

## ORIENTEERING ACT RESPONSE TO DRAFT PLAN OF MANAGEMENT FOR NAMADGI N.P.

### Summary

Namadgi National Park has been used regularly for orienteering since 1972. Major international and national events have been held with no discernible environmental impact, with participant numbering nearly 1000. Without major events of this type, orienteering in ACT does not have a viable future as a competitive sport. However, the Draft Plan in Schedule 3 places an absolute limit (600 participants) on the size of events that will normally be allowed.

The purpose of the following comments on the Draft Plan is:

- To reassure Park authorities that Orienteering ACT ('OACT') and its members are as committed as all other Park supporters to its environmental sustainability: orienteering is proud of its role in maintaining public recognition and appreciation of the Park and its values.
- To emphasise orienteering's place in the Park and to the ACT's wider community health interests and social values, while reiterating the Park's importance to our sport.
- To ensure that the Plan of Management is adjusted to more accurately reflect the reality that orienteering has had no discernible adverse impact on the Park, correcting misperceptions that orienteering has or will have such impacts, and to have orienteering deleted from or treated differently in Schedule 3, for the reasons in the next point;
- To question the environmental and policy rationale for proposed limits in the Draft Plan Schedule 3 on number of events according to number of participants: this approach is arbitrary; potentially fatal for the occasional larger national events which Namadgi has successfully hosted for nearly 30 years; and ignores the long and effective practice whereby individual events are considered, designed and managed in close cooperation with Park managers; and
- To emphasise the importance of practical approaches with actual benefits to both the park and orienteering, so that where any aspects of a proposed orienteering event might be seen as a risk to the Park, these would continue to be managed to the satisfaction of the Park's managers.

Throughout the period since 1972, OACT has enjoyed a good working relationship with the various managers of the area. We are disappointed that this relationship and our sport's good environmental record in the Park is not reflected in the Draft Plan, despite the OACT submission in 2002 which detailed the sport's environmental and social credentials. Instead the Draft Report highlights environmental risks that are largely unsubstantiated, and proposes arbitrary limits on size and number of events. This inflexible approach ignores what can (and has been) achieved in the past through careful planning and cooperation between Park Managers and Orienteering.

### Environmental Impact of Orienteering

OACT is surprised and disappointed by the following judgment made at page 118 of the Draft Plan about orienteering and rogaining:

*When a large number of participants are involved, trampling of vegetation, dispersal of weed seeds, disturbance to animals and heritage sites, inappropriate waste and garbage disposal could be significant.*

This statement makes unsubstantiated assumptions about trampling and weed dispersal, and ignores our sport's exemplary performance with regard to rubbish disposal and avoiding individual heritage sites (as requested by Park managers when events are approved). This reflects an inadequate understanding of orienteering and the minimal impact of dispersed running and walking in the bush, as will be detailed.

The fact that orienteering is an organised sport does not mean that its compatibility with Park values and objectives should be judged any differently from any other activity. It is not apparent from either experience in Namadgi or from overseas studies that orienteering has caused, or is likely to cause, any adverse short- or long-term impact on the Park or other users' rightful enjoyment of it.

Orienteers, like bushwalkers, enjoy traversing a native environment in preference to other locations such as pine plantations. Leaving rubbish behind is anathema to them. Indeed, many actually pick up and take away *existing* rubbish. Consistent with the sport's own code of practice, assembly areas are invariably left as they were found (or better). Orienteering has long had and practised its code of practice for event participants that essentially is - "no rubbish, fires, timber collection, pets, firearms".

Comments are frequently received from natural resource managers around Australia, reflecting favourably on the low impact of the sport and the care taken by event organisers to leave assembly areas in a tidy condition. Such comments have been made by Namadgi managers on several occasions, and OACT is unaware of any adverse comments regarding trampling, tracking, vegetation damage or rubbish impacts after events.

Orienteering is a low impact sport which is ideally suited to natural areas. There is scientific information to support this statement, based largely on studies in Europe where the scale of events is much greater than in Australia. Attachment 2 is the Summary from *Review of Research into the Ecological Impact of Orienteering* by Brian Parker, Chairman of the Environment Commission of the International Orienteering Federation. Orienteering Australia has adopted an Environmental Code of Practice that applies to all State and Territory member associations including the ACT and is Attachment 1 to this submission. As is apparent from its detail, much environmental sensitivity and practical awareness is reflected in this Code.

The low impact of orienteering, even at larger events with several hundred participants, stems from the dispersed movement of orienteers through the terrain, the infrequent use of areas (no more than once a year in the same area of Namadgi), and the fact that every event involves courses being planned in different directions. While it is infrequently warranted or requested by land managers, we can and do design courses to avoid areas of ecological or cultural sensitivity.

Park managers looked at the trampling effect at the 1992 Australian Championships at Smoker's Flat. For the first 100 metres of the courses – the one stage shared by nearly 1000 runners - they reported that the trampling effect impact had gone in 3 days, and were happy that no damage had been done.

Despite being used for orienteering for over 30 years, none of the areas show any increase in the number of paths. To the contrary, there has been a reduction in paths as some former farming tracks slowly grow over. (Orienteering maps themselves help provide an accurate historical record of these areas with regard to tracks, and vegetation density.) Orienteers disperse through the forest whereas bushwalkers often use the same footpaths and routes along creek lines and ridges (sometimes not official paths).

There is no evidence that orienteers have caused the spread of weeds, and almost all of the areas we use are former farming land where weeds have been established for a long period of time. If orienteers were causing the spread of weeds, it would be possible to see an increase in weed abundance in the areas we use, compared with adjacent areas with a similar land use history. This is not the case, and it is evident that most weeds are associated with areas previously used for farming. Weeds tend to grow in areas of disturbance, near roads and tracks, where a large range of park users tend to congregate.

Most weeds of concern in Namadgi do not spread by clothing, but are spread by other means such as wind dispersal or by animals eating the seeds/fruit. Those that do spread on clothing, are just as likely to be spread by bushwalkers, firefighters, park managers, vehicles, picnickers and the thousands of animals (native and feral). Most weeds have had 150 years to spread, particularly during the period of cattle grazing which occurred for more than a century.

Parking for events occurs on either regular surfaced parking areas or, with park permission, on former grazing land which is well drained and not unduly sensitive in other respects. Parking is supervised by our own parking marshals to ensure all parking is appropriate. Car pooling or bussing is an option we have used, and can use again where appropriate for larger events.

Heritage sites are not disturbed because event approval requires that courses avoid those sites, with control site coordinates proposed for events being checked by rangers against their sensitive sites register. Any adjustments are then made if requested. Toilet facilities for orienteering events are generally provided by OACT and at its expense through the hire of portable toilets. This is now standard practice for all but small events.

The Draft Plan seems to suggest that some Park users believe that orienteering will detract from their enjoyment of the Park. Any such concern we believe is overstated given the small number, size and duration of normal orienteering events. In terms of visual impact and any disturbance of natural tranquillity, the reality is that for normal events fewer than 100 runners and their parked vehicles are present for 3 or 4 days a year. Some of the areas where existing events are held or could be held include purpose-built car parks. Other areas are in open paddocks in locations already settled or disturbed by human use and approved by the Park on a case-by-case basis. All orienteering assembly areas are adjacent to main roads and well away from undisturbed and more scenic or remote areas.

While larger events might be superficially intrusive, these only occur once every 3 or 4 years on average, and there is the opportunity for orienteering and park managers to give advance notice of these events to other park users.

### **How the Draft Plan will Restrict Orienteering**

It is of great concern to OACT that the numeric and size restriction guidelines in Schedule 3 have a potentially fatal impact on major orienteering events, with the following implications:

- No Australian Orienteering Champs or equivalent national or international events could be held AT ALL in Namadgi (given the absolute limit of 600 participants per event in Zone 2 – *Recreation/Conservation*.)
- The potential clash with rogaining whereby the two sports would be unable to hold an event in the 400-600 participant size category in either of the two parts of Zone 2 in the same year.

In the ACT, the majority of the accessible granite terrain, for which Australian orienteering is renowned internationally, is located within Namadgi. There is no viable alternative terrain of comparable quality within 2 hours travel of Canberra. Consequently, the Park has been regularly used for major national and international events hosted by OACT. Some of these events (national carnivals held every 3 or 4 years on average) have attracted up to 1000 participants but

without any environmentally related complaints from the Park. If such carnivals could not occur in Namadgi, they would most likely have to be relocated to surrounding areas of NSW, with significant loss of tourism and economic benefits to the ACT.

## **Orienteering and the Park – Mutual Needs and Benefits**

### ***Orienteering Needs***

Namadgi National Park is used for organised orienteering events on no more than three or four occasions per year and these are mainly minor events that rarely attract more than 100 participants. The locations within the Park which are suitable for such use are dictated largely by suitable road and parking access; notably -

- Lower Orroral Valley;
- Glendale-Brandy Flat;
- Rendezvous Creek;
- former Mount Clear Station area; and
- Honeysuckle Creek;

and for possible future use -

- upper Orroral Valley;
- parts of the Grassy and Naas Creek areas west of the Boboyan Road; and
- former Boboyan Pines area (longer term use following rehabilitation).

These areas represent only a small proportion of the total area of Namadgi National Park.

Before the 2003 bushfires, two or three orienteering events were regularly held in the Park each year, averaging about 300 participants in total for most years. (This position, in relation to minor events, has now almost been restored). In relation to major events (with over 200 participants and some closer to 1000), these have been held in Namadgi only every 3 years on average: Orroral Valley in 1977, Mt Clear in 1984, Honeysuckle Creek in the 1980s and again in 2002, Corin Forest in 1987 and 1992 and Glendale in 2001. Major events have been spread across different areas of Namadgi, in order to maintain the sporting challenge of navigating in fresh areas.

It is vital to the future of our sport, especially in the ACT, that these sorts of events can continue to be held: they present the best standard terrain and events and sporting challenge to our members, as well as being the most significant source of our revenue as an amateur sport.

The value these national and international events bring to the ACT economy and to widespread recognition and appreciation of the Park itself totally outweighs any short-term compaction of open paddocks from parking. At the same time, OACT understands the common practice (eg in ACT Forests) of partial reliance by land managers on access fees which contribute to the maintenance of access roads and parking areas used by sporting groups.

### ***The Social and Economic Value of Orienteering***

Orienteering is one of very few sports which is organised so that all members of a family can participate at their own level in the same place at the same time. It is therefore particularly important as a family activity and this is certainly demonstrated in Canberra. The fact that orienteering is an organised sport does not mean that its compatibility with Park values and objectives should be judged any differently from any other activity.

As most orienteering events are held in natural areas such as Namadgi, they provide an excellent means of enabling people to appreciate the Australian environment. The fact that orienteering is

competitive for some participants does not devalue this appreciation. Ultimately the community will undervalue a national park that it fails to adequately enjoy and appreciate.

The opportunities to use the Park for orienteering are important also from a community health aspect. The health promotion aspects of orienteering are well recognised in the ACT, particularly by Healthpact (the ACT Health Promotion Fund), the Cancer Council and the ACT Bureau of Sport and Recreation which have been ongoing supporters of the sport for the past decade. Significant restrictions on orienteering in the Park would be inconsistent with all the good public education effort and result which the sport and its sponsors have steadily developed, and at a time of increasing public concern over childhood inactivity and obesity.

As mentioned, the economic and tourism benefits to the ACT from major events are considerable given that they generally attract well over 600 orienteers from beyond the ACT and Australia. A major national event in Namadgi would normally be the centrepiece of a carnival with several other events in other parts of the ACT.

### **The Need for Balance and Flexibility**

#### ***Proposals to Ensure Compatibility between Orienteering and Namadgi Objectives***

OACT wishes to continue to work cooperatively with Park managers on a flexible but principled basis, a basis which recognises that events can be designed, approved and managed in ways that allow both enjoyment of the sport and support for the values and integrity of the Park.

OACT is happy to canvass further opportunities for cooperative management of events to best meet park sustainability needs; eg:

- OACT to help longer-term planning by lodging forward event schedule proposals several years in advance, especially as regards larger events
- Car pooling and bussing options for larger events
- Park management contribution fees per event entrant
- OACT management and event organisers to hold a practical workshop with Park managers on best practice event design and management.

#### ***Recommended Adjustments to the Draft Plan***

OACT hopes that the final Plan will correct the assumptions and misperceptions that orienteering has significant adverse environmental impacts on the Park or its enjoyment by others. If there is any such evidence, it should be cited and sourced.

That said, OACT appreciates the rationale for almost all of the criteria listed in para. 38-100 on page 119 of the Draft Plan, for consideration when proposed events for being assessed for approval; such as availability of venues outside the park; capacity of the staging area (eg toilets, parking) and Park management oversight; likely environmental and cultural impacts; and safety of participants and other visitors.

However, we disagree with translating those criteria into arbitrary numeric restrictions on event and participant numbers in Schedule 3. OACT strongly believes that the improved management steps proposed in the preceding section will ensure that major events are run consistently with the Park's values and the objectives of the proposed Plan of Management. In this we are pleased that Schedule 3 itself recognises that park managers can exercise flexibility where there is a "willingness of event organisers to accept additional conditions to protect the park from impacts". This criterion should be added to the list on page 119.

For these reasons, orienteering should be deleted from Schedule 3 or treated in a way that involves adequate flexibility as regards the occasional larger national or international event.

### ***Follow-Up***

Orienteering ACT would be happy to discuss this submission further and will in any event continue to work to enhance both Namadgi and our careful and valued use of it. As mentioned, OACT officers would be happy to meeting with Park managers and/or the Namadgi Interim Board to plan for the future and to look at options which will continue to minimise our environmental impact on the park.

***For further information,*** please contact Bill Jones, president, Orienteering ACT, [bill.j@bigpond.net.au](mailto:bill.j@bigpond.net.au) , PO Box 402 Jamison Centre ACT 2614, w- 02 6256 8025  
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*[from Competition Rules for Orienteering Australia Foot Orienteering Events, 2005]*

## **Appendix 7: Environmental code of practice**

### **International Orienteering Federation resolution on good environmental practice**

At its meeting on 12/14 April 1996, the Council of the International Orienteering Federation, acknowledging the importance of maintaining the environmentally friendly nature of orienteering, and in accordance with the GAISF Resolution on the Environment of 26 October 1995, adopted the following principles:

- ~ to continue to be aware of the need to preserve a healthy environment and to integrate this principle into the fundamental conduct of orienteering
- ~ to ensure that the rules of competition and best practice in the organisation of events are consistent with the principle of respect for the environment and the protection of flora and fauna
- ~ to cooperate with landowners, government authorities and environmental organisations so that best practice may be defined
- ~ to take particular care to observe local regulations for environmental protection, to maintain the litter free nature of orienteering and to take proper measures to avoid pollution
- ~ to include environmental good practice in the education and training of orienteers and officials
- ~ to heighten the national federations' awareness of worldwide environmental problems so that they may adopt, apply and popularise principles to safeguard orienteering's sensitive use of the countryside
- ~ to recommend that the national federations prepare environmental good practice guidelines specific to their own countries

### **Orienteering Australia environmental code of practice**

#### **1. Introduction**

Orienteering is an outdoor sporting and recreational activity involving navigating cross-country with the aid of a map and compass. As the sport is based primarily on the use of natural landscapes, those who participate generally have a high level of environmental awareness and a desire to cooperate with landowners in meeting their particular requirements.

The sport is highly dependent on access to both private and public land to conduct events and the full cooperation of landowners and managers is vital for its ongoing growth. This Environmental Code of Practice has been developed to clearly demonstrate what is expected of both organisers and competitors.

#### **2. Purpose**

This Code of Practice is primarily intended to serve as a guide to organisers and competitors to ensure that our activities have minimal impact on both natural and constructed features of our competition areas. Secondly, it will provide a means by which both private and public land owners and managers can be informed of the steps that we take to avoid adverse impacts resulting from our sport.

#### **3. Statement of intent**

Orienteering Australia and its member associations are committed to ensuring that the sport of orienteering is conducted in a manner that is environmentally sound and in accordance with landowner requirements. Furthermore Orienteering Australia will ensure that organisers and competitors are made aware of this policy and the means by which it will be implemented.

#### **4. Orienteering Australia responsibilities**

4.1 Orienteering Australia will include this code of practice in the Technical Regulations governing the conduct of the sport of Orienteering within Australia.

4.2 Orienteering Australia will ensure the regular review and updating of the code. From time to time and in conjunction with the State Associations specific impacts will be monitored to ensure best practice is followed. The Federation and its State Associations will work with landowners to ensure the sport is conducted in an environmentally acceptable manner.

4.3 Orienteering Australia will encourage research, collate and disseminate information on the environmental impacts of orienteering.

4.4 The Orienteering Australia Director, Technical will be responsible for coordinating the implementation and monitoring of the code.

## **5. State Association responsibilities**

5.1 State associations and clubs must be conscious of the need to collect data on the impact of orienteering and to pass on any substantial or significant reports to Orienteering Australia. Studies may be commissioned by the State Associations or clubs using the skills of professional consultants.

5.2 Requests by landowners for studies to be undertaken should be welcomed and, providing funding is made available, every cooperation should be given to researchers to help them carry out valid independent studies.

5.3 Map files should be maintained and updated with copies of courses to assist with monitoring impacts over a period of time and to provide a reference for course setters to avoid overuse of control sites.

## **6. Event organisers' and controllers' responsibilities**

### **6.1 Area selection**

In selecting areas for orienteering the following points should be considered:

- Whether an area is capable of sustaining the scale of the proposed event without excessive impacts on the physical environment or conflicts with other users.
- Where seasonal sensitivities exist, for example, due to wildlife breeding, lambing or other rural operations or climatic extremes, schedule events in those areas to avoid sensitive periods.
- Once an area has been selected, regular liaison must occur with the relevant owner or manager to ensure their requirements are incorporated into planning for the event at an early stage. When necessary, relevant permits must be obtained and organisers must ensure that everyone associated with the event is aware of the conditions that may apply.

### **6.2 Access and parking**

- Consult with owners and managers on selection of parking and assembly areas.
- Check that roads and tracks are adequately formed for the number of vehicles expected. Adverse weather conditions must be considered.
- Clearly define prescribed routes across open areas and provide attendants to direct and control parking.
- Vehicles should not be parked in areas of long dry grass if there is a risk of fire caused by hot exhausts.
- Manage gate closure by signs or attendants.
- Ensure that stock are not adversely affected by the movement of vehicles or people.
- Car pooling should be encouraged.

### **6.3 Area management**

- Signs must never be nailed to trees because of the danger to felling and milling operations and also the risk of introducing disease into the tree.
- Secure permission to use pit toilets and agree siting. Portable toilets may be required in water catchment areas, areas of high public use, environmentally sensitive areas and on land where the management authority or owner does not permit pit toilets.
- Check whether fire restrictions apply and inform competitors of such restriction and of any precautions that are necessary. As a general principle, the lighting of fires at events should not be allowed and smoking should be discouraged.
- Assembly areas must be planned to ensure minimum impact on vegetation. Areas of concentrated activity such as adjacent to start, finish, results and food sales must be carefully located.

- Particular care should be taken when selecting the route to remote start points to avoid creating tracks through sensitive areas or areas which would take some time to recover.
- The finish chute area should be located away from steep, erodible slopes or areas of sensitive vegetation.
- All rubbish must be removed from the area. Competitors should always be encouraged to take out their own waste but adequate rubbish collection facilities must be provided. A thorough inspection of the area must be undertaken after the last competitors have left the area. All tapes to mark control sites or specific routes must be removed. The area surrounding water points on courses must also be carefully checked and cleaned if disposable cups or bottles are provided.
- Respect the rights of other users of an area when an orienteering event is in progress by sharing or, if practical, avoiding public areas and other facilities.
- If public announcement systems are used, design and locate these to minimise the spread of noise outside the assembly area.

#### 6.4 Course setting

- When setting courses in sensitive areas thought must be given to numbers of competitors passing or visiting a specific point. Control sites are an obvious example where care must be taken to minimize impacts but other areas to be considered may include obvious crossing points at fences or creeks, open marshes, mossy surface rock and soft earth embankments.
- In some cases, after consultation with land managers, it may be necessary to declare areas as 'out of bounds' because of management, security or privacy factors. An area may be undergoing regeneration or seasonal factors may dictate that the area should be avoided to prevent any risk of damage. Such restrictions need to be clearly communicated to competitors.
- On property containing stock or crops, owners must be consulted to determine what, if any, measures must be taken to avoid disturbance. Appropriate measures must be clearly communicated to competitors if courses pass close to such areas. Out of bounds areas must be clearly shown on each competitor's map.
- If the area contains known sites of natural or cultural significance which may be disturbed by the movement of orienteers, avoid placing controls on or near these sites or setting legs which would concentrate the movement of orienteers through them. (It may be counter-productive to mark such areas as out of bounds as this can attract undue attention to the sites).
- The property owner's requirements in regard to fence crossing must be communicated to competitors. In some cases it may be necessary to create and identify specific crossing points.
- If the area contains animals which flee rather than hide when disturbed (kangaroos, wallabies, sheep, wild pigs), endeavour to plan courses with a view to reducing continual disturbance to these animals. This may be done by having all courses follow the same general direction or by leaving parts of the area free of controls or obvious route choices.
- Some areas may contain sensitive surface rock that would be subject to damage by spiked shoes. If required by the relevant land managers, pre-event advice must be given to competitors that such shoes cannot be used.

#### 6.5 Competitors' responsibilities

- Read and adhere to organisers instructions.
- Pets and firearms must not be taken to events because of the restrictions that generally apply.
- Fire restrictions must be observed.
- Gates must always be closed unless there is a specific instruction otherwise.
- Report any damage to property to the organisers.
- Avoid spreading seeds and mud when cleaning your shoes and clothing. This can be done by cleaning them at the event site, provided that this does not spread material from an infested area on the course to a 'clean' assembly area. If cleaning at home, dispose of the material so that it is not spread elsewhere. Do not leave the cleaning until you arrive at the next event site.
- Avoid fauna and stock as much as possible. Cattle trapped at fence corners or in a confined area can stampede and should always be given a wide berth.
- Try to avoid disturbing wildlife. Keep a distance whenever possible to avoid stressing any animal.
- Remove your own rubbish. Do not leave it for the organisers to collect and take away. Drive and park as directed by the organiser. The organiser is responsible to ensure you do not cause damage by becoming bogged or by trampling sensitive vegetation or pasture.

- Wherever possible avoid damage to sensitive areas such as wetlands, marshes and soft earth embankments. Mossy rock surfaces should be avoided to prevent damage and also because they could be slippery and dangerous.
- Respect the rights of other users of the area such as walkers, picnickers, and of course resident land owners. Do not approach farm residences.

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**REVIEW OF RESEARCH INTO THE  
ECOLOGICAL IMPACT OF ORIENTEERING**

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June 2005

**SUMMARY:**

In its classic form orienteering is a sport which takes place largely off-track in terrain which often has conservation value. This gives rise to concern amongst ecologists that there is the potential for damage to flora and fauna. Although the experience of orienteers is that the ecological impact of their sport is low, it is necessary to prove/test this by scientific measurement in order to assist land managers and their advisers in making objective judgements affecting orienteering.

Research has been conducted in the three main areas of environmental concern, the trampling of vegetation, the disturbance of large mammals and the disturbance of birds. Reported studies that have come to the notice of the IOF are critically reviewed and, for each of the three areas of concern, are used to test the hypothesis that orienteering does cause significant long-term ecological damage.

The conclusion to be drawn from the general vegetation impact studies is that orienteering has low to very low impact with rapid recovery. With respect to sensitive vegetation, the sport takes precautionary measures and no evidence of significant long-term damage has been reported. The hypothesis is rejected.

With respect to the disturbance of large mammals the sport takes precautionary action and no evidence of long-term detriment has been reported. The hypothesis is rejected.

The disturbance of breeding birds is more problematic. Research information is very limited. Two studies indicate that 56 breeding species were unaffected by orienteers. One faulted study is unable to determine whether the reduction in a bird population was due to severe weather or orienteering, although precautionary action assumes the latter. There is no valid evidence of significant long-term damage to birds, to support the hypothesis. Whether there is sufficient evidence to reject the hypothesis is a matter of subjective judgement. Given the available evidence, the starting point for any discussion should be that the sport appears to be non-damaging to breeding birds.

**1. Introduction**

In response to increasing difficulties in obtaining access to countryside for sport and recreation in the United Kingdom, arising from perceptions of the potential for environmental damage, Sidaway (1991), in his guide *Good Conservation Practice for Sport and Recreation*, recommended that governing bodies become involved in research. Internationally, as well as in the UK, orienteering federations have responded to environmental pressures by commissioning, encouraging and collaborating in research into the ecological impact of their particular sport. Research has been conducted in the three main areas of environmental concern, the trampling of vegetation, the

disturbance of large mammals and the disturbance of birds. This report critically reviews all those studies referred to the International Orienteering Federation and which are considered to be of sufficient merit to make a useful contribution [15 studies in all]. Most of the studies are unpublished or published in journals with very limited circulation. This review is believed to be the first in which all these studies have been brought together and rigorously examined. For this reason they are considered here in more detail than might be usual, so that their contribution may be better understood.

For each of the three areas of concern the reported studies in this review are used to test the hypothesis, implicit in the application of the Precautionary Principle, that orienteering does cause significant long-term damage. Evidence of significant long-term damage will be sought in order to accept the hypothesis....

### **2.2.1 Trampling of lichen on rock in Australia**

At the instigation of the Western Australia Department of land Conservation and Land Management a study was set in place to determine the impact of orienteering on lichen-covered rocks (Moore and Tacey 1987). A low outcrop of lichenose granite was chosen for the test and a control point placed so that the natural direction of approach by the orienteers was across the outcrop. The lichen cover was assessed over an area of 40m<sup>2</sup> before and after the event. A total of 30 competitors passed through the control.

The researchers noted the area of crusteose lichen disturbed and rated the degree of disturbance on a scale from foot imprints being visible to bare substrate being exposed. They concluded that less than 1% of the lichen had been disturbed and that a relatively rapid recovery was expected due to its small extent and the high density of surrounding lichen.

The study appears to have been conducted with meticulous detail. However, it has one weakness, in that the competitors were not observed at the test site and that it cannot be confirmed that all 30 competitors passing through the control also passed across the monitored area, although this is highly likely. This work gives a result not inconsistent with that reported above by Kardell (1974) despite the very great biogeographical separation. He suggested a limit of 50 competitors across lichenose rocks before damage becomes visible. In this case a close inspection after 30 competitors shows less than 1% damage. Since the percentage damage at the threshold of visibility is not stated in either work, the correlation between them cannot be precisely stated.

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