



Mountain Marathons, Adventure Racing, and Mountain Tours

3

Chapter Summary

This chapter first defines mountain marathons, adventure racing, and mountain tours and gives examples of a range of such activities and events. It then briefly discusses the history and diversity of mountain marathon, adventure racing, and high mountain tours and safety/legal issues before presenting recent data on user numbers. The final part of the chapter focuses on specific environmental impacts associated with particular events such as the UK's National Three Peaks Challenge and the Yorkshire Three Peaks Challenge and highlights the need for more research. The final section considers the management of these activities and gives some examples of education initiatives that have been used in management attempts.

usually participate in teams of two and have to carry their own food and tent. There are various classes of event (e.g. for the Original Mountain Marathon—Elite, A, B, C, D and Long, Medium, and Short Score).

Some of the more well-known events include:

- The Original Mountain Marathon (OMM—formerly the Karrimor International Mountain Marathon/KIMM) held in a UK hill or mountain area in the last weekend in October (www.theomm.com).
- The Saunders Lakeland Mountain Marathon (SLMM) held in or near the Lake District in early July.
- The Swiss International Mountain Marathon (since 1976: formerly the Karrimor International Mountain Marathon/KIMM Switzerland/Mammut International Mountain Marathon/MIMM Switzerland/R'adys Mountain Marathon) held in Switzerland in mid-August.
- Marmot Dark Mountains held on the last weekend of January each year.
- The Lowe Alpine Mountain Marathon (LAMM) held in the Scottish Highlands in June.
- The Mourne Mountain Marathon held in Mourne Mountains, County Down, Northern Ireland, in September.
- The ROC Mountain Marathon held on the last weekend of September each year.
- The SCOTT Snowdonia Trail Marathon, which is a challenge in every sense of the

3.1 Definitions

3.1.1 Mountain Marathon

Mountain marathon is an extended form of fell running. Races usually take place over two days and often have a strong element of orienteering (i.e. competitors must plan their own route and navigate using map and compass). Competitors

word. Ascending 1685 metres over 26 miles of iconic and spectacular trails, this epic race circumnavigates and eventually climbs Wales' highest peak—Snowdon.

- The Longmynd Hike—a 50-mile competition hike open to anyone aged 18 or over—which takes place over the first weekend of October every year.
- Starting and finishing at Church Stretton, the hike follows a set figure-of-eight route over the rugged countryside of South Shropshire and the Welsh Marches, with about 8000 ft of climbing covering eight summits.

There are also newer events springing up and attracting increasing numbers, including the Highlander Mountain Marathon which began in 2007 and is held in April at a Scottish location within a two-hour drive of Inverness.

3.1.2 Adventure or Expedition Racing

Adventure racing has been characterised as a new “lifestyle sport”: “a non-stop, self-sufficient, multi-day, multidiscipline, mixed gender endurance competition that takes place in the wilderness

over a designated but unmarked course” (Kay and Laberge 2002, p. 25).

Adventure racing (also called expedition racing) is typically a multidisciplinary team sport involving navigation over an unmarked wilderness course with races extending anywhere from two hours up to two weeks in length. Some races offer solo competition as well. The principle disciplines in adventure racing include trekking, mountain biking (Fig. 3.1), and paddling although races can incorporate a multitude of other disciplines including climbing, abseiling, horse riding, skiing, and white-water rafting. Teams generally vary in gender mix and in size from two to five competitors. The most popular format is generally a mixed-gender team of four racers. There is typically no suspension of the clock during races, irrespective of length; elapsed competition time runs concurrently with real time, and competitors must choose if or when to rest.

3.1.3 High Mountain Tours

A high mountain tour (German: *Hochtour*) is a mountain tour that takes place in the zone that is covered by ice all year round, the nival zone,

Fig. 3.1 Competitor on a cycling leg of an adventure race in the English Lake District. Photo by Tim Stott





Fig. 3.2 The start of the high mountain tour at the end of the eighteenth century: contemporary portrait of Horace-Bénédict de Saussure on Mont Blanc in 1787.

Source: By Marquard Wocher—www.unil.ch/webdav/site/viaticAlpes/users/dvaj/public/colloqueprojet/Vaj_ViaticAlpes.pdf

above a height of about 3000 metres (High Alps) where many mountains are at least partly glaciated (Fig. 3.2). Important historic milestones in the development of high mountain touring in the Alps were the first ascents of the Ankogel (3262 m) in 1762, Mont Blanc (4810 m) in 1786, the Großglockner (3798 m) in 1800, and the Ortler (3905 m) in 1804 as well as the conquest of many high western Alpine summits during the golden age of Alpinism around the middle of the nineteenth century. In other parts of the world, the term may be misleading. For example, in many non-Alpine areas, such as the polar regions, much lower mountains are glaciated. On the other hand, the summits of much higher peaks in the tropics are not always in the nival zone. As a result, their ascent cannot automatically be described as a high mountain tour using the

Alpine definition, even if they share some of the features of Alpinism, such as requiring acclimatisation. Mountaineering expeditions in which elevation plays a particularly important role, especially those from about 7000 m, are no longer referred to as high mountain tours but tend to be described by the term high-altitude mountaineering.

Other forms of mountain tours might be known by the term “peak bagging.” Examples include:

- *The Seven Summits*: the Seven Summits are the highest mountains of each of the seven continents. Summiting all of them is regarded as a mountaineering challenge, first achieved on 30 April 1985 by Richard Bass who summited Everest, Aconcagua, Denali,

Kilimanjaro, Elbrus, Kosciuszko, and Vinson. However, there are other versions of the list which depend on how one defines the continents, so sometimes Puncak Jaya (also known as “Carstensz Pyramid”) and Mont Blanc are included. The Seven Summits achievement has become noted as an exploration and mountaineering accomplishment.

- *The eight-thousanders*: these are the 14 independent mountains on Earth that are more than 8000 metres (26,247 ft) high above sea level. All eight-thousanders are located in the Himalayan and Karakoram mountain ranges in Asia. Their summits are in the death zone. The first person to climb all 14 eight-thousanders was the Italian Reinhold Messner, who completed this feat on 16 October 1986.

The mountains and hills of Great Britain, and to a lesser extent Ireland, are the subject of a considerable number of lists that categorise them by height, topographic prominence, or other criteria. They are commonly used as a basis for peak bagging, whereby hillwalkers attempt to reach all the summits on a given list. The oldest and best known of these lists is that of the Munros, mountains in Scotland over 3000 ft (914.4 m); other well-known lists include, for example, the Corbetts, Wainwrights, and Marilyn's.

- *The Scottish Munros*: the Munro is a mountain in Scotland with a height over 3000 ft (914 m) named after Sir Hugh Munro, who produced the first list of such hills, known as Munro's Tables, in 1891. The publication of the original list is usually considered to be the epoch event of modern peak bagging. The list has been the subject of subsequent variation. The 2012 revision, published by the Scottish Mountaineering Club, has 282 Munros and 227 subsidiary tops. “Munro bagging” is the activity of climbing all the listed Munros. They present challenging conditions to walkers, particularly in winter. As of 2017, more than 6000 people had reported completing a round. The first continuous round was completed by Hamish Brown in 1974, whilst the

record for the fastest continuous round is currently held by Stephen Pyke, who completed a round in just under 40 days in 2010.

- *The Corbetts*: these are peaks in Scotland that are between 2500 and 3000 ft (762.0 and 914.4 m) high with a prominence of at least 500 ft (152.4 m). There are currently 222 Corbetts.
- *The Grahams*: these are mountains in Scotland between 2000 and 2499 ft (610 and 762 metres) high, with a drop of at least 150 metres (490 ft) all round. There are currently 221 hills in this list.
- *The Donalds*: these are mountains in the Scottish Lowlands over 2000 ft (610 m). A mountain with a prominence of at least 30 metres (98 ft) is automatically a Donald, but one with a relative height of 15 metres (49 ft) may be one if it is of sufficient topographic interest. There are 140 Donalds, comprising 89 mountains and 51 tops.
- *The Furths*: these are those mountains in Great Britain and Ireland Furth of (i.e. “outside”) Scotland that would otherwise qualify as Munros or Munro Tops. They are sometimes referred to as the Irish, English, or Welsh Munros. There are 34 Furths: 15 in Wales, 13 in Ireland, and 6 in England. The highest is Snowdon.
- *The Hewitts*: these are hills in England, Wales, and Ireland over 2000 feet (609.6 m), with a relative height of at least 30 metres (98 ft). There are 528 Hewitts in total: 179 in England, 138 in Wales, and 211 in Ireland. The current TACit booklets contain 525 mountains, with Black Mountain being counted in both England and Wales.
- *The Nuttalls*: these are mountains in England and Wales over 2000 ft (610 m) with a relative height of at least 15 metres (49 ft). There are 444 Nuttalls in total (254 in England and 190 in Wales).
- *The Wainwrights*: these are mountains or hills (locally known as fells) in the English Lake District National Park that have a chapter in one of Alfred Wainwright's *Pictorial Guides to the Lakeland Fells*. There are 214 in the

seven guides. There are no qualifications for inclusion other than an implied requirement of being at least 1000 ft (300 m) high, to which Castle Crag in Borrowdale is the sole exception. A further 116 summits were included in the supplementary guide, *The Outlying Fells of Lakeland*.

- *The Birketts*: these are all the fell tops over 1000 ft high (about 305 m) within the boundaries of the Lake District National Park. Height and location, but not prominence, are the criteria. There are 541 of these tops.
- *The Marilyns*: these are mountains and hills in the British Isles that have a prominence of at least 150 metres (490 ft), regardless of absolute height or other merits. There are currently 1556 Marilyns in Great Britain: 1217 in Scotland, 176 in England, 158 in Wales, and 5 on the Isle of Man (Black Mountain, on the England-Wales border, is counted as being in Wales). There are a further 454 Marilyns in Ireland.

In the English Lake District especially, there is a tradition of finding the maximum number of tops, including all the major summits, which can be visited in a 24-hour period. This usually requires fell running and a support team. The pre-war record, set by Bob Graham, of 42 tops, has become a standard round, which has been repeated by over 1000 people. In 1975 Joss Naylor, the famous English fell runner, and a sheep farmer, born in the English Lake District, ran over 72 peaks, claimed to involve over 100 miles and about 38,000 ft of ascent in 23h20m, a record which stood unbroken for 13 years.

In Wales, Joss Naylor also completed the Welsh 3000s—the 14 peaks of Snowdonia in 1973 in another record-breaking time of 4 h 46 m, which stood until 1988 when Colin Donnelly set his, still-standing, record for the traverse of the Welsh 3000s with a time of 4 h 19 m.

These “lists” and “rounds” or tours can be done continuously (as in these past examples), or they may be completed over a lifetime. However, in terms of environmental damage, they do not

see the huge numbers of participants at one time which modern events (discussed hereafter) bring. It is the huge influx or masses of participants which create the biggest impacts on the environment, and so the rest of this chapter tends to focus on such events.

3.2 History, Diversity, and Participation Numbers

3.2.1 Mountain Marathons

The OMM, formerly known as the Karrimor International Mountain Marathon (or KIMM), and initially simply The Karrimor, is a two-day mountain event, held in a different region across the UK every year. It was first held in 1968 and continues today. The full-length KIMM course is a double marathon in length. The team must carry all their gear, including equipment for an overnight camp. The course is not disclosed until the race begins, so each team must have good navigation skills since it is not possible to practice running the course beforehand. Some have called the KIMM the forerunner of modern adventure racing. For its first eight years, the event was known as “The Karrimor.” In addition to the “Elite category” double marathon, other course lengths have been added over the years to suit a greater variety of competitors. In 2004 the event became known as the OMM after Karrimor’s sponsorship was withdrawn. In 2013, the organisers of the OMM revealed plans for a summer version of the event, along with a mountain biking marathon.

The SLMM is a two-day mountain marathon held in the English Lake District (“or its environs,” such as the adjoining Howgill Fells) in early July. It was founded by Robert Saunders, a long-time UK manufacturer of lightweight tents. The SLMM has been held annually since 1978, apart from 2001, when the Lakeland Fells were closed because of the foot and mouth crisis. 2018 will therefore be the 40th event. It is usually considered to be less tough than the slightly older OMM, since the weather is often mild, the

courses are slightly shorter, and the overnight camp is often found to be within walking distance of a pub. The event comprises eight courses of which six are solely for pairs of runners, one is exclusively for solo competitors, and one course is open for both pairs and solo entrants. The organisers encourage young competitors, with lower entry fees for under 25s, and there is a specific, handicapped class for parent and child (age 14+). Because of the popularity of the Lakes, courses are usually set to run “across the grain” of the country, away from popular paths, so as to minimise erosion due to the race.

3.2.2 Adventure Racing

The roots of adventure racing are deep, and people debate the origin of the modern adventure race. Some point to the two-day KIMM, first held in 1968 as the birth of modern adventure racing. The Karrimor Marathon required two-person teams to traverse mountainous terrain while carrying all the supplies required to support themselves through the double-length marathon run.

The Adventure Racing World Series (ARWS) is a number of expedition-length adventure races that push the world’s best endurance athletes to their limits in a season of competition that tests their skills in a range of disciplines including navigation, trekking, mountain biking, paddling, and climbing. Mixed-gender teams of four competitors compete in a series of up to a dozen races held in locations spread across the globe. These races culminate in the staging of the Adventure Racing World Championships, the winners of which earn the title of World Champions. The competition’s format ensures that each of the individual events of the World Series functions as a qualifier for the World Championships. The actual World Championship race rotates each year. One of the qualifying events is singled out and designated as the World Championship event, and this event provides a

dramatic conclusion to the end of the World Series racing season.

The first World Series event was held in Switzerland in 2001; there was a gap of two years, and it has been held every year since 2004.

In 1980, the Alpine Ironman was held in New Zealand. Individual competitors ran, paddled, and skied to a distant finish line. Later that year, the Alpine Ironman’s creator launched the better-known Coast to Coast race, which involved most of the elements of modern adventure racing: trail running, cycling, and paddling. Independently, a North American race, the Alaska Mountain Wilderness Classic started in 1982 and involved six days of unsupported wilderness racing (carry all food and equipment, no roads, no support) over a 150-mile course. It continues today, changing courses every three years.

In 1989, the modern era of adventure racing began with the launch of the Raid Gauloises in New Zealand. This is an expanded expedition-style race in which competitors rely on their own strengths and abilities to traverse big and challenging terrain. The race incorporates all the modern elements of adventure racing, including mixed-gender teams competing in a multi-day 400+ mile race. The United States Adventure Racing Association (USARA) was formed in 1998 and was the first national governing body for the sport of adventure racing which arose from the need for safety standards, insurance, and to promote the growth of adventure racing in the USA. The USARA has added national rankings, a national championship, and ecological standards to the list of benefits provided for the sport of adventure racing. The USARA National Championship has been held on the first weekend in October since 2000 and is considered the premier adventure race in the USA. The USARA Adventure Racing National Championship has continued each year drawing the best US teams for a chance at earning the title of national champion.

In 2001, the inaugural World Championships were held in Switzerland with Team Nokia Adventure crossing the finishing line first. The

concept of a world championship lay dormant until it was revived in 2004, with Canada's Raid the North Extreme serving as the AR World Championship event in Newfoundland and Labrador. The Adventure Racing World Series and its penultimate event, the AR World Championships, have been held every year since. In 2002, the first major expedition length race to be held exclusively in the USA was launched. Primal Quest has become the premier US expedition race, being held each year since its launch. In 2004, the death of veteran racer Nigel Aylott overshadowed the race and raised debates about the nature of Primal Quest and adventure racing.

In 2004, a professional geologist Stjepan Pavicic organised the first Patagonian Expedition Race at the bottom tip of the American continent, in the Chilean Tierra del Fuego. Truly demanding routes through rough terrain of often more than 600 km soon made it be known as "the last wild race." In 2010, the German Adventure Race Series was held for the first time in three different locations all over Germany. Since then the popularity of the sport in Germany has grown every year. More races and venues have joined the series, and the number of competitors is still growing from year to year. In 2012, Commander Forer of the Royal Navy organised the first sea-land navigation discipline race The Solent Amphibious Challenge. The race demanded the competitors to split up between sailing, running, and cycling in parts of the race and rendezvous at the end and sail the yacht to the finish line.

In the USA, during the 2016 calendar year, a total of 24,134 online interviews were carried out with a nationwide sample of individuals and households from the US Online Panel of over one million people operated by Synovate/IPSOS (Outdoor Foundation 2017). A total of 11,453 individual and 12,681 household surveys were completed. The total panel is maintained to be representative of the US population for people aged six and older. Oversampling of ethnic groups took place to boost response from typically under responding groups. The 2016 participation survey sample size of 24,134

completed interviews provides a high degree of statistical accuracy.

Table 3.1 shows that participation numbers in adventure racing rose from 725,000 in 2006 to 2,999,000 (almost 3 million) in 2016, showing a three-year change of 35.5%. Of all the activities surveyed by the Outdoor Foundation (2017) shown in Table 3.1, only BMX biking, cross-country skiing, and stand-up paddleboarding showed higher three-year changes.

3.2.3 High Mountain Tours

The classic high mountain tours require sure-footedness, a head for heights, and the ability to handle greater technical difficulty in rock and ice climbing as well as mixed climbing in combined rock and ice terrain. In glaciated terrain the risk of crevasses means that even technically easy walks require the use of rope, crampons, and ice axes as well as knowledge of safety and rescue techniques. Walking with a rope requires a roped team to be formed and makes trekking alone dangerous. In addition, a certain level of fitness and height acclimatisation is usually necessary. For mountain tours in high mountains such as the Himalayas, the Karakorum, or the Andes, which reach elevations of over 6000 m above sea level, one or two weeks should be allowed for acclimatisation. Low temperatures may also be an important factor. The dangers and problems presented by high mountain touring, as in sports climbing, are caused less by the actual technical difficulty of climbing than by the (often rapidly changing) external conditions. The description of the requirements of a tour with the aid of climbing grade scales is therefore problematic. As a result, such scales attempt to take into account to a greater extent as the severity of a route or its fitness requirements. An example of an established rating system for Alpinism is the SAC Mountain and High Mountain Tour Scale (Table 3.2).

Map reading and the ability to read the weather may also be important in high mountain touring. When snow falls, a knowledge of

Table 3.1 Outdoor participation by activity in the USA, 2006–2016 (The Outdoor Foundation, 2017, p. 8)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	3-year change (%)
Adventure racing	725	698	920	1089	1339	1065	2170	2213	2368	2864	2999	35.5
Backpacking overnight >¼ mile from vehicle/home	7076	6637	7867	7647	8349	7095	8771	9069	10,101	10,100	10,151	11.9
Bicycling (BMX)	1655	1887	1904	1811	2369	1547	2175	2168	2350	2690	3104	43.2
Bicycling (mountain/non-paved surface)	6751	6892	7592	7142	7161	6816	7714	8542	8044	8316	8615	0.9
Bicycling (roads/paved surface)	38,457	38,940	38,114	40,140	39,320	40,349	39,232	40,888	39,725	38,280	38,365	-6.2
Birdwatching (more and ¼ mile from home/vehicle)	11,070	13,476	14,399	13,294	13,339	12,794	14,275	14,152	13,179	13,093	11,589	-18.1
Boardsailing/windsurfing	938	1118	1307	1128	1617	1151	1593	1324	1562	1766	1737	31.2
Camping (RV)	16,946	16,168	16,517	17,436	15,865	16,698	15,108	14,556	14,663	14,699	15,855	8.9
Camping (with ¼ mile of home/vehicle)	35,618	31,375	33,686	34,338	30,996	32,925	29,982	29,269	28,660	27,742	26,467	-9.6
Canoeing	9154	9797	9935	10,058	10,553	9787	9839	10,153	10,044	10,236	10,046	-1.1
Climbing (sports/indoor/boulder)	4728	4514	4769	4313	4770	4119	4592	4745	4536	4684	4905	3.4
Climbing (traditional/ice/mountaineering)	1586	2062	2288	1835	2198	1609	2189	2319	2457	2571	2790	20.3
Fishing (fly)	6071	5756	5941	5568	5478	5683	6012	5878	5842	6089	6456	9.8
Fishing (freshwater/other)	43,100	43,859	40,331	40,961	38,860	38,868	39,135	37,796	37,821	37,682	38,121	0.9
Fishing (saltwater)	12,466	14,437	13,804	12,303	11,809	11,983	12,017	11,790	11,817	11,975	12,266	4.0
Hiking (day)	29,863	29,965	32,511	32,572	32,496	34,491	34,545	34,378	36,222	37,232	42,128	22.5
Hunting (bow)	3875	3818	3722	4226	3908	4633	4075	4079	4411	4564	4427	8.5
Hunting (handgun)	2525	2595	2873	2276	2709	2671	3553	3198	3091	3400	3512	9.8
Hunting (rifle)	11,242	10,635	10,344	11,114	10,150	10,807	10,164	9792	10,081	10,778	10,797	10.3
Hunting (shotgun)	8987	8545	8731	8490	8062	8678	8174	7894	8220	8438	8271	4.8
Kayak fishing	n/a	n/a	n/a	n/a	1044	1201	1409	1798	2074	2265	2371	31.8
Kayaking (recreational)	4134	5070	6240	6212	6465	8229	8144	8716	8855	9499	10,017	14.9
Kayaking (sea/touring)	1136	1485	1780	1771	2144	2029	2446	2694	2912	3079	3124	16.0
Kayaking (white water)	828	1207	1242	1369	1842	1546	1878	2146	2351	2518	2552	18.9

(continued)

Table 3.1 (continued)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	3-year change (%)
Rafting	3609	3786	4226	4342	3869	3725	3958	3915	3924	4099	4095	-10.6
Running/jogging	38,559	41,064	41,130	43,892	49,408	50,713	52,187	54,188	51,127	48,496	47,384	-12.6
Sailing	3390	3786	4226	4342	3869	3725	3958	3915	3924	4099	4095	4.6
Scuba diving	2965	2965	3216	2723	3153	2579	2982	3174	3145	3274	3111	-2.0
Skateboarding	10,130	8429	7807	7352	6808	5827	6627	6350	6582	6436	6442	1.5
Skiing (alpine/downhill)	n/a	10,362	10,346	10,919	11,504	10,201	8243	8044	8649	9378	9267	12.4
Skiing (cross-country)	n/a	3530	3848	4157	4530	3641	3307	3377	3820	4146	4640	40.3
Skiing (freestyle)	n/a	2817	2711	2950	3647	4318	5357	4007	4564	4465	4640	2.7
Snorkelling	8395	9294	10,296	9358	9305	9318	8011	8700	8752	8874	8717	0.2
Snowboarding	n/a	6841	7159	7421	8196	7579	7351	6418	6785	7676	7602	3.4
Snowshoeing	n/a	2400	2922	3431	3823	4111	4029	3012	3501	3885	3533	-12.3
Stand up paddling	n/a	n/a	n/a	n/a	1050	1242	1542	1993	2751	3020	3220	61.6
Surfing	2170	2206	2607	2403	2767	2195	2895	2658	2721	2701	2793	3.0
Telemarking (downhill)	n/a	1173	1435	1482	1821	2099	2766	1732	2188	2569	2848	3.0
Trail running	4558	4216	4857	4833	5136	5610	6003	6792	7531	8139	8582	26.4

Note: All participation numbers are in thousands (000)

Table 3.2 The EXCEDO hiking difficulty scale based on the classification of the Swiss Alpine Club

Scale	Trail/terrain	Requirements
T1 = hiking	Hiking trail well cleared. Flat or slightly sloped terrain. If present, exposed areas are well equipped and secured. No risk of falling given normal conduct and regular circumstances	None. Accessible even with sports shoes. Easy orientation, in general even without a map
T2 = mountain hiking	A continuous hiking trail with balanced ascent. Terrain partially steep, possible risk of falling	Some sure-footedness. Trekking shoes and basic orientation skills recommended
T3 = demanding mountain hiking	Hiking path not necessarily visible along the entire trail. Exposed passages may be secured with ropes and chains. Possible need to use hands for balance. Single exposed passages with risk of falling, scree, pathless grassy slopes, and jagged rocks	Sure-footedness is required. Good trekking shoes and advanced orientation skills recommended. Basic alpine experience
T4 = alpine hiking	Hiking trail not necessarily marked and/or visible. The use of hands might be required for advancing in certain passages. Terrain quite exposed, precarious grassy acclivities, pathless steep scree and jagged rock sections, easy firm fields	Familiarity with exposed terrain. Solid trekking shoes. Some experience in terrain assessment and good orientation skills. Alpine experience
T5 = demanding alpine hiking	Hiking often without trail. Single easy climbing sections. Exposed, demanding terrain, steep grassy acclivities, and jagged rocks. Firm fields with risk of slipping	Climbing boots. Reliable terrain assessment and very good orientation skills. Profound alpine experience. Basic skills in the use of ice axe and rope
T6 = difficult alpine hiking	Generally, hiking without a trail to follow. Climbing sections up to second grade. Terrain often very exposed, very precarious grassy and rocky slopes, glaciers with high risk of slipping and falling. Most often unmarked	Excellent orientation skills. Advanced alpine experience and familiarity with the use of alpine equipment

Source: <http://www.excedotravel.com/en/hiking-difficulty-scale/>

avalanche behaviour is necessary, even in the summer months. High Alpine terrain is currently subject to a particularly high degree of change in terms of glacier retreat and climate change, which can both increase or decrease the difficulty and dangers of high mountain touring.

NB. A serious misunderstanding, which can lead to tricky situations, is the belief that hiking stops where the Alpine Climb Scale begins. In reality, an alpine hike in the upper range of the T5 and T6 difficulty is usually significantly more demanding than, for example, an “F” rated Alpine Climb. A major difference, as compared to an easy Alpine Climb, for example, is that in case of a T5 and T6 hike, one can rarely or almost never use protective gear such as a rope or other equipment, meaning that the

terrain must be perfectly mastered. Often this requires high technical as well as psychological skills. Typical examples are extremely steep grassy slopes, scree, pathless steep slopes with jagged rocks, or very exposed ridges. Due to their different characteristics, a typical Alpine Climb and a typical extreme hike can hardly be compared, but one can assume that a T6 hiking route requires a similar set of skills and experience as an Alpine Climb up to F.

3.3 Safety and Legal Regulation

The 2008 OMM was abandoned, for the first time in the race’s history, due to ill-informed media coverage which suggested that the very challenging weather conditions (100 mph winds and

Table 3.3 Example of adventure race event rules from Marmot Dark Mountains

General event rules for all Ourea Ltd events:

1. The Participant must abide by the Event rules as laid out below by the Organiser. Ignorance of these rules by the Participant is no excuse and failure to comply with these rules will result in disqualification from the Event. In the event of disqualification the Participant may be required to leave the Event and travel back to the start at their own expense. In these circumstances no refund of the Participant's entry Fee will be given
2. The Golden Rule. Once registered, each Participant must download their SI data at the Event Centre before departing regardless if they have retired or not (or even not started). This is our check to account for everyone being safely off the hill
3. All Participants are expected to enter into the spirit of this mountain running race and not seek to gain any unfair advantage
4. Participants must comply with our basic safety rules and obey any reasonable instruction given by an event official
5. On open hills and mountains, which are generally defined as Access Land, Participants may cross walls or fences but are encouraged to use gates and stiles where available
6. On agricultural and farmland, Participants must follow rights of way, established footpaths and tracks and must NOT cross walls and fences except at designated crossing points, gates and stiles
7. Any Participant seen dropping litter will be disqualified
8. Participants must comply with the 'Equipment List' and carry all mandatory items as specified. Any breach of the mandatory kit list will result in disqualification
9. Any Participant who acts in a manner that brings the Event into disrepute or endangers another competitor, marshal or member of the public will receive a life ban from Ourea Ltd events

Specific Event Rules for Marmot Dark Mountains:

10. The Event is a team event and each pair must maintain both voice and visual contact with each other for the duration of the Event. Both team members must visit each checkpoint together
11. If one member of the team must retire, then both team members must retire. It is not possible for an individual to continue alone or join another team
12. The competition map may have Out of Bounds Areas, Uncrossable Boundaries and Crossing Points marked on it and these must be respected. An Uncrossable Boundary doesn't necessary mean it is physically uncrossable, but crossing it would be deemed a breach of the rules
13. The competition area is embargoed. If a competitor or team becomes aware of the competition area they are not allowed to reconnoitre or inspect it in advance of the event
14. Absolutely no GPS / Satellite navigation devices (including watches, phones, etc.) are allowed. This includes GPS watches that can display distance travelled or speed even if they cannot display location data. Altimeters that work via barometric pressure are allowed
15. We encourage teams to carry a mobile phone with them but it must be turned off and sealed in bag at registration. Unless required for a genuine emergency the mobile phone must remain sealed in a bag for the duration of the event and this will be checked at Kit Check

Source: <http://www.marmot-dark-mountains.com/information/#displayEventRules>, accessed 10/01/18

extremely heavy rain) placed competitors and potential rescuers in danger. Reference was made to "1700 people unaccounted for in the hills" though in fact all of these were still competing and unaware that anyone was concerned for them; as usual a significant number of competitors were current or former mountain rescue team members.

The USARA was formed in 1998 and was the first national governing body for the sport of adventure racing which arose from the need for safety standards, insurance, and to promote the growth of adventure racing in the USA. Race organisers have developed event rules (see

Table 3.2 for an example) which are there to ensure the safety of the competitors, spectators, and, to some degree, the environment (see Table 3.3, points 5, 6, 7).

3.4 Environmental Impact, Management, and Education

3.4.1 Research Needs

There appear to be no complete systematic scientific studies of the full impact of particular mountain marathons/tours or adventure races on the

Table 3.4 General reviews, recent Australian research, and activity-specific issues/impacts associated with activities that are often part of adventure races

Potential activities	General reviews of impacts	Activity-specific issues/impacts
Walking/running	Liddle (1997), Buckley et al. (2004), Cole (2004), Pickering et al. (2010b), Pickering and Mount (2010), Stevens et al. (2011)	Boots, socks, and other clothing items can spread large numbers of weed seeds from a wide variety of species. It is also likely that shoes spread fungal pathogens, including root rot fungus (<i>Phytophthora cinnamomi</i>) in Australia. Spread of weeds and pathogens on boots and clothing. Spread of pathogens in human waste, increased nitrification from human waste
Mountain biking	Liddle (1997), Marion and Wimpey (2007), Pickering et al. (2010b), Stevens et al. (2011)	Likely that spreads weeds and pathogens on tyres, but limited actual research. Damage from construction and use of trail technical features. Some impacts of mountain biking are similar in intensity per km as hiking but likely go further so have more impact per unit of time
Horse riding	Liddle (1997), Newsome et al. (2004, 2008), Pickering and Mount (2010), Pickering et al. (2010b)	Additional nutrients and spread of weeds and pathogens in dung and on hair. Has higher impact per user than mountain biking, walking, and running due to weight per unit area
Abseiling, climbing	Cater and Hales (2008) ^a	Damage to fragile vegetation and lichens growing on cliffs. May also damage nesting birds, depending on location
Camping	Liddle (1997), Smith and Newsome (2002), Smith (2003), Cole (2004)	Longer time periods, may involve deliberate alteration to the site such as creation of campfires
Canyoning, white-water rafting, swimming	Liddle (1997), Stevens et al. (2011)	Often in remote “pristine” water bodies where few other impacts. Damage includes to aquatic system but also to vegetation and soils at access points. Introduction of pollutants including from human waste but also sunscreens, and so on

Source: Newsome et al. (2011, p. 409)

^aResearch by Vogler and Reisch (2011) in Europe indicated that rock climbing reduces the abundance of, and affects the population structure of, cliff vegetation

environment. However, there is a growing body of research associated with the various impacts of walking, running, mountain biking, horse riding, camping, abseiling-climbing, canyoning, white-water rafting, and swimming on the environment (Liddle 1997; Newsome et al. 2002; Buckley 2004; Turton 2005; Pickering and Hill 2007; Monz et al. 2010; Pickering et al. 2010a) which are all commonly undertaken in adventure racing (see Table 3.4).

Newsome (2014) raises awareness about the potential environmental impacts of such activities and sporting events taking place in protected areas (such as national parks and Areas of Outstanding Natural Beauty). Adventure racing participants are most likely focused on risky, thrill-seeking activities where the overall goal is

to complete the event in as fast a time as possible. Newsome argues that such a philosophical standpoint and competitive attitude towards the environment is therefore likely to be suboptimal in terms of such visitors appreciating the natural values and conservation function of a protected area.

The rapid increase of adventure racing and its possible impacts on the environment as well as social aspects are thus in need of further research and policy development. Newsome’s analysis demonstrated that there was a lack of data concerning the impacts of adventure racing on conservation values, environmental resilience, wildlife disturbance, and ecotourism importance where sporting activities take place in protected areas. Because protected areas, such as national parks, play an important role for conservation

and other (more passive) kinds of recreation, the issue of appropriate use of such lands is a cause for concern. Newsome calls for a research agenda that explores the approval process for these events so that park managers can assess the capacity along with existing recreational impacts. There is an urgent need for policy guidelines that can assist managers in making the best environmental decisions.

Next we look at some examples from the UK which seem to generate quite a bit of controversy and debate. One which triggers emotion widely is the National Three Peaks Challenge which takes place in the UK, normally during the summer months and often centred around the third weekend in June which is closest to the longest day of the year (21 June) so maximising the amount of daylight in which to complete the route.

3.4.2 The National Three Peaks Challenge

The National Three Peaks Challenge involves climbing the three highest peaks of Scotland, England, and Wales, often within 24 hours. The total walking distance is 23 miles (37 km), and the total ascent is 3064 metres (10,052 ft). The total driving distance is 462 miles. People can take part in the challenge in two ways—a self-organised group or a professionally organised event. Self-organised events are the cheapest way to take part, but many groups will hire professional mountain guides. The three mountains are Snowdon, in Wales (1085 m); Scafell Pike, in England (978 m); and Ben Nevis, in Scotland (1345 m). A popular misconception is that the three mountains that form the challenge are the three tallest on the British mainland. Rather, they are the tallest mountains within each representative country: Scafell Pike is the tallest in England, Snowdon the tallest in Wales, and Ben Nevis the tallest in Scotland—over 100 peaks in Scotland are higher than Scafell Pike and 56 higher than Snowdon.

James Keen's article "The Big Debate" in *The Great Outdoors* magazine, January 2009, which can be viewed at http://www.mountainadventures.co.uk/documents/TGO041028_002.pdf illustrates

how there are a number of direct criticisms concerning the National Three Peaks Challenge, many of which can be prevented with a bit of consideration and planning.

- *Lack of support for local businesses.* While many participants will spend time in Fort William and Llanberis before and after their challenge, Wasdale Head can be seen to miss out somewhat as groups rush through. The growing popularity of the Three Peaks Challenge over three days helps this matter somewhat.
- *Large groups taking over mountain paths.* While the recommendation is that challenge groups should be kept to an appropriate size, to be considerate to others using the mountains, this is not always adhered to.
- *Walkers don't always stay on the mountain paths* (which on these popular routes have been largely paved to manage erosion caused in the past). Walking off the paths on scree can cause loose rock to be displaced (or even fall on others), and trampled vegetation can quickly be destroyed resulting in additional damage the mountain environment.
- *Reliance on mountain rescue teams.* Ill-prepared and inexperienced groups which are not proficient in mountain navigation and safety can result in unnecessary call-outs for the voluntary mountain rescue teams.
- *Littering.* Walkers or runners who are competitive can be thoughtless and inadvertently drop litter which gets blown around the mountains or left on roadsides to be cleared up by locals after the event.
- *Driving over the speed limit to complete the challenge within the 24-hour time* has been witnessed; driving through the night is also necessary and needs to be planned in advance.
- *Noise.* Groups passing through isolated farms, hamlets, or small settlements in the dead of night can be disruptive to local residents.
- *Pollution.* Groups from Southern England attempting the challenge will travel nearly 1500 miles in total. This has a carbon cost as it is not possible to complete the challenge in the 24-hour time by public transport.

Table 3.5 The National Three Peaks Challenge: Ben Nevis, Scafell Pike, and Snowdon—for or against?

For the challenge	Against the challenge
<ul style="list-style-type: none"> • A great test of stamina and mental strength and an excellent personal development tool • Good team-building platform and a chance for people with minimal experience to enjoy the outdoors • Raises substantial funds for the chosen charities (which participants/groups choose) • A challenging objective requiring commitment and discipline, factors often the catalyst for positive change for the individual or organisation 	<ul style="list-style-type: none"> • Attracts thousands of participants from across the world. This has both macro and micro effects on the environment, resources, and local communities • Most people do it in high summer to make the most of the better weather and longer hours of daylight • Most participants have day jobs so do it at weekends which focuses large numbers of people into the certain pressure spots like Wasdale valley over a few weekends • Wasdale, for example, has just one public lavatory for all those people • All those minibuses and one narrow road with limited parking facilities • Large groups pass through farms, hamlets, and small settlements, often at unsocial hours • All those participants and just one stretched mountain rescue team for each peak

Table 3.5 summarises the arguments for and against the UK’s National Three Peaks Challenge.

The Institute of Fundraising’s Outdoor Events Code of Practice includes some specific guidelines on the Three Peaks Challenge. The code of practice does not apply to privately organised challenges, so does not affect most groups. Applicable only to challenges organised by charities directly, the Code of Practice sets out guidelines to ensure that the potential negative effects of the Three Peaks Challenge are minimised (Table 3.6).

Many protagonists of the National Three Peaks Challenge do admit that it’s time for a radical rethink to ensure that its environmental impact is kept to a tolerable level. To ensure a long-term future, future revisions to the Code of Practice for Outdoor Fundraising in the UK (Table 3.6) should reflect the event’s popularity and incorporate a registration system so that organisers can submit

Table 3.6 Three Peaks Challenge Code of Practice

Specific Three Peaks Challenge guidelines
<ul style="list-style-type: none"> • Limit the number of walkers to no more than 200 per event • Avoid the peak holiday times, for example, bank holidays and summer solstice. Events should not cause overcrowding on the mountains and the respective valleys’ infrastructure • Be aware toilet provisions are very limited; plan accordingly when obtaining local permissions • Strongly discourage racing between teams on and between mountains • Agree designated rest stops and driving times beforehand that respect speed limits, road safety, and other road users • Include a policy to remove the time pressure element categorically excluding the driving time between mountains as part of the challenge by allocating a minimum driving time of ten hours for all participants which is added to the walking time, regardless of the actual duration of the drive • Provide information to participants on the environmental and land management sensitivities of the areas they will be visiting and give participants guidance on how to mitigate their impact as far as is possible • Individual mountain and site specific codes of conduct should be followed • To minimise disturbance and adverse impact, organisers ought to consider the timing of the event for the least disturbance • In settlement areas, arrival or departure ought not to be between the hours of 23:00 and 06:00 • Coaches block narrow roads so should not be used • Local facilities are inadequate for large events. Organisers ought to identify and use motorway services and other facilities en route especially to top-up water supplies and use the toilets • If using Pen-y-Pass (Snowdon), parking is usually difficult and waiting not possible so disembark only. Use local bus services when you can

Source: <https://www.threepkchallenge.uk/national-three-peaks-challenge/code-of-practice>, accessed 10/01/18

applications in accordance with a predetermined standard. This should look at scaling down from the current recommended maximum of 200 participants. If a registration system were adopted which required some kind of prior approval by, for example, a national park authority or alternative designated body, it would mean some kind of control over numbers. Then, organisations who have hitherto subscribed to such mass challenge events would have to address their inherent problems and adhere to codes of conduct which would be kinder to the environment.

Other practical measures which can help might be if organisers offered alternative and/or mid-week and off-peak events, sensible routing, and planned start times to minimise impact on local communities and a responsible attitude to litter, ensuring that all waste remained in vehicles and was disposed of outside the national parks. Perhaps the best we can hope for is responsible self-regulation on the part of organisers.

In addition to the National Three Peaks Challenge, there are two other “Three Peak Challenges” in the UK: (1) the Welsh Three Peaks Challenge, lesser known than the National or Yorkshire Challenges, takes in the three peaks of Wales—Snowdon (Yr Wyddfa) in the North, Cadair Idris in mid-Wales, and Pen y Fan in the South. The Welsh Three Peaks Challenge includes a total walking distance of 17 miles (27.4 km) and an ascent of 2334 m (7657 ft), usually in less than 24 hours; and (2) the Yorkshire Three Peaks is 24 miles (39 km) and includes the summits of Whernside, Ingleborough and Pen-y-Gent.

3.4.3 The Yorkshire Three Peaks

The Yorkshire Three Peaks Route is about 24 miles (39 km) in length and involves 5000 ft (1600 m) of vertical ascent taking in the summits of Pen-y-ghent (694 m), Whernside (736 m), and Ingleborough (723 m). The terrain underfoot is varied and includes mountain paths, grassy slopes, farm tracks, short sections of steep rocky scrambling, and a bit of tarmac. The organisers have a section of the website about environmental concerns (Table 3.7).

3.4.4 Management Approaches to Minimise Damage

As we have seen, approaches to managing the environmental damage resulting from mountain marathons/tours and adventure racing are still evolving. Event organisers are taking some responsibility through publicising codes of conduct (such as seen in Table 3.4) to participants via entry information and their websites. However, the Institute of Fundraising’s Outdoor Events

Table 3.7 The Annual Yorkshire Three Peaks Challenge: environmental concerns

<i>Environmental concerns</i>
Some parts of the route can receive a battering due to the sheer weight of numbers. With the large numbers of people attempting this challenge, it is more important than ever to make sure that we ‘tread lightly’ and help to maintain this landscape for the people who visit or work on it and the wildlife that lives in it.
<i>When on your challenge</i>
<ul style="list-style-type: none"> • Stick to the path, even in mud. This helps to minimise erosion. • Consider doing the challenge mid-week in order to ‘spread the load’. • Cross walls and fences only where there is a stile or a gate. • Leave no litter (not even a banana skin!!). If you see litter pick it up. • Leave no food waste. Some otherwise conscientious people leave fruit peel and the like, not realising the problems it can cause for marginal upland species. • Do not allow dogs to chase sheep or wildlife. The law requires you to keep them on a short lead in areas of Access Land between March 1st and July 31st. • Keep noise to a minimum especially when near houses, late at night and early in the morning. • Close gates carefully behind you, avoiding slamming them. Use the latch if present and do not just push it ‘to’. If you believe that the gate has been left open deliberately by the landowner then leave it open, but if in doubt, close it. • Be considerate about where you go to the toilet. Use the public toilets at Horton and avoid going to the toilet where it could offend people. If going to the toilet on the hill then make sure you are nowhere near any path or stream bed (at least 30 m away). Treat all waste as litter; burn it, bury it or bag it up and remove it as appropriate. • Become a Friend of the 3 Peaks.

Source: <http://yorkshire3peaks.org.uk/environmental-concerns.html>, accessed 10/01/18

Code of Practice does not apply to privately organised challenges, so does not affect most groups. These codes are still voluntary, and there are no penalties (as far as we are aware) for breaching them. There is some discussion about some kind of registration system so that organisers would be required to submit applications in accordance with a predetermined standard. This system might look at negotiating (and limiting) the number of participants who could take part in a particular event. Event organisations which have previously organised mass challenge events would, hopefully, have to address their inherent

problems and adhere to codes of conduct which would be kinder to the environment.

Other practical measures which might help alleviate pressure might be for event organisers to offer alternative and/or mid-week and off-peak events, sensible routing, and planned start times. For example, the Yorkshire Three Peaks Challenge website on environmental concerns (Table 3.7) suggests that in settlement areas, arrival or departure ought not to be between the hours of 23:00 and 06:00 to minimise impact on local communities.

Perhaps the best we can hope for is responsible self-regulation on the part of the organisers.

Conclusions

1. Mountain marathon is an extended form of fell running. Races usually take place over two days and often have a strong element of orienteering. Well-known events include the OMM, the SLMM, the Swiss International Mountain Marathon, Marmot Dark Mountains, the LAMM, the Mourne Mountain Marathon, the ROC Mountain Marathon, the SCOTT Snowdonia Trail Marathon, and the Longmynd Hike. The first OMM was held in 1968, and the size and number of events annually have grown since then.
2. Adventure racing (or expedition racing) is typically a multidisciplinary team sport involving navigation over an unmarked wilderness course with races extending anywhere from two hours up to two weeks in length and often include trekking, mountain biking, and paddling although races can incorporate a multitude of other disciplines including climbing, abseiling, horse riding, skiing, and white-water rafting. The first Adventure Racing World Series event was held in Switzerland in 2001.
3. According to the Outdoor Foundation (2017) survey, in the USA participation numbers in adventure racing rose from

725,000 in 2006 to 2,999,000 (almost 3 million) in 2016, showing a three-year change of 35.5%, with only BMX biking, cross-country skiing, and stand-up paddleboarding showing higher three-year changes in a list of over 40 outdoor activities.

4. Mountain tours are more difficult to define. They began in the European Alps in the 1700s and take place in the zone that is covered by ice all year round (above a height of about 3000 metres) where mountains are at least partly glaciated. Modern mountain tours may include the Seven Summits; the eight-thousanders; the Scottish Munros; Corbetts, Grahams, and Donalds; and the Furths, Hewitts, Nuttalls, Wainwrights, Birketts, and Marylins. Challenges like the Bob Graham Round and Welsh 3000s are still popular races for some or personal challenges undertaken over a lifetime for others.
5. The rapid growth of mountain marathons (since the 1960s) and adventure racing (since 2001) means that there is still a lack of research and evolving policy development on the environmental and social impacts of such events.
6. Most large events today have codes of conduct and environmental guidelines for participants, but these codes are still voluntary. There appears to be a need to undertake more research and develop policies further.

References

- Buckley, R. (Ed.). (2004). *Environmental Impacts of Ecotourism*. New York: CABI.
- Buckley, R., King, N., & Zubrinich, T. (2004). The role of tourism in spreading dieback disease in Australian vegetation. In R. Buckley (Ed.), *Environmental Impacts of Ecotourism* (pp. 317–324). New York: CABI.
- Cater, C., & Hales, R. (2008). Impacts and management of rock climbing in protected areas. In C. Cater, R. Buckley, R. Hales, D. Newsome, C. Pickering,

- & A. Smith (Eds.), *High Impact Activities in Parks: Best Management Practice and Future Research* (pp. 24–36). Gold Coast: Sustainable Tourism Cooperative Research Centre, Griffith University.
- Cole, D. N. (2004). Impacts of hiking and camping on soils and vegetation: A review. In R. Buckley (Ed.), *Environmental Impacts of Ecotourism* (pp. 41–60). New York: CABI.
- Kay, J., & Laberge, S. (2002). Mapping the field of 'AR': Adventure racing and Bourdieu's concept of field. *Sociology of Sport Journal*, 19, 25–46.
- Liddle, M. J. (1997). *Recreation Ecology*. London: Chapman & Hall.
- Marion, J. L., & Wimpey, J. (2007). Environmental impacts of mountain biking: Science review and best practices. In P. Webber (Ed.), *Managing Mountain Biking: IMBA's Guide to Providing Great Riding* (pp. 94–111). Boulder, CO: International Mountain Bicycling Association (IMBA).
- Monz, C. A., Cole, D. N., Leung, Y.-F., & Marion, J. L. (2010). Sustaining visitor use in protected areas: Future opportunities in recreation ecology research based on the USA experience. *Environmental Management*, 45, 551–562.
- Newsome, D. (2014). Appropriate policy development and research needs in response to adventure racing in protected areas. *Biological Conservation*, 171, 259–269.
- Newsome, D., Cole, D. N., & Marion, J. (2004). Environmental impacts associated with recreational horse-riding. In R. Buckley (Ed.), *Environmental Impacts of Ecotourism* (pp. 61–82). New York: CABI.
- Newsome, D., Lacroix, C., & Pickering, C. (2011). Adventure racing events in Australia: Context, assessment and implications for protected area management. *Australian Geographer*, 42(4), 403–418.
- Newsome, D., Moore, S., & Dowling, R. (2002). *Natural Area Tourism: Ecology, Impacts and Management*. London: Channel View.
- Newsome, D., Smith, A., & Moore, S. (2008). Horse riding in protected areas: A critical review and implications for research and management. *Current Issues in Tourism*, 11, 144–166.
- Pickering, C. M., Castley, C., Newsome, D., & Hill, W. (2010b). Environmental, safety and management issues of unauthorised trail technical features for mountain bicycling. *Landscape and Urban Planning*, 97, 58–67.
- Pickering, C. M., & Hill, W. (2007). Impacts of recreation and tourism on plant biodiversity and vegetation in protected areas in Australia. *Journal of Environmental Management*, 85, 791–800.
- Pickering, C. M., Hill, W., Newsome, D., & Leung, Y.-F. (2010a). Comparing hiking, mountain biking and horse riding impacts on vegetation and soils in Australia and the United States of America. *Journal of Environmental Management*, 91, 551–562.
- Pickering, C. M., & Mount, A. (2010). Do tourists disperse weed seed? A global review of unintentional human-mediated terrestrial seed dispersal on clothing, vehicles and horses. *Journal of Sustainable Tourism*, 18, 239–256.
- Smith, A. J. (2003). *Campsite Impact Monitoring in the Temperate Eucalypt Forests of Western Australia: An Integrated Approach*. Unpublished PhD thesis, Murdoch University, Perth, Australia.
- Smith, A. J., & Newsome, D. (2002). An integrated approach to assessing, managing and monitoring campsite impacts in Warren National Park, Western Australia. *Journal of Sustainable Tourism*, 10, 343–359.
- Stevens, R., Pickering, C. M., & Castley, G. (2011). A review of the impacts of nature based recreation on birds. *Journal of Environmental Management*, 92, 2287–2294.
- The Outdoor Foundation. (2017). *Outdoor Participation Topline Report 2017*. Washington: The Outdoor Foundation. Retrieved from www.outdoorfoundation.org.
- Turton, S. M. (2005). Managing environmental impacts of recreation and tourism in rainforests at the wet tropics of Queensland world heritage area. *Geographical Research*, 43, 140–151.
- Vogler, F., & Reisch, C. (2011). Genetic variation on the rocks—The impact of cliff climbing on the population ecology of a typical cliff plant. *Journal of Applied Ecology*, 48, 899–905.