

Outdoor education fatalities in Australia 1960-2002.

Part 2. Contributing circumstances: Supervision, first aid, and rescue

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Abstract

This paper, the second in a series, presents a partial analysis of outdoor education fatalities in Australia. It examines outdoor education related fatalities in Australia in the period 1960-2002 with a view to understanding how fatality prevention measures can be improved. The fatal incidents are reviewed from the perspectives of supervision, first aid, and rescue. The paper draws attention to particular supervision considerations around water, to the special case of unsupervised teenage boys around moving water or cliffs, and to the importance of planning for the possibility of the death of one or more supervisors. The analysis found evidence that underlines the importance of frequent CPR practice, but little to suggest that inadequate first aid had been a factor in any death. The study emphasises the importance of planning to ensure that medical aid can be obtained promptly, and presents a number of imperatives relating to rescue using a group's own resources, or with outside assistance.

In a previous paper (Brookes, 2003a) I discussed the role of case studies in developing fatality prevention strategies in outdoor education, and provided a summary of outdoor education related fatalities in Australia since 1960. I provided a brief description of each incident, grouped by immediate circumstance. Drawing on information on public record (mainly Coroners' reports and newspaper reports) I examined 114 fatalities. Two were homicides and seven were from natural causes. The accidental deaths were grouped as followed: Drowning in lakes or pools (12); drowning in moving water (18); drowning in open water (11); falls (8); falling objects (24); fire/lightning (4); hypothermia (5); motor vehicle related (23). In the current paper I extend the consideration of circumstances to supervision, first aid, and rescue.

I have used the term 'supervision' to emphasise a particular responsibility of teachers to care for students in the outdoors, which is not necessarily identical to the responsibility that outdoor recreation instructors or leaders may have. Some (but not all) of the incidents studied are best understood in a broad context of care for students in the outdoors rather than in the narrower context of the conduct or management of specific outdoor recreation activities. A number of the incidents occurred around the edges of structured recreational activities.

Lay attribution of cause to outdoor education fatalities tends to emphasise either 'freak' accidents or human error, especially on the part of supervisors. 'Operator error' figures prominently in accident analysis in many fields, for several reasons:

1. A common bias towards perceiving and emphasising actors rather than situations.

The sources of the bias are probably cultural and psychological (Ross & Nisbett, 1991).

2. There is often better evidence describing the actions of individuals than there is evidence which would permit one to reconstruct physical environments, dynamic social situations, or the psychology of the actors.
3. Attributing cause to human error on the part of someone directly involved in an incident is simpler than reviewing and understanding a wider set of circumstances (Perrow, 1999).

I have attempted to separate supervision from other duties or expectations of supervisors (for example special knowledge of particular environments). In practice it may be hard to separate supervision from other consideration such as the knowledge and expertise a supervisor might have as teacher, leader, or instructor. I will consider the environmental circumstances of fatal incidents in a separate paper, along with consideration of broader organisational and conceptual aspects of fatality prevention.

First aid and rescue relate to the immediate aftermath of an incident. I have considered first aid specifically because it is an area in which the outdoor education profession has invested considerable time and effort. Nothing in this study suggests that first aid is not important, and there have been incidents that reinforce the importance of basic first aid skills. But it is clear that not many, if any, fatal outcomes were contingent on the quality of first aid provision. Rescue is another matter. Rescue and first aid are linked to the extent that 'seek qualified medical assistance promptly' is a first aid imperative, but rescue also includes retrieving a situation before it becomes a first aid matter or worse. I found

- evidence to support the view that better planning for a possible rescue could have saved lives.

I have not attempted to develop elaborate advice or guidelines based on this analysis. Rather, it has been my intention to draw out specific lessons that may be used in a range of circumstances to test existing policy and practice. Any approach to safety management drawing only on these incidents would be incomplete.

In what follows I refer to specific incidents by the location and year, as listed in the previous paper (Brookes, 2003a). The limitations of this study should be borne in mind: more information is available on the public record about some incidents than others, and I had access to more of the available information on some incidents than others. I provided sufficient information in the previous paper to enable readers to locate newspaper reports or coroners reports for each incident. Brookes (2003b) provides some additional discussion of the implications of this research.

Supervision

At an administrative level supervision might sometimes boil down to supervisor/student ratios. For supervisors, 'supervision' can sometimes be taken to mean a more or less alert adult presence, not necessarily having a specific focus or requiring particular organization. I have not attempted to catalogue the implied understandings (or misunderstandings, with hindsight) of 'supervision' that emerged from the material I examined. I have instead focussed on what the fatalities studied have to teach about supervision. My intention is provide a basis for understanding how *specific supervision structures and practices* may contribute to fatality prevention.

Supervision as a circumstance

In this section I consider the role of direct supervision, or its absence, in the cases examined. I am distinguishing for the sake of analysis, so far as possible, between supervision (*opportunity* to see and intervene in a dangerous situation) and expertise (*capacity* to recognise and *ability* to intervene in a dangerous situation).

Supervision is not necessarily a relevant circumstance in fatal incidents

For example, while supervisors could be responsible in an overall sense for the circumstance surrounding a motor vehicle accident (even if only by choosing a particular bus company), in none of the motor vehicle related deaths examined could I see supervision as itself a consideration, apart from the fact that supervisors may be victims. There were incidents where the deceased persons had been allowed to travel in the trays of utilities (Morgan, 1988;

Chillagoe 1997); I have treated those as serious errors of judgement rather than incidents that have much to teach about supervision in outdoor education as such.

Fatalities have occurred under close supervision

At Renmark (1991) a student had an unexpectedly severe asthma attack during supervised canoeing; at Lamington (1992) two supervised girls were killed by lightning that struck a tree they were sheltering under; at Lal Lal Falls (1990) and Bremmer Bay (1997) students were killed by rocks dislodged during supervised climbing or abseiling; at Logan River (1990) the first canoe to take a planned course past a bridge was swept against a pylon, entrapping a girl.

Such incidents inevitably raise the very sensitive question of whether there has been an error or lapse on the part of supervisors, bearing in mind that in many cases this will not be true. This requires a more extended discussion, however it is important to make some brief points about perceived supervision failure. Reason (2001) makes the following distinctions:

1. It can be helpful to distinguish slips or lapses (execution failures, due to inattention, not recognising danger, choosing a wrong strategy) from mistakes (planning failures, due to lack of knowledge, misconceptions, lack of information).
2. It can be helpful to distinguish *errors* (slips, lapses, and mistakes), which are unintentional, from *violations*, which are intentional. Violations may be more or less forced by circumstances, may arise from optimising something other than fatality prevention, may arise from non-task related reasons, or from routine corner cutting.

(It should be borne in mind that these categories may overlap or be indistinct; they may help to explain the facts, but it is important not to force the facts to fit the analytical categories).

Supervision may collapse as a consequence of conditions contributing to the incident

In all three Cradle Mountain incidents parties became separated. Individuals who could maintain body heat by activity (i.e. who were not exhausted) and who expected to be able to reach shelter understandably did so, unsupervised. In Cradle Mountain (1971), the party had spread out as conditions deteriorated, but it was the students who successfully reached the hut who assisted with the rescue of those who had not. In both open water incidents (Lake Hume, 1963, Lake Alexandrina, 1987) it is clear that the capacity of supervisors to effect rescues was overwhelmed by the conditions and by multiple capsizes; most of those who survived did so by making their own way to shore, helping others where they could but not attempting futile rescues. In both

instances the alarm was raised by those who made it to shore¹. At Yarrunga Creek (1999) heavy rain led to a group of students and teachers to abandon a rendezvous point before a group that had been delayed got there. The delayed group, which was unsupervised, on finding no teachers at the rendezvous, continued on, with tragic results. At Anglesea (1976); (1979) a current took several participants into deeper water near rocks. In both cases someone drowned while supervisors were occupied rescuing others.

Supervision has been a specific factor in swimming and wading fatalities

At Lake Eppalock (1980) supervision of swimming had been overlooked in organising an end of year excursion to a lakeside park. Some staff assumed the physical education teachers would supervise swimming; the physical education teachers regarded themselves as having other duties; only one of five was present at the park. Two turned up at the scene in a speedboat, one water-skiing, after the ambulance had left. Earlier, when students in the water had realised a student was drowning, there was a delay while they tried to attract the attention of someone on the bank. Two students on the bank went to get a teacher, who in turn sought another teacher competent to effect a rescue. Students seeking help reported at first being disbelieved. At Stokes Bay (1980) three fully clothed students had been swept out to sea before teachers, who regarded themselves as accompanying an excursion run by a tour company, were aware of a problem. At Crystal Lake (1990) it is unclear when or how the drowning occurred, but the supervision arrangements were such that a student could have gone under and not resurfaced without anyone noticing. There were several supervisors watching a relatively large group of students in muddy water; each supervisor had, in effect, to watch the whole group. The deceased's absence was not noticed until dinner time. Several of the incidents demonstrate that a drowning will not necessarily be preceded by obvious signs or signals. In three cases: Anglesea (1979), Lake Eppalock (1980), Morley (2000), nearby students thought the deceased was pretending or mucking around. At Conto Springs (1998) one of two teachers supervising 25 students at a surf beach was lying down with her eyes closed at the time of the incident. The student closest to the deceased heard him call out but did not think he was in

difficulty. Media reports of Galston (1991) suggest that no one saw the deceased in difficulties; I believe no one saw the Maroon (1981) drowning, although that is unclear. At Bibra Lake (1994), two lifeguards were specifically supervising a pool with an estimated 350 people in it; the lifeguard who first spotted a body on the bottom was at first uncertain if the person was playing or not, and went to get a colleague before initiating a rescue. At Bayswater (2000), more than one student thought they saw a body on the bottom, but were unsure. The coroner found that lifeguards who claimed to be watching the pool were not. As at Eppalock (1980) and Morley (2000), at Murgon (2000) children struggled unsuccessfully to raise the victim to the surface before supervisors swam to the scene. At Avon Valley (1997), teachers accompanied a group of students to a swimming place around a bend in the river from where they had camped. Some students swam back around the bend, at which point some other students, including the deceased, entered the water. The drowning occurred about 50 metres from teachers, out of their sight; other students struggled to assist the victim before teachers arrived on the scene.

It is possible that a trained, experienced lifeguard, in an elevated position with a good view of a whole pool, with no distractions, operating in short shifts and having the means to immediately summon assistance could satisfactorily supervise a large number of swimmers by systematically scanning the pool for signs of anyone in difficulty (clearly that number is considerably less than 350). By the time someone is seen lying on the bottom it may be too late (Galston, 1991; Bibra Lake, 1994; Bayswater, 2000). In several of the cases discussed here, it is my impression that 'supervision' has been seen by teachers as comparable to what a teacher is expected to do on yard duty rather than what a professional lifeguard is expected to do. For non-professional lifeguards supervising organised activities (i.e. activities in which discrepant events will be relatively obvious because of the defined pattern of expected activity) the ratio of students to supervisors should also correspond to the maximum group size - two teachers watching 20 students is not the same as two separate groups of ten students each watched by a teacher. If students are engaged in free play the teacher must be in a position to notice an absence immediately, because distress will be difficult to distinguish from play; five is probably the largest number most people can keep track of without counting. (If, for example, there are four with red caps and four with yellow caps it is probably possible to count a larger number at a glance). In muddy water it is not sufficient to be in a position to notice an absence immediately. Once someone has disappeared in muddy water delay while a rescuer swims out and attempts to locate the body may be fatal (Lake Eppalock, 1980; Murgon,

¹ The deaths of nine on Mt. Hood USA in 1986 is an example of a situation in which there was good reason to keep a group together in cold conditions. A party of 4 adults and 14 students from Oregon Episcopal School encountered a blizzard during an easy ascent on May 12. Five turned back early; of the remaining 13, 11 sheltered in a snow cave while two went for help. The two seeking help encountered difficulties, and rescuers had great difficulty finding the cave under 1.2 meters of fresh snow. They were found on May 15; remarkably, two survived.

2000); buoyancy vests may be necessary in turbid water.

Fatalities due to falling objects are not consistently linked to supervision

While the general potential for something to fall exists wherever there is steep ground, tall trees, or for that matter tall buildings (*every tree falls eventually*), it is not reasonable to expect supervisors to avoid all such situations. The question of supervision (as distinct from special knowledge of particular environments) hinges on how readily specific dangers can be discerned. At Lal Lal Falls (1990), Serpentine Gorge (1990), Mt Edwards (1993), and Bremmer Bay (1997) the deceased were below others who were in a position to accidentally dislodge rocks (it is unclear what dislodged the rocks in the latter case). Eliminating or avoiding situations where one participant is liable to be struck by any rocks dislodged by another participant would prevent such incidents. There are implications here for where those belaying climbing or abseiling activities are positioned. The Bremmer Bay (1997) incident in which nine died suggests an

operative to avoid the base of unstable cliffs as much as possible, but here the boundary between supervision and expert judgement becomes blurred. Some evidence that a cliff is unstable may be obvious – loose rocks, or material at the base of the cliff that has clearly fallen recently; but some cliffs are more stable than others and the difference is not necessarily obvious. Similarly, the extent to which supervision can extend to minimising risks from falling trees or branches is unclear. This study includes 10 fatalities from falling trees or branches; falling trees or branches qualifies as a distinct risk associated with outdoor education. In principle that risk may be: (a) obvious, and avoidable with supervision; (b) evident to someone with expert knowledge, and possibly avoidable; or (c) essentially unavoidable short of avoiding all trees. I could not determine if any of the tree cases studied were other than (c).

Use or absent supervision of teenage boys around moving water or steep drops has been associated with many fatalities

The number of instances of teenage boys (15), not closely or directly supervised, making a fatal error on steep ground or around moving water is one of the most striking patterns to emerge from this study, accounting for about one in six of the non-motor vehicle related fatalities. In some instances the boys were unsupervised as part of a deliberate program aim, in one or another variation of the 'boys taking an adult role' theme that has entered some forms of outdoor education from the early twentieth century youth movements. At Crooked River (1978) and Yarrunga Creek (1999), unsupervised teenagers were attempting to cross a river or creek after heavy rain. Shoalhaven River (1990) was a similar incident, although I had insufficient access to detail to be certain that teachers were not present.

At Bungonia (1994) adult supervisors permitted boys to navigate and route-find down an unfamiliar creek. The adults were apparently intentionally not with the boys at the front of the group when one fell to his death attempting to find a route down a cliff. At Tatachilla (1976) boys were playing unsupervised in an area at the back of a stage, where it was possible to climb from one room to another via a windowsill, past a room divider; an 11 year-old apparently doing so fell to his death. At Barkly River (1979) the leader permitted a 16 year-old boy to take a different route back to the camp, which could be seen on the river flats below. He apparently attempted to descend a cliff he encountered, and fell to his death. At Falls Creek (1961) the deceased had apparently tobogganed over a drop during a period of unsupervised tobogganing and hit his head on a large vertical pipe buried to its lip in the snow; he was knocked out, fell in, and drowned. At Anglesea in 1979 scouts who entered the water were at best loosely supervised; the group was spread out, some instructions had been disregarded or not passed on, and supervising adults were not all clear on supervision arrangements for swimming. On Barrington River (1995) a 19 year old ex-student leading a kayaking group was pinned in a rapid. Hawkesbury River (1986) also involved an unsupervised teenager, although, like the Cathedrals (1983) incident, the deceased fell only a short distance; it is not clear there was danger a supervisor could have seen.

In some cases boys escaped supervision, or supervision lapsed, briefly. At Bungonia (1991) one of four participants fell or was pushed during a lunch break when the two supervisors were momentarily not looking. Supervisors saw him falling, but did not see him start to fall. On the Thomson River (1976), canoeing had finished for the day and gear was being carried back to the vehicles when two students decided to put a canoe in and paddle a grade one rapid without life jackets. A teacher noticed them attempting to ferry glide incorrectly, called advice, and seeing one let go of the canoe after it capsized swam after him, getting to within a metre or so of him before he disappeared. On the Forth River (1998) a student attempted to cross a section of river to join another spectator on a rock; canoeing supervisors came to his aid after he became entrapped, but the partial river crossing was apparently neither a planned part of the program nor supervised directly. Similarly, at the Grampians (1979) an abseiling activity had ceased due to rain when a student attempted to climb a cliff unroped to obtain better radio reception, without the knowledge of the teacher. At the Cathedrals (1983) a boy fell a short distance, receiving a fatal blow to the head, while teachers attended to a student who had fallen a metre or so.

I did not find similar incidents in which teenage girls died. At Stony Creek (1974) the victim was

an 18 year old woman. She was an inexperienced bushwalker, but it is unclear the extent to which the more experienced youths in the party could be regarded as supervisors. The Avon Valley (1997) incident, in which a 15 year old girl entered the water away from the supervised area, might also be considered on the edge of this category (she was ill, and current was not a factor). I would be reluctant to conclude that teenage girls are safer unsupervised around steep ground or moving water – the cases examined may reflect historically greater exposure of boys to risk, or my failure to discover relevant cases in which girls died – but I would not rule it out.

Several strong considerations for fatality prevention emerge:

1. 'Indirectly supervised' (i.e. not directly supervised) expeditions for teenagers present a clear fatality risk if there is a possibility of the group encountering moving water or steep ground.
2. In common with a good deal of safety analysis (Reason, 2001), the psychology of error ('what were they thinking?') remains unclear in most cases. However it seems reasonable to speculate that bravado, and peer effects, may be important in cases where an obvious risk has been taken.
3. The tight supervision that organised instruction necessitates (in activities such as abseiling or canoeing) should be in place while students are near steep ground or moving water, i.e. not only while the activity is in progress. The fact that students may actively escape supervision or take advantage of a supervisor's inattention should be considered.
4. Specialised supervision ('lifeguard standard') is impossible to maintain during the entirety of a camp or excursion, especially when teachers have other duties. It may also be undesirable educationally. Necessary periods of general supervision ('yard duty standard') should be planned to take place in locations where there is no moving water and no steep ground.

Supervisor fatality

Eighteen of the 114 fatalities were adult supervisors or accompanying adults. At Lake Hume (1963) both instructors died attempting to rescue participants already in the water; at Lake Alexandrina (1987) the leader's canoe overturned after attempting to tow a swamped canoe and failed attempts by others to untie it. He was last heard to say that he could swim better without his life jacket. Another accompanying adult also died in that incident. A student teacher died at Cradle Mountain (1965) apparently attempting to evacuate a hypothermic student who also died. At Anglesea (1976) a teacher successfully rescued two students who had been carried out of their depth by the current, but was himself drowned.

At Growling Swallet (1990) and Coogee Beach (1993) supervisors drowned attempting to rescue participants who had been swept away by a current. At Barrington River (1995) the leader of a kayaking group died attempting a rapid. At Coogee Beach (1993) a supervising teacher intervening in a dispute between a man fishing and a student was fatally stabbed by the man, who had accused the student of theft. At Carnarvon Gorge (2002) and Cowaramup Bay (1996) supervisors died when a tree and a cliff collapsed respectively. At Christmas Creek (1979) a teacher driving a 22 seater bus and another adult, together with two students, were killed when the bus left the road and rolled. At the Bogong High Plains (1979) an adult accompanying a group died of natural causes.

In this study the overall ratio of accompanying adult fatalities to participant fatalities is about 1:6, broadly comparable to the overall ratio of teachers to students in outdoor education. If the Cowaramup Bay (1996) incident is excluded the ratio is about 1:8.

The pattern of fatalities for supervisors is not the same as for participants. In about half of the incidents the act of exercising supervisory responsibilities was itself a relevant factor:

1. In all incidents involving cold water or cold weather, there is reason to think that supervisors could not optimise their own chances of survival because they were attempting to help participants. (At Cradle Mountain, 1971, one of the teachers also suffered severe hypothermia, but survived).
2. Three moving water incidents were characterised by the sudden onset of a crisis, and a supervisor making an immediate (fatal) decision to enter a current to attempt a rescue.

Supervisor fatalities covered the spectrum of supervision roles, from teacher in charge onlooker, and a range of experience, from a 19 year old teacher on her first day at work and a 19 year old ex-student helping out his old school, to instructors with considerable experience and qualifications. (Supervision roles can be ambiguous; a teacher who at the time regarded him or herself as not supervising swimming may be later held by others to have been responsible for swimming supervision.)

Three considerations emerge:

1. Planning should include the possibility that supervisors could be victims. What does the safety plan look like if one or more supervisors are out of the picture? A single-vehicle bus accident, for example, may leave teachers dead or injured and surviving students having to seek assistance and assist the injured (Christmas Creek, 1979).

2. Particular consideration should be given to circumstances that may overwhelm the whole group, such as cold weather, fatally exhausting a supervisor's personal capacity to cope.
3. Planned alternatives to entering a current unassisted to attempt a rescue are necessary.

First aid and rescue

First aid

The study definition excluded instances where first aid saved a life; there will have been a number of such instances in the study period. However, a review of fatal incidents may help to identify instances or patterns in which improved or modified first aid training might have prevented fatalities.

There were many cases in which first aid was not a consideration because a body was found some time after death. In other cases first aid was not a consideration because injuries were so severe that the victim was plainly dead. Details are unnecessary.

The most prominent application of first aid was CPR applied where victims had evidently drowned or had stopped breathing after a head injury. In the case of severe head injury the quality of CPR applied is unlikely to have been a factor (Rosemurgy, Norris, Olson, Hurst, & Albrink, 1993). In the case of apparent drowning it is quite possible that lay CPR could be administered poorly, but whether that was so in any particular case is purely a matter of speculation. I found very little reference to the quality of first aid. In the Lake Eppalock (1980) incident a teacher took over CPR from another whose efforts were observed to be ineffectual. In the Conto Springs (1998) incident a teacher went for help only when she believed a pulse had returned, although the coroner found the victim would have been dead at that time. Notwithstanding the limited evidence about the quality of CPR provided in particular cases, there are sufficient instances in which CPR has been applied to conclude that maintaining and frequently testing the capacity to perform effective CPR is important for outdoor education supervisors, when the literature on retention of CPR skills is taken into account (Berdn et al., 1994; Weaver, Ramirez, Dorfman, & Raizner, 1979).

There is some reason to think that treatment of some hypothermia victims (Cradle Mountain 1964, 1965, 1971) was less than optimal according to present knowledge. Prevention and treatment of hypothermia received considerable attention in South-Eastern Australian bushwalking and outdoor education circles in the 1970's, due in part to the 1971 incident.

There was some newspaper discussion about asthma treatment following the death of a previously mild sufferer from a severe attack while canoeing (Haran, 1991), with no suggestion that the actual treatment in the particular case was inadequate.

I did not find any examples where the possibility that better first aid could have prevented a death was investigated by a coroner, although that may have happened. My impression is that coroners, and the community generally regard first aid as lay treatment pending medical attention and are realistic about what first aid can and cannot achieve. However, the speed and effectiveness of efforts to obtain qualified medical assistance are another matter.

Rescue

There have been many instances of successful rescue that are not discussed here, this being a study of fatal incidents.

Rescue by party members

The window of opportunity for party members to effect a rescue may be a matter of seconds in some moving water incidents. At Crooked River (1978) all members of a human chain were swept off their feet towards the opposite bank. The deceased was seen holding a branch and struggling to keep his head above water. Another student turned to take off his pack before assisting, but the deceased was swept away before he could do so. At Stony Creek (1974) a girl crossing with the aid of a nylon rope handrail was swept off her feet. She was seen clinging to the rope and struggling to keep her head above water, but was swept away before another party member could reach her. At Yarrunga Creek (1999) the victim's younger brother was restrained from entering the torrent after him. At Growling Swallet (1990) and Sandbar Beach (1998) rescuers followed a victim into a current and also drowned. In the latter case several individuals were successfully rescued by a bystander (who happened to be a teacher). A rescuer almost reached the victim at Thomson River (1976).

In none of the moving water fatalities, except those involving canoes, were supervisors or others prepared for a possible rescue, for example by positioning a person or a line downstream, or by having flotation aids on hand to assist rescue in the sea. This is not to suggest that such preparations would have saved a life in any particular incident, but to emphasise that planning for situations involving moving water should contemplate the possibility that someone will be taken by the current. The bystander who rescued several at Sandbar Beach (1998) commandeered a boogie board.

At Stony Creek (1974), Crooked River (1978), and Yarrunga Creek (1999) streamside vegetation

made it difficult for party members to search downstream. In each case the bodies were found later by search parties.

Except for the Thomson River (1976) incident, in which the victim was not wearing a life jacket, all of the deaths associated with canoeing in moving water were entrapments in which rescuers were unable to free the victims, who were all wearing buoyancy vests, before they drowned (Shoalhaven River, 1990; Logan River, 1990; Barrington River, 1995; Forth River, 1998). Based on the information available to me, these incidents appear to involve situations in which rescue was impossible.

Split second decisions may face rescuers confronted by a fire. A bystander (who happened to be a teacher from another school) pulled one badly burned student from the Sutton (1994) fire in which another student died (I was denied access to the Coroner's report, and so do not know whether or not smoke detectors were operating). In that incident teachers were not actually present at the time the fire broke out, as was the case at Noojee (1984), and the cabin and tent respectively were well alight when teachers were alerted.

The window of opportunity for rescue in cold related incidents is longer. On both open water incidents (Lake Hume, 1963; Lake Alexandrina, 1987) those craft not initially swamped were subsequently swamped attempting rescues; this, rather than time, partially defeated rescue attempts. One Lake Hume survivor was partially in water at 9°C for four or five hours (he reached a submerged branch, where he attempted to hold another youth out of the water). One survivor at Lake Alexandrina clung to an upturned canoe for about two hours before beaching. At Kanangra Walls (1981), party members were unable to assist the victim, who had become stuck on a knot in a long abseil rope in cold conditions. Rescuers did not reach him until about 17 hours after the incident, by which time he had died. In the 1965 and 1971 Cradle Mountain incident there were, in addition to fatalities, successful rescues of additional hypothermia victims by party members and others. Two students walked out to seek assistance in the 1965 incident, which led to the rescue of eight who had sheltered in boatshed overnight, and four others who had spent a night in the open. Both teachers and five students suffered hypothermia in the 1971 incident; the remaining group members and other walkers brought them to a hut during the night.

To summarise,

1. in moving water incidents time is short, and rescue attempts may fail if a rescue has not been anticipated, with rescuers in place beforehand. Equipment such as throw-lines or flotation devices are important, but time to deploy them is critical.

2. In cold-related incidents there tends to be (relatively) more time to think and act; however rescue requires substantial additional resources (sea-worthy rescue craft on water, clothing and equipment to keep several unconscious individuals warm on land). In cold conditions, *resources* make the difference between successful self rescue and needing outside help, and *time* makes the difference between successful outside rescue and body retrieval.

Missing person rescue

At least eight incidents first manifested themselves to supervisors as missing person incidents: Falls Creek (1961); Tatachilla (1976); Loftia Park (1977); Anglesea (1979); Barkly River (1979); Maroon (1981) (unconfirmed); Crystal Lake (1990); Yarrunga Creek (1999) (the latter was a missing group). In the Tatachilla and Falls Creek cases, the deceased was found within a few hours. At Anglesea (1979) it was more a matter of an absence being noted, and as it emerged he was not at the car park and not with another group, the possibility that he had drowned became a reality for the supervisors. In the case of the Loftia Park, Barkly River, Crystal Lake (and possibly Maroon) incidents the deceased was missing overnight. In the Barkly River incident, the fact the boy was missing was not reported to police until he had been missing for 24 hours and a search by the group members had failed. As in the Loftia Park and Crystal Lake incident, the deceased was found after assistance had been sought from outside.

In each of these cases the victim would have been dead at the time their absence was discovered, except in the Yarrunga Creek incident, in which the victim was swept away around 11.30am on the day after the missing group had failed to meet the main group at a planned campsite. The school had a policy of waiting 24 hours before calling for assistance. In the Barkly River incident the deceased had fallen down a cliff, and died instantly; however, it is easy to envisage a similar fall leaving a victim in need of urgent medical attention. There is a strong case for calling for assistance sooner rather than later. There have been many successful searches for school students lost in the bush (e.g. Wheeler, 1991). The potential search area for a possibly mobile person increases exponentially with time. It is true that seeking assistance sooner rather than later will lead to more 'false alarms' involving individuals who 'turn up' within a short time. However, it takes time to organise a search, and the more advance warning police or other organizations have of a possible search the better. The police (or other rescuers) will make their own decision about whether or not to give the missing person more time to turn up; but in the meantime they can be making preparations. While 'risk management' may suggest calls for assistance be delayed until other options have been exhausted

(to contain costs and save face), fatality prevention requires that outside rescuers be alerted as soon as it is evident that help might be needed.

Rescue assisted by others

There were no cases in which it was clear-cut that a particular victim could have survived an injury had medical treatment been available sooner. However, the Grampians (1979), Cathedral Ranges? (1983), Hawkesbury (1986), Serpentine Gorge (1990), Mt. Edwards (1993), Bremmer Bay (1997) and Thredbo (2000) incidents involved severe injury that was not immediately fatal, as was the case in at least one of the motor vehicle related incidents (Gordonvale, 1987). These incidents raise the possibility that the time to receive medical treatment may be critical.

In the Cathedrals (1983) incident, the victim fell mid afternoon and died around 12 hours later. Local police were alerted around 4.30 pm., with two hours of daylight remaining. Local rescuers decided to attempt to bring the injured boy out themselves, rather than contact the Police Search and Rescue Squad or request a helicopter. In the Grampians incident an ambulance had to come about 60 kilometres. It was about two hours before ambulance officers reached the scene. Those at the scene had first had to contact a teacher near the vehicles; he then had to go to a homestead to seek assistance. In the Kanangra Walls (1981) incident, party members went for help after the victim had apparently lost consciousness, about five hours after becoming stuck on an abseil knot. It took 3 hours to walk out to request assistance, and most of the night for rescuers to reach the area. In the Avon Valley (1997) incident, although a vehicle was parked close by it took one and a half hours to contact an ambulance (while teachers performed CPR on the victim) because the phone at a nearby house was found to be disconnected.

Sydney bushwalkers publicly criticised the Kanangra rescue, claiming they could have reached the victim more quickly, had their assistance been requested (Sydney Morning Herald, 1981). The rescue attempt in the Yarrunga Creek (1999) incident attracted considerable scrutiny. Police were not contacted when an unsupervised group failed to make a planned rendezvous at a campsite. Staff found the missing group the next day, and were told a boy had been swept away in a flooded creek. The emergency number '000' was dialled about an hour and a half later. The call was directed to the fire brigade, and then a message passed on to police. Police did not ring the school back, but instead went to and waited at a ford on the creek, thinking that was the accident site, and expecting to be met. The police eventually proceeded to the school about three hours after the emergency call. Once on the scene police requested immediate assistance from search and rescue police.

However, the information conveyed to the search and rescue police by the communications officer was inaccurate, and understated the urgency of the request. Meanwhile, a pair of the deceased's shorts was found by a school search party, but the location was not marked and the fact the shorts had been found was not passed on to police. The inquest considered whether the deceased drowned almost immediately on being swept away, or had escaped the torrent and died from hypothermia, in which case the delayed search may have made a material difference. As in the Crooked River (1978) incident, the force of the water removed some clothing from the body; some had speculated that the deceased had left the water, removed his clothing, and re-entered the water in a state of confusion. The coroner found this had not happened.

After the Lake Hume (1963) incident, farmers owning properties which abutted the part of the lake where the incident occurred criticised the fact that rescuers had not contacted them to help search for the missing (The Age, 1963). They said they had boats, and knew the area better than anyone. After the Lake Alexandrina (1987) incident, the South Australian Sea Rescue Squadron criticised police for not alerting them. They had two boats stationed within half an hour of the incident site (Hunt, 1987).

In the Bungonia (1994) incident attempts to radio for assistance failed, and contact with local police was made difficult because the police radio was 'out' (an earlier rescue would not have saved the life of the deceased). Questions were raised at the inquest into the Bungonia (1991) incident about the time taken to inform police of the death (the deceased had died instantly in that case also).

Criticisms of rescue efforts can be unwarranted (Hallenstein, 1988). However, it would be naïve to assume that rescue will be performed optimally on every occasion. Fatality prevention planning by outdoor educators should take this into account.

Five considerations emerge:

1. There have been several cases in which outside assistance could have been sought sooner, and more than one case where the seriousness of an incident was initially underestimated, or downplayed. Fatality prevention requires a precautionary view of any potentially serious incident (such as a missing person around cliffs or water, or a head injury), and a mindset that accepts the possibility that outside assistance may have to be sought at any time. It is possible there are psychological factors that get in the way of teachers seeking assistance or acknowledging the potential seriousness of some situations.
2. Fatality prevention requires emergency communication to be planned and tested, including contingency arrangements should

the preferred method fail. The question of radio communication arose in newspaper discussion of the Cradle Mountain (1971) incident, and in the court cases following the Cathedrals (1983) incident. At the time of those discussions community expectations were probably unrealistic. There are more options available now, and I found a consistent willingness in the community to be critical of delays in seeking medical or other assistance.

3. A rescue obtained via a '000' call may be some time in coming, and in some cases may not be a sufficiently specialised response to a particular situation. It may not be reasonable to assume a call will end up with someone (for example a police officer on duty) who will necessarily understand just what is needed for a particular rescue, and who will know what resources and expertise are available.
4. Some situations will warrant a plan to call on immediate local assistance from individuals or agencies, who may be in a position to understand the situation and respond very quickly, to assist during the sometimes crucial interval between assistance being requested from the police or other authority, and assistance arriving.
5. Elaborating on points three and four, emergency response can be seen to entail not only technical or procedural competence, but specific local knowledge, including knowledge of who or what organizations in the local community can be called on. Likewise, it is likely to be helpful if potential rescuers are already aware of a groups' activities when they receive a call for assistance.

Conclusions

Consideration of supervision arrangements and practices, examination of rescue provisions, and careful attention to what can and cannot be expected of first aid provide insights in fatal incidents with implications for fatality prevention.

The need to emphasise supervision that takes into account the environment, participants' ages, and perhaps sex of the participants, draws a distinction (albeit blurred) between outdoor education and outdoor recreation instruction or leadership. From a fatality prevention perspective, outdoor education requires a special emphasis on supervision structures and practices both during planned activities and in the spaces in between.

Rescue situations involve what is often a sudden 'change of state' from normal operations. Teachers or supervisors can find themselves transported from a situation that is well-planned and comfortably within their experience to a situation that is unplanned, unplanned for, and outside their experience in a matter of minutes. Rescue planning requires specific, deliberate attention in any fatality prevention process; it cannot be assumed that because a program runs smoothly and has a good record it will not descend into chaos in a rescue situation.

I hope this analysis contributes to the prevention of future fatalities. In the third paper in this series I will examine motor vehicle related fatalities, non-accidental fatalities, and the environmental circumstances in which fatalities have occurred.

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