



PATHFINDER SPECIALIST AWARD

# SROBWG002 / SRONAV002





Demonstrate Bushwalking Skills in Difficult and Trackless Areas / Navigate in Difficult and Trackless Areas Resource Material

Apríl 2010



Resource material for the Pathfinder Specialist Award.

The Resource Material, Review Booklet and Assessment tools were produced by the Seventhday Adventist Church Youth Ministries of the South Pacific Division (SPD). We acknowledge John Wells who led in the reshaping and rewriting with the assistance of a number of other experienced leaders. An editorial team brought the task to completion. We wish to express our deepest thanks to them all.

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# Orientation

Welcome to the Resource Material for SROBWG002 Demonstrate Bushwalking Skills in Difficult and Trackless Areas and SRONAV002 Navigate in Difficult and Trackless Areas.

#### Purpose

This unit covers the knowledge and skills required for bushwalking and navigating in difficult and trackless areas, under minimal supervision and for a period of up to two days.

## The Resource Material

The Resource Material contains the essential information to meet the competencies outlined for this unit. It should help you to:

- Gain a comprehensive understanding of and acquire the skills for bushwalking and navigating in difficult and trackless areas.
- Understand the issues relating to applying the acquired knowledge and skills in the context of Pathfindering activities.
- Prepare for the PSA training/review/assessment program.

A basic Review Booklet has been developed for this unit. It contains a small number of worksheets that, once completed, provide evidence that you understand the material. The Review Booklet needs to be completed before the assessment and forms part of the requirements to gain competence in this unit.

Note: If you have any questions, please consult your District Director or your local Conference/Mission Youth Department.

# What Additional Resources Do I Need?

• Outdoor camping equipment.

## What Do I Need to Bring for the Training/Review/Assessment Program?

- Resource material (if received beforehand).
- Review Booklet (completed, if required).
- Pencil/pen.
- Any other resources or equipment as specified by your Assessor.

## How Will I Be Assessed?

At the Conference/Mission training/review/assessment program your competency will be assessed by one or more of the following methods:

- Written/oral questioning.
- Completed Review Booklet.
- Simulation activities.
- Project/assignment.
- Practical demonstration.

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#### **Reassessment Process**

- You will be given the opportunity for reassessment if you are not found competent.
- There will be no limit to the number of opportunities for re-assessment.

#### **Appeal Process**

If you are not satisfied with your assessment you can:

- Discuss the issue with your Assessor.
- Discuss the issue with your District Director.
- Request the mediation of another Assessor.
- Report your concern to the Conference/Mission Youth Director.

#### **Consistency in Performance**

This unit must be assessed after the demonstration completion of two different bushwalking/ navigational activities. The Review and Assessment weekend is counted as an additional activity.

# **Unit Outlines**

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The Unit Outline below summarises the requirements (Elements) of this unit. Each Element requires completion of various tasks (Performance Criteria).

SROBWG002	Demonstrate Bushwalking Skills in Difficult and Trackless Areas	
BWG	Bushwalking	

DESCRIPTION: This unit has been developed for the Outdoor Recreation Industry Training Package. It has been adapted to meet the needs of activities conducted within the framework of the Adventist Youth Ministries. The material has been presented for delivery using the Competency Based Training (CBT) method.

This unit covers the knowledge and skills that relate specifically to bushwalking in difficult or trackless areas, under minimal supervision, for a period of up to two days duration. Bushwalking occurring in a bushland, arid, alpine or rainforest area can be defined as difficult or trackless. Difficult or trackless areas are those areas where there are limited modifications to the natural surface. Track alignment is indistinct in places, minimal clearance is evident along the track, signage is minimal and only for management purposes, natural terrain and man-made hazards exist (eg. cliff lines or dense forests), and the possibility for changes in weather and visibility exists.

Ele	ement	Performance Criteria	
1.	Select appropriate equipment for bushwalking.	1.1.	Select equipment after consideration of contextual issues, and check to ensure that equipment is in good working condition and fitted correctly.
		1.2.	Pack backpack to ensure that heavy contents do not affect balance whilst walking, and that sharp contents are not protruding.
		1.3.	Ensure pack weight is appropriate to body weight and level of fitness.
		1.4.	Ensure backpack contents are waterproofed, as required.
2. Apply planning process to organising a bushwalk		2.1.	Identify food and fluid requirements based on principles of nutrition and energy for a bushwalk.
	0	2.2.	Plan a menu appropriate for the dietary requirements and personal tastes of the bushwalker.
		2.3.	Identify and plan for emergency food requirements.
		2.4.	Access information on water purification techniques.
		2.5.	Address packing and storage issues for food and fluids, as appropriate to bushwalking.
		2.6.	Select personal clothing for the activity, and identify the design/construction features that make it appropriate.
1		2.7.	Identify an appropriate activity site/location after consideration
			on statutory and organisational procedures, where
		2.8.	Access and interpret meteorological data, and determine

			activity plans following consideration of weather information.	
3.	Demonstrate walking	3.1.	Adopt appropriate posture when lifting and carrying backpack.	
	skills in difficult or	3.2.	Adjust backpack straps to ensure comfort and balance.	
	trackless areas.	3.3.	Demonstrate compliance with relevant Codes of Ethics.	
		3.4.	Negotiate obstacles in a safe manner.	
		3.5.	<ol> <li>Demonstrate appropriate ascending technique on slopes, wher required.</li> </ol>	
		3.6.	Demonstrate appropriate descending technique on slopes, when required.	
		3.7.	Establish and maintain a good walking rhythm appropriate to the activity aims, terrain and physical ability.	
4.	Demonstrate navigational	4.1.	Select the appropriate map(s) for the intended walk.	
	skills in a non-urban	4.2.	Apply information contained on the map(s) to plan an efficient	
	environment.		route/course suitable to the participants' abilities.	
		4.3.	Calculate accurate grid and magnetic bearings using a map	
			and compass.	
		4.4.	Obtain additional information to assist in navigation from the	
			map.	
		4.5.	Identify emergency or contingency escape routes.	
		4.6.	Orientate map to surroundings with and without the use of a compass.	
		4.7.	Follow a route in tracked or easy untracked areas,	
			demonstrating use of navigation aids.	
		4.8.	Apply techniques for estimating the distance travelled.	
		4.9.	Maintain, where necessary, a compass course whilst bypassing	
			an obstacle.	
		4.10.	Select an efficient route/course choice for the surroundings and	
			conditions.	
		4.11.	Demonstrate techniques for estimating distance covered.	
5.	Walk in a safe manner.	5.1.	Identify hazards and minimise or eliminate risks where possible.	
		5.2.	Take measures to guard personal and group safety.	
		5.3.	Consider the safety of others whilst walking.	

SRONAV002	Navigate in Difficult and Trackless Areas
NAV	Navigation

DESCRIPTION: This unit has been developed for the Outdoor Recreation Industry Training Package. It has been adapted to meet the needs of activities conducted within the framework of the Adventist Youth Ministries. The material has been presented for delivery using the Competency Based Training (CBT) method.

This unit covers the knowledge and skills required to apply off-road navigation to untracked areas, in situations where extreme environmental conditions and/or poor visibility are not likely to occur.

Element	Performance Criteria
6. Use a map.	<ul> <li>6.1. Select the type of map(s) suitable for the activity.</li> <li>6.2. Identify possible sources of error and inaccuracies on the map.</li> <li>6.3. Identify symbols and information contained on the map, that may be used in pavingation.</li> </ul>
	<ul><li>6.4. Identify the ways in which relevant symbols and information can be used in navigation.</li></ul>
7. Use a compass.	<ul><li>7.1. Identify the essential features of a compass.</li><li>7.2. Demonstrate the manner in which a compass is used to maintain a designated equivalent</li></ul>
	<ul><li>7.3. Demonstrate understanding of the factors that affect accuracy in compass use.</li></ul>
8. Plan a route in trackless areas.	<ul> <li>8.1. Select the type and scale of map suitable for an activity.</li> <li>8.2. Apply information and symbols contained on the map to plan an efficient route/course using appropriate navigation skills and activity-specific abilities.</li> </ul>
	8.3. Obtain additional information to assist in the preparation of a navigation data sheet, using the map and other suitable sources of information.
	8.4. Prepare a navigation data sheet/route card.
	8.5. Identify emergency or contingency escape routes.
	8.6. Consider all contextual issues in the planning of a route.
	8.7. Consider environmental impact issues in the planning of a route.
9. Navigate in trackless	9.1. Maintain orientation of map to surroundings.
areas.	9.2. Demonstrate combined use of map and compass whilst following a route in remote, difficult or trackless areas.
	9.3. Demonstrate techniques for distance estimations of travel.
	9.4. Maintain the designated course whilst bypassing obstacles.
	9.5. Demonstrate navigation techniques for maintaining a course in poor weather conditions and/or visibility, and in the event of
	unexpected weather changes.
	9.6. Demonstrate interpretation of features implied on the map.
	9.7. Demonstrate an efficient route choice for the surroundings and conditions.
	9.8. Demonstrate suitable combinations of techniques to fix a position and identify unknown features when lost.

# **Introduction**

Bushwalking is an Australian term that captures all of the physical, mental, sociological and emotional images associated with walking in the great outdoors.

Bushwalking is a physical outdoor activity that may or may not have a set destination. It takes the participant away from their daily stresses to quiet places where they can be refreshed.

This collection of units covers different issues involved in bushwalking and navigation. Requirements include the following:

To demonstrate skills in bushwalking techniques, navigational skills and safety
practices in untracked areas. An untracked area is considered to be an area that
does not have extreme environmental conditions, and that is attempted at a time
when there are no anticipated extreme weather changes or sudden lack of visibility.

A track for the purposes of this unit is a Class 5 track according to the *Australian Standards for Walking Tracks AS* 2156 1 - 2001. The features are as follows:

- There are limited modifications to the natural surfaces so that track alignment is indistinct in places.
- There is minimal clearance along the track.
- Signing is minimal and only for management purposes.
- There are terrain and man-made hazards (such as cliff lines or dense forests).
- The possibility for changes in weather and visibility exists.
- To demonstrate bushwalking skills while carrying an overnight pack.
- Navigational skills that indicate competence in using a map and compass, and in being able to bypass obstacles.

# **CHAPTER ONE: Bushwalking Skills**

Bushwalking and Camping are some of the great experiences in exploring the wonders of the natural world. As a Christian, you are reminded that God is the Creator, and that we are very special to Him.

"When I look at the night sky and see the work of your fingers – the moon and the stars you have set in place – what are mortals that you should think of us, mere humans that you should care for us?" Psalms 8:3,4 NLT.

Bushwalking and camping bombards our senses with the fact that:

"God is love', is written upon every opening bud, upon every spire of springing grass. The lovely birds making the air vocal with their happy songs, the delicately tinted flowers in their perfection perfuming the air, the lofty trees of the forest with their rich foliage of living green, - all testify to the tender, fatherly care of our God, and to His desire to make His children happy."<sup>1</sup>

## Bushwalking

The basic skill required for bushwalking is walking. This is something that we do every day. But just because we walk at home or work does not mean that it comes naturally when we enter the bush. Walking in the outdoors requires greater walking skills due to varied terrain, vegetation, varying climatic conditions and other challenges. This chapter explores these points.

## **Physical Preparation**

Bushwalking is more enjoyable if you are physically prepared. In preparation for a bushwalking adventure, spend some time walking each day. Include walking with a weighted pack, to increase physical fitness. Walk up stairs; complete up to 50 squats each day.

## **Bushwalking Equipment**

Bushwalking equipment has been outlined in the Unit SROODR002 Guide Outdoor Recreation Activities and SROBWG008 Guide Bushwalks in Tracked or Easy Untracked Areas. The important things to remember are to:

- Check that boots/walking shoes are in good repair.
- Wear boots/walking shoes on pre-hike walks.
- Check all equipment to make sure it is in good repair and ready for the adventure.

#### Food

- Plan each meal before the adventure.
- Pack only food that is needed plus emergency rations
- Include :- A good breakfast, ether cereal or cooked
  - Light finger food lunch
  - Snacks for each rest
  - A cooked evening meal

<sup>1</sup> E G White, Steps to Christ pp10

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# Water

- Take plenty of water. Quantities will depend on available water sources and their purification needs
- Each person needs about 4 litres a day
- Purify all water in the bush.

# Clothing

- Wear clothing appropriate for the location, environment and weather conditions
- Hats and sun screen are vital
- Hot weather wear lightweight cotton
- Cold weather layer clothes to retain heat and cut wind-chill.

# Safety Management

- A Safety Management Plan must be completed to identify any risks and develop ways of reducing them. An example of a Safety Management Plan is in the Appendix.
- All Church documentation requirements must be completed. Forms requiring completion before the event include the following:
  - Application Forms,
  - Health Records
  - Risk Acceptance Forms
  - Notification Form, which needs to be sent to the Conference Youth Department before the event.

## Weather

- Check weather forecasts before leaving on the hike.
- Watch the sky each day and adapt the program as needs arise.

## Equipment

Equipment needed for walking may include:

- Foot wear
- Backpack
- Food
- Water
- Torch (hand or head light)
- Maps and Compass
- Walking aids walking sticks
- Watch
- Mobile phone
- Wet weather gear
- Shelter
  - Tent, tarp etc
- Sleeping gear
  - Sleeping bag

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- Inner bag
- Sleeping mat
- Cooking gear
- Personal gear toiletries, towel, medication needs
- Bible,
- AO Logbook, pen
- Other items camera

# **Emergency Equipment**

Emergency Equipment could include:

- GPS
- EPIRB
- Satellite Phone (Depends on needs)
- Basic repair kit (Duck tape and a sharp pocket knife)
- First Aid Kit (adapted to the specific needs of the area)

## Walking Skills

It is important to develop a natural swinging movement that is both smooth and energy efficient. The arms and legs should be allowed to naturally swing without any spring or jerking movements. It is not the length of the stride that is important but the smoothness of the style. The pace should be appropriate for the distance to be covered in the time available. Walking too fast is tiring, while walking too slowly is equally energy inefficient. The challenge is to set a pace that is sustainable for a whole day if need be. Walking goes through a cycle as depicted in Figure 1.1.



Day hike (10+km)

Figure 1.1: Energy cycle of walking.<sup>2</sup>

It is important to stagger rests so that bushwalking remains pleasurable. To maximize energy usage:

- 1. Complete stretching exercises before starting the walk.
- 2. Walk slowly and gently for the first half an hour.
- 3. Have a rest to recheck all of the equipment. Readjust footwear, clothing, packs, etc.

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<sup>&</sup>lt;sup>2</sup> Pr John Wells

4. Begin to settle into the pace for the hike. Increase your pace so that the body experiences a 'second wind', with increased heart rate and loosening muscles. Hiking then becomes a pleasure.

Have regular short rests every 1-1  $\frac{1}{2}$  hours. This is a time for drinking, eating snacks, and briefly releasing the weight from the back. Keep the rest time short so that the body does not cool down, or it will take a real effort to move back to walking pace. Lunch time is a good opportunity to rest, but not for too long, as the same process of winding up is needed until everyone settles into their walking pace again. A hiking graph would look something like shown in Figure 1.2.



Figure 1.2: Proposed hiking graph example.<sup>3</sup>

The pace will vary depending on any or a combination of the following factors:

- Climbing or descending hills
- Gradual slopes
- Weather changes
- Vegetation
- Track or non track
- The group walking pace
- Fitness levels

The average walking distance depends on all of the factors listed above. For Australian conditions the "Naismith's Rule" is good guideline to follow:

"For any average walker with a medium pack, allow one hour for:

- every 4km of easy going
- every 3km of easy scrubbing
- every 1 <sup>1</sup>/<sub>2</sub>km of very rough country, deep sand, soft snow, or thick bush

then add:

- one hour for every 500m up
- one hour for very 1000m down"<sup>4</sup>

<sup>&</sup>lt;sup>3</sup> Pr John Wells

<sup>&</sup>lt;sup>4</sup> Bushwalking and Ski Touring Leadership. P14, 16

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For a fit group, shorten the time. For a larger group of inexperienced walkers, add to the time. The Federation of Victorian Walking Clubs has a nomogram for predicting walking time shown in Figure 1.3.



EXAMPLE Predict time to walk 3 km through open bush, including a climb of 200 m and a descent of 100 m. From experience, estimate your speed 'on the flat' as 4 km/h. Using a straight-edge, follow the dashed lines to find an estimated total time of 1 ¼ hours.

## Walking With a Group

Most bush walking is done with a group. This allows walkers to share the experience together, support each other and help to reduce the risk factors by working through any emergencies together. However, not all groups are able to function well together because of different personalities, walking pace and expectations. The challenge of being a leader on a bushwalk is not only to prepare for the trip, but also to manage the trip. Here are some observations for a group of walkers:

Figure 1.3: Nomogram for predicting walking time.<sup>5</sup>

 <sup>&</sup>lt;sup>5</sup> Bushwalking and Ski Touring Leadership. P15
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- Clarify what everyone wants to achieve for the day. Share the plans for the day with everyone. Point out interesting things that will be encountered. Talk about some special feature for the day, eg. a great swimming hole at the proposed campsite. A good time to do this is at morning worship. This is a time to focus on God's promises, each other's needs and the challenges of the day. At the end of the day after tea, have another worship to acknowledge God, thank Him for His protection and create an opportunity to debrief the day's experiences.
- 2. Check that everyone is positive and looking forward to the experience. Ensure that everyone has adequate food, footwear and clothing for the day's conditions.
- 3. Establish a method in which the group is happy to walk at an acceptable pace.
  - a. Set a pace that makes good time but does not burn out the slower walkers
  - b. Appoint a slower walker to be the pace setter at the front and appoint one of the fast walkers as the sweep at the back of the group. Give the faster walker specific roles to play so that they are occupied at the slower pace. Examples may include: route finder, timekeeper, group observer, etc.
  - c. Allow the group to develop into smaller subgroups to cater for the different walking paces. Clearly identify the route to be taken. Have an identified leader of the faster pace group and a sweep for the last group. The first group must stop at regular intervals and be prepared to wait until the last group has had a ten-minute rest. Everyone must be accounted for at each resting point.
- 4. Make sure that nobody in a group ends up walking alone.
- 5. Avoid following too closely behind the person in front. Try to keep at least 3-5 paces behind.
- 6. Check behind before releasing a branch or bush that you have to push through. Call out "branch" so that the person behind you does not get swatted unexpectedly.
- 7. If the group is walking in single file and someone wants to stop for some reason, ask them to step aside to allow people behind to keep walking. If someone wants to move up the line, it's polite to ask if they can move forward, then choose a spot where it is easy to do so.
- 8. Remember the Biblical principal of treating others as you would like to be treated yourself. Always be willing to encourage, praise and honour each other for skills displayed. Be a positive influence on the whole group.
- 9. Be observant of other members in the group, especially toward the end of the day when everyone is ready to set up camp. Check that everyone is warm (especially if it is cold or wet), that they are having an adequate fluid intake and that they are willing to socialise.
- 10. When the group is walking through an environmentally sensitive area, it is better for them to spread out. When the group is hiking up or down a slope where there are potentially loosened rocks, then it is also wise to spread the group out and warn of loose rocks by calling out "ROCKS".

# **Bushwalking Hazards**

Hazard	Handling Methods/Notes		
Loose rocks on flat ground	Concentrate on your foot placement. Walkers may need to lift their feet up instead of using a swinging stride. Leaders should warn others in the group if necessary.		
Falling loose rocks on a slope	Immediately call out, "Rocks". The group should space themselves out so that each individual has room to dodge the falling object. This is especially if the group are zig zagging up or down a slope		
Tree roots	Concentrate on placing feet on secure ground so as to avoid tripping.		
Temperature extremes – hot	Choose not to walk in the heat. If necessary, walk in the early morning and late afternoon. Stop in a shaded spot during the middle of the day. Drink lots of water. Keep covered.		
Temperature extremes – cold	Wear clothes in the layered method. Keep moving when resting. If wind is involved, find shelter and establish camp. Heat up something warm to drink. Encourage each other. Leaders may need to consider going home.		
Steep, slippery or unstable terrain	Pery or Avoid this terrain. Choose another route. If leaders are aware of the terrain and it is unavoidable, take a short rope to be used as a stabilize and hand support. It would be an advantage to have walking sticks to act as extra points of contact. Move smoothly and as quickly as possit across/over the slippery or unstable place. Have an escape plan. Hel each other. Have one person at a time covering the problem area. It may help to pass packs over. Be adaptable.		
Snakes	If one is found, back away carefully so that it will sense a way of escape. Don't attack it with a stick. If bitten, follow first aid procedures.		
Biting insects	Apply insect repellent early in the morning and from 4pm onwards. Camp in exposed windy areas if insects are an issue.		

Hazards	Handling Methods/Notes		
Crocodiles	In northern Australia, crocodiles may be present in any waterway and in the ocean. Vary your approach to the water source. Do not collect water from the same spot each time. If a crocodile attacks, run fast in a zig zagging motion away from the water. If possible, zig zag between trees as crocodiles run faster than a man over a short distance. Crocodiles are most aggressive during the wet season, October – March.		
Cassowary	If threatened, run away zig zagging through the trees until you are a safe distance from the bird. Keep watching it until it is out of sight.		
Stinging trees	Learn to identify the large leaves. Do not touch any part of leaves, including dead leaves on the ground. Keep well away from the leaves.		
Stinging nettles	If nettles are present, put long pants on or gaiters to protect any exposed legs. Avoid touching. If someone does touch a nettle leaf, most people find the 'stimulating' feeling will quickly subside.		
Lantana	Avoid at all costs. If unavoidable, then travel slowly, trying to find the easiest way through. Wear a long shirt, long pants and leather gloves where possible.		
Wait-a-whiles	If this hanging vine entangles a walker, stop, reverse and allow the 'teeth' to detach themselves from body parts, clothes, or pack. To keep pushing through could mean ripped skin, clothes, or equipment.		
Dense vegetation	Try to detour around this. If the group has to continue, wear long sleeves, long pants and boots. Walk close behind each other so that walkers can pass bent bushes back to the next person. Change the leader regularly. Avoid thrashing quickly through dense bush.		
Snow	If the snow is hard and icy, do not continue unless equipped with correct snow gear.		
	If snow conditions are fine, walk normally but keep group together.		
	If ascending, kick the toes of boots into the snow.		
	If descending, kick boot heels back into the snow.		
	If the snow is soft and unable to hold a walkers weight, follow the leader's route. Change the trailbreaker often.		
	Try and cover snow slope areas early in the day before the sun softens the snow. Watch out for snow falling from trees.		
71	The snow makes the bush very beautiful.		
Flooding	Don't move until the flood has subsided.		

Hazards	Handling Methods/Notes	
Bush fires	Be aware of the fire danger level. If it is high, seriously consider not going. If you observe smoke while out bushwalking, change your route if necessary, to move away from the fire. If fire becomes a threat to the bushwalk, follow one of the prepared escape routes. NEVER try to outrun a fire.	
	If caught in a fire:	
	<ul> <li>Find cover to protect yourselves from radiant heat. The more solid the material between you and the fire, the more radiant heat will be blocked. Examples include: submerging yourselves in running streams or pools; sheltering in scrub-free eroded gullies; or sheltering under road bridges, large rocky outcrops, etc.</li> <li>Cover all exposed skin. Drink lots of water. Keep checking on everyone in the group<sup>6</sup>.</li> </ul>	
	See notes in the Respond to Emergency Situations.	
Lightning	This is a very rare possibility. Stay away from exposed rocks, cliffs, peaks, mountain ridges or isolated trees. ensure all walkers are as water proof and seek protection where possible, with no points of contact on the ground. See illustration below <sup>7</sup> :	
Dingoes/Foxes	Keep all food well covered and stored in packs. If aggressive, avoid walking alone and keep watch on them if they are following the group. Stand tall or in groups and carry a stick. Chase them away if possible. Do not feed.	
Cattle	If you have to walk past a mob, which could become aggressive, detour around them, making sure that there are trees that can be quickly climbed or hidden behind. Do not camp by a water hole that is obviously used by cattle.	
Native Marsupials	These little nocturnal animals love to eat camp food. Keep food well sealed and out of reach. Some animals will tear through packs to get to food that they can smell.	

 <sup>&</sup>lt;sup>6</sup> Bushwalking and Ski Touring Leadership. P201, 202
 <sup>7</sup> Bushwalking and Ski Touring Leadership. P99

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# Risk

Risks are many and varied in bushwalking. Leading a bushwalking group involves being able to demonstrate skills needed to handle the associated risks. The table below gives a summary of the common risks.

Risk	Signs/Symptoms	Basic Treatment	Prevention
Hypothermia – a fall in core body temperature to below 35°C	<ul> <li>Forgetfulness</li> <li>Loss of judgment</li> <li>Loss of coordination</li> <li>Shivering</li> </ul>	<ul> <li>Stop and provide shelter immediately it is suspected.</li> <li>Create a warm environment, eg. in a tent.</li> <li>Replace wet clothes.</li> <li>Transfer heat to the body core. Put the patient into a sleeping bag with another person, and apply hot packs.</li> <li>Get the person to drink warm, sweet drinks and eat high- energy foods.</li> <li>Handle carefully.</li> <li>In severe cases, use the vapour barrier principle by warming the person as above but in their wet clothes</li> </ul>	<ul> <li>Dry clothes under windproof outer shell (layering principle).</li> <li>Adequate food and water.</li> <li>Rest in sheltered location.</li> <li>Communication and observation of the group.</li> </ul>
Heat Exhaustion – loss of salt and or water from the body (usually by significant sweating) Heat Stroke (Hyperthermia)	<ul> <li>Weakness</li> <li>Dizziness</li> <li>Nausea</li> <li>Vomiting</li> <li>Heat cramps</li> <li>Fainting</li> <li>Altered level of consciousness</li> <li>Increased heart rate</li> <li>Increased breathing rate</li> </ul>	<ul> <li>Stop – rest in a shaded environment.</li> <li>Drink water (lightly salted). 1-2 litres over 2-4 hours.</li> <li>Cool skin by wetting and fanning.</li> <li>Loosen restrictive clothing.</li> <li>Needs rapid cooling.</li> <li>Stop – immediate rest.</li> <li>Shade the person from the sunlight.</li> <li>Remove excess clothing</li> <li>Sprinkle with water and fan vigorously</li> <li>Apply cold packs in a towel to the skin</li> <li>Evacuate as each as paceible</li> </ul>	<ul> <li>Light clothing.</li> <li>Avoid hiking in the heat of the day.</li> <li>Rest in the shade</li> <li>Be physically fit</li> <li>Drink. Hydrate well before hiking</li> <li>Drink lots of water. 3-4 litres a day</li> <li>Avoid hot periods of the day</li> <li>Rest</li> <li>Wear light clothing</li> </ul>

Risk	Signs/Symptoms	Basic Treatment	Prevention
Injuries	<ul> <li>Pain</li> <li>Sores</li> <li>Broken bone</li> <li>Etc</li> </ul>	<ul> <li>Protect the First Aider and the group</li> <li>Reassure the patient/victim</li> <li>Deal with the injury</li> <li>Decide on evacuation needs</li> </ul>	<ul> <li>Look where you are walking and help each other in difficult situations.</li> <li>Walk at a suitable rate.</li> <li>Have adequate rests</li> <li>Drink and eat properly</li> <li>Be responsible to self and others</li> </ul>
Illness	• Varied	<ul><li>Rest</li><li>Maintain water intake</li><li>Evacuate</li></ul>	<ul> <li>Maintain a good balance between rest, sleep, activity, eating and drinking</li> <li>Do not go on a bushwalk if feeling sick</li> </ul>
Diarrhea	<ul> <li>Frequent toilet stops</li> <li>Watery bowel movements</li> </ul>	<ul> <li>Drink lots of water</li> <li>Avoid eating fatty foods</li> <li>If symptoms persist, take charcoal or other diarrhoea medication</li> </ul>	<ul> <li>Practice good hygiene</li> <li>Drink only clean water</li> </ul>
Colds, Coughs	<ul><li>Coughing</li><li>Fatigue</li></ul>	<ul> <li>Patient needs rest and lots of water</li> <li>Symptomatic medications</li> </ul>	<ul> <li>Practice good hygiene so the rest of the group doesn't get sick</li> <li>Wash hands, don't share eating gear etc</li> </ul>
Exhaustion	<ul> <li>Overheated</li> <li>No energy to keep going</li> <li>Lethargic</li> </ul>	<ul> <li>Rest</li> <li>Drink water</li> <li>Eat something sweet</li> <li>Sit down and relax</li> </ul>	<ul> <li>Have regular stops</li> <li>Make sure that everyone drinks and eats during the stop</li> <li>Get adequate food and rest at night</li> <li>Pre trip fitness walks really help</li> </ul>
Phobia	Unable to do something because of fear	<ul><li>Offer encouragement</li><li>Respect their rights</li><li>Help as far as possible</li></ul>	Be aware of the problem and adapt the route as needed
Equipment Failure	Equipment is unable to be used	Do basic repairs where possible	<ul> <li>Check all equipment, especially packs and footwear, each evening</li> <li>Carry out repairs as needed</li> <li>Carry a basic repair kit for the group</li> </ul>

# **Bushwalking Obstacles - Rivers**

River crossings are one of the most dangerous aspects in bushwalking. If a river is flooded, either wait for the river to drop or change the route. If crossing the river is the only option, the following notes provide excellent advice on how to deal with this problem:

- Be prepared to spend time and energy looking for a safe crossing place
- Choose a technique that gives good safety margins.<sup>8</sup>

## Factors to Remember when Considering a Crossing Point

- 1. Run Out (Area where water slows down)
  - Is it safe? Are there any trees, drops, logs, rocks etc?
- 2. Riverbed
  - Cloudy or dirty water may cover mud, sand, silt, logs, snags or big boulders. Look for an even-bottomed, shingle (stony) bed, preferably at a point where the river is just widening out.
- 3. Speed of River
  - Gauge the speed by throwing a stick in. If the speed is greater then walking pace, be careful.
- 4. Depth of Water
  - Try to avoid water deeper than knee level for the shortest member of the group.
- 5. Entry and Exit Points
  - Both entry and exit points need to be easy to approach or exit from (Figure 1.4).





<sup>8</sup> Bushcraft. NZ Mountain Safety Manual 12. p111

<sup>9</sup> Bushcraft. NZ Mountain Safety Manual

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# **Techniques for River Crossing**

- 1. Individual
  - Only use this technique when the water is not too fast or too deep (knee height is the limit).
  - Choose a clear route at 45 degrees to the current
  - Walk downstream with the side of your body to the current.
  - Keep body weight directly over feet
- 2. Individual with Support Pole (Figure 1.5)
  - The pole is used as a third leg.
  - It provides an extra anchor point.
  - Cross with the body to the side and the pole up river.
  - Put weight on the pole and walk forward carefully.



Figure 1.5: Individual with Support Pole<sup>10</sup>

- 3. Group Mutual Support
  - Figure 1.6.
  - For 2 12 or more people.
  - Excellent for helping weaker people across
  - Flexible enough for the whole group
  - Each person is double linked
  - Able to communicate well with each other
  - The strongest person is put in the upstream position

<sup>10</sup> Bushcraft. NZ Mountain Safety Manual

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- They should be slightly forward of the rest to allow the force of the current to push the group over across
- The group lines up on the bank and then sets off across the river, working together.



- 4. Group Mutual Support using Pack Straps
  - Figure 1.7.
  - Good method if people are of a similar height.
  - Can be used to cross uneven river bottoms.
  - Provides good support if anyone stumbles.
  - Saves taking equipment.
  - The strongest person stands up river, then the next strongest and so on down river.
  - Each person reaches for the next person's pack and holds the pack strap on the furthest shoulder.



Figure 1.7: Group using pack straps<sup>12</sup>.

- 5. Group Mutual Support using a Thin Pole
  - Figure 1.8.
  - The pole gives rigidity to the team.

<sup>&</sup>lt;sup>11</sup> Bushcraft. NZ Mountain Safety Manual

<sup>&</sup>lt;sup>12</sup> Bushcraft. NZ Mountain Safety Manual

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- The strongest person stands upstream, then the next strongest and so on downstream.
- The pole is grasped and arms interlinked as shown in the picture.



Figure 1.8: Group using a thin pole.<sup>13</sup>

• If using a log, then the hold is different, as shown in Figure 1.9. Using a log allows the group to tackle deeper water. It pays to have the strongest person second in the group so that they can help the person breaking the force of the water to maintain a strong foothold.



Figure 1.9: Group using a log.14

- 6. Line Astern
  - Three or more people stand behind each other facing into the flow of the current. They hold each other's pack or belt.

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<sup>&</sup>lt;sup>13</sup> Bushcraft. NZ Mountain Safety Manual

<sup>&</sup>lt;sup>14</sup> Bushcraft. NZ Mountain Safety Manual

- In fast water move sideways across the river together.
- In slower-moving water, move one at a time and support each other.
- The strongest person should be second in line.

#### Swimming Across using a Pack

- Only strong swimmers should use this method.
- The pack provides buoyancy.
- Hold the pack in front of you with one arm, then swim with the other arm and legs.

#### If a Person is Swept Away

- This should not be a problem if you have chosen a good run out.
- The pack acts as a life jacket (see Figure 1.10).
- Release the waistband and push down on your pack straps with your thumbs to keep the pack down.
- Lean on the pack with your legs in front of you, to fend off any rocks and to keep your legs from getting trapped in rocks.
- If the pack pushes you under, take it off and hold it in front of you, as used for swimming across.
- Try not to panic. Relax and wait to be deposited in an eddy where you can quickly get out and make yourself visible.<sup>15</sup>



Figure 1.10: Floating using a pack.<sup>16</sup>

## **Other Bushwalking Obstacles**

#### 1. Scree

Scree is a term that describes layers of stones that cover a slope, but are not embedded into it. When climbing scree, walkers feet will slide down a little with each step. It is a strenuous way of climbing a slope.

Coming down can be more fun. Descend by facing outward and placing heels into the slope with each step. It can be exciting to descend the slope rapidly, keeping your weight back slightly so that the heels dig in with each step.

<sup>&</sup>lt;sup>15</sup> Bushwalking and Ski Touring Leadership. P163-167

<sup>&</sup>lt;sup>16</sup> Bushcraft. NZ Mountain Safety Manual

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With a group, spread out so that each person can follow their own route, with its array of falling stones. This is especially the case when climbing close together, so that no dislodged stones gain enough speed to hurt anyone.

#### 2. Crossing over Logs

Where possible, step over them. If it is a large trunk, help each other to get over the obstacle. Avoid walking on logs where possible, as you may slip or punch a hole in a rotten log and fall.

#### 3. Rocks

Step over or walk around them to avoid slipping and wasting energy. If walking in a rocky creek bed, then allow extra time to cover the distance. Watch feet placement and be aware of slippery surfaces. Centre weight forward so that it is over your feet.

If crossing a rocky area or following a rock path, watch feet placement. Be relaxed when walking so that if you do slip, you can adapt to the shift of weight on your ankles and avoid a sprain or fall. Again, keep weight forward.

#### 4. Gullies

The easiest way to cross gullies is to find an animal track. If there is none, then the entry and exit point is very important. Choose wisely. Move carefully and smoothly. Help others in the group. Try to find flat spots while going across the gully. Keep body weight over your feet.

#### 5. Exposed Areas

Move carefully, watching feet placement. If afraid, concentrate on the route across rather than the surroundings. Be prepared to help each other. Step carefully, using any flat stable rocks or other features to negotiate the area. If a rock ledge is being followed, use hand holds to increase safety. A rope used as a handrail may be useful in these situations. An experienced walker should be last, in order to encourage and guide each walker over the exposed area.

#### 6. Cliffs

Cliffs should be avoided at all times unless there is specific equipment and experienced leaders in the group. Remember that walkers need to keep a body's length and a half from a cliff edge. If you want to look over the edge, then lie down to increase the points of safety and friction. Gravity allows for no mistakes.

#### 7. Night Walking

This should be avoided as much as possible. If unavoidable, each person needs a light (head lights are the best). Adequate experience in navigation is also required.

#### 8. Ascending Steep Slopes

The safest and most energy efficient method of climbing a steep slope is to walk up in a zig zag pattern. Choose a route across the face of the slope that includes flat sections. Use rocks, vegetation etc as security points. Take deliberate steps with feet flat and knees bent.

Use of walking sticks or rope hand lines makes the effort easier. Try and set a pace that the group will be able to sustain until the group reaches the top, or a good resting point.

#### 9. Descending Steep Slopes

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Again, zig-zag across the slope to increase the groups security while descending. Keep knees bent to keep feet as flat as possible while working across the slope. Lean slightly forward.

Choose the flattest spots and rocky projections for the route down. Do not rush. Call out, "Rocks!", if rocks are dislodged. Use a walking aid or hand lines if available.

#### The Backpack

#### 1. Handling the Pack

The joy of walking freely through the bush and enjoying all of its beauty and challenges is affected by the pack that walkers carry on our back. This pack contains all the essential items of shelter, food, protection, safety and cover. It forms the basis for the group's entry into the wilderness.

#### 2. Pack Correctly

The weight of the pack should be close to the back and centred at belly button level. The pack should feel like it is part of the body. It should not push walkers forward and force them to keep walking, or pull walkers back due to the positioning of the weight on the outside. A suggested layout for packing a pack is illustrated and listed in Figure 1.11.



Figure 1.11: Packing a Pack<sup>17</sup>

- Keep everything inside the bag. Avoid items hanging outside.
- Keep sharp objects away from the back
- Avoid lots of outside pockets
- Keep pack weight to a minimum. Every item taken involves weight and space
- Store each separate general item in pack liners or waterproof bags. Eg, sleeping gear, clothes, food, cooking, etc. This helps to keep the pack tidy and makes things easier to find.
- Remember that no backpack is waterproof. You may even have to use your pack as a floatation device.
- Plastic zip lock bags are excellent for clothes (squeeze the air out to save space), food, etc.

<sup>&</sup>lt;sup>17</sup> John Wells personal notes

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#### 3. Pack Weight

For adults, pack weight should not exceed one third (1/3) of total body weight. For children (Pathfinders etc), it should not exceed one quarter (1/4) of total body weight. These are maximum weights, so the challenge is still to make it as light as possible.

Helpful tips:

- Take only the amount of toothpaste and soap really needed.
- Choose as much lightweight food as possible
- Choose a lightweight stove
- Take minimum clothes. One set of layer clothes for walking, one for sleeping, and underclothes
- Strip any excess webbing off the pack.

When buying equipment, consider weight, size and comfort level, eg. In northern Australia, basic compact +5 sleeping bags are sufficient.

Use water bladders (such as Platypus) instead of ridged plastic bottles, to save space. Bring two bladders and only fill up what is needed, according to how much water is available.

4. Lifting the Pack

Remember the basic standards in OH&S about the importance of bending your knees and keeping the weight close to the body when lifting a load. All of these principles are vital when it comes to lifting a pack.

The easiest way to put a pack on is the two-stage method. If there are two walkers or more, get them to correctly lift the pack, and guide your back and arms into the shoulder straps until you can take the weight from them. Then do the same for them.

If there is a natural or man-made feature, which is at the right height, lift the pack correctly so that it sits on the feature. Turn around and slide your arms through the straps, taking the weight when ready.

If there is only flat ground and no one to help, use the swing method. Grab the pack by the top of the shoulder straps and lift it onto your bent knee. Swing it slowly around while putting one arm through the strap. Allow it to swing all the way onto your back with your legs slightly apart. Slide the other arm through the remaining strap.

Once the pack is on your back, stand up, tighten the shoulder straps, attach the waist strap and tighten it, and attach the chest strap. You are now ready to go. Help someone else and enjoy the adventure together.

## **Bushwalking Behaviour and Attitude**

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The Bushwalking Code of Ethics and the Minimal Impact guidelines are in Appendix 1. It follows a basic biblical principle:

Treat everyone as you would like to be treated yourself. Care for nature as a responsible steward. Leave it so that those who follow will be impacted by the surroundings, and feel that they also have discovered something beautiful and unspoilt.

# **CHAPTER TWO: Understanding and Using a Map**

Navigational skills are an essential part of the bushwalking experience. Bushwalking is the action and navigation gives the direction. That is why these two units are clustered together.

Navigation is the ability to know where you are at all times. It allows leaders to choose a level of bushwalking appropriate for the time and skills available. Successful navigation through a new area, even if it is only on a map, is a satisfying aspect of enjoying the great outdoors. This section looks at maps and compasses, and provides the knowledge needed to understand and use them. The reading of this material and completion of the workbook do not substitute for going outdoors with a map and seeing how the map illustrates the countryside. It also does not substitute for using a compass to take bearings and back bearings, and practise other navigational skills. After reading these notes, please go and test your skills in the bush <u>before</u> the assessment.

## Introducing the Map

A map is designed to place the surrounding landscape onto paper. People have drawn maps as a way of showing what is ahead or around them since the earliest generations. Maps are vital because they inform users about:

- Where they are.
- What the surrounding landscape is like.
- What dangers are ahead or to the side.
- The impact that humanity has had on the earth.

## Ways People have Drawn Maps

- Mud Maps basic outline in the sand.
- Sketch Maps basic outline on paper, often includes shaded hills and other features.
- Special Purpose Maps eg. political, road, tourist, mineral, weather, ocean, river, town, National parks.

## **Topographical Maps**

These maps cover a specific section of land and can be purchased for nearly every country, especially national parks. Lines called *contour lines* are used to represent elevation and the natural shape of the ground. Topographical maps are the most accurate type of map for outdoor activities. There are different scale maps which serve different purposes. These include:<sup>18</sup>

Scale	Use	1 grid square on the map equates to:
1:250,000	Trip planning	2.5km
	Available on CD	
1:100,000 Trip planning		1km
	Bushwalking outback	
	4WD	
	Outdoor activities	
	Other outdoor activities	
	Main map used	
1:50,000	Bushwalking	500m
	4WD	
	Outdoor activities	
	Main map where available	
1:25,000	Great bushwalking/orienteering	250m
	Outdoor activities	
1:15,000	Orienteering	150m
1:10,000		100m

## **Map Errors**

In converting the shape of the world (3D sphere) to a flat presentation, there are variants that leaders need to be aware of with maps. They are:

- 1. The most accurate part of the map is the central north south grid lines. The details are less accurate at the two outer edges. Note: This applies more to larger scale maps than those generally used in bushwalking.
- 2. The contour lines are not always 100% accurate. Eg. In thick rain forest, the map topographer may have guessed inaccessible terrain.

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- 3. Australian Map drawing standards maintain a 90% accuracy level. This means that a horizontal detail could be anywhere within 12.5 meters of true position, and 5 metres of true elevation. Details may be even less accurate in dense vegetation.
- 4. Man-made features are not to scale on the map. A road is not literally the width of the line on the map. A building is not proportional to the size of the symbol used to represent it.
- 5. In order for topographers to illustrate specific map features, symbols are used. These symbols may not correspond exactly with their location in real terms. So dams, houses, roads, railway lines etc. always appear 100 meters apart, even when they are much closer.
- 6. Map accuracy is correct on the published date. It is worth noting that man-made features change. The natural landscape features retain detail more permanently, but leaders need to be aware of changes caused by environmental impacts.
- 7. Australian map-making standards allow errors up to ½ millimetre (or 12 metres on the ground) on a 1:25000 standard topographical map.

#### **Map Information**

All topographical maps have the same basic information:



Figure 2.1: Information on a contour map.<sup>19</sup>

Map Datum details also need to be added. This information is extremely important to GPS users. Note: The older 1:100000 maps do not have some relevant details. North details are found in that location instead (eg, 1:100000 1973 Queensland edition 1 series).



## Map Information

Top of the map (Left to Right header section):

- Scale. As outlined above.
- Name The map name is based on a geographical or man-made feature.
- Map Number This provides the sheet number and the edition number. These are important for reordering particular maps.

Bottom of the map (Left to Right foter section):

• Date

The date provides information about:

- When the aerial photo was taken
- Accuracy of the map
- Method of compiling the information for the map
- Date of printing
- Production and Distribution details
- Universal Grid Reference This provides details on how to calculate a six-figure grid reference.

#### • North Points Diagram

The position of this diagram depends on the age of the map. Maps drawn after 1980 place it in the illustrated position, and shows the relationship between True, Grid and Magnetic North.

- True North The earth's true geographical North.
- Grid North

Grid North is the north on the map and is generally towards the top of the page. These grid lines are the ones used for measuring bearings.

Magnetic North

North on the magnetic compass, as indicated by the needle. The magnetic pole varies each year. In maps produced since 1999, a conversion table is also listed under the diagram for each year (cf Northern Territory WGS 84 Series Maps).

• Scale

This gives additional detail to the scale information at the top left hand side of the map. It includes:

- Detailed linear scale
- Information about latitude and longitude
- Horizontal Datum: Australian Geodetic Datum 1966

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Note: More recent maps contain with a new Horizontal Datum detail. Australia and New Zealand have decided to integrate their combined datum system so that it corresponds to the rest of the world. This means that the datum point of reference is the centre of earth (not 200m away from the centre). This change to Geocentric Datum will be introduced gradually. It will affect all current grid references and latitude and longitude. In Australia, this datum is known as Geocentric Datum of Australia 1994 (GDA94). This is equivalent to the satellite datum of WGS84<sup>20</sup>

Contour lines

Contour lines provide the vertical distance and layout of varying land forms, for example mountains and valleys.

• Legend of Symbols

The map legend is an extremely important feature of topographical maps and interpret the conventional mapping symbols used .

• Weather Details

This detail is found on maps drawn since 1980. It provides helpful information when planning an outdoor activity. The three areas of information given are:

- Temperature graph
- Rainfall graph
- Water guide distinguishes intermittent and permanent water.
- Index to Adjoining Maps

The index puts the map into context with the maps that surround it. It provides map names and map numbers.

#### **State Differences**

The above details are correct for Queensland and Northern Territory maps. In NSW, all of the above details are on the right hand foldout of the map. This includes the cover, which shows the name, location in the state and the surrounding maps. The new GDA maps have topographical details on one side and an Orthophoto on the other. These new series maps do not include the weather details. Other states and countries may have different variations of this information.

#### Map Navigational Skills

Arguably, the most important navigational aid is the topographical map. A compass only provides information on where magnetic north is. The map details where you are, what you are about to face, and the desired destination. Topographical maps are the main source of information on the geography and environment that you are about to encounter. Rod Phillips, in *Cross Country Navigation*, calls this "feature based navigation".<sup>21</sup>

<sup>20</sup> Know Where you stand with GDA. Geocentric Datum of Australia. Pamphlet 1997.
 <sup>21</sup> Phillips, Rod. <u>Cross Country Navigation</u>. Introduction i

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# **Understanding Contours**

Each contour line represents a height above sea level. The distance between contours is identified on the map. Not every contour line is numbered. Generally only the 50 meter or 100 meter contour lines are numbered, with lighter brown contour lines marked in between (at the specified contour distance).



Figure 2.2: Contour lines.<sup>22</sup>

 <sup>22</sup> Pr John Wells
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# **The Contour Shapes**

Figures 2.3-2.6 illustrate the basic shapes that are depicted by contour lines.<sup>23</sup>



Figure 2.3: Knoll.24

<sup>23</sup> Stein, C. Topographical Mapping. P24-28
 <sup>24</sup> Stein, C. Topographic Mapping
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Figure 2.4: River valleys on knolls, rivers and spurs.<sup>25</sup>

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Figure 2.5: Shapes of slopes.<sup>26</sup>

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Figure 2.6: U-Shaped Valley and Pass.27



Figure 2.7: Cliff and Ridge.28

#### **Grid References**

Grid references are interpreted using superimposed, equally spaced vertical and horizontal lines that intersect at right angles to form squares.<sup>29</sup> On a topographical map, grid references are the most accurate way of communicating to someone else a group or individual location or where something is located. It minimizes misunderstandings or refering to unfamiliar features. Grid referencing is a method of location identification that is used by industry, army and GPS (Global Positioning Systems). this skill is essential knowledge for outdoor leaders and individuals wishing to navigate successfully.

In many places in the world (especially North America) a ten-figure grid reference is used. GPS technology also employ a ten-figure grid reference. In Australia and New Zealand, outdoor enthusiasts use a six-figure grid reference. The combination of horizontal and vertical lines demonstrate a grid as illustrated in Figure 2.8.



Figure 2.8: A Grid.<sup>30</sup>

To remember the correct sequence for the grid reference, use the word END. Each letter represents a step in understanding grid references:

<sup>30</sup> Stein, C. Topographic Mapping

<sup>&</sup>lt;sup>28</sup> Stein, C. Topographic Mapping

<sup>&</sup>lt;sup>29</sup> TASMAP. Map Reading Handbook edition 2. p17

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E is for Eastings. These are the vertical lines that run from the top of the page to the bottom (Figure 2.9). The numbers increase as you go east across the map.



Figure 2.9: Eastings.<sup>31</sup>

**N** is for Northings. These are the lines that run horizontally across the map (Figure 2.10). The numbers at each end of the lines increase as you go or North, or up the page.



**D** is for Dot. The dot refers to the actual location the group is aiming for (Figure 2.11). The Dot will be the identified location in the grid square created by the Eastings, and Northings.

	35	36 	37	38			
54					54		
53							
52 <del></del>			×		52		
51							
	35	36	37	38			
Figure 2 11: Dot <sup>33</sup>							

Each square within the grid is divided up into 10 smaller grid squares (Figure 2.12). This is either imagined by the reader or measured more accurately using the scale ruler or orienteering compass.

<sup>31</sup> Stein, C. Topographic Mapping<sup>32</sup> Stein, C. Topographic Mapping

<sup>33</sup> Stein, C. Topographic Mapping 42



Figure 2.12: Division of grid square.<sup>34</sup>

From this square the navigator can locate the approximate location (withing 10 metres) of the exact grid reference point. This will determine where the Dot is. Remember that every square has an Easting and a Northing number, and the dot is expressed using these terms. The maths for the square in fig 2.12 is given below:.

Easting	36		
Easting Dot	5		
Northing	52		
Northing Dot	5		

365525

Provided below is a practical example (Figure 2.13). What is the grid reference for the Dot? (Remember END).



Figure 2.13: Practical example.35

You should end up with a grid reference of 774106. Another practice: Put a dot on the above graph for this grid reference – 768082.

## Things to Remember regarding Grid References:

Always read the numbers in the same order: Easting before Northing. The acronym, E.N.D. is useful in remember this process. The grid reference in Australia and New Zealand must always be exactly six numbers. This means that if there is a 04 reading the '0' is extremely important.

If the dot location is not exactly where you think a dot number should be on the grid square, use the closest number below it. A grid reference is not completely accurate, even when using a GPS, so some variation needs to be allowed for.

## **Ten-Numbered Grid References**

On the GPS, ten numbers are used. The extra numbers known as (little numbers) are found on the scales for Eastings and Northings. The ten digit grid numbers are illustrated in Figure 2.14.



Figure 2.14: Ten digit grid numbers.<sup>36</sup>

So the ten-numbered grid reference on the GPS would read:

03	77	4	76	10	6
Little number	Eastings	Dot	Little number	Northings	Dot

Therefore it is written as: 0377476106.

The 'little number' changes every 100 grid lines. It is written at every tenth grid line as seen in the example above.

# **Calculating Distance**

Each map has a linear scale that identifies what the distance represents on the ground. The distance can be calculated various ways, eg. by using a pair of dividers, a ruler, length of string, counting the squares etc. The most accurate way to calculate distance is to use a ruler, a (base plate) orienteering compass edge or edge of a piece of paper.



Figure 2.15: Calculating distance with a ruler.37

A ruler gives a fairly accurate estimate of distance without allowing for the ups and downs of the terrain. If there are dramatic variations in height, walkers need to estimate times accordingly. The map reading only reveals the most direct distance.

<sup>37</sup> Phillips/Phillips/Foley. Cross Country Navigation. P17 Demo. Bushwalking Skills in Difficult & Trackless Areas / Navigate in Difficult & Trackless Areas SROBWG002 / SRONAV002 April 2010

# **CHAPTER THREE:** Using a Compass

A compass establishes where Magnetic North is. There are many types of compasses available; the best type for bushwalking is the base plate compass. This is because it combines a magnetic needle suspended in an oil filled capsule with a built in protractor for establishing bearings that need to be followed.



The parts of a base plate compass are shown in Figure 3.1.

Figure 3.1: Parts of a base plate compass.<sup>38</sup>

# Taking a Site Bearing

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Site bearings are especially important if you can see your destination.

- Hold the compass in a horizontal position
- Point the direction of travel arrow toward the object
- Rotate the (base plate) orienteering compass move the housing until the two arrows point in the same direction (the marriage).
- This establishes the direction for the group
- Read and record the bearing off the index line.

<sup>38</sup> Martin & Lotty. Map & Compass Fundamentals Orienteering

• See Figure 3.2.



Figure 3.2: Taking a site bearing.<sup>39</sup>

# **Travelling on a Bearing**

Dial the bearing that you have been given on the compass so that it is read at the index line.

Move the compass base around until the orienteering arrow and the magnetic needle are pointing the same way (marriage). See Figure 3.3.

<sup>39</sup> Martin & Lotty. Map & Compass Fundamentals Orienteering Demo. Bushwalking Skills in Difficult & Trackless Areas / Navigate in Difficult & Trackless Areas SROBWG002 / SRONAV002 April 2010

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Figure 3.3: Marriage of the orienteering arrow and magnetic needle.<sup>40</sup>

# Walking on a Bearing (or Using a Compass)

- Follow the *direction of travel arrow*, keeping the magnetic needle and orienteering arrow pointing the same way (marriage)
- Look along the *direction of travel arrow* to a feature (tree, rock or building), then walk to that feature (remembering the correct tree in a forest). This means that you will follow a straight line based on features that do not move. Repeat this process until the group has reached the destination.
- Trust the correctness of the magnetic needle. However the needle responds to any magnetic field so ensure you avoid such things as:
  - Taking bearings on the bonnet of a car
  - Hanging a knife or other metal objects close to the compass
  - Being too close to a fence or gate
  - Being near electronic gear such as cameras with built in meters

<sup>40</sup> Martin & Lotty. Map & Compass Fundamentals Orienteering

- Taking bearings near power lines
- Magnetic rock, eg. iron ore deposits. You will possibly only know this if given local knowledge.

Sometimes there are no natural features. In this case, the navigator can:

- Send someone ahead to stand still at the correct spot until everyone arrives. This is
  particularly useful at night (using a torch) or in white conditions such as fog, snow or
  very heavy rain.
- Walk 2 or 3 people behind the leader. They can then use the people in front of them to monitor the direction that the group is going.
- Count their steps while walking on a bearing, if they know how many steps they take to walk 100 meters.

# **Using Map and Compass**

## Taking a Point-to-Point Bearing Using a Map

- Lay the edge of the compass base along the line joining the current location of the group and the point where the group plans to go.
- The *direction of the travel arrow* must be pointing in the direction you will be travelling.
- Turn the movable housing (base plate) around until the orienteering arrow is pointing in the same direction as the Easting grid lines on the map.
- Take the compass from the map and turn the base plate around until the magnetic needle points in the same direction as the orienteering arrow.
- Then walk following the *direction of travel arrow*.

See Figure 3.4.



Figure 3.4: Taking a point to point bearing.41

<sup>41</sup> Martin & Lotty. Map & Compass Fundamentals Orienteering Demo. Bushwalking Skills in Difficult & Trackless Areas / Navigate in Difficult & Trackless Areas SROBWG002 / SRONAV002 April 2010

## **Converting Between the Different Norths**

A compass responds to the magnetic north. The location of the magnetic north keeps changing at a known rate; this is known as magnetic variation. In Australia, most of the variation is to the east, except for the southern region around Perth in Western Australia, where the variation is to the west (Figure 3.5).



Figure 3.5: Variation of magnetic north in Australia.<sup>42</sup>

The compass is reacting to Magnetic North, but the map's details are relevant to Grid North (the closest representation of True North). When giving bearings the navigator needs to distinguish which north they are referring to.

- Compass Points to Magnetic North
- Map Grid lines corresponds with Grid North (Northings on the map) or True North

The map gives the information needed to convert from one North to the other.

Converting from Grid/True North to Magnetic North

• SUBTRACT

Converting from Magnetic North to Grid/True North

ADD

Note: In parts of WA the above formula is reversed. Regardless of the country or state it is important to check the variations with the map you are using.

Another handy way to remember the calculation is with this short rhyme:

"Magnetic east, magnetic least, in other words subtract

Magnetic west, magnetic best." In other words add

If the Norths were shown on the map like the diagrams below, these calculations would be used. Two examples have been given in Figure 3.6 and 3.7 to illustrate that true north and grid north can be in different places in relation to each other as you move around Australia.

<sup>42</sup> Paddy Pallin. Bushwalking and Camping



Figure 3.6: True north calculation 1. 43

Magnetic North - Grid North

15 MN + 12.2 variation = 27.2 GN Magnetic North – True North

15 MN + 12.2 - 0.7 = 26.5 TN



Figure 3.7: True north calculation 2. 44

Magnetic North – True North		
15 MN		
+ 7.4		
+ 0.2		
= 22.6TN		

For short distances, Magnetic North is alright to follow. For longer distances however, Magnetic North needs to be converted to True North to try and cut down the error. Over 6km, there is up to a 1km difference between TN and MN.

<sup>43</sup> Martin & Lotty. Map & Compass Fundamentals Orienteering

44 Cardwell map. Series R631

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# **CHAPTER FOUR:** Route Planning

Which is more dependable, the compass or the map?

Most experienced bushwalkers use the map more than the compass as their source of information and direction in bushwalking.

Following a compass course has an error factor of about 3-4 degrees over about 1000m. This can equal up to 60m. This applies to both errors of the compass and of the navigator. Greater errors can be experienced in scrub, hilly or steep terrain.

When walking on a compass bearing, the focus is on the direction. This means missing out on enjoying the bush. "If you always rely on such methods, (navigating by compass) you cut yourself off from the world around you, substituting figures and measurements for a close understanding of the nature of the terrain. I don't like my walking to be reduced to mathematical calculations".<sup>45</sup>

A compass is useful when determining where north is, or dealing with environmental situations (dense forest, fog, heavy rain, snow, etc), or where the terrain makes it difficult to recognise your location.

A good leader should hike using the terrain and map as their navigational methods. Understanding a map is vitally important. A map:

- Illustrates what terrain surrounds the group.
- Describes what to expect.
- Provides information as to the best way to travel to where the group wants to go.
- Is more reliable because the terrain has less potential errors than a compass.
- Reveals how far the group has walked and how much further they have to go.

#### **Navigational Techniques**

These are the tricks used when navigating, whether using a map and/or compass. These skills are used in the sports Orienteering and Rogaining, as well as bushwalking.

#### **Linear Features**

These are the map features such as tracks, roads, creeks, rivers, ridges, gullies, or spurs. They are the 'roads' through the bush. They help walkers know where they are and to estimate how much distance is involved.

#### **Point Features**

These are ground features that can help leaders recognise the terrain around them. They are the summits, saddles, knolls, quarries, dams, bridges, etc. They could be the joining of two creeks, a road junction or the point where a spur goes over a ridge. It could be a sharp bend that a creek or road takes. These are the signposts that help leaders say confidently where they are.

Linear and point features are the secrets to walking confidently through the bush without having to use a compass. They give leaders an opportunity to enjoy the experience. Rod Phillips in Cross-Country Navigation refers to this form of navigation as 'feature based navigation'.<sup>46</sup>

### **Hand Rails**

This term refers to a natural (eg. river, ridge or mountain range) or man-made feature (eg. road) that runs reasonably parallel to the route that the group is taking.

#### **Attack Points**

This is an easily recognisable feature (eg. hill etc) that is close to the point that the group is aiming for. From the attack point (Figure 4.1), the group can easily make their way to the destination.



Figure 4.1: Attack point.47

# **Aiming Off**

This skill is used when a leader knows they won't see the destination when approaching. Some other feature such as a creek, road, or ridge is used as a linear reference instead. The idea is to deliberately aim off to one side so that when you reach the linear feature the group just follows it to the destination.



Figure 4.2: Aiming off.48

<sup>&</sup>lt;sup>46</sup> Phillips/Phillips/Foley. Cross Country Navigation

<sup>&</sup>lt;sup>47</sup> Phillips/Phillips/Foley. Cross Country Navigation. Introduction i

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# **Collecting Features**

This is a linear feature that runs across the desired route (eg. ridge, spur, creek/river or road). Once the group reaches it, it acts as a reference point for the next part of the journey. You can then aim off the collecting feature with confidence.

# **Choosing the Best Terrain**

The type of bush is a major factor to consider when choosing bushwalking routes. Generally, gullies and creeks have thicker vegetation than ridges and spurs, which are usually the best route to follow. A map illustrates the type of terrain, but not the undergrowth. Leaders will just have to adapt if they encounter lantana, thick bracken, high kangaroo grass or a blackberry patch.

# Spiral and/or Sweep Search

These techniques can be used by a group that is looking for a specific location (eg. cave entrance). A Spiral Search is when the group arrives at what they believe is the right place and then search out in ever widening circles til they find the place. A Sweep Search is when the whole group forms a line and walks parallel to each other across the suspected area. This technique is also used in search and rescue. See Figure 4.3.



Figure 4.3: Spiral and sweep.49

# **Back Bearing**

This technique uses a compass to return the way that the group has just been; this means, a 180 degree change in direction. It is very simple with the base plate compass. Instructions are as follows:

- If the bearing you are on is less than 180 degrees, then ADD 180 degrees by turning the movable housing around to the new degree (ie, 25 + 180 = 205)
- Then shift the base around until the orienteering arrow and magnetic needle line up.
- If the bearing is greater than 180 degrees, then SUBTRACT 180 degrees from the bearing by turning the moveable housing. (ie, 250 180 = 70)

<sup>48</sup> Phillips/Phillips/Foley. Cross Country Navigation

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49 Pr John Wells
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• An easier way still, without changing anything on the compass, is to turn your body around so that the *direction of travel arrow* is pointing towards you. Now you are actually looking at the direction to go on a back bearing.

#### Resection

This method uses natural visible features to find your general location. It can be done with two or three features and a compass, or by line of sight on a map that has been orientated to the features of the terrain around it (Figure 4.4).



Figure 4.4: Resection. 50

The same result can be achieved by taking a bearing from the current location to each feature, then transferring this information to the map. The magnetic bearing also needs to be converted to a Grid North or True North reading.

## **Going Around an Obstacle**

If walking towards an obvious feature that may be identified from any angle, just walk around the obstacle to reach it.

If walking around an obstacle (eg. billabong, small dam etc.) in terrain that has no obvious landmarks (eg. trees all look the same), send some of the group members ahead, then follow them once they reach the right spot on the other side. This same method may be used when following a bearing in dense bush, fog, at night etc.

If the group is walking on a bearing that is between two easily seen points around the obstacle, then just walk around it until the two points line up with the bearing that you are following.

If there are no obvious points, use one of the following two methods:

<sup>&</sup>lt;sup>50</sup> Phillips/Phillips/Foley. Cross Country Navigation.

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1. Walk at right angles to the course to avoid an obstacle (Figure 4.5).



Figure 4.5: Right angles.<sup>51</sup>

- 2. Walk at a 60-degree angle around the obstacle.
  - As you approach the obstacle: Stop. Subtract 60 degrees from your bearing.
  - Count the number of paces that you walk on this new bearing until you have avoided the obstacle. You will be walking to the left side.
  - Stop. Change you're bearing by ADDING 60 degrees to your original bearing. Walk the same number of paces on this new bearing.
  - Stop. Change to the original bearing and walk on your way.
  - This method takes you to the left of the obstacle. If you need to go to the right, do calculations in the reverse order (i.e. +60, -60).
  - The beauty of this method is that you have walked two sides of an equilateral triangle, so you are still making progress in the direction that you want to go.



Figure 4.6: 60-degree angles.52

<sup>52</sup> Phillips/Phillips/Foley. Cross Country Navigation.

<sup>&</sup>lt;sup>51</sup> Phillips/Phillips/Foley. Cross Country Navigation.

# **Estimating Distance Travelled**

This involves identifying your location as you walk.

In really difficult situations where you are unable to follow linear or point features, you need to know how many of your paces equal 1 kilometre. One pace is the distance from one foot touching the ground till that same foot touches the ground again. The counting process is a bit of a challenge and people use fingers, stones, or assistance from other group members to help with the counting. Don't try to do this for more than a kilometre.

To estimate distance based on walking time, use the Victorian Walking Club monogram discussed in Chapter 2.

#### **Dealing with Difficult Weather Conditions**

If you have to keep walking in difficult weather conditions, then you need to operate according to the compass. Do not rely on your own personal sense of direction.

In foggy conditions, head for easily identifiable features that help identify exactly where you are. If going down a hill, zig-zag on a compass bearing using short distances before changing. Use all of the navigational tricks just mentioned.

If in a featureless location, locate yourself further back in the group to help stay on the bearing.

If in cold, wet or windy conditions with poor visibility, get someone else to manage the group while you work on the navigation. Include the whole group as much as possible. Share the counting of paces and being in the lead etc.

In their book, *Bushwalking and Ski Touring Leadership*, the Victorian Bushwalking Club give guidelines for walking in the snow, following snow poles. If the visibility is so bad that the next pole can't be seen, a rope should be attached to the pole you are at and held while walking out in search of the next pole. Once the leader reaches the next pole, the rest of the group follow the rope, rolling it up as they go.<sup>53</sup>

## **Night Navigation**

This should only be attempted if you have no choice, or it is part of the experience planned for the group. The limited sense of distance travelled and the potential lack of good reference points can make navigation difficult. There is also an increased risk of injury. Strategies for minimising risk when navigating at night include the following:

- Keep the whole group together. Have a designated leader and sweeper.
- Make sure the group works together at all times.
- Ensure everybody has a torch. A head lamp is best.
- Choose a route that is easy walking or on a track.
- Find easily identifiable linear or point features.
- If the group does actually get lost, stop, set up camp, and find out where you are in the morning.

<sup>53</sup> Reynolds, V. Bushwalking and Ski Touring Leadership. P58

## Identifying an Unknown Feature

- 1. Using a Compass
  - If you know where you are, then take a sight bearing to the feature with the compass.
  - Lay the map out.
  - Orientate it towards north.
  - Put the edge of the compass base on the point where you are.
  - Point the *direction of travel arrow* in the direction where the feature is.
  - Swing the compass base around on the axle of your location until the magnetic needle and orienteering arrow align (marriage).
  - Look along the compass edge and see what/where the feature could be.
- 2. By Sight
  - Look at your map and systematically identify each of the features you can see.
  - Identify easy features first.
  - Work from known features to unknown features. Find them on the map.
  - If still unsure, get out the compass.

## **Terrain and Vegetation**

The map will be able to give an idea of what to expect from contours and other features marked on it. Look at the symbols and interpret what they are referring to.

## **Planning Process for a Hike**

Hiking through the bush, and knowing where you are, is one of the great pleasures of life. The best was to experience what the bush has to offer, is to get out there. A basic outline of the planning process for bushwalking is given below:

- Decide the group goals
- Identify the most appropriate map for the area
- Work out the best route for the experience from the map:
  - Look at the contour lines
  - Identify the natural features
  - Decide the easiest route by using linear and point features on the desired route
- Consult with others who have been in the same area
- Recognise the features of the area. For example, if hiking in the Blue Mountains region, expect to find cliffs whether they are marked or not.
- Consider the environmental impact
- Consider the effect of group size
- Decide on camp sites
- Choose the routes
- Identify the potential risks:
  - Consider how to minimise them
  - Complete a Safety Management Plan for the walk (see Appendix)

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- Identify escape routes for different parts of the adventure
- Adapt the route to the anticipated group of people. Consider the following factors:
  - ♦ Age
  - Fitness level
  - Skill level
  - Type of gear walkers have
  - Availability of water, campsites, etc
  - Group size that would be manageable
  - The time, season and other factors
- Identify the route using grid references
- Fill out a data sheet including appropriate details if useful (see Appendix)
- The route should now have been considered, measured, and adapted until it is close to the desired route
- Complete the data collection required by the Conference/Mission Youth Department:
  - Application Form
  - Health Record
  - General Consent and Release Form
  - Notification Form (sent to office)
  - Safety Management Plan (as above)
- Break the route up into legs
- Each leg should begin and terminate at easily recognisable features.
- For a day walk, each leg should be no more than an hour's walk.
- If you use a data sheet, each column should be filled in for the following reasons:
  - It forces you to consider the challenges of each leg
  - It helps to identify what desired features to highlight
- As each leg is completed, look at the map and identify the linear or point features detailed in your plan.

# **CHAPTER FIVE: Other Navigational Resources**

## **Global Positioning Systems (GPS)**

A GPS is a device that is able to identify/fix its position on the earth's surface by referring to signals from satellites, which orbit the earth. By sending a signal to these satellites, and receiving a return message, the GPS is able to identify/fix its position using time/distance calculations. The device's location is stated as a ten-figure grid reference.

A GPS can provide a wide range of information. It can;

- Identify your location
- Store all the way points (point features) for a route
- Estimate the walking rate
- Provide direction to the next point (way point) on the walk
- Provide many more features, (depending on the GPS)

Weaknesses of the GPS:

- Will not be accurate if there are not enough satellites reference points
- Will not function well under thick forest coverage
- Accuracy is dependant on the USA military. This can range from 100m 20m.
- Will not be accurate if there is a limited area of sky available, eg. in a gorge, canyon etc.
- Is limited by the freshness of the batteries used. The signal may become weak.

How to make it as accurate as possible:

- 1. Use 3D positions by using 4 or more satellites
- 2. Use when the PDOP (Position Dilution Of Precision) is less than 5 (5>). The PDOP refers to how the satellites are spread out. The best combination is one overhead and at least 3 spread around the horizon.
- 3. Use the correct map datum, which are found on the your map. These details make improve the accuracy of the GPS.
- 4. Optional position. Use an averaging position not all GPS have this ability. This method provides for greater accuracy.

Advice about GPS:

- The bearing and distance display are only meaningful when you are actually moving
- Your GPS receiver is slow to respond to sudden changes or speed due to the process of collecting signals from the satellites
- The largest number of satellites are obtained when the receiver faces the equator
- Choose easily identifiable landmarks as waypoints
- Gain experience at using a map and compass. Do not rely on GPS alone for navigation. Use the GPS as a reference point to compliment your navigational skills.
- Do not leave your brain at home. DON'T EVER ASSUME ANYTHING<sup>54</sup>

# **Natural Navigation Aids**

- 1. Using the Sun
  - The sun rises in the general east direction and sets in the west.
  - Around midday, the shadow will give an approximate north/south line.
- 2. Quick Stick Method
  - This works any time of the day.
  - Put a metre long stick in a cleared area of ground.
  - Mark where the shadow is as X.
  - Wait 15-20 minutes and mark the new shadow as X.
  - Draw a line between the two X's to get the east/west line.
  - This line is at right angles to the north/south line.
  - Figure 5.1.



Figure 5.1: Quick Stick Method.55

- 3. All Day Sun Stick Method
  - This method takes all day. It is a bit more accurate than the above method.

<sup>55</sup> Casey, Kevin. Australian Bush Survival Skills

<sup>&</sup>lt;sup>54</sup>McElroy, Simon. Exploring GPS p80

- Put an upright stick in the ground and mark where the shadow reaches. (Do this at least 2 hours before midday).
- Using a piece of string attached to the base of the marker stick, draw an arc in the ground at the same distance from the stick as the end of the shadow.
- Wait till the shadow touches the arc in the afternoon
- Draw a line through these two points. This is the E/W line.



Figure 5.2: All Day Sun Stick Method.56

- 4. Watch Method
  - This method gives a general idea of the north/south line.
  - Using an analogue watch (with hands), hold the watch horizontally in front of you and point 12 towards the sun.
  - Now look at the hour hand.
  - The north/south line lies exactly halfway between the hour hand and the 12.
- 5. Direction at Night

The moon follows the same arc as the sun, so when it rises it identifies where east is located.

The Southern Cross is our own unique sign in the southern hemisphere locating south. There are two ways to use the Southern Cross to identify south (Figure :

- a. Extend the axis of the cross approximately 4  $\frac{1}{2}$  times to the horizon
- b. Imagine a line from the axis of the cross toward the horizon. Next take a right angle from the two pointers.
  Find the point where these two imaginary lines cross.
  Go straight down to the horizon from that point

<sup>56</sup> Casey, Kevin. Australian Bush Survival Skills



Figure 5.3: Using the Southern Cross for direction.<sup>57</sup>

#### Conclusion

This unit has provided a basic introduction to guiding and navigating in difficult or trackless areas. There are other resources that contain more detail on certain aspects of outdoor guiding and navigation. It is advised that leaders keep current with best practice resources for outdoor guiding and navigation as new technologies are released regularly.

Please refer to the appendices for more useful information:

Appendix 1 – Adventist Outdoor Bushwalking Guidelines

Appendix 2 – NSW Bushwalking Guidelines

Appendix 3 – Safety Management Plan

Appendix 4 – Data Sheet

# **Bibliography**

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Brow, Ian. Paddy Pallin's Bushwalking and Camping. Envirobook. Sydney NSW: 1995.

Bushpeople Publications. *Bushpeople's Guide to Bushwalking in South East Queensland* 2<sup>nd</sup> *Edition*. Bushpeople Publication Goodna QLD: 1991.

Casey, Kevin. *Australian Bush Survival Skills*. Kimberley Publications. Upper Mount Gravatt QLD: 2000.

Dunlery, Maurice. *Stay Alive 3<sup>rd</sup> Edition*. Australian Government Publishing Service. Canberra ACT: 1997.

Greydon, Don. *Mountaineering, the Freedom of the Hills* 6<sup>th</sup> *Edition*. The Mountaineers. Seattle WA USA: 1997.

Hampton, Bruce. Soft Paths. (Revised). Stackpole Books. 1995.

Hodgson, Michael. *The Basic Essentials of Minimising Impact on the Wilderness*. ICS Books, Merrillville Indiana US: 1991.

Kestenbaum, Ryel. *The Ultralight Backpacker*. Ragged Mountain Press, Camden ME USA: 2001.

McElroy, Simon.*Exploring GPS* Surveyor – Generals Department. NSW. Bathurst NSW: 1998.

Macartrey-Snape, Tim. Being Outside. Australian Geographic Pty Ltd. Sydney NSW: 1993.

Meyer, Kathleen. *How to Shit in the Woods* 2<sup>nd</sup> *Edition*. Ten Speed Press. Berkely Cal USA: 1994.

O'Dean, Marcus. Basic Bushwalking. Envirobook. Sydney NSW: 1998.

Phillips, Rod. Cross Country Navigation. Outdoor Recreation in Australia. Perth WA: 1989.

Reynolds, Vanessa (convener). *Bushwalking and Ski Touring Leadership* 3<sup>rd</sup> *Edition*. Bushwalking and Mountaincraft Training Advisory Board Inc. Melbourne Vic: 2000.

Stein, C. Topographic Mapping. Sapphire Books. Strathfield NSW: 1983.

Tilton, Buck. *The Wilderness First Responder*. The Globe Pequot Press. Old Saybrook CON USA: 1998.

Townsend, Chris. *The Backpacker's Handbook 2<sup>nd</sup> Edition*. Ragged Mountain Press. Camden MA USA: 1997.

Wilderness Society. Minimal Impact in the Bush. Wilderness Society. Sydney NSW: 1992.

Wisheart, Pippa. *Bushcraft. NZ Mountain Safety Manual 31, 3<sup>rd</sup> Edition.* NZ Mountain Safety Council. Wellington NZ: 1995.

*Map Reading Handbook 2<sup>nd</sup> Edition*. TASMAP, Department of Environment and Planning. Tasmania: 1991.

# **Appendix 1: Adventist Outdoors Bushwalking Guidelines**

#### **Bushwalking Guidelines**

Adventist Outdoors Manual > Activity Guidelines > ....

Last edited by Ken Marsh on 04/03/2005

# INTRODUCTION

These guidelines are adapted from **Bushwalking** Adventure Activity Standard, draft four, developed by the Outdoor Recreation Centre Inc. (Vic). They will not cover each and every circumstance of a **bushwalking** activity. Nor can they, when adhered to, entirely eliminate the risk or possibility of loss or injury. Consequently they should be used as a guide only. Activity organisers and/or planners should carefully evaluate the specific requirements of the **bushwalking** activity and the persons participating in it. If necessary, advice should be obtained from a suitably experienced and qualified professional.

## Adventist Outdoors Risk Management Worksheet (Bushwalking)

The document Adventist Outdoors Risk Management Worksheet (**Bushwalking**) is included as an attachment at the end of this guide and is designed to be used in conjunction with the guide. The worksheet is provided as an aid to activity planners and may be modified or adapted as appropriate to meet their requirements. A completed worksheet will help demonstrate the thoroughness of the risk management process in relation to the activity.

## **Activity Description**

**Bushwalking** is the activity of walking in the natural environment and may include walks for pleasure, challenge, experience and/or educational outcomes. **Bushwalking** can involve long (multi day) as well as short (an hour or two) walks and can be enjoyed in environments as diverse as urban suburbs, coastal and alpine regions.

This guide is written specifically for formal groups, such as Pathfinders or school groups, and is intended to provide guidance towards satisfying the legal obligations inherent in delivering **bushwalking** activities. It is important that each leader or activity provider interpret the guide appropriately for the specific group, area and duration of each bushwalk.

## 1.0 PLANNING

In any adventurous activity, planning is essential in order to achieve objectives, have fun and to minimise the inherent risks to participants. There are many recognised ways to plan a **bushwalking** activity and each group may approach this differently. This section is intended to provide a framework for planning **bushwalking** activities to minimise the risks to participants.

# 1.1 Considerations for Developing an Activity Plan

Organising bodies and experienced leaders may be familiar with the many factors that can influence the quality and the safety of a **bushwalking** trip. The following is a list of such factors and should be addressed in any **bushwalking** activity plan.

Adventist Outdoors SPD recommends that the process of addressing these factors be documented for all groups.

- Objectives of the trip (desired outcomes).
- Expected capabilities of participants.
  - Age, experience, skill.
  - Fitness, disposition, known medical conditions.
- Area and route selection.
  - Availability & suitability of maps.
  - Land managers requirements (access restrictions, group sizes, permit requirements, booking requirements).
  - Availability of area specific information.
  - Ability of site to withstand visitation with minimal impact.
  - Terrain (route characteristics) and associated implications.
  - Remoteness and access.
  - Seasonal factors (snow, fire).
- Expected weather conditions and implications (hypothermia, hyperthermia).
- Group composition.
  - Size of group.
  - Standard of care (Education, Commercial, club or informal).
  - Supervision requirements (see 2.6).
- Equipment, food and clothing requirements.
  - Availability of equipment for participants.
  - Available communication equipment.
- Support/evacuation capabilities (Vehicle etc.).
- First aid requirements.

The leader selected for a **bushwalking** trip:

- Must have the required skills and experience available to conduct the trip.
- Should be suitably familiar with the area being visited (the level of familiarity will vary according to the objectives and circumstances surrounding the walk/group.)

Reasons for cancelling, modifying or postponing a trip include (but are not limited to) inappropriate weather conditions, insufficient equipment, restrictions dictated by the land manager and environmental factors (flood, drought, fire).

## **1.2 Pre Trip Documentation**

There are many sound reasons for documenting certain aspects of the activity plan. This may be for the safety of the group should the leader become injured or incapacitated, it may allow search and rescue teams to conduct a more efficient search (where necessary) or may assist with a legal defence following an incident.

Appropriate to the standard of care owed to the participants, the following should be documented, carried on the walk and a copy should be made available to a non-participating contact:

Trip Plan. (At minimum: the planned route, anticipated time and expected hazards.)

- Emergency strategy (refer 1.4).
- Participants' names, addresses and emergency contact details.
- Any medical conditions of participants that are likely to affect performance;

- For example: asthma (details of management plan required), diabetes, epilepsy, fainting/dizziness, specific allergic reactions, blood conditions which may affect bleeding/ blood clotting, conditions affecting balance, recent or long-standing injuries (eg back, knee, ankle), disability or other relevant medical conditions (eg pregnancy, repetitive strain injury (RSI) and any relevant medication).
- Participants' signatures acknowledging inherent risks and authorising any relevant medical treatment by a medical officer if required (after a full explanation/brief).

The signature of a parent/guardian for participants under the age of 18.

Throughout the trip, the leader must take reasonable steps to account for any known medical requirements.

## 1.3 Risk Management

The Australian/New Zealand Standard on Risk Management (AS/NZ 4360:1999) is an established process for risk management. It describes risk management as 'a process consisting of well-defined steps which, taken in sequence, support better decision making by contributing a greater insight into risks and their impacts.'

Appropriate to the walk being undertaken and the group involved, foreseeable risks should be noted and assessed, and strategies considered to avoid or minimise these. This may be a part of the trip plan which should also identify risks such as unseasonal snowfalls, rock scrambles and river crossings. Significant risks and required controls should be documented.

## 1.4 Emergency Strategy

An emergency strategy must be devised (from the risk assessment) to manage foreseeable incidents and minimise their escalation.

Trip leaders, including assistants, and a non-participating contact, either within the organisation or otherwise, must be aware of the emergency strategy.

The emergency strategy for a **bushwalking** trip must be specific to each walk and will contain:

- Emergency access and emergency escape routes (where possible).
- Emergency contact details for key organisations (Land manager and police) and how they are best contacted (mobile phone, satellite phone, radio).
- Planned start and finish time of the walk.
- The emergency trigger time for the non-participating contact to inform emergency services (on failure of group to return/check-in).
- Specific communication being carried by group.
- Strategies adopted peculiar to specific areas being visited. (eg a rock scramble)

The trip leader must communicate with the relevant external contact at designated time/s. Upon failure to do so (trigger time), the external contact will notify the police.

# 1.5 Restrictions to Participation

Participants may be excluded from a trip (or a trip may be modified) at any time prior to departure, and at the leaders discretion throughout the trip where possible. Such participants

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can include (but are not limited to) those who may be under the influence of alcohol or drugs (including prescription drugs which may affect performance), those who are unable or unwilling to follow instructions, and those who lack suitable equipment, level of fitness and experience for the particular trip.

# 2.0 Responsibilities of the Trip Leader/Assistant

This section of the guide includes all aspects of the activity plan that are specifically relevant to the leader of the trip and any assistants. It describes the skills that those individuals should have and the minimum tasks that they are responsible for throughout the duration of any bushwalk.

## 2.1 Skills Expected of a Leader

To lead **bushwalking** activities, you must be confident in having skills and experience at least equivalent to that described by the following Units of Competency. Adventist Outdoors acknowledge that experience with community organisations such as walking clubs or employers, TAFE colleges, universities, registered training organisations (RTO's), in-house training and international qualifications are all ways in which a leader can acquire these skills.

Adventist Outdoors also acknowledges that Pathfinder clubs and other groups or organisations may not have staff with all the required competencies. Clubs and other groups or organisations in this situation should make sure as part of their activity planning that the lack of specific competencies is not an unacceptable risk to participants. Where the lack of competencies is considered an unacceptable risk, the club, group or organisation should:

- develop a plan to help staff attain the required competencies; or
- make arrangements with other groups, organisations or individuals to provide people with the required competencies.

# 2.1.1 Bushwalking Leader on Tracked or Easy Untracked (Easy)

"Tracked or easy untracked areas" are reliably marked on maps and are obvious on the ground. Tracks are inspected on a regular basis, and road or other safe collecting features are easily reached within 2 hours by applying elementary navigation principles.

A leader at this level should have the following:

- Leadership & Management Skills
- Respond to emergency situations (SRXEMR001A)
- Provide first aid (SRXFAD001A)
- Facilitate a group (SRXGRO001A)
- Deal with conflict (SRXGR0002A)
- Apply sport and recreation law (SRXINU002A)
- Follow defined occupational health and safety procedures (SRXOHS001B)
- Undertake risk analysis of activities (SRXRIK001A)

## **Outdoor Recreation Skills**

- Operate communication systems and equipment (PUAOPE002A)
- Navigate in difficult and trackless areas (SRONAV002B)

- Plan for minimal environmental impact (SROOPS002B)
- Apply weather information (SROOPS003B)
- Use and maintain a temporary or overnight site (SROOPS006B)
- Plan outdoor recreation activities (SROODR002A)

# **Bushwalking Skills**

- Guide outdoor recreation sessions (SROODR005A)
- Demonstrate **bushwalking** skills in difficult and trackless areas (SROBWG002A)
- Guide bushwalks in tracked or easy untracked areas (SROBWG008A)

## 2.1.2 Bushwalking Leader on Difficult and Trackless (Intermediate)

"Difficult or trackless areas" are areas where there are limited modifications to the natural surface so that track alignment is indistinct in places. There is minimal clearance along the track. Signage is minimal and only for management purposes. There are terrain and manmade hazards (such as cliff lines or dense forests). The possibility for changes in weather and visibility exists.

A leader at this level should have the above skills plus the following:

## Leadership & Management Skills

- Coordinate emergency response (SRXEMR002A)
- Provide leadership to groups (SRXGRO003A)
- Implement and monitor the organizations occupational health and safety policies procedures and programs (SRXOHS002B)

## **Outdoor Recreation Skills**

- Navigate in unmodified landscapes in extreme environmental conditions (SRONAV003B)
- Interpret weather conditions in the field (SROOPS004B)
- Plan outdoor recreation activities (advanced) (SROODR003B)
- Manage risk in an outdoor recreation activity (SROODR006A)

## Bushwalking Skills

- Demonstrate **bushwalking** skills in unmodified landscapes (SROBWG003A)
- Demonstrate river crossing skills (SROBWG004A)
- Guide **bushwalking** in difficult and trackless areas (SROBWG009A)

# 2.1.3 Bushwalking Leader on Unmodified landscapes (Advanced)

"Unmodified landscapes" are those which are totally natural. There are no modifications to the natural surface, so track alignment is indistinct and there is no clearance along the track. There is no signage and the track is not managed for public risk. The onset of extreme environmental conditions would have a significant adverse impact upon the bushwalk.

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A leader at this level should have all of the above skills plus the **bushwalking** skills described within the Unit of Competence:

• Guide bushwalks in unmodified landscapes (SROBWG010A)

Details of these units and the National Outdoor Leaders Registration Scheme (NOLRS) can be accessed free by logging on to <u>http://www.qorf.org.au/</u>.

# 2.2 First Aid

"When rendering first aid you are required to act with reasonable care and common sense and are required to render the first aid to the best of your ability, but within the limits of your training and qualifications." (Handbook of the BMTAB Inc.; Legal aspects of outdoor recreation leadership; page 285.)

On every **bushwalking** trip where participants are predominantly children (under the age of 18), there must be a responsible group member who has agreed to act as the first aider for the trip. This person must hold a current and recognised senior first aid certificate or equivalent.

More specialised first aid knowledge may be required on multi day trips, trips planned for participants with disabilities and/or walks into remote areas.

# 2.3 Specific Responsibilities of the Trip Leader

The following are the responsibilities of a **bushwalking** trip leader (In addition to leading the group). Individual tasks may be delegated but the responsibility remains with the trip leader:

- Take reasonable steps to ensure that the level of knowledge, ability, skill and equipment of each participant is appropriate for the level of difficulty and complexity of the trip.
- Research and plan for likely hazards.
- Ensure that minimal environmental impact message is conveyed and adhered to.
- Nominate an assistant (or assistants) who has/have demonstrated leadership potential and are willing to perform the duties.
- Ensure a briefing is conducted and understood by all participants.
- Undertake headcount before, during and immediately after the trip.
- Maintain awareness of the physical and psychological condition of the group.
- Control the pace of the group appropriately.
- Delegate responsibility to other group members as necessary (radio, first aid, etc.)
- Notify appropriate persons of safe completion.
- Ensure that any incidents are managed, reported and recorded.
- Manage group to avoid or minimise the effects of hazards.

# 2.4 Assistant to the Trip Leader

If an assistant to the leader is appointed, they must be familiar with the requirements of the activity in order to be able to assume an effective assistant role. They must also have the ability to competently participate in emergency response procedures as needed.

If the leader becomes incapacitated, then the nominated assistant assumes the responsibilities of the leader.

## 2.5 Communication

It is essential that communication about a trip begin with pre trip information being accurately disseminated to potential participants. Information needs to be shared with participants in adequate time for an informed decision to be made about their participation.

All participants and leaders must use agreed and understood communication (briefing, calls). It is essential that this is devised before the trip and that it is included as a component of the pre trip briefing. A pre-trip briefing should include:

- Introduction of trip leader and assistant/s
- An outline of the trip plan and objectives.
- The nature of the activity and it's inherent risks.
- Essential equipment and clothing.
- Recommendations on the type and amount of food likely to be required.
- Recommendations on the availability of water.
- Strategies for conservation including flora, fauna and rubbish removal and sanitation.
- A summary of the emergency plan, or sufficient information to allow participants to act appropriately in the event of an incident or emergency.
- Explanation of what is expected of participants (conduct etc.)
- Agreed methods of communication within the group.
- Leaders should receive acknowledgment that participants have understood the content of the briefing.

# 2.6 Ratios of Trip Leader and Assistants to Participants

There are clearly situations where judgment will dictate the requirement for smaller numbers of participants per leader/assistant. As such, the leader of any walk should carefully consider the supervision ratio based upon consideration of:

- Experience of the leader.
- Expected capabilities of participants.
- Conditions (environment, remoteness, weather).
- Land manager's requirements.
- Planned duration of walk.
- Remoteness of planned walk.

Where consideration of the above factors does not identify appropriate ratios for the planned walk, a ratio of 1:12 should be adhered to (ratios stated as Leader: Participants). For groups where the participants are primarily minors (under the age of 18), a ratio of 1:10 should not be exceeded.

Where walks are conducted overnight (or for base camping) and the participants are primarily children, additional consideration must be given to supervision at the campsite. For such walks, a ratio of 1:6 should not be exceeded, unless the issue of supervision is effectively addressed by the specific risk assessment and emergency strategy.

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It is desirable in mixed gender groups that the leadership group include a male and female.

#### 2.7 Group Size

Group size is an essential component of group management. Maximum and minimum group size must be carefully decided based upon the following:

- Specific restrictions imposed by the land manager.
- Expected environmental impact of the planned route.
- Experience of the leader and participants.
- The potential impact of other users.

As a general rule, groups should be of no less than 4 and no more than 30 participants. [Two groups of 20, each adhering to the guidelines, is generally safer and easier to coordinate than one group of 40.]

## **3.0 EQUIPMENT**

Equipment requirements for **bushwalking** are subjective and will vary with the objectives of the trip, experience of the participants (and leader), and the expected environmental conditions. As such, it is essential that equipment and clothing requirements be considered in a way that can account for unpredictable weather changes. Leaders must be satisfied that all participants set out with suitable equipment, food and clothing for the planned trip. It is recommended that this is achieved by reference to a tailored checklist, which should be provided to participants in advance. The checklist should include (as a minimum) the contents of 3.1, 3.2 and 3.3, which are provided as examples below. Adjustments to the clothing and equipment should be made for:

- Walks in hot, dry conditions
- Walks in tropical conditions
- Extended trips

## 3.1 Clothing

Footwear, socks, gaiters, shorts, trousers, shirt, thermal top & pants, wool jumpers or fleece jacket, waterproof jacket, waterproof pants, sun hat & beanie, gloves or mittens. Consider what spares may be required.

#### 3.2 Personal Items

Watch, compass and maps, notebook and pencil, whistle, sunscreen, insect repellent, first aid kit and any personal medication, matches/lighter, suitable knife, toilet paper, trowel, sleeping bag, sleeping mat, toiletries for overnight walks.

Pack, pack liner, sit mat, water bottles, food, torch, rubbish bag, section of cord or rope.

## 3.3 Group Equipment

The leader should consider the following equipment when determining what equipment is appropriate for the specific walk being undertaken. Depending on the group, it is likely that participants will share the group equipment.

- Tent, groundsheet, cooking equipment, pot scrubber, candles (for overnight/extended trips).
- Communication equipment appropriate to the location (for day or overnight/extended trips), eg. mobile phone, radio, satellite phone, PLB (personal locater beacon), or EPIRB (electronic personal indicator response beacon)

## 4.0 ENVIRONMENT AND CONDUCT

The leader and organising body should be satisfied that participants are aware of their responsibilities (as members of the group) in respect to the environment and the community as follows:

- Minimise disturbance to native plants, animals, historical and archaeological sites and geographic features.
- Try to avoid tracks and other areas which will be intrinsically more prone to erosion. Especially with larger groups.
- Carry out all rubbish (including foodstuffs) as they may harm native wildlife.
- Wash all soil from camping and personal equipment and vehicles before leaving home or moving between locations, in order to avoid transporting seeds or soil-born pathogens such as phytophthora.
- Camp at established campsites where possible.
- Use toilet facilities where available
- Where possible, faecal matter is to be buried at least 100 metres from any water supply.
- Avoid using any soaps or detergents. If they must be used, use only biodegradable soaps and detergents. Dispose of washing water at least 50 metres from any water source.
- No fire (including a fuel stove) may be lit on a day of Total Fire Ban. Total Fire Bans may be implemented regionally, so be sure to check regularly and be aware of fire regions that cover the route.
- Use fuel stoves in preference to open fires.
- Where open fires are used:
  - Use existing fireplaces where possible.
  - Keep fires to a minimum size necessary for cooking, and minimise disturbance to the surrounding area.
  - Extinguish fires with water.
  - Return the fireplace as closely as practicable to its original condition.
  - Never light or use open fires (or stoves) dangerously
  - Do not light an open fire if fuel is scarce.
  - Avoid lighting an open fire (even if permitted) if not necessary, or where doing so will not comply with the minimal impact approach.
- Leaders MUST know applicable fire regulations in advance of the trip, as fire regulations are LAW.

Walkers should respect the community by:

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- Making reasonable efforts to minimise the impact of the group on others.
- Assisting other parties in difficulty, provided that this action does not adversely affect the safety of the group.

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- Being diplomatic with other groups and other recreational users of the area.
- Trying to minimise noise.

## LINKS

The following links provide access to additional information that may aid the planning and conduct of **bushwalking** activities. AOSPD provides these links as a service to aid the Seventh-day Adventist Church community to manage risks associated with outdoor activities. No claim is made to the accuracy or otherwise of information contained within the linked pages. Users are responsible for evaluating and acting on the information.

## **Bushwalking Associations and Clubs**

• The website of the *Confederation of* **Bushwalking** *Clubs NSW Incorporated* provides links to other state associations plus a range of information:

#### http://www.bushwalking.org.au

The menu at the top of this page provides access to information that may be helpful in planning a walking activity. Also, information on food and equipment (Miscellaneous), 'nasties & bities' and 'Water-born Health Hazards' (Health and Safety).

• Federation of Victorian Bushwalking Clubs (VicWalk)

#### www.vicwalk.org.au

VicWalk produce a useful guide to **bushwalking** risk management. It provides a list of generic hazards and examples of controls.. Click on '*Publications*' on the opening page. ('*Risk Management Guidelines for Bushwalking Clubs*'not accessible on site. New website)

#### The National Parks Association of New South Wales

• The Bushwalkers Code

#### http://www.npansw.org.au

Click on **Bushwalking on opening page, then** 'Confederation of Bushwalkers Code of Ethics'

#### Weather

• Department of Meteorology

http://www.bom.gov.au/

Ninemsn Weather

http://weather.ninemsn.com.au/weather/

#### Fire Brigades

Fire authorities provide information on fire restrictions, fire bans and the like. You will have to search the sites to find relevant information:

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- ACT Emergency Services Authority
  <u>http://www.esa.act.gov.au</u>
- NSW Rural Fire Service
  <u>http://www.rfs.nsw.gov.au/index.cfm</u>
- The Bushfires Council of the Northern Territory
  <u>http://www.nt.gov.au/nreta/natres/bushfires/about.html</u>
- Rural Fire Service of Queensland
  <u>http://www.ruralfire.qld.gov.au/</u>
- Country Fire Service of South Australia
  <u>http://www.cfs.org.au/</u>
- Tasmanian Fire Service
  <u>http://www.fire.tas.gov.au</u>
- Country Fire Authority of Victoria
  <u>http://www.cfa.vic.gov.au</u>
- Fire and Emergency Services Authority of Western Australia
  <a href="http://www.fesa.wa.gov.au/">http://www.fesa.wa.gov.au/</a>

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# **Appendix 2: NSW Bushwalking Guidelines**

## Bushwalking Code

This is the accepted Bushwalkers Code of the Confederation of Bushwalkers NSW<sup>58</sup>

- Be self reliant
- Tread softly
- Watch your safety
- Pack it in pack it out
- Be Hygienic
- Keep water pure
- Be very careful with fire
- Choose campsites carefully
- Protect plants and animals
- Respect aboriginal heritage
- Be courteous to others

## Do not Disturb

If you enjoy the pleasures of bushwalking and related self-reliant outdoor activities, you have a big responsibility to protect and preserve the natural landscape for the enjoyment of future generations. This code will help you enjoy the bush without leaving your mark.

## **Be Self-Reliant**

- Enjoy the natural landscape as it is, on nature's terms. Carry with you the things you need for your comfort and safety.
- For shelter carry a lightweight tent or fly, or use a cave or rock overhang. Avoid huts except when weather conditions are really bad.

## **Tread Softly**

- Keep walking parties small in number; four to six people is ideal.
- Avoid popular areas in holiday periods when campsites are crowded.
- Use existing tracks; don't create new ones. On zigzag paths, don't cut corners as this creates unsightly damage that leads to erosion.
- In trackless country, spread your party out; don't walk in one another's footsteps. Avoid easily damaged places such as peat bogs, cushion moss, swamps and fragile rock formations.
- Wade through waterlogged sections of tracks; don't create a skein of new tracks around them.

<sup>58</sup> www.nswbushwalkingguidelines.nsw.au

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- Except in really rough terrain, wear lightweight, soft-soled walking shoes or joggers rather than heavy boots.
- Become proficient at bush navigation. If you need to build cairns, blaze trees, place tags, break off twigs, or tie knots in clumps of grass to mark your route, you are lacking in bush navigation skills. Placing signposts and permanent markers of any kind is the responsibility of the relevant land manager (such as the National Parks and Wildlife Service).

#### Watch your Safety

- Know what to do in emergencies. Rescue operations often cause serious damage so take care to avoid the need for rescue.
- Acquire knowledge of First Aid so you know how to handle illness and injuries.
- Carry clothing and equipment to suit the worst possible conditions you are likely to encounter.
- Carry a mobile phone if you want to, but use it only for summoning aid in an emergency. Keep it switched off until needed.
- Watch for the health and safety of your group. Beware of fatigue or hypothermia affecting your group. (this point not on the website)

### Pack it in, Pack it out

- Don't carry glass bottles and jars, cans, drink cartons lined with aluminium foil and excess packaging. If you can't resist carrying such things, don't leave them in the bush. Remember, if you carry a full container in, you can carry the empty one out.
- Remove all your rubbish including food scraps, paper, plastic, aluminium foil and empty containers. Don't burn or bury rubbish. Burning creates pollution and buried rubbish may be dug up and scattered by animals. Digging also disturbs the soil, causing erosion and encouraging weeds.
- Carry a plastic bag for your rubbish. If you find litter left by irresponsible people along the track or around a campsite, please remove it. Show you care for the environment, even if others don't.

#### **Be Hygienic**

- Ensure you are at least 50 metres from campsites, streams and lakes, when going to the toilet. Wait until you get out of sensitive areas such as caves and canyons before defecating or urinating.
- Bury all faeces and toilet paper at least 15cm deep. In snow, dig through the snow first, then dig a hole in the ground.

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- Carry out things that won't easily decompose, such as used tampons, sanitary pads and condoms.
- Carry a lightweight plastic trowel or a large aluminium tent peg to make digging easier.

#### Keep water Pure

- Wash well back from the edge of lakes and streams so waste water falls on soil where it will be absorbed.
- Prevent soap, detergent or toothpaste from getting into natural water systems. Similarly, when washing cooking utensils, don't use detergent and don't let oils and food scraps get into streams or lakes.
- Always swim downstream from where you draw drinking water.

#### Be VERY careful with fire

- Have a fire only when you are absolutely certain you can light it with safety. A fuel stove is preferable for cooking and thermal clothing is better for warmth.
- Always use a fuel stove in places where even a tiny fire may cause permanent damage. Places where fire lighting should be avoided include many rainforest and all alpine regions.
- Do not light fires in hot, summer conditions, in dry windy weather, in declared "fuel stove only" areas or when there is a declared fire ban.

#### Always remember:

• Fire doesn't destroy aluminum foil, and plastics release toxic gases when burnt. So carry foil and plastics out in your pack with all your other rubbish, including food scraps. Don't use your campfire as a rubbish incinerator.

If you must light a campfire, follow these rules:

- In popular campsites, light your fire on a bare patch left by previous fires. Don't light it on fresh ground.
- Light your fire on bare soil or sand, well away from stumps, logs, living plants and river stones (which may explode when heated).
- Definitely **don't** build a ring of stones as a fireplace. This is unnecessary and unsightly. Dismantle stone rings wherever you find them.
- Sweep away all leaves, grass and other flammable material for at least two metres around your fireplace. (Major bushfires have been caused by careless campers who didn't take this precaution.)

- Burn only dead wood that's fallen to the ground. Don't break limbs from trees or shrubs.
- Keep your fire small. Remember, the bigger the fool, the bigger the fire.

#### Before you leave

- Douse your fire thoroughly with water, even if it appears to be already out. Don't try to smother a fire by covering it with soil or sand as the coals will continue to smoulder for days. Only water puts a fire out with certainty.
- Feel the ground under the coals. If it is too hot to touch, the fire is not out. Douse it some more.
- Scatter the cold charcoal and ashes well clear of your campsite then rake soil and leaves over the spot where your fire was. You should aim to remove all trace of it.

## Choose campsites carefully

- Think twice about using a popular campsite to avoid overuse. If possible, vary your route slightly so you can find an alternative site in a less frequented area.
- Find an open space to erect your tent so it is unnecessary to clear vegetation. In difficult overgrown areas, trample undergrowth growth flat rather than pull plants out of the ground. A trampled spot soon recovers.
- Use a waterproof groundsheet or tent with a sewn in floor and you won't have to worry about surface run off in wet weather. Avoid the temptation to dig drains around your tent. This environmentally damaging practice is no longer acceptable.
- If you have to remove branches or rocks to create a tent site, replace them before you leave.
- Leave your campsite pristine. After a few days it should be impossible to see where you were camped.

#### Protect plants and animals

- Try not to disturb wildlife. Remember, you are the trespasser.
- Give snakes a wide berth and leave them alone. They have more right to be there than you do.
- Watch where you put your feet. Walk around delicate plants.
- Don't feed birds and animals around campsites or they may become pests. Unnatural food can be harmful to many species.

## **Respect Aboriginal heritage**

- Many places have spiritual or cultural significance for Aborigines. Treat such places with consideration and respect.
- Obtain permission from traditional landowners or the relevant land manager to visit sensitive areas.
- Leave Aboriginal relics as you find them. Don't touch paintings or rock engravings.

### Be courteous to others

- The sound of radios, CD players, mobile phones and similar devices is out of place in the natural environment. Leave the electronics at home. (See note under Safety concerning the acceptable use of mobile phones.)
- Ensure your behaviour and activities don't disturb or offend others.
- Camp as far away from other groups as conditions allow. Don't use another group's campfire without permission.
- Leave gates and slip rails as you find them. When you open a gate, make sure the last person through knows it has to be closed.
- Respect the rights of landholders and land managers. Don't enter private property without permission. In national parks, abide by plans of management and encourage others to do so too.<sup>59</sup>

#### When in Camp

- Do your share of getting firewood and water. When breaking camp, help to remove the remains of your fire (if you had one) and clean up the site.
- Don't throw rubbish on a fire where people are cooking. In fact, don't throw rubbish on a fire at all; carry it out with you. (See section: Pack it in Pack it Out.)
- Don't step over other people's uncovered food.
- Offer what is required to help others in need. This could be your leader, who may be carrying group safety items, someone in the group who has injured themselves, or forgotten their billy, or another group who may not have communications to summon emergency medical aid. Recognise that some individuals may need your help but will never ask for it. Volunteer it.

Minimal Impact Bushwalking means do nothing, leave nothing that shows where you have been.

<sup>&</sup>lt;sup>59</sup> http://www.bushwalking.org.au

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# **Appendix 3: Safety Management Plan**

#### Safety Management Plan (18.07.06)

#### **Activity Context**

Activity:	Location:
Date:	Anticipated Time:
Group/Ages:	Experience (of group):
Leader:	Training (of leader):
Leader Experience:	Notification Form Approved:

This document outlines the best practice and anticipated response to any danger, emergency or accident for this activity. This document will be given to every staff member involved and its contents will be shared with the participants involved in the activity. We also acknowledge that if such an anticipated event happens, due to the difference between the real and the anticipated, there may be some other safe and responsible response that may be taken outside of what has been recorded here. This Safety Management Plan reflects the best response based upon the experience that we have had or industry procedure that is currently available. This will be the first procedure method considered in managing the danger.

Item	Dangers	Risk	Control Strategies
	(Risk/Hazard/Peril)	Score	(To reduce or eliminate risk)
	List only the major contributing	H = High	
	dangers that are specific to this activity	M =	
		Medium	
		L = Low	

People	e Dangers – Attributes that people bring th	at could imp	pact on the activity
1			
2			
3			
4			
5			
6			
7			
8			
9	F		V TT
10			

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Equipr	ment Dangers – Use of Equipment resourc	ces that could	d have an impact on the activity
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
-			
Enviro	nmental Dangers – Factors in the environ	mental conte	ext that can impact the activity
Enviro 1	nmental Dangers – Factors in the environ	mental conte	ext that can impact the activity
Enviro 1 2	nmental Dangers – Factors in the environ	mental conte	ext that can impact the activity
Enviro 1 2 3	nmental Dangers – Factors in the environ	mental conte	ext that can impact the activity
Enviro 1 2 3 4	nmental Dangers – Factors in the environ	mental conte	ext that can impact the activity
Enviro 1 2 3 4 5	nmental Dangers – Factors in the environ	mental conte	ext that can impact the activity
Enviro 1 2 3 4 5 6	nmental Dangers – Factors in the environ	mental conte	ext that can impact the activity
Enviro 1 2 3 4 5 6 7	nmental Dangers – Factors in the environ	mental conte	ext that can impact the activity
Enviro 1 2 3 4 5 6 7 8	nmental Dangers – Factors in the environ	mental conte	ext that can impact the activity
Enviro 1 2 3 4 5 6 7 8 9	nmental Dangers – Factors in the environ	mental conte	ext that can impact the activity

# **Specific Guidelines**

Medical Procedure

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Emergency procedure	 	 
Emergency contacts		

Choice for Run	ning the Activity
Name of leader who makes the final choice	
Accort	Point
Why –	Why –

Time Arrived									
Time Left									
Amount of Climbing or descending									
Compass Bearing									
Distance travelled									
Destination									
Location									

# Appendix 4: Data Sheet

# Notes

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