowledge your brain has stored, and you will learn more by being on the water than you will by sitting in a classroom or reading a book. Experience is the best teacher- pay attention! This is only an introductory program, designed to get you started in sea kayaking. There is much more to learn, and that's part of what makes it fun.

Sea Kayaking Trip Classification

	SKI	SK II	SK III	SK IV	SK V	SK VI
Geography (Fetch is defined as the unobstructed distance that the wind can blow over water and build up waves.)	In areas protected from waves by nearby landforms, in case of wind.	Fetches less than 10 NM unless it is generally possible to land and walk out. Crossings less than ½ NM except for very protected trips.	Crossings up to 2 NM wide and/or fetches longer than 10 NM.	Crossings up to 5 NM.	Crossings more than 5 NM but less than 3 hours paddling time at the speed listed for the trip. Exposed ocean coasts are included when precautions are taken.	Trips combining a long fetch with stretches where safe landing may be difficult or impossible for most of a day.
Hydraulics (expected on route)	Insignificant currents	Max predicted current up to 1 knot	Max predicted current up to 2 knots	Predicted currents may be more than 2 knots but less than slowest paddller's top speed	Currents may be faster than group can paddle against.	Exposure to hazards at any other levels taken to extremes.
Route	Day trips near shore.	Either has protection or intermittent places to get out.	May involve crossing eddy lines & tide rips.	May cross strong eddy lines, tide rips, and upwellings.	May include landing and launching in surf.	Exposure to hazards at any other levels taken to extremes.
Acceptable Conditions (no guarantees) Kt = knot	Calm	Either has protection or intermittent places to get out.	Generally will not start out in white caps, but be prepared for paddling into waves large enough to wash over the deck and be comfortable paddling in at least 10 kt winds.	May include steep waves and swells. Be comfortable paddling in 15 kt winds.	For groups prepared to knowingly set out in rough weather, white caps, and fast currents.	May only be negotiable with favorable conditions. Kayak rescues may not be possible.
Skills and Experience (The skills and experience required are cumulative with ascending levels)	Except with the leader's permission: • Previous kayak trip experience on trips more than 5 nm • Previous practice capsizing and wet exiting (or be willing to learn before the trip)	Participants must have practiced assisted sea kayak rescue techniques.	Conditions may require bracing skills. Previous group and self-rescue practice (both as rescuer and rescuee).	Conditions may require anticipatory learning, reflexive bracing, using the paddle to stern rudder, and the ability to read moving water. Familiarity with charts and navigation.	Trip members must have tested their skills in rough conditions, know their limits, and be self-reliant in the event of separation from the group. The ability to Eskimo Roll is highly recommended as conditions can make sea kayak rescues difficult. Rescue practice with the kayak and equipment used on the trip.	Extensive experience and skill including kayak surfing and rolling are required.

Plus or Minus signs can be used to further differentiate the levels. For example, a minus sign could be used for a trip, which technically fits a given level, but is on the 'easy side' of that level.

An asterisk designates training trips open to paddlers new to that level. The distance to paddled and the expected paddling speed should be listed, but do not affect trip level.

Due to extra risk, the following factors increase the trip ratings ½ level:

- Water temperatures less than 55 F, unless participant wear wetsuits or dry-suits
- A slightly faster current or longer crossings when all other conditions meet the criteria of a stated level
- Overnight or longer trips, unless an alternative (e.g., hiking out or being picked up by a support boat) is available.
- Trips planned for times of the year when the weather is at its worst and/or least predictable.
- Reduced visibility or night trips.

Weather Guide

Before we discuss weather and some of its effects on us, we must understand some of the words and terms used in the science of meteorology (weather). The next few paragraphs are arranged in sequence with the National Weather Service (NWS) observation format. Since most NWS data is collected at airports, it is sequenced by level of importance to pilots, not boaters. It's great info, but maybe just not in the order we prefer.

Wind

Wind! You can feel it pushing against you, but you can't see it - unless it's pushing some liquid or solid like rain, snow or dirt around, too. You can see its effects on trees and the water, but you can't catch it. And it is very difficult to forecast where it will come from and how fast it will be moving. Wind speed is stated in knots or statute miles per hour. Wind direction is stated in the compass degree that it is blowing FROM. The peak speed that it's gusting up to will also be included. Wind affects our surroundings in many ways. You've already learned about its effects on the sea condition. Always keep in mind there could be gap winds, wind shadows, corner winds, cliff winds, off-shore and on-shore sea breezes that need to be considered before leaving shore as well as when we're on the water. Wind can be a great tool when predicting weather changes, too.

Clouds

There are various names for the different types of clouds that we see in the sky (every day around here has some sort of cloud in the sky). The most common is the CIRRUS cloud. They're the high, thin clouds that precede warm and cold fronts and (usually) rain/snow/freezing precipitation. Their movement is generally SSW to NNE, WSW to W, or WNW to W. Each of these directions foretells a different outcome (more on that, later). Other cirrus cloud types are CIRROCUMULUS and CIRROSTRATUS, which are just thicker, fluffier versions of cirrus. Lower level clouds are a form of STRATUS or CUMULUS clouds. Fog is basically a stratus cloud at ground/water level. Cumulus clouds are the basis for thunderstorms. Their towering presence is the warning to get off of the water as soon as possible.

Air Temperature

Air Temperature and Dew Point are both measured in degrees Fahrenheit or Celsius. The dew point is always equal to or lower than the air temperature. When the dew point and the air temperature are equal, you have 100% relative humidity. The dew point is the temperature at which water vapor condenses into water droplets. These two measurements are a good indicator of when rain, fog, or other precipitation will occur.

Atmospheric Pressure

Atmospheric pressure can't be seen, but some people claim they can feel it in their bones or sinuses. Atmospheric pressure is recorded in inches of mercury or millibars on a barometer. Even a simple aneroid barometer at home can be a useful aid in determining weather changes. You might notice it moving slightly up and down over a 24 hour period. This is normal. Daily diurnal pressure variations are much like the tides – highs and lows occur throughout the day. It's when the pressure changes become greater over a 3 hour period. A rapid drop in pressure, accompanied by lowering/thickening clouds are good indicators of bad weather ahead. Meteorologists monitor HIGH and LOW pressure areas on weather charts since winds flow from highs to lows. The CW

winds around the HIGH pressure will feed the CCW winds rotating around a LOW. An extreme version of a low is a hurricane or tornado.

The above data will be broadcast in many different variations. As long as you have a basic understanding of the terms, you'll be able to comprehend any observation or forecast you receive. In its most cryptic, difficult form it will be the NWS data feeds. In its simplest, lay terms, the radio/TV broadcast.

Forecasting

It is easy to tell what the weather is at any given moment, but it is another matter to forecast its future. The Northwest is not the easiest place to create weather forecasts. We are on the "corner" of the country. We have water to the west, southwest, and northwest. These are the directions that the majority of our weather approaches us from. So, who's out there to tell us what's coming? Fortunately, we now have satellites that observe the area and provide both visual and infrared (temperature sensitive) images. Along with ship and pilot reports, and monitor buoys, there is little else to provide the data so necessary for predicting the weather. Factor in our coastal range of Olympic Mountains, the large water mass of Puget Sound, and the Cascade Range and you now have a real challenge. Given these conditions it's still possible to get a pretty decent 72-hour forecast. (Editor's Note: Be careful relying on a marine forecast that far in advance. The weather on the water can change rapidly – 12 hours is probably a safer upper limit) It's hard to have much faith in those that go beyond that point. So, how do you become your own weather forecaster? Well, you have a basic knowledge of the terms, so let's put them to work.

First, look up. The sky is a great indicator of future events. What types of clouds are present? If cirrus clouds are moving in, then look to see if there is a loose halo or tight corona around the sun/moon. Is there a lenticular cloud over Mt Rainier? What direction and how fast are the clouds moving? Putting those few observations to work could help you forecast whether or not it will rain in the next day or two. Next, look around. What is the surface wind? Compare it with the speed/direction of the winds aloft. If you're on the water, what is the sea condition? Remember that high pressure and certain wind combinations can flatten the sea, but only temporarily (if the tide turns against it, for example). What is the air temperature? Off-shore breezes can feel nice and warm, but what are the chances of fog in the morning with the warm air sitting on top of the relatively cooler water? Also, remember the relative humidity percentage that's created by the air and dew point temperatures. The greater the "spread" (or difference) is between them; the less chance there will be fog or precipitation. What's the old barometer doing? Watch for large changes in pressure in a short (3 - 6 hours) time frame. Check other data sources.

Look for information on frontal systems headed our way. These are the real shakers and movers in our weather patterns. They come in Warm, Cold, Stationary, and Occluded models. Each one has its own identifying features. Warm fronts move up from the direction of Hawaii (Pineapple Express), and cold fronts move down from the north (Arctic Express). Occluded fronts are a combination of warm-cold-warm, or the reverse, and are much too complicated to discuss here. Stationary fronts are just that – in whatever form they arrived in. Study up on the temperature / wind / humidity / pressure changes that accompany each of these fronts. Knowledge of whether or not to hang out another day, change course, or "buy the farm" may rest in your knowledge of these systems.

Fog

You get one whole paragraph on fog alone – and that is not enough. Fog can be great stuff when "you're sittin' on the dock of the bay," with Otis Redding, but when you're out on the water…it's another story. Radiation, advection, and warm frontal fogs are the types we'll concentrate on. Radiation fog is most common in the autumn months and often follows wet weather. It is produced when some of the moisture from damp ground evaporates into the lower layer of the atmosphere. As the system that brought the moisture passes, the clouds clear and overnight, considerable heat is radiated by the ground into the colder atmosphere above. The moist air close to the ground/water cools, and condenses into a layer of fog. This fog will "burn off" as the day warms up. Advection fog on the other hand does not burn off quite as easily. Advection fog is formed (most often in the summer months) when warm, moist air moves over cold water. As the air cools, water vapor condenses out of it in the form of fog. A breeze is generally required to move this fog away. Thicker layers of this type of fog may take several days to fully dissipate. Warm frontal fog in this area is the worst type. It will not burn off at all. It precedes a warm front as a saturated cold air mass that has turned into fog. The warm front pushing it along must first pass through in order for this type of fog to end.

More info! Use your Internet connection to get more data. Listen to your portable weather channel radio. Watch the 6 o'clock weatherman. Read books on the subject. The following web sites are a listing of just those kinds of sources: accuweather.com, kingtv.com, weather.com, and weather.noaa.gov

Conservation Principles for Kayakers

Whether you intend to paddle on long expeditions or short day paddles, your experience will be much more rewarding if the environment in which you paddle remains one of natural beauty. Remember that shoreline, along which our trips are concentrated is a narrow, highly valued, environmentally unique resource. With popularity of our sport increasing, it is essential we make every effort to leave no trace either in open water or on the beach. Conservation is about sharing, partnership, and stewardship for present and future generations of wildlife and people, as well as the environment. It is about caring, doing the right thing and taking responsibility to minimize your impact.

General Code of Conduct

1. Avoid damage to banks and shoreline vegetation.
2. Come ashore only on approved put-in sites such as public parks, DNR beaches and ends of roads or where prior permission has been given. There is a right to land below high tide line but use this sparingly and discreetly.
3. Do not trespass on private property or moorings.
4. Leave no trace.
5. Avoid overcrowding one put-in or campsite. Park away from the put-in or campsite and/or carpool if possible.
6. Always try to leave the areas you visit more pristine than you found it. Have a mesh bag handy to collect the trash you encounter.

The Beginning

1. Park your car in designated spots.
2. Respect the neighbors of put-in sites.
3. Be discreet when changing into or out of paddling clothing in public places.
4. Avoid spreading out so it is difficult for others to use put-in site.
5. Move quietly, talk softly.

Low Impact Traveling

1. Be aware of your impact on wildlife.
2. Avoid using areas important for migrating waterfowl, nesting birds, nursery sites and spawning fish in the appropriate seasons.
3. Abide by the provisions of the Marine Mammal Protection Act (MMPA)
4. Respect wild and commercial shellfish environments.

Seal/Sea Lion Haul-outs and Bird Nesting Sites

1. When approaching seal and sea lion haul-outs and nesting bird refuges, stay at least 200 yards from shore. Startling the seals and sea lions could result in their stampeding toward the water, trampling each other on the way. Scaring the birds may result in them abandoning their nests.
2. If you notice the seals or sea lions lifting their heads or if you hear birds giving alarm calls slowly retreat from the area.
3. Never enter a Wildlife Refuge unless you are positive that it is open.

Whales

1. Never pursue an animal and remain at least 100 yards away at all times.
2. Limit observing time to 30 minutes or less from a safe distance. Use binoculars.
3. Never interfere with feeding, breeding, or nursing activities.
4. Do not encircle a marine mammal or trap them between another vessel and the shore. Learn to recognize stress-related behavioral signs, such as tail-lopping and spy-hopping.
5. Move around animals from behind.
6. Do not feed or touch animals; do not discard fish or fish wastes.
7. If whales surface occasionally, tap the side of your boat with hands.
8. If you are in a group, line your boats up side by side; whales must surface to breathe and covering a large surface area with boats inhibits their access to air.

Low Impact Camping

1. It is always better to camp at established sites where your stay will not cause additional damage.
2. Choose an area that will not be damaged by your stay.
3. Avoid critical wildlife habitats, obvious animal trails and fragile terrain such as stream banks.
4. Try to keep your campsite small and unobtrusive.
5. Do not cut standing trees or live branches.
6. Do not dig gutter drainage trenches around tents; choose high ground instead.

7. Choose sites of rock, sand or gravel that have no vegetation. Use grassy areas if you can avoid trampling tree seedlings and other plants, spend only one or two nights at each site. Use of a thicker sleeping pad will permit you to used rougher areas with less site clearing.
8. If you clear your sleeping spot of surface debris, small rocks, twigs, etc., then "re-debris" it before leaving.
9. Be prepared to store your food safely so that it is inaccessible to animals.
10. Consider the air quality impacts of a camp fire. Use a stove if possible.
11. If you have a fire, build it below the high tide mark or use established fire sites, restrict to cooking size, disperse collected firewood, bury or scatter the ashes, return fire pit to a natural state.
12. Use soap-free saltwater for dishwashing, using sand as a scouring pad. Commercial biodegradable soaps are available which can also be used to wash yourself and your clothing.
13. Plan your menus to minimize waste generation and cleaning. Do not cook so much that you have to pack out leftovers.
14. Be prepared to take out everything you brought in with you, including all waste products.
15. Wherever you stay, leave it in a more pristine state than you found it by removing rubbish and dismantling unnecessary or unsafe fire rings.

Classroom Session – Mind & Body

- Drowning: The Things We Know
- Hypothermia & Cold Water Survival
- Preventing Tendonitis
- Elements of a First Aid Kit
- First Aid Training
- Thoughts on Followership

Drowning: The Things We Know

Drowning is the third leading cause of accidental death in the United States. About 20% of all aquatic fatalities are boat related. Most drowning victims do not expect to be in the water, and most victims cannot swim or swim poorly. Panic in an unprepared, unsuspecting, fully clothed poor or non-swimmer is a major factor in the majority of water fatalities. Acute hypothermia increases the likelihood of fatality.

The University of Victoria's investigations of drowning and hypothermia have shown that wearing a PFD and rolling into a fetal position (called HELP or Heat Escape Lessening Position), or huddling with others is the best defense against hypothermia in most sea water situations.

Moreover, swimming, treading water, "drown proofing" and removal of shoes and clothing in most cold water accidents are not only of questionable assistance, but may be lethal for the poor or non-swimmer.

A sudden fall into relatively cold water produces three primary effects. The first is a sudden involuntary gasp. This "torso reflex" is deadly if it occurs when the head is immersed. Second, cardiac arrest or similar ventricular complications often occur in older, out-of-shape persons in this situation. Third, muscle performance and stamina are quickly reduced by cold water. For instance, a good swimmer can precede only seven-tenths of a mile in 50°F water before collapsing.

Although core hypothermia is a major consideration, its effects are not felt immediately upon immersion. Similarly, falling into cold water, such as the Puget Sound, does not - contrary to popular folklore - mean immediate death. With proper training and clothing, survival times are appreciable.

Through initial research, it was generally believed that water 70°F or colder posed danger for the average swimmer. It now appears, for some people, that water slightly cooler than normal body temperatures may be potentially lethal. Hypothermia has been observed in the initial stages (shivering) in heated indoor pools with water temperatures between 84 to 86°F. In most cases, the hypothermic person was a thin young man or woman 19 to 26 years old.

The mammalian diving reflex is emerging as another aspect of hypothermia. This reflex, similar to hibernation or suspended animation, occurs primarily in cold water. It is a rapid method for inducing hypothermia because of the repeated submersion of the head and neck. If inadvertently dumped into the water, a clothed person should gently roll onto their back and, when possible, slowly hand scull to safety. Otherwise, if they are wearing a PFD, they should cross their wrists over their chest, clamping their arms tightly to their sides, cross their ankles, raise their head out of the water and then raise their knees toward their chest (HELP position). This will normally reduce heat loss to the water by at least 50%. Although HELP can be performed by someone wearing hip or chest waders, firefighter's turnout gear or other types of airtight, waterproofed rubberized clothing, the best success lies in wearing PFDs and practicing before they are actually needed. If more than one person is in the water, huddling is recommended. Here, groups of nonmoving survivors - all wearing PFDs - closely embrace each other with arms around each other's waists, chest touching chest. This shares heat and slows its loss, makes a better visual target and aids morale. Again, effectiveness is based on knowledge and practice.

Rear Admiral Norman C. Venzke, U.S. Coast Guard, and Commander David S. Smith, U.S. Coast Guard (Retired). December 1982
Adapted by Merv Frye, April 1999.

Hypothermia & Cold Water Survival

Hypothermia is defined as subnormal body temperature - a lowering of the body's core temperature. Unconsciousness can occur when the body core temperature drops from normal (98.6° F - 37° C) to approximately 86° F (30° C)

Cold Water Kills

Safety experts estimate that half of all drowning victims actually die from the fatal effects of cold water, or hypothermia, and not from water filled lungs. Loss of body heat is one of the greatest hazards to survival when you fall overboard, capsize, or jump into the water. Cold water robs the body of heat 25-30 times faster than air. When you lose enough body heat to make your temperature subnormal, you become hypothermic.

Sudden immersion in cold water cools your skin and outer tissues very quickly. Within 10 or 15 minutes, your core body temperature (brain, spinal cord, heart, and lungs) begins to drop. Your arms and legs become numb and completely useless. You may lose consciousness and drown before your core temperature drops low enough to cause death.

Rules of 50

1. An average adult person has a 50/50 chance of surviving a 50-yard swim in 50° F. water.
2. A 50 year old person in 50° F water has a 50/50 chance of surviving for 50 minutes

Body Hot Spots

Certain areas of your body are "hot spots" that lose large amounts of heat faster than other areas. These "hot spots" need special protection against heat loss to avoid hypothermia. The head and neck are the most critical areas. The sides of the chest, where there is little fat or muscle, are major areas of heat loss from the warm chest cavity. The groin region also loses large amounts of heat because major blood vessels are near the surface.

How Cold is "Cold" Water?

Cold water does not have to be icy... it just has to be colder than you are to set water hypothermia in motion. A person who is wet, improperly dressed and intoxicated can become hypothermic in 70° F weather. The rate of body heat loss depends on water temperature, the protective clothing worn, percent body fat and other physical factors, and most importantly the way you conduct yourself in the water.

Different activities in the water consume varying amounts of body heat. The more energy (heat) you expend, the quicker your body temperature drops, reducing your survival time. As shown below, wearing a PFD can add hours to your survival time.

Predicted Survival Times

For Average adult in 50° F (10° C) water

Drown Proofing - 1 1/2 hours†	Swimming slowly - 2 hours
Treading water - 2 hours	Holding still - 2 3/4 hours
H.E.L.P. position - 4 hours	Huddle - 4 hours
Wearing a PFD - 7 hours!	

† Drown proofing is a warm water survival technique: to conserve energy you relax in the water and allow your head to submerge between breaths. This technique is **NOT RECOMMENDED in cold water**, since about 50 % of heat loss is from the head.

How to Survive In Cold Water

If you suddenly find yourself in the water, don't panic! Calmly follow the procedure below to increase your survival time.

- **Minimize body heat loss.** This is the single most important thing you should do. Take the following steps:
- **Do not remove clothing,** despite what you may have been told. Instead, button, buckle, zip and tighten collars, cuffs, shoes and hoods. Cover your head if possible. A layer of water trapped inside your clothing will be slightly warmed by your body and help insulate you from the colder water, slowing your rate of body heat loss. If you're not already wearing a PFD, put on a PFD if available.
- **Devote all your efforts to getting out of the water.** Act quickly before you lose full use of your hands and limbs. Climb onto a boat, raft, or anything floating. Right a capsized boat and climb in. Most boats will support you even if full of water. If you cannot right a capsized boat climb on top of the hull. The object is to get as much of yourself out of the water as possible.
- **Do not attempt to swim unless** it is to reach a nearby boat, another person, or a floating object on which you can climb or lean. Unnecessary swimming "pumps" out warmed water between your body and your clothing circulating new cold water to take its place. Unnecessary movement of your arms and legs pumps warm blood to your extremities, where it cools quickly. This may reduce your survival time by as much as 50%.

If you can't get out of the water, try one of the following survival techniques:

- Heat Escape Lessening Position (H.E.L.P) hold knees to chest to protect trunk of body from heat loss. Wrap arms around legs and clasp hands together.
- Huddle - huddling together with 2 or more people will extend survival time 50% longer than swimming or treading water.
- Remain as still as possible, however painful. Intense shivering and severe pain are natural body reflexes in cold water, which will not kill you, but heat loss will.

First Aid for Hypothermia

Any person pulled from cold water should be treated for hypothermia. Symptoms include intense shivering, loss of coordination, mental confusion, cold & blue (cyanotic) skin, especially around lips or fingers, weak pulse, irregular heartbeat and enlarged pupils. Once shivering stops, core body temperature begins to drop critically.

Your goal in treating hypothermia is to prevent further body cooling. Severe cases call for re-warming by trained medical personnel. In all cases, arrange to have the victim transported to a medical facility immediately.

What to Do:

- Gently move the victim to warm shelter.
- Check breathing and heartbeat. In cases of hypothermia you should check very closely for as long as two minutes. Start CPR if necessary.
- Remove victim's clothing with a minimum of movement, cut them away if necessary.
- Lay victim in a level face up position with a blanket or other insulation beneath them.
- Wrap victim in warm blankets, sleeping bag or other warm covering.

If there will be a long delay before victim arrives at a medical facility, use the following re-warming techniques:

- Apply heating pads or hot water bottles (wrapped in a towel to prevent burns) to the head, neck, chest, and groin.
- **Do not** apply heat to arms and legs or give them a hot bath. This forces blood out through the cold extremities and back to the heart, lungs and brain which will further drop the core temperature. This can cause "after drop" which can be fatal.
- **Do not** massage or rub the victim; rough handling may cause cardiac arrest.
- Apply warmth by direct body to body contact. Have someone remove their own clothes and lay next to victim skin to skin. Wrap both in blankets.
- If person is alert enough you can give them hot drinks. If they are unconscious or stuporous do not give them anything to drink. **Never give alcoholic beverages**.

Cold Water Drowning

Some apparent drowning victims may look dead, but may actually still be alive! A phenomenon called the "mammalian diving reflex" can be triggered by cold water. This reflex, common to whales, porpoises and seals, shuts off blood circulation to most parts of the body except the heart, lungs and brain and slows the metabolic rate. What little oxygen remains in the blood is circulated where it is needed most. Do not assume that a person who is cyanotic and who has no detectable pulse or breathing is dead. Administer CPR and transport the victim to a medical facility as quickly as possible for specialized re-warming and revival techniques. People have been revived after having been submerged for extended periods, some in excess of 45 minutes! So don't give up!

Merv Frye adapted this article from Alaska Information Cache. www.alaska.net/~akcache/akcache.html

Preventing Tendonitis

What is Tendonitis?

Tendonitis is an injury to the tendons and their sheaths. Tendons are the tough connections between muscles and bones. They are made of collagen fibers; long filaments of protein bundled together, much like a rope. Fibroblast cells scattered between the strands make the collagen. Nourishment and oxygen for the tendon comes through tiny blood vessels from the muscle tissue at the end. Because most of the tendon is made of tough collagen fibers it is extremely strong. Because there are few fibroblast cells and blood vessels, injury repair is very slow. Tendons slide in slippery sheaths of synovial membrane. The synovial membranes are made of the same material that lubricates the joints. Injured tendons are like frayed ropes. Some of the collagen fibers break under stress. The damaged cells send a chemical signal that causes swelling, pain, and brings the fibroblast cells into action to remove damaged fibers and secrete new ones. The new fibers are laid down along patterns produced by the tension on the tendon. Linear stress and motion sets up an electrical field that guides the fibroblast cells to orient the new fibers properly. The repair process is very slow because of the poor blood supply. It takes several weeks to months to remove the damaged fibers and produce properly oriented ones.

Prevention During The Trip

Start Slowly, Then Taper Off

Warm up and stretch a little. Muscles and tendons are physically stronger and more elastic at warmer body temperatures; thus they are far more resistant to injury.

Dress warmly; cold, stiff arms are easily injured.

Plan your trip to be easy in the beginning especially. Make sure it is well within every paddler's range.

WHAT TO DO IF YOU'VE BLOWN IT?

Initially

1. Stop paddling, rest, splint your wrist and wrap with ACE wrap.
2. If you can, put ice on it and elevate it.
3. Take anti-inflammatory medications. They seem to delay swelling and moderate the initial injury and inflammatory process so that it is easier to repair with less scaring later.
4. Sit in the front of the double kayak and tell amusing witticisms so your paddling partners will forgive your injuring yourself.

After the First Few Days

1. Gradual gentle range of motion.
2. Ice, compression wrap, anti-inflammatory medication afterwards.
3. Slow, repeat, gradual increase of loading and time spent in range of motion over several weeks to rebuild strength with flexibility. Rushing the process can produce weak, short, stiff, painful, lumpy tendons. These are prone to repeat injury and extremely tedious to treat.

Gary Kelsberg, M.D.

Elements of a First Aid Kit

Surgical pads: *For large bleeding wounds, it is essential that clean absorbent dressings be applied to cover the entire wound and that sufficient pressure be applied to stop bleeding. May be used to pad splints*

2x2 and 4x4 Sterile Gauze Pads: *For cleaning and covering wounds*

2" and 3" Gauze Roller Bandage: *For applying bandages and splints (aka Cling Bandage)*

Triangular Bandage: *For Arm slings, swathing, traction splints, constricting bands, bandaging, etc.*

Sam©splint or wire splint: *Compact moldable splint*

Occlusive dressing: *For relieving tension pneumothorax; burns (sandwich bags work well)*

Butterfly Closures: *For closing wounds*

Tincture of Benzoin: *Painted on skin to hold tape and butterfly closures in place*

Band-Aids© (assorted sizes): *For minor wounds*

1-1/2" Adhesive Tape: *For applying bandages, removing small splinters, nettles, thorns, etc., wrapping strains/sprains*

3" Ace Bandage: *For wrapping strain/sprain*

Moleskin & Molefoam: *For preventing chafing/blisters, protecting hot spots/blisters*

Second Skin©: *For covering scratches/blisters*

Providone© Iodine: *For disinfecting water & for wound cleaning*

CPR Mask with one way valve: *For artificial respiration*

Acetaminophen

Aloe Vera Gel: *For minor burns*

Antacid

Antibiotic Ointment

Antihistamine

Aspirin

Bee Sting Kit

Betadine©

Cortisone Cream 1%

Ear Drops

Emergency Dental Kit

First Aid Book

Glucose Paste

Hyperthermia and Hypothermia Thermometers

Ibuprofen

Immodium AD©

Ipecac Syrup

Irrigation Syringe

Safety Pins

Latex Gloves

Needle: *For removing splinters*

Prescriptions

Safety Razor

Sandwich Bags

Single Edge Razor Blade

Small Scissors

Snake Bite Kit

Syringe: *For irrigating wounds*

Tweezers

Waterless Antibacterial Hand Cleaner

Zinc Oxide

- All medications and medical supplies with expiration dates need to be replaced on/before that date.
- The first aid kit can be expanded for wilderness/extended trips.
- The duct tape in your repair kit will often work when all else fails or you run out of adhesive tape. **Try not to apply directly to skin.**
- It is recommended that a dry bag be used to keep the first aid kit dry, as the first aid kit items and the primary container need not be waterproof.
- Easily identify the first aid bag or container (**RED** with a white cross, **WHITE** with a red cross, the words, **"FIRST AID,"** etc.). It may be you that needs attention, and the person digging through your kayak needs to readily find it.
- A good waterproof first aid book: **"Pocket Guide To Emergency First Aid,"** Authors:
- Cordes/LaFontaine, Publisher: Umpqua Feather Merchants, $12.95 (800-874-4171)

First Aid Training Sources

The Mountaineers - MOFA

Mountaineering Oriented First Aid (MOFA) is a 30-hour first aid course for the wilderness traveler. The course meets the requirements for the American Red Cross (ARC) Standard First Aid course with 24-hours of additional wilderness focused first aid training. By far, the best training for the price! Check THE GO GUIDE for more information.

American Red Cross (ARC) (253) 474-0600

Bates Technical College (253) 596-1587

Clover Park Technical College (253) 589-5671

Emergency Medical Training Associates (800) 634-8048

Heart Starts (253) 858- 3682

Medical Training Consultants, Inc. (253) 566-8282

Thoughts on Followership

The following essay explores the "whys" and "wherefores" of group participation by examining the nature of group activity, motivations for group participation, and some practical guidelines.

The Whys of Groups

The Mountaineers, like other outdoor organizations, emphasizes group activities as the preferred form of activity and adventure. For many activities, Sea Kayaking included, demonstrated competence at a certain skill level is required before members can participate. For expeditions as well as day trips, the group format has much to recommend it. Foremost is safety, since solo wilderness travel in extreme or changeable conditions is never condoned. Simply put, the group is a ready-made rescue party at the service of any member in need. Secondly, the collective knowledge and wisdom of the group is greater than that of most individuals, permitting an easy introduction to new routes, locales, and ways in which to apply or build our skills. Finally, we recreate in groups for camaraderie, for the sheer fun of adventuring with our friends. The group approach to wilderness activities is based on logic and common sense, but we believe we actually travel in groups out of enlightened self-interest. It is simply the easiest, safest and most enjoyable means to partake of and expand our scope of wilderness adventure. The group can afford us power, knowledge and support not available to the solo enthusiast.

Who is a Group?

In the commercial world, an outfitter-led group can be any collection of souls, with any, little or no knowledge or competence in their selected activity. Their only common bond may be the fact that they are in the same place, with similar interests. The only guiding principle is to do as they are told. They will literally be taken on their trip. In the Mountaineers, a trip or outing is composed of peers. We share not only membership, but also a commonly held competency and commitment to safe and responsible outdoor travel. Our leader and co-leader are not guides or caretakers; rather they are fellow paddlers appointed by their peers to coordinate the activities of the group for a particular activity, they are trained and evaluated in certain skills in group management, but they are not equipped or authorized to impart or supplant for any participant the knowledge or skill necessary to engage in the activity. For any volunteer organization, effective leadership is not possible without the cooperation of informed and responsible participants. This informed participation in group activities we call **followership.**

The Hows of Group Activity

Good Followership is motivated foremost by concern for our own safety; it is evidenced by behavior, which enhances the safety and integrity of the entire group.

Some Points:

Arrive promptly at the put-in. Delays to the group due to your tardiness will cause tension and unnecessary urgency, particularly if the trip is tide-and –current-critical. If late, be prepared to be left behind.

Come prepared with equipment in good working order. Advice and assistance are available before the trip, not on the beach. Whether or not your stuff is owned, borrowed or rented, you are responsible for the fitness and appropriateness of the equipment you bring, as though it were your own.

Be aware of your own interests, motivations and limitations relative to your trip. Discuss them in advance with the leader. Don't assume his or her definitions or goals for the trip will match your own. Trip classifications are broad, and address many variables; be sure you understand what's involved in your trip.

Listen to the weather immediately before the trip. Leader will keep the group updated, but be prepared to pro-actively protect your own limits, or to clarify leader's intentions in the face of new or changing conditions.

Stay within hailing distance of fellow paddlers. In case of a mishap, you will need to summon help for yourself or assistance in rendering aid to another paddler. Rescues and assistance will be carried out by group members under the direction of the leader or co-leader. It is your responsibility to be available to render assistance.

Stay aware of the position of all other group members.

Do not break out of the group for exploration, equipment adjustment, etc., without approval of the leader.

Within any skill rating, a group will contain paddlers of varying skill levels and paddling speeds. Do not contribute to disorder by using your own faster paddling rate to "string-out" the group.

Worsening conditions will exaggerate the differences among members of the group and tend to cause the group to spread out more. When the wind and seas build, focus on the "shape" and cohesiveness of the group, fight the "every one for themselves" instinct. Be available to help or to be helped.

The above behaviors, motivated by personal and group safety, can directly contribute to the realization of the other benefits of group travel: expanded personal skill and knowledge (through proximity of information and support), and the sheer joy of being out there together.

Failure to practice the above behavior carries a price. Inappropriate equipment or actions on your part may result in the inability of the group to render timely assistance or even save your life.

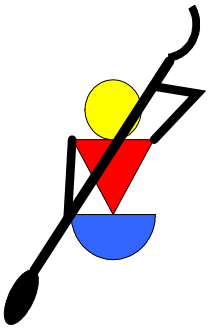
Final Thoughts

If taken as just another set of rules, the foregoing will likely not be heeded or remembered with much concern. However, keep in mind why you paddle, why you paddle with the Mountaineers, and what you want out of it. We think you'll see that each of the ideas above works directly for your benefit through added safety and access to information and support on the water. And just in case you feel that group travel is a local or club phenomenon, keep in mind that in Britain, home of some for the most skilled paddlers in the world, the guiding precept is that, **"fewer than three shall never be".** In New Zealand, with ocean, island and sheltered paddling much like our own, it is against the law for outfitters to hire out kayaking gear to solo paddlers.

Gary Knudson is a member of the Tacoma Mountaineers

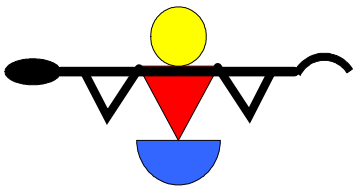
Paddle Strokes

The basic strokes fall into three groups:



- Basic Control
- Turning and Steering on the move
- Bracing for stability

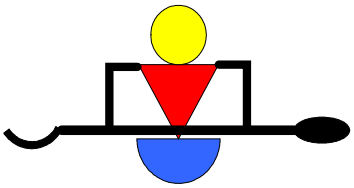
Basic Control



- Forward Paddling
- Reverse Paddling
- Stopping
- Sweep Strokes (to turn)
- Draw Strokes (to go sideways)
- Brace Stokes (to keep yourself upright)

These strokes start or stop movement of the boat

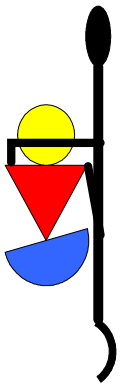
Turning and Steering on the move



- Stern Rudder (or Stern Pry)
- Low Brace Turn

These strokes change the direction of the boat and require the boat to be moving in order to be effective.

Sculling



- Sculling draw
- Sculling for support

These are refinements of the first group "draw and recovery" and provide continuous stability in unstable situations

Forward Paddling

Lower Body:

- Press against the foot rest with foot on each stroke (right foot as you paddle right side, etc)
- Press your foot against the foot pegs to push your hip back and rotate your torso side to side with each stroke
- Straighten out your legs periodically so they don't get stiff

Trunk:

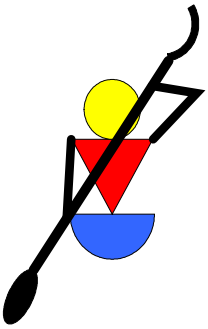
- Torso rotation (via pushing your hip back) from side to side with each stroke
- Sit upright or slightly forward – do not paddle while leaning back
- Body steady – no bobbing
- Periodically stop and flex your torso forwards and backwards so you don't get stiff

Head:

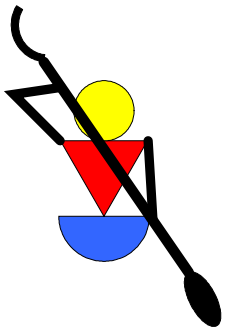
- Hold steady, independent of hip movement
- Occasionally raise chin to release neck tension

Arms and paddle:

- Medium paddle angle
- Use "paddlers box"
- Put in at feet and out at hips
- Direction of stroke is along bow wake
- Elbows straight when paddling in high winds
- Hands relaxed
- Let your torso do the work, not your arms!



Reverse Paddling



Head:

- Watch where you are going, looking over paddle shoulder with each stroke

Trunk:

- Torso rotated side to side with each reverse stroke

Paddle:

- Blade is angled somewhat flat, 45° out from boat

Arms:

- Low paddle angle
- Paddle slightly flattened for stability
- Maintain paddlers box

Lower Body:

- Drive transmitted through to feet

Boat:

- To correct heading, hold edge toward stroke and finish stroke further toward the bow

Stopping

- Apply maximum effort
- Short, quick series of Reverse Strokes on each side of boat
  - Be aware of any current which might carry the boat onwards

Sweep Stroke

Head:

- Keep eyes on the paddle blade

Trunk:

- For reverse sweep, start with torso rotated
- For forward sweep, end up with torso rotated

Lower Body:

- Use knees, feet and hips to rotate torso

Paddle:

- Low paddle angle, blade just below the water
- Paddle slightly angled up for support
- Forward sweep in a half-circle arc from near your feet to near your stern
- Reverse sweep in a half-circle arc from near your stern to near your feet

Traditional Draw Stroke

Head:

- Look directly at your paddle shaft

Trunk:

- Rotate torso towards direction you want to go
- Body upright

Lower Body:

- Knee lift on side you are paddling towards
- Other leg is straight and pressing on foot rest

Paddle:

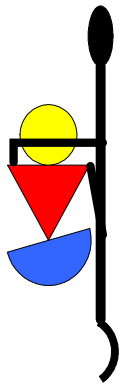
- Shaft is vertical, or angled slightly away from boat if you want more stability
- Blade totally submerged
- Cut paddle blade out (blade is perpendicular to boat) and Draw paddle blade back in (blade is parallel to boat)

Boat

- Keep boat level, or edge slightly away from the side you are paddling on if you want more stability

Arms:

- Top arm high with back of hand near forehead – hand is loose and just holds paddle upright
- Lower arm is fully extended to water – this hand controls the paddle movement



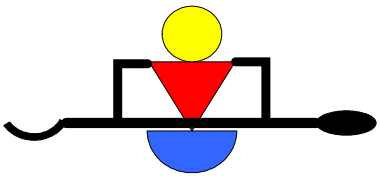
Sweeping Low Brace:

Trunk and head:

- Torso rotation
- Eyes on your paddle blade

Lower body:

- Paddle side knee is braced
- Opposite leg is extended and presses on foot rest



Paddle:

- Shaft held low, horizontal and parallel to side of boat
- Almost flat blade slaps water near stern and skims forward on water surface until 90° to hips

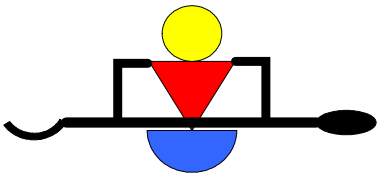
Arms:

- Pushing action on shaft
- Elbows high
  - Recover paddle with "motor cycle wrist roll" and slice to surface

Traditional Low Brace:

- Same as Sweeping Low Brace except the flat blade extends out from the hips
- Slap the water with the back face of the paddle
- Recover paddle with "motor cycle wrist roll"

  and slice to surface



Lower body:

- Paddle side knee is braced
- Opposite leg is extended and presses on foot rest
  - When the paddle is "slapped" on the water, use paddle side knee to do "hip snap" on paddle side

Arms:

- Pushing action on shaft
- Elbows high
  - Recover paddle with "motor cycle wrist roll" and slice to surface

Stern Rudder (or Stern Pry)-- used to adjust direction of boat while it is moving

Trunk:

- Torso rotated

Lower body:

- Paddle knee is braced
- Opposite leg is extended and pressing on foot rest

Paddle:

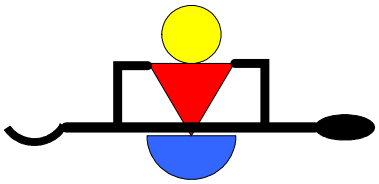
- Shaft parallel to boat
- Slice blade completely into water and use lower hand to "pry" it out at a slight angle

Boat:

- Boat must be moving forward to do this stroke
- This stroke will somewhat slow down your forward momentum

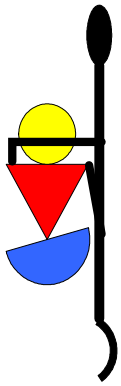
Low Brace Turn

- Establish speed
- Set up turning momentum with outside edge then transition quickly to inside edge
- Extend paddle blade 90º from hips into Low Brace position



- Hold brace while edging boat towards the direction of turn
- Transition to forward stroke

Sculling Draw



- The technique for this draw is similar to a Traditional Draw stroke except the movement of the paddle is side to side parallel to the boat
- The paddle blade is moved in the shape of a flattened figure-8, or like spreading butter across the top of a muffin
- This draw stroke is more stable than a Traditional Draw

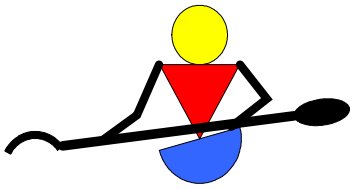
Sculling For Support

Trunk:

- Trunk and head stay upright but hips are flexible

Boat:

- Can be level, edge towards your paddle or edge away from your paddle, depending on comfort level



Paddle:

- Horizontal shaft
- Driving face of blade downwards
- Leading edge of blade raised on each direction of scull
- Keep blade moving back and forth in 45° to 60° arc out from your hips

Arms:

- Keep flexed
- Elbows under paddle shaft

Permission from BCU (British Canoe Union) for illustrative purposes.

KAYAK REENTRIES (How to get back in your kayak)

Occasionally the unexpected happens, and you may find yourself tipping over in your kayak. What to do now? There are a lot of different options but we are going to focus on two different types of reentries – a one person (or "self" reentry) and a two person (or "assisted" reentry).

First things first – you need to be able to get out of your kayak while it is upside down. You will also be upside down underneath the water, attached to your kayak via your spray skirt.

The "Wet Exit"

A "wet exit" is just what it sounds like – you are exiting your kayak into the water while turned upside down. It's not as difficult as it sounds. All it takes is a little practice.

You simply lean forward and locate your spray skirt grab loop at the front of your cockpit, push it forward then straight up to release your spray skirt, then run your hands around both sides of the coaming to make sure the spray skirt is released all the way around. After that, use your hands to push yourself out of your kayak and up towards the surface of the water. Some people like to "somersault" out of their cockpit. Practice this over and over until you feel comfortable with getting out of your kayak.

One good trick to find your spray skirt grab loop is to put your hands on the coaming on either side of you then feel your way along the coaming to the front of the cockpit where you will locate your grab loop.

Another good trick is to practice grabbing your spray skirt on either side and pulling it off. How easy this is depends on your spray skirt.

A very important skill to practice when doing is wet exit is to keep a good hold on your paddle and kayak the whole time. If you are doing a wet exit in current and let go of your paddle or kayak then they will float away from you, most likely faster than you can swim.

The Assisted T-Reentry

This two person reentry is commonly used and is very stable and effective, even in rough conditions. It also allows you to empty out your boat quickly before getting back into it. It requires two people: a rescuee in the water (holding firmly only their paddle and kayak) and a rescuer in a second kayak.

If the rescuee is able, they flip their kayak upright by lifting up on the side of the cockpit (still keeping a good hold on their paddle). The rescuer approaches the other kayak and grabs it anywhere, then instructs the rescuee to, hand-over-hand, work their way to the cockpit or as directed by the rescuer, to hang on securely out of the way and rest there for a minute. Generally the rescuer also secures the rescuee's paddle, if the conditions are rough and the paddle could float away. The paddles can be secured across your lap by tucking them between your PFD and spray skirt.

The rescuer then manipulates his kayak around until he can grab the bow toggle of the rescued kayak and turns his kayak until it is at a "T" with the other kayak. Using the other kayak's deck lines, he pulls the bow of the kayak up onto his own kayak, right in front of him across his spray skirt and starts tipping that kayak **towards** himself to allow the water from the cockpit to drain

out. If the other cockpit is still partially submerged, it will need to be pulled a little further out of the water to effectively empty the cockpit. While the rescuer is in this "T" position with the other kayak on top of him, he is actually in a very stable position so don't be afraid to lean back and really drain that boat out.

Note that if you pull the other kayak onto your deck via its stern (or rear) and try to empty the kayak, it won't work! When you empty a kayak the correct way, the water hits the bulkhead just behind your kayak seat – the water can't go anywhere except out of the kayak. When you try to drain the water out in the opposite direction, it will travel all the way past the foot pegs underneath the front deck and the water just stays in the boat.

Next, the rescuer quickly flips the second kayak back upright and slides it back into the water with it positioned parallel but in the **opposite** direction of the rescuer's kayak (ie, bows to stern). If the kayaks are positioned opposite each other, it is much easier for the rescuer to keep a good grip on the boat for the rest of the rescue. The rescuer actually leans his body over the front deck of the other kayak (the more you commit to this, the more secure you will be) and holds onto either side of the other cockpit firmly.

When the kayak is slid down into the water, the rescue can grab the deck lines and begin the walk themselves hand over hand to their own back deck. When the rescuee is in position at his back deck and the rescuer has indicated to them that they are "fully committed," the rescuee can begin to re-enter their boat.

The rescuee re-enters their kayak by doing a powerful kick and pushing down on their kayak back deck until they can get their chest onto the back of their kayak. If the rescuee finds they have trouble with this, they can kick their feet to the surface so that they slide onto the back deck like a seal instead of having to use only arm strength to push your body weigh out of the water. They can use rear deck lines to help, as well. They then slowly rotate their body to face their stern, keep their rear end down and crawl back into their cockpit, feet first. Once far enough into the cockpit, they rotate their body by facing their rescuer (it's more stable that way) and sit down in the kayak seat.

Another option for a rescuee that may have trouble with the "seal launch" up on the back deck is to use a heel hook re-entry. The rescuee hangs onto their back of their coaming and lies on their back with their feet toward their bow. They swing their outside leg up and into their cockpit, hooking their heel under the front part of the coaming. They reach across the cockpit with the outside arm to grip the opposite side of the coaming. Using their heel as leverage they roll themselves onto their back deck. They will be on their stomach with their feet inside the cockpit, ready to enter their kayak in the same way as they would with the seal launch.

The rescuer still hangs on to the other kayak until the rescuee has reattached their spray skirt, has their paddle back and is ready to go.

The Paddle Float Reentry

This is a rescue that you can do by yourself, with a little practice. It requires that you have an inflatable paddle float which is what will provide you with added stability to enter your kayak, and a pump to empty your boat.

After you have wet exited your kayak, flip it upright by pushing upward on the side of the cockpit, and then locate your paddle float (it should be stored either behind your seat or under the deck lines). Swing one of your legs into the cockpit to tightly hold onto your kayak and slightly lay back in the water for the next step.

Slip on end of your paddle into the paddle float and wrap your paddle float straps securely around the shaft of your paddle. Unscrew the blow valve on your paddle float and inflate one side of the float, then screw the blow valve shut.

Face your kayak back deck and place your paddle perpendicular to your kayak behind your cockpit, with the paddle float end extending far out into the water. Your paddle will be between you and your cockpit. You need to have your paddle fairly securely anchored, either by holding the paddle shaft and the rear of your cockpit together in a grip with your hand (the preferred method), or by putting your free paddle blade underneath the bungees on your rear deck.

Place one hand on the rear of your cockpit and the other on your far deck lines. From here try to kick your feet to the surface so that you slide onto the back deck like a seal instead of having to use only arm strength to push your body weight out of the water. Use a powerful kick while pushing down on the back deck until you can get your chest onto your back deck and one leg onto your paddle. For the rest of this rescue it is very important to GO SLOW, your rear end down and your weight tipped toward your paddle float. If you tip too far over towards the other side, you will do a "yellow rainbow" and flip your kayak over.

Once you are on your back deck, pause for a second to collect yourself and put both legs on your extended paddle. Then start slowly rotating your body towards your stern, moving the leg that is closest to the cockpit into the cockpit. Next, move the opposite hand to the paddle so that you have two points of contact on your paddle at all time while you move your remaining leg into the cockpit. Keeping both hands on the paddle, slide down into the cockpit. Slowly turn around by facing your paddle float.

Keep your weight leaning towards your paddle float while you attach your spray skirt, leaving it open enough at the front of the cockpit that you can use your pump to mostly empty your boat (this may take a little while). After you have stowed away your pump and reattached the rest of your spray skirt, remove the paddle float from your paddle, deflate it, and stow it under your deck bungees. Ready to go!

Additional Documents

- Zen & the Art of Sea Kayaking
- To Pee At Sea

- What To Do With Your Poo
- Environmental Ethics

- The Wilderness Washroom
- Pack It In, Pack It Out
- Planning For the Long Paddle
- Fitness & Kayaking
- Washington Water Trails Association
- Seas Kayak Reading List
- Telephone Numbers and Internet Addresses

Telephone Numbers and Internet Addresses

Last Updated: January 2017

Emergency Telephone Numbers

Mountaineers Emergency Number ***206-521-6030***

In the case of an emergency, first call the Coast Guard (if on the water) or 911 and ask to be transferred to the Sheriff on the county you are in (if on land). Then call the Mountaineers emergency number.

Coast Guard

Bellingham 360-734-1692
Ilwaco (Cape Disappointment) 360-642-2382
La Push 360-374-6469
Neah Bay 360-645-2237
Port Angeles 360-417-5990
Seattle 206-217-6750
Westport (Grays Harbor) 360-268-0121

County Sheriffs

Clallam County (Port Angeles) 360-417-2459
Grays Harbor County (Montesano) 360-249-3711
Island County (Coupeville) 360-678-4422
Jefferson County East (Port Hadlock) 360-385-3831

King County (Seattle) 206-296-4155
Kitsap County (Silverdale) 360-337-7101
Mason County (Shelton) 360-427-9670
Pacific County (South Bend) 360-875-9397
Pierce County (Tacoma) 253-798-4721
San Juan County (Friday Harbor) 360-378-4151
Skagit County (Mt. Vernon) 360-336-9450
Snohomish County (Everett) 425-388-3393
Thurston County (Olympia) 360-458-2878
Wakiakum County (Cathlamet) 360-795-3242
Whatcom County (Bellingham) 360-676-6650
Red Tide and Biotoxin Hotline 800-562-5632
Seattle Poison Center 206-526-2121

Emergency Radio Channels

Marine VHF

Distress or hailing: Channel 16

Coast Guard Liaison: Ch. 16, 22

CB: Channel 9

Information Telephone Numbers

Ferries

Washington State Ferries 800-843-3779
British Columbia Ferries 888-223-3779
Guemes Island Ferry 360-293-6356
Lummi Island Ferry 360-676-6692
Washington Water Trails Association 206-545-9161

Washington State Parks

-Information 360-902-8844
- Reservations 888-226-7688

Washington State Parks

Deception Pass State Park 360-675-2417
Moran State Park (Orcas) 360-376-2326

San Juan County Parks

Friday Harbor 360-378-2992

National Parks

Olympic National Park (Port Angeles) 360-374-5450

Other Important Numbers

Nature Conservancy of Washington 206-343-4344
Whale Hotline (and other marine mammals) 800-562-8832
Please report sightings, strandings, or harassment.

Internet Addresses

NOAA Tidal Current Tables	https://tidesandcurrents.noaa.gov/
50 Cool Sea Kayaking Trips in the Pacific Northwest	http://www.kayaktripsnorthwest.com/
Northwest Outdoor Grrl	www.nwoutdoorgrrl.com
British Columbia Marine Forecast	http://www.vashonwatersports.com/
Seattle Weather	http://www.intellicast.com/
Vancouver Weather	http://www.intellicast.com/
Victoria Weather	http://www.intellicast.com/
Washington Marine Forecast (NOAA)	http://www.atmos.washington.edu/data/marine_report.html
Alaska Marine Highway	http://www.dot.state.ak.us/external/amhs/home.html
British Columbia Ferries	http://www.bcferries.com/
Washington State Ferries	http://www.wsdot.wa.gov/ferries/
Tacoma Mountaineers	https://www.mountaineers.org/about/branches-committees/tacoma-branch
The Mountaineers	https://www.mountaineers.org/
Washington Kayak Club	http://www.washingtonkayakclub.org/
Washington Water Trails	https://www.wwta.org/
Sea Kayaker Magazine	www.seakayakermag.com
Deep Zoom (current atlas)	http://www.deepzoom.com/

- Glossary

Zen & the Art of Sea Kayaking

Safety and Harmony among the Waves

Within minutes the urban environment can be left behind- dissolved into an expanded world of sensory and physical mutability. The city dweller can leave work for the day, the weekend or an extended time and readily become immersed in a renewing expanding experience on water. Sea kayaking can be done in the urban wilderness of Seattle's Arboretum, among spring's golden Canadian goslings, among the seals barking at Golden Gardens at Shilshole, or even among whales, during an extended cruise to the Alaskan frontier.

The centering rhythm of paddling stills the thoughts. Harmony is made with the waves. A merging takes place with the natural marine environment that is more rhythmical, for me, than any other. The interface of the air, sea and land is a place of extraordinary vibrations. The surface of the water ripples under moving air, rises and falls with the swell, surf or wave, and the sun and breeze on my body drive out the artificially created vibrations and tension-arousing demands of modern living. I come in contact with things deep within - a stilling occurs - awareness, attentiveness and equanimity well up inside. I am calmed, more rooted and connected to things infinite. It's a spiritual dimension I carry back to my everyday world, refreshed, rejuvenated, and energized.

Sea kayaking can also be a dangerous endeavor. Beware of those who advocate "No experience necessary!" The 50-degree salt water is a relentless, unforgiving environment for the ill-prepared, even on day when the sun drives the thermometer over 85. The shock of sudden immersion from a capsize surprisingly and involuntarily mashes out your breath. Within minutes, your fingers go numb and unusable. The body's core temperature begins to drop (and continues to drop after coming out of the cold water) and death can occur in less than a few hours. How can we safely enjoy the fruits of this wondrous sport?

Training from competent, qualified sources is essential. At a minimum, to be a safe paddler, the basics of paddling skills-forwards, backwards, sweeps, draws, braces- and techniques of self and group rescue should be learned. Simply learning how to sit in balance is the first line of defense. In balance while unmoving and static in calm water, in balance under dynamic water conditions in waves and surf, and in balance while entering or leaving the kayak are rudimentary. The individual rescues, especially the Self Rescue (and later the kayak Roll) are basic to safe water travel. Rolling the capsized kayak back upright is an advanced technique requiring considerable practice. Assisted rescues (ie, two+ person rescues) serve to increase your competence and enjoyment on the water. Eventually you learn to think safely and plan and organize for safety. Reading about paddling skills and rescue is insufficient. Practice, practice and more practice is essential. The mind and the body need to be coordinated in the understanding of what is to be done. This very practice instills and enhances your harmony with yourself and with water environment.

Where can you get this training? Around Puget Sound several local clubs offer training each spring (The Mountaineers, Washington Kayak Club, etc). Ongoing instruction is offered commercially as well. Other clubs offer tours, social gatherings and extended trips.

When the minimal training is completed, there are various ways to get out there and enjoy kayaking. Single or double kayaks can readily be rented from the commercial training sources. Deposits and signed assumption of risk and release of liability are usually necessary. Most rental sources also require attendance at one of their basic skills classes or at least participation in a clinic to ensure some minimum level of competency.

The price range for purchase of a kayak is broad, from around $800 for a simple plastic boat, to over $3,500 for a "decked out" kayak with all the accessories. The prospective buyer would be wise to do a self-appraisal of the scope and intensity of interest and then a systematic comparison of the types of hull designs/boat features with the types of paddling conditions they expect to encounter. There is much difference of opinion about which kayak is the "best" -- the "best" for you will just depend. Do lots of thinking and actual paddling comparisons, under many water conditions, before making the final decision. Although the initial cost of kayaking equipment seems high, it is comparable to or less than other outdoors sports, because most of the kayak equipment lasts for a lifetime, without the need for regular replacement found in so many outdoor activities. A wise purchase lasts a lifetime.

Norm Kosky took kayaking training from the Washington Kayak Cub two years ago and from the Mountaineers this pas year, and has canoed for 35 years. He has been climbing and leading basic and intermediate climbs since 1977, and also leads tours for ski mountaineering, snowshoeing, Nordic and telemark skiing.

To Pee At Sea

Two friends, Rick and John, recently decided to paddle to Catalina Island, 24 miles off our Southern California shore. They decided to do a comparable distance along the coast as a trial run, as neither had paddled more than 10 miles in a day. Rick arrived at the put-in late, so was in a great hurry to unload his kayak and pack his gear. They soon headed down the coast, enjoying a lively conversation. After an hour, Rick started to fall behind, and John had to wait now and then for him to catch up. Pretty soon their conversation ceased, as Rick became silent and John chafed at the slow pace. By the third hour, neither paddler was having fun. At the end of the sixth hour, they reached their destination harbor and landed. The look on Rick's face and his quick waddle into the water gave him away. He returned with a smile and exclaimed that he never wanted to go that long without peeing again! In his morning rush he had not followed the golden rule of kayaking: The last thing you do before taking off...." A glass of juice and three cups of coffee had taken their toll. Rick had paddled several hours in real pain, with all of his attention focused on his body and none on his partner or their trip.

Drinking fluid is essential to keeping up our energy, warding off headache, sea sickness, cramps, and poor decisions: all possible effects of dehydration, in fact, we are encouraged to begin drinking extra liquid the night and morning before a long day's paddle, making certain a continuing need to pee at sea.

I once encountered a related problem when paddling with a man I had just met. Headed for an offshore island in Baja, we glided over three- to four- foot swells with calm winds and no breaking waves. It was bouncy but pleasant. About three miles into our seven-mile crossing, I felt a strong need to relieve myself of the remains of last night's dinner. I was used to handling such activities and had the proper aids aboard. All I needed was for my partner to stabilize my kayak for a couple of minutes. My request for that assistance was met with a blank stare, and he paddled on. I waited what seemed an eternity (about ten minutes) before rephrasing the request, apologizing for any inconvenience or embarrassment. True, we had just met, but my need was really urgent, the island was still more than an hour away and surf might not let us land immediately. This time, the response was more direct. My companion said I would have to wait, because he wasn't going to steady my boat for me. The water was too cold for me to hop overboard and the seas too rolling to manage by myself. So I had to wait until we reached the island. Pretty uncomfortable!

What are people afraid of? Why are we inclined to "hold it' for too long, accepting discomfort and irritability, and inviting a bladder infection? Some of us can't imagine releasing bodily liquids and solids in a suddenly tippy kayak. And many of us are reluctant to call attention to our bodily needs, preferring to be discreet and even secretive, certainly not announcing our need to fellow paddlers. For years we have been admonished to drink copious amounts of liquid while paddling, as much as a liter every hour. "Good heavens, that means stopping to pee every hour! I'd be sooo embarrassed!" Yet drinking fluid is essential to keeping up our energy, warding off headache, sea sickness, cramps, and poor decisions: all possible effects of dehydration. In fact we are encouraged to begin drinking extra liquid the night and morning before a long day's paddle, making certain a continuing need to pee at sea.

The realities of paddling may require some adjustment of attitudes toward urinating ("peeing" is a much simpler term) and defecating ("crapping," after Thomas J. Crapper. a London plumber who designed a variety of sanitary systems for handling human waste discreetly). Paddlers with a healthy attitude freely talk and gently joke about their common needs. They share information about what works and what doesn't. They take time for everyone to make a "pit stop" before taking off, even if it means a brief delay. They give each other time to handle matters underway,

offer to steady a partner's kayak, discreetly but effectively — when necessary. Thus they are free to enjoy paddling and each other, unencumbered by trivial matters of everyday bodily functions.

Each paddler should select clothing which opens without a hassle when the need to pee arises. This means bathing suits, shorts, or pants with loose legs, a generous fly opening, or elastic waistband. I wish clothing manufacturers would make outdoor pants with a simple fly that extends all the way down to the inseam.

If you feel unstable, ask a friend to support your kayak by rafting your boats together.

Wet suits can be modified by slitting the crotch, from front to rear. Bind the edges and ends of the slit and glue on a flap of thin (two or three mil) neoprene to the inside of one edge to bridge the gap. The suit won't be as comfortable for swimming in cold water, but kayakers who use their suits primarily for paddling may not consider that a major drawback. The slit, however, will let more water through if you capsize. Dry suits cannot be readily modified and present the ultimate obstacle to relieving oneself.

Then there's the matter of carrying a container to catch the pee. A large, heavyweight plastic, zip-locking bag is the strongest, least expensive, most compact and flexible, reusable container I have found. Plastic vegetable bags always seem to spring a leak. I carry several of the zip-locking bags with me, one under my seat, the rest in a bag with about 30 other essentials like a compass, flashlight and a few dollars in case I find a fisherman with a fresh catch along the way. Some friends use bicycle water bottles and even soft-drink cans, but they take up more room and have smaller openings. Too, they must be marked so they are not reused for drinking water.

Women may want to try using a urinating funnel which makes it possible to direct the stream accurately. Some funnels, designed for one-time use, are made of biodegradable paper. Others are reusable plastic ones. I find washing the plastic funnel and the bag at sea quite acceptable. Funnels can be purchased by mail (see Resources). They also can be found in outdoor equipment stores.

Some people, most of them men, use a sponge instead of a bag or other container. But most paddlers are put off by the thought of having to handle a couple of saturated sponges. Other receptacles I have found less than satisfactory are sandwich-size bags (you'll never believe how much liquid you can release!). Styrofoam or paper drinking cups (which slosh, collapse, or crush at precisely the wrong minute), and containers like soda cans with small openings (that are too easy to miss).

Actually doing it is pretty simple. If you feel unstable, ask a friend to support your kayak by rafting your boats together, sliding a few feet in front of you and leaning on your kayak. With their back toward you, he or she will hardly be aware of what you are doing and will probably enjoy the excuse for a short rest. Total privacy is possible in single boats. A woman usually slides her clothing to the side and places a funnel firmly against her body to direct the flow of pee to her bag. Inch forward in your seat so the urine can follow gravity's pull into the bag on the floor in front of your seat. When finished, empty the bag overboard. Then rinse both bag and plastic funnel (being careful not to drop anything) and tuck them away for repeated use.

Men have several options. The easiest is to remain in the regular seated position, reach in through the loose leg opening of shorts or swim trunks, and direct the stream into a bag large enough to spread below you on the floor. You might also try using a hand bailer or a common hand pump as a receptacle. Whatever, the challenge will be to work with gravity.

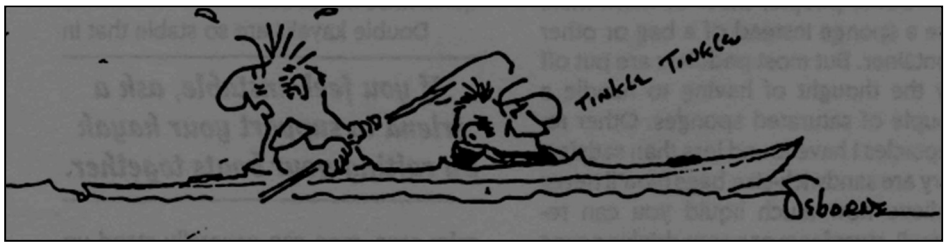
If you must open a fly, you probably will be better off if you slide your pants down your legs a few inches, since flies are generally installed quite high up the front of pants. That much movement could be enough to capsize you in rough water, so ask a friend to stabilize your boat.

Some men use a sponge as a bridge between themselves and their coaming before directing a powerful stream up and over the side of the kayak. (This makes quite a show for nearby paddlers.) The sponge absorbs just the beginning and end of the stream and requires a quick rinse in the sea.

Double kayaks are so stable that in calm seas. Men can generally stand up and pee overboard. If that feels unstable, try kneeling on the deck with one knee while the other foot remains in the cockpit. Or simply sitting on the deck behind your seat with your feet in your cockpit is comfortable for either person and allows the front paddler privacy. The rear partner always has that advantage, while the front partner must either be uninhibited about the whole matter or trust the rear partner to find a momentarily distracting focal point.

Paddlers of open-top kayaks usually just pee where they sit. They wash the seat and themselves clean with sea water, sloshing out the old with the new. The procedures already described work but open-top kayak paddlers will enjoy considerably less privacy than in a traditional kayak.

Several tricks must be mastered to make peeing in your kayak quick and simple. You have to relax or very little, if anything, will be released. I breathe slowly and deeply when I want to relax. One friend just waits and waits until the stream starts. Others visualize sitting comfortably on a toilet at home. If you have difficulty, “tune into your feelings” as your stream starts in comfortable surroundings a few times. Recalling those feelings and sensations when you are ready to pee in your floating kayak might make it easier.



Bob! There's a leak in this kayak — I can hear it!

Some paddlers find that they also have trouble completely emptying their bladders. The stream stops prematurely, even though they still feel pressure, and they cannot start again. My best advice is to try for a little while but not to force it. You can be confident that whenever the pressure builds up sufficiently, you will be able to release enough to get relief. Usually, the first time each day is the most difficult both to get started and to empty your bladder completely. Enjoy the scenery and relax!

In choppy water, it might not be safe to remove your spray skirt to pee. Some people can slip one or both hands through the spray skirt body tube and carry on as usual. This takes practice, and is most easily accomplished while a friend stabilizes the boat. Nylon spray skirts generally fit loosely enough to allow this trick, but the tubes on neoprene skirts usually are too tight.

If you paddle solo and have no one to steady your kayak, get support from a paddle float on one blade of your paddle with the other blade securely fastened to your rear deck bungie cords or held with one arm over the shaft (like leaning on a friend's shoulder) while you use your other hand to pee. The first technique is easy if your kayak is equipped with rear deck cords: the second requires some practice.

"Crapping" requires even more finesse. But holding it can lead to days of discomforting constipation. Before an extended trip I adjust my regular habits to go as soon as I rise in the morning. Then I am not faced with this challenge during a normal paddling day.

In the boat you have to slide your pants down near your ankles. This takes slow and steady movements and is much easier when you have a partner steady your boat. Next your must rise up a couple of inches so there is some space between you and the kayak seat. Maintain that position by pushing down on your cockpit coaming. A paper bowl about 6" in diameter can be placed on the kayak seat as a receptacle. The final product can be dumped overboard if you are truly in open waterways or placed in a large plastic bag for later disposal. Wet wipes are much easier to use than toilet paper. They too should be packed out.

An alternative position involves placing two paddles behind your cockpit and across to the rear deck of your friend's kayak. Remove your pants and sit perched on the paddles while your friend steadies your boat. This takes calm seas and some willingness to be exposed (the rest of your group, we hope, have paddled ahead). It is best attempted on a sunny day among friends who are up for a hearty laugh in case your balance is off.

Menstruation occasionally must be dealt with on the water. Preparation is the key to making the process as easy as possible. Carry a supply of sandwich-size plastic bags, each holding a one-use supply of tissue and a tampon. (Sanitary napkins are a poor choice because it is so common for a little water to end up on your kayak's seat.) Whatever you use, seal all refuse in a plastic bag and pack it out. The remains won't burn in a campfire unless it's a very hot one!

There are some problems for which there are no good answers. For example, tight clothing (I love to paddle in Lycra climbing tights) restricts access and requires much wiggling (and consequent instability) before you can pee comfortably. In an unaltered wet suit, you have to pee where you sit or hop overboard to flush with fresh water through the neck, both often unacceptable alternatives. Dry suits prohibit all forms of relief because they are sealed systems. Rough seas can be handled, up to a point, when a partner stabilizes your kayak. But most paddlers find it impossible to pee when seas are rough enough to require keeping a spray skirt in place. Some are unable to relax enough under conditions that require steadying from a friend.

Success depends upon finding a good friend or two with whom you can experiment with techniques and practice under varied conditions. A frequent paddling partner and I have taken several 25-30 mile ocean crossings as fine opportunities to discover what works and what doesn't for each of us. Such an excuse for paddling to beautiful islands, and for lots of laughs along the way!

Joanne Turner lives in Irvine. California.

Resources

Freshette is sold through REI and the Kayak Academy. It is a pink plastic funnel with a 4 1/2 inch length of tubing, costs $25.

What To Do With Your Poo

How many times have you arrived at a campsite to find little white toilet paper flowers and their accompanying nastiness behind every rock? With more and more people retreating to the outdoors for a little rest and relaxation, this is becoming an all too common occurrence.

To combat this problem, many land management agencies are aggressively installing pit toilets in some heavy "use" areas. In other places, land managers are requiring visitors to carry out their wastes. Carrying out your waste, if done properly, is relatively easy to do.

Many white water river areas have for years been requiring that boaters carry out their wastes. One of the most common methods is to get a large military ammo can (called a "Rocket Box"), line it with a plastic trash bag, and use it as a toilet. This contraption, know lovingly as "the groover' (for the imprints or "grooves" that the edge of the can leaves on your rear and thighs), works well if you have a raft to carry it around. But what do you do if you are in a smaller boat like a kayak or a canoe?

One effective method utilizes plastic bags and a dry bag. Take a plastic bag and roll the edges down until it forms something that looks like a pan with 4 to 5 inch walls. I recommend a trash compactor bag. These bags are a good size and they are tough. Do your duty in the bag, roll it up, tie it shut, and you're done. Congratulations! You have just created a time bomb!

With a couple of easy precautions you can carry this little treasure safely around in your boat. First, you want to be very careful not to urinate in the bag. What's that you say? Take a poo without peeing? Impossible! Actually, it's not impossible –in fact, with a little practice, it's no trouble at all. Try to pee before you poo. Getting liquids in the bag greatly increases the chances that you will have a spill.

As an aside—since most paddlers camp in well-known and well-used sites, try to urinate in the river or ocean so as not to foul the limited space near the camps. The last time some friends and I were in the Grand Canyon, we did the following calculation: 15,000 visitors per year with an average trip length of 7 days, peeing 1 quart a day equals about 26,250 gallons of urine flowing towards Los Angeles. Who says you can't get even?! Secondly, once you have finished relieving yourself, you must sprinkle a small laundry scoop of powdered Clorox bleach into the bag. The Clorox keeps your wastes from decomposing. Decomposing human wastes produce huge amounts of gas. What, you may ask, happens if you don't put in the Clorox? The answer: your poop bag explodes and **your boat stinks for the rest of its life**.

After the Clorox, point the bag away from you and squeeze the air out of the bag and tie the end in a knot (I tie two Knots!). Put this poo bag in to another plastic bag; this is the "general holding bag." Put a twisty thing on this bag, and put this in a dry bag. The next time you need to go to the bathroom, do this all again and put your new poo bag into the general holding bag with the old poo bag. The dry bag that you use will undoubtedly become a dedicated poo dry bag. Generally, this bag will smell more like Clorox than like poop. This should encourage you to get the lemon fresh or mountain scented Clorox.

Some areas don't want boaters to use plastic bags in their waste systems. Call these areas and ask them specifically if these regulations apply to self-supported kayak and canoe trips. Often, due to space constraints in these smaller boats, these "no plastic" regulations don't apply.

One final note: What you do with your bag of goodies once you finish your trip depends on where you are. Some areas don't mind if you just put this in the trash (think of this as a really big diaper). Other areas want it taken directly to the dump. Also, some R.V. parks will take it off your hands for a couple of dollars.

Justin Hayes is a lecturer in the Earth Systems Program at Stanford University.

About Alternative Methods

Lest novices think that Justin's approach is 'the only way to go', an excellent book which covers the issue in detail is *How to Shit in the Woods*, by Kathleen Meyer (Ten Speed Press, 1989).

The book is aimed primarily at the inland hiker, climber or lake paddler who has no access to the tidal flush of the oceans. It is a comprehensive look at the Giardia pathogen; transmission, symptoms and prevention; humorous tips on techniques and style of squatting; group waste management methods; coping with Trekker's Trots; field water disinfection devices; TP alternative gentle on your; and the environment, and a chapter for women only. While packing it out is best, using "cat holes" is ok as long as you don't go down more than 8", stay well away from any fresh water source, and don't bury your TP. In coastal environments, it is considered appropriate to defecate below the high tide line, in zones of high energy.

The Wilderness Washroom

As responsible paddlers, we are faced with the task of ensuring that we, and everyone else in our group, know how to properly dispose of human waste. This may not be a topic of polite conversation, but it is one, which has to be addressed. In the past, when wilderness travel was not as common, this issue was not a problem. Now, when we paddle a popular route, we may be one of hundreds of paddlers passing though that area in a summer.

What was once a small problem is multiplied by a factor of hundreds, and the consequences are easy to imagine. Human waste naturally biodegradable and will break down into harmless organic material in time. Our duty is to assist this process, and to be responsible about the esthetics of our campsite at the same time.

Human urine is not much of a problem. The urine of a healthy person is basically a sterile liquid that will not transmit disease. The only requirement is that we be smart about where we choose to deposit that urine. Common sense dictates that we choose an area well away from the campsite to prevent odor, and make sure we are not in an area where urine will flow into any natural drainage course and find its way to the lake where we are swimming and drawing our drinking water.

Human feces are another matter entirely. Feces can contain pathogens, which spread disease. It is important to be carefully and responsible with our disposal methods. There is nothing worse than arriving at a site to find human waste carelessly disposed of or toilet paper scattered throughout the area. The cleanup job is not a pleasant one.

The only acceptable disposal technique for human waste is to bury it in an area of soil, which is biologically active. For larger groups, this may mean digging a small latrine for everyone to use. In small groups, each person is responsible for burying waste in a small "cat hole."

The trick to properly disposing of feces is to bury it deep enough that there is no odor, but shallow enough that it is in the layer of soil, which has bacterial and microbial action. This generally means a hole 4" to 6" deep. The feces should be placed in this hole, stirred up with a stick to mix in natural organic material (which will help hasten the decomposition) then buried. The area should be covered with loose material from the surrounding area to help disguise the site.

The process of burying waste is not always as simple as it sounds. The problem is that when we travel on a well-used route, if we find a spot that looks suitable for use as an outdoor bathroom,

chances are good that someone from a previous group has discovered the spot before us. We have to resist the temptation to take the closest and easiest to reach location to take the time to travel a little further off the beaten path and pick a spot as far as possible from the site. We should realize that everyone will not take the time to do this, so if we all pick the closest and most convenient location, the site will soon be a toxic waste dump.

Women have the added problem of sometimes having to dispose of tampons and sanitary napkins while they are out paddling. The same rule applies to these materials as does to toilet paper. They should never be buried – animals will dig them up and scatter them. The only responsible method is to burn them completely or to pack them out. Keep in mind that it takes a very hot fire to completely dispose of them.

Pack It In, Pack It Out

Pick up and pack out all of your litter. Trash and litter have no place on kayak trips. Set a good example-pick up litter left by others.

Reduce litter at the source. When preparing for your trip, repackage food into reusable containers or remove any excess packaging. This simple practice lessens the likelihood that you will inadvertently leave litter behind.

Trash

Trash is inorganic waste brought along on the trip, usually from over-packaged products. You should carry out all of your trash in extra garbage bags or ammo boxes. Bail buckets lines with garbage bags make convenient trashcans around camp. If you smoke, put butts in our pocket until you can dispose of them with the trash. Some paper items can be burned in a campfire, but much of the paper packaging used today is lined with non-burnable foil or plastic, so it is best to get in the habit of carrying everything out.

Other items such as tin and aluminum cans, plastic, tin foil and glass are not burnable and must be packed out. Recycle these if possible.

Garbage

Garbage is organic waste left over from meals. Careful planning and preparation can easily reduce this type of waste. Food scraps should be picked up from around the kitchen area and packed out. This helps keep the ants, flies and mice to a minimum at high-use campsites. Wastewater should also be strained before disposing to remove any food particles. Any leftovers should be either saved and eaten later, or put in a plastic bag or other container and carried out. Burning and burying these types of waste are ineffective and inappropriate methods of disposal. It requires a very hot fire to burn garbage thoroughly, and animals will dig it up if buried. Keeping food waste away from animals is important so they do not become habituated to people as a food source and their normal activities are not disrupted. Consider separating your organic waste from the trash so it can be taken home and composted.

Environmental Ethics

1. FIRES: Avoid building open wood fires where none have been designated. Get into the habit of using camp stoves. Even a “safe” beach fire, when left unattended, could get out of control. Many remote locations you are likely to use do not have a neighborhood fire station.

2. TRASH: Take it home, all the way home! Pack it out and avoid depositing it into or on the ground. Also, don't use someone's private garbage can. Kayakers wear out their welcome when they cause the locals the expense of disposing of their garbage. Kayakers "drop" very few bucks but many bags of refuse.

3. HUMAN WASTE: Attempt to use only provided sanitary facilities. The final chapter is not written on this problem, but like the Marine Island Trail and the Michigan Trail, the Cascadia Marine Trail is investigating a "pack it out" policy.

4. USE ESTABLISHED SITES: Strive to impact only a very small area. Placing poles and moving logs to form your chosen form of "outdoor architecture" may not please the next camper. Leave it natural.

5. PETS V. WILDLIFE: Leave your pet at home. Their presence will automatically send the local wildlife into hiding. Even the best-behaved pet declares "turf" and this will affect the natural behavior of the local fauna.

6. BEWARE of your impact, your footsteps, and your behavior. Be considerate of the environment. Take only pictures leave only your wake.

7. PICK UP ANY GARBAGE someone else may have overlooked. It may just give you a good feeling to know that you are leaving a special place better than you found it.

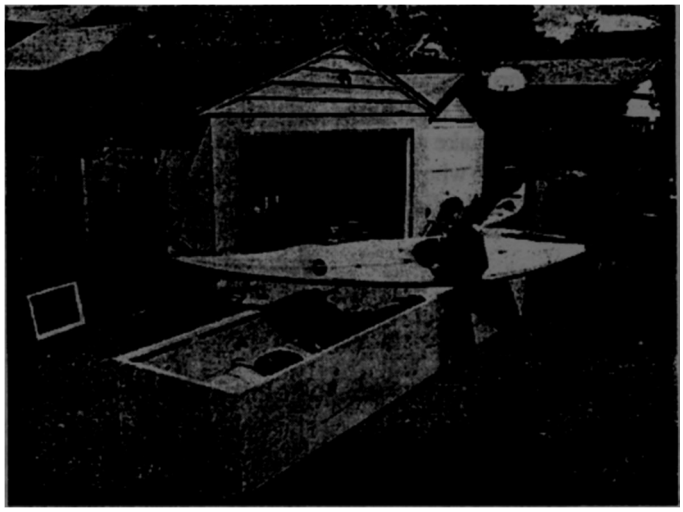
Planning For the Long Paddle

Timing, communication are everything in making a kayak expedition work

A recent kayaking excursion in remote islands near Kodiak, Alaska was the most formidable trip I have ever helped to plan. Many complicated elements had to fall together in time and space to allow the trip to happen as we hoped it would. Had one little piece in the schedule of events fallen apart, the trip would have been a disaster. Our trip might never have begun or we could have been stuck at our pick-up location for an extra day or two, thereby missing our kayak-shipping dates and our flights.

Our kayaks (and a lot of the gear) were shipped in a home-built wooden crate to Kodiak via a shipping consolidator in Seattle. We flew to Kodiak, got a ride for ourselves and our luggage to the location of the consolidator in town where we unpacked the crate. We then got another ride with our kayaks and a mountain of gear to a fishing boat moored near town where we loaded our kayaks and gear before motoring out to a remote island group at the north end of the Kodiak Archipelago where our two-week journey began. Since our arrival date was on a Saturday, we had to make special arrangements with the shipping company to give us access to our crate when they were normally closed. Our pick-up at the end of the trip was via a different fishing boat and at a different location. Once back in Kodiak, after hauling our stuff here and there, the crate was repacked with our boats and equipment, and the whole process reversed.

The fact that our trip went smoothly is less a matter of luck and more a matter of planning. Many hours were spent perusing the many possible ways of getting kayaks, ourselves and gear to our location and back. We looked at many different possibilities, including renting boats in Kodiak, renting boats out of Seward or Homer and taking the SW ferry system, renting/ buying folding boats and flying them in, hauling our boats to Seward by auto, and shipping them in a crate out of Seattle. Some of the options were impossible while others were too expensive. Many hours were spent talking on the phone and typing messages via e-mail in order to get the pieces of the trip put together. However, as complicated as this may sound, it was not at all a displeasure to do this. In fact, I enjoyed the whole process as it heightened my anticipation of the adventure to come. Planning a trip is often as enjoyable as the actual paddle itself, since the planning process builds excitement as prospects of the kayaking experience grow with each new preparation.



Kayaks were shipped to Alaska in home-built wooden crates

Planning extended kayaking trips in remote places like Alaska and Northern British Columbia can be a challenge. I have been planning and executing these kinds of trips since 1987. Some trips have been planned better than others. I have learned that when things go wrong, the problems are almost always made significant by inadequate planning. Things will go wrong, of course, but contingency plans can be put into place in expectation of the most likely kinds of mishaps. With a plan in place which includes contingency plans, mishaps that might normally produce big problems can amount to nothing more than a nuisance. This is all part of the process called planning.

Planning your trip

The best way to start planning your big trip is to pick a very general location such as British Columbia or Baja, Mexico. Your initial choice might be based on exciting stories from books, friends or even based on pure ignorant speculation and curiosity (these often generate the most interesting trips). If any of these areas have a tourist bureau, write, call or e-mail for information specific to your needs, such as maps, natural features, transportation on land, air and/or water, kayaking outfitters or retailers, lodging, if appropriate, and anything else that you think might be relevant. Don't forget to find out what the typical weather patterns are like for an area during the time of the year for your proposed trip. Use this information to narrow your choices.

When you have selected a general area from a large-scale map or chart (say, SE Alaska), go to a retailer who sells detailed charts such as Captain's Nautical Supplies or Metsker Maps. Nearly all of these places have a space set aside for you to peruse the charts before you buy them. Zoom in on a particular area that strikes your fancy. Perhaps you might find your magic area as one that has lots of barrier islands with only a small portion of the coast exposed to the open ocean. Or maybe you are looking for protected coves and quiet inland waterways. Whichever, this is the way to find them.

Once you have selected one or more specific areas, get information from other paddlers who may have been there. You will have to be a bit of a sleuth. Often you will seem to reach dead ends; no one seems to know anyone who can give you enough detailed information on the area. While it is pretty easy to get information on the Broken Islands off Vancouver Island, it can be much more difficult to get info on Yakobi Island in Alaska. Some tips here:

Start several months to a year (or more) in advance by announcing your plans to a group of paddlers at a meeting or gathering where adventuresome kayakers may be (i.e. the Mountaineers!). You might also advertise in a kayaking club bulletin or put a notice on a kayak shop bulletin board. Let people know about your tentative plans and find out if anyone knows someone who may know something about your intended destination. Take down any info on paper as detailed and as accurately as you can.

Once you have located people who have some first-hand knowledge of this area, contact them. You will want to find out if they have been there (to your area) and more importantly, whether or not they were involved in the planning of the trip. If they seem like a good source of information, ask them general questions about their trip such as how well they enjoyed it, particular difficulties, transportation, dates of trip and any other things they might advise you to think about. Remember, at this stage, you are only looking for general information. Save the details for a later meeting. Ask them, also, if they know of anyone else who has been on a trip in this area. Contact these additional people and be persistent. It is worth the effort. Be sure to reciprocate in some way for their efforts in helping you. Using this information, you will be deciding on your general destination and beginning to formulate your plan.

Now for the details. The idea here is to find out as much as you can about the area for the purposes of planning the trip. Arrange a time when you can meet one or more of your information providers. Ask them to bring their charts and any notes they may have taken during or after the trip. Bring your charts, your list of questions, a notepad and, perhaps, a tape recorder to the meeting. Make marks on your chart as they point out features in the area (use a pencil—trust me). Audrey Sutherland taught me a neat trick: Instead of writing all over your chart in strategic areas, use symbols. For example, use hollow triangles to represent unconfirmed campsites and solid triangles for confirmed ones. A plus sign (+) above a solid triangle could represent a campsite to die for. Cabins can be represented with a square, and so on. It is very important to

make sure that they have their own marked charts at the meeting because this will help jog their memory of the trip. Have a list of prepared questions with you. Don't blow this great opportunity for valuable information. Don't forget to ask about other important things such as:

a. Currents: Try to get the direction and strength of flood or ebb currents in as many places as they know about in this area. Determine their sources for tides and current values that they relied on for their trip.

b. Weather information: Were there any unique weather patterns here? Did they get any weather on their VHF radio? Were there any areas where the radio could not receive a signal?

c. Exposure: What is the potential exposure to wind and waves in this area? Wind and fetch (the distance over the water which the wind is blowing) are the biggest factors. Find out what the prevailing winds are likely to be in this location during the time you may be there. Imagine you are paddling in the most exposed portion of your intended ' route and suddenly big winds come up along with big waves. Will your options be acceptable?

d. Beaches: What are the beaches like? Are there lots of protected beaches with little exposure to pounding surf? How far would you have to paddle without any good landing beaches? Remember that your progress will be measured by the speed of the slowest paddler.

e. Other potential trouble: Find out if there were other factors such as problem animals* boat traffic, private beaches, etc.

f. Features: Did they find any interesting features in the area—things you should have a look at?

g. Transportation: How did they get there? Ferry? Charter boat? Fly? Drive? Or perhaps a combination of two or more of the above?

Once you have chosen a location and have a pretty good idea of the conditions you are going to be in, start planning the trip by making early arrangements for tickets, shipping, lodging and other accommodations. I have found that outfitters or others whose livelihood depends on providing services to adventuring kayakers are generally reliable in keeping their commitments. On the other hand, atypical arrangements with non-outfitters can be problematic. For example, I had to be vigilant in my efforts to ensure that the skipper of the fishing boat was there to pick us up and drop us off as arranged. This involved periodic communication with the skipper to reaffirm our appointment (even during the trip via VHP Marine operator assisted phone calls). Although I cannot be sure that had I not been on top of it, the boat would not have been there, the fact that the fishing boat was there and on time was reward enough for the effort. I can vividly recall the feeling of relief that the four of us shared when we first spotted the fishing boat coming toward us after not seeing anyone else for two weeks.

Choose the location of the "put-in" and the "take-out" carefully. Don't try to bite off too much distance on the trip. This will help to keep anyone from feeling like the trip is a death march to the take-out spot. Remember that "Murphy" is always on the trip with you. Consider all factors of safety, feasibility and recreation opportunities in your choices.

Planning with others

If you are planning a trip with friends or acquaintances, be sure to discuss your plans with them frequently. Schedule plenty of planning meetings to share information and decision making. This will also give you a good chance to get to know who you will be paddling with (this would be another article onto itself).

Keep a good handle on the projected costs as the endeavor develops so that there are no surprises at the end. Often, it is better to estimate on the high side because trips usually seem to end up costing more than originally planned.

Decide how to divide gear up between boaters. Although each paddler should be independently equipped with essential gear, it is useful to divvy up some of the group items such as a kitchen tarp, shovel, etc. I have found that it is more efficient and rewarding to coordinate the evening meals wherein dinners are prepared in turn by one or more members for the whole group. This greatly reduces confusion as well as the total time spent cooking by any individual paddler.

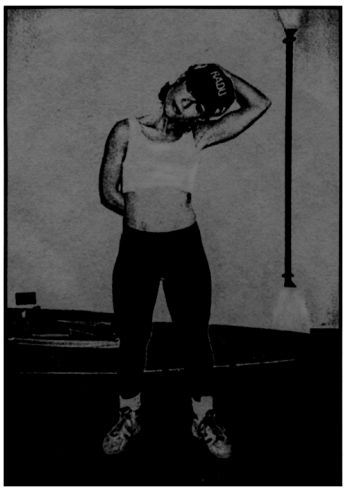
It is important to think of as many possible things that could go wrong. Make certain that the most timid paddlers are aware of the risks involved. Encourage quiet people in the group to express their concerns. Keep the discussion wide open to all risks, including group dynamics issues. For example, do you plan to move camp every day? Will someone's planned recreation activities interfere with the wishes of others (e.g., delays for a photo or fishing opportunities)? It is far better to suffer a little embarrassment in a planning meeting than to risk lives or ruin the trip because of group incompatibilities.

If the planning process starts early enough, a thoroughly planned trip can be accomplished with a seemingly minimum of effort. So, start looking at those charts because now is the time to put together the trip of your dreams.

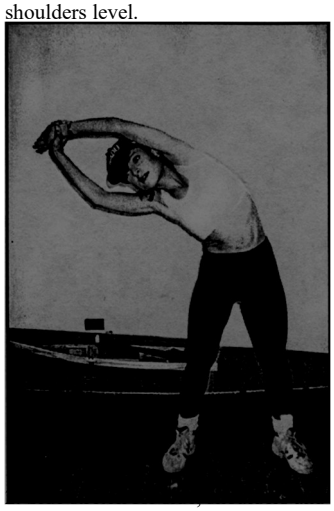
Les Uhrich is a Tacoma Mountaineers member, former chair of the Tacoma Branch and currently serves on The Mountaineers Board of Trustees when not planning long-distant kayak trips.

Fitness & Kayaking

One way to get in shape for kayaking is just to go kayaking. But you need to have good overall fitness—the physical demands of paddling in surf, rolling, reentering the boat upon capsize, practicing hip snaps, and even getting the kayak from the car to the water require more fitness than paddling alone can provide. Training for kayaking does not end with the paddling season. In the off season, focus on general conditioning; in the preseason include training for specific kayaking conditioning. During the paddling season you can concentrate on paddling and cross-train in other activities to maintain overall fitness. There are five aspects of general fitness: strength, speed, endurance, flexibility and balance. Coordination combines these different aspects in harmony. Excessive concentration on one or two aspects of fitness for a specific activity will, over time, be to the detriment of the others and overall fitness. As an example, a marathon runner who trains only for endurance, specific leg strength, and coordination for running may risk injury if he helps a neighbor move a heavy couch from one room to another. The "fit" marathoner may wind up with a strain or a tear in a body part that has been neglected in the unbalanced training for running. A kayaker who focuses only on upper body strength for paddling runs a similar risk for unbalance with potentially greater complications.



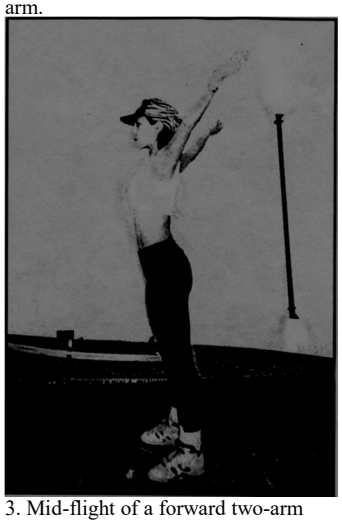
1. Neck Stretch. Pull gently and firmly in a continuous movement. Keep the shoulders level.



arms. Grab the wrist and pull the upper arm.

Runners and cyclists have an advantage over kayakers in developing cardiovascular fitness. Because legs are the body's "prime movers," most people's legs are fit enough to make the heart and lungs work hard to deliver blood and oxygen. This isn't the case with the arms and upper body. The kayaker has to develop fitness in the muscle groups of the upper body before being able to reach a level of exercise that can give the heart and lungs a workout.

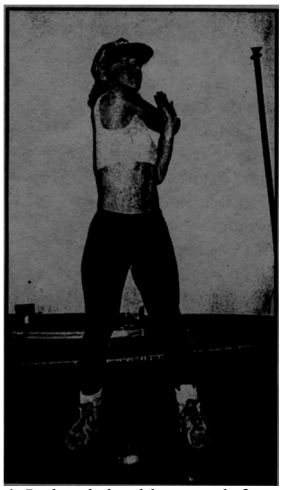
A kayaker is only as strong as his weakest muscle group. If he has a powerful stomach but weak shoulders and upper back, the unfit muscles will fuse like an overtaxed electrical circuit. If a paddler only paddles as long and as hard as his weakest link allows, and fails to develop that weak area, his general cardiovascular fitness for paddling will not improve. While paddling may gradually strengthen those weaker muscles, specific strength-building exercises can accelerate that process even in the off season when there are fewer paddling opportunities.



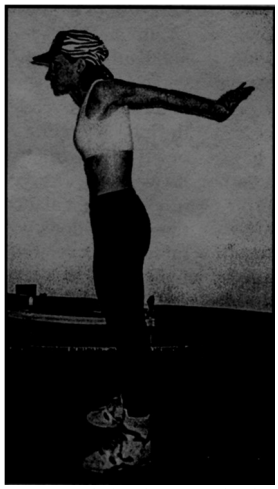
3. Mid-flight of a forward two-arm windmill. Warms up the entire shoulder girdle.

Kayakers need to be ready to apply all aspects of fitness both on water and on land. A paddler on an expedition might fight a headwind for four hours, then quickly switch to backpaddling coming through the surf zone, plant a low brace to prevent a capsize with a loaded boat, jump out of the boat onto legs that have been in a semi-static bracing position for half the day, and haul the kayak up the beach before the next

wave hits. He then may have to lift the kayak and carry it several hundred feet to get it out of the intertidal zone. All of these transitions from one type of work to the next occur with little or no warm-up or preparation. The body has to be in excellent, balanced general fitness to make these transitions without possible mishap and injury. On a remote beach, a strained back or a twisted ankle is more than an aggravation. A well balanced general fitness program can help minimize the chance of injury.

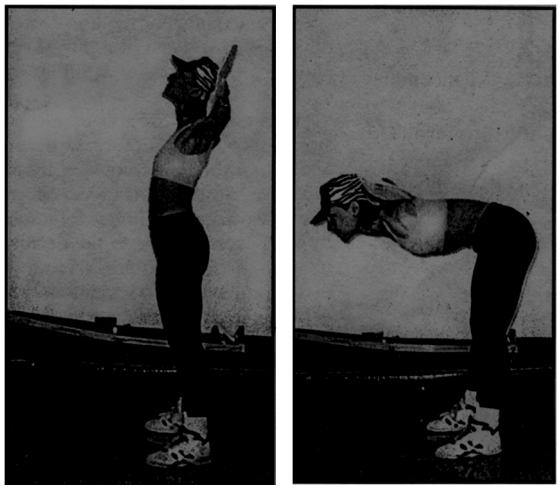


4. Isolated shoulder stretch for the side and rear areas of the deltoid.



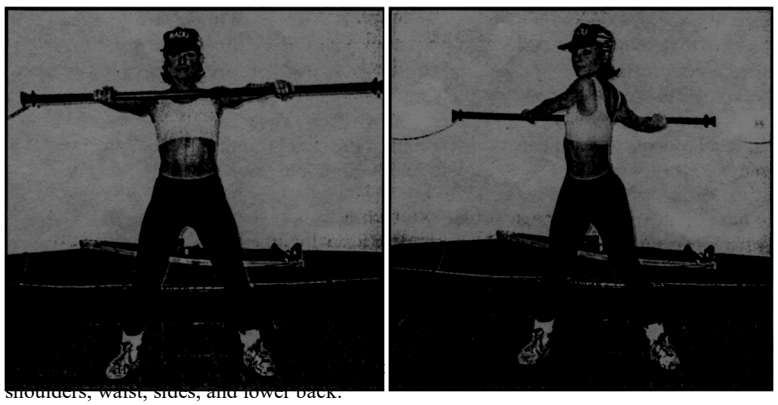
5. A stretch for the upper back and shoulders. Warning: not for injured shoulders.

When paddlers do day hikes or mountain climbs in the areas they've reached by kayak, they again cross over to a new set of fitness demands only remotely related to kayaking, and incorporate different muscles and different aspects of fitness. Lifting a kayak off and on the roof of a car involves supportive muscles and qualities that are only partially related to specific kayaking fitness. It doesn't take much to pinch a shoulder or tweak a back in this ordinary function of kayaking.



6. The "good morning" done in slow succession stretches the chest and shoulders and warms the lower back and hamstrings.

You don't need to work out in a crowded gym to prepare yourself for paddling. The exercises and stretches presented here are designed to use the simplest of aids and concentrate mainly on using your own body in a focused, vigorous, and imaginative way so that training can be fun and easily incorporated into your paddling routine. You can be your own personal trainer and use your paddle and kayak as fitness tools. In this issue we'll start with a stretching and warm-up routine you can use at the put-in, even before you take the kayak off the roof rack. In subsequent articles we'll work on other aspects of fitness that will improve your paddling performance and reduce your risk of injury.

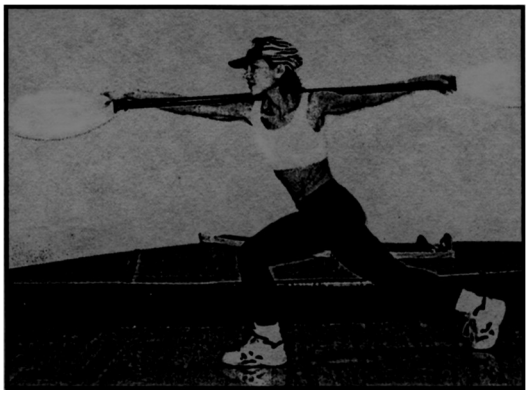


shoulders, waist, sides, and lower back.

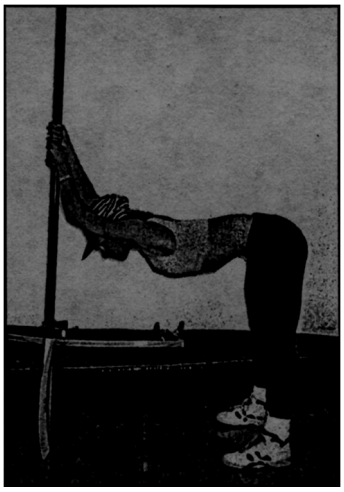
Do at least six repetitions of each exercise. Hold stretches for a count of eight. If you feel stiff, do 10 repetitions and hold stretches for a count of 12.

Professional Trainer Radu Teodorescu emigrated from Romania and now operates a fitness center in New York City. He has been kayaking for about five years. Among his students are Cindy Crawford and contributor Eric Stiller. Eric used Radu's training methods to paddle over 4,000 miles of Australian coastline and bicycle 2,500 miles of its interior free from aches and injury.

8. Lunging stretches and warms the calves, shins, butt, thighs, lower back, and groin. Using the paddle for support allows you to make a deeper lunge at a controlled rate.

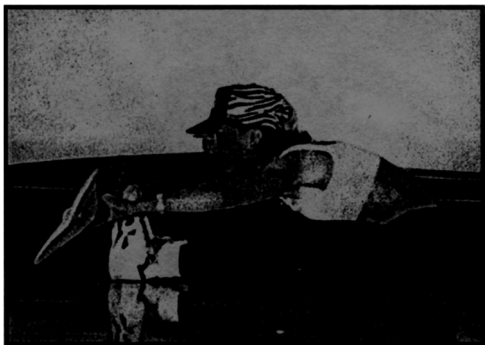


9. Paddle twist with a partial lunge. Works the shoulder girdle, waist, legs and groin. Twist only as far as is comfortable.

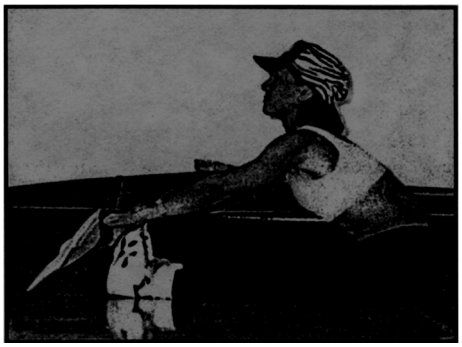


10. Hang on the paddle to stretch the hamstring, lower back, shoulders, sides, and upper chest.

11. The cobra position stretches the lower back and abdominal wall.

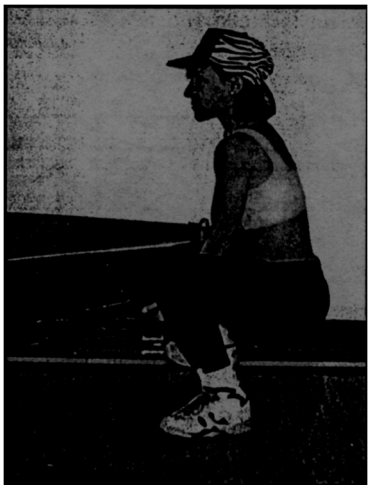


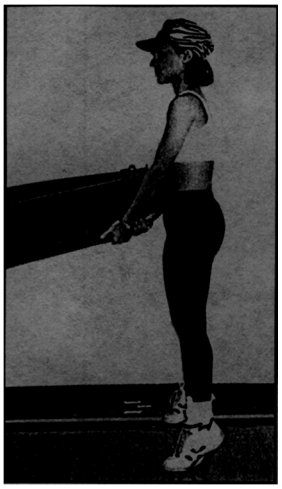
12. With the paddle at your feet, stretch the calves, hamstrings, forearms, and lower back.



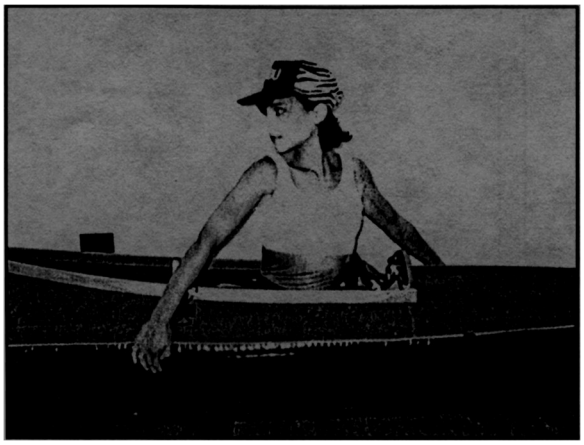
13. Sitting up stretches the mid and upper back.

14. Spreading the feet outside of the hands works the adductors and groin.





15. Boat squats in succession warm the legs, hips, butt, and lower back while stretching the arms, shoulders, and upper back.



16. The cockpit twist stretches the waist, back, sides and shoulders.

Washington Water Trails Association

WWTA is a non-profit collaboration of people who love to travel and enjoy the world by small boats. We joined together in 1990 realizing that urbanization along Washington's shorelines, particularly the Puget Sound Basin, is limiting access and rapidly changing the pristine nature of the resource. WWTA provides a clear voice of support for our fun mode of travel and a helping hand to protect Washington's waterways for all boaters to enjoy and explore.

WWTA accomplishes its mission by establishing access, recreation and educational opportunities for users of human and wind-powered, beachable watercraft through the creation and stewardship of water trails. We work as a coordinator to engage people from all walks of life and organizations in both the private and public sectors to support, develop and steward water trails in Washington State. WWTA is working to ensure you always have an accessible and sustainable resource to enjoy for its cultural significance, environmental integrity and recreational value.

A water trail, as defined by WWTA, is a network of access points, resting places and attractions for users of human-powered and beach able wind-powered water craft on marine and inland waterways. These sites should be of sufficient numbers to allow you, the small boater with limited range, to travel safely from one site to the other in a single day.

Water trails are important because they afford an opportunity for you to personally explore Washington State's natural and cultural heritage from a distinctly unique perspective - "sitting on" the water. Water trails also continue an important traditional mode of travel that has been practiced for thousands of years - first by Native Americans, then by the explorers and traders who followed, and now by people who wish to rediscover the joy and adventure of small boat travel. In addition, a water trail is a "schoolhouse without walls" in which WWTA involves the small craft boater and general public in marine and inland waterway shoreline preservation and stewardship programs.

Officially designated in the spring of 1993, the Cascadia Marine Trail began with 11 State Park and Department of Natural Resources' sites. Stretching 150 miles from Olympia to the Canadian border, the trail has now grown to over 35 camping sites throughout Puget Sound and the San Juan Islands. In addition, it includes many innkeeper partners offering unique overnight alternatives for the human powered boater. The Cascadia Marine Trail's initial success has been recognized by the United States Department of the Interior, which awarded the Trail with National Recreation Trail status in 1995.

WWTA is working toward the goal of expanding the Cascadia Marine Trail to include 100 campsites, 100 access points, and 100 innkeeper, restaurant and special attraction partners (such as museums along the water's edge) by the year 2000. As more people discover, visit and move to our spectacular piece of the earth, we want to continue the expansion of the Trail to provide ample access and opportunity to anyone with a sense of adventure for small boat travel and exploration.

WWTA is also working to create and support the development of other water trails through the State of Washington. These initiatives include the establishment of the Willapa Bay Trail, a potential partnership with Oregon State for development of an historic Lewis and Clark Water Trail along the Lower Columbia River, and possible water trails in places such as Ross Lake, Lake Chelan or the Upper Columbia River.

In WWTA's short history we have established several important programs and accomplished projects beneficial to the Puget Sound Community and visitors exploring our beautiful natural and significant cultural heritage. These efforts include:

- Establishing a "Water Recreation Trail Program" through the Washington State Legislature to support and build the Cascadia Marine Trail and other future water trails throughout the state. This includes offering an annual fee permit for unlimited access to Cascadia Marine Trail campsites for individual human and wind-powered boaters.
- Publishing an official guidebook, updated regularly, for the Cascadia Marine Trail. This book provides users with helpful descriptions of camping sites and associated trail partners, as well as how to practice environmentally sensitive travel and camping.
- Building WWTA member-based chapters throughout Puget Sound to steward the Cascadia Marine Trail and identify opportunities for its expansion.
- Partnering with organizations dedicated to the protection and preservation Washington's marine and inland waterways. These groups include Adopt-a- Beach, who train volunteers to monitor the exotic weed Spartina which now threatens native northwest habitat and species along our marine shorelines.
- Collaborating with public and private organizations and individuals at federal, state and local levels to create water trails and accessibility to them. This work includes performing surveys and studies with Washington State Ferries to improve the transport of small boats by ferry to water trail access points.
- WWTA supports a strong stewardship ethic and conducts extensive public education among current and potential water trail users. Our guidebook and newsletters promote a Code of Ethics for enjoyment of water trails. The philosophy of leaving the shoreline and aquatic environment in a better condition than found is integral to our code. We have also conducted programs such Harbor Patrol Training with SoundKeeper Alliance, to teach human-powered boaters how to properly identify and report potential pollution.

Please consider joining the more than 1,500 paddlers, rowers, sailors and odd assortment of water rats who love traveling by water and the unique experience it affords. With WWTA membership you will receive the Cascadia Marine Trail Guidebook, quarterly newsletters and the chance to participate in important workshops and fun events. Your membership will help further our mission to provide access and opportunities for you and other mariners of human-powered and beach able, wind-powered watercraft. Come explore with us the natural wonders and cultural heritage of Washington's waterways from a fish-eye view!

To join WWTA please visit their website at www.wwta.org.

Sea Kayaking Reading List

This is not intended as the latest and greatest, all-inclusive list. New books are being published every year. We recommend that you visit a book store, such as the "Armchair Sailor" on Westlake Avenue in Seattle, where there are many books on sailing trips and destinations (often referred to as "cruising guides"). Sailors share many of our interests and are equally concerned with weather, tides, and currents.

We are always trying to improve this list. Please let us know of any new finds!

Sea Kayaking – Books

Coastal Kayaker's Manual, The – Randal Washburn

Derek Hutchinson's Guide to Sea Kayaking – Derek Hutchinson

Eskimo Rolling – Derek Hutchinson

Essential Sea Kayaker, The – David Seidman

Savvy Paddler – Doug Alderson

Sea Kayak Rescue – Roger Schumann and Jan Shriner

Sea Kayaking – John Dowd

Sea Kayaking – Nigel Foster

Sea Kayaking Basics – David Harrison

Sea Kayaking Illustrated – John Robison

Sea Kayaking, A Woman's Guide - Shelley Johnson

Sea Kayaking – Magazines, Articles, Pamphlets, etc.

Sea Kayaker Magazine

Canoe and Kayak Magazine

Wave-Length Magazine

Accident Reports and Safety

Sea Kayaker Deep Trouble – Matt Brose & George Gronseth

Most issues of Sea Kayaker magazine contain accident reports and lessons learned. Back issues are available through the magazine.

Navigation, Weather and the Marine Environment

NOAA website: http://tidesandcurrents.noaa.gov

Fundamentals of Kayak Navigation – David Burch

Waves and Beaches – Willard Bascom

Oceanography of the British Columbia Coast – Richard Thomson

Marine Weather of Western Washington – Kenneth Lilly

Northwest Marine Weather – Jeff Renner

Marine Weather Hazards Manual: West Coast -- Gordon Soules Book Publishers

Specific weather and water hazards along the coast of British Columbia

Coast Pilots – US, Canada - available at marine bookstores and marine supply stores. Many volumes with detailed information on marine weather, currents, hazards, and small craft services.

Currents and Tides – Puget Sound

Tidal Currents of Puget Sound – Starpath Publication – current atlas/tidal prints for Puget Sound

Current and Tide Tables – must be purchased annually and is used in conjunction with both current guides. NOAA website: http://tidesandcurrents.noaa.gov

NOAA website: http://tidesandcurrents.noaa.gov

Current atlas website: www.deepzoom.com (click on "boats")

Chart No. 1: Nautical Chart Symbols and Abbreviations – US Government

Tides and Currents Charts – US Government

- *Puget Sound – Northern Part*
- *Puget Sound – Southern Part*

Tide Prints: Surface Tidal Currents in the Puget Sound – Noel McGary and John Lincoln

Currents and Tides – British Columbia and Alaska

Current Atlas: Juan de Fuca Strait to Strait of Georgia – Canadian Hydrologic Service

Southeast Alaska Current Atlas: Grenville Channel to Skagway – Randel Washburne

Washburne's Tables – must be purchased annually and is used in conjunction with both Current atlases.

Chart 1: Symbols, Abbreviations, Terms – Canadian Government

Canadian Tide and Current Tables, Vols. 5 and 6 (annual) – Canadian government.

Boat Launches and Public Beaches in Washington State

Washington Public Shore Guide: Marine Waters – public launches, marine water only

Washington Atlas and Gazetteer – public and private launches, marine and fresh water

Washington State Parks – Marge and Ted Mueller

Trips and Destinations – Puget Sound

Afoot and Afloat Series – Marge and Ted Mueller

- San Juan Islands
- North Puget Sound
- Middle Puget Sound
- South Puget Sound

Washington State Parks – Marge and Ted Mueller

Kayaking Puget Sound, the San Juans and Gulf Islands – Randel Washburne

Kayak Trips in Puget Sound and the San Juan Islands – Randel Washburne

A Sea Kayakers Guide to South Puget Sound – Ken Campbell

A Sea Kayakers Guide to the San Juan Islands -- Ken Campbell

Paddle Routes of Western Washington – Verne Huser

The Hidden Coast – Joel Rogers

Exploring the Coast by Boat –Frieda Van der Ree

Cascadia Marine Trail – available only through membership in Washing Water Trails (www.wwta.org)

Trips and Destinations – British Columbia and Alaska

A Guide to the Queen Charlotte Islands – Neil Carey

An Explorer's Guide: Marine Parks of B.C. – Peter Chettleburgh

The Coastal Kayaker – Randel Washburne

Sea Kayaking Canada's West Coast – John Ince and Heide Kottner

Islands for Discovery – Dennis Harwood and Tom Parker

Island Adventures – Richard Blier

Island Paddling – Mary Snowden

The Hidden Coast – Joel Rogers

Exploring the Coast by Boat – Frieda Van der Ree

Telephone Numbers and Internet Addresses

Last Updated: January 2017

Emergency Telephone Numbers

Mountaineers Emergency Number ***206-521-6030***

In the case of an emergency, first call the Coast Guard (if on the water) or 911 and ask to be transferred to the Sheriff on the county you are in (if on land). Then call the Mountaineers emergency number.

Coast Guard

Bellingham 360-734-1692
Ilwaco (Cape Disappointment) 360-642-2382
La Push 360-374-6469
Neah Bay 360-645-2237
Port Angeles 360-417-5990
Seattle 206-217-6750
Westport (Grays Harbor) 360-268-0121

County Sheriffs

Clallam County (Port Angeles) 360-417-2459
Grays Harbor County (Montesano) 360-249-3711
Island County (Coupeville) 360-678-4422
Jefferson County East (Port Hadlock) 360-385-3831

King County (Seattle) 206-296-4155
Kitsap County (Silverdale) 360-337-7101
Mason County (Shelton) 360-427-9670
Pacific County (South Bend) 360-875-9397
Pierce County (Tacoma) 253-798-4721
San Juan County (Friday Harbor) 360-378-4151
Skagit County (Mt. Vernon) 360-336-9450
Snohomish County (Everett) 425-388-3393
Thurston County (Olympia) 360-458-2878
Wakiakum County (Cathlamet) 360-795-3242
Whatcom County (Bellingham) 360-676-6650
Red Tide and Biotoxin Hotline 800-562-5632
Seattle Poison Center 206-526-2121

Emergency Radio Channels

Marine VHF

Distress or hailing: Channel 16

Coast Guard Liaison: Ch. 16, 22

CB: Channel 9

Information Telephone Numbers

Ferries

Washington State Ferries 800-843-3779
British Columbia Ferries 888-223-3779
Guemes Island Ferry 360-293-6356
Lummi Island Ferry 360-676-6692
Washington Water Trails Association 206-545-9161

Washington State Parks

-Information 360-902-8844
- Reservations 888-226-7688

Washington State Parks

Deception Pass State Park 360-675-2417
Moran State Park (Orcas) 360-376-2326

San Juan County Parks

Friday Harbor 360-378-2992

National Parks

Olympic National Park (Port Angeles) 360-374-5450

Other Important Numbers

Nature Conservancy of Washington 206-343-4344
Whale Hotline (and other marine mammals) 800-562-8832
Please report sightings, strandings, or harassment.

Internet Addresses

NOAA Tidal Current Tables	https://tidesandcurrents.noaa.gov/
50 Cool Sea Kayaking Trips in the Pacific Northwest	http://www.kayaktripsnorthwest.com/
Northwest Outdoor Grrl	www.nwoutdoorgrrl.com
British Columbia Marine Forecast	http://www.vashonwatersports.com/
Seattle Weather	http://www.intellicast.com/
Vancouver Weather	http://www.intellicast.com/
Victoria Weather	http://www.intellicast.com/
Washington Marine Forecast (NOAA)	http://www.atmos.washington.edu/data/marine_report.html
Alaska Marine Highway	http://www.dot.state.ak.us/external/amhs/home.html
British Columbia Ferries	http://www.bcferries.com/
Washington State Ferries	http://www.wsdot.wa.gov/ferries/
Tacoma Mountaineers	https://www.mountaineers.org/about/branches-committees/tacoma-branch
The Mountaineers	https://www.mountaineers.org/
Washington Kayak Club	http://www.washingtonkayakclub.org/
Washington Water Trails	https://www.wwta.org/
Sea Kayaker Magazine	www.seakayakermag.com
Deep Zoom (current atlas)	http://www.deepzoom.com/

Glossary

Abeam: On the side of the kayak, amidships, or at right angles to the keel line. “On the weather beam” means at a right angle to the keel in the windward direction, while “lee beam” means at a right angle to the keel in a leeward direction.

Aft: Towards the stern.

Amidships: In the center of the kayak.

Anchor: A weight that, when dropped to the bottom of a body of water attached to a kayak by a rope, or line, holds the kayak in one place.

Astern: In the direction of the kayak’s stern or rear.

Asymmetrical: Pertaining to hull shape in which the kayak’s widest point, or beam, is either aft or forward of amidships.

Bail: To empty water from a kayak.

Bang plate: A reinforcing plate or “shoe” made of abrasion-resistant material that protects the stems of a kayak from scrapes and impact damage during beaching or launching.

Beacon: A post or buoy placed over a shoal or bank to warn vessels of danger.

Beam: The width of a kayak at the widest point.

Bearing: The direction to an object in relation to the person looking at it.

Bight: A rope bent back upon itself so that it is doubled. Also, a bend in the shore that creates a bay.

Bilge: Area where a kayak hull’s bottom turns up into its sides.

Binnacle: The receptacle for a compass.

Bitter end: The end of an anchor line that is attached to a boat at a bitt.

Blade: The wide, flat area of a paddle.

Bow: The front of a kayak.

Brace: Paddling technique used to stabilize a kayak. The “low” brace and “high” brace are two common techniques.

Breaker: Waves broken by shoals or ledges.

Broach: A potentially dangerous situation that occurs when a kayak becomes caught in currents of different speeds. An example is when a kayak accelerates down the face of one wave and collides with a slower-moving wave in front, causing it to veer or yaw abruptly sideways.

Bulkhead: Transverse wall that creates a sealed compartment fore or aft in a kayak. Primarily used for floatation, but also used as a storage area with access via deck hatches.

Buoy: A floating mark that identifies a location or channel.

Can Buoy: A buoy shaped like a cylinder. Most can buoys are black.

Canoe: An open craft with pointed ends that is propelled with one or more single-bladed paddles.

Chine: The intersection between the bottom and the sides of a vee- or flat-bottomed kayak.

Cleat: A device to which ropes or lines may be attached.

Compass: An instrument that points toward magnetic north.

Cross bearings: Two or more bearings used to determine the position of a kayak.

Current: Water moving horizontally.

Current rips: Small waves formed n the surface by the meeting of opposing currents.

D-ring: A metal D-shaped ring for fastening ropes and straps.

Daymark: A structure used as an aid to navigation during daylight.

Dead ahead: Directly ahead.

Dead astern: Directly behind.

Dead reckoning: Calculation of distance from time on the water and estimated paddling speed. Derived from the word “deduced.”

Deck: Surface that covers the bow and the stern of a kayak.

Depth: Vertical measurement from a hull's lowest to highest point, usually from the top of the gunwale amidships to the floor of the kayak.

Directional stability: Tendency of a boat to hold its course under way.

Displacement: The weight of the water displaced by a kayak.

Draft: The depth of water needed to float a craft.

Draw stroke: A stroke that is used to move a kayak sideways.

Dry bag: Waterproof storage bag.

Dry suit: Fully enclosed, waterproof garment with latex gaskets at the neck and wrists and sometimes ankles. Worn by kayakers for protection from cold water.

Ebb: A receding or falling tide.

Eddy: Area of swirling water down-current of an obstruction.

Eddy line: Transitional area between main current and eddy current.

Eskimo roll: A self-rescue technique used to right an overturned kayak or canoe without exiting the boat.

Fathom: Measurement equivalent to six feet.

Feathered: Pertaining to a blade that is canted to present the narrow edge rather than the surface to the wind, thereby minimizing wind resistance. A feathered blade on a kayak paddle is offset at an angle from its opposite blade.

Ferry: To cross a current with little or no downstream travel, using the current's force to move the boat laterally.

Fiberglass: Glass-fiber cloth impregnated with resin that can be easily formed into hull shapes.

Flare: A hull cross-section that grows increasingly wider as it rises from the waterline toward the gunwales. Also, a pyrotechnic device used to get the attention of someone beyond shouting distance.

Flat water: Lake or ocean water or slow-moving river current.

Flood: A rising tide.

Flotation: Buoyancy elements built into a craft to ensure that it does not sink when swamped.

Fore: The part of a kayak forward of the cockpit.

Freeboard: The portion of a kayak above the waterline.

Grab loop: Short rope or grab-handle threaded through bow or stern stem of a kayak or canoe. Most often used as carrying handle but also useful as handhold for swimmers.

Grip: The part of kayak paddle held in the hand.

Gunwale: The line where hull and deck intersect.

Hatch: Access opening on front or rear deck.

Hull: the underbody of a kayak, which comes in contact with the water.

Hull configuration: Shape of the hull.

Inflatable kayak: An inflatable, open-topped craft designed for one or two paddlers.

Initial stability: A boat's resistance to leaning; tippiness.

Kayak: A watercraft that a sitting paddler propels with a double-bladed paddle.

Keel: A strip or extrusion along the bottom of a kayak to prevent slipping sideways under the pressure of wind.

Keel line: The shape of a kayak's bottom from a sideways perspective.

Kevlar: A DuPont aramid fiber used in kayak construction.

Knot: Rate of speed based on the time it takes to cover 1 nautical mile or 6,076 feet.

Layup: Manner in which layers of fabric such as fiberglass or Kevlar are place to form the kayak hull.

Lee: The downwind side. "Under the lee" of an object means having it between you and the wind.

Leeboard: A board fixed to the lee side of a kayak under sail to prevent the kayak from being blown sideways.

Lee shore: The shore upon which the wind is blowing.

Leeward: To the lee side.

Leeway: The distance a kayak drifts to leeward, or downwind.

Life jacket: See PFD.

Nautical mile: One minute of latitude or 6,076 feet.

Navigation: Determining and following one's route.

Neap tide: The period in the moon's first or third quarter when the low and high tides have the least amount of change.

Nun buoy: A buoy with a conical top. Most nun buoys are red.

Offing: Distance from shore.

Overfalls: Short, usually breaking waves that occur when a current passes over a shoal (or other underwater obstruction) or meets a contrary current.

Paddle: Primary tool for propelling a kayak.

Painter: A rope attached to bow or stern for tying a kayak to shore.

Peel out: The act of leaving an eddy and entering the main current.

PFD: Personal floatation device required by law for every person aboard a vessel of any size.

Piloting: Navigation using geographical points.

Polyethylene: Thermoplastic material used in construction of kayaks.

Port: The left side of a kayak from the perspective of the paddler. Also, an opening or hatch.

Pump: A device for removing water from inside a kayak. Also called "bilge pump."

Put-in: The starting place of a paddling trip, where you put your boat in the water.

Ribs: Pieces of wood spaced along the inside of a hull to form its frame. Used in skin-on-frame kayaks.

Rocker: Upward curvature of the keel line from the center toward the ends of a canoe or kayak. A great amount of rocker enables quick, easy turns.

Rudder: A foot-controlled steering device on touring or sea kayaks.

Sea: Waves caused by wind blowing at the time and place of observation, as opposed to "swell," waves caused by a distant wind.

Secondary stability: A hull's tendency to stabilize as it leans to one side.

Shaft: The rod or tube holding the blades, which the paddler holds.

Skeg: Rudder that is fixed laterally but may be raised or lowered and that improves a kayak's ability to move in a straight line.

Sound: To measure the depth of the water.

Spring tide: Tides that occur near the times of full or new moons when the range tends to be greater.

Starboard: The right side of the kayak from the perspective of the paddler.

Stem: The end piece of a hull at bow or stern.

Stern: The rear part of a kayak.

Surf: Large breaking waves along a coastline or tidal area. Also, to ride large waves on a river or the ocean in a kayak or canoe.

Surf ski: A long, narrow kayak used for cruising and racing across open water. The paddler sits in divots on the hard-shelled deck, not in an enclosed cockpit.

Sweep stroke: Stroke used to turn a kayak toward the off-side (non-paddle side) by reaching out and ahead, then "sweeping" the blade in a wide arc fore to aft.

Swell: Waves caused by far-off winds.

Symmetrical: Pertaining to a hull shape in which the kayak's widest point, or beam, in directly amidships.

Take-out: The end point of a paddling trip.

Tandem: Two-person kayak.

Tide: The vertical movement of water caused by the gravitational force of the moon.

Tie-downs: Ropes, lines or straps used to secure a kayak to the top of a car.

Tracking: The ability of a boat to hold a straight course due to its hull design.

Trim: Balanced and level both side-to-side and end-to-end. A trim boat is achieved by shifting the load or the position of the paddlers.

Tumblehome: A hull cross-section that curves inward from the waterline toward the gunwales.

Vee: a hull shape.

Volume: Overall capacity of a given hull shape.

Waterline: The line formed at the edge of the water along the hull of a kayak. The shape of the waterline and the handling characteristics of the boat change as the load changes.

Wake: The path or track of a kayak in the water.

Wave: An undulation on the surface of the water, usually caused by wind. The water does not move, while the wave does.

Weather: In the direction from which the wind is blowing.

Wetsuit: Gear worn by kayakers for cold-water protection. Typically made of neoprene, which creates a thermal shield.

Windward: The direction from which the wind is blowing; opposite of leeward.


MOUNTAINEERS
SEA KAYAKING