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## IMPACT OF SKI RUNNING AND SKI ORIENTATION ON THE ENVIROMENT

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### ABSTRACT

The purpose of this study is to demonstrate the existence of environmental problems in ski sports. They must not disturb its environmental sustainability and be realized under optimal conditions of the environment.

The results obtained unequivocally reveal weaknesses in organizing and conducting winter sports events. Optimization suggestions have been formulated which could help organizers and contestants.

Conclusion: The combined efforts of various institutions are needed to increase the popularity and awareness of these sports, which need to be realized under optimum environmental conditions and not to disturb its environmental sustainability. This necessitates an up-to-date environmental policy and education aimed at future development in this direction.

**Key words:** ski sports, environmental sustainability, combined efforts.

### INTRODUCTION

Winter sports are gaining increasing popularity in recent decades among the population through its emotionality, a wide variety of mountain relief and ecosystems. Ski-sports hold an important place and are a favorite pastime for many people.

Interest in the sports discussed has increased progressively over the years, covering people of different age groups.

The purpose of this study is to discuss environmental issues in ski sports. The study includes a description and analysis of the general and specific scope in organizing and conducting these sports.

The results obtained reveal weaknesses in the organization and conduct of winter sporting events. Optimization suggestions have been formulated that could help organizers and competitors.

Conclusion: A concerted effort by different institutions is needed to increase the popularity

and awareness of the sports commented on, which will be implemented under optimal environmental conditions and will not impair its environmental sustainability. This requires an up-to-date environmental policy and education aimed at future developments in this direction.

Winter sports: cross-country skiing, orienteering, alpine skiing, ski jumping, biathlon, cross-country skiing, snowboarding, bobsled, sledding and more, have been gaining in popularity in recent decades among the population through their emotionality in various forms of relief, the character of the area and the great diversity of mountain ecosystems.

Skiing plays an important role and gaining popularity. As a favorite activity of many people during the winter season. They have a strengthening effect on all organs and systems of the organism and increase their sports performance. Skiing sports have an educational, healing and social importance to practitioners. Pursuing clean mountain air in various extreme atmospheric conditions has an impact on the human being. The development of skiing goes a long way in evolution. It starts when hunting was a major livelihood, goes

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back to the time when skis were used in war and reaches a period when they are a means of physical activity and sport.

Cross-country skiing and orienteering have a completely different effect on the environment than ski alpine disciplines, which are performed on restructured natural slopes. Ski lifts, ski slopes and walkways, which in most cases must not be restructured but only cleaned of stones; trees and shrubs are required for the discussed sports in order to be able to apply the said winter sports.

Cross-country skiing uses ski trails, made in the snow in the low to mid-altitude mountain valleys or flat stretches, allowing complete expression of the functional training of practitioners. Cross-country skiing includes two styles of movement - classic and skate. When using the classic style, there must be ski trails for the better movement of practitioners. This „soft” sport, which hardly needs any infrastructure, can nevertheless conflict with the conservation of the natural environment when practiced in the wrong place. The main problem with skiing is the choice of terrain. Specialized processing equipment makes cross-country ski runs in the snow, which is marked, maintained and protected from hazards (avalanche-dangerous areas). The conditions on the ski slopes can be changed quickly (e.g. wind, rain, snowfall, air temperature, and light), which requires continuous control. All stretches of mountain lowlands or valleys are potentially suitable for the pursuit of this sport until natural barriers occur (dense forests, rocks, rocks, marshes, open areas, areas prone to avalanches, and steep and specific sections) or artificial objects (road, clearing, intersection with bridge, tunnel, stone wall, special artificial object, shooting range, permanently prohibited crossing areas, etc.).

Modern ski orienteering is a sport in which a competitor (ski orienteer) uses a map to navigate a network of ski trails or a road network in a specified order to pass a certain number of checkpoints. In ski orientation, the skills for skiing and orienteering must be built in such a way that the skills become a decisive element (1).

Ski orienteering is a „soft“ form of skiing that hardly needs any infrastructure, but can still run into potential environmental conflicts with

nature conservation when practiced in the wrong place.

The race route is the set of all checkpoints placed on the terrain through which the competitor must pass in a mandatory sequence. The route information is drawn only from the specialized topographic map which the competitors get at the start with the aforementioned route. Symbols used in the ski orientation maps are earth forms, rocks, and stones, water and marshes, open areas and vegetation, artificial objects. The selection of a specially prepared competitive route is particularly important for ski orienteering (1). The presence of four types of ski trails, as well as the fact that racers have to constantly monitor their location, greatly differentiate the athletes motor activity in orienteering from that of cross-country skiing and biathlon. The ski trails are of the following types and are marked with green colour: speed trails over 3 meters; speed trails up to 3 meters; fast ski track - 1.2 meters wide; slow ski trail - 0.8-1.0 meters wide (1).

**Biathlon** is built on the basis of two sports - cross-country skiing and shooting. In many countries, skiing is a military-applied sport and undergoes various stages of development, which creates the preconditions for the future formation of the classic biathlon. As a sport, the biathlon in Bulgaria has its origins in military-applied disciplines in the form of „military patrol“. It can be considered that the beginning of the development of biathlon in Bulgaria is set in 1970 (2).

The race track must be positioned in relation to the firing range so that the sections are constructed according to the requirements of the track.

The climbs in this sport are classified into three main groups: climb on a slight slope, climb on a medium slope and climb on a sharp slope (heavy stretches) (3).

Biathlon shooting is associated with a number of additional factors that affect the accuracy of hits. Unlike sports shooting, where shooting is carried out in indoor and outdoor shooting ranges, in standard biathlon, it takes place outdoors in winter, with constantly changing meteorological factors (wind, air temperature, light, and light) (1).

**Skiathlon** is a new sport discipline on a ski-oriented marked route, with a selection of checkpoints drawn on the map compared to the total number of checkpoints placed on the track. The choice of terrain is essential for the skiathlon. The skiathlon is held on the territory of the stadiums for cross-country skiing and biathlon or in another area with ski infrastructure.

The potential environmental conflicts posed by these two „soft“ forms of ski sport are relatively small compared to those of alpine skiing, excluding secondary effects (such as the use of motor vehicles). Potential conflicts with nature conservation are limited to those several areas in which skiers violate the habitats of plants and animals that are subject to protection (4). Other potential conflicts (such as damage to young shrubs and trees in forest plantations or disturbance of cloven-hoofed ruminants and non-ruminant mammals) are predominantly of an economic nature (5).

The potential for the disturbance of rare species (especially birds) arises from activities that disturb the affected animals or expel them from their habitats. Where animals cannot be moved to an appropriate asylum, the existence of entire populations may be jeopardized (6).

There are 405 bird species found in Bulgaria. This is more than half of Europe's 760 species. Of the world's endangered birds, 29 species have been identified. In the Red Data Book of Bulgaria, the list of endangered birds includes 164 species after its update in 1988. It is forbidden to pursue and disturb them, spoil their nests, collect and destroy their eggs and their offspring.

The diversity of birds is determined by the geographical location of the country and the different habitats in Bulgaria: the open sea, the sea coast, sand dunes, high mountain cliffs above the forest boundary, combined with mountain lakes, steppe-like terrain, deciduous, mixed and coniferous forests, claw-shaped forests, high mountain meadows. In all these places there are peculiar complexes of birds (7).

The main ecological problem caused by ski running and ski orientation lies in the possible disturbance or expulsion of partridges. We will pay particular attention to the sensitivity of the capercaillie, hazelnut, black grouse and snow partridge. They are all of the Pheasant family

and are seriously endangered (exist only in small, isolated communities) and definitely need protection. We, therefore, consider it necessary to provide more detailed information on the characteristics of the birds mentioned above.

**Capercaillie** (*Tetrao urogallus*) is included in the Red Data Book of Bulgaria as an „endangered“ species, with a total population of around 2000. It is the largest hen-like bird. Its typical habitats are pure white-tailed or mixed coniferous forests with spruce and fir.

It prefers rounded ridges and slopes, with small clearings, often with damp soil. The capercaillie is a herbivorous bird. It feeds on buds and leaves of white pine, spruce, beech, blueberries, raspberries, and seeds. Sometimes it also eats insects, molluscs and other invertebrates. The main negative factors affecting the capercaillie population are the deterioration or loss of its habitats, poaching, and disturbance during the winter and breeding season. At this stage, Pirin National Park is one of the most important places for the conservation of the species in Bulgaria (8).

This species requires open, airy forests with rich and well-developed vegetation on the ground (with low shrubs, dwarf shrubs and soil cover) where birds seek food and shelter. However, when the land cover is scarce, one can disturb the habitat of the capercaillie from a long distance (5).

The **hazel grouse** (*Tetrastes bonasia*) is an endangered species, extinct in many places in Bulgaria, protected by the Biodiversity Act. In Pirin, it is scarcely found in the Banderitsa forest belt above 2000 meters above sea level, in the reserve „Bayovi Dupki – Dzhindzhiritsa“.

It prefers mountain slopes, rarely reaching the upper limit of the forest. It inhabits mostly deciduous and mixed forests with diverse slopes, often near rivers and streams. The species is not globally endangered, but it may be diminished as it is very sensitive to changes in habitats, especially with current forest use trends (8).

The hazel grouse is sensitive to external disturbances but reacts with even greater sensitivity during the breeding season and raising its young.

A pair of hazel grouse requires at least 30 hectares of habitat (DSV 1995) (9).

While partridge species adapt to the harsh winter conditions, hazel grouse can be endangered, with skiers in their activities severely limiting their choice of habitat in winter. This type of bird can be significantly reduced (severely deficient), the more they have to escape from danger or have only limited food options.

**Black grouse** (*Tetrao tetrix*) is one of the endangered species of birds that have disappeared from the territory of Bulgaria. This bird requires areas and places in mountain ranges with low altitude with stable vegetation, meadows, wetlands and marshes. The few remaining as a number of surviving individuals are also threatened by external disturbances. The most serious disturbances are caused by the desire of people to go outdoors and have fun (skiers for example), entering the habitat of the black grouse, and disturbing the birds. This forces them to hide or interrupt their normal routine activities, but not make them leave their habitats) or force them to abandon their traditional habitat and seek another, less suitable biotope. A human passing only 200 to 300 meters to a black grouse causes the bird to fly away (9).

**Rock ptarmigan** (*Lagopus lagopus*) is one of the endangered bird species that have disappeared in Bulgaria. Now lives predominantly in the higher parts of the Alps (between 1800 and 2400 m). In its case, their „partners in conflict“ are not cross-country skiers and orienteers but alpine skiers (6).

#### **In order to conserve biodiversity**

When considering the disturbances that can be caused by skiing, we need to distinguish between the types of routes:

- arising from the cross-country ski track and passing through the endangered species biotope;
- arising from the skiers, who leave the slopes, skiing on natural terrain (4).

The biggest issue with cross-country skiing is whether certain trails will be made to protect the natural areas. Some of the race tracks are already entering cities and parks. The ski slopes cannot pass through the habitats of the partridges. The same applies to other environmentally valuable and sensitive areas. In areas under strict protection, designers should carefully choose ski slopes or ignore

them completely to avoid focusing on sensitive areas. Already established and existing ski runs must have the infrastructure in place with all requirements.

In the planning of the ski slopes, consideration must also be given to the following circumstances, which are dictated by environmental policy:

- connecting the tracks to the public transport network: The runway and its systems must be connected to the public transport network (train and bus) or be easily accessible to public transport by other transport services.
- the infrastructure for skiers (restaurants, sanitary units, wardrobes, parking lots) must be integrated into the existing infrastructure of the villages and towns in the area (9).

Cross-country ski runs, like cycling lanes, are an important element in „soft tourism“ and therefore deserve support from environmentalists and those who are involved in nature conservation. People can fulfill their physical activity needs through these, provided they follow the measures outlined here to avoid environmental stress and protect the landscape at the same time.

#### **Ski orienteering**

In areas that provide a habitat for capercaillie, skiers will need to be appropriately guided to a specially prepared competitive route (having a specialized topographic map) that can be modified to protect endangered partridges. Mandatory and forced restrictions affecting skiing will be necessary, in the places used in winter by the capercaillie for their survival. The German Alpinists Association, which works together with representatives of sports and environmental organizations, organizes an information campaign titled „Conducting ski orienteering in an environmentally friendly way“, which presents and explains the necessary measures for the destination of the visitors by the ski operators. The following principles form the basis of this initiative:

- the ski tours should continue to be allowed in all major regions;
- tourist routes that are particularly popular must remain intact (as far as ecologically possible);
- measures must be taken to ensure that partridges survive even in harsh winter conditions;

• neighboring populations of Capercaillie cannot be detached from each other (10).

Maps have already been created for some areas indicating the ecological routes. Calls were made to the travel card publishers to include some changes to the routes, according to the specific environmental conditions.

### CONCLUSION

Interest in the sports discussed has increased progressively over the years, covering people of different age groups. There is a need for concerted efforts by different institutions to increase the popularity and awareness of these sports, which will be realized under optimal environmental conditions and will not impair its environmental sustainability. This requires an up-to-date environmental policy and education aimed at future development in this direction.

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