

# Learning to Row Whitewater

## Levels I-III

### Simple, elegant and fun

Whitewater rowing is elegantly simple. You need to do two things well— work a pair of oars and read a river.

Every stage of learning to row is fun. It is fun to learn beginning skills and fun all the way through the learning progression. There are so many great things to look forward to in learning to row.

The goal is to train self sufficient, independent rowers.

We believe rowers should have the skill and knowledge to be safe and self sufficient in reading and running white water. We teach a toolbox of skills for you to build confidence and make sense of the river for yourself.

Respect the river, be positive and skilled to be safe

We take a point positive approach to being safe based on skill, knowledge, preparation and respect for the river.

Whatever you are ready to learn.

Start at the point in the learning progression that is right for you. Pick and choose what is helpful to your individual rowing needs.

It all depends on how good you want to be.

With all the skill and knowledge in the world, you still have to pay attention. Your degree of commitment, joy and passion will determine how far you want to go with whitewater rowing.

To become a rower, you don't just pass a test and get a diploma. Rowing is a constant cycle of learning and applying what you've learned. You have to show up every day.

## Level 1:

# Preparing to Succeed

## The skills to be safe

For a whitewater rower, the best safety technique on the river is having the skills and knowledge to stay out of trouble. The second best safety technique is having the skills and knowledge to row your way out of any trouble you find yourself in.

With fundamental, sound rowing skills and good understanding of “reading the water,” you have the best chance of avoiding trouble in the first place.

When oars pop, equipment fails, attention wanders or you just plain make a mistake, and it happens to all of us, there are times you must be prepared for threatening situations. If you can't fix them on the oars, you have to be prepared to fix them another way. This means having safety and rescue gear and knowing how to use them. It means communicating and being safe as a team with the other rowers in your party. If there ever comes a time when an accident happens and you need to be rescued, or rescue someone else, you need to be as prepared as you can possibly be.

This guide is focused on learning to row. For detailed safety training we highly recommend you take a swift water rescue class.

These are the things that give you a safe foundation as rowers. You hone your skills, train and prepare for things to go wrong, while you focus your attention on the safe line, the clean run, the positive outcome.

We want to be confident, but not cocky. Which brings us back to the most important part of a safe foundation; always treat the river with respect. It is vastly more powerful than we are and it reminds us of this fact often.

## Styles of rowing

There are many styles of rowing. There is no on right way to row.

Rivers and rafts are not all created equal. Our goal may be to develop a style appropriate to row the big water of the Grand Canyon, do multi-day trips on the Rogue, or row steep rocky Cherry Creek. We may row a light cataraft, a family raft, or a heavily loaded gear boat. We may have the desire to challenge ourselves or to just relax and have fun. Every rower gets to discover their own comfort level. Learning what is right for each of us is part of the process. There are many right paths, all equally enjoyable.

If we start with respect and a safe foundation, every river and raft and every level of rowing presents opportunities to find solutions and be creative on the oars. With experience and a good foundation everyone can develop a style of rowing appropriate to them.

## The toolbox of skills

Rowing is learned through experience. The ideas presented here make no attempt to exhaust every detail of rowing. They provide some fundamental tools to start building your own rowing tool box. The goal is for you to have the tools and knowledge to solve problems on the river for yourself.

The great part is that it is all fun. From the very beginning to the highest levels of skill, rowing is nutritious, satisfying fun.

## The basic learning progression

To be a whitewater rower you will need to do two things well— row and read a river.

Step one is learning to row. Until you get the rowing part down, it helps to keep the water reading as simple and bare bones as possible.

So we start by learning to identify basic obstacles and the clean lines through rapids. This provides enough to get you started rowing Class II and some Class III rapids.

Initially the focus is on the strongest stroke, pulling techniques for ferrying and catching eddies. No matter what style of rowing you eventually adopt, these skills will nail down the crucial ability to catch eddies and pull out of trouble situations.

As soon as the basic handling of the oars and driving of the boat start to click, more detailed reading of the water will come into play. Starting to understand how the current moves will immediately make ferrying techniques more effective and economical.

We want the skills of catching eddies and ferrying to become rock solid habits for when you need them. Once they feel really solid, then you are ready to jump into a whole different way of running rapids using pushing.

The push stroke is not as strong as pulling, yet pushing is a very powerful tool for running rapids. Pushing requires knowledge of using the water to help us row. It depends on it.

We teach pushing after you have reached a comfort level on the oars, when you don't have to think about them very much, and can put your attention on reading the water.

As we start to push, we quickly fill up our rowing toolbox with a whole collection of new things. We are opening up the knowledge of how rapids really work and all the ways water can help you row a boat down the river.

## The strokes

There is an important question to ask before heading down into your first rapid. Can you control a raft with the basic oar strokes?

Before you can understand whitewater, it is imperative to be able to drive the boat forward, backward and spin in either direction. To row whitewater, you can't be thinking about which oar goes in the water, your attention needs to be on the river.

Practice sessions in flat water can make your first time on the river much better.

Here is a good test to see if you are ready. On the river, if your boat starts to spin, can you tell if it's your rowing that has made this happen, or if the river has made it spin?

## Building Muscle Memory

Practicing the strokes in flat water builds the coordination that gets them into your muscle memory. Rowing becomes a natural extension of the decisions you make on the water.

## Safety training

A good swiftwater rescue class is highly recommended. To be well prepared for emergencies you need knowledge of safety gear, crucial knots, proper rigging, throw bag technique, upstream and downstream safety, rescue procedures, rope safety, swift water swimming, and handling emergencies like a wrapped or flipped boat.

## Cataracts v conventional rafts

This is a long conversation. A cataract, if not heavily loaded, is light and nimble and can do some things a conventional raft cannot. It can develop or halt momentum very quickly and spin on a dime.

A raft handles differently than a light maneuverable cat. The momentum of a raft must be managed. Momentum is a useful tool but it takes longer to accelerate a raft or slow it back down.

Do both types of boats benefit the same foundation of skills? Definitely.

## Oarlocks, Oar Rights, Pins and Clips

What is the best way to rig oars? That depends on the river and how you learn to row. For beginners, starting with a positive oar position (Oar Rights or pins and clips) eliminates a layer of complication during the initial learning process. Once you understand the foundation skills, try open oarlocks if they appeal to you. Free moving oars are extremely versatile especially if you get used to them as early as possible. On the other hand, many rowers prefer a positive oar position when they row in critical situations. This style can and has been used to brilliant effect for many years. There is no one right answer. This is an open and ongoing debate in the rowing community.

## Downstream oar safety

Taking care of your downstream oar is like checking to see if your fly is zipped. It needs to be a habit.

When your boat is turned sideways with one oar downstream, you are vulnerable to jabbing it into a submerged rock. Part of you must *always* watch where the oar blade goes into the water. You don't want that oar to become a dangerous missile. For a skilled rower it is second nature to take safe strokes even in shallow or rocky water.

## Learning to pull first?

Pulling is by far the strongest stroke. Advanced rowers who can read water have a wide variety of techniques available to them. They know how to let the river help them, so they don't always need strength to make great moves.

When you are learning, you don't have as much knowledge of the river. To be safe, first learn to catch eddies and make moves with your strongest stroke. It works with a basic understanding of reading water. Even when you gain greater understanding; there are times when you need to be your strongest. When the shit hits the fan you will appreciate knowing how to pull.

## Level 2:

# Building a Safe Foundation

## Meet the Eddy Line

Can you recognize the difference between upstream moving water and downstream moving water? Where they meet is where you will make the acquaintance of the Eddy Line.

## Crossing to safety

Catching eddies is how you pause your movement down the river. For ordinary situations and emergencies, you need to be able to stop one or all of your boats. Scouting a rapid, communicating a plan, making camp or organizing a rescue are a few of the reasons why it is imperative to catch eddies. As a team and on your own, catching eddies is the most fundamental skill of a safe rower.

## How to catch eddies

The Eddy Line is not a push over. You have to bust across to get into an eddy.

You want this to be a reliable move. Turn the raft sideways and pull backwards using your strongest stroke. This is the easiest way to create the momentum to bust into an eddy.

As you approach the eddy, pull hard to get the raft moving laterally across the water. When you hit the eddy line, you will cross from downstream moving water into upstream moving water. The boat has to drive straight across to “stick” the eddy. But the opposing directions of water will want to make it spin. Counteract with quicker stronger strokes on the upstream oar.

Recognize the eddy early. Catching eddies is a timing move and often you’ll want to stick the top or upstream end of one.

Even after you are in an eddy, you have to pay attention to staying in it. Every eddy is different. You have to really look at them. Sometimes it takes tying up to shore to be really secure.

## Practicing a fundamental sequence of strokes

In calm stretches of current, practice aiming the boat straight downstream, then pivot sideways into a “ferry angle,” and take a couple of strokes to create a little momentum, pivot back to facing downstream, and repeat in the opposite direction.

Pivot from straight to sideways and take a stroke. Pivot from sideways back to straight.

This is a *fundamental sequence* of strokes you will need to know and get good at.

A group of boats can practice by playing follow-the leader.

## Team boating

A whole rafting party catching eddies together is essential to team boating. On a hand signal, all the boats should be able to halt progress downstream.

A team of boats is organized into a boat order. The lead boat watches out in front of the whole group and a sweep boat paying attention in the back. They will be in charge of downstream and upstream safety. Each rower should know hand and whistle signals, and stay aware of the boats directly upstream and downstream.

As students and instructors break into groups, these smaller parties can work on team communication and keeping their own boat order.

## Scouting Safe Lines and Obstacles From Shore

We start learning to read the features of a rapid from a safe place on shore, where we can take our time. A side creek can also be a place to scavenge hunt river features. Ask a lot of questions.

Look down into a rapid and identify the boulders, islands, shoreline, hydraulics, etc. that impede the way through a rapid. Where the river flows past the obstacles there are safe lines we want our boats to travel. The obstacles define the safe lines.

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## Reading the Obstacles

When you learned to recognize an eddy line, you began to read water.

If you have never done it before, it's like meeting a stranger for the first time. You can pick out the obvious features, brown hair, blue eyes, athletic build, but you cannot read all the subtle clues of body language and facial expression. Those only come when you know someone better. The same goes for the river.

We want to get you rowing rapids as soon as possible. The obstacles are the obvious features. Right now we want to keep things as simple as possible to get you into the whitewater.

If you can read the obstacles and the safe lines, you are ready to learn the basics of how to row the rapid.

## How the river helps us, technical rowing

In a river running at a moderate 2,500 cubic feet per second, 156,000 pounds of water pass downriver every second. That is the equivalent of 11.14 large African elephants every second.

The river is much stronger than you are! The secret of whitewater rowing is to use every bit of help you can get from it. The river can make you very strong, save you a lot of work and help you make moves.

Technical rowing, the kind of rowing needed for complex technical rapids, is based on letting the water (the elephants) do as much of the work as possible.

In rapids, the weight of all that water, the “elephants” perpetually marches downstream. That is the movement of the water flowing, the current. It is very reliable.

To miss obstacles and stay in safe lines we simply turn and pull sideways across the river to where the safe channels will carry us past the obstacles. We let the river do the rest.

Imagine a river as a giant conveyor belt, like the moving sidewalks in an airport. Of course a river is much more complex and does not follow a straight line, but like a conveyor belt it never stops moving forward even as it snakes between rocks and bends around turns, and it carries with it all the weight of those thousands of pounds of water.

*The river (elephants) will do all the work of conveying us in a forward direction.*

This seems painfully obvious, but is so important to grasp all that this implies. We want to harness the power of the elephants; we do not need to duplicate their work.

*In a rapid, no effort on our part is needed to make the boat go downstream.*

All we have to do is row across and select the clean lines of current.

### “Pulling away from danger”

This is a slightly ominous sounding, but easy phrase to remember for something that is a lot of fun to do. It means floating down into a rapid and identifying the first most dangerous obstacle. To stay in the safe line, we turn the boat sideways and pull “away” to move across the river to continue choosing a safe line past the obstacle.

### Why sideways?

There are only 2 ways you can develop momentum in a raft. You can either row forward or backward and of the two, pulling backward is the stronger stroke.



It may sound strange to be floating sideways, it is counter intuitive, but this is the way you sidestep obstacles. Remember you are going to get help from the river; you don't have to do any of the work of moving downstream. Move sideways and allow the river to carry you past the obstacles.

Stick with this counter intuitive stuff for a while longer. Other ideas are coming. This is important to being safe.

## Sideways to current not the river bank

### *Very important!*

Do not judge "sideways" by looking at the banks of the river. The shore does not tell us the direction current is running. River current runs in diagonals, curves and is deflected by obstacles. It *does not* follow the banks.

When we talk about being sideways we mean sideways to the current, not the shoreline.

In river running we call being sideways to the current a "ferry angle."

## The ferry angle

The ferry angle is the way a boat is angled sideways to current for moving across the river. For right now lets just talk about a ferry angle in relation to using the pull stroke.

Strictly speaking a ferry angle is 45° to the current. Picture an old fashioned ferryboat crossing a river sideways from point A to point B without being carried downstream. A cable anchored on the banks holds the raft in place and the current pushes it across. This is where the term "ferry angle" comes from.

In rafting, the word "ferry angle" refers to a lot of different angles, not just strictly 45°.

Finding and holding any angle on the river can be a challenge in the beginning and we want you out there doing it as safely as possible. That means paying attention to downstream oar safety.

That said, by far the most efficient way to row across current is sideways, at a 90° angle.

## Feeling angles with your oars

Test this for yourself in a place with current and no rapids. Start by facing your boat straight downstream, and row directly upstream into the current.

Feel the pressure against the oars. What does it feel like to row this way?

You are putting all your rowing energy into slowing down in relation to the current. Slowing your boat in relation to current is a fundamental rowing technique. But in the

context of ferrying across the river you are fighting directly against the current. You can feel this by how hard you have to work at the oars rowing directly upstream.

Next turn the boat to a 45° upstream angle to current and again row upstream. Feel what this angle feels like to the oars in your hands.

You are rowing with half your energy slowing the raft, and half moving it across the river, again an important technique. You gain some benefit from the ferry effect, but still are putting a lot of energy into slowing down.

Feel this, it is important to know what this feels like to slow down to current. but as an angle for ferrying, you are wasting a lot of energy fighting the current rather than moving across it.

Try it and decide for yourself.

Now, turn the boat fully sideways, 90° to the current and row.

All of your energy will go into moving across current. The pressure against your oars will feel entirely different. They bite into the water and move the boat with ease. None of your energy is wasted fighting the river. Remember what this feels like.

With experience rowing at these different angles, you will know your angle to current just by feeling the pressure against your oars, a huge benefit. Eventually you will choose your angle by feel alone.

## Rowing the rapid by pulling

You will use the fundamental sequence to pull through the rapid.

Once more, here is how it goes.

When there are no obstacles in your path you want the raft to be facing downstream. You see better this way, you are in position to run through waves and you can quickly turn into a ferry angle in either direction.

Identify the first obstacle you will need to miss and within plenty of time, pivot the boat sideways into a “ferry angle” and “pull away” going backwards to move across into a safe line of current that will miss it. As soon as you are sure that you have cleared the first obstacle, pivot the boat back to straight, feeding it into the current that will carry you downstream through the safe line.

Immediately start scanning for the next obstacle.

This process can happen many times during a rapid and the safe line is not always a straight.

Keep identifying the next most dangerous obstacle and pulling away. Then identify the next most dangerous obstacle. We may have to pull away either right or left depending what the river throws at us.

## Pivoting has to be quick

You want the sequence to become automatic—face straight, pivot quickly to your ferry angle, pull away, and then quickly straighten back out.

Pivoting quickly is key.

Stopping your pivots at the correct angle is also very important.

*In whitewater rowing, the move you are making has to happen on time.*

In easy rapids this is not so important. But even in easy rapids a move can be perfect one second and all wrong the next. As soon as you decide to turn the boat, you want to spin it very promptly. When you get into harder water, this will be crucial.

Always face downstream when you can to make your pivots. Avoid pivoting with your back to what is ahead. You can't read a rapid if you can't see it.

Remember to be aware of that downstream oar.

## When to point straight downstream

Face straight ahead unless you are pulling away from obstacles. This gives you the best view of the rapid, the clean lines and obstacles.

Often you enter a rapid facing forward down the middle of a V shaped tongue where the water enters the drop. Looking for this characteristic shape helps you identify the main flow.

It is complicated to explain how to keep the boat straight. It requires a lot of paying attention and making small adjustments. Currents, waves, eddies and driver errors can knock a raft off a straight course. You use a combination of pushing, pulling, ruddering and pivoting to keep it facing downstream.

## Punching waves and holes

In Class III water and higher, the safe lines may be punchy. They can have runnable "hydraulics"—waves and holes when you will want to be facing forward, downstream. You do not want to be sideways!

When you identify a wave or hole...

*Hit it straight.*

*Hit it with momentum.*

*Start early.*

When you identify a hole or hole start by digging the oars into the river and pushing hard forward. The earlier you start the more momentum you will generate. As you line the boat up straight, punch the wave or hole with both oars braced as wide as possible. Time it so you hit in mid stroke, hitting the hydraulic at the strongest point of your forward push.

The bigger the hydraulic, the more important it becomes to hit straight, with momentum and punch.

Hitting a wave straight can be called "Teeing it up."

## Line up to *each* wave

Waves do not always line up nicely perpendicular to the current. Even in a train of waves, they can come from different angles. You must adjust to meet *each* wave straight on.

## Pulling around turns

When current forms a curve, you have to keep adjusting your ferry angle.

Missing a single obstacle in a rapid means choosing one good ferry angle to pull away. When the river bends, a ferry angle has to adjust all the way through the arc of the turn.

If you watch one spoke of a slowly turning bicycle wheel, that spoke will always stay at the same angle to the curve of the wheel. This is the way you want your raft to stay at a consistent ferry angle to a curve in the river.

## Cutting the C

There is always slow water on the inside of turns and an eddy along the far inside bank. By pulling inside of a bend in the river, you can place your raft in slower water to go around the turn and avoid waves and holes that form along the outside edge of a turn.

Cutting to the inside of a turn, across the C shape of the bend, is called Cutting the C.

Just file this next thought away in the back of your mind. It will make more sense later.

## Taking a downstream angle

Taking a slight downstream angle to the current (turning the ferry angle past 90°) and cutting the C by pulling to the inside, will make Cutting the C an easier move. It will keep the momentum of the raft under control and slice toward the inside of the curve.

## Oar Management

Oars are long objects sticking out from the boat. How do you fit through narrow or rocky places and still row? This needs to become an instinctive part of your technique.

Swinging the blades forward when you get close to a wall or run a tight slot is a carefully timed dance. Observe experienced rowers and practice. It should be one fluid movement. You do not want to joust an oar into a boulder, on the other hand, missing by an inch is as good as missing by a mile.

When things suddenly get tight and there is no time to swing the oar blade forward, throw the handles forward, letting the blades trail behind in the water. This eliminates the danger of jousting the oars and you can lean forward and grab the handles when the danger is past.

## Playing

Playing is not an after thought. The river is a fluid flowing medium. Being playful helps you relax and get the feel for it.

Playing is a way for good rowers to stay sharp and improve their skills. Getting a boat down a river can be as delightful as a dance. Play with the water, let it help you learn how it feels and moves.

## Start to play *with* the water

The secret to making effortless moves is reading the water. It is time to look more closely at the details in a rapid, the water.

We have so far talked about obstacles and clean lines. Now look more closely at the ways the water moves coming down into a rapid. Current is not just one block of moving water. It can be comprised of many small currents angling in different directions above, around and through rocks.

*Current does not align with the banks of the river!*

Remember we are not setting ferry angles to the banks of the river but to the current, *or currents!*

As early as you can see them, study the currents ahead of your raft as they flow down into rapids or above moves.

*See the currents*

*Figure out how and where they are moving*

*Set your ferry angles to how the water is really moving*

## Playing by making moves

Every rock in the river is an obstacle you can practice missing by pulling away and ferrying. There are often tight gaps between rocks or alternate lines that require you to make moves. Discovering tricky routes through Class II rapids is a great way to learn harder rowing skills.

Practice seeing the currents and judging the timing, distances and speed of the water. How early do you need to start ferrying?

You can goof around using different angles, judge how many strokes to take, how hard to pull, pivoting and stopping the boat at a precise angle.

A moving raft will continue to glide after you stop taking strokes. Play with being able to judge the moment when you have taken just enough strokes to miss the obstacle. It can be as big a problem to take too many strokes as to take too few.

Take into account the currents.

## Play at calling your shots

*"I'm going to sink the seven ball in the corner pocket!"*

Figure out the exact move you want to make before you try it. Like playing pool, call your "shot" before you attempt it.

Just slopping down into rapids is a recipe for getting into trouble. You want to be intentional with your moves. Learn to bring the boat through whitewater under control.

Read the currents above the moves correctly and get the right angles and you will suddenly find yourself in control of your raft and the rapid.

## Playing with mid-stream eddies

Behind every rock in the river, water moves back upstream. Eddies don't just exist along the shore. They are all over rapids and you will learn to make them your friends.

Upstream moving eddy water is also called "back water" or "slack water." Because it moves in the opposite direction to downstream current it can have a powerful impact on a raft.

To go back to the elephant analogy. If the water weight of 11 elephants is moving downstream at 2500 CFS, imagine one of them turning back upstream. Even a baby elephant moving in the opposite direction would be a powerful weight of water to run into.

The impact of a raft sliding onto a mid-stream eddy is a profound tool that we can start to play with in easy water.

## Starting to maneuver using mid-stream eddies

When part of a raft tube slides onto eddy water, it abruptly slows down while the rest of the raft is still in downstream moving water. The result is that the raft turns in the direction of the eddy. Whether it turns a little bit or starts to completely spin depends on the strength of the eddy and how much raft hits it.

Dragging a little bit of tube into an eddy can be a subtle tool for slightly altering course, something we will soon explore in detail.

If you ferry backwards into a mid-stream eddy, the back of the raft will abruptly slow and the front, still in current, will swing around and slingshot the raft's momentum in a new direction, sideways across the river.

This is a tricky timing move. You have to get the raft moving early (develop momentum) and time some hard pulls to just miss the mid stream rock and drive the raft across the eddy line as high as possible, as close as possible to the rock.

The sensation of a big heavy raft suddenly being whirled around by a river is exhilarating and addicting. It is also a great tool for changing direction quickly in moving current, with the river doing the hard work for us.

Moves that might be very difficult with just pulling on the oars, become elegant and easy.

This is our first introduction to using eddies as maneuvering tools. Eventually we will be seeking out eddies to help us all the time.

*As soon as you are comfortable with these things, we will be encouraging you, pushing you, begging you to move on to the next steps.*

## Level 3:

### Learning to Use the Water

The river is no longer a complete stranger. You have run rapids, kept your raft straight, caught eddies, busted waves and felt the current carrying you downstream. You have gained the experience to notice more than the obvious features of whitewater.

When you look at a rapid, you have practiced seeing it like a map of obstacles and clean lines. There is another map that overlays this one. It is the detailed map of current.

Reading current holds the key to the next levels of rowing technique. In any given “line,” current can flow straight, diagonally, or sideways. It can pillow up on rocks, speed up, or feed into other flows. It can divide around obstacles, curve, or dead end. When you start to recognize all these things, you can work with them. If you let them help you, and definitely avoid fighting against them, a door is about to open for you.

## Understanding how to read water

Understanding the water is the best way to be safe on the river. Understand it and you can predict how it will affect your boat before you get there. You will turn river rowing into something enjoyable and satisfying not random and frightening. You establish a baseline of being in control. The river stops being chaotic and starts to make sense. You will read the water like you read highway signs. You will have cracked the code.

## The ABC's of reading current

We are going back on shore to our scout rock and looking more closely at the water running past the obstacles. Let's break down how to read current.

Start looking at the very beginning of the rapid and study what the water does. Within the lines of current look for the details of how it moves. Try to follow a flow of water all the way through the rapid with your eyes. It might take a few tries to make it all the way. If you threw a stick into the top of the rapid where would it go?

The next step is to imagine your raft floating into the rapid. What would happen? If it floated on its own, where would it go? What would it run into? Would it run into anything at all?

Then finally imagine rowing your boat through the rapid. First just try to find any way that would be successful. Then, focusing on the current, find a way that lets the natural flow of the water help you.

Do you see the rapid differently now? From your boat this should give you a whole new perspective.

## The set up—entering a rapid

A good set up can make a whole run.



Choosing the location to enter a rapid is where you have the most control. The key is to see and understand the water flowing down into the rapid where it is still green, before it becomes white.

Use this water to enter the rapid where it can best help you make your first moves.

Start to see the current or currents above a rapid and you can start taking effective angles to them. Start taking effective angles and you can make good moves in plenty of time. The water above the rapid starts to make sense and you start to be in control of how you enter.

## Reading water from the raft

When in doubt, scout. If you have any concerns, if you don't know a rapid, or if you can't see it from the river, catch an eddy and take a look.

Many rapids can be read from the slower water above them. You won't have time to go through all the steps we practiced on shore, but you can learn to determine a good set up and series of moves.

*Once you enter the rapid, reading water becomes a completely different animal.*

Suddenly all the things we have been talking about are coming at you at once. Reading water is no longer a leisurely activity. Things are happening fast.

Focus on the first move, the first obstacle you need to miss. Read the move as early as you can and start early. Watch the downstream oar, and if you have time, pay attention to the details of the current.

*Look at the water not the obstacles.*

Put your attention on where you want to go, the positive outcome and be decisive.

## Cycle your vision

Reading water in a rapid you have to see everything at once. You must constantly split your attention between what you see close to the boat, what is in the middle distance and what is far ahead.

Cycle your vision from close, to middle to far.

Keep taking mental snapshots of all three distances. If it is easier at first, just try to read the obstacles; for example, a small rock 10 feet ahead and a boulder 20 yards ahead and the tail waves at the end of the rapid. Always try to be sketching out the whole line in your mind.

## Make the first decision

Choose which way to go around the small rock. Keep cycling your vision and remain open minded. As you make the first move be prepared to improvise. Running a rapid does not always go the way you plan it in your head.

Keep cycling your vision from the time you enter the rapid until you are through into calm water below. Eventually it will be natural and easier to observe the current as well as the obstacles.

You will make better decisions when you recognize how current pushes straight onto the small rock, veers diagonally across in front of the big boulder, and curves before it flows into the tail waves.

You are rowing to miss obstacles and you are taking into account the current.

When you start really seeing it, the way you row will transform.

## Interacting with current

Rapids are by nature *dynamic* places. Things change from one instant to the next. What was the right thing to do one second might be completely wrong the next.

Rowing and reading water while in a rapid is an interaction. You read the water, make a decision and initiate a move. Then you see how the river reacts to what you did and you make another decision, another move. You anticipate what you think is going to happen, try something and *crucially important, leave behind what you thought would happen and read what really is happening.*

Then you read, decide and move again, on and on in a flowing set of actions and reactions.

It's like a dance with the river as your partner. The music starts and you keep dancing together until the rapid is over.

The river is stronger than you. You can initiate wonderful moves. You can be creative and playful. You can push your limits. Be respectful and you won't find a better partner.

## Knowing what will happen if you do nothing

As you interact with current and make decisions, one thing is always crucial to consider.

*If you did nothing where would the river take you?*

Learn to accurately judge this one thing, and the decisions you make will become good ones.

If you know where the river is taking you and it is where you want to go. Great! Do nothing and start looking ahead to the next decision.

If you know where the river is taking you and it is not where you want to go. Great! Use the tools you have. Read the water and make a move.

## Pushing forward through rapids

Pushing forward through rapids depends on help from the water.

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Pushing forward through rapids depends on all the help you can get from the water!

Pushing rapids is a technical rowing skill. Technical rowing is where you use help from the water to make moves, you are not muscling the river.

We have gone over ways to make technical moves using pulling techniques and ferrying. The better your understanding of current and your technical rowing, the easier and more elegant your pulling technique becomes.

But pulling is your strongest stroke and sometimes you can and will get away with muscling through moves.

## Pushing is strong because you can see the river!

Pushing does not work like pulling. It depends on help from the water. Some absolutely incredible master rowers insist that pushing is actually a stronger technique than pulling, *because* it uses the water so effectively. On certain rivers this is absolutely true. They insist it is stronger because, facing forward, they can see the water so well and utilize every nuance.

Pushing is an essential way to row as well as a very efficient and effortless way to row because you are facing forward where you can see to use the river so well.

## Pushing to go faster than the current

For pushing technique to work, you need to get the raft moving faster than the current.

While floating in current, dip the oars into the water and push forward hard. The first stroke needs a hard shove to break the friction of the boat's weight in the water.

Push hard again. The second stroke is easier and builds on the momentum from the first.

Push a third time and usually the raft will have started moving faster than the current. There is a glide you can feel at this point. Pay attention to what this feels like. You can feel it through the whole body. Knowing this glide will help you get the feel for pushing.

## Moving faster than current is called Tracking

When you have the boat gliding, moving faster than the current, you can start to maneuver by pushing. This feeling of gliding and maneuvering faster than water is called tracking. You can track a boat across currents, gliding it down the river.

## Pushing in catarafts vs rafts

Just a quick note. It is much easier to initiate momentum in a cat than in a raft. This is one of the great advantages of a cat. It is quick and easy to get it moving faster than the water.

On the other hand, the momentum of a heavier raft gives it advantages in tracking once you do get it moving. It can hold momentum crossing current or cutting the C while a cat is more susceptible to the different directions of water.

## Keep the glide going

Once you have done the heavy lifting to get the boat tracking faster than current, you want to keep it going. Do this with steady forward strokes.

## Walking the oars

You can either keep pushing with both hands at the same time, or by “walking the oars”, alternating pushing one oar at a time.

It does not take a lot of work to keep the raft tracking, keep feeling for it and enjoy the sensation of the current below you and the boat gliding on top. It doesn't have to move a lot faster than current, just a steady glide.

Now you can start to maneuver the boat by pushing. Pulling technique slows the boat down, or ferries it across the current. Pushing we move faster, diagonally at slight angles to the current.

## Point the boat where you want to go

You determine the diagonal angle of pushing by pointing the boat where you want it to go—far ahead downstream!

By moving the boat faster than the water and tracking, you are actually every so slightly falling down the slope that is inherent to all rapids. You are a little like a sled or a pair of skis aiming downslope.

## You are not driving a car

How many cars have you driven on a road that moves and changes directions and speeds? None.

As close as this might seem to driving forward at the wheel of an automobile, *pushing a raft is not driving a car!*

You have almost no horsepower going forward. You can't zoom. The strength comes from guiding the boat into current that will take you where you want to go. Not from pushing on an accelerator pedal.

## Put the boat into current that is going where you want to go

Pushing depends on looking ahead, reading the current as far ahead as possible and selecting the water that will take you where you want to go.

You are reading the current in the rapid with great attention and care, looking to see where you want to be as far ahead as possible.

The over arching idea is this—track the boat into current that will take you where you want to go and let it the current do the work.

## Slowing back down and riding in current

When you have guided the raft into current taking you where you want to go, you may choose to stop pushing forward, let the raft slow down to the speed of the current and let it carry you.

## Don't add the power until you have the right angle

Pushing is subtle. Tracking across the water is not super powerful. Choose the current you want to be in far ahead and aim the boat at that place as far ahead as you can.

You are not using the push to ferry across current. If you find yourself having to push really hard at a big angle to current, you should probably spin the boat around and pull because you are ferrying.

If you are going to row the rapid by tracking, carefully select the point you are aiming at.

*Start building momentum only after your angle is established and aimed where you want to go.*

## Pushing starts much earlier than ferrying

Often a push move can be initiated in the green water before a rapid, before the turbulence begins and the drop gets steeper. Establishing momentum of moving faster than the water is a great way to set up for a rapid.

In a rapid, it is important to initiate a push move *much earlier* than a ferry

## Read the current early!

*This is very important.*

As far out ahead of the boat as you can see, recognize obstacles and read current as early as you possibly can. You are not going to turn sideways and pull away using your big strong muscles. The current will be carrying you where you want to go.

Above the rapid, cycle your eyes as far ahead as you can. See what the current is doing close to you, in the middle distance and farther ahead. Make a quick mental sketch of what you think your line will be. Then, set up to enter in the optimal place for current to help.

With a good eye and skillful encouragement from the oars, you will keep driving the raft into currents that will help you get where you want to go. You won't need your stronger stroke, because you are letting the river be strong for you.

## Use one thread of current to take you to the next

One thread of current may not always take you all the way through a rapid. Sometimes you need to start on one line of current and transition to another to get through a stretch of whitewater. In a complex rapid, this may happen many times.

When you set your angle and begin moving faster than current, you can change threads of current by aiming at the point where you want to join the next current. You keep pushing, maintain momentum and track the raft across from one piece of current onto the next.

You will be going faster than the current and tracking in long diagonals.

## Pushing to cut the C

There is a ton to learn from pushing a raft across the slower water inside a turn.

Cutting the C with pushing is particularly effective when the water is not too big or steep.

How much of the raft hits the slow water will determine how much you either hold your line (good glide, just a piece of slow water), bend your line (a little more of the slow water), or slow down and spin (by aiming all the way into the eddy).

We can use mid-stream eddies the same way. Taking varying amounts of them will make the raft do different things. Cutting the C teaches us a lot about making eddies into useful tools wherever you find them on the river.

Depending on how much of a raft cuts across the inside of a turn, you may need to make adjustments with the oars to hold the line you want.

By aiming at current past a turn, through the turn and downstream of it, you can push a boat through a turn without losing your tracking. This applies in all kinds of situations in rapids where a boat can be driven without taking ferry angles.

## Eddies become friends

The same eddies that were knocking your boat off course and pulling you out of tail waves, that you were always trying to avoid, now become sought after tools for guiding your raft.

## Interactively reading the water

Aim far ahead across the C. Use long diagonals and the slow water to steer. Build momentum. Move faster than the water and point where you want to end up. Recognize current that will take you where you want to go. Start early and aim for where you will be changing threads of current. Start above the rapid in the green water before the white water begins.

This is truly interactive rowing; you make decisions to do all these things in split seconds. Traveling faster than the water and building momentum, you are speeding up your water reading, making it happen earlier and earlier, assessing adapting and making decisions to keep tracking, keep getting the most help from the current.

## The perpetual set up

In effect what you are doing throughout a rapid is exactly the same as setting up at the top of a rapid. By looking ahead, you give yourself time to set up for each consecutive section of the rapid. You set up a section and then row yourself into the most advantageous position to be “set up” for what comes next and next and next, through the whole rapid.

You are calling your shots, or your series of shots by reading the water better and better, farther and farther in advance, anticipating the moves, making them look easy and elegant.

## Seeing and feeling

You have focused your attention on seeing the river. While meanwhile, you have felt a lot of things going on in the raft and with the oars. We talked about feeling the pressure against the oars at different ferry angles.

Pushing and pulling begin to change. When you take a stroke you are not just pushing evenly like lifting weights, each stroke feels the water all the way through from

beginning to end. The hands sense what the water is doing, if the boat is turning or running straight, if there are eddies or different directions of current and they react instantaneously with the right amounts of pressure. Each hand pushes its oar through the water with feel and touch.

You do not sit in the rowing seat of a raft like a lump of clay. You sit with a good “seat” like a rider sits on a horse— balanced and alert.

When you are balanced, you can feel the boat gliding, sliding sideways, tilting or falling, moving faster or slower than the current, spinning, stopping, catching bits of eddies. Your “seat” lets you physically connect with all these movements of the raft and therefore the river beneath it. You can feel the interaction between river and boat.

Likewise, your hands gripping the oar handles connect you directly to current. Your oar blades extend the hands’ sensitive touch down inside the river itself. The reactions by the muscles of your arms, hands, shoulders, back, and legs become instant and instinctive.

The hands are your means of having a conversation with the river. You use them to impart touch to your strokes. Feeling the water, you can react with touch on the oars faster than you can think. The hands communicate your decisions and ideas to the river, and feel the current communicating back to you. The hands are where the dance begins.

## The angle is everything

Eventually, rowing reaches a point where this statement has a great deal of truth to it.

With the right angle at exactly the right time, you can be precise in a raft. With a sloppy angle you cannot. You waste your own energy and squander help from the river.

Eventually the subtle changes in angle will become instinctive. You simply feel the glide of the boat and the resistance against the oars that come with slight changes of angle.

Pulling at a 45° ferry angle or other upstream angle, rowing feels brisk and strenuous as you work to keep the oars gripping current and the raft from moving downstream. You can feel this without even having to look at the current the boat is in.

Pulling at a 90° angle your strokes feel effortless because 100% of your energy is going into crossing the river and zero to slowing down. You can feel the distinctive bite and glide of stroking at 90°.

Pulling at downstream angle feels powerful and piles on the speed and momentum. The first strokes grip with leverage in the moving water, springing the boat into motion. Then quickly the sensation comes of sliding faster than current.

Pushing downstream takes effort and brings the subtle gliding sensation. Pushing to ferry and move upstream are hard work and useful in special circumstances.



## The downstream ferry angle

When you need to accelerate to change lanes or merge on the highway, this is the stroke to use. When you pull downstream you brace your oars against the current and get tremendous leverage. The result is to accelerate a raft quickly and powerfully to be moving faster than the water.

This is the power move.

It is the most powerful way to bust into an eddy either along shore or in the middle of the stream because it creates the most momentum and a slicing angle.

## Practice the downstream angle for catching eddies

Play with the timing of driving into eddies with a downstream ferry angle. The raft whirls around, powerfully changing direction and feeling so good. Play with this a lot. It is super useful when you need it and works in powerful big water or in any good mid-stream eddy.

## Downstream eddies in big powerful water

Cutting the C in big water is another place where the downstream ferry angle works like nothing else. When water is too strong to pull against, flip to a downstream angle for the momentum to slice inside a big powerful bend.

Or watch a Grand Canyon guide make the entrance to Crystal Rapid. A downstream ferry angle cuts across powerful current and sets up a perfect angle for penetrating big lateral waves.

## Nailing precise angles

When you pivot, stop the boat's motion at exactly the angle you want. Find a place to play with this in any flat water with or without current.

Look at the boat and water at first to judge your accuracy. Eventually, you will be busy looking at the river when you change angles in whitewater. So practice nailing the angle just by feeling it with the oars and the boat's movement under your seat.

## Focus and concentration

Even with great technique and water reading skill, you can have terrible runs if you lose concentration.

The ultimate goal is to lock in on the river and row with perfect focus and concentration; the harder the whitewater, the greater the need to concentrate.

Be one with the river grasshopper.

## Playing

Once again playing is not just an afterthought. Playing is the practice. It is the journey that gets you to the destination of great rowing and water reading.

Always treat the river with respect, *and* recognize its playful nature. A river is fluid, flowing, and much like a living thing. Fluid rowing, and flowing concentration have a lot in common with play.

### Lots of play to get good at judging speed and distances.

Practice reading water for Class III situations in Class II rapids where you can goof around, make mistakes, and gain experience. Play with reading, seeing, and feeling water from the raft and it will become second nature.

The same goes for learning to concentrate and row interactively. Treat the easy parts of the river as your playground and you will learn to row.

## Expanding team boating

- Safety first

- Agree on safety and rescue procedures before getting on the water.

- Agree on hand and whistle signals and use them.

- Trip Leader is in charge on the river, communicates destinations and plans

- Eddy as a team on trip leaders signal, or in safety situations.

- Whenever possible, trip leader or lead boat choose an eddy or eddies that everyone in the party can catch.

- First boat to eddy makes room for the next boat. Each successive boat makes sure the next boat has a clear path to cross the eddy line and stick the eddy. The whole team works together to get all the boats into small or tricky eddies.

- Lead boat is downstream safety. Lead rowers never tie up or leave their rafts unless all boats are accounted for and safe, or another boat covers downstream safety.

- Lead boat sets pace and makes sure the group stays together. Lead rowers know the river, lead through clean lines, and can read and run.

- When the lead boat signals to eddy out, the other boats should eddy out.

-Sweep boat goes last, watches out for the whole party, carries rescue gear, and is ready to catch eddies quickly as needed. Sweep rowers are usually qualified at rescue and first aid.

-Each boat should stay in visual contact with the boats in their party immediately up and downstream.

-If you lose touch upstream, signal downstream and eddy out.

-If you lose touch downstream, signal upstream and row to catch up.

- In continuous whitewater, stay close. Be close enough to rescue, but not in each other's way.

-Take into account different kinds of crafts. Paddleboats generally move faster in rapids than oar boats. Inflatable kayaks are wild cards.

- Designate a ducky raft to keep track of the inflatable kayaks, coordinate with other rafts and insure downstream safety is in place.

-In serious whitewater conditions, never let a boat go alone. If the lead boat eddies but another boat misses the eddy, it becomes the new lead boat and the other boats peel out and follow.

## Don't throw out the baby with the bath water

Just because reading current opens the door to new techniques, it doesn't mean that the foundation techniques are not great. Different rivers and boats require different techniques in different circumstances. Some rivers require pulling and slowing down. Others call for pushing and speeding up.

Reading current allows for smart, beautiful rowing with a wide variety of techniques.

*There is no one single best way to row.*