SECOND EDITION

Franco Ferrero

WHITE WATER **SAFETY & RESCUE**

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CONTRIBUTIONS FROM:

Loel Collins
Ray Goodwin
Dave Luke
Geraint Rowlands

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About the Author

Franco Ferrero divides his work time between managing Pesda Press and freelance coaching. He is qualified as a BCU Level 5 Coach (Sea and Inland), is a REC first aid provider, a Rescue 3 Instructor. and holds the Mountaineering Instructor Certificate. His passions are white water and sea kayaking, rock and ice climbing, ski–mountaineering and sailing. He has paddled throughout the UK and in many parts of the world including Nepal, Scandinavia, the European Alps, Peru and Western Canada.

Franco Ferrero

Contributors

Loel Collins

Ray Goodwin

Dave Luke

Geraint Rowlands

Loel Collins has been paddling white water around the world. 'In thirty years you get to paddle lots, swim a bit and throw loads of lines at your mates, colleagues and clients'. He works as a senior instructor at Plas y Brenin, the National Mountain Centre, where he runs the canoeing and kayaking departments. He has worked with the BCU designing the safety training programmes for the Coach Education Scheme and worked closely with the emergency services designing bespoke water safety training for rescue teams. Most of all he loves boating. Loel acted as technical proof reader and contributed many ideas to the development of the book,

Ray Goodwin has paddled throughout Britain and in North America and Nepal. He has a considerable reputation as a coach running his own business *RayGoodwin.com*. In 2005 he was featured on Ray Mears' BBC2 *Bushcraft* series. Ray is a BCU Level 5 Coach. Ray wrote two canoe chapters for the BCU Canoe and Kayak Handbook and wrote the canoe specific sections for this book.

Dave Luke has paddled throughout Britain, in the Alps, Corsica and in the United States. He represented Britain in the OC1 at the rodeo (freestyle) championships in Germany. Dave wrote and advised on specialist white water open boat matters.

Geraint Rowlands has worked as a commercial river guide on every continent apart from Antarctica. He is an instructor for Rescue 3 UK and a Level 5 Coach who works as Head of Rafting at Canolfan Tryweryn, the National White Water Centre. Geraint wrote the raft specific sections of the book.

Introduction

The writing of this book started when I tried to put some notes together as course notes for the safety and rescue courses I was running at Plas y Brenin. It soon became clear what a huge topic it is, and in sheer frustration I explained to a friend that I would have to write a book to cover it properly. His answer was, 'Why don't you?'

This is the result. I hope you find it enjoyable and informative.

▶ **WHAT'S NEW IN THE 2ND EDITION?** - Apart from the obvious improvement of full colour and new photos throughout, the following changes have been made:

1. **The text has been completely revised and numerous small but significant improvements in the explanations in the text have been made.**
2. **The principles of safety and rescue have been unified and the mnemonic CLAP adopted. This is to make it easier to remember them and fall in line with current practice in the teaching of white water safety.**
3. **The rescue section has been reorganized to fit in more closely with the TRTTG. 'low to high risk' model.**
4. **The rafting sections have been completely rewritten by Geraint Rowlands.**
5. **The chapter 'Planning a Descent' has been extended to cover factors to be considered when travelling abroad.**
6. **One-handed signals as used by Paul O'Sullivan in his chapter in the BCU Canoe and Kayak Handbook have been adopted.**

▶ **LEARNING ABOUT SAFETY & RESCUE** - The point of safety and rescue training is that there is rarely the time to develop a technique during a life–threatening emergency. Paddlers must already be in possession of a range of techniques that will allow them to solve the problem quickly. There isn't the time to reinvent the wheel. New techniques are often developed in training and practice situations.

There are three parts to becoming a safe and effective paddler and rescuer; knowledge, training and experience.

KNOWLEDGE, TRAINING & EXPERIENCE

This book can only provide the knowledge. It is important that the reader should consider attending practical safety and rescue courses in order to evaluate a range of techniques under controlled conditions. This will also ensure that the techniques are fully and correctly understood.

For those who already have a good deal of training and experience the book will be useful as an 'aide–memoire', and probably cover some areas that are new to the reader.

- **PRACTICE -** Like all skills, safety and rescue skills need to be practiced, initially to become competent and thereafter to maintain competence. Great care should be taken in selecting suitable sites, where the skills can be practised in controlled conditions. Nothing could be worse than to be, or see a friend, injured whilst practising how to stay safe! It is also important to try and practise as a team with the people you normally paddle with.
- **STRUCTURE -** This book is in four parts. The order they are in reflects the importance that I attach to them.

WHITE WATER SAFETY	**Part One deals with safety, which is about staying out of trouble in the first place.**
WHITE WATER RESCUE	**Part Two is about rescuing people. This is what we do when our safety has failed.**
CARE OF VICTIMS	**Part Three is about caring for and evacuating people who are physically or emotionally injured.**
ACCESS & RECOVERY	**Part Four is primarily about recovering equipment.**

- **TERMINOLOGY -** The following words are given specific meanings for the purposes of this book:

  Paddler means anyone who paddles on white water.

  Boater means kayakers and canoeists.

  Where there is a Standard American English word in 'paddlespeak' that is different from Standard English, it is indicated by italics and single quotation marks, i.e. weir, 'low head dam'.
- **GENDER -** Despite being rich in words, English has a simple grammar which can't cope with the equal opportunities world we live in. Unless the context implies otherwise, 'he', 'him' and 'his' are used as neuter words, and could refer to a male or female person.

DISCLAIMER: MANY OF THE SAFETY & RESCUE TECHNIQUES DESCRIBED IN THIS BOOK ARE INTENDED FOR USE IN SPECIFIC CIRCUMSTANCES, AND MAY BE HAZARDOUS IF APPLIED INAPPROPRIATELY BY UNSKILLED OR INSUFFICIENTLY TRAINED PADDLERS. THE ONUS IS ON THE READER TO APPLY THE TECHNIQUES DESCRIBED APPROPRIATELY AND CORRECTLY. THESE TECHNIQUES ARE BEST LEARNED AND PRACTISED UNDER THE GUIDANCE OF A QUALIFIED INSTRUCTOR.

CONTENTS

Acknowledgements

Once again I'd like to thank all the people I acknowledged in the first edition. In this edition, in addition to the other contributors Loel Collins, Ray Goodwin, Dave Luke and Geraint Rowlands, a special thanks is due to Bob Timms who organised our alpine photo–shoot with consummate professionalism. A special thanks is also due to my wife Joan for being a great proof–reader and a sup–portive friend.

A big thank you to all of the people who acted as our 'models': Bob Timms, Dino Heald, Torry Jones, Dave Luke, Loel Col–lins, Pete Catterall, Rose Powell, Richard Manchett, Mark Chadwick, Chris Mur–min, Steve Macdonald and Dave Brown.

Thank you to all the people who sent us so many of the photos that have made this edition so different. They are all credited in the captions. Any photos not credited were taken by Franco Ferrero or Peter Wood.

▶ **DEDICATION** - To the memory of 'Ack' Hairon. Without his encouragement and practical support, neither I, nor his son Derek, would have been able to take up kayaking and get into so many scrapes at such a young age.

APPENDIX D - The photos and diagrams used in this book are available free to use in presenta-tions on white water safety. They are available on our website.

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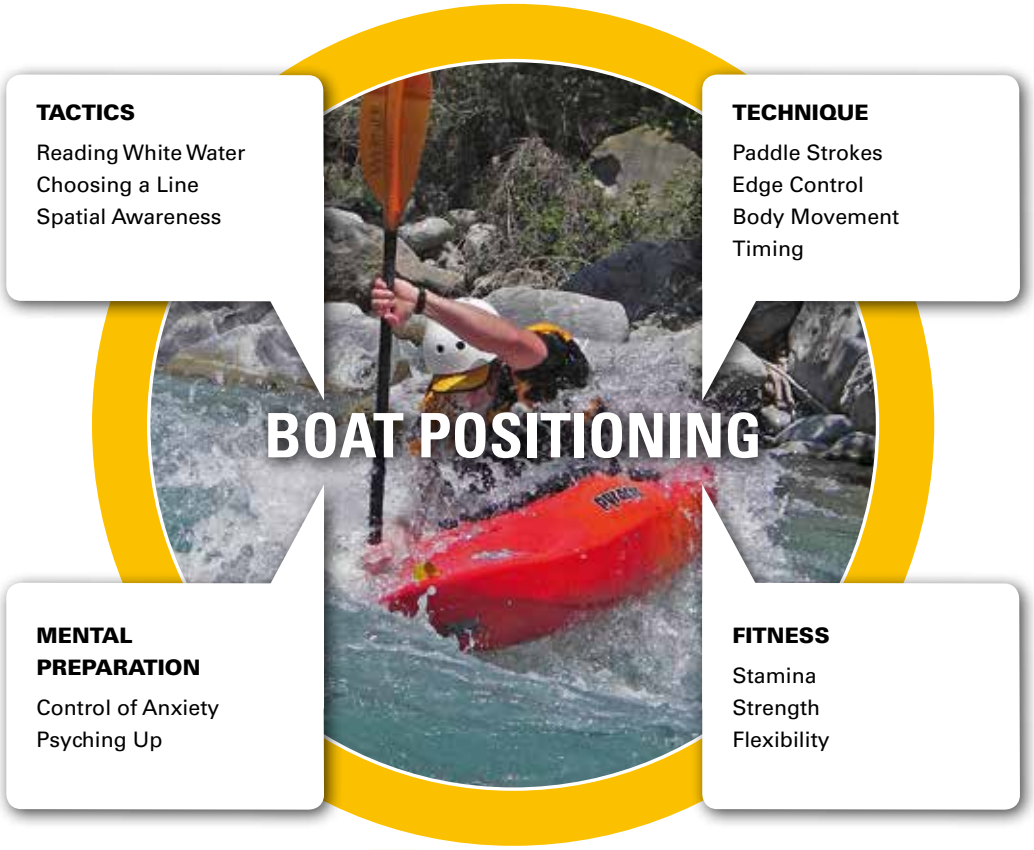


Figure 5-1 skilful paddling. Photo: Dino Heald

CHAPTER 5

Skilful Paddling

The best way to become a safer paddler is to be a better paddler! Combined with the ability to read water, skill is a far better guarantor of safety than a full-face helmet and body armour.

Skill

Skill in paddling white water is the ability to choose a line and paddle down it smoothly and efficiently. A truly skilful paddler makes it look effortless.

The diagram above shows a profile of all the parts that have to come together for a paddler to perform skilfully. When all these factors combine what we see is in essence good boat positioning. It doesn't matter in what proportion the parts are mixed, as long as the end result is that the paddler is in the right place at the right time. They also need to be pointing in the right direction, moving at the right speed and the right way up!

Mental Preparation

This subject is covered in Chapter 6.

Tactics

Reading white water is covered in Chapter 2.

Choosing a line is the ability to 'see' a way down a rapid that avoids all the hazards and uses rather than fights the water wherever possible. It is your brain's contribution to good boat positioning.

CHOOSING A LINE IS THE ABILITY TO SEE A WAY DOWN A RAPID

Figure 5-2 choosing a line, Rio Calaya, Bolivia. Photo Mark Rainsley

When choosing their line paddlers need to ask themselves the following questions:

1. **Which way is the water flowing?**
2. **What hazards need to be avoided?**
3. **Will the water take the paddlers where they want to go?**
4. **Where it won't, what do they need to do to stay on a line that avoids any hazards?**
5. **Are they capable of making the moves necessary?**

Technique

Good technique will serve a paddler far better than brute strength.

It would take another book to cover technique, so for now I will refer the reader to other books. However, as it has a direct bearing on safety, we will look at some techniques that, when performed poorly, can lead to injuries.

In both the following cases poor technique can and frequently does lead to shoulder dislocations. If this injury ever occurs, help should be sought from a specialist sports physiotherapist. It is vital to build up the various groups of muscles that prevent instability of the shoulder joint. Repeated dislocations could lead to irreparable damage and the end of that person's paddling days. Prevention is better than cure. Nonetheless, treatment is dealt with in the chapter on first aid.

Figure 5-3 (left) a poor high brace.

Figure 5-4 (right) a good high brace support stroke.

- **HIGH BRACE -** A kayak technique, the high brace is used to prevent a capsize. The kayaker reaches out at 90° and gains support by laying the drive face of the blade on the water and pulling down, with his wrists underneath the paddle shaft. The stroke can be used statically, as a brace, where a water feature provides so much uplift that it feels like one is resting the paddle on a firm cushion. Alternately, it can be used dynamically, as a support stroke. In this case the paddler gains enough support to bring the boat back upright by pulling down powerfully on the paddle.

  Good technique consists of keeping the mid–point of the shaft no more than forehead high and keeping both elbows bent . Bent elbows act as shock absorbers relieving the pressure on the shoulder joint.

  Bad technique is illustrated in the above photo. The shoulder joint is already at the extreme end of its range and the elbow is already fully extended. Should there be a sudden increase on the force applied to the paddle there is no way to safely absorb the energy. The only way of relieving the pressure is for the shoulder to dislocate, or for the paddler to let go of the paddle. Unfortunately it often happens too quickly for the latter to be an option.

- **BOW RUDDER -** The bow rudder or 'Dufek stroke', is a very variable stroke. It has been suggested that a better name for it would be the Vertical Paddle Turn. The blade that is in the water may, depending on the situation, be held in a position that can range from almost touching the hull of your boat forward of your knee, to reaching out to the side level with your hip. In the latter case the placement should be achieved by rotating the trunk, rather than by just using your arms.

Figure 5-5 (left) unsafe example of a bow rudder.

Figure 5-6 (right) a good example of a bow rudder.

Try the following exercise

Sit upright on a bench or hard backed chair. Now hold one arm so that your elbow is touching your side and your forearm sticks horizontally out in front of you at 90° to your upper arm. Keeping your upper body still and your elbow at your side, rotate your forearm out to the side and see how far it will go. The position your arm is now in is the extreme range of movement permitted by your 'outer rotator cuff muscles'. In most male paddlers the range of movement will be about 80°. In female paddlers it may be over 100°. Memorise this position and then go back to the original position.

This time, by rotating your trunk, turn your shoulders through 90° and place your forearm in the same place it reached in the first movement. Now try to rotate your forearm even further. You should find that because you have rotated your trunk you can now rotate your forearm through another 20°+. This represents the safety margin that is introduced through good technique.

Fitness

A paddler inactive for months and then jumping straight onto a demanding white water run, may find their body unable to deliver the fitness component of the skill required.

The best way to get fit for paddling is to paddle regularly. Even if paddlers live a long way from white water they can still paddle on flat water to build up stamina and strength, and maintain flexibility. If you have had a long break from paddling, build up slowly.

Geographical location and work patterns may make it impossible to paddle as regularly as is necessary to maintain the required standard of fitness. A carefully thought out fitness training regime, designed to build up strength and stamina in the right proportions, and at the same time maintain flexibility, can pay dividends.

Stretching should be used to promote the normal range of movement required for paddling.

Seek expert advice. Poorly thought out training can do more harm than good. If the right muscle groups are not built up in a bal–anced way it can set up an instability in the muscles that affect the shoulder joint. This can make paddlers more prone to dislocations. Strength training must be complemented by stretching in order to maintain flexibility. Research shows that over–flexibility in the shoulder joint can make paddlers more prone to dislocations. The shoulder is a very poorly designed joint and it is only the tension of the various muscle groups that hold it in place.

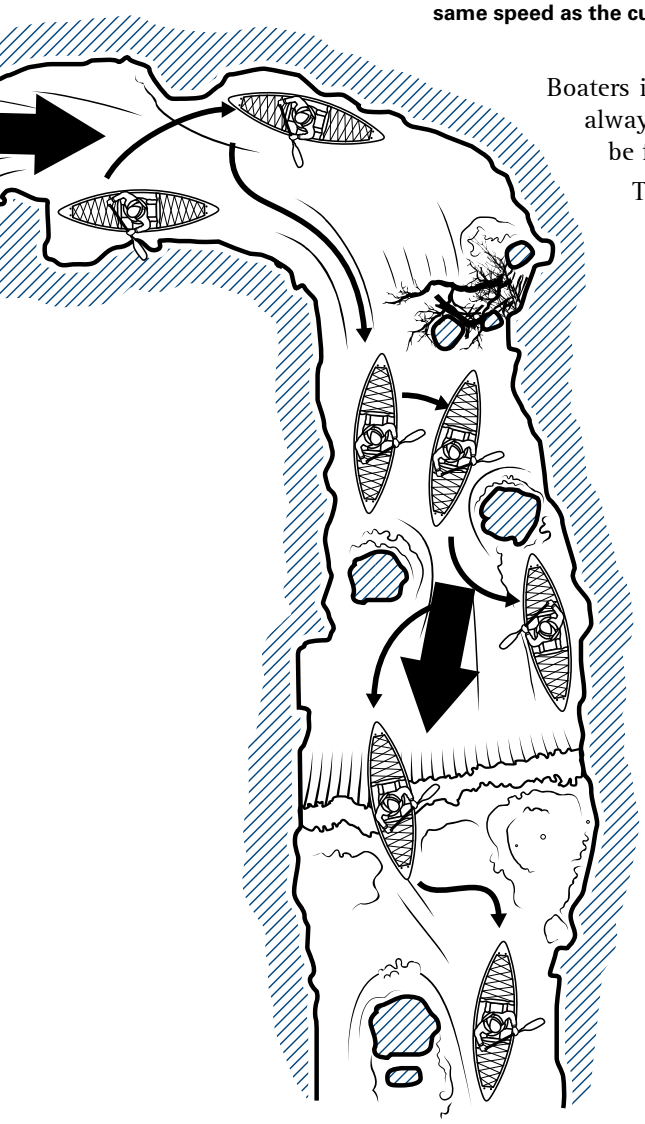
Figure 5-7 playboating - improving skills and fitness by having fun.

Boat Positioning

There are four ways paddlers can go about hitting their chosen line:

- **By moving faster than the current**
- **By choosing to drift at the same speed as the current**
- **By moving slower than the current**
- **By using water features**

Figure 5-8



Boaters involved in competition such as slalom try to always move faster than the current. They need to be fast and accurate.

Traditional open boaters and rafters generally try to go slower than, or at the same speed as, the current. They need to use their buoyancy to ride over the waves, because if they go fast and plough through them, they will get swamped.

Kayakers, closed deck C1 paddlers and specialist white water open boats, (with asymmetrical hulls, saddles and buoyancy bags), will benefit from using a mixture of all three approaches.

▶ **FASTER -** The times you need to be moving forwards are to accelerate into or out of an eddy, to 'punch through' a stopper, or when paddling across a fast–flowing current to avoid an obstacle or hazard. In each of these cases there needs to be a distinct change of pace. If you are only paddling forward because you have chosen to in preference to other methods then you can afford a more leisurely pace. In both cases good forward paddling technique will pay dividends, either gaining more speed or saving energy.

▶ **SAME SPEED -** If the flow of water is taking you where you want to go, then you can afford to drift. Your paddles should still be in the water, either moving the boat sideways using draw strokes to make small corrections to keep you on line, or in the low brace position to keep you stable.

WHEN DELIBERATELY ALLOWING YOURSELF TO DRIFT YOU SHOULD BE VERY AWARE OF WHERE THE WATER IS TAKING YOU

When deliberately allowing yourself to drift you should be very aware of where the water is taking you and ready to change mode when the flow is no longer going your way.

Apart from not swamping open boats, the main advantage of slowing your boat down is that you get more time to see what is coming and plan your moves.

SLOWER - By reverse paddling with your stern pointing directly upstream, you slow your boat down, or even hold your position in relation to the bank. By reverse paddling and angling your boat to the current (reverse ferry glide) you slow down and move across the current. This allows you to adjust your position and stay on line whilst moving slower than the current.

In modern white water playboats that have very low and flat back decks it is necessary to lean right forward when reverse ferry gliding. Failure to do this may result in an involuntary tail stand.

Changing Gear

When paddling on white water you need to be either idling, paddling at a steady rate or, if only briefly, going flat out. It is important to:

1. **Know when to paddle in which mode.**
2. **Be able to change gear instantly.**

A good exercise is to set up a circuit on a section of easy rapid. Plan your line, decide how you are going to stay on your line, where you can afford to idle, where to paddle at a steady rate and where you need to accelerate. Then paddle the circuit, consciously and deliberately changing speed at the points you identified earlier. At the points where acceleration is called for, shout 'NOW', and paddle flat out. The shout will let your companions know at which point you intended to speed up, allowing them to feed back to you how effective your acceleration was.

Figure 5-9 surfing a wave to cross the river. Photo: Dino Heald

Using Water Features

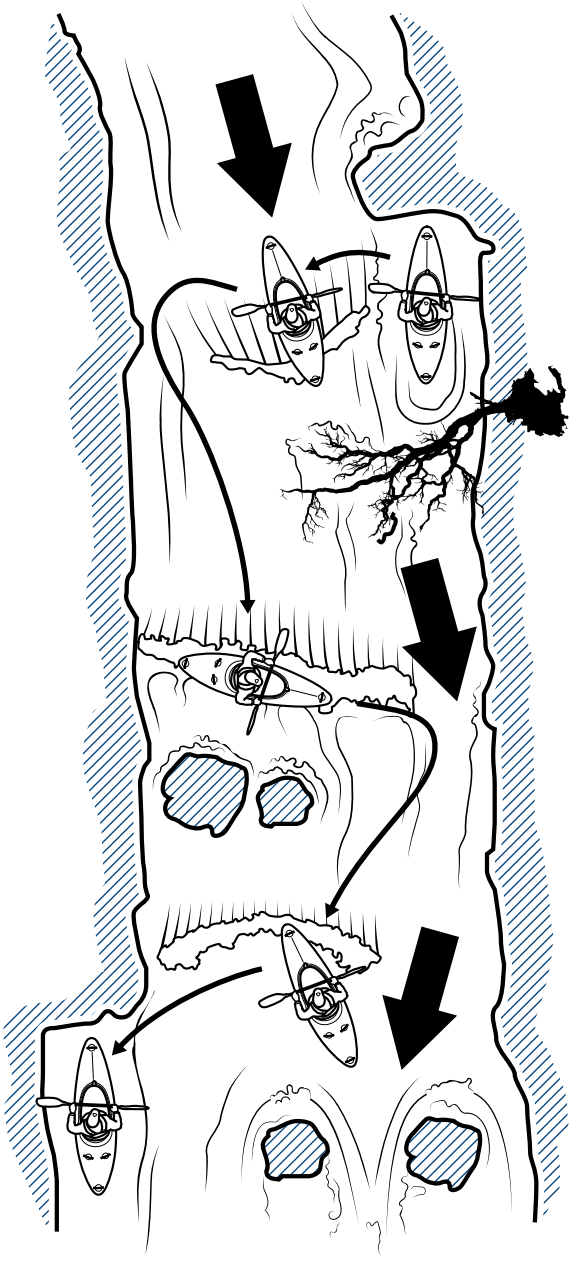


Figure 5-10

Every paddler must be able to read white water well enough to choose a line down a rapid. The sign of an advanced paddler is the ability to read the water well enough to make use of water features, large and small, to accurately work his way down a rapid with the least effort. A tired paddler makes mistakes, so whenever possible use the water rather than fight it. With modern short length/flat hulled boats that lack forward speed but can surf the merest hint of a wave, this is more important than ever. The most commonly used ways of doing this are:

- **Surfing standing waves**
- **Side-surfing stoppers**
- **Using the edge of a stopper to turn**

These skills are best practised by getting involved in playboating, or freestyle as the competitive version is known. All that is needed is a standing wave, a 'friendly' stopper and a group of friends.

TRAIN HARD, PADDLE EASY

It is quite possible to have a grade 3 and a grade 5 rapid that require the same level of technical skill to follow the chosen line. If the paddlers end up off line on the grade 3, they will probably be able to fight their way down anyway. If they lose the line on the grade 5 they are in serious, possibly life threatening, danger.

I believe that grade 2 is where we should learn our basic white water skills. Beginners shouldn't move on to harder rivers until they are in control at this level. That is to say that they can follow a predetermined line down a rapid and make a number of predetermined eddies on the way, rather than simply get to the bottom of the rapid still upright.

Grade 3 is where we hone our skills and ensure that we are sufficiently skilled to cope

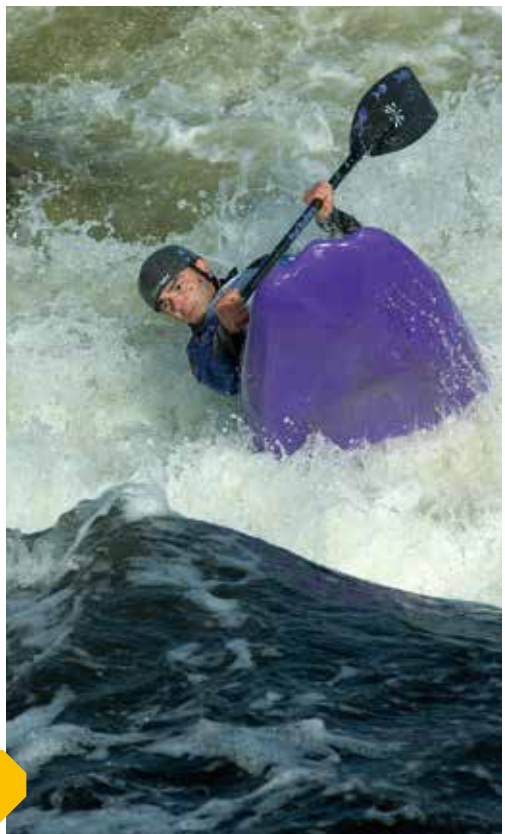
with the demands of hard white water paddling before we move up the grades. Before considering themselves ready to move on to harder things, paddlers should practise until they are competent, confident and fluent on grade 3. They should also make the relatively safe grade 3 that they are paddling as technically difficult as grade 4 and 5, by deliberately choosing the most difficult line down the rapid, and making as many eddies as they can. In this way it is possible to simulate the difficulty of grade 4 and 5 paddling without paying such a high price if mistakes are made.

Coaching

GOOD COACHING IS A VALUABLE INVESTMENT

Good coaching is a valuable investment. It can lay firm foundations for future skill by ensuring that the basics are learnt well and that bad habits are not 'grooved in'. Experienced paddlers can benefit from it to help them get over a 'learning plateau' or iron out bad habits.

Practice



Practice, and lots of it, is what is needed but beware, practice doesn't make perfect. Practice makes permanent. So, when training, someone else needs to observe the paddler, and give constructive feedback that will help him improve.

The other important thing about practice is that it should be as varied as possible. Use different locations, practise on the left and right, vary the angles, speeds, stroke work and approach.

Figure 5-11 Stu Morris at the UK Freestyle Championships, Holme Pierrepont, Nottingham.

CHAPTER 18
Incident Management

When a mishap first occurs in a white water situation, either the victim or a nearby person will have to do something to retrieve or at least stabilise the situation. The situation is often retrieved so quickly that the only team organisation needed is to recover the equipment. However, if the initial action is only able to stabilise the situation and buy time, the team will be faced with a rescue that will require effective management.

Figure 18-1 a dislocated shoulder and a bad swim (inset) - now to manage the evacuation. River Drac Noir, French Alps. Photos: Pete Knowles

Roles

It is essential that team members are clear as to what their roles are in the event of a rescue. Whether in a formally structured rescue team or an informal group of friends we can identify the following roles:

- **Leader**
- **Specialist**
- **Gofer**
- **Rescuers**

LEADER - If at all possible leaders should take a 'hands off' approach. They should literally take a step back, tuck their hands in their buoyancy aid, and see the whole picture. As soon as rescuers become physically involved in a rescue they, quite rightly, become 'focused' on the task, or the individual they are helping. This means that they will probably not realise that there is no back-up downstream, or that no one has been sent to call an ambulance.

With small teams of boaters, the lack of numbers means that the leader has to be in on the action. In this case the leader should take on the task that requires the least involvement.

- **SPECIALIST -** Different people in the team will have different skills that may need to be identified. They may be trained first–aiders, have climbing and rope skills, or be particularly strong and confi–dent swimmers, willing to be involved in 'wet' rescues.
- **GOFER -** It is a good idea to appoint someone whose role is to try and make sure that the rescuers have all the equipment or people they need. If this person has no other specific task, he also has an overview, which enables him to anticipate rescuers' needs and make up the shortfall before it occurs. With complex rescues or recoveries, it makes sense to establish an equipment dump. All the spare equip–ment that rescuers have but don't anticipate using to complete their allotted task is left here for the gofer.
- **RESCUERS -** This should be everyone else in the team. Some will be less experienced, skilled or confident than others but anyone can help out by pulling a rope or keeping an eye out upstream for floating hazards or other paddlers.

Sequence of Events

Most rescues will involve a sequence of events that will be some–thing like the one outlined below:

1 **Assess the situation.**
2 **Stabilise the situation.**
3 **Reassess the situation.**
4 **Decide on a plan of action.**
5 **Communicate plan to team.**
6 **Allocate tasks and ensure everyone is clear what their task involves.**
7 **Execute the plan.**
8 **Review incident to learn lessons and improve future performance.**

- **THE PLAN OF ACTION -** Typically broken into a number of phases. These are:

1 **Get victim safely to shore. If victim OK, carry on with trip.**

If not:

2 **If injured, administer first aid**
3 **Evacuate injured**
4 **Recover equipment**
5 **Evacuate team members and equipment**

If there are plenty of rescuers available, a team leader who is able to keep the whole picture in view will try and have more than one of these events happening at the same time.

A Scenario

Imagine the following scene:
A member of a two raft team was catapulted out of a raft, took a bad swim and finally ends up stranded on a rock in midstream. It is obvious, even from a distance that the victim is in pain and has badly hurt his lower leg.

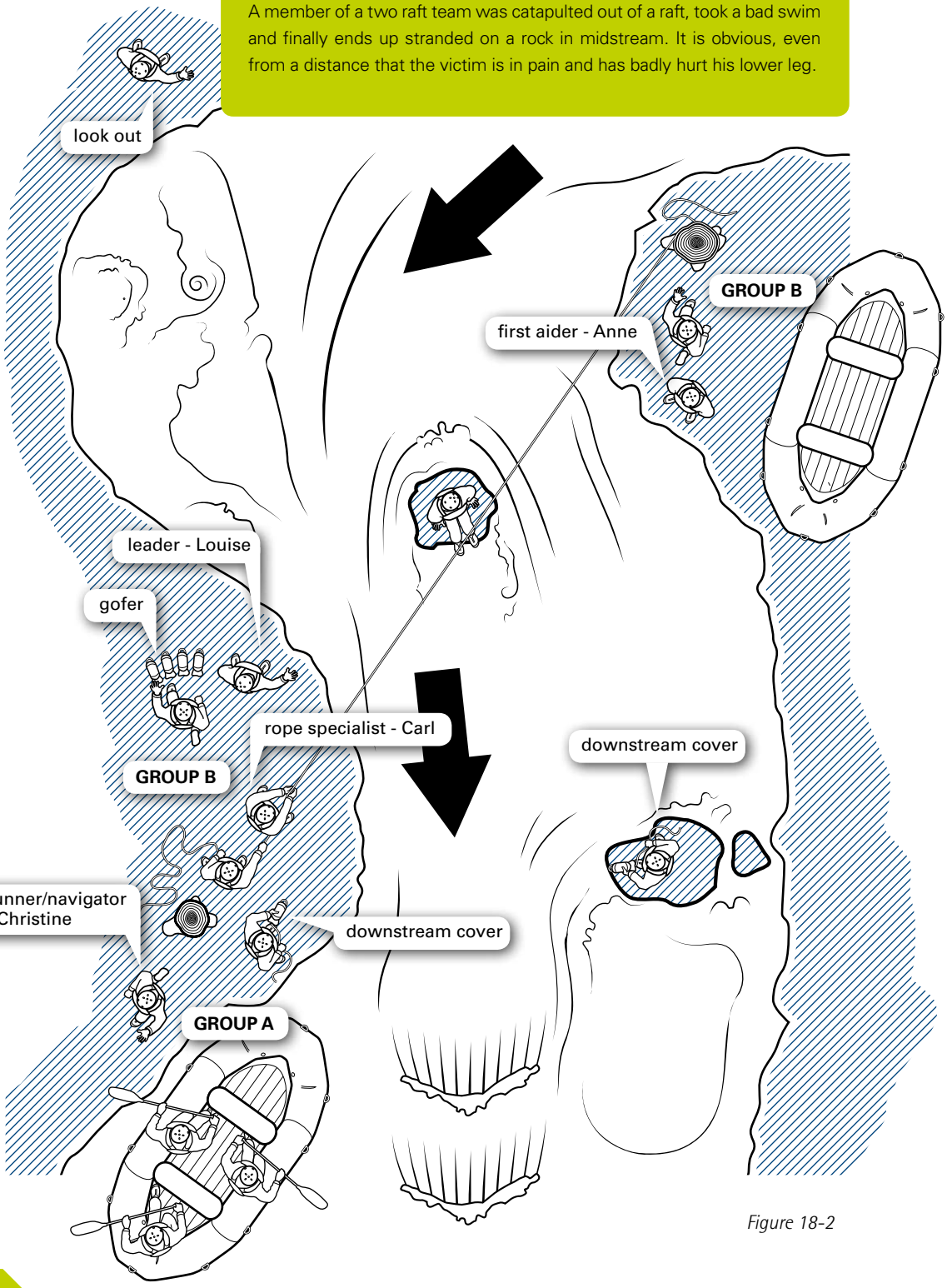


Figure 18-2

- **PHASE ONE -** The leader, **Louise**, quickly assesses the situation, formulates a plan of action and delegates the following tasks to the fourteen people she has available.

  Carl, (specialist), the other raft guide, is tasked to set up a tensioned diagonal to access the boulder. Three rescuers are tasked to work under his direction.

  Jane, who has quite a lot of rafting experience, is promoted to raft guide and is tasked to ferry rescuers back and forth across the quiet stretch of river below the rapid as required. She is allocated three other rescuers to crew the raft and is also charged with using the raft as a chase boat should anyone fall in during the rescue.

  Pete is appointed gofer and establishes a central equipment dump.

  Christine, who is a ranking orienteer, (specialist), is sent to the nearest road to await the ambulance that she has already summoned by mobile phone.

  Eric is posted as upstream lookout. His task is to warn any other paddlers that the rapid is obstructed with lines and that they should not run it till the rescue is complete.

  The two remaining rescuers are positioned, one on each bank, below the scene of the rescue, ready to throw a line to anyone who might accidentally end up in the water.

  Once everyone is briefed they get on with the first phase of the rescue plan.

- **PHASE TWO -** As soon as the tensioned diagonal is set up, Louise splits Carl's team in two.

  Anne, who is a trained first–aider, (specialist), is sent down the tensioned diagonal accompanied by one of the other rescuers. Her task is to treat the victim's injuries and evacuate him from the rock.

  Eric and the other rescuer are now tasked with building a stretcher with which to carry the injured victim to the road.

- **PHASE THREE -** As soon as the victim is safely on the bank, Louise sends the two rescuers who were standing by with throw lines to dismantle the tensioned diagonal. This done, everyone is ferried to the same side of the river. The whole group help in the evacuation to the road. They take it in turns to carry the stretcher and change places frequently as it is a tiring job. Anne, the first aider stays at the head of the stretcher and monitors the victim the whole time.

- **PHASE FOUR -** Once the casualty is handed over to the ambulance crew, Louise has to think about whether to evacuate the whole team by road or carry on with the trip.

  If she had allowed herself to become an actively involved rescuer with a specific task, Louise would not have been able to be forward planning. There would probably have been oversights and mistakes.

There would certainly have been a great deal of time wasted when one step was completed before anyone thought about the next step.

With smaller teams the approach is still valid. However, there will obviously have to be compromises due to the lack of numbers.

Signals

Dealing with a rescue and coordinating rescuers requires different signals from those used when running a river. In addition, we may receive help from, or offer help to, other paddlers or even professional rescue teams. I therefore propose to introduce the standard signals that are taught on *Rescue Three International* Swift Water Technician courses. This is because these courses have become the de facto internationally recognised standard for rescue teams and raft guides.

▶ **HAND SIGNALS -** Signal with clear deliberate movements:

▶ NEED MEDIC KIT & HELP

both arms crossed in front of chest

Meaning: I need a first aider and/or a first aid kit.

▶ OKAY

two hands forming an 'O' above head

Meaning: Affirmative, expression of agreement, or 'I am OK'.

▶ DISTRESS / NEED ASSISTANCE

one hand extended above head

Meaning: 'I am in distress and require rescue and/or need first aid attention'.

MOVE, SWIM OR MOVE BOAT

two hands extending above head then pointing left/right.

Meaning: Directed at a person, 'move yourself to the left/right' either in the general direction or to the location indicated.

MAKE THAT EDDY

two hands extending above head, wave arms in a circular motion, then point left/right.

Meaning: Directed at a person, 'move yourself to that eddy', pointing both arms at the indicated eddy.

▶ **WHISTLE SIGNALS** - Short, sharp blasts on the whistle.

- **STOP / ATTENTION** ✸ ..... *one blast*
- **UPSTREAM** ✸✸ ..... *two blasts*
- **DOWNSTREAM** ✸✸✸ ..... *three blasts*
- **EMERGENCY** ✸✸✸ – ✸✸✸ ... *three blasts repeated*

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Covering topics from strategies for safely descending a rapid, to making safe and recovering an injured person. Essential knowledge for every recreational paddler and professional river guide.

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