INTERNATIONAL ORIENTEERING FEDERATION

COMPARISON OF THE ENVIRONMENTAL IMPACT OF ORIENTEERING AND OTHER OFF-TRACK RECREATIONS IN THE DARTMOOR NATIONAL PARK, UK

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INTERNATIONAL ORIENTEERING FEDERATION,,
RADIOKATU 20, FI-00093 SLU, FINLAND

I0F/ENV/004

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May 2005

SUMMARY:

The Dartmoor National Park in SW England is a major resource for orienteering. Shaped by geological and human mining agencies, it offers complex terrain suitable for high quality competition.

Orienteering is a long-standing activity on Dartmoor but, in the last 25 years, the National Park Authority has applied increasing restrictions on the sport, culminating in a draconian blanket ban on orienteering during the bird breeding season, which is currently deemed to run from the end of February to mid July.

A comparative survey, in terms of environmental and ecological impact, has been carried out on 12 off-track activities, including orienteering, which use Dartmoor. Particular attention has focussed on their environmental management by the National Park and, in particular, the different attitudes towards letterboxing and orienteering, which have superficial similarity.

It is concluded that expectations of scientific objectivity, even-handedness and freedom from emotive bias on the part of the Dartmoor National Park Authority, with respect to its management of orienteering, have not been met.

It is recommended that the Authority attends to this shortfall as a matter of priority.

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1. Introduction

From time to time the International Orienteering Federation (IOF) receives requests from orienteering clubs and associations for advice and assistance in responding to environmental actions and attitudes which are affecting their sport. Sometimes it is appropriate for the IOF to become actively involved in the matter, provided the governing body for the sport in the country concerned gives its approval. The benefits of such involvement are that the IOF can offer expertise and expanded experience and, in return, the details of a federation's problems and solutions are of interest and value across the international spectrum.

In 2004 assistance was requested by the Devon Orienteering Club in addressing a difficulty concerning the status of the sport and the restrictions on its taking place in the Dartmoor National Park, in the south west of the United Kingdom. The National Park encompasses most of the high moorland associated with the largest of several granitic intrusions in the south west peninsula (Figure 1).

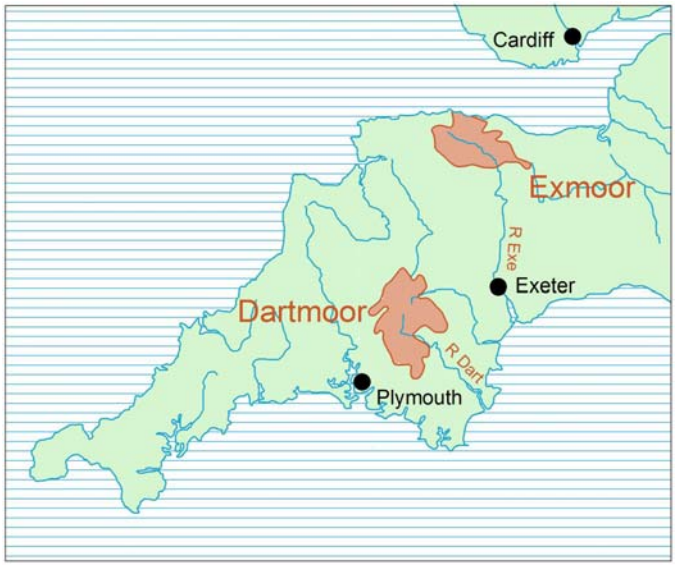

Figure 1. The south west peninsula, the brown shading indicating terrain above 400m.

Differential weathering of the granite has produced a landscape rich in rock features. Additionally, mineralisation of the granite cap and the metamorphosed country rock was exploited for many hundreds of years with the extraction of tin and other metal ores, leaving extensive areas of complex small scale workings. The combination of man's and natural processes has produced a terrain of high value for the map reading and ground recognition skills of advanced orienteering. An example of part of an orienteering map of the Burrator area of Dartmoor in Figure 2 illustrates the ground complexity in a former tin mining site.

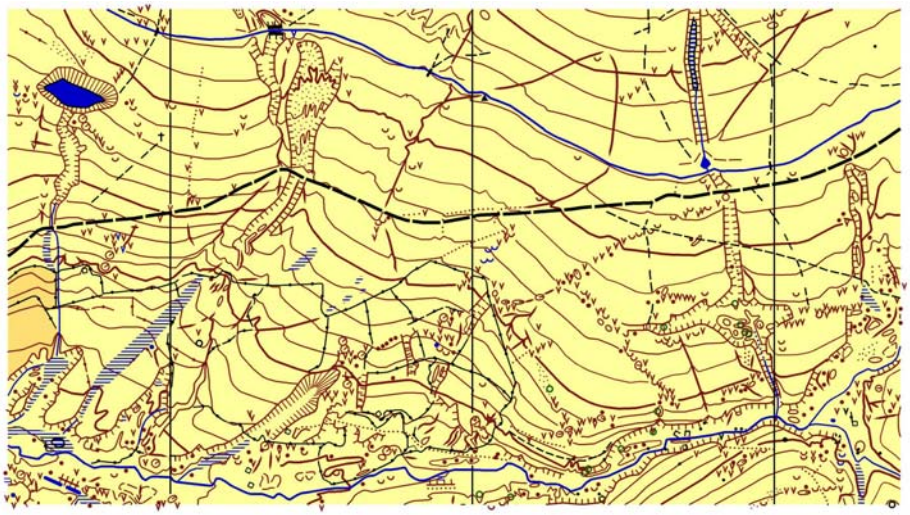

Figure 2. Part of the Crazy Well 1:10000 orienteering map (by the author).

The sport of orienteering has taken place on Dartmoor since its introduction to the United Kingdom in the 1960s. In the following decade major events took place on the Moor, such as the British Championships and, in 1979, the International Jan Kjellstrom Easter Festival. These events were well received by the Dartmoor National Park Authority. In its annual report for 1979, it commented: "The International orienteering event in mid-April drew a crowd of 3000 to Fernworthy. No problem at all; and hardly a candy wrapper left lying at the end of the day to mar what was really a model of mass recreational use of our National Park" (DNPA 1979).

However, four years later the National Park considered that mass events in general, but including orienteering, "do have a cumulative effect on Dartmoor itself, on the enjoyment of others, and on local interests" and that "the motivation behind each event may be admirable, but the need for control has become increasingly evident" (DNPA 1983, 27).

The 1983 review, in its forward policy on specialist recreation pursuits, referred to the 1979 Jan Kjellstrom event which took place in Fernworthy Forest as causing "no problems whatsoever" but expressed caution about future events outside the forested areas, treating them "as acceptable in principle, but subjected to close scrutiny in detail with regard to timing, routes, checkpoints, etc." (ibid. 96). In the short interval since the 1979 event, there had been a shift in attitude towards a major orienteering event from enthusiastic support to no more than 'acceptable in principle'.

An indication of the meaning of 'close scrutiny' became apparent at the Caddihoe Chase two-day regional event held at Burrator in September 1992. The numbers permitted to enter were limited by the National Park to 1200 "to minimise potential damage and

disruption" (Baldock 1992). A condition of permission being granted was that the event organisers would cooperate with the National Park ecologists who wished to assess any impact of the event on vegetation and soils. Impact surveys were made at a number of high use control sites. Although the measurements were conducted with precision, the study as a whole was severely faulted. There was a failure to draw attention to the anomalous nature of the results (such as vegetation damage *decreasing* as the number of competitors *increased*) and, more importantly, a failure to place the orienteering impact in context with that from other recreational users and the grazing animals. Recovery over the subsequent 12-month period was monitored and the final report concluded that the event "appears to have had minimal long-term impact on the vegetation at this site" (Baldock 1993). Notwithstanding this proper conclusion, there were a number of caveats and the impression remained from the exercise was that it was not even-handed, suggesting underlying bias against the sport within the Authority.

The decline in orienteering opportunity on Dartmoor was to continue. For Easter 1997 the Jan Kjellstrom International Trophy event was scheduled to return to the South West of England. Permission was sought to stage this flagship championship event, as a once in 20 years occurrence on Dartmoor, within the forest plantations and the adjacent open moorland of the Burrator catchment. Recognising that Easter is a popular period for day visitors to Burrator, the event organisers proposed to bus the competitors in to the competition from parking areas off the Moor, so as to avoid traffic congestion. The landowners, South West Water, gave permission for the event subject to approval by the Dartmoor National Park. This approval was not forthcoming, the National Park rejecting the application on ecological grounds.

Within the decade further restrictions were to follow. For 2004 and beyond the National Park Authority indicated that no orienteering events would be permitted in the Dartmoor National Park within the bird nesting season, which the Authority determines is between the end of February and mid July. This constraint is particularly punitive as it confines the sport to late summer, when many areas are unusable through growth of bracken *Pteridium aquilinum*, and winter, when there are problems of poor weather conditions and hazards of exposure.

Clearly, there had been a substantial change in policy by the National Park towards orienteering on Dartmoor from commendation to condemnation over the last quarter century. Such a shift might conceivably have derived from changes to the nature of the recreational activity itself, such as increased competitor numbers or the manner it which it is conducted, but this is not the case. It is possible that the change results from a more rigorous approach to ecological matters by the National Park staff with respect to all

recreation. It is possible that such rigour is applied to orienteering with more severity than to other recreations. It is possible that the ecological impact of orienteering is significantly overestimated. It is even possible that there is underlying cultural bias against the sport.

A preliminary investigation into these suppositions indicated that there was a 'case to answer' and that the findings of a more detailed study would be of interest and potential benefit to regional, national and international associations, not only within orienteering but for other recreations which use semi-natural countryside. The International Orienteering Federation, therefore, acceded to the request of the Devon Orienteering Club, with the approval of the British Orienteering Federation, and conducted the study reported below.

2. A survey of off-track sports and recreations in the Dartmoor National Park

A survey has been conducted of a range of off-track sports and recreations which take place in the National Park. These off-track activities are manifold, from a solo ornithologist seeking out a listed bird to the hunt, riding to hounds after foxes or, in the possible consequence of current UK legislation, dragged scents. In between these extremes of impact are other activities, some formal, others informal, some organised, some not. A further distinction is in the duration of the activity. Some are 'continuous', perhaps varying with weather and season, but essentially occurring day-on-day. Others are short in duration, referred to as 'pulse' activities. An example of a pulse activity is the sport of orienteering.

Semi-natural countryside, such as Dartmoor, has landscape and conservation value. It is not surprising, therefore, that off-track activities involving significant numbers of participants can generate ecological concerns about the trampling damage to vegetation and disturbance of wildlife. Most concern appears to be reserved for the pulse activities, presumably because their relatively larger numbers over a short period are associated with greater impact than the less obvious activities with smaller numbers over long periods. However, a note of caution must be sounded; to use a weather analogy, a short sharp shower is not necessarily more wetting than a continuous drizzle. Nevertheless, for good reasons or not, formal pulse off-track activities do engender ecological concerns which may result in the imposition of restrictions of time and place. There is, however, some national evidence that restrictions imposed ostensibly for reasons of conservation may, in fact, be based upon attitudes and values which have nothing to do with ecological factors. This possible factor will be addressed in the analysis.

In the following analysis the focus is on ecological impact of the various activities, away from the roads and car parks, and off the paths and tracks. Although there can be

problems of parking and assembly, particularly for the pulse activities, these can be managed successfully. Orienteering event organisers, for example, have flexibility in positioning their start, finish and assembly areas so as to minimise intrusiveness, environmental and ecological impact. These can, if advised to be necessary, be substantially distant from the car parking. An example of such an arrangement are events on the Crazy Well area of Burrator which start and finish at Nun's Cross. Competitors assemble in the car park of the Plume of Feathers Inn in Princetown and are transported to and from the competition by minibus. This is an arrangement in which the orienteers, the Dartmoor National Park and the landlord of the hostelry all benefit.

However, the matters of parking and assembly are not the issue which bars even minor orienteering activity from the Moor for a substantial part of the year. The issue is ecological impact and it for this reason that the various activities are compared in terms of the numbers taking part, the extent to which the activities are off-track in the terrain, the time spent off-track and the manner in which the activity is conducted, all of which have a bearing on ecological impact.

A comparison of the annual use of Dartmoor National Park for off-track sports and recreations is given in Table 1. Inevitably, the data in such a survey are subject to uncertainty. Where available, figures are taken from published sources. Where not, best estimates have been obtained from experienced practitioners in the different activities.

	1	2	3	4	5	6	7	8	9	10	11	12
Activity	Rambling	Bird watching	Letter-boxing	Riding to hounds	Pony trekking	Beagling	Hashing	Rock climbing	Mountain marathon	Mountain biking	Hang-gliding	Orienteer-ing
Formal/ informal	Informal	Informal	Informal	Informal	Informal	Informal	Informal	Informal	Formal	Informal	Informal	Formal
Frequency	Daily	Daily	Daily	200 / year	Daily	10 / year	40 / year	Daily	Annual	Daily	Daily	6 / year
National Park control	None	None	Some	None	Some	None	Some	None	Some	Some	Some	Strict
Density	Dispersed	Dispersed	Dispersed	Dispersed	Dispersed	Dispersed	Conc'd	Conc'd	Dispersed	Conc'd	Conc'd	Dispersed
Day visits	1,600,000	800,000	560,000	4000	16,000	125	1200	9000	7200	15,000	1000	800
Proportion off-track	25%	25%	100%	100%	25%	100%	100%	10%	100%	10%	10%	100%
Number off-track	400,000	200,000	560,000	4000	4000	125	1200	900	7200	1500	100	800
Duration hours	4	4	4	4	4	3	1	3	30	4	1	1
Total off-track hours	1,600,000	800,000	2,240,000	16,000	16000	375	1200	2700	216,000	6000	100	800
Ecological impact	Low	Low	Moderate	High	High	Moderate	Low	Low	High	Low	Low	Low
Erosion off-track	Low	Low	Moderate	High	High	Low	Low	Moderate	Low	Low	Low	Low
Wilderness intrusion	Moderate	Low	Moderate	Moderate	Low	Low	Nil	Low	High	Nil	Nil	Nil
Visual intrusion	Moderate	Low	Moderate	High	Moderate	Moderate	Moderate	Low	High	Moderate	Moderate	Low
Aural intrusion	Moderate	Low	Moderate	High	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Low	Low
Overall intrusiveness	Moderate	Low	Moderate	High	Moderate	Moderate	Moderate	Low	High	Moderate	Moderate	Low
Acceptability	Yes	Yes	Yes	Tradition	Tradition	Tradition	Running	High tech	Misuse	High tech	High tech	Running
Dogs	Some	None	Some	All	Some	All	None	None	None	None	None	None

Table 1. Summary of annual use of Dartmoor National Park for various sports and recreations

Notes:

Formal/informal. Formal activities are those organised events for which an application for access is made to the National Park who may or may not withhold permission. Approval from the landowner, if other than the National Park, is a prerequisite. Informal activities, both organised and casual, take place without approval being required, although requests from the National Park to be informed of organised activities are often met.

Frequency. Some activities, mostly casual but sometimes with organisation, occur day-on-day and are labelled continuous. Other activities, particularly those organised events involving larger numbers of participants, are pulsed.

National Park control. Formal activities can be strictly controlled, with time and place restrictions. Informal activities are generally uncontrolled, except through passive measures of encouragement and discouragement, such as location and sizing of car parking and the provision of signage. With some informal activities the National Park has some control in that representatives agree voluntary constraints, which the participants may or may not follow. In some cases the National Park does not approve of the activity but has no power to affect it.

Density. Most activities are such that the density of their participants is low, in that they are dispersed throughout the activity area. Others have participants concentrated together, either static at a feature or moving together across the terrain.

Day visits. These statistics are taken from raw data in National Park documentation or from personal communications with participants who have administrative knowledge of the activities (such as Club Secretaries).

Proportion off-track. In those activities where movement is mostly off-track, the proportion is rounded up to 100%, although paths will be used, where convenient. The 25% figure is based on observations of ramblers (Anderson 1990). Those activities with low off-track movement are assigned a notional 10%.

Duration. For unorganised activities the standard day is taken as 4 hours off-track.

Total off-track hours. These annual estimates have considerable uncertainties but there are several orders of magnitude covering the figures over the range of activities and this allows general conclusions to be drawn.

Ecological impact. This is, in essence, the disturbance of breeding birds and the trampling of vegetation, the former being the more important. The levels of impact are relative to this range of activities and vary from near zero, rated as ‘low’, to the most severe in this location, rated as ‘high’.

Erosion off-track. This is the edaphic change from repeated passage, forming new footpaths or worn areas round fixed assembly points. With static activities long use should have resulted in an equilibrium condition.

Wilderness intrusion. This is considered degraded when other than a small number of solo walkers are within sight. Some activities do not enter the wilderness areas designated by the Dartmoor National Park.

Visual intrusion. This is considered to be increased by grouped participation and by increased speed of movement across the terrain.

Aural intrusion. This is rated as nil for solo participation and increases markedly for groups, particularly those moving in single file, for whom raised voice levels are needed to communicate.

Acceptability. Walking is taken as the base line activity accepted as appropriate. Activities with horses and beagling are considered by the National Park as traditional, having taken place on the Moor for a very long time. The remaining activities are liable to objections of inappropriateness or unacceptability for the reasons listed.

Dogs. Research has shown that the presence of dogs is disturbing to wildlife (Douglas 1989), particularly so for ground-nesting birds (Yalden and Yalden 1990). Additional to hunting, activities are sometimes accompanied by dogs. Others are rarely or never associated with dogs.

2.1 Rambling

Rambling is generally perceived as an track following activity. However, it embodies an element of off-track walking in open countryside which has been monitored. Anderson (1990) reported that 23.4% of visitors to moorland in the Peak District were counted off paths, this proportion varying from 5.2% to 41.8%. These figures are delivered to a much higher precision than the accuracy of the data permits but, for general purposes, it can be noted that about one quarter are recorded off-track. This is consistent with the Ramblers' Association statement that walkers seek access to upland areas not just on Rights of Way but with freedom to roam (Mattingly 1990). A number of reasons are cited. There are many places that walkers wish to visit which cannot be reached by footpaths alone. Many of the 'paths' used by walkers may be minor features, such as sheep trails or dry stream beds, insufficiently substantial to be classed as tracks. Moreover, some walkers "will want to test their navigation skills by following a route across open country on a compass bearing, rather than keep to defined paths . . . use of map and compass being part of the challenge of hill walking" and finally, "the sense of liberation when walking in the hills is of fundamental importance" (ibid.).

The visitor figures for rambling are computed from data for the 1994 National Park Visitor Survey (DNPA 2004, 8). A total of 11.2 million visitors was estimated, with 37% going for a 'short stroll' and 15% going for a long walk (over 2 hours). The figures are combined to give an estimated equivalent total of 15% spending 4 hours on the Moor. The proportion of the walks off-track is taken as 25%.

The ecological impact of disturbance of nesting birds by the off-track element of rambling is likely to be low, because of its dispersed and infrequent nature. On the other hand, disturbance by on-track walking is more concentrated in space and is likely to be more significant. This on-path disturbance is not that of flushing birds from nests but the discouragement of their building nests in the first instance. However, some caution needs to be exercised about interpretation of negative correlations between walkers and nesting densities near paths. For example, the often quoted negative correlation between people numbers on paths and Golden plover *Pluvialis apricaria* numbers nearby (Yalden and Yalden 1989) may be due to ground conditions as much as bird sensitivity. The Golden plover is a wader that tends to favour boggy ground, whereas paths created and used by walkers tend to be on less boggy ground. Therefore, a negative correlation might be expected for habitat reasons alone, irrespective of disturbance (Watson 1991).

Intrusion into the designated wilderness areas on Dartmoor by ramblers is frequent, because of its modest size compared with larger and remoter areas of Scotland and Wales, and because it can be readily approached from all sides. In both of the two wilderness areas are minor central features, Cranmere Pool (UK National Grid Reference SX 603858) and Duck's Pool (SX 625678), which are a challenge to locate and which makes them attractive objectives. The visual intrusion of ramblers depends largely on whether they are present as a group and the extent to which their clothing is conspicuous. A large group moving across the terrain is frequently aurally intrusive; in quiet conditions of moorland voices can be heard at ranges of many hundreds of metres.

Dogs do sometimes accompany ramblers. Owners are urged to keep dogs on leads during the designated bird breeding season from 1st March to 15th July (DNPA 2004a) but this appeal appears to be extensively ignored.

2.2 Bird watching

Bird watching is closely allied to rambling, but separated in the 1994 visitor statistics. The main differences are that bird watchers tend to move more slowly across the terrain and in smaller numbers. This latter point is believed to be essentially correct despite promotional literature by the Dartmoor National Park for Moorland Bird Walks showing grouped bird watchers. These differences account for the different ratings for the aesthetic qualities in Table 1. It is highly unlikely that dogs accompany bird watchers, unless for specific research on disturbance of wildlife by dogs (for example, Yalden and Yalden 1990).

2.3 Letterboxing

The name refers to an activity originating with an unofficial 'post box' set up at Cranmere Pool in 1857. This was then a relatively inaccessible site, rarely visited. The custom arose whereby a visitor would leave a stamped addressed postcard in a cairn at the site, having picked up the card left by the previous visitor and posting this in a Royal Mail post box once off the Moor. In the last quarter of a century the activity has evolved and burgeoned, so that there are estimated to be 21,000 letterboxes currently on Dartmoor (Finch 2004). The activity now takes the form of a 'treasure hunt' in which the boxes are well hidden in cavities and located by following bearings, distances and other instructions from usually prominent features. The instructions are either published, or passed on by word of mouth, or included within the letterbox for another site. Also within the box is a rubber stamp showing the name of the box and an outline drawing or cartoon. The letterboxers carry an inkpad and a logbook into which they can stamp the letterbox mark

(Figure 3). The boxes are placed and maintained mostly by individuals, not necessarily coordinating with other individuals placing boxes.

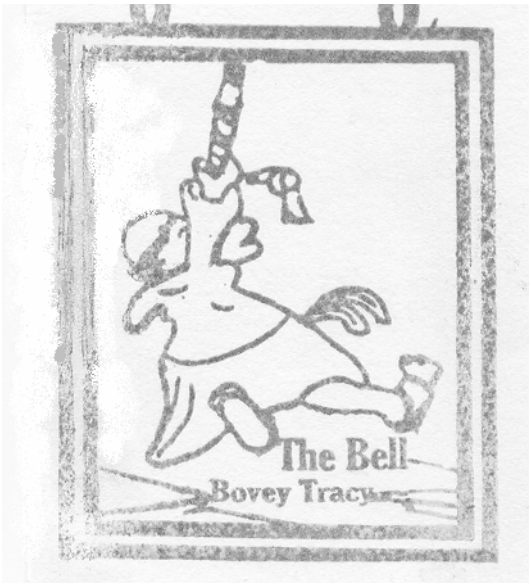

Figure 3. An example of a letterbox stamp

Letterboxing is very popular on Dartmoor, as the participating numbers extracted from the 1994 visitor statistics and listed in Table 1 show. In the United Kingdom Dartmoor has such primacy in this activity that, at present, it has not significantly spread to other parts of the country. This is not so abroad, where there is an explosion of interest and participation. In particular, the United States of America have taken to the activity, with over 12,000 letterboxes reported placed in that country in the ten years since the activity first arrived there.

Letterboxing is largely uncontrolled. There is a self-appointed 'Letterboxing 100 Club' which attempts to apply some structure to the activity by issuing badges for collecting various numbers of stamps (several members have reported passing the 10,000 mark), new box clues and general advice. The Dartmoor National Park has dialogue with the Club and makes requests for certain areas not to be visited during the bird nesting season. The Club is able to advise members to abide by the request and, where appropriate, to withdraw their boxes during the critical period. However, most letterboxing is outside the sphere of influence of the Club and continues throughout the year, abated only by weather and season.

The locating of a letterbox often requires a detailed and possibly extensive search, probing into holes and crevices, many of which are typical of nesting sites of, for example, wheatear *Oenanthe oenanthe*. Experienced letterboxes use a stick for this, aware that many crevices on Dartmoor also contain the adder *Vipera berus*. These potentially disturbing actions, coupled with the large participation numbers moving mostly off-track, results in Table 1 in a raised rating for ecological impact and erosion. Letterboxing is often, perhaps usually, a social activity involving pairs and groups. For these reasons their visual and aural intrusiveness is rated as moderate. The same rating is accorded to wilderness intrusion, as both Cranmere Pool and Duck's Pool have cairns containing letterboxes.

2.4 Riding to hounds

The Hunting Act 2004 (HM Government 2004) came into force in February 2005. It is not yet clear whether the several hunts using Dartmoor will circumvent the law, convert to drag hunting, or disband. Personal communications with hunting contacts indicate that the third option is the least likely outcome. Therefore, it is proper to include riding to hounds as a continuing activity of relevance to this analysis.

Five hunts have access to Dartmoor. The present hunting season is from early August to mid-April and it is estimated from information published by the hunts, such as Spooners and West Dartmoor (Spooners 2004), that approximately 200 meets take place on the Moor each year. It is assumed that they attract a modest 20 riders at each meet on average. The hunt followers are discounted because they tend to congregate on viewing points close to access roads, although there have been instances of all-terrain vehicles driving off the roads, in contravention of the bye-laws.

The ecological impact of hunting on horseback is high, for reasons including the trampling of vegetation, soil compaction and erosion of surfaces. Importantly, this activity takes place over the first third of the bird nesting season and ground-nesting birds are at risk when the hounds are casting about. The attitude of the National Park towards the ecological effects of hunting appears equivocal. The substantial level of such ecological impact is well understood (for example, Douglas 1989), but when the justification for restrictions on lesser impacting activities is queried, the National Park's response has been that hunting is a traditional activity whose ecological impact is not open for discussion (Atkinson 1993). It is indeed an activity which has enjoyed authority and influence built up over several centuries and has taken place 'as of right' without being

subject to the control measures placed on other activities. There is a possible ecological argument in support of hunting in that, as a long-standing activity, it must be in equilibrium with the environment it uses, if that environment is seen to be stable. However, there are doubts about the stability of upland heather terrain, which is variously considered to be in decline (Trumpington 1991, Gimingham 1995), although recent observations are more encouraging, with the Moorland Association (2000) reporting some improvements in upland heather. If upland vegetation is indeed under threat, from climate change or atmospheric nitrogen take-up (de Smidt 1993), or other contributing factor, it may not be able to sustain any significant localised impact from hunting or horse riding in general. However, even if in an equilibrium condition, any significant impact is not necessarily compatible with one of the objectives for management of conservation areas, which is to enhance as well as conserve (English Nature 1995).

To what extent drag hunting, if that is to be the successor to foxhunting once the Hunting Act comes fully into force, will take place without having to present environmental credentials in order to gain continued access to Dartmoor terrain, remains to be seen. Since the drag scent is laid by a person and not a wild animal, there will likely be attempts to control areas and routes taken by the drag.

2.5 Pony trekking

The visitor figures for pony trekking are computed from data for the 1994 National Park Visitor Survey (DNPA 2004, 8). Riding is permitted by ancient right on most open moorland, but “the open appearance of the landscape is deceptive, for despite the areas of good galloping grass, it is interspersed with granite boulders, deep bogs and fast-flowing streams . . . which make it a challenge to cross” (MFHA 2004). The proportion of riders moving off-track is taken to be the same as for ramblers, 25%, for similar reasons.

Much of the pony trekking is from commercial stables and is usually of one to two hours duration. The remainder is by riders generally more experienced and whose outings are much longer. An average of 4 hours overall for each ride is assumed. In most respects the assessments for riding to hounds also applies to pony trekking except that, where dogs do accompany horse riders, they are either single or in very low numbers. There is some control by the National Park over commercial pony trekking but essentially none over individuals.

2.6 Beagling

Hare on Dartmoor is currently hunted on foot by the North Dartmoor Beagles who do so on about five occasions during the season from September to mid-March. This activity is also proscribed by the Hunting Act 2004. Once the Act comes into force the North Dartmoor Beagles will continue to operate, but in accordance with the law, by seeking out rabbit (which is permitted under the Act) or changing to drag (Flick 2004). Although the participation numbers are low, their ecological impact is raised because of the presence of hunting dogs during the first month of the bird breeding season.

2.7 Hashing

Hashing is a running activity carried out by Hash House Harriers, from reputed origins in Malaya in 1937 to a now worldwide recreation. Its origins are in the 'hare and hounds' paper chase of boarding schools in the nineteenth century. Today the trail, including loops and false legs, is marked by flour or sawdust, rather than paper.

In England there are approximately 184 clubs, averaging about 100 members (UK H3 2004). A number of clubs operate around and on Dartmoor, with about 40 meets spread throughout the year on the Moor and attracting an average of around 30 runners (Flick 2004). As a courtesy, the diary of Hash outings by the various clubs is sent to the National Park, who may make requests to avoid certain areas. These requests are usually met.

Those taking part in a hash tend to group together and this raises their visual and aural intrusiveness, but otherwise their environmental impact is low.

2.8 Rock climbing

On Dartmoor there are a small number of rock climbing faces, such as Dewerstone Rock (SX 540639), and a larger number of features used for 'bouldering', such as Haytor Rock (SX 747770), which has several short routes on it (Figure 4).

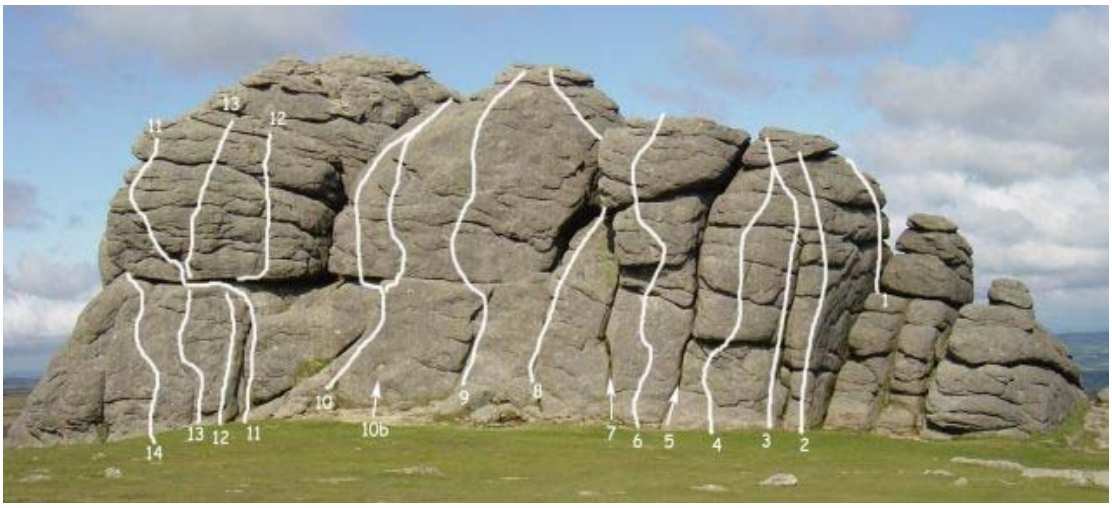

Figure 4. Climbing routes on Haytor Rock, Dartmoor
(from http://www.javu.co.uk/Climbing/Guides/DartmoorRoutes/Haytor/Haytor.shtml)

Annual participation figures are computed from typical numbers to be found at climbing sites in good weather on weekday evenings and during the day at weekends (these figures being provided by rock climbing contacts). In bad weather climbing rarely takes place. It is assumed that, on average, climbing conditions are suitable on one day and three evenings per week for six months of the year, a day session lasting four hours and an evening session two hours. The combined participation figures for all the sites are about 9000.

Estimating the proportion of off-track movement by climbers and the level of ecological impact needs explanation. Initially, when the sites were first visited, these would have been high. However, the sites have been frequently used over a long period, so that the damage to vegetation and the Type 2 disturbance of birds (Liddle 1997, 396) should have stabilised. Paths have formed to and around the features, so that most movement is now on-track. Some additional off-track movement will take place around subsidiary features and a notional 10% is assigned to this.

2.9 Mountain marathon (Ten Tors)

The international mountain marathon format is for a team of two competitors to undertake a two-day long-distance navigation event over mountain and/or moorland, carrying food, camping equipment and emergency clothing. Minimum standards are set for these. The event consists of two timed parts, one on each day, with the overnight camp set in a remote location. There are different length courses to suit the range of physical ability. The fastest aggregate time on each course defines the winning teams.

The first and only mountain marathon on Dartmoor took place in 1982. However, a similar event does occur on the Moor every year. This is the Ten Tors two-day expedition for older schoolchildren. The event has 400 teams of six participants; it is untimed and the teams are to be self-sufficient and complete distances of 35, 45 or 55 miles over the two days. The event is staged by the Army, assisted by Exeter University and others (Ten Tors 2004). In calculating the participation hours the 2400 entrants are assumed to be the terrain for a total of 30 hours during the two-day expedition. There is also the training, which is permitted from February. The form of training schedule is at the discretion of the participants but typical schedules consist of single day expeditions leading up to at least one overnight camp. Overall, it is assumed that the training hours total on Dartmoor is equivalent two two-day expeditions.

The Dartmoor National Park Authority has difficulty with this event. In 1983 the Authority considered it to be using "Dartmoor simply as a challenging environment" and out of line with "NPA purposes of promoting enjoyment and understanding" (DNPA 1983, 94). Notwithstanding the current Charter for the Ten Tors including the objectives:

> "A greater appreciation of the beauty and fragility of Dartmoor as a landscape and ecosystem, including its diverse historical and cultural importance.
>
> "Developing a respect for, and wish to return to, Dartmoor and similar areas of natural beauty." (Ten Tors 2005, Charter),

sources indicate that the Authority retains the view that the event is inappropriate. Quite apart from this objection in principle, there are other problems. The two-day event, with 2400 entrants, is large, twice the size of the largest orienteering event that the Authority will permit under special circumstances. It is not just a single event over the 30 hours or so on the weekend of the Ten Tors Challenge itself but consists also of the many weekends allocated for training from February. It uses the wilderness areas of the Moor. It takes place in mid-May, during the bird nesting season. It is not accompanied by dogs, but in most other respects it breaches the guidelines that the Authority sets for sensitive use of the Moor.

The Ten Tors continues because it has become a firmly established event, having been staged since 1960, with year-on-year anticipation by the schoolchildren who take part. More significantly, it has high level backing from the Army, who see it as being in keeping with military training objectives, with possible benefits in public relations and recruitment.

Although it is clear that the event is disapproved of by the Authority, measures are agreed between the organisers and the National Park for ameliorating its impact.

2.10 Mountain biking

In the mid 1990s the Dartmoor National Park Authority made known its intention to make off-road cycling on the open areas of the Moor illegal. This produced a vigorous protest with a mass 'trespass' by 300 mountain bikers onto the Moor around Haytor. The Authority withdrew its proposal and reviewed its position. It is understood, from contacts within the Authority, that it retains strong reservations about off-road mountain biking on Dartmoor. There are concerns about conflict with walkers' use of paths, visual intrusion and the perception that it is an activity inconsistent with quiet enjoyment. Whether these concerns originate with the Authority or whether they are re-expressing views they believe are held by the public, is not known. Nevertheless, mountain biking is a popular and expanding activity which has had to be accommodated on the Moor. Sufficient off-road mountain biking opportunity has had to be made available to encourage compliance with permitted routes and discourage general unapproved access. The Authority appears to have taken significant steps to provide this opportunity. It offers for purchase a highly detailed, waterproof map at 1:40 000 scale, showing permitted routes with their degree of difficulty (DNPA 2004b). Most of the routes shown are off the high moor. However, the small number of high moor tracks which are marked for off-road cyclists appear to be well chosen, encompassing most routes that mountain bikers would wish to follow. Because of this, the extent to which mountain biking is known to take place off-track is thought to be low and given the notional figure of 10% in Table 2.1.

The visitor figures for mountain biking are computed from data for the 1994 National Park Visitor Survey (DNPA 2004, 8). These figures combine cycling and mountain biking. A proportion of 50% accessing the routes on the high moor is assumed for this comparative study.

2.11 Hang gliding and paragliding

Permissions to conduct hang gliding and paragliding on Dartmoor are granted by the National Park to the South Devon Hang Gliding and Paragliding Club, from whom participation information has been obtained (Moore 2004). The National Park Authority exercises control over which sites can be used but, with one exception, does not apply day-to-day constraints. The exception was a demand from the Authority not to overfly a valley on the north of the Moor during the bird-nesting season. The Club questioned the

logic of this requirement, particularly as the Mid Devon Hunt had been seen crossing the area. The requirement was withdrawn.

This activity is particularly sensitive to weather conditions, requiring a wind speed of 10-15 miles per hour and in the correct direction at the launch site. With the benefit of a number of sites facing different directions the frequency of flying days is two days or more per week throughout the year, with up to 20 participants each day. There is some off-track movement prior to take off and after landing and this is taken as 10% of the activity time.

2.12 Orienteering

The rules of orienteering require written permission for each event to take place. This gives authorities, such as the Dartmoor National Park, the opportunity to exert strict control. On Dartmoor the sport is proscribed between 1 March and 15 July, for the stated intention of protecting nesting birds and, at other times, is banned from using certain traditional orienteering areas, on the grounds of preventing erosion and vegetation damage, notwithstanding these areas being frequented by cattle and members of the public.

A club event on Dartmoor has up to 100 competitors. These participants are spread out in the terrain on six different courses, and they are spread out in time across a two hour start interval. The density of competitors in the terrain is very low. Perhaps once in two years there is a regional event with 400 competitors with more courses and a longer start interval. Perhaps once a decade there is a two-day event with a limit of 1200 competitors but this is specially negotiated with conditions of time and place and is excluded from this inter-activities comparison.

With the dispersal in time and space the potential disturbance of birds by the numbers of competitors in club and regional events is low and this is the rating entered under ecological impact. However, under current constraints applied by the National Park, in that no orienteering is permitted during the bird nesting season, this rating could be entered as nil. However, the comparison with other activities is made more meaningful by considering the impact of orienteering, were it to take place during the bird nesting season.

3. Comparison of the activities

The main parameter of comparison between the various activities using Dartmoor is the number of hours spent off-track in Table 1. These are rank ordered in Table 2.

Activity	Total off-track hours	Ecological impact	Intrusiveness
Letterboxing	2,240,000	Moderate	Moderate
Rambling	1,600,000	Low	Moderate
Bird-watching	800,000	Low	Low
Mountain Marathon Ten Tors	216,000	High	High
Riding to hounds	16,000	High	High
Pony trekking	16,000	High	Moderate
Mountain biking	6,000	Low	Moderate
Rock climbing	2,700	Low	Low
Hashing	1,200	Low	Moderate
Orienteering*	800	Low	Low
Beagling	375	Moderate	Moderate
Hang gliding	100	Low	Moderate

Table 2. Comparison of off-track recreational activities on Dartmoor in order of total hours per year. The asterisk indicates an activity strictly controlled by Dartmoor National Park.

It can be seen from Table 2 that the range of time spent off-track by the different activities is large, a ratio of about 20,000 between the highest and lowest. This spread across several orders of magnitude is such that any uncertainties in the figures used to generate the comparison do not significantly affect the overall conclusions. One such conclusion from the table is that the activity strictly controlled and restricted by the National Park is a negligible contributor to the total recreational time spent off-track on the Moor.

It can be argued that the total time computed for an activity is not the full measure of its overall impact on the Moor and on those using it. Some weighting is needed to take account of some activities being intrinsically more ecologically damaging than others and also to take note of aesthetic concerns. A subjective rating for these two considerations is given in Table 2. Research into user perceptions which allows these ratings to be given

numerical values has not been conducted. However, *for exercise only*, to investigate how sensitive the comparative conclusions are to this nature of adjustment, quasi-numerical coefficients are accorded as follows:

For ecological impact:
- Moderate x 2
- High x 3

For intrusiveness:
- Moderate x 1.5
- High x 2

Applying these factors yields Table 3.

Activity	Adjusted off-track hours
Letterboxing	6,720,000
Rambling	2,400,000
Bird-watching	800,000
Mountain Marathon Ten Tors	**1,296,000**
Riding to hounds	96,000
Pony trekking	72,000
Mountain biking	9,000
Rock climbing	2,700
Hashing	1,800
Orienteering*	1,200
Beagling	1125
Hang gliding	150

Table 3. Comparison of off-track recreational activities on Dartmoor with a notional weighting for ecological and aesthetic impact.

The results of this notional weighting exercise are that the rank order of the different activities stays largely unchanged, apart from the Mountain Marathon/Ten Tors which advances up the table, and that the overall range expands. Therefore, it is concluded that the figures in Table 2 which, despite considerable uncertainties, are based on practical measurements and estimates, do enable meaningful comparisons to be made for land-use management purposes. The conclusion from Table 2 that the Authority sees fit to restrict

the asterisked activity that forms only a minuscule contribution to environmental impact is repeated for Table 3. In numerical terms the potential contribution of orienteering, the focus activity of this study, is 0.01% of the whole. This concentration by the National Park Authority on strict control measures for an activity that, in reality, cannot affect the success or otherwise of the breeding bird conservation measures lays the Authority open to criticisms of its objectivity.

4. Further analysis of letterboxing and orienteering

Particularly instructive is a comparison between orienteering and the activity heading the off-track impact list, letterboxing. Orienteering has some similarities with letterboxing. Both activities involve convergence of dispersed participants onto particular points – a letterbox or a control flag. It is this convergence which gives rise to ecological concerns. In terms of the average time off-track that the exponents of the two activities spend on a single day (one hour and four hours) it might be assumed that one letterboxer is equivalent to four orienteers. However, this does not take note of the important differences in the way the activities are conducted in the terrain and which affect their potential ecological impact.

Letterboxers make their way at leisure to the target letterbox site using written descriptions and then have to rummage around for the hidden box. This will take ten minutes, perhaps less, perhaps more. Having found the box, letterboxers will open it, take out the stamp, ink it with their own ink pad, stamp their logbook, ink and stamp their own mark in the book in the box, read any instructions or clues within the box, put it all back together, ensuring it is waterproof, and restore it to its cavity. This will take five minutes or more. In comparison, orienteers make their way at speed to the target feature by map-reading; the marker flag is not hidden and is visible from 15m distance and usually from very much further. Having found the marker flag, orienteers will record their visit by using a pin punch on a card they carry or by swiping an electronic sensor. This will take five seconds or less. All in all, on average, a letterboxer will spend 15 minutes in the vicinity of a letterbox and an orienteer will spend 15 seconds in the vicinity of a control. In terms of total disturbance, comparing time at one site, one letterboxer is equivalent to 60 orienteers. This is the typical total number of orienteers that pass through a busy control site during the three hour period of a club orienteering event on Dartmoor. .

In considering the disturbance of ground-nesting birds the impact of one prolonged 15 minute disturbance is different from 60 ephemeral 15 second disturbances spread over a

three hour period. The prolonged disturbance is potentially more damaging. Although there may be differences between species, observations reported by Parker (2005) of two species, wheatear *Oenanthe oenanthe* and stonechat *Saxicola torquata*, the former being considered important on Dartmoor (DNPA 2004a), are consistent with repeated short disturbances being non-damaging.

This comparison refers to a single site. Of course, an orienteering event has more than one control site and a letterboxer will visit more than one letterbox in a day's outing. An average tally of letterboxes for one day's outing may be taken as being in the range 10-20 boxes (Finch 2004); the number of reasonably busy control sites in a club orienteering event is much the same. Therefore, one club orienteering event of around 100 competitors is roughly equivalent to two letterboxers in terms of potential ecological impact around the control points where the competitors converge.

This equivalence of two letterboxers and a club-sized orienteering event may be scaled, with caution, to more letterboxers in a single day and larger orienteering events. The most important difference, however, between letterboxing and orienteering is that, in a particular area, the letterboxing will occur day-on-day (subject to season and weather) whereas the orienteering will only take place once in a year or perhaps at longer intervals.

These comparisons do not represent actual impacts, not because the calculations are invalid, but because of the Dartmoor National Park ruling that prohibits orienteering during the bird nesting season from 1 March to 15 July. To further the analysis, suppose that monthly club events were permitted during the bird nesting season. They would amount to about 500 runs, equivalent to 10 letterboxers. Taking half the annual visitor numbers for letterboxing (560,000 in Table 1) as being those in the bird nesting season gives an ecological impact ratio, based on time figures, of 28,000. However, this is not the end of the comparison. The procedures followed at the focus points have further ecological implications. The orienteers visit a flag and move on, the letterboxers probe into holes and crevices, potentially disturbing hole-nesting birds and other fauna. This undoubtedly increases the ecological impact ratio but it is difficult to make sensible numerical estimates as to its extent from the data which are currently available.

5. Survey of orienteers' responses to the bird nesting closed season

Orienteers have great difficulty with the blanket ban on their sport for the whole National Park during the bird nesting season and question its validity. Their knowledge of letterboxing and orienteering - many take part in both activities - leads them to the same conclusions of mismatch between the National Park's attitude towards the two activities that the above survey has enumerated. This leads in turn to their distrust to the National Park's even-handedness or its objectivity, or both.

In order to assess the level of their concern a questionnaire survey was conducted among orienteers at an event on Dartmoor on 11 December 2004. The questionnaire made the following introductory statement:

> In the interests of protecting and enhancing the bird population on Dartmoor, the National Park Authority prohibits orienteering on Dartmoor during the bird breeding season from 1 March to 15 July. With respect to the other 2.96 million ramblers, bird watchers and letterboxers (DNPA figures), who do not seek permission for access, the Authority asks organisers of events involving more than 35 walkers or 20 riders to avoid the season or contact them for advice.

Orienteers were asked to respond by tick box to the statement that *"The action of the Dartmoor National Park Authority with respect to the ban on orienteering during the bird breeding season is fair and reasonable, considering the environmental objectives."* They were also asked to give their assessment of the National Park's overall performance on environmental matters on a scale from 1 to 10. A total of 45 questionnaires were returned, representing a two thirds response. The responses are given as percentages and average marks out of 10 for each of the categories in Table 4.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
30%	50%	11%	9%	0%
5.0	5.9	6.8	5.8	

Table 4. Survey of orienteers' responses concerning the ban on the sport on Dartmoor during the bird nesting season.

The survey shows a substantial majority (80%) disagreeing with the National Park Authority's seasonal ban on orienteering. It also shows that, although in disagreement, most orienteers are broadly supportive of the Authority in its general environmental stewardship of the Moor. The two elements of support and criticism are reflected in the following examples of written comment that the survey also invited, these comments representing the spread of expressed opinion:

> "No orienteer is going to complain about a restriction during an environmentally-sensitive time of year at a particular location. What does need to be asked is whether a ban over the *whole* of Dartmoor for the *whole* of the spring/early summer is really appropriate or whether the restriction can be less severe in certain areas. Remember that orienteers have every interest in keeping the countryside in a healthy state and authorities should use this to their advantage." *('Neutral' respondent)*

> "The National Park Authority, in its efforts to control access, is driven by what is politically possible and not by what is scientifically and logically required to preserve the environment. It can't stop Ten Tors, hunting, challenge walks, etc. because there would be a public outcry. It can stop orienteering, so it does. This policy is intellectually indefensible." *('Strongly Disagree' respondent)*

The underlying support for conservation measures on the Moor shown in this exercise is consistent with information obtained elsewhere. A survey of attitudes of 100 orienteers towards conservation was conducted at events in Devon and Cornwall in 2004 (Parker 2005a). The responses showed, inter alia, that 80% of the orienteers were members of environmentally-conscious organisations. These included the National Trust (60%), the Royal Society for the Protection of Birds (20%) and a number of other organisations. These percentages are particularly high and demonstrate substantial commitment to environmental protection. This lends support to the caution that the orienteers rejection of the DNPA policy towards orienteering should not be dismissed as an unthinking reaction to a constraint on their activities.

6. Discussion

The analysis gives rise to three questions.

'Why does the Authority take such stringent measures against a minority activity when it is clear that there is negligible ecological benefit from doing so?'

It seems unlikely that the Authority has seriously misunderstood the nature of the activity, there are competent orienteers on the DNPA staff. A possible answer is that the seasonal banning of orienteering has political intent, to encourage informally conducted activities to follow suit. There is evidence for this in the statement by the Authority that:

> "Events involving large groups are considered to represent an increased risk of disturbance. Many major walking, riding and orienteering events have been rescheduled in recent years. The organisers of these events have taken positive steps to help safeguard moorland breeding birds." (DNPA 2004a)

This statement is incorrect, in that orienteering events have not been rescheduled, instead they have not been permitted to take place, and the 'positive steps' referred to suggest voluntary compliant action, which is not the case. A further possible explanation suggested by the second respondent's comment above concerns the exercise of power.

With respect to more than 99% of the recreational access to Dartmoor the National Park Authority is unable to exert significant active control. Orienteering and any occasional activity that seek formal permissions provide an opportunity to exercise control measures.

'Why does the Authority promote, in its literature, an activity which has substantially the greatest potential for disturbance of nesting birds?'

It encourages letterboxing as an activity which appeals to those who "like solving clues, testing navigation skills and enjoy being outdoors", noting that "letterboxers thrive on the challenge of locating cunningly concealed boxes . . ." (DNPA 2004c). Whilst it is appreciated that the Authority is obliged to come to terms with an informal activity that will largely continue to take place irrespective of any control it may wish to exercise, there is a profound difference between promotion of an activity that is acknowledged to be disturbing to bird life and its tolerance. The Authority acknowledges this in its informing participants, "letterboxing often involves continuous rummaging over a limited area, you might worry livestock or disturb wildlife. This is particularly true during the bird breeding season . . . so be extra careful when out on the hunt" (Ibid.).

The final question returns to the matter of bias raised in the opening paragraphs of this report;

'Why does the Authority appear to approve the 'challenge' of letterboxing (Ibid.) and the 'challenging' and 'exciting' activity of rock climbing (DNPA 2004d), without questioning the motives of the participants, whereas the challenge of more active recreations is considered to be inappropriate use of the National Park?'

There does appear to be a general cultural bias against running activities amongst land managers and their advisors. Blunden and Curry (1988) concluded from their analysis of land use policies that the more passive forms of countryside recreation are favoured by environmental and other authorities and that "the more active or sport-oriented an activity becomes, the less likely it is to be encouraged by a county council". Of more specific interest to this analysis is the statement, with respect to orienteering, of a former Dartmoor National Park Officer that "visitors' enjoyment would be spoilt as much by the passage of muddy runners as by the crawling past of black-faced, kit-bearing soldiers" (Mercer 1989). The emotive nature of this comment is self evident but, even if expunged from the statement, its underlying assertion is that informal users object to runners and soldiers. This view is not supported by a survey of user perceptions in the three National Parks in

Wales (Sports Council for Wales 1993). The survey of 272 users investigated whether the encountering of sports and active recreations in the Parks increased, decreased or had no effect on their enjoyment. These activities were wide-ranging, from walking, mountaineering, running and orienteering to mountain biking and water sports. The survey reported that users' enjoyment was enhanced by such encounters in 47% of cases and diminished in only 2%. Which activities were objected to was not indicated. With respect to encounters with soldiers on foot, the survey reported that 7% of users had their enjoyment decreased but that of 18% was increased. The report concluded that users of the National Parks in Wales are "very tolerant" of sport and recreational activities and "generally tolerant" of other activities, such as military exercises (Ibid., 6). Given that the opinions of the users of the Dartmoor National Park are unlikely to be very different, it appears that the Dartmoor National Park Officer's statement in 1983 was a land manager's perception wrongly presented as that of the public.

A more recent survey directly addressing public attitudes towards orienteering was conducted on Dartmoor and the Cornish coast (Parker 2005a) and questioned 40 members of the public present at the same time as an orienteering event and potentially competing for the same recreational space. All 40 considered that orienteering did not interfere with their enjoyment of the countryside and all 40 did not think that orienteering caused environmental damage. Although this sample was not large, it indicates that it is very unlikely that public support for stringent control measures that land managers see fit to apply to orienteering would be other than miniscule.

On the balance of evidence it appears possible that the Dartmoor National Park Authority continues to have a cultural objection to orienteering but is re-expressing that objection in ecological terms. Such practice is not uncommon. The House of Commons Environment Committee had the opportunity to take wider evidence in its review of the Environmental Impact of Leisure Activities and noted that:

> Cultural conflicts are just as real as, and sometimes more important than, the physical problems – indeed they are often the root cause of the various tensions and dissatisfactions that are redefined as threats to the environment. (House of Commons Environment Committee 1995, vol. I, xxvii)

A number of such redefinitions and misrepresentations have been identified in orienteering involving governmental and major non-governmental organisations (Parker 2005a).

7. Conclusions

This survey of 12 off-track recreations in the Dartmoor National Park has shown considerable discrepancies in the attitude towards and management of the different activities by the National Park Authority.

In particular, a comparison of letterboxing and orienteering reveals widely varying standards. The former is promoted by the National Park, the latter is not. Letterboxing is a major activity largely unconstrained by the National Park, there being some attempts to moderate the activity during the bird nesting season. Orienteering is a minor activity on which a blanket ban over the whole Moor is applied during the bird nesting season. Moreover, the difference in participation is such that, were club orienteering events to be permitted during the bird nesting season, their ecological impact on nesting birds would be *at least* 28000 times less than that of the letterboxing already taking place.

Whilst the difficulties for the Dartmoor National Park Authority in managing conflicting interests are readily acknowledged, there is an expectation among those affected by the decisions of a public-funded body that these are based on scientific objectivity and even-handedness, and are free of emotive bias. In these three respects the Dartmoor National Park Authority appears to fall short of acceptable standards in its dealings with orienteering.

Therefore, it is recommended that the Dartmoor National Park Authority reviews its policy towards orienteering as a matter of priority.

It is suggested that the agreement in Sweden between the environmental authorities and the orienteering federation, concerning the critical elk breeding season, in which club orienteering events are permitted and larger events deferred, provides an example of equitable management practice (Barklund 1987, updated Lundkvist 2002).

Acknowledgements

The invaluable assistance of many experienced practitioners in the various activities surveyed in providing participation figures and details of the conduct of their activities is warmly acknowledged.

Thanks are given to David Hogg (AUS) for his perceptive comments on the draft issue.

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Note: The annotation of an Environmental Research Paper Number (IOF/Env/ RP***) to certain references indicates that copies of those unpublished and limited circulation documents are held by the International Orienteering Federation and are available for consultation.

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