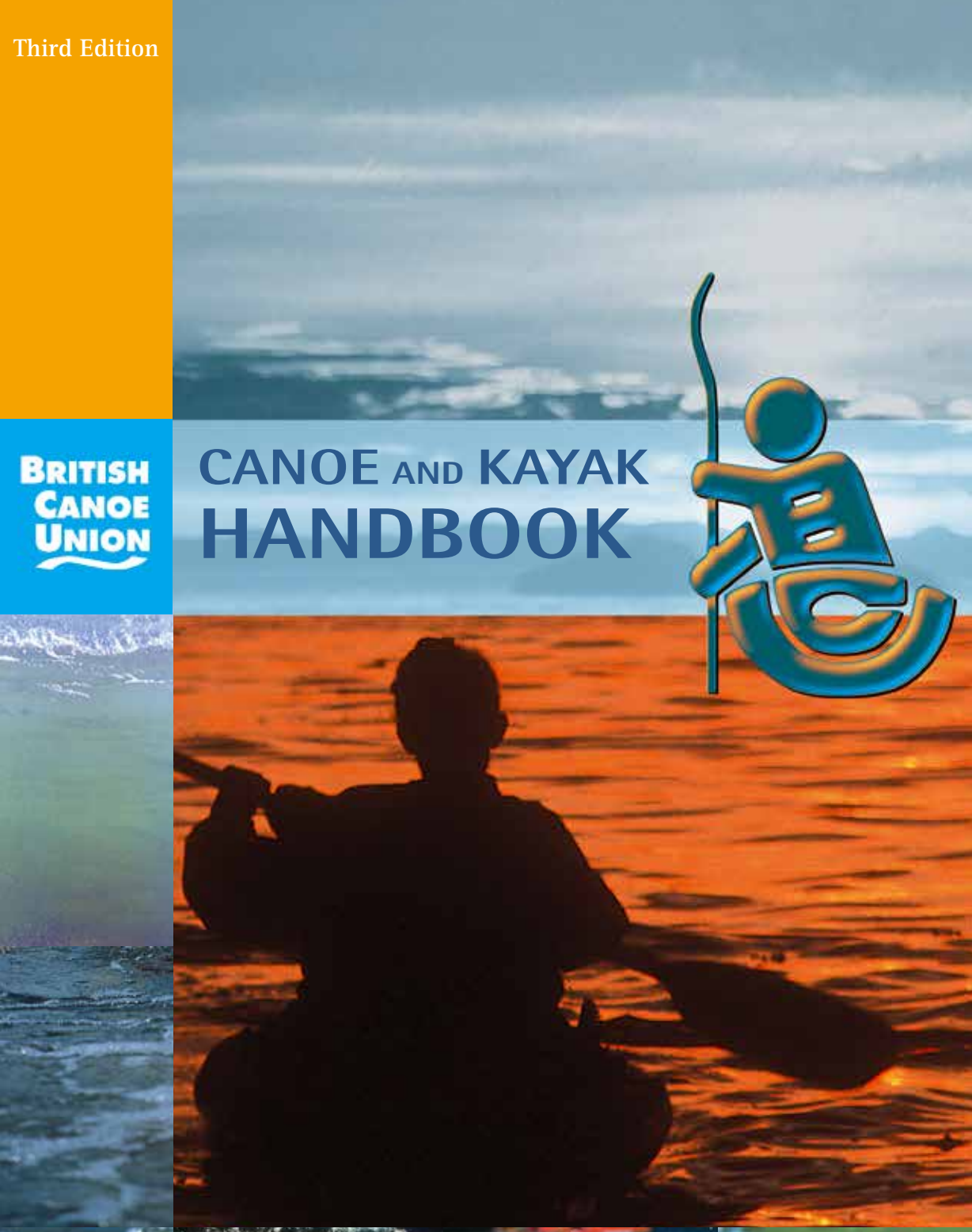
Third Edition

BRITISH CANOE UNION

CANOE AND KAYAK HANDBOOK



Recreation Coaching Competition

The British Canoe Union

Canoe and Kayak Handbook

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Foreword

You do realise, of course, that if you have got to the stage of thinking enough about paddling to pick up this book you are probably already damaged forever as a human being! Buried deeply inside your psyche is an urge to spend totally unreasonable amounts of time in the often uncomfortable surroundings of a small boat. Take heart in the fact that you are not alone, and that the number of your fellow paddlers continues to grow steadily.

The sheer size of this book is evidence of the progress that has been made in canoeing and kayaking, from the distant days when the boats all looked very much the same and the official manual was but a sliver. Through development of equipment and evolution of technique we have discovered many different ways to enjoy and negotiate the waters of our little planet. The range of boat shapes and performance is staggering, and the differing types of paddling available to us are incredibly diverse.

The cynic might say that modern canoeing/kayaking has become a collection of totally unrelated sports – that the flat water sprinter has nothing whatsoever in common with the white water free-style star, and that the rambling sea kayaker shares nothing at all with the competitive slalom racer. But this is not so. As we sit or kneel in this small craft, which we have carried to the water's edge under our own steam and give it life through the way we grab hold of the water and pull on it, we are united. There are easier ways to travel through water but none has the simple, delightful and fluid appeal that comes when a paddle blade gripped by the bare hand translates itself into movement of the boat. A canoe or kayak in expert hands is a true delight to watch.

The BCU Canoe and Kayak Handbook, as well as providing invaluable information on specific areas, serves as an important reminder that we are part of one great paddlesport family. There is a huge amount of knowledge, experience and tradition to be passed on in these pages. Some of this information lies within the area of teaching and coaching. Here again, paddling is quite unique in being a sport where great emphasis and value has been placed on helping people to learn and develop safely and efficiently. Coach education has evolved no less rapidly than the rest of the sport and anyone endorsed as a coach, at any level, can be proud of their efforts.

Unlike many other forms of recreation, our sport continues to be harmless to the natural environment in which it happens. In the future we must continue to preserve the tradition of care for the environment and wildlife - this handbook provides an important instrument to that end. Leaving nothing but the fading wake from our boats and the spinning eddies from the paddles must be the tenet for all.

No one could possibly think that you could become an expert paddler by reading a book. There isn't any short-cut to getting on the water and gaining experience. What this very special book does is draw on the countless years of experience of the expert authors, and condense this background knowledge into a single, unique publication.

Enjoy your paddling.

Ray Rowe

Dedication

This book is dedicated to the memory of

Geoff Good

BCU Director of Coaching (1979-1999)

A gentleman and a scholar

Acknowledgements

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Contents

Information

A wide range of calendar events, specialist committees, coaching and access information for novice and experienced paddlers, coaches is available on the websites listed below.

Clubs

One of the best ways to get involved in paddlesport is to join a club. Details of clubs andhow to contact them are available on the websites listed below.

Individual and Family Membership

Join your association and help us to promote and represent the interests of canoeists and kayakers throughout the UK. (See contact details below.)

The Governing Bodies

The British Canoe Union represents the interests of canoeists and kayakers at UK and international level. It is also responsible for coordinating all matters of a federal nature that affect all of the Home Countries.

British Canoe Union,
National Water Sports Centre
Adbolton Lane, Holme Pierrepont
Nottinghamshire, NG12 2LU

Tel 0300-0119-500 - Fax 0845-370-9501
E-mail info@bcu.org.uk - Website www.bcu.org.uk

The Home Countries are represented by the following associations which represent paddlers at local, regional and home country level:

Canoe Association of Northern Ireland,
Unit 2 River's Edge,
13-15 Ravenhill Road,
Belfast, BT6 8DN
Tel 02890-738-884
E-mail office@cani.org.uk - Website www.cani.org.uk

Canoe England,
National Water Sports Centre
Adbolton Lane, Holme Pierrepont
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Tel 0300-0119-500 - Fax 0845-370-9501
E-mail info@bcu.org.uk - Website www.canoe-england.org.uk

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Introduction

This book is designed to be read by different people at different levels. For the newcomer it is an introduction to the breadth of the varied aspects of canoeing and kayaking available. To experienced paddlers it is a chance to learn more about the areas of the sport they are less familiar with, and to update their knowledge of those they have already embraced. To the coach, who is expected to be a 'font of all knowledge' it is the essential reference book.

Someone once described the task of being the governing body of all aspects of canoeing and kayaking as the equivalent of being responsible for all team games played with a ball. BCU Coaching UK has put together this book so that we can all have access to knowledge of the many different facets of canoeing and kayaking. Each chapter will give an overview of its aspect of the sport and cover as much detail as is feasible in a book of this nature. In addition most chapters will provide a further reading list, and where appropriate, a list of available videos and websites so that the reader can explore further.

The Handbook will be updated much more regularly in future. Nonetheless, for the information that needs updating annually I will refer you to the yearbooks produced by the governing bodies. For information on the star tests and coaching awards you should consult the BCU Coaching Directory, available direct from the BCU.

The Coaching Service also administers a network of national association contacts and Regional and Local Coaching Officers. The contact details for these people can be found on the websites on the page opposite. Alternatively, whether you wish to know more about the work of the coaching service, wish to contact coaching officers for their support, or wish to offer your support to the network, please contact the BCU directly.

Editing this book has been an 'interesting' experience that has made me some new friends and taught me far more than I would have expected. I hope it has a similar effect on all those who read it. If you have any comments or suggestions for improvements for future editions, please send them to me via BCU Coaching.

Franco Ferrero

Franco is a Level 5 Coach (Inland and Sea) and now divides his work time between freelance coaching, writing and publishing. He was formerly the head of the canoeing department at Plas y Brenin, and was honoured with the Geoff Good Coach of the Year Award (coaching adults category) in 2000.

His main paddling interests are white water and sea touring, though he occasionally 'dabbles' in other aspects of paddlesport and is also a keen mountaineer. He has paddled throughout Britain and the European Alps, as well as in Norway, Nepal, Peru and British Columbia in Canada.

23 White Water Kayaking

Just as this was due to be sent to the editor, I took the opportunity to go paddling, rather than do the spell checking.

I had been on that river more times than I cared to remember. Yet, later that evening, I still sat down in front of the fire enjoying that great feeling of having done something new, always different and challenging. That is what I love about white water kayaking.

Introduction

This chapter is built on the work of two previous chapters, Foundation Kayak Skills and Reading White Water. A thorough and skilful performance of the skills in the foundation kayak technique chapter and a good understanding of the hydrology section are essential before this one can be understood and appreciated fully. Take time to read them before delving into this one!

Having mastered the foundation strokes and gained an understanding of moving water, we can apply ourselves to the three fundamental elements of white water kayaking:

Balance (trim and edge/lean)

Accuracy
Timing } (speed and angle)

The term 'fundamental' is, perhaps, a new one to kayaking. I prefer 'fundamental' or foundation to the term 'basic' for the reason that these skills form the basis of good white water performance, and yet are not basic. When learning new skills we need to return to the fundamentals before we can address the sophisticated elements of the more complex techniques. Time spent developing and understanding the fundamentals is never wasted and its benefits returned ten-fold.

Balance

Being able to put the boat on edge and maintain the balance of the boat is a vital component on white water. The idea of achieving balance is a continuum, using edge at one end (which requires a great deal of leg and back effort) and lean (requiring the paddler to extend the body outside the boat) at the other.

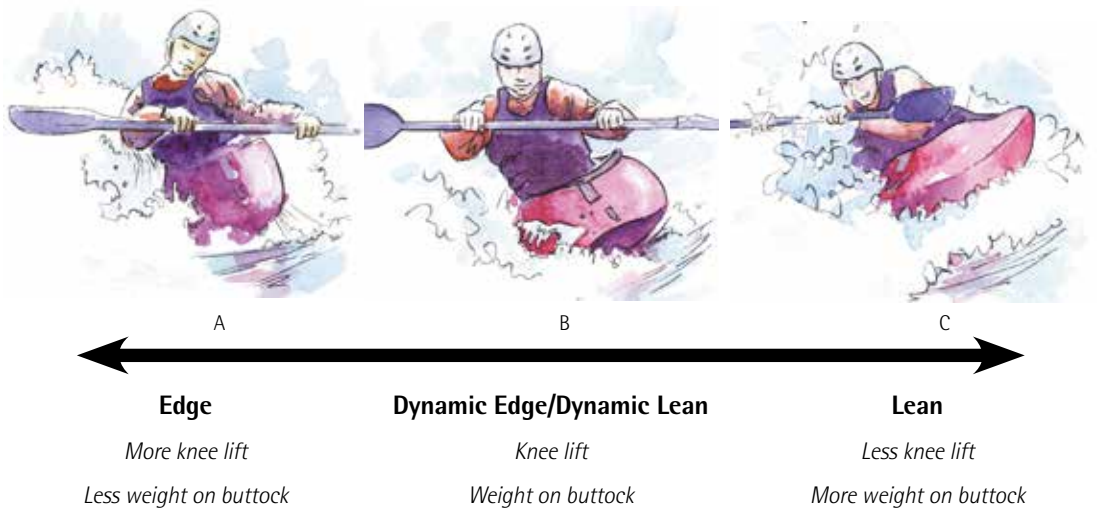


Fig 23.1a-c The Balance Continuum illustrated

A paddler will need to develop the ability to alter the boat's shape in the water by holding the boat on edge without being off balance. This is achieved by the use of the legs and a subtle shifting of body weight from side to side and from front to back.

Fig 23.1a Edge

The kayaker is sitting upright in the boat, using a single knee to raise one side of the kayak. The edge is achieved by lifting a knee and arching the back towards that knee. An extended period of edging is very tiring.

Fig 23.1b Dynamic Edge/Lean

The kayaker has lifted a knee, and in order to hold the kayak in that position, has subtly shifted weight over the buttock, holding the boat on its edge and maintaining that edge.

Fig 23.1c Lean

The kayaker has now leaned the boat to create an edge by shifting body and head outside the gunwale lines of the kayak. The knees and hips are held perpendicular to the body. This position can only be maintained by gaining support from the paddle; this prevents the paddle from being used for any other purpose and has limited value on white water.

Accuracy

Accuracy is as much in the mind as in the paddling skills and the paddler must aspire to be accurate in terms of boat positioning.

The foundation kayak skills need to be effective and confidently performed. These skills will enable the kayaker to apply speed and set the boat's angle to the current. The kayaker will need both control and power in order to be accurate.

Being accurate also requires an understanding of the hydrology section beyond the simple reading of the words. The kayaker must be able to identify the different wave features on the river and understand their effect on the kayak.

Setting a boat's angle and then being able to apply speed in a series of linked strokes is an important skill. Whilst these elements are examined separately, they form two elements of the same sequence.

Angle

Creating, setting and maintaining the boat's angle to the water feature prior to applying speed is essential; it allows the kayaker to control the effect of the water on the kayak. Setting the angle is achieved with sweep strokes. When combined with dynamic footwork, a dramatic turn can be achieved. The stroke is wide from the boat, blade covered but with the paddle loom close to horizontal.

A forward sweep can be used to set the angle of attack if the boat is in mid-current. If the boat is close to an eddy, a reverse sweep may be more appropriate as this will also move the boat away from the eddy, having the effect of opening the angle of attack into an eddy if required.

Fig 23.2 The use of a forward sweep alters the angle of the boat and maintains forward speed

In large standing waves, setting the boat at an angle needs to be timed so that the boat is turned on the way up a wave. This ensures that the bow is free of the water and the boat can be moved easily.

Fig 23.3 The timing of the forward sweep, when used to turn in standing waves, needs to be practised

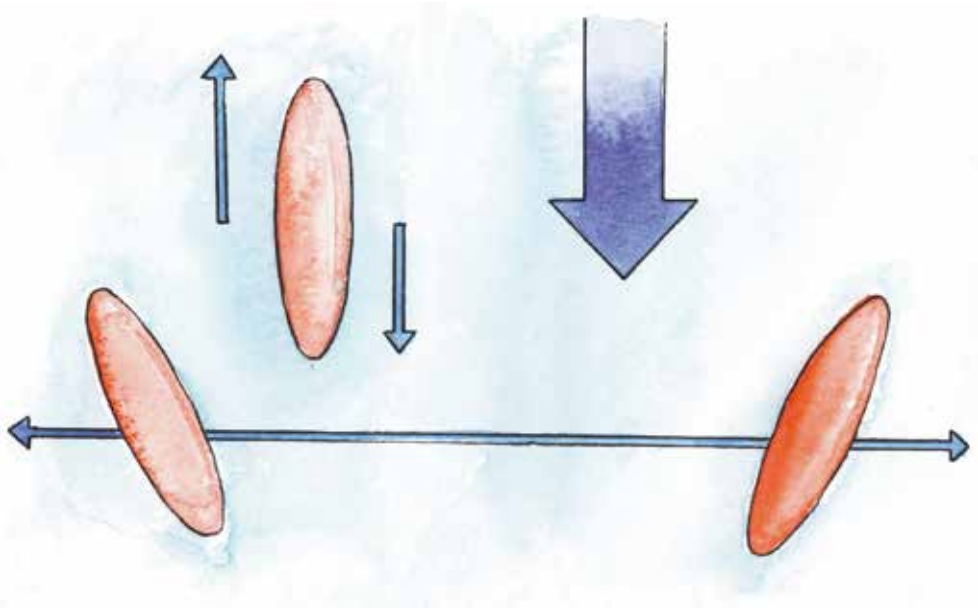


Fig 23.4 Current, upriver speed, dowriver speed, lateral speed

Speed

Speed, when used in relation to a boat in white water, is a difficult concept. The boat's speed is described relative to the moving water in the river. It is described in terms of upstream, downstream and lateral speed.

- Upriver speed is best described as going against the current.
- Downriver speed is best described as moving with the current.
- Lateral speed is best described as the movement across the current.

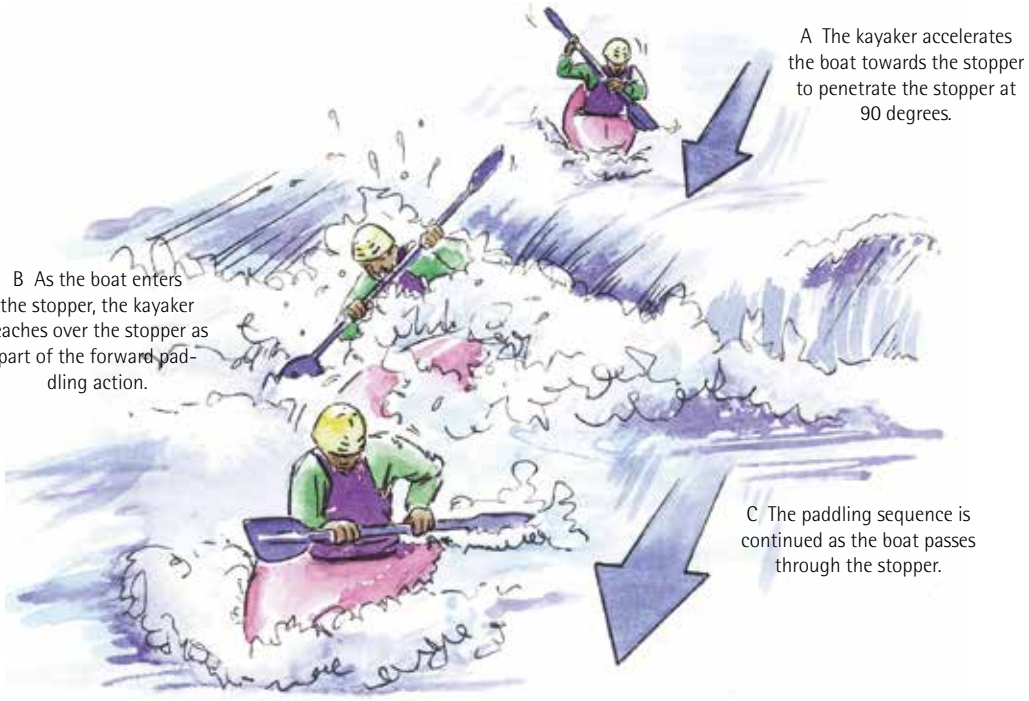


Fig 23.5 Boat accelerated forwards to 'punch' through a stopper

All are combinations of boat speed and current:

- Directly against the current to create upriver speed.
- Against the current and by setting the boat at an angle to create lateral speed.
- With the current to create downriver speed.

An understanding of how to generate speed, (both forwards and reverse) is important because it enables the kayaker to accelerate the kayak in a straight line to penetrate eddies. That speed needs to be controlled so as to match the conditions and the manoeuvre, (i.e. identify and move at a speed appropriate to the conditions). These are all related to and rely on the use of effective power strokes that have minimum turning effect and maximum driving power (both forwards and reverse).

Downriver Speed

Accelerating to the kayak's maximum speed, for most white water kayaks, takes 4-5 effective strokes. Once the boat is at speed, effort can be reduced to maintain speed rather than trying to push the boat faster and faster. Accelerating strokes differ from the cruising and racing forward strokes required in other disciplines. The difference in technique is forced on the kayaker by the design of most modern white water kayaks. White water kayaks tend to be wide and short with limited directional stability; indeed the hulls are designed to enhance manoeuvrability, often at the expense of forward speed. The result is that the kayaker must create forward movement with minimum turning effect, (this is difficult in a short, flat-hulled boat). It requires a very short rapid stroke to 'pull' the boat forwards with limited body rotation. This means that the strokes need to be short, close to the boat and rapid. The blade should be covered but in the surface water. The more vertical the paddle (during the period of most effort), the better. This will necessitate the upper arm coming over the boat which will differ from the technique required in craft with a greater directional stability.

Downriver speed need not be generated simply by the kayaker's effort; speed can be 'carried' by the kayaker by using the hydrology of the river and/or gradient of the water. The natural gravity of the rapid or wave can be used to add speed to a manoeuvre.

Reverse Paddling

Losing downriver speed creates time for the paddler to pick a route down a rapid and enables the kayak to be positioned in order to set the correct angle to a wave feature.

Photo 23.1 Carrying river speed!

Speed and Angle Together

Setting the angle and then following it with the application of power to create speed goes hand in hand. The paddler needs to be able to continually adjust the boat angle to the current. As the paddler accelerates forward they may feel the need to adjust the angle of the boat to a wave or eddy. This is achieved by 'widening and lowering' the power stroke to provide an element of turning effect.

Photo 23.2 A 'low wide' stroke to turn

Photo 23.3 A vertical stroke for power

Fig 23.6 Keeping an angle to the current

The two strokes do two different jobs. A stroke that compromises by doing a bit of both will not do enough of either. The kayaker needs to be able to vary the stroke within the paddling sequence without a break in rhythm. Training on flat water enables the kayaker to practise varying the height and width of the stroke to give the required effects.

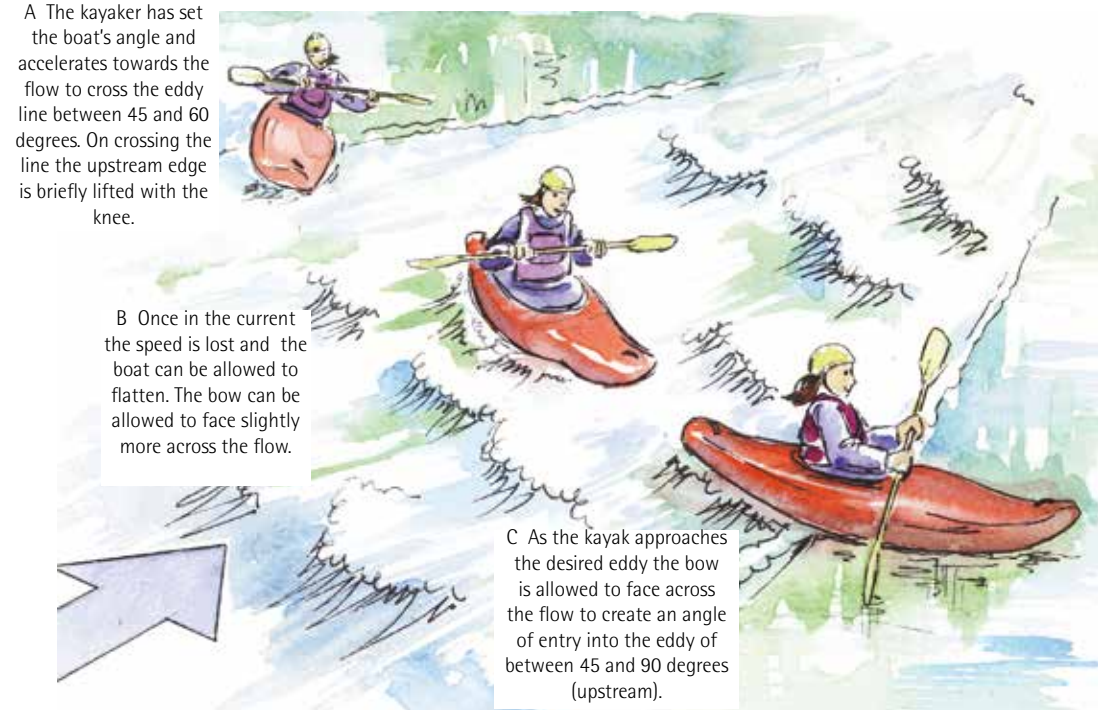


Fig 23.7 Forward ferry glide

Timing

The environment of the white water kayaker is always moving! Just because we aren't paddling, it doesn't follow that we aren't moving! For the paddler this means that strokes, edge and changes of speed need to be timed and paced to maximise effect.

Sometimes a good paddler will know when to do nothing but wait, and the ability to 'float with intention' can be practised. Simply floating over waves and allowing the boat to move as it will within the rapid requires flexibility and a relaxed kayaker. The paddler should attempt to maintain sight on a downstream point so that the head stays passive with the eye line level whilst the body and hips are relaxed, allowing the boat to float over waves and move with the current.

Foundation Manoeuvres

Crossing the Current (Ferry Glides)

Moving from eddy to eddy or within the flow is essential for the kayaker and is refered to as a 'ferry glide'. An understanding of the water movement with a downstream 'V' is important. The current within a chute does not flow in a single direction. Flow within a downstream 'V' is best thought of as moving towards the bottom of the 'V' (i.e. downstream) and also towards the mid-point of this 'V' shaped tongue of water.

In all ferries it is vital to set the angle of the boat to the current to create a vector, because if you keep an angle to the main flow you will ultimately be paddling parallel to the current and be unable to cross into the eddy.

Crossing the Current from Eddy to Eddy (Forward Ferry Glide)

Moving from eddy to eddy allows the kayaker to inspect rapids without getting out of the kayak, rest, wait, and move within the current.

The High Cross

In fast flows the kayaker can gain speed by using the upstream face of a standing wave to assist in the ferry. This manoeuvre is referred to as a high cross.

Changing Position in the Current (Reverse Ferry)

Once in a rapid, the kayaker may need to reposition the boat, lose unnecessary speed and/or set the angle of the boat to the current as part of setting up the next manoeuvre.

Fig 23.8 High cross

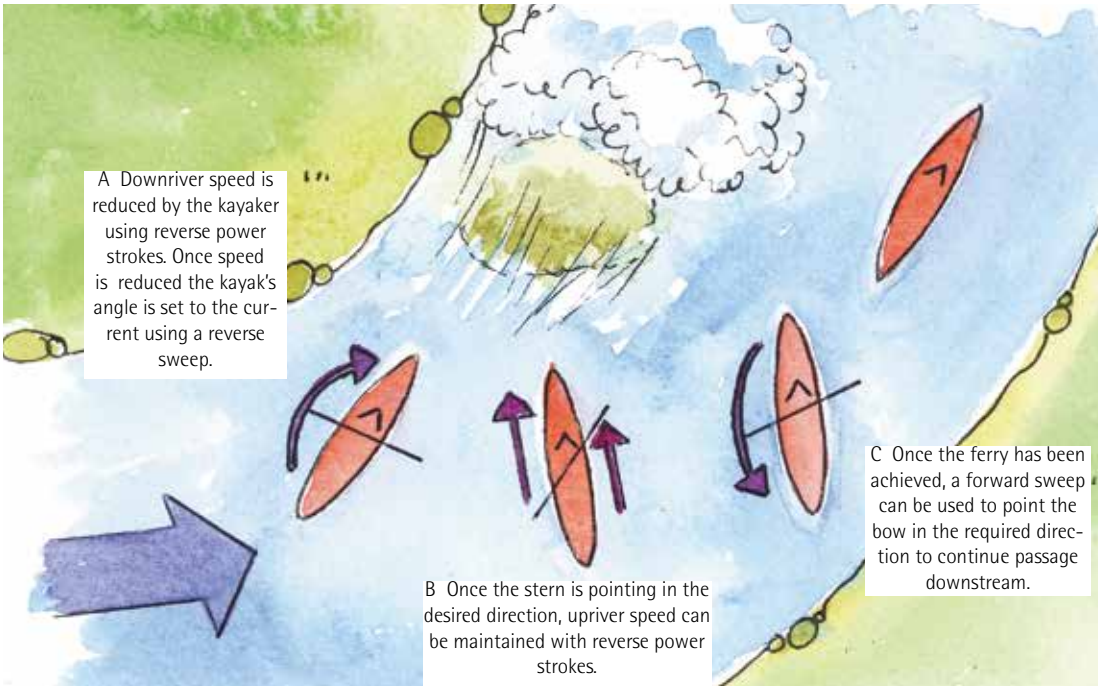


Fig 23.9 Reverse ferry glide

Breaking In and Out

Moving into an Eddy from a Current (Breaking Out)

Moving out of the current is not only a white water technique, it's a safety skill.

The radius of turn achieved in the breakout is related to four elements:

1. Position of entry into eddy. Ideally, a paddler will want to enter the eddy in its upper third. At this point the eddy line is distinct, defined and easier to cross.
2. Speed of entry into the eddy. The boat must be driven into the eddy with positive downriver and lateral speed. This pushes the bow into the eddy as the stern is pushed round by the current. This creates the turn to face upstream and no sweep is required to cross the eddy line.
3. Angle of attack into the eddy. The boat will need to cross the eddy line between a 45 and 90 degree angle (beyond 90 degrees and the boat is effectively ferry glided into the eddy).
4. The stroke used to consolidate the kayak's position in the eddy. A bow rudder can be used here. The bow rudder is placed well into the eddy and converted, (rolled) into a power stroke to consolidate the boat's position. Alternately, if the eddy is shallow or support is needed because it is turbulent, a low brace is placed well into the eddy and converted into a power (consolidation) stroke.

Problems often arise because people use a low brace turn (a combination of sweep stroke and low brace) in the same form that it is taught on flat water. This sequence is considered easier to perform but actually requires greater judgement. The sweep stroke spins the boat too soon with minimum driving effect into the eddy. The low brace is often mistakenly pushed forwards to create the turn, because the eddy has not been penetrated, acting as a reverse sweep. Inappropriately timed or executed, this in effect 'bounces' the boat back into the current.

On moving water there is no need for a sweep if the angle, speed and edge are correct. The low brace is only applied when the boat has penetrated deep into the eddy and the turn has already been initiated by the opposing currents.

Every eddy is different, and the greater variety of breakout techniques you can choose from the more skilful your performance will be. Choosing the right techniques for the right situation is a question of practice and experience. Find a site with a number of eddies that are different in character and experiment.

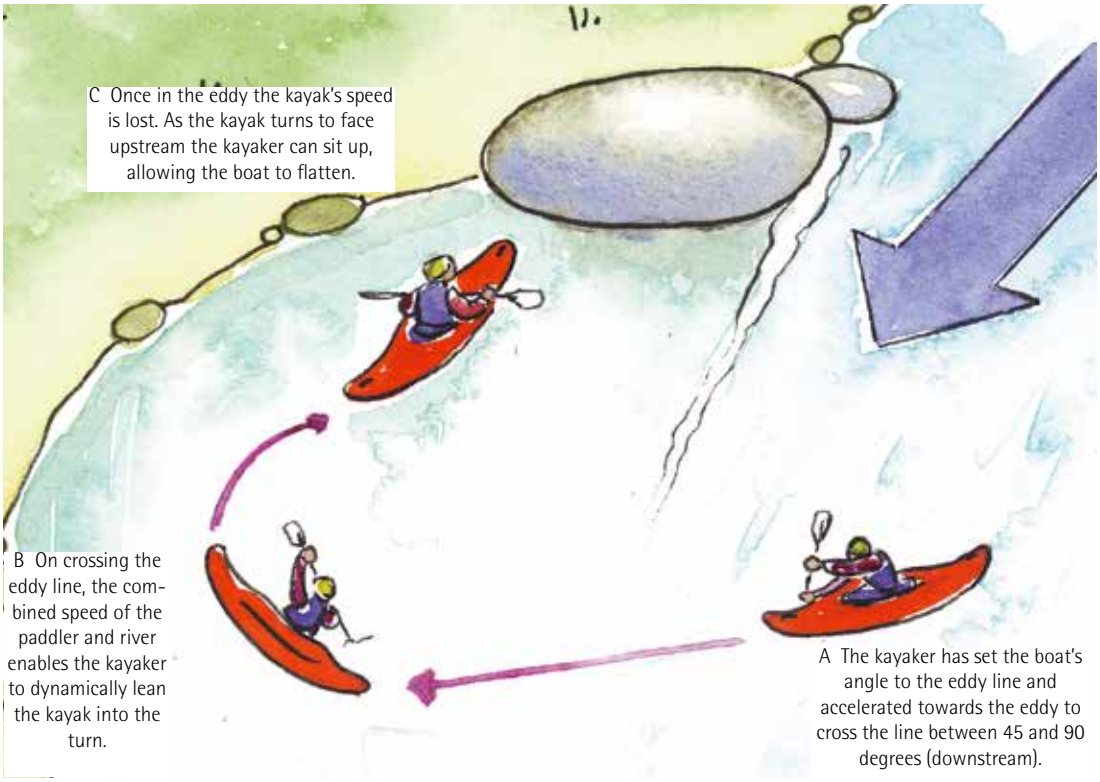


Fig 23.10 Breakout using speed, angle and edge; forward power stroke used as consolidation stroke

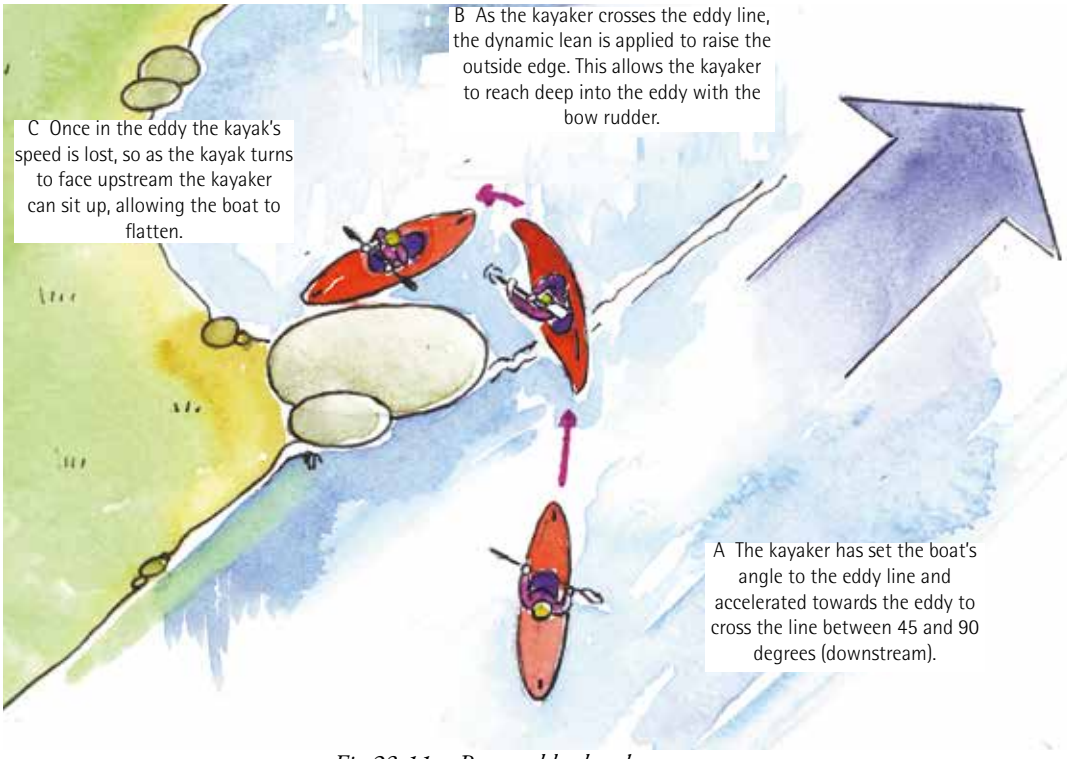


Fig 23.11 Bow rudder breakout sequence

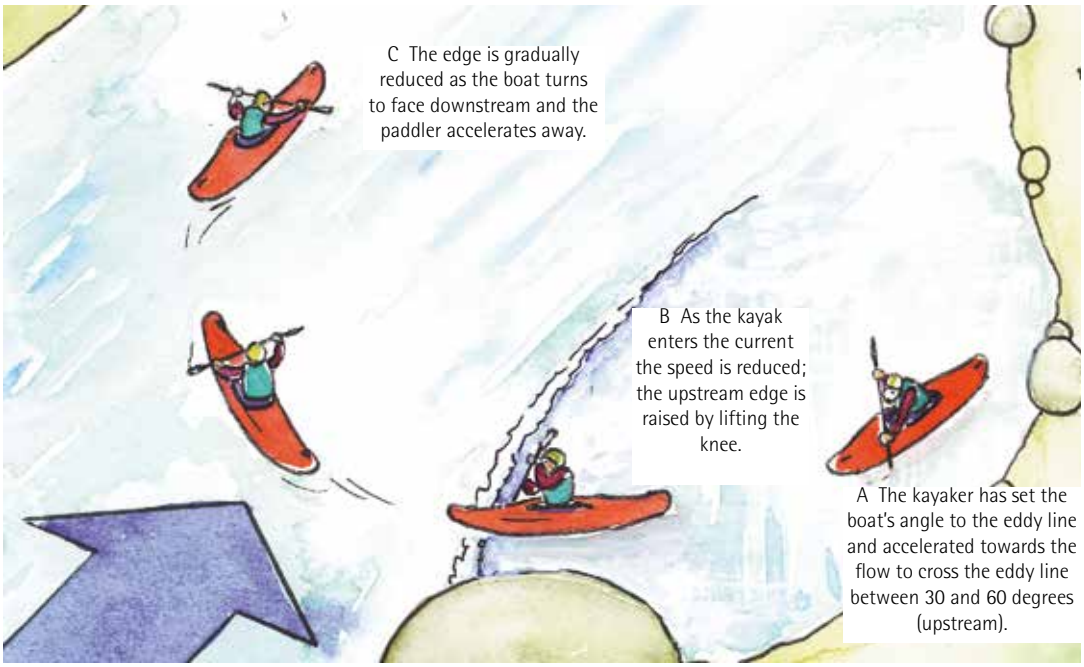


Fig 23.12 Break-in using speed, angle and edge, forward power stroke used as consolidation stroke

Moving into the Current from an Eddy (Breaking In)

Once in an eddy, the time has to come when the kayaker needs to re-enter the main flow.

The objective of any break-in is to enter the main current. The same principles apply as in a breakout. The kayaker will need to leave the eddy with speed in order to penetrate the water moving downstream.

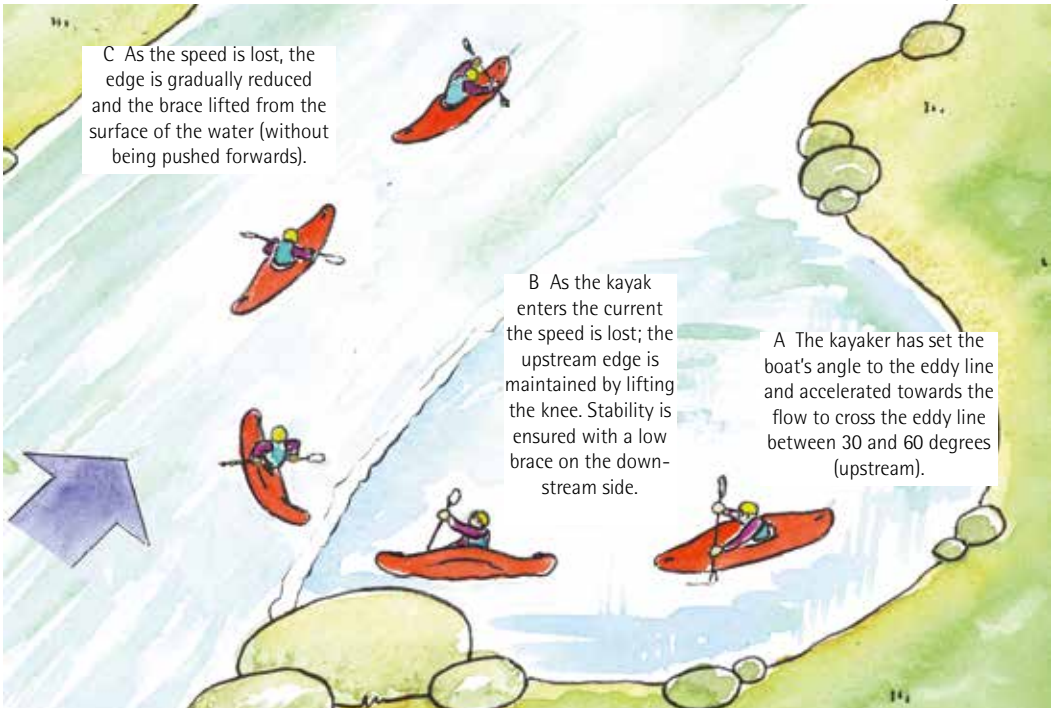


Fig 23.13 Low brace break-in sequence

Using Diagonals

Water, within a diagonal wave, always moves to the downstream end of that wave. This can be utilised by the kayaker to create speed and move across the current. It could also have an unwanted effect on the paddler if its influence is not anticipated.

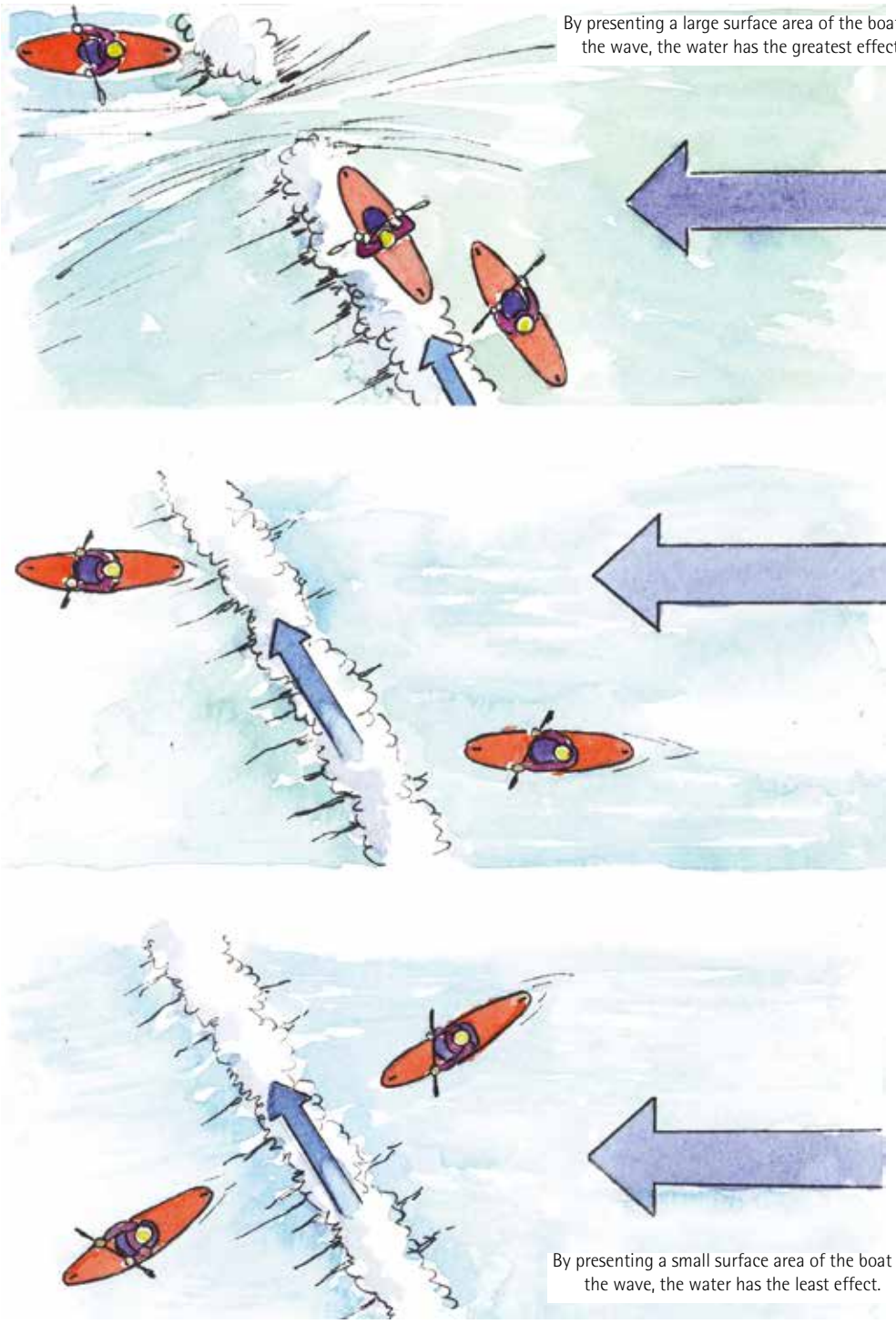


Fig 23.14 Using diagonal waves

Getting out of Stoppers

Stoppers occur downstream of drops in the river bed. They are best avoided but need not be a problem if you find yourself in one.

If you inadvertently find yourself in a stopper, it is important to stay relaxed and in balance. Firstly find a relaxed, balanced, sitting position that allows you to look around (edge the kayak dynamically downstream).

Dynamic edge/lean enables you to lift the upstream edge of the boat without becoming tired. This keeps you upright and also enables you to use the paddle to move the kayak towards an outflow and so out of the stopper.

Practice

At the end of the day, there is no substitute for time spent on the river. However, by structuring your practice you will improve faster.

See you on the river.

Exercises

Find a jet of water and vary the amount of angle and speed you use to ferry glide across.

Find a site with a number of eddies that are different in character and experiment.

Try the following:

Break in and out at different speeds.

Break in and out at different angles.

Break in and out using different amounts of edge.

Break in and out at different points on the eddy line.

Break in and out using different stroke combinations.

Vary the combinations of all the above factors.

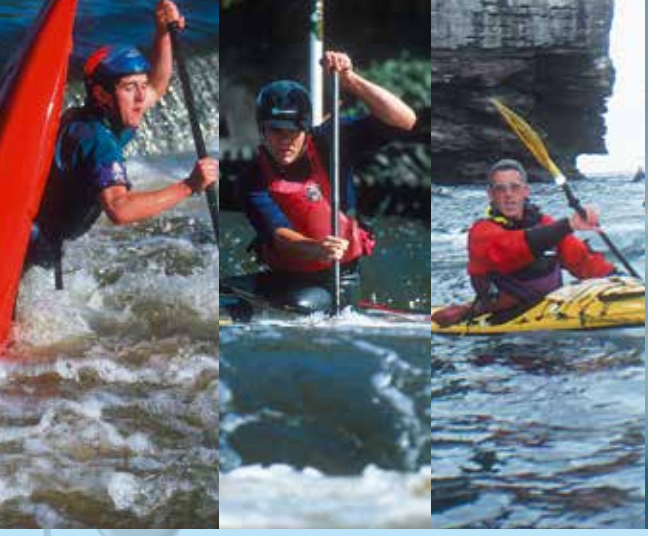
Further Reading

Kayak, Nealy W, 1993, Menash Ridge Press, 0-89732-050-6
Whitewater Paddling - Strokes and Concepts, Jackson E, 1999, Stackpole Books, 0-8117-2997-4
White Water Kayaking, Rowe R, 1988, Salamander Books

Loel Collins

Loel Collins was formerly the Director of the National White Water Centre, Canolfan Tryweryn and is now the head of the canoeing department at Plas y Brenin, the National Mountain Centre. Loel is one of the UK's leading coaches.

His passion lies in coaching white water skills and exploring and travelling in both kayak and canoe. He has paddled and taken part in first descents in many parts of the world including Papua New Guinea, Pakistan and Iran.



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