

# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

### The Concept

Ideally all Rescue personnel should have appropriate training in Swiftwater Rescue, First Aid and Patient handling and packaging relative to their involvement. Ultimately they should not be allocated to any task unless they are appropriately trained in that discipline. In due course it should be an aim to be able to say, you can not participate at certain levels until you have undertaken our training or an acceptable level of external training.

It is necessary for all personnel to have a basic understanding of all aspects of the rescue and recovery activities. Not only to make them more versatile but also so that they can ensure that the integration of various functions occur without confusion or conflict.

Swiftwater Rescue training for most will not mean Rescue Swimming but shore based support for the Rescue Swimmers. Shore based rescue personnel must be aware of the capabilities of the rescue swimmers, the strategies they can and will employ and what support they will need or expect from the shore based personnel.

Team Leaders are expected to maintain a minimum level of both their knowledge and skills in all the disciplines that swiftwater rescue encompasses. They are also expected to contribute to and participate in the passing on of that knowledge and skill through participation in the training programs as instructors.

### **Team structures:**

Each team will comprise a minimum ten personnel as follows:

Team leader, Deputy Team leader, welfare officer, two swiftwater rescue swimmers and five shore based swiftwater rescue technicians.

At least two shore based members, and ultimately all personnel should be qualified in both First Aid and to Swiftwater rescue technician standards for shore based rescue.

# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

Rescue swimmers will include the boat operators and are intended to be able to be rotated and rested in rotation. Swimmers, when not required in the water or boats will supplement the shore based personnel.

Shore rescue personnel will, in conjunction with Team leader and Deputy, perform, upstream safety marshal, shore based rescue and downstream backup shore based personnel. Sweep boat crews require the same training and qualifications as the rescue swimmers.

Two inflatable rescue boats will be deployed at selected locations on both day one and day two. Each boat will be manned in rotation by two teams of two rescue swimmers (4 at each location)

To man all currently identified rescue locations requires seven teams (a minimum of 78 personnel including boat crews).

To provide for last minute inability or failure to attend a pool of 90 rescue personnel is recommended.

Two teams of sweep boats, in rotation, will follow the paddle and power competitors down river and ensure no competitors remain on the river. Personnel are not to leave their rescue locations until such time as the sweep boat coordinator has confirmed that the river to their location has been cleared and closed their location.

A minimum of ten Recovery Teams of, two personnel each, will patrol the left bank of the river to assist any competitors who withdraw from the race for any reason.

# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

### Equipment

**PFD:** Personal Flootation Device also referred to as a Life jacket or buoyancy vest. PFD's come in a variety of shapes, styles, colours and sizes. In Australia Type 2 PFD's are suitable for water sports. Type 2 / 4 are special purpose PFD's and this includes the Rescue PFD'S used by the Avon Support Unit. Generally PFD's are required to be buoyant enough to support the weight of an average adult in the water (6.125kg). The Australian Standard therefore requires that they have 6.25 kg uplift. Our rescuer PFD's have an uplift of 12.25kg, enough buoyancy to support two adults in the water if necessary.

PFD's also provide significant protection against impact injuries whether when swept against objects in the water or in the event of slips, trips or falls whilst working on the bank.

PFD's provide additional protection against the weather and environment, whether in or out of the water, and help retain body heat, especially when worn over a wet suit or warm clothing.



**Helmets:** provide obvious protection against impact injuries in the event of being swept away or a fall on land. They also help retain body heat as approximately. 80% of body heat is lost through the head, face and hands. Thermal hoods can be worn under helmets to provide greater heat retention.



# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

**Throw Bags:** Throw bags are our main rescue tool. The bags contain 15 – 18 m of floating water rescue rope with a strength rating of 850kg. A well thrown throw bag can provide assistance to a victim probably quicker than any other strategy and has the added advantage of not requiring the rescuer to put them self at risk by entering the water. They can be carried around the waist until required leaving the hands free. They are small and light and can be used by almost anyone.



**Wet Suit:** Wet suits provide thermal insulation, buoyancy and some impact protection for swimmers in the water. They come in a range of sizes, shapes and thicknesses. Generally, the thicker the material, the greater thermal protection and buoyancy but may restrict physical movement.



# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

**Spray Jacket:** A wind proof and rain proof jacket to protect from the worst of the weather. Often used by paddlers and referred to as CAG's. An added layer for thermal protection.



**Karabiner:** A Karabiner is a simple mechanical device which is used to join, or form, a connection between pieces of equipment, cords, ropes or slings. Karabiners are a self closing device using a spring loaded gate, which forms a loop of some description. Construction of the karabiner is made in such a way as the main stress is born along the long axis. Karabiners come in a range of locking mechanisms. Quick twist lock, screw gate (ASU issue) and non-locking. Non-locking karabiners are NOT to be used in any lifeline or safety system. Karabiners may be used as a safety belay device in conjunction with a munter hitch, when attached to a secure anchor.



# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

**Pulleys:** Pulleys are a low friction device designed to provide a mechanical advantage. The more pulley loops the greater the mechanical advantage. Prusik minding pulleys are designed with a squared off end to push a prusik loop and prevent it from jamming in the mechanism.



**Prusik Loop:** A prusik loop is a specially tied loop of high strength lifeline rope, usually 7 – 8 mm, that when wrapped around an 11 mm lifeline and attached to a secure anchor creates a friction grip break on the lifeline when placed under tension. A three wrap prusik will start to slip when the load reaches 700 – 800 kg well within the strength of both the prusik rope and the lifeline providing a warning well before the stress threatens an overload on the lines.

# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

### Rescue Priorities

As with other emergency situations the safety and welfare of various participants must be prioritized. As you would have learned DRABCDB when undertaking any first aid course the same principles apply in a swiftwater rescue situation as they would in any other emergency or rescue situation.

1. Self preservation is the first priority. You are no use to anyone if you are injured or become a victim yourself. Your safety is the number one first priority. World wide swiftwater rescue statistics reveal that one third of all fatalities during a swiftwater rescue are the rescuers themselves. Often the rescuer tried to implement rescue methods that training would have shown to be inherently dangerous. Our training provides you with the tools that work and the judgment to know when you have done all you safely can.
2. Team members are your second priority. You can not do it all alone and they are as important to the rescue effort as you are.
3. Bystanders and spectators are priority number three. They may need to be guided away from the rescue scene for their own protection or to prevented them from attempting a rescue themselves or from interfering in your rescue efforts. Nevertheless bystanders may be a useful resource and will usually contribute willingly to a rescue effort when appropriately directed. They would not usually be used in the front line but may provide extra muscle, fetch and carry, crowd control or other logistic support. Firm leadership will reassure them that all that can be done is being done.
4. The victim is your fourth and last priority. Only when you can guarantee the safety and welfare of all other participants do you attend to the victim. The victim is responsible for his or her own predicament. In the case of competitors in the Avon Descent they were aware of and assessed the risks and voluntarily placed themselves in danger. They should also have undertaken training in self rescue techniques as part of their training and preparation for the event.

# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

### Absolutes of Swiftwater Rescue

1. **Always wear your personal protective equipment** when working within three meters of the water. Your personal floatation device (PFD) and helmet are an important part of your overall safety. A properly fitted and secured PFD should be worn at all times when near the water. To be effective it must be worn and secured properly, an unsecured PFD may put your life in danger instead of protect you. PFD's serve many purposes other than providing buoyancy should you find yourself in the water. They provide significant impact protection should you fall on land or be swept into a solid object in the water. They also have significant heat retention and wind chill protection properties. Helmets are also an essential part of your personal protection. When working near the water, or where the footing is rough, unstable or there is any risk of a fall. Heads are hard to fix. If you are a rescue swimmer ensure that you have adequate thermal protection. What is adequate will vary with the weather, location and season but more is better than less.
2. **Never put your feet down** if swept away in fast water. Leg entrapment, and subsequent drowning is the principal cause of death of both victims and rescuers in swiftwater emergencies in the USA.
3. **Once the victim is contacted never lose them.** Even if you are unable to reach the victim you may be able to give them information, guidance or instruction that will enable them to self rescue. Your mere presence will give them confidence that assistance is available and encourage them to help them selves or hang on until more help arrives. Above all keep communicating with them.
4. **Never count on the victim to help themselves.** Victims and bystanders at rescues undergo a distinct psychological process. While few victims exhibit true panic, they are often numbed by events, reacting sluggishly or non-purposefully if at all. During a crisis people are often unable to follow even simple instructions. If at all possible the rescuers should assist victims until they are safely on the bank.



# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

5. **Always keep the rescue simple.** Complex rescues require more time to put into action, resources of both equipment and manpower and create more opportunities for equipment failure or human error. In a water rescue situation **Time Is Critical**.
6. **Always have multiple downstream backups and an upstream spotter.** Water is always pushing down stream, if anything goes wrong in a rescue situation there must always be an emergency alternative ready to respond. Always deploy upstream spotters above the rescue location. When a rescue is in progress the rescuers must be made aware of any floating hazards, craft or competitors approaching the rescue scene. Our upstream safety marshals will stop any approaching craft and competitors from continuing to the rescue scene where necessary.
7. **Always use the right equipment.** Over recent years the Avon Descent Association has spent in excess of \$30,000.00 making sure we have the appropriate equipment available. Learn to use it properly, practice your skills so that when needed you are ready.
8. **Never tie a rope around a rescuer or stand inside the bight of a rope.** Rescuers have died tied to a rope and trapped underwater by the force of the river and unable to cut themselves free. Shore based rescuers have been pulled into the water by the force of the water. Always stand on the upstream side of a rope. Any load or tension from a rescue victim will swing the rope downstream, potentially wrapping the rope around you and taking you with it..
9. **Never tension the line at a right angle to the current** when tensioning a line across the river to be used for in-water safety or walking stream crossings.

# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

### Low to High Risk Rescue Options

#### **Yell**

The safest rescue is one where the rescuer does nothing that will put them at risk. It may be possible to talk a victim through a self rescue or guide them into safer water that may not be visible or apparent to them from water level. Your presence on the bank and calm demeanour will often give them confidence to accept your instructions and help themselves. When providing guidance or directions, always provide positive guidance and indicate safe areas. In a water environment a swimmer will, often, not clearly hear your instructions and will instead follow physical signals. If you point out the danger areas or where not to go they will follow your indications straight into the areas you are trying to warn them to avoid.

#### **Reach**

Reach is simply trying to reach the victim from the shore by extending a branch, article of clothing or anything close at hand. Since the rescuer does not intend to enter the water, the risk is obviously low.

#### **Throw**

Throw refers to throwing some floatation device to a swimming victim. In the river this usually refers to a throwbag but may refer to any handy item that will provide additional buoyancy to a swimmer. Throwbags are our main rescue tool, all personnel on or near the bank will be equipped with a throwbag and must ensure that they are competent in its use. As you will discover further into our training, throwbags have multiple uses and can be utilized in a variety of rescue strategies.

#### **Row**

Row refers to boats of any kind that might be appropriate to the rescue situation. During the Avon Descent it will usually refer to our inflatable rescue or sweep boats but may also include another competitor's craft if they are recruited to assist with a rescue or affect a rescue of a fellow competitor on their own initiative. The Race Rules require all competitors to give assistance to other competitors if they are in difficulty.

# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

### **Go and Tow**

Go and tow cover in-water contact rescues. Since a significant number of people drown each year trying to rescue others it follows that making such rescues in current has even higher risks and should only be attempted after all other lower risk options have been exhausted. **Only our trained rescue swimmers will enter the water to affect an in-water contact rescue.**

### **Hello**

Hello stands for helicopter rescue. During the Avon Descent either or both of the Police Rescue Helicopter or the RAC Rescue Helicopter will be in attendance. The timeliness of the rescue effort means that they will seldom be on the scene in time to affect a rescue and are more likely to be utilized for an emergency medical evacuation. Any rescue or situation in hilly country involving helicopters is inherently very dangerous and the assistance of helicopters in a rescue will only be used as a last resort.

### **NO**

The final decision whether a rescue is even attempted or is called off rests with your team leader or other senior authority. It may be considered that attempting a rescue is too dangerous or that the recovery of a body does not justify putting further lives at risk. “It is always better to be judged by 12 than be carried by 6.” This does not mean we give up. It merely means we don’t, currently, have the necessary manpower, equipment, knowledge or expertise to undertake a safe rescue. It may mean a delay in executing an appropriate rescue strategy until such time as the necessary resources are available. The **RESCUE PRIORITIES** discussed earlier should always be kept in mind.

# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

### Safety Marshalls

The Safety Marshall's are the team members responsible for the safe conduct of competitors and craft through the rescue location manned by their team. They perform two principal roles.

- a) Upstream lookout, and
- b) Flag Safety Marshall.

The role of the upstream lookout is to alert rescue team personnel and competitors downstream of the approach of other competitors and craft, especially where there is a possibility of conflict.

The role of the safety marshal mirrors that of the upstream lookout in that they alert approaching competitors of congestion downstream and provide guidance on whether it is safe for them to proceed.

In performing the role of Safety Marshall the appointed team member must consider the following issues:

- 1 Where possible they should position themselves on the bank approximately 50 meters upstream from their obstacle the rescue team is manning.
- 2 They should ensure that they have a clear view of at least 50 meters upstream from their location and that they are in a position to be visible to the competitors for that distance also.
- 3 At or near their location, upstream or down stream, there must be a "safe harbour" where competitors can hold position and wait for any obstruction to be cleared or rescue to be executed. It should also provide a beaching area should the competitors decide to portage around an obstacle rather than wait.
- 4 It should be close enough to their position to allow communication between them and the competitors so that they can keep the competitors updated on river conditions, the reason for any hold up and progress on clearing the river so that they can proceed.
- 5 If possible they should also have a view downstream to the obstacle. However, their view upstream as in note 2 holds priority.

#### Communication:

The Safety Marshal will be equipped with three forms of communications.

- 1 They will have a two way radio with which to communicate with their section leader. They can use radio communications to keep up to date on the reason for any hold-up and progress with clearing the hold-up and can then communicate this information to

# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

the waiting competitors. They will receive guidance and instructions from their Team Leader in relation to the application of the flags and will keep the Team Leader informed of any relevant information including approaching competitors.

- 2 They will have a whistle with which to attract the attention of competitors and warn their team members of approaching competitors and craft. One whistle blast is used to attract attention or indicate to a competitor to stop. Two whistle blasts indicate, to the rest of your, team that something is approaching from upstream. This may be a competitor who has been unable to stop, ignored or not seen or understood the safety Marshall's signal and instructions or some floating debris.
- 3 They will have two flags with which to warn competitors about river conditions. The orange flag with a diagonal white stripe is the warning flag. This flag indicates to the competitors that it is clear for them to proceed, but with caution. The caution flag should be used when there is congestion but no blockage, a rescue or assist is in progress but well away from the main channel or route for the competitors. It is not a warning of river conditions as that is something that the competitors must assess for themselves. The solid red flag is the STOP flag and no competitors must pass it or proceed beyond the red flag or indicated staging area until it is lowered. The red flag will be raised at any time a rescuer or competitor is in the river unless the Team Leader directs otherwise. It will also be used at any time that the river is so congested as to create a potential hazard with competitors piling up on each other or colliding and any other occasions as directed by the Team Leader.

When a rescue swimmer or competitor is out of their craft in the water the safety Marshall has a significant responsibility to ensure that their safety is not compromised by the approach of competitors of craft from upstream.

# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

### **Terminology:**

#### **Eddy:**

Horizontal reversal of water flow where the pressure of current along an obstacle (such as a rock) causes the water behind the obstacle to reverse flow upstream.

#### **Eddy fence:**

A line in a river, where the current moves in opposite directions on each side. This current differential between an eddy and downstream current ranges from a gentle surface line to a wall of water dropping around the obstacle and recirculating horizontally.

#### **Cushion, Pillow:**

Water pressure build up against any large solid object restricting the flow of the current.

#### **Hole, Stopper, Keeper, Hydraulic.**

Vertical reversal of water flow hydraulic effect in the form of a V pointing downstream where the pressure of the current falling over a gradient (such as a bench of rock) causes the channel water at the base of the gradient to be forced downward into a loop style reversal and back up to the surface where part of the water flow continues downstream and part reverses back upstream to the base of the gradient.

#### **Haystack, Standing wave:**

Rhythmic series of waves caused by the convergence of the main channel currents as a result of rising river water, underwater obstacles or ledges, or an increasing river speed / gradient which converts the hydraulic effect of holes to a wave or series of waves that form downstream from the gradient.

#### **Frowning Hole:**

A natural hole whose outer edges curve upstream. When viewed from upstream, it has the appearance of a frown. A frowning hole tends to be a keeper by recirculating on itself.

#### **Smiling Hole:**

A natural hydraulic whose outer edges curve downstream. When viewed from upstream, it has the appearance of a smile. A smiling hole tends to flush free a victim / craft due to the downstream current at its edges.

# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

### **Downstream V / tongue:**

Hydraulic effect in the form of a V pointing downstream caused by the convergence into downstream water flow into channels of least resistance.

### **Upstream V:**

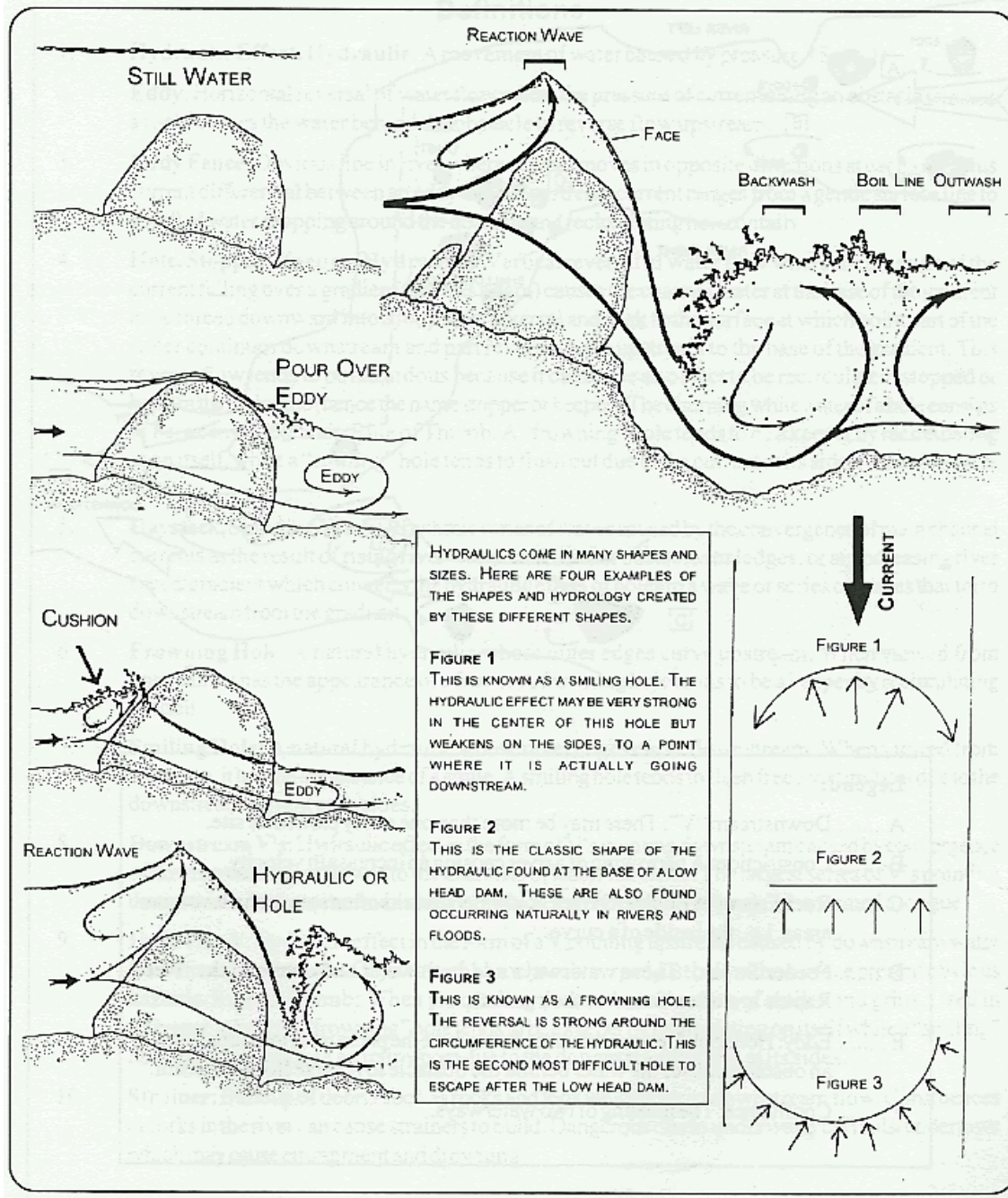
Hydraulic effect in the form of a V pointing upstream caused by downstream water flow around an obstacle. Objects such as rocks submerged just below the surface present obvious obstacles.

### **Strainer:**

Any obstruction through which the water can flow but which can hold or trap solid objects. Includes debris piles, rock jams and bushes and shrubs such as ti-trees.

# AVON SUPPORT UNIT

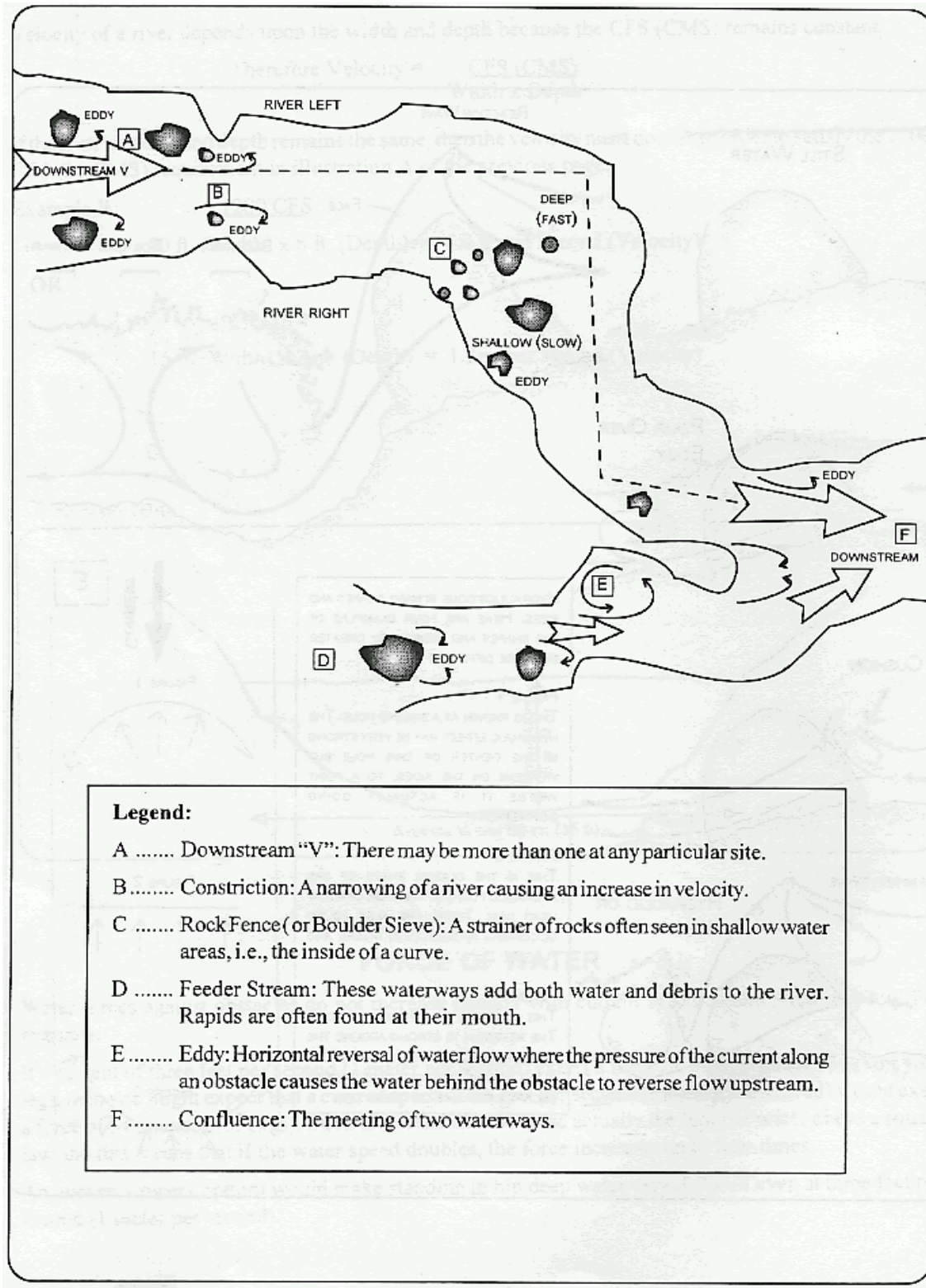
## SWIFTWATER RESCUE





# AVON SUPPORT UNIT

## SWIFTWATER RESCUE



# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

### Whitewater River Sense

People are not born with river sense. It is something developed over time with experience from observing the hydraulic forces of moving water.

#### Accident prevention = River Sense

- = appreciating the forces and hazards of whitewater
- = understanding equipment
- = clear evaluation of your and others ability.

#### Evaluating the forces and hazards of whitewater depends on:

1. Volume and speed of water flow. Double the speed and you quadruple the force of the water.
2. Vertical drop of the river. Danger increases dramatically the steeper and narrower the river and especially the larger the volume of water.
3. Identifying the parts of the rapid and understanding what is happening under the surface to cause these effects e.g. fallen trees and branches, rock slides or boulders, potholes, undercut ledges, etc.
4. Isolation from help (accessability) and the weather (hypothermia) must also be considered but do not strictly speaking define the difficulty of a river.

#### Identifying parts of the rapid.

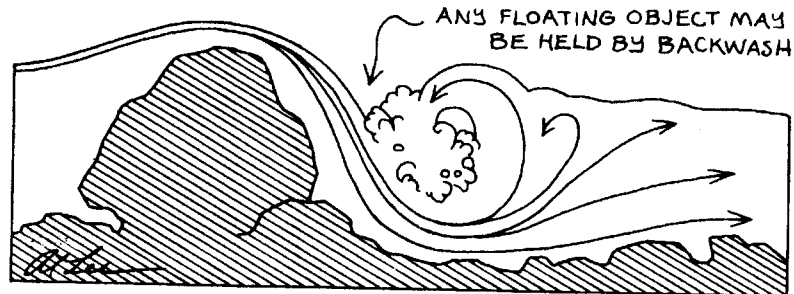
See diagram overleaf. Arriving at your rescue position identify:

1. Fast and slow water. All being equal the deeper water (in the middle?) will flow faster than the shallower water closer to shore. The outside bend (deeper water) of a river will flow more quickly than the shallower inside bend. The faster water at the top of a rapid will form a smooth 'v' shaped tongue or chute before the turbulent water below.
2. Visible or submerged hazards such as rocks or trees. Are the obstacles solid which are creating a rebounding pillow of water on the upstream side or does the water sieve through or under them leaving no pillow. Tree branches are particularly dangerous if the water sieves through them as there is no upstream pillow of water to help bounce a paddler away from them.
3. Where are the eddies? Look below the larger rocks (whether visible or submerged) for the eddy line between the fast downstream current and the recirculating upstream eddy. Can the eddy be used as a safe haven to pull a rescued paddler into?
4. Haystacks and standing waves indicate the faster water below the chute or tongue.

# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

5. Stoppers or holes where the water flowing over a rock recirculates on itself trapping anything within it. See diagram below. A kayak or person floating on the surface

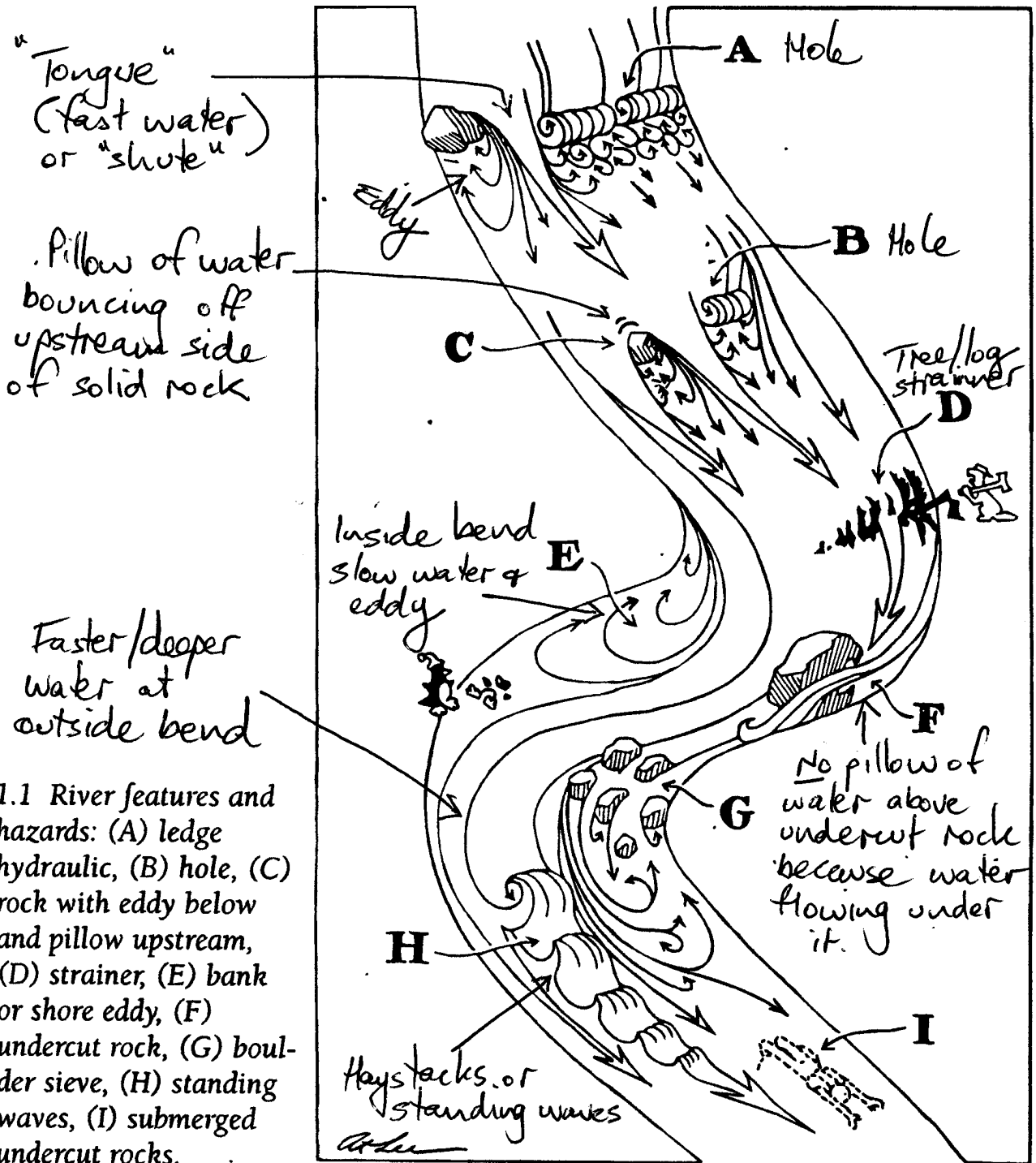


1.3 A typical hole caused by water flowing over a rock.

may be trapped in the stopper unable to get over the backwash of recirculating water below them. If trapped is it possible for them to work to one end of the stopper and exit out the side? If throwing them a rope which end is best to pull them out? Look for safe anchor points for the rescuer throwing the rope so that they are not pulled into danger. In smaller stoppers it is sometimes possible for them to dive down and catch the deeper through flowing current underneath. A kayak filled with water will often help catch this undercurrent and help pull them through.

# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

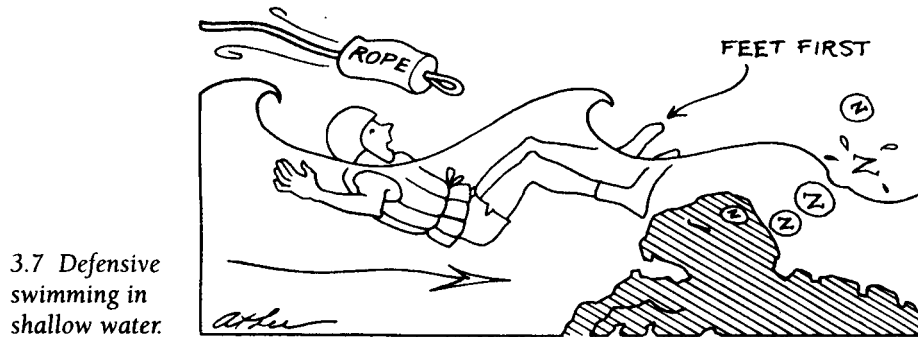


# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

### Swimming techniques in whitewater ( see diagrams):

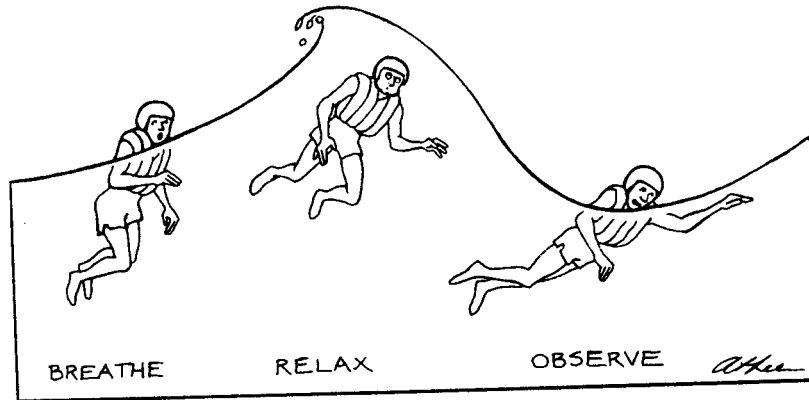
1. In shallow rocky rivers assume a defensive position lying on your back using your feet to fend off any obstacles downstream. Keep your bum up to avoid painful bruising on submerged rocks! Arms can be used to back paddle across a current or into an eddy. Never dive head first into unknown water especially shallow water due to risk of spinal injury.



2. In deeper water where there is less danger of foot entrapment a more aggressive freestyle stroke or sidestroke will help get across a strong current. Keep your head above water wherever possible to keep bearings. In large standing waves synchronize your breathing to the troughs of the waves.

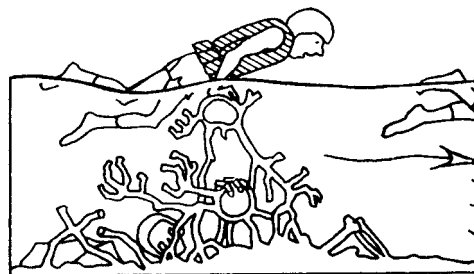
# AVON SUPPORT UNIT

## SWIFTWATER RESCUE



3.8 Swimming in big, deep, water requires timing your breathing for the troughs of the waves. Since the danger of foot entrapment is minimal, a crawl stroke may be the best option for getting ashore quickly.

3. If you see a log or a tree strainer hazard approaching as you float downstream try to avoid it as they are extremely dangerous. If unavoidable switch to a freestyle head downstream position and use your arms, the momentum of the current and any handholds available to pull yourself up and over the strainer. Avoid a feet first approach which could result in trapping your feet or sucking your less buoyant legs under or through the strainer pinning you underwater.



3.9 Strainers. If a strainer is unavoidable, pull yourself up and over it.

### References and recommended reading:

1. This Is Canoeing  
by Jane and Roy Farrance
2. River Rescue A manual for whitewater safety  
By Les Bechdel and Slim Ray

# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

### Victim Behaviour Statistics

There are four stages of victim behaviour. A victim's behaviour may vary between the various stages either improving or deteriorating as conditions change. Factors that may influence the behaviour of a victim in a swiftwater environment can include:

- swimming ability,
- whether or not they are wearing a PFD and helmet,
- the water temperature,
- the air temperature and wind chill factor,
- whether or not they are wearing thermal protection,
- how long they have been in the water,
- hypothermia,
- medical conditions,
- injuries,
- shock

### **Survival behaviour**

A responsive victim is one who is receptive to instructions, can communicate their condition and respond to questions and will attempt self rescue or actively assist in their rescue. Approximately 90% of casualties will display these behavioural characteristics.

### **Panic**

A panicked victim will display random, non-purposeful movement. A panicked victim can not be relied upon to cooperate, but can sometimes be brought back to survival behaviour by the presence of a rescuer. Panicked victims can be extremely dangerous and must be approached with extreme caution. Approximately 9% of casualties will display these behavioural characteristics.

# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

### **Counter panic**

A victim displaying counter panic behaviour appears totally unresponsive, and may ignore all attempts to assist them. These victims generally present a low level of threat to the rescuer but cannot be relied upon to assist in their own rescue either. Approximately 0.99% of casualties will display these behavioural characteristics.

### **Instinctive Drowning Response (IDR)**

A victim in imminent danger of drowning will appear to be attempting to push themselves up out of the water or to climb out of the water. A victim displaying IDR is likely to drown if not rescued immediately. You may only have seconds to respond. Approximately 0.01% of casualties will display these behavioural characteristics.



# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

### Wind Down Syndrome

Wind down syndrome is a phenomenon which can occur towards the end of any strenuous, stressful or extended period of physical or emotional activity. It usually manifests itself in a temporary lapse in care and attention when the end is in sight. It may occur at the end of an individual rescue or towards the end of a long day on duty, especially the end of the second day. Many rescuers have injured themselves through inattention when a rescue is almost over and they are sure the victim is safe. In a swiftwater rescue setting it may be that the victim has reached the bank and merely needs assistance to shore. A momentary inattention may result in them being swept back into the current, or the rescuer not paying attention to their footing and taking a fall. In either event the result can range from a minor inconvenience to a further rescue of the victim or the rescuer in life threatening conditions.

After two days of intense activity and concentrated attention to the task at hand all ASU personnel must be aware of the possibility of wind down syndrome in themselves, their fellow team members and the competitors. Extra attention must be paid to detail at this time. All equipment in use must be critically examined, all knots doubly inspected to ensure that they are properly tied and secured especially where people are or may depend on them for their security. It is important at this time to rigidly apply the buddy system where anyone actively participating in a rescue or hazardous activity is working in company with another team mate.

It is a statistical fact that the majority of motor vehicle accidents occur within 5 km of the drivers home. This is an example of wind down syndrome. After the event you will be tired. Be aware and drive with extra care to ensure you get home safely. If possible travel in convoy with other volunteer personnel and maintain radio contact for as long as possible.

# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

### Throw Bag Skills

#### **ABSOLUTES THAT APPLY TO THROW BAGS & ROPES**

1. Always wear a personal floatation device and helmet when working within 3 meters of the water.
2. Never tie a rope around a rescuer.
3. Once the victim is contacted, never lose them.
4. Never count on the victim to help in their own rescue.
5. Always use the right equipment.
6. Never stand inside the bight of a rope under tension, always stand on the upstream side.

#### **SKILLS ASSESSMENT**

##### Pack Throw Bag

Assess rescue location for personal safety:

Secure footing

Room to move

Minimum obstructions to visibility

Minimum obstructions to use of throw bag

Achievable safe haven for victim within range

Static Belay:

Rope around body from downstream side,

Rope NOT tied off

Dynamic belay:

Release rope to guide victim into safer water location

Travel with rope, guide the victim into a safer water location

Throw:

Attract attention of victim before throwing bag

Secure rope in non throwing hand

Retain workable length of rope

Throw rope bag, with accuracy 10 m on 2 of 3 attempts

# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

Achieve second throw within 20 seconds on 2 of 3 attempts

# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

### Ropes and Knots

#### **ABSOLUTES THAT APPLY TO ROPES AND KNOTS:**

1. Never tie a rope around a rescuer.
2. Always use the right equipment.
3. Never stand inside the bight of a rope under tension, always stand on the upstream side.
4. When tensioning a line across the river to be used for in-water safety or walking stream crossings, never tension the line at a right angle to the current.

#### **KNOWLEDGE AND SKILLS ASSESSMENT**

Parts of the rope:

Running end	Bight
Loop	Turn
Standing part	Bitter end

Knots:

Figure eight stopper	Figure eight on bight
Figure eight follow through	Double figure eight on bight
Directional figure eight	Water Knot
Double fisherman's knot	Prusik wrap
Clove Hitch	Bowline
Butterfly knot	No knot
Munter Hitch	

Care of ropes

- Inspect for damage
- Do not stand on life line rope
- Wash rope after use if dirty
- Store away from sunlight & chemicals, including vapours

# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

### Introduction to Equipment.

#### 1. Ropes

- Prusik / Utility rope
- Control ropes
- Rope protection
- Rope strength

#### 1. Webbing

- Tubular webbing
- Flat webbing

#### 2. Carabiners

- Oval
- D
- Offset D
- Pear
- Ratings
- Shackles
- Other

#### 4. Pulleys

# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

- Standard
  - Prusik minding
  - Construction
    - Metal sheave
    - Bearings
    - Bushes
    - Rotating side plates
    - Caribiner holes
  - Thread diameter
  - Wheel diameter
  - Strength ratings
5. Other hardware
- O rings
  - Rigging plates
  - Figure 8's
  - Rope grabs & ascenders
  - 4WD recovery equipment
  - Kooteny / knot passing Pulleys
  - Harnesses
    - Recreational

# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

- Climbing
- Rescue
- Chest harnesses
- Industrial / fall arrest
- Improvised with webbing or rope
- Gloves
- Footwear
- Helmets
- Clothing (not loose, long hair tied up & secure)

### Knots

- Figure 8 stopper
- Figure 8 loop
- Figure 8 follow through
- Double figure 8
  
- Butterfly knot
- Bowline
- Clove Hitch
- No knot
- Water knot

Fisherman's knot

# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

- Double fisherman's knot
- Munter Hitch
- Prusik Loop

### Anchors

- BFR / BFT
- Load sharing
- Load equalising



# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

### Forces on ropes, anchors and components

- Vector forces
  - 30° = 52%
  - 45° = 54%
  - 60° = 58%
  - 90° = 71%
  - 120° = 100%
  - 145° = 166%
  - 150° = 193%
- Strength reduction when knotted
  - See attached table

### Casualty handling and Stretcher Management

- Casualty lift & security
- Stretcher tie in
- Tying off stretcher for raise or lower

### Mechanical advantage and belay systems

- 2 : 1
- 3 : 1

# AVON SUPPORT UNIT

## SWIFTWATER RESCUE

- 3 : 1 pig rig
- Anchors
- Safety systems – Prusiks and Munter hitches
- General safety ( never stand in the bight etc)

### Highlines, Tyroleans, Telfer lowers

- Application to swiftwater rescue
- Katrines rope system
- Extracts rope system
- Emus rope system