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Preliminary assessment of the environmental impacts of the Zakopane 2006 Winter Olympic Games proposal

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Abstract. A bid is being prepared to hold the 2006 Winter Olympic Games in Zakopane in Poland in 2006. In its current form, the proposal threatens to degrade significant natural values and cause environmental disruption. Polish law prohibits organised sport activities in a national park. Yet as part of the Olympic bid, several such organised events are being proposed for the Tatra National Park, including most of the downhill skiing events. As currently formulated, Poland's Winter Olympic Games proposal should be withdrawn from consideration by the International Olympic Committee on the grounds that it fails to meet environmental standards not just under Polish law, but also those now accepted internationally, such as the Europe-wide recommendations of the Federation of Nature and National Parks of Europe (FNPPE) which unambiguously reject the possibility of holding Winter Olympic Games and related organised sports events in and around national parks.

Key words: Winter Olympic Games, Zakopane, Polish Carpathians, Tatra National Park, Environmental Impacts

Introduction

Environmental considerations must now be given due regard by Winter Olympic Games organisers (Watanabe *et al.* 1990; Janiga *et al.* 1993; Heukemes 1993). Poland's proposed bid for the Zakopane 2006 Winter Olympics must also take environmental considerations into account. This paper reports on a preliminary assessment of environmental implications ofthe Polish Winter Olympics´proposals, undertaken by a team from the Polish Academy of Sciences, Institute for Nature Conservation (Witkowski *et al.* 1997a; 1997b). The terms of reference for cities proposing to organise Olympic events prepared by the International Olympic Committee (IOC) were used to guide the assessment (IOC 1994). The assessment has not been made public as yet and there has not been public discussion on the environmental impacts of the Winter Olympic Games proposed for Zakopane - despite demands for such debate by an NGO-Coalition Save the Carpathians´ led by the National Parks Unit of the Polish Ecological Club (PKE) (Sawicki and Machalica 1997).

The environmental assessment completed is by definition preliminary and incomplete as the proposed events and associated infrastructure development are still in their initial planning phase. According to Zwiastun (1996), initial proposals for Winter Olympic Games events are as follows:

Event	*Location*
Ice hockey	Kraków and Nowy Targ
Speed skating	Zakopane
Short track skating	Kraków and Zakopane
Alpine skiing	Tatra National Park, including downhill, slalom and giant slalom on the slopes of Kasprowy Wierch, special slalom and parallel skiing on the slopes of the Nosal
Snowboarding	Szczyrk - the slopes of Skrzyczne
Freestyle skiing	Poronin
Curling	Kraków
Biathlon	the slopes of Skrzyczne, Kościelisko-Kiry, the so-called military route
Ski jumping	Zakopane-Krokiew ski-jump
Cross-country skiing	Three proposed tracks in the Cyrla (90% of the route within the Tatra

National Park), other routes under the Krokiew or on Butorowy Wierch Norwegian comb.Szczyrk as analternative and Zakopane) Toboggan, bobsled Szczyrk and Bielsko, alternates-Krynica orSzczawnica

For the purposes of environmental assessment it is important to consider not only the events themselves, but also related infrastructure development including location of the Olympic village, new hotels, as well as new or upgraded transportation routes. In accordance with IOC recommendations, specifications of all developments must be approved in advance of the Olympics. Approval requires that at least one international event and several national ones are held at the proposed sites. Moreover, IOC requires guarantees from organisers that Olympic developments will be used on an ongoing or long-term basis and so require a program of national and international events planned for the site in the years following the Olympics. Once this information has been assembled a formal environmental assessment can be undertaken.

Potential impacts on natural values

The Zakopane Winter Olympics are to take place in an area predominantly in the Western Carpathian Mountains defined by the peaks of Szczyrk in the Beskid Śląski Mountains to the south-west, Zakopane and the Tatra Mountains to the south, Krynica in the Beskid Sądecki Mountains to the south-east and Kraków to the north (Fig. 1). This ´Olympic Quadrangle´links the cities of Kraków, Nowy Sącz, Zakopane and Bielsko-Biala.

The Polish Carpathians are distinctive in terms of natural and biodiversity values. These are well documented and protected by a range of protected areas. The Olympic Quandrangle´includes: four national parks - Babia Góra, Gorce, Pieniny and Tatra, sixteen nature reserves in the Bielsko region alone and a further twenty-eight nature reserves in the southern part of the Kraków region and the southern part of the Nowy Sącz region, two landscape parks - Żywiecki and Popradzki (Denisiuk 1993; Mirek 1996; Sawicki and Machalica 1996). Two of the national parks - Tatra and Babia Góra - are also UNESCO World Biosphere Reserves. Plans are under way to designate additional protected areas in the area, notably the Orawski National Park and landscape parks in Beskid Śląski and Beskid Mały and several nature reserves (Figure 2).

Regionally, nationally and internationally significant natural habitats have been identified and are being documented in the area as part of Europe-wide habitat inventory programs, such as CORINE. The areas identified as significant coincide only with existing protected areas as they relate to habitats and species threatened on a continental scale. Examples include enclaves of mature Carpathian forest ecosystems with primeval characteristics in the Beskid Śląski, Żywiecki and Sądecki, as well as relatively undisturbed river valleys and wetlands. CORINE habitats include also streams and rivers characterised by high water quality and rich biodiversity and special habitats, such as caves which are important for invertebrate fauna and wintering sites for bats. Conservation of these areas as relatively undisturbed ecosystems is important for maintaining ecological balance in neighbouring areas. Mountain forests and wetlands, for example, serve important functions in maintaining hydrology of whole watersheds (Dyduch-Falniowska *et al* 1994).

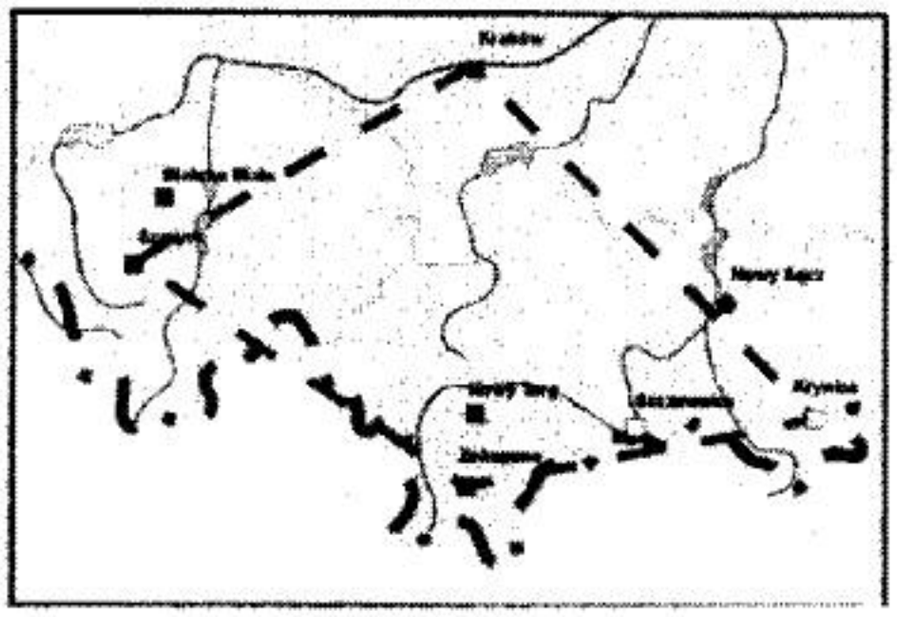

Fig. 1. Proposed 'olympic quadrangle' of the Winter Olympic Games - Zakopane 2006.

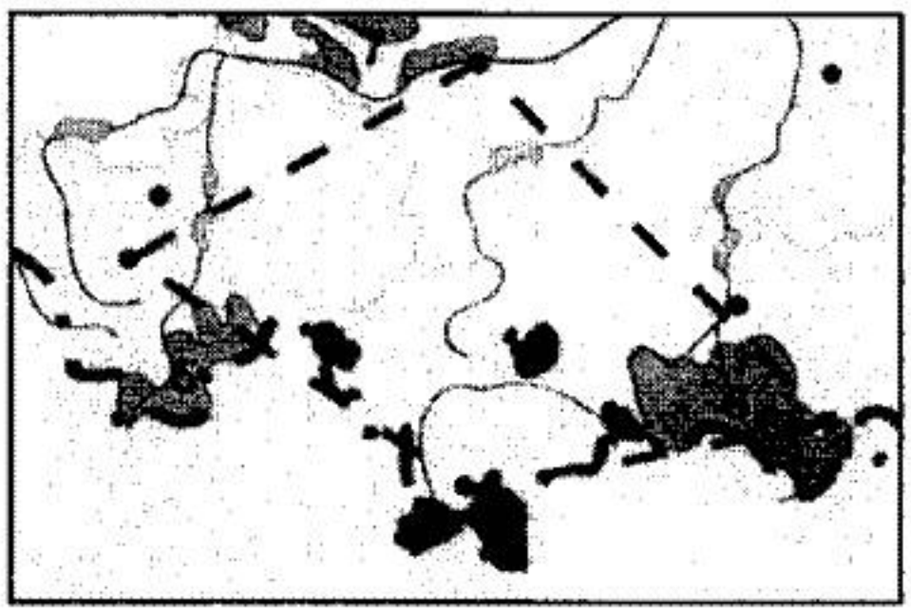

Fig. 2. Existing nature protected areas in the frame of 'olympic quadrangle': 1 - Tatra N. P., 2 - Pieniny N. P., 3 - Gorce N. P., 4 - Babia Góra N. P., 5 - Żywiecki Landscape Park, 6 - Popradzki Landscape Park, 7 - Group of Jura Landscape Parks.

An ecological nodes and corridors network has been proposed for Poland as part of the European ECONET initiative and contribution to implementation of the Pan-European Strategy for Biodiversity and Landscape Conservation developed by the Council of Europe and adopted by the European Environment Ministers in 1995 in Sofia (Liro, 1995; Council of Europe, 1996). The ECONET proposal identifies nodes of high species diversity, habitat and landscape significance and corridors that link them together, preventing their isolation. The area proposed for the

Winter Olympic Games includes six ECONET nodes and four ecological corridors.

The Tatra Mountain ecosystems are the most significant area in terms of biodiversity and natural values. They have been identified as highly significant as CORINE sites, nodes in the ECONET system, an international UNESCO World Biosphere Reserve and are protected as a national park. The largest threat posed by the Winter Olympic proposals is to the habitat, landscape and biodiversity values within the Tatra National Park. This is because the alpine skiing events are proposed to take place within the national park around Kasprowy Wierch and Nosal, with ski jumping in Krokwie and cross-country skiing in the Cyrla area on the boundary of the national park. The Kasprowy Wierch area constitutes the very heart of the Polish Tatras, forming a bridge between the Western Tatras and High Tatras comprising the Gąsienicowa Valley - with Kasprowy Wierch - the Kuźnice area, Kasprowa Valley, Goryczkowa, Sucha Kondracka, Świńska and Suchy Wierch. Here the Tatra National Park is at its narrowest - Kasprowy Wierch Peak is separated from the urbanising area of Zakopane in Kuźnice by only 4 km.

It is worth noting that construction of the cable car to Kasprowy Wierch Peak in the 1930s led to the resignation of the National Council for Nature Conservation in 1935 which was overruled. In the post-war period, operation of the cable car has created an intense pressure in the Kuźnice-Kasprowy Wierch region causing significant environmental degradation in the national park's core natural area (Skawiński, 1993). The area remains an important habitat for the forrest fauna with areas above the treeline serving as refugia for isolated Tatra populations of chamoix and marmots. Experience from elsewhere suggests that there is little question that intensification of skiing activity and associated development will impact these sensitive ecosystems (Cernuska 1986; Hammelbacher and Muhlenberg 1996; Haslett 1988, Kopeszki and Trockner 1994; Lajczak *et al.* 1996; Miquet 1990; Tsuyuzaki 1994; Zeitler 1994).

The Winter Olympic proposals foresee skiing infrastructure development and more intense ski use in the vicinity of the Tatra core area around Kasprowy Wierch. This will not only contribute directly to degradation of the national park's core area, but will likely also create an ecological barrier spearating the West Tatras from the High Tatras on the Polish northern side thereby fragmenting the Tatra Mountain ecosystem.

Barriers to sustainable development

The area proposed as the main location or focus for the Winter Olympics is surrounded by several urban areas lying within hundred kilometres - to the East is the Ostrava urban-industrial area of the Czech Republic, to the Northwest is the Upper Silesian Industrial Area - Central Europe's largest urban-industrial complex with Kraków lying to the north. Other major urban centres such as Bratislava, Budapest and Vienna are fewer than 200 km away.

Transportation infrastructure proposals anticipate growing north-south transit traffic and related upgrading and construction of transit routes through the Carpathians (Ruder 1996). The first of these is to run through Cadca in Slovakia to Zwardoń on the Polish-Slovakian border and further on Żywiec and Bielsko in Poland cutting through the West Carpathians and isolating the Beskid Śląski from neighbouring Beskid Mały and Beskid Żywiecki. The second route is to run Eastwards from Cadca to Chyżne on the border and then on to Kraków, isolating the Orawa and Babia Góra Mountains from the Tatra massif to the East. The road proposals are scheduled to be built prior to the Winter Olympics and will also likely disrupt Carpathian ecosystems (Cichy-Pazder and Witkowski 1995).

The area between Kraków and the Tatras is rapidly urbanising and is already intensively used for agriculture and industry. Environmental assessments published by the State and Voivodship Environmental Inspectorate indicate heavy water, air and soil pollution in the area, suggesting limited capacity for additional development associated with the Winter Olympic Games (WIOŚ 1994a,b,c,d, 1995). Surface water resources are poor quality due to chemical and bacteriological contamination caused by lack of adequate sewage and effluent treatment facilities, air pollution, inappropriate tillage practices.

Several local municipalities such as the Zakopane, Biały Dunajec, Szaflary, Nowy Targ are all known to have been responsible for illegal discharges into streams and inappropriate solid waste disposal. Indeed, few urban areas are served with adequate sewage treatment, as the majority of facilities are old, overloaded and do not meet current treatment standards.

An additional concern for the Podhale region is that a broad range of environmental impacts is being further exacerbated by urbanisation. For example, sulphur dioxide deposition in the Tatras is classed as having a significant environmental impact, ie. 20-50 g SO_2 (Posch *et al.* 1997). A pollution index calculated on the basis of accumulation of nine heavy metal elements in mosses in the mid-1970s for the Tatra National Park classed the park the fifth most the polluted among the twelve national parks assessed (Grodzińska 1978, 1985). A decade later, the Tatra National Park was classed as one of the top three most polluted national parks in Poland (Mirek 1996). The increase in pollution impact in the Tatra National Park is indicative of an overall increase in air pollution impacts across the Western Carpathians.

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that the area proposed for the Winter Olympic Games is already at the limits of environmental carrying capacity and further mass tourism development is undesirable without significant investment in environmental protection infrastructure. Tourism development should be limited in such areas as Zakopane and Szczyrk and not be promoted as an economic development solution for the area as a whole (WIOŚ 1994a,b,c,d).

Legal constraints to Winter Olympics sites proposed for Zakopane

The sites proposed for Olympic events have varied legal status:

1. Tatra National Park (skiing events in the Tatra National Park and its buffer zone) is an area of the highest level of nature protection in Poland.
2. Popradzki Landscape Park (proposed for toboggan runs in Krynica).
3. Beskid Śląski Forest Promotion Complex and Żywiecki Landscape Park (skiing events in Szczyrk and Bielsko).
4. Buffer zones of national and landscape parks (Skalne Podhale and Krynica).
5. Other areas are subject to land use planning regulations (events in Kraków and Nowy Targ).

A nature protection designation is based on applying the appropriate category of protection to safeguard the habitat, landscape and biodiversity values of an area. Once applied, the designation is thus not subject to renegotiations to accommodate some additional development interests as the designation process itself served to balance development and national nature conservation interests. The legal status of the Tatra National Park is set forth in the following legal statutes and documents:

- Nature Protection Act (16. 10, 1991, Journal of Laws 114, pos. 492)
- Decree of the Council of Ministers (30. 10. 1954 on the creation of Tatra National Park, Journal of Laws, 1955, No. 4, pos. 23).

The Nature Protection Act unambiguously defines the goals and objectives of a national park:

- Article 14.2 states that 'All activities taking place within the national park must conform to the goal of nature protection and nature protection activities have precedence over all other activities'.
- Article 14.3 states that the 'overarching goal of a national park is to understand and protect the total natural system on the designated area and restoration of degraded or otherwise rare centres of native natural values',
- Paragraph 3.1 'Within a national park... human activities and all economic activities, their character, scope and form must be rigorously matched to the needs of nature protection and be consistent with its goals'.

UNESCO designation of the Tatra National Park as part of an International Biosphere Reserve places additional obligations on Poland related to co-ordinating nature conservation activities of both the Polish and Slovak Tatra national parks (Denisiuk 1993). In the early nineties, the Slovak Government bid to hold a Winter Olympic Games in the Slovak Tatras in 2002. An environmental assessment undertaken by a team from the Tatransky Narodny Park (TANAP) criticised the Winter Olympic proposals and argued that the Biosphere Reserve designation required consultation with the Polish side (Janiga *et al.* 1993). Although there is no mandatory or legal requirement to consult and secure approval from the Slovak Government for the Winter Olympics bid, the Biosphere Reserve designation makes such consultation desirable as both Poland and Slovakia wish to demonstrate to the international community that they will fulfil their international obligations in programs such as the IUCN Parks for Life, European Union directives on habitat protection and the Pan-European Biological and Landscape Conservation Strategy (IUCN 1994; European Commission 1996; Council of Europe 1996).

Conclusions

The desirability of the Zakopane Winter Olympics must be assessed in terms of tourism-related social, economic and sport-related factors set in a regional context, as well as in terms of environmental impacts on conservation values (Long 1993; Nelson *et al.* 1993; Nelson and Serafin 1997). It is worth remembering, however, that the primary values of the Tatras and Carpathians are the natural, biodiversity and landscape values that already attract millions of tourists annually. Human impact is already very strong, even in strictly protected areas such as national parks. For example, a result ofintense human use is the transformation of 39.4% of the natural vegetation and soil cover of Kasprowy Wierch Peak with 12.9% removed completely (Skawiński 1993). The impacts of downhill skiing in the region of Kasprowy Wierch, Pilsko or Skrzyczne are becoming ever more apparent in terms of extensive damage to vegetation and soil cover, reduction in forest cover and forest damage, loss of rare of threatened plant and animal species (Skawiński 1993; Łajczak *et al.* 1996; Widacki pers. com.).

Uncertain winters and lack of winter snow cover have intensified environmental impacts still further as the ski lobby has campaigned successfully for artificial snow-making on many ski runs (Łajczak *et al.* 1996). Undoubtedly securing sufficient snow cover will be one of the main challenges for Winter Olympic organisers and the major barrier to running successful downhill skiing events. This situation will put increasing pressure for artificial snow-making, and thereby threatening addi-

tional environmental impact linked to disruption of hydrological systems through appearance of retention ponds in forests, further water abstraction from streams and rivers and development of water supply and transfer installations within protected areas.

Even a cursory analysis suggests that the infrastructure needs for high performance downhill skiing simply cannot be met without significantly impacting the natural resources and values of the Tatra National Park. In any case, Winter Olympic events cannot be held within the Tatra National Park as these would conflict with the national park's statutory goals. Sports events proposed for the Popradzki Landscape Park (tobogganing and bobsleigh) are permissible, as long as they do not degrade the natural, historic and cultural values of the park and as long as the event itself and the associated developments conform to the management plan of the park. An environmental impact assessment of specific proposed developments is required prior to any construction or development. On the contrary, degradation of nature resources protected by national parks is likely to translate to environmental and economic disruption in the broader region (Mc Neely 1995; Nelson and Serafin 1997).

Proponents of the Winter Olympic Games have argued that the Games will contribute to accelerating the solving of various environmental problems as national funds and international investment will be mobilised for upgrading infrastructure. Be this as it may, the impacts on the natural and biodiversity values of the Tatras are unlikely to be alleviated by additional environmentally-oriented investment.

Preliminary environmental assessments reviewed in this paper have not focussed on economic analysis of the Winter Olympic proposals, but given the substantial potential environmental impacts costs of environmental remediation and restoration are likely to be significant - indeed, so much so that they are likely to make the whole undertaking questionable. Experience from sites of previous Winter Olympics corroborates this view (Deviers 1993; Watanabe *et al.* 1990). In recognition of the undesirable impacts of Winter Olympics and other sport events in mountain areas, the Federation of Nature and National Parks of Europe (FNNPE) has formulated a set of recommendations for action in mountain areas as follows (Heukeemes 1993):

41. Winter Olympic Games and other major winter sports events should not be held in protected areas. They should not take place in adjacent areas or peripheral zones unless binding assurances are given to minimise environmental impact and to give environmental issues a high priority.
42. No new developments for Winter Olympic Games or other major winter sports should be built near protected areas. Where there are existing facilities, consideration should be given to their use by means of split-site and multi-national games to avoid new development.
43. Where Winter Olympic games or other major sports events are proposed in the vicinity of a protected area, representatives from the protected area must be fully involved in all proposals from the earliest possible stage and before any decision is reached. The proposals must include a full environmental assessment. If an event is planned the Organising Committee should immediately set up an Environmental Commission that includes a representative from a protected area.
45. Protected area managers need advice on how to respond to Winter Games and other major sports proposals. Better information channels are needed to enable previous experience about the impact of winter sports developments to be used effectively.
46. The number of people carried by existing mechanical lifts in and around protected areas must be regulated in relation to carrying capacity of sensitive areas.

Unless Winter Olympic proponents can demonstrate possibility of meeting FNPPE recommendations - which they clearly cannot - Poland's Winter Olympic Games proposal should be withdrawn from consideration by the International Olympic Committee on the grounds that is fails to meet environmental standards not just under Polish law, but also those now accepted internationally. Three fundamental obstacles stand in the way of achieving this:

1. The area proposed for the Winter Olympic Games in Zakopane contains habitats, biodiversity and landscapes of regional and European significance which will be degraded should the event be held as there are no alternatives to downhill skiing in particular beyond protected areas.
2. The area proposed for the Winter Olympic Games is at the limits of environmental carrying capacity due to escalating impacts of urbanisation, lack of pollution control facilities and inappropriate land uses. Further intensification of tourism and sports development in the area as proposed by Winter Olympic proponents threatens to further intensify environmental degradation.
3. Polish law prohibits organising Winter Olympic events in the Kasprowy Wierch area of Tatra National Park. Events proposed for other categories of protected areas (landscape parks) and unprotected areas require detailed environmental impact assessment prior to any go-ahead decision.

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