SAFETY OF FELL RACES

A Cumberland Fell Runners Association Report

CONTENTS:

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SAFETY OF FELL RACES

A. INTRODUCTION

1. This report has been commissioned by the committee of the Cumberland Fell Runners Association. It reviews the risks to competitors in high level, medium to long distance fell races & proposes appropriate race rules & organisational procedures taking account of the risks involved, the benefits from particular measures, the enjoyment & views of competitors & the practical constraints on organisation.
2. It was compiled by a small group consisting of:
   Peter O'Neill (Chairman)
   Danny Hughes
   Tommy Orr
   John Peel

B. PHILOSOPHY

3. In carrying out this study, it rapidly became apparent that decisions on safety issues are strongly influenced by basic attitudes to the sport of fell running. In this section therefore, the consensus views on the philosophy of the sport are clearly presented as they form the foundation for the remainder of the report. If those views are disputed, it is probable that many of the conclusions in the remainder of the report will also be disputed.
4. Unless the sport is to be emasculated we must anticipate some accidents, although we seek to minimise both their frequency & severity. As in other athletic events with very large entries competitors run to the point of physical & mental exhaustion; Fell Running imposes additional risks as runners usually wear light clothing on high mountains in possibly adverse weather while traversing rough terrain requiring physical & navigational care.
5. A rough Assessment of the risks referred to above has been carried out & is presented in Appendix 1. It shows that a very active fell runner has about the same risk of death (1 in 700 per year) as an active rock climber. This is a lower risk than smoking (1 in 400 per year) but a factor of 6-10 greater than for an active fell walker. The risk is acceptable but should be reduced if possible.
6. Much of the enjoyment of the sport derives from the factors referred to above – in taking on major physical & mental challenges. We must be careful that, in modifying the sport in the interests of safety, we do not significantly reduce the competitors' enjoyment.
7. Runners must be responsible for their own safety; it is they who must make the basic decisions regarding fitness, the weather, clothing, route choice, retirement etc. The organisers must strive to increase competitors' awareness of their responsibilities & be careful not to appear to release runners from any of their responsibilities.
8. The organiser's primary safety role is to define minimum safety standards (e.g. clothing) & to provide an efficient system for identifying missing runners – that is to provide a 'safety net'.
9. Rules must be enforceable, objective & acceptable to the majority.
10. Race procedures must be as simple & foolproof as possible to ensure they are effective, especially under adverse circumstances.
11. As a final reinforcement of earlier points, the basic features of the sport & competitors' enjoyment must receive due consideration in any safety review.

C. ANALYSIS

12. The information below is self explanatory & summarises the various factors involved in fell running accidents.

Death due to	Cause	Contribution	Exacerbated by	Consequences minimised by
Fall Exposure Heat exhaustion Medical condition Falling rocks	Navigation errors	Lack of suitable clothing	Lack of food Unsuitable footwear Weather conditions Inadequate preparation Course planning	Early location help, rescue

PRIMARY CAUSES OF DEATH	CAUSES, CONTRIBUTORY & EXACERBATING FACTORS	LOCATION & RESCUE
SECTION D	SECTION E	SECTION F

D. PRIMARY CAUSES OF ACCIDENTS

14. Section C identifies the above as:
    Fall
    Exposure
    Heat exhaustion
    Medical conditions
    Falling rocks

    Although not necessarily independent - an immobilising fall could lead to exposure & vice-versa – for simplicity the causes are considered separately.

15. Falls, to the layman, might be expected with great frequency, but are relatively rare. They are a very obvious danger & runners must make their own judgement of choice of route & speed of passage in line with their agility, skill & fitness. Organisers should not modify courses to avoid rough terrain; this should be left to the choice of the runner. However, they should avoid selecting routes which temp runners to gain advantage by quasi rock climbs (e.g. the passage from Scafell to the Pike), & avoid routes which concentrate many runners on loose screes or in dangerous gullies. Organisers will also take account of the risk of falls on ice or snow if there are unreasonable weather conditions.
16. Exposure is a major concern & is a recurring theme throughout this paper. It is a particularly dangerous condition for fell-runners as, in its earlier stages it impairs both judgement & physical co-ordination. As a result the runner is both more prone to have an accident, more likely to lose himself (& make rescue a slow business) & less likely to be aware of the dangers, retire, & return to base.
17. Section E discusses ways of reducing the risk of exposure; given the necessary precautions it is then the responsibility of the competitor to be fully conversant with the risks, conscious of adverse weather, aware of his own condition & responsible enough to retire at a sufficiently early stage. No-one else could or should take the decision for him. He should monitor himself for early signs of deterioration affecting ability to use map & compass, vision & co-ordination.
18. Appendix 2 reviews the risks, incidences, consequences & treatment of exposure.
19. Heat exhaustion, although caused by the opposite end of the weather spectrum, raises issues & arguments similar to those for exposure. That is, the competitor is ultimately responsible for his own safety, must be aware of the dangers, receptive to the warning signs & responsible for his retirement.
20. Appendix 3 is a similar review to Appendix 2 covering heat exhaustion.
21. 'Medical condition'. This term is used to describe incidents arising from runners competing with known or unsuspected problems such as a heart defect, 'gammy' knee or virus infection.
22. Organisers expect competitors to be fit enough to run. We have considered – briefly – the possibility of medical certification as a precondition for race entry but have rejected it for the following reasons:-
    - The standard of 'fitness' is a matter of medical judgement & controversy; consistent standards could not be applied.
    - It would not be acceptable to competitors.
    - It increases organisational overheads.
    - There is no indication that it would provide detectable safety benefits.
23. Falling rocks can be a major hazard if a large field is descending a scree slope or is concentrated into a loose gulley. It is not a hazard that an individual runner can control – the normal risk is of being hit by a boulder dislodged by a following

runner. Section E discusses these risks by using check points to avoid such danger areas.

E. CONTRIBUTORY FACTORS

24. Section 3 listed the following factors as likely to either cause accidents directly, to increase the risk of their occurrence or to increase their seriousness:
    - navigation errors
    - lack of suitable clothing
    - lack of food
    - unsuitable footwear
    - weather conditions
    - inadequate preparation
    - course planning
25. This section discusses each factor in turn from the point of view of the organiser & the competitor & their joint & separate responsibilities for reducing the risks associated with each factor.
26. Navigation errors increase the risk of accidents occurring; runners are no longer choosing the terrain they are traversing, become anxious, take more risks & become more fatigued. If an accident does occur, rescue may be delayed because an extensive search is needed.
27. Runners are much less likely to get lost if they:
    - carry a suitable map & compass
    - know how to use them both when navigating on course & if they are 'lost'
    - have 'prospected' the course beforehand
28. To what extent should the organiser ensure that the above are met?
29. It is considered that the risks from allowing competitors to run in races requiring 'navigational skills' without the basic navigational tools are significant; that the number of competitors who are familiar enough with a course to dispense with those tools in mist are very small (& probably overconfident); that a rule to make the carrying of map & compass mandatory would be acceptable & understandable to competitors & easily enforceable.
30. Obviously, if it is important for runners to carry map & compass, it is equally important that they be capable of using them. We considered various possibilities for assessing navigational skills or avoiding the need for them:
    - flagging of difficult sections
    - compulsory examination
    - compulsory training course
    - affirmation by a runner of his skills/experience on application form
31. We rejected the idea of flagging as being completely alien to the sport, encroaching on the runners' responsibilities & being environmentally unacceptable. It should only be used to guide runners through privately owned land or other access limited areas.
32. We considered very seriously the idea of a compulsory examination/training course & came to the following conclusions:
    - it could be of great value in allowing newcomers to the sport to learn the basic skills
    - such a scheme could only apply to new entrants; fell-runners with any experience could not be forced to take such a course
    - the scheme would only succeed if it was accepted, promoted & organised by the whole of the fell-running fraternity
33. It was therefore concluded that the CFRA should promote the above with a view to developments over the next 2-3 years; in the meantime, other schemes must be

considered.

34. We reluctantly came to the view that, in spite of its importance, for the present we could only encourage competitors to increase their navigational skills by:
    - exhortation
    - specific reference in the entry form
    - supporting efforts to provide navigational training under the FRA umbrella
    - encouraging runners to develop orienteering skills
35. Finally, we concluded that prior knowledge of courses ('O' type events excluded!) was desirable rather than essential, should be advisory rather than mandatory.
36. In summary, we recommended that;
    - all runners in races advertised as 'requiring navigational skills' should be required to carry map & compass
    - every opportunity should be taken to encourage runners to acquire & enhance navigational skills
    - runners should be encouraged to prospect courses ('O' type events excepted)
37. Lack of Suitable Clothing can make a significant difference to a runner's susceptibility to exposure in adverse weather. While on the move, he can probably maintain body temperature; if he slows or stops he is at risk unless additional clothing is available (see Appendix 2).
38. For absolute safety, one would wish to ensure that runners carried sufficient clothing to survive assuming:
    - worst possible weather conditions
    - complete immobilisation
    - 6-8 hours' delay before rescue
39. This would require the equivalent of a 'Mountain Marathon' pack to be carried & was considered to be totally impractical.
40. A 'sliding scale' of clothing requirement depending on time of year, & weather forecast was considered & rejected as being too subjective & also as giving a runner the impression that the organiser feels that the specification is 'safe'.
41. At the other extreme, it was agreed that it was irresponsible for an organiser to permit runners to dispense with any protective clothing if they so wished.
42. As a difficult compromise, it was agreed that runners should be required to carry as an absolute minimum:
    - windproof *(waterproof?)cagoule*
    - windproof *(waterproof?)* overtrousers

    on the clear understanding that in many circumstances this would be totally inadequate. Runners would be recommended to wear/carry additional clothing bearing in mind the weather & their own physique & physiology.
43. This rule would be applied even in heatwaves, bearing in mind:
    - the rapid changes possible in mountain weather conditions
    - the possibility of runners being on the fells into the late evening
    - the difficulty of defining when a relaxation should be applied
44. For heatwaves, runners will be recommended in addition to use suitable headgear.
45. Lack of Food in the longer races can contribute to accidents; it impairs both co-ordination & judgement. In adverse weather, accident risks are significantly increased.
46. While noting that runners' food requirements vary greatly, it was agreed that worthwhile safety advantages accrue if food reserves are carried; that a minimum should be set (as for clothing) & that this should be the equivalent of a 2oz (56g) chocolate bar for races with winning times greater than 2 hours. This rule would be specified so that competitors are clear that they should take the decision on whether they need to carry food additional to the basic requirement depending on their

assessment of:
- their normal requirements
- their view of the risks/additional weight
- expected running time

47. Unsuitable Footwear Choice of fell running footwear is a matter of personal preference; it is a compromise between lightness & support & also between grip & protection on various types of terrain. Experienced runners can compensate for inadequacies of footwear on difficult terrain.
48. It is therefore felt that, although runners should be discouraged from using unsuitable footwear, objective rules to ensure this would be impractical to devise & apply.
49. Weather Conditions. Adverse weather – be it cold or hot – can seriously increase the risks associated with a fell race; this section considers what the organiser could & should do to reduce these risks.
50. Under adverse conditions, the organiser can consider various possibilities
    - cancel the race
    - run an alternative or shortened course
    - advise runners on conditions
51. In view of the increasing number of competitors in races, organisers will obviously wish to avoid the widespread disappointment that cancellation would cause. On the other hand, ensuring that an alternative course can be resorted to at the last minute greatly adds to the organisational complexity.
52. It was agreed that a race would not be cancelled on account of mist/cloud cover, rain or high winds. These are conditions that any runner must be prepared to face. The conditions under which an organiser would cancel/reroute would be if there was widespread snow, ice or verglas cover on the higher parts of the course; he would be concerned at the risk of exposure if rain & wind were combined with temperatures below 40F (4.5C) on the fell tops but would probably tighten up on the clothing requirements under these conditions.
53. Consequently, for all the fell races on the fell tops an alternative course should be planned, available at short notice & the criteria for switching determined beforehand. During the summer months, although the risk of cancellation is small, alternative course plans are justified.
54. It was also agreed that, for all races, runners should be made aware of forecast fell top conditions in sufficient time to make their decisions on clothing & food.
55. Inadequate Preparation. It was recognised that certain runners had a higher than usual risk of accident. They have a selection of the following characteristics:
    - lack of mountain knowledge/awareness
    - inexperience of traversing rough mountain terrain
    - lack of stamina/basic fitness
    - poor navigational skills
56. While we would like to be able to ensure that such runners were rejected, we could not devise a scheme which was fair, reliable & acceptable.
57. Some of the points considered were:
    - vetting of runners as currently practised is arbitrary & unsatisfactory as a safety measure, though it may be of value for limited entry events
    - it would be possible to develop a 'Catch 22' situation where a runner could not get experience in long distance fell racing until he'd had long distance fell running experience
    - vetting of entries allows a runner to pass the responsibility for deciding if he is safe to enter onto the organiser
    - the questions used in vetting can check on running experience & performance; they cannot check on mountain sense & experience or navigational skills (q.v.)

58. We therefore concluded:
    - pre-vetting entries should not normally be attempted
    - the entry form (Appendix 4) should indicate that navigational skills are essential
    - that mental maturity was more important than physical maturity for high fell races, that a lower age-limit is essential &, though arbitrary, the present limit of 21 should be retained.

F. LOCATION & RESCUE

59. The early identification of missing runners, the definition of the part of the course where they have gone astray & the start of the search activities is a vital safety service provided by the organiser.
60. The other primary service provided is to ensure a fair race & to record/report competitors' progress & times & to provide detailed results.
61. More specifically these services comprise:
    Race - ensure each competitor visits each check point (including the start)
    - record intermediate times (desirable)
    - report race progress to officials & spectators
    Safety - register progress round the course
    - allow retirements to be advised
    - close down the course
    - identify runners unaccounted for
62. Carrying out these safety services relies on:
    - runners leaving evidence of having visited a checkpoint
    - retirements being advised to checkpoint/base
    - a procedure for closing down courses
    - a reliable communication system with base
63. These four topics are discussed in the following sections.
64. Runners checking in. Traditionally, runners record their passage through a checkpoint by punching their card which is handed in at the finish for checking or, in some races, hands are 'marked'. This system has no safety contribution; for location of runners we currently rely on checkpoint marshals noting down numbers. In adverse conditions this is difficult; numbers are obscured by cagoules & runners have no incentive to ensure that their number is taken correctly.
65. It has become clear that a simpler, more effective system can be devised, which requires a runner to leave a numbered token at each checkpoint. Various prototypes are being considered for trial; apart from its safety advantages, the system appears to simplify the task of checkpoint marshals & to possibly allow for increases in field sizes.
66. Retirements. With increased emphasis on rapidly identifying missing numbers, it becomes critical for retiring runners to ensure that their retirement is advised to base before a search is mounted. This will require them to:
    - be aware of the time at which they will be flagged as missing
    - announce their retiral at either:
        : a check point
        : the finish
        : a telephone (via the police)
    - advise their further plans &, if appropriate, report at the finish.
67. It will be necessary to be more specific in retirement instructions to competitors; in addition, sanctions on non-compliant runners may be required either by individual organisers or, preferably, co-ordinated across the sport.
68. Closing down courses. It is an unfortunate necessity that courses must be 'closed

down' progressively after set times for the following reasons:
- to allow the vital 'book keeping' to identify missing runners & to concentrate on locating them with maximum efficiency
- to avoid overstretching the good-will & risking the safety in bad of volunteers who are prepared to man checkpoints in all weathers
- to give a reasonable chance of location & rescue before darkness.

69. Organisers should balance the need to allow the poorer runners the satisfaction of completing a major fell race against the above factors when they fix closing down times. Having done this, then it is agreed that:
- competitors should agree to abide by the time as a condition of entry
- publicity on the reasons for such a procedure should be widespread
- sanctions should be applied against runners who ignore the rules

70. Communications System. Monitoring progress round the course & early identification of missing runners requires an efficient form of communication with base. The following characteristics are needed:
- rapid transfer of information
- high reliability
- enough checkpoints covered to allow search areas to be limited

71. Three possibilities have been considered. Relying on checkpoints to hand deliver the information is slow; base would not receive the data until close-down time plus descent time. This could add 2-5 hours to the delay before a rescue is mounted.
72. The second alternative is to use additional runners or competitors to relay information. The former adds to the support numbers for a race, is not absolutely reliable & is only a small improvement on the scheme in the previous paragraph; using competitors to convey information is a well-tried technique of proven (& understandable) unreliability.
73. The only practical possibility is the use of radio communication (as currently provided by Mountain Rescue teams). It has the advantage that key information can be rapidly transferred (provided that the organisation of the race is such that essential transmission of data is minimised). Teams can usually provide sufficient sets to give adequate checkpoint coverage.
74. However, reliability or availability of the service is a potential problem. Currently Mountain Rescue teams welcome the opportunity to practise their communication skills & justify their use of their radios on these events.
75. Consequently, investigations have been carried out into the practicality of fell-race organisers owning & operating their own radio equipment. The current position is as follows.
76. Frequencies are allocated by the Home Office to Companies or Organisations for specific activities, the frequency being dependant upon the area within which the radios are to be used. However, the frequency may also be used elsewhere in the UK for the agreed activity if seven days' written notice is given to the respective Post master.
77. It seems that Fell Running clubs could apply for an allocated frequency. However, the cost of the radios themselves is high at £400 per set. The total cost of a system of radios is of the order of £4000 could only be shared between a number of clubs, at an annual cost of approximately £800 (to cover depreciation) or £50-£100 per race.
78. With the legislation of CB radios on 27 MHz (FM), a cheaper (£70 per set) but less robust alternative becomes available. CB has the advantage that 40 frequencies are allocated & a race organiser could choose to have a different frequency for different checkpoints.

    The main drawback of CB is that it is not 'private' , & on the fell tops CBs for miles around could be received. This aspect could prove critical if the radios were required

in an emergency.
For all its apparent drawbacks a full scale trial, with the assistance of CB enthusiasts, would seem well justified.

79. Whatever the type of radio in use it is important that radio teams are trained & self-disciplined, & know the race organiser's requirements. A flow of information that the race organisation is not able to process is a hindrance rather than a help.
80. The ultimate technological solution to monitoring runners would appear to be the use of radios combined with VHF 'bleeps' carried by the runners. Currently these bleeps cost approximately £7 & weigh 1oz but will undoubtedly reduce in price & weight in the future.
81. With a directional radio, a missing runner could be located much more quickly than at present. Ideally the bleep should be so designed that it only worked if the runner remained stationary for longer than, say 20 minutes. Further technical enquiries are required.
82. For the present, we will rely on the old-fashioned whistle for locating runners in distress; this will be included in the mandated kit list.
83. To conclude this section the question of race numbers is considered. We have concluded the following:
    - as a service to runners, organisers should avoid imposing limits on numbers; the bigger the field the greater the collective (if not the individual) enjoyment. Organisers must however be sensitive to the views of other users of the fells.
    - ignoring the risks of rock falls, a larger field means that runners are less likely to get lost & more likely to be aided by other runners.
    - the safest race, therefore, will be one where the size of the field is just below that at which the organisation starts to deteriorate through pressure by numbers.

G. REVIEW OF RESPONSIBILITIES OF RUNNERS

84. This section pulls together all the items from previous sections which relate to the responsibilities of the runner in preparing for an event, his pre-start responsibilities & those during the race itself.
85. It has been noted in previous sections that, once on the fell, the runner must be self reliant & cannot rely on help from others. This section reinforces that view.
86. Prior to entering a race a runner must ensure that:
    - he is basically healthy & has the necessary fitness
    - can use a mountain map & compass to navigate under adverse conditions
    - has sufficient mountain 'sense' & experience to make sensible route choices & negotiate rough terrain.
87. Before starting the race, he must:
    - be aware of the weather forecast displayed by the race organiser'- carry spare clothing & food appropriate to the course, the weather & his own needs
    - be appropriately clad & shod
    - conversant with the course, & with race requirements (eg checkpoint close down times & retirement procedures).
88. While racing he must remain aware of:
    - the weather conditions
    - his position
    - his physical condition
    & temper race euphoria with sound navigation & his pride with responsible judgement if retiral is under consideration.
89. If retiring he must, must, must follow the procedures to ensure that he does nor needlessly divert rescue activities.

H. REVIEW OF RESPONSIBILITIES OF ORGANISERS

90. In addition to his duty to provide runners with an enjoyable & fair race, the organiser has the following safety responsibilities:
91. The course, while nor being absolutely safe, must not be unnecessarily dangerous. Competitors must be prevented, by course design, from obtaining advantage by taking a route involving rock climbing or the descent of unstable slopes.
92. Safety back-up must be provided in a number of ways. First of all, the organiser must equitably enforce the minimum safety rules. He must have an efficient system for identifying missing runners so that he can speedily alert rescue services, & ensure his officials are suitably briefed & efficiently deployed.
93. Finally, he must have available an alternative or a shorter course if weather conditions are are possible which would make his normal course unacceptably risky.

I. REVIEW OF RACE RULES & ORGANISATIONAL PROCEDURES

94. The foregoing implies a series of race rules & a number of organisational procedures. These are summarised in the following paragraphs. Unless otherwise stated they will be applied to all races involving navigational skills.

(A) RULES

95. Age limit :- Entries for A category medium & long distance fell races will be restricted to runners over the age of 21 on the day of the race.
96. Equipment :- All runners will be required to carry the following minimum equipment :-
    - wind proof (*waterproof?*) cagoule & overtrousers
    - *thermal hat & gloves*
    - map & compass for route-finding
    - whistle for emergencies
    - food equivalent to a 2oz chocolate block or Mars Bar.
97. Retirement :- After voluntary retirement runners are required to advise race officials as quickly as possible. This must be done by either:
    - reporting to a checkpoint & then at the finish (preferred method
    - reporting directly to the finish
    - telephoning the police (if the runner finds himself in the wrong valley).

    Each race has a sequence of checkpoint closing times; runners checking in outside the allowed time will be compulsorily retired & must return directly to the finish.
98. Numbers :- On registration, runners will be issued with their race number plus numbered tags. The former must be shown on request or advised to checkpoint marshals; the latter must be used, one per checkpoint, as a record that the runner has visited each checkpoint.
99. Non-compliance with the above rules will lead to disqualification or, in the case of a breach of the retirement rules, to a ban from future races.

(B) PROCEDURES

100. Competitors will fill in the revised entry form (Appendix 3) which will include sections on:
: usual personal details
: transport arrangements (car registration & companions in case a rescue is mounted)
: disclaimer

101. Runners will be issued with consecutive numbers as they register. With the number they will also receive a set of numbered tags to be left one at each checkpoint & a detachable part of the entry form defining:
- the checkpoints (with grid references)
- their closing time
- the retirement procedure
- flagged sections (in the valleys)

102. Advice to competitors will be prominently displayed at registration & will comprise:
- the latest forecast for fell top weather conditions
- a reminder of the minimum kit list that may be subject to checking
- the voluntary & compulsory retirement procedure

103. Before the start, six numbers will be drawn at random & the kit checked. Runners in breach will be disqualified; they will not, for obvious reasons, be allowed to remedy any deficiency.

104. Checkpoints will be organised on the basis of two officials (minimum) + 1 radio operator (if available). The officials will:
- opening up control by contacting base & noting any non-starters in the consecutive sequence of runners
- collect tags as runners arrive using a threading system to preserve sequence
- note down numbers & times – unless or until the tag system renders this superfluous
- retire any runners arriving after the cut-off time
- close down the checkpoint
  : either all runners at previous checkpoints have been accounted for
  : or base instructs the close down

105. Race monitoring will normally be carried out by radio contact between checkpoints & base. Apart from notifying the times of the leading runners, checkpoints will be crossing off runners' numbers from the start list to leave a query list. This will be co-ordinated by base to identify a 'potential missing' list.

106. Base will have the responsibility of alerting rescue services; this will be based on an assessment of :
- time at the last checkpoint
- time to return to base (as competitors may be retired)
- hours of daylight remaining

  If radio facilities are not available, 'sweepers' must be used to carry out a similar function less satisfactorily as checkpoints close down.

107. Contingencies – a shorter/lower course will be available as an alternative for 'A' category medium & long distance fell races.

108. Should all of the above arrangements fail to prevent an accident, the organiser will have ensured that:
- each competitor has signed an entry/acceptance of risk form (see Appendix 4)
- insurance covering legal liability has been taken out via the FRA Scheme.

APPENDIX 1 - COMPARATIVE RISK OF FELL RACES

Details are available of the following races as a result of the attached letter.

Fairfield
Skiddaw
Borrowdale
Moffat
Marsden-Edale
Vaux — 8 other races not yet responded
Northern Counties
Ennerdale
Wasdale
Copeland
Morrison Sky-Line

Only 3 deaths are known about: the recent Ennerdale tragedy, the 1979 death in the Three Peaks & in the Ben Nevis race in the late 50s. Estimates of race starts have been made for these races.

Using figures available & estimates we calculate :-

3 deaths in at least 14000 race starts

ie 1 death in 4700 race starts

Using average times for each race, one can arrive at an overall figure for death/race hours;

it is approximately 1 death per 14000 race hours.

Alternatively for a runner entering 8 races/year of 2.5 hours each, his risk/year would be 1 in 700. Comparing this with risks of other sports, we compile the following table:

Risk of Death

Climbing in Himalayas	1 in 26 per visit
Mountaineering abroad	1 in 250 per 3 week visit
Rock climbing	1 in 600 per year
Fell racing	1 in 700 per year
Fell walking	1 in 4000 per year

Above taken from J. Wilkinson article 'And now for the bad news' – Fell & Rock Climbing Club Journal 23, 67, p.145

An alternative table from the Windscale Inquiry Report

Risk of Death per year of Exposure	
Smoking 10 cigarettes /day	1 in 400
All accidents	1 in 2000
Traffic accidents	1 in 700 per year
Fell walking	1 in 8000

At the present, it appears that the risks of fell running are comparable with those in another risk

sport such as climbing.

APPENDIX 2 - EXPOSURE

1. The human body has a remarkably effective system for keeping itself at a constant temperature under a wide range of external conditions.
2. There are limits beyond which the mechanism will not cope; 'exposure' is when the body temperature falls while 'heat stroke' (next appendix) sets in when the body temperature rises.
3. This section discusses exposure. Figure 1 is a simplified representation of the factors involved.
4. The active runner is working at a high rate. Energy is provided by oxygen breathed into the lungs combining with food from the stomach; through the circulating blood the muscles are fuelled to propel the body; as a waste product large quantities of heat are produced.
5. This heat is lost from the body – normally by sweating. In cold, windy conditions heat will be lost by cooling of the body surface.
6. Provided heat produced by the body balances the heat lost, the body temperature will stay steady. Three factors are important – the rate of heat production, the insulation of the body, & the weather conditions.
7. The rate of heat production varies dramatically; between hard running & lying immobilised on the fell there is a factor of 15-20. Note also that food is required to fuel the process – an empty belly is equivalent to an empty petrol tank.
8. The insulation of the body controls the rate of heat loss. The body itself acts as an insulator – surface layers of fat being the most effective. Clothing is the second factor. Fell runners do not usually have much in the way of body fat & shorts, singlet, & windproofs provide a very low level of insulation.
9. External Conditions
   The rate of loss of heat from the body is dependent on the external temperature, the wind speed &, to a limited extent, the humidity. The graph in Figure 2 shows the effective external temperature for a range of wind speeds.
10. Conclusions
    From the above some simple rules can be derived:
    1. If you run out of food, not only will your legs pack up, but you are at greater risk from exposure.
    2. At normal running speeds, exposure is not likely to be a problem on fell tops in the summer.
    3. If you slow down or stop altogether then, even if temperatures are approximately 45F (7C) you can be at risk in usual fell-running kit.
11. Symptoms of Exposure
    Lowering of the body core temperature sets in train a range of symptoms :-
    - violent shivering
    - reduced muscular control
    - impaired balance
    - irrational behaviour
    - impaired mental abilities
    - physical collapse
12. The greater the degree of exposure, the more likely that the runner will have an accident &/or get lost, changing the problem from one of minor exposure to a full scale search/rescue for a victim of serious exposure &/or injury.
13. Remedies
    The advice to runners is simple & straightforward :-
    - exposure can be a problem in summer as well as winter; beware of days of cold driving rain on the fell-tops.
    - dress-up rather than down for such conditions; if in doubt, put on more clothes.

- make sure you are well stocked up with food.
- monitor yourself for the early signs of exposure :-
  legs feeling cold & not working well
  lack of co-ordination & balance
- if you suspect that you are getting chilled: retire. If you delay you may not be capable of sound judgement.
- Get out of the wind, get warm & get fed as soon as possible.

FIGURE 1

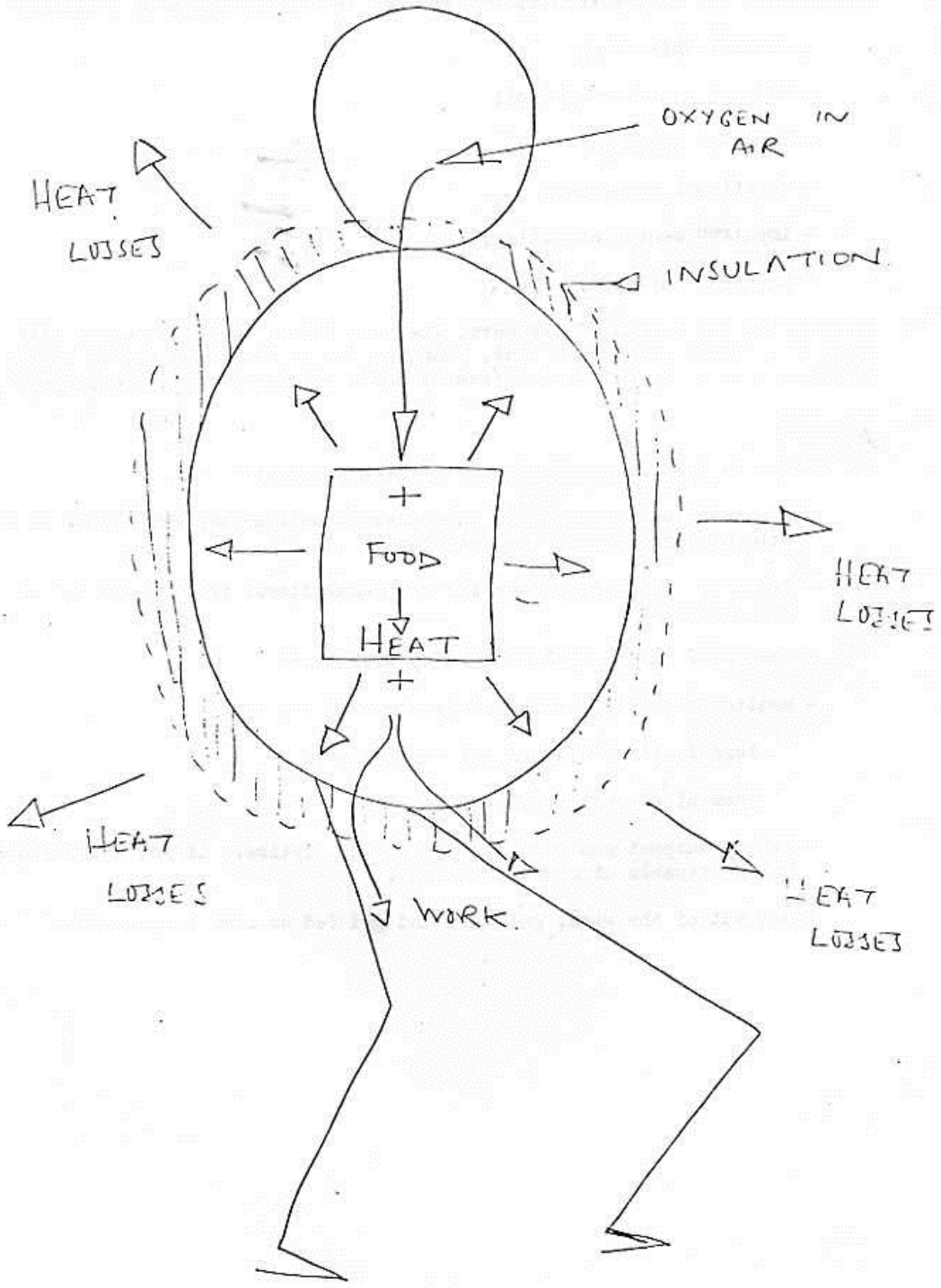

OXYGEN IN AIR
HEAT LOSSES
INSULATION
FOOD
HEAT
HEAT LOSSES
HEAT LOSSES
WORK.
HEAT LOSSES

Figure 2 – Wind Chill Factors

Steadman Apparent Temperature as a Wind Chill

Apparent temperature (AT) as a Wind Chill - after Steadman 1994

Wind Speed (km/h) \ Temperature (°C)	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
0	-8	-7	-6	-5	-4	-3	-2	-1	1	2	3	4	5	6	8	9	10	11	12	14	15	16	17	19	20	21
2	-9	-8	-6	-5	-4	-3	-2	-1	0	1	2	4	5	6	7	8	10	11	12	13	15	16	17	18	20	21
4	-9	-8	-7	-6	-5	-4	-2	-1	0	1	2	3	4	6	7	8	9	10	12	13	14	15	17	18	19	21
6	-9	-8	-7	-6	-5	-4	-3	-2	-1	1	2	3	4	5	6	8	9	10	11	12	14	15	16	18	19	20
8	-10	-9	-8	-7	-5	-4	-3	-2	-1	0	1	2	4	5	6	7	8	10	11	12	13	15	16	17	19	20
10	-10	-9	-8	-7	-6	-5	-4	-2	-1	0	1	2	3	4	6	7	8	9	10	12	13	14	16	17	18	20
12	-11	-9	-8	-7	-6	-5	-4	-3	-2	-1	1	2	3	4	5	6	8	9	10	11	13	14	15	16	18	19
14	-11	-10	-9	-8	-7	-5	-4	-3	-2	-1	0	1	2	4	5	6	7	8	10	11	12	13	15	16	17	19
16	-11	-10	-9	-8	-7	-6	-5	-4	-3	-1	0	1	2	3	4	6	7	8	9	11	12	13	14	16	17	18
18	-12	-11	-10	-8	-7	-6	-5	-4	-3	-2	-1	1	2	3	4	5	6	8	9	10	11	13	14	15	17	18
20	-12	-11	-10	-9	-8	-7	-6	-4	-3	-2	-1	0	1	2	4	5	6	7	9	10	11	12	14	15	16	18
22	-13	-11	-10	-9	-8	-7	-6	-5	-4	-3	-1	0	1	2	3	4	6	7	8	9	11	12	13	15	16	17
24	-13	-12	-11	-10	-9	-7	-6	-5	-4	-3	-2	-1	1	2	3	4	5	6	8	9	10	12	13	14	15	17
26	-13	-12	-11	-10	-9	-8	-7	-6	-4	-3	-2	-1	0	1	2	4	5	6	7	9	10	11	12	14	15	16
28	-14	-13	-12	-10	-9	-8	-7	-6	-5	-4	-3	-1	0	1	2	3	5	6	7	8	9	11	12	13	15	16
30	-14	-13	-12	-11	-10	-9	-7	-6	-5	-4	-3	-2	-1	1	2	3	4	5	7	8	9	10	12	13	14	16
32	-14	-13	-12	-11	-10	-9	-8	-7	-6	-4	-3	-2	-1	0	1	3	4	5	6	7	9	10	11	13	14	15
34	-15	-14	-13	-12	-10	-9	-8	-7	-6	-5	-4	-3	-1	0	1	2	3	5	6	7	8	10	11	12	13	15
36	-15	-14	-13	-12	-11	-10	-9	-8	-6	-5	-4	-3	-2	-1	1	2	3	4	5	7	8	9	10	12	13	14
38	-16	-15	-13	-12	-11	-10	-9	-8	-7	-6	-5	-3	-2	-1	0	1	3	4	5	6	8	9	10	11	13	14
40	-16	-15	-14	-13	-12	-11	-9	-8	-7	-6	-5	-4	-3	-1	0	1	2	3	5	6	7	8	10	11	12	14
42	-16	-15	-14	-13	-12	-11	-10	-9	-8	-6	-5	-4	-3	-2	-1	1	2	3	4	5	7	8	9	11	12	13
44	-17	-16	-15	-14	-12	-11	-10	-9	-8	-7	-6	-5	-3	-2	-1	0	1	3	4	5	6	8	9	10	12	13
46	-17	-16	-15	-14	-13	-12	-11	-9	-8	-7	-6	-5	-4	-3	-1	0	1	2	3	5	6	7	9	10	11	13
48	-18	-16	-15	-14	-13	-12	-11	-10	-9	-8	-6	-5	-4	-3	-2	-1	1	2	3	4	6	7	8	9	11	12
50	-18	-17	-16	-15	-14	-12	-11	-10	-9	-8	-7	-6	-5	-3	-2	-1	0	1	3	4	5	6	8	9	10	12
52	-18	-17	-16	-15	-14	-13	-12	-11	-10	-8	-7	-6	-5	-4	-3	-1	0	1	2	4	5	6	7	9	10	11
54	-19	-18	-17	-15	-14	-13	-12	-11	-10	-9	-8	-6	-5	-4	-3	-2	-1	1	2	3	4	6	7	8	10	11
56	-19	-18	-17	-16	-15	-14	-13	-11	-10	-9	-8	-7	-6	-5	-3	-2	-1	0	2	3	4	5	7	8	9	11
58	-20	-18	-17	-16	-15	-14	-13	-12	-11	-10	-8	-7	-6	-5	-4	-3	-1	0	1	2	4	5	6	8	9	10
60	-20	-19	-18	-17	-16	-14	-13	-12	-11	-10	-9	-8	-6	-5	-4	-3	-2	-1	1	2	3	5	6	7	8	10
62	-20	-19	-18	-17	-16	-15	-14	-13	-11	-10	-9	-8	-7	-6	-5	-3	-2	-1	0	2	3	4	5	7	8	9
64	-21	-20	-19	-17	-16	-15	-14	-13	-12	-11	-10	-8	-7	-6	-5	-4	-2	-1	0	1	2	4	5	6	8	9
66	-21	-20	-19	-18	-17	-16	-14	-13	-12	-11	-10	-9	-8	-6	-5	-4	-3	-2	0	1	2	3	5	6	7	9
68	-21	-20	-19	-18	-17	-16	-15	-14	-13	-11	-10	-9	-8	-7	-6	-4	-3	-2	-1	0	2	3	4	6	7	8
70	-22	-21	-20	-19	-17	-16	-15	-14	-13	-12	-11	-10	-8	-7	-6	-5	-4	-2	-1	0	1	3	4	5	6	8
72	-22	-21	-20	-19	-18	-17	-16	-15	-13	-12	-11	-10	-9	-8	-6	-5	-4	-3	-2	0	1	2	3	5	6	7
74	-23	-22	-20	-19	-18	-17	-16	-15	-14	-13	-12	-10	-9	-8	-7	-6	-4	-3	-2	-1	1	2	3	4	6	7
76	-23	-22	-21	-20	-19	-18	-16	-15	-14	-13	-12	-11	-10	-8	-7	-6	-5	-4	-2	-1	0	1	3	4	5	7
78	-23	-22	-21	-20	-19	-18	-17	-16	-15	-13	-12	-11	-10	-9	-8	-6	-5	-4	-3	-2	0	1	2	4	5	6
80	-24	-23	-22	-21	-19	-18	-17	-16	-15	-14	-13	-12	-10	-9	-8	-7	-6	-4	-3	-2	-1	1	2	3	5	6

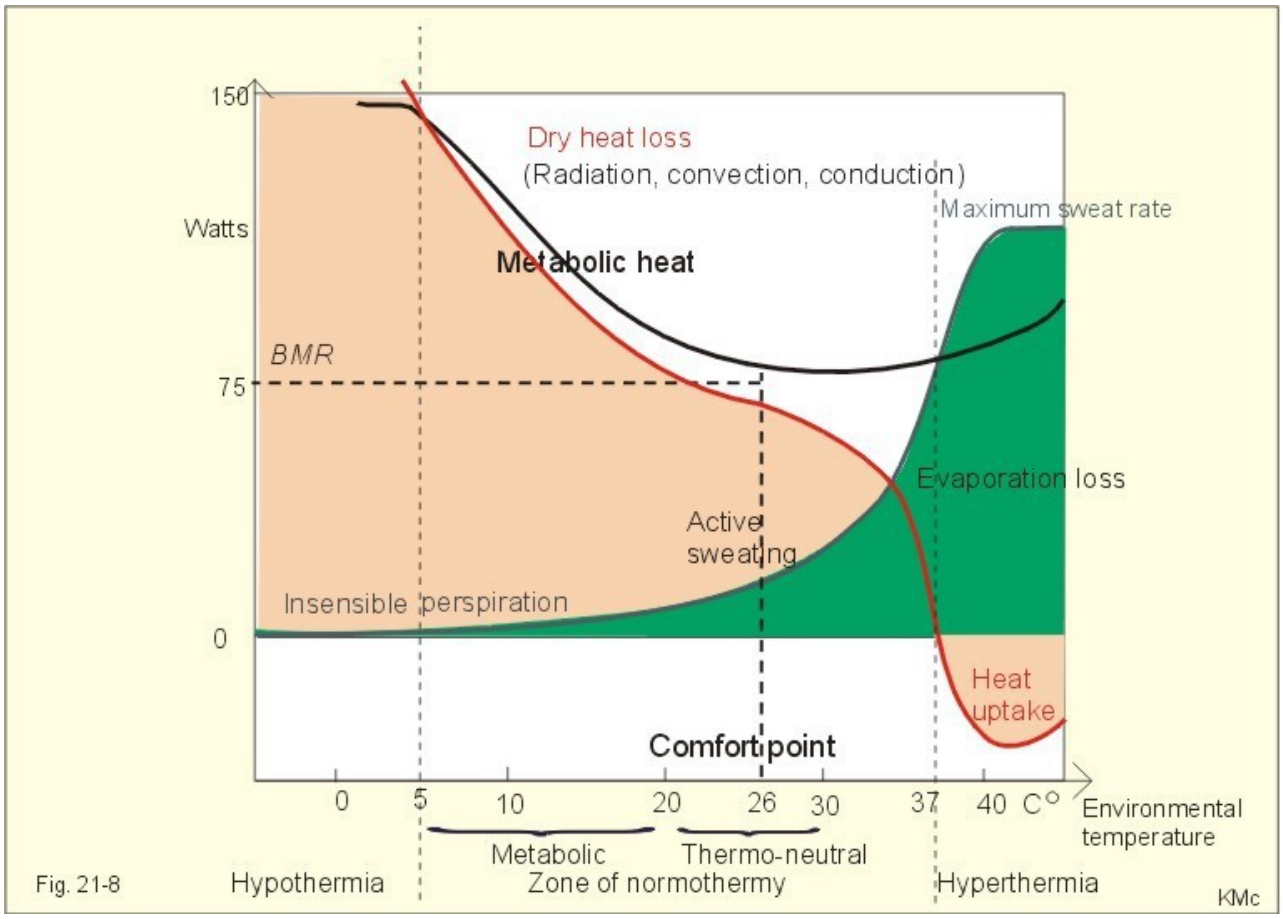
Apparent temperature with no radiational heating and relative humidity fixed at 70%

Formula from *Norms of apparent temperature in Australia* , **Aust. Met. Mag**, Vol 43, 1994, 1-16.

Legend: Colours added to visually delineate increasingly colder values.

Figure 3 – Hypothermia/Hyperthermia

BMR – Basic Metabolic Rate ~75W



APPENDIX 3 - HEAT EXHAUSTION & HEATSTROKE

1. 'Heat Exhaustion' is when the body core temperature rises out of control, i.e. to between 37C & 40C. Once above 40C the body begins to overheat internally & the condition becomes 'Heatstroke' & is far more serious. As in Figure 1, waste heat is produced & normally lost from the body by sweating & by convection, very little by conduction.
2. Symptoms of Heat Exhaustion:
   - hot, flushed skin, heavy sweating
   - fatigue, extreme tiredness
   - feeling nauseous, being sick (vomiting)
   - rapid heartbeat
   - mental confusion
3. Symptoms of Heatstroke:
   - heavy sweating that suddenly stops
   - rapid heartbeat
   - hyperventilation
   - lack of co-ordination, muscle cramps
   - mental confusion/hallucination
   - loss of consciousness
4. Medical conditions that may be a precursor to susceptibility to heat exhaustion:
   - kidney, heart or circulation problems
   - diabetes
5. Heat loss (or gain) is caused by the difference in temperature between a body & its surroundings, specifically the surface temperature of the runner's body & the air temperature. With exercise, this process is aided by sweating, where the extra energy to evaporate water (Latent heat of evaporation) is exploited by the body. Here we explore where heat cannot be removed as fast as it is generated by the fell runner.
6. The effectiveness of heat removal is dependant on:
   - the difference in temperature between the skin & the surrounding air
   - the movement of air over the surface of the runner's body
   - the amount of insulation carried by both the body & the runner's clothing
   - the level of humidity in the air
   - radiation from the sun
7. Normal skin surface temperature is about 34C but runners will begin to feel uncomfortable if their body temperature rises only 1C to just over 38C.
8. Air movement on a hot day is crucial, if the competitor is running through still air, or even worse a slow following breeze such that he is running in effectively 'still air', the situation is at its worst.
9. The fat layers on the runner's body which may protect him from exposure now works against him to reduce the heat transfer. The clothing is required to 'breathe' so helping the transfer of heat from the skin.
10. Humid conditions greatly or completely remove the effectiveness of sweating. A high relative humidity (RH) increases the effective air temperature (see Figure 4). As sweating controls the rate of heat loss, reduction or removal of the ability to evaporate sweat puts the cooling system on hold – not a good situation.
11. The effect of solar radiation is important under all temperature conditions. Excess radiation acts to increase the heat load on a runner. Under hot conditions it is vital that this extra heat load must be shed.
12. The one advantage that most fell runners have, is that they do not usually have much in the way of body fat! & they will probably be wearing only shorts & singlet. The more experienced runners will probably wear a white sun hat to reduce radiation heat absorption & sun glare which will act to reduce the likelihood of stumbling & falling.

13. The greater the amount of overheating, the more likely that the runner will have an accident &/or get lost, as for exposure.

    Precautions

    The advice to runners is simple & straightforward :-

    - likelihood of suffering from heat exhaustion can be predicted by checking the weather forecast.
    - dress-down, wear mesh vest etc. & consider a white sun hat..
    - make sure you are well hydrated before starting
    - either carry water in say a camelback, or ensure you know where the water may be found on the fell.
    - take energy drink with balanced salts, not just water
    - take it easier when running on flat or climbing, save more energy for downhill sections

    Remedies

    - get in shade if possible
    - drink plenty of fluid
    - cool with damp/wet clothing or towel if available
    - report to checkpoint marshals if possible & if there is no immediate recovery so impaired runner can walk down with escort, get medical help through the RO

Figure 4 – Humidity & Temperature Relationship

Steadman Apparent Temperature

Apparent temperature (AT) from temperature and relative humidity - after Steadman 1994

Relative Humidity (%) \ Temperature (°C)	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
0	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
5	16	17	18	19	20	21	22	23	24	25	26	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	44	45	46	47	48
10	17	18	19	20	21	22	23	24	25	26	27	28	29	31	32	33	34	35	36	37	38	39	41	42	43	44	45	46	48	49	50
15	17	18	19	20	21	22	24	25	26	27	28	29	30	31	33	34	35	36	37	38	40	41	42	43	45	46	47	48	50		
20	17	18	20	21	22	23	24	25	26	28	29	30	31	32	33	35	36	37	38	40	41	42	43	45	46	47	49	50			
25	18	19	20	21	22	24	25	26	27	28	29	31	32	33	34	36	37	38	40	41	42	44	45	46	48	49					
30	18	19	21	22	23	24	25	26	28	29	30	31	33	34	35	37	38	39	41	42	43	45	46	48	49						
35	19	20	21	22	23	25	26	27	28	30	31	32	34	35	36	38	39	40	42	43	45	46	48	49							
40	19	20	21	23	24	25	26	28	29	30	32	33	34	36	37	39	40	41	43	44	46	48	49								
45	19	21	22	23	24	26	27	28	30	31	32	34	35	37	38	40	41	43	44	46	47	49									
50	20	21	22	24	25	26	28	29	30	32	33	35	36	38	39	41	42	44	45	47	49	50									
55	20	22	23	24	25	27	28	30	31	32	34	35	37	38	40	42	43	45	46	48	50										
60	21	22	23	25	26	27	29	30	32	33	35	36	38	39	41	42	44	46	48	49											
65	21	22	24	25	27	28	29	31	32	34	35	37	39	40	42	43	45	47	49												
70	21	23	24	26	27	28	30	31	33	35	36	38	39	41	43	44	46	48	50												
75	22	23	25	26	28	29	31	32	34	35	37	38	40	42	44	45	47	49													
80	22	24	25	27	28	30	31	33	34	36	38	39	41	43	45	46	48	50													
85	23	24	26	27	29	30	32	33	35	37	38	40	42	44	45	47	49														
90	23	25	26	28	29	31	32	34	36	37	39	41	43	45	46	48	50														
95	23	25	26	28	30	31	33	35	36	38	40	42	43	45	47	49															
100	24	25	27	29	30	32	33	35	37	39	41	42	44	46	48	50															

AT above 50°C

Legend: Red values, apparent temperature above air temperature; blue values, apparent temperature below air temperature

APPENDIX 4 - Pre-Entry Form

CFRA Pre-entry form for the 2013….....Fell Race

1. Please enter me for the above race.
2. I declare that I am an amateur as defined by AAA/UK Athletics' Rules for Competition.
3. I understand that this race is held in accordance, & that I have familiarised myself, with both the Rules & Safety Requirements of the FRA. I confirm that I am aware of the Organiser's information & requirements in connection with this race. I confirm that I have navigational skills appropriate for this race & will carry throughout the race any equipment specified either by the FRA Safety Requirements or by the Organiser. I accept the hazards involved in fell running & acknowledge that I am entering & running in this race at my own risk. Other than the Organiser's liability for causing death or personal injury by negligence, I confirm that I understand that the Organiser accepts no liability to me for any loss or damage of any nature to me or my property arising out of my participation in this race.
4. I have read and understand the rules of the race and agree to abide by them.
5. I am aware that both local knowledge & navigational skills are required.
6. I have enclosed a cheque / postal order / cash for the pre-entry fee of : £..... made payable to 'CFRA' (& if details are required a self addressed envelope).

Please use BLOCK CAPITALS for the following details :-

Name.....

Age on the day of the race ..... Date of Birth ...../...../.....

Category Male U18 / U23 / S / V40 / V45 / V50 / V55 / V60 / V65 / V70
Female LU18 / LU23 / LS / LV40 / LV45 / LV50 / LV55 / LV60 / LV65 / LV70

Club ….....

Address .....

.....

Post Code ..... Tel. No ..... Mobile .....

e-mail (if available) .....

Emergency contact is required for juniors U18 (parent/legal guardian) or if available for over 18

Name .....Tel. no..... Mobile.....

Signature ..... U18 Parent/legal guardian / Competitor over 18

Please note :
The lower age limit for the Ennerdale & Wasdale fell races is 18, for the Scafell Pike 16, **on the day of the race**. This form now carries the FRA disclaimer, so you will not now be required to fill out a second registration form at the race. **But,** if any of the above details have changed then you **must** correct or rewrite the form at registration. In all cases sign below to verify details are correct.

Signature (at race registration) ….....

Please record your car registration below so if you don't reach the finish we can verify if your car is still present :-

Car registration….....

D i b b e r N u m b e r

Race Number