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TECHNIQUES AND STRATEGIES

A study on the preservation of the Tatras region and the plans to hold the 2002 Winter Olympics in northern Slovakia

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Abstract. This study reviews the effects of the Winter Olympic Games (of 2002) on the environment of northern Slovakia. We show that the Olympics will have an adversal effect on the most valuable ecosystems of our country. This study mainly includes the National Parks of the Low and High Tatras, and provides evidence of the damaging effects of the Games on the biodiversity of the region.
Key-words: biodiversity, alpine and monutain ecosystems, history, Winter Olympic Games, environmental destruction

Introduction (M. Janiga)

January 18 and 19, 1994, were remarkable days in Slovakia. All the media, including TV and press announced information, that the Slovak government approved of the Candidature of the Poprad-Tatra region for the Winter Olympic Games of 2002. The source material for this approval was the so called "Complex study to propose the candidature of Slovakia to host the Winter Olympic Games in the year 2002" (authors: I. Petro *et al.*, 1993, hereinafter "the Study").

In this article, we try to review this proposal from the point of view of biodiversity and environmental destruction in the Tatra mountains. Apart from the Alps, the Tatra comprise the only mountain landscape of Central Europe, with alpine, or high-mountain, characteristics. In contrast to the Alps, the Tatras are mountains with vast forests, which have not been fragmented by the tourist industry. The woodland communities are very rich in different species, particularly because of the great diversity of habitats. Carnivores like the Brown Bear *(Ursus arctos* L.) and Northern Lynx (*Lynx lynx* L.) are extinct in many countries of Europe, but in the Tatras, they are still common. With many other species of animals, they serve as indicators of relatively undamaged biotopes. The rich biodiversity of the Tatras also contains, for example, a total of 1,398 species of vascular plants.

We should be concerned with the the global development problems of Europe, like land degradation, global warming, ozone shield rupture, pollution, etc. Serious scientific prognoses indicate, that **the World may reach critical limits between 2010 and 2030**, if per capita consumption of resources remains at the current levels (Goodland 1992). So the natural potential of the Tatra mountains in Central Europe is extremely valuable and strategic not only for the Slovak and Polish nations, but also for all of Europe. Before our review of the "Complex Study" , we guide several quotations for more general readers. The quotations are from newspapers, and we assume, that they give an accurate picture of the situation. We do not comment on them.

Money

August 10, 1993
The overall budget for hosting the Olympic Games is 12 thousand million Slovakian crowns (approximately 350 - 360 million USD). 70 % of the expenses (approximately 9 thousand million Slovak crowns, hereinafter "Sk") would be paid by TV and Radio companies, 1.5 thousand million Sk by sponsors, and 5 - 7 % by visitors (admission tickets). Organisers assume a profit of 4,126 million Sk (Buzinkay 1993).

August 25, 1993
Authors of the Study assume a profit from the Olympics, but do not exclude a deficit, for which the State would be responsible (Višváder 1993).

January 19, 1994
(the first day after the Governmental approval of the candidature) 60 million Sk (approximately 1.8 million USD) will be offered for promotion of Poprad to gain WOG. The most important source of the money will be financial contributions from the regions, towns and villages in which the Olympics would be held (Petro in Anonymous 1994a). The second contribution - 20 million Sk - will be provided by the Slovak government (10 for 1994 and 10 for 1995, Madáč in Šimo and Zerer 1994), and the rest is to be raised from sponsors (Petro in Anonymous 1994a).

13 thousand million Sk is the expected contribution of sponsors to the expenses of hosting the WOG in Poprad, the profit would be 4.5 thousand million Sk (Bartek 1994). The total expenses would be approximately 27 thousand million Sk (Anonymous 1994d). The Slovak government would contribute 6.5 thousand million Sk (ecological projects and highway - Madáč in Šimo and Zerer 1994).

The expenses of the "Complex study" were 2 million Sk (Anonymous 1994c).

March 15, 1994
"Currently, the Olympic Games are a big business..." says one of the defenders of the Tatras candidature, M. Findura, director of the FIS Hotel in Štrbské pleso. (Kriško 1994). Kriško (1994) also says that if we only consider the commercial point of view, then the Slovak republic has not any chance of organising WOG, but they hope that International Olympic Committee (I.O.C.) will also consider other criteria. Another article in the same edition of the newspaper displays a comparable situation in Nagano. In Japan, people are afraid of large debts for the town, because the Candidature for WOG 1998 has already cost 11 million USD (note that the Slovak republic plans to spend approximately 1.8 million USD for this purpose). Moreover, organisers of the Olympics in Nagano have promised to pay the air fares of sportsmen and officials. This was one of the most important reasons that Nagano was selected by the International Olympic Committee to organise WOG -1998 (Anonymous 1994k).

March 17, 1994
The organisers suggest that Candidature for WOG 2002 would cost approximately 60 million crowns, of which 50 % would be donated by sponsors (Magyarova 1994). From this we can deduce that the contribution of regions and towns would be 10 million Sk of the 60 million planned for promotion.

May 6, 1994
"The 2002 Poprad Winter Olympics Bidding Committee has no money, and its activities have been financed until now from the budget of the towns Poprad and L. Mikuláš. ...We still wait for the money promised by the Slovak government" (Madáč in Anonymous 1994m).

Travelling

January 19, 1994
On 24th January, 1994, the Slovak delegation will deliver the official proposal for organising the WOG 2002 in Poprad to the Head of the International Olympic Committee residing in Lausanne (Šimo and Zerer 1994).

"Preparation of the introductory materials...are in press." (mayor of Poprad, J.Madáč in Bartek 1994). The six member delegation will visit WOG in Lillehammer, will introduce the case for Poprad, and will organise a press conference (Bartek 1994). "It needs very frequent and intense sport diplomacy (A. Slafkovský, mayor of L. Mikuláš in Šimo and Zerer 1994). "The 2002 Poprad Winter Olympics Bidding Committee will start work today or tomorrow" (Madáč in Šimo and Zerer 1994).

January 20, 1994
The delegation, vicepremier of the Slovak government, Head of the Slovak Olympic Comittee, and mayors of Poprad and L. Mikuláš will travel to Lausanne on 23rd January. They will officially introduce the Candidature of Poprad (Anonymous 1994f).

February 24, 1994
Mayors of the Tatra towns and villages will visit the Winter Olympic Games in Lillehammer. Poprad - Tatras will be introduced at the press conference on February 26th. Promotional materials will be offered to all members of the International Olympic Committee and to journalists at the conference (Anonymous 1994j).

March 3, 1994
All developed countries had their own display stands at the WOG in Lillehammer, where they publicized the sporting as well as touristic and economic features of their countries. Slovakia no display. There was also a lack of printed materials promoting the WOG in the Tatras, and those that there were, were not of appropriate quality (Kriško 1994).

April 25, 1994
"On March 24, 1994, we were in Lausanne to obtain further instructions for the towns seeking candidature for WOG 2002....The next talks will be on January 24 and 25, 1995..." says the general secretary of the 2002 Poprad Winter Olympics Bidding Committee (Anonymous 1994l).

Study

August 10, 1993.
"Our chances of gaining the Olympics are high", says Mr. Petro, chief of the team of 25 architects, town planners, and sport technicians from atelier Olympia, who spent three months on the final version of the Study (Buzinkay 1993).

January 19, 1994
The Government of the Slovak republic discussed the "Complex Study" three times (October 12, 1993; December 15, 1993; and January 19, 1994). The most discussed problem was the economic management of WOG (Šimo and Zerer 1994)

Ecological protection of the core areas of the High Tatra and Low Tatra National Parks

August 10, 1993
For the downhill track in Jasná, **we need to cut 6.1 ha of forest** aged 90 - 100 years (Petro in Buzinkay 1993). The maximum number of visitors will be 30,000 in Štrbské pleso (the core area of the Tatra National Park). Regulation of the numbers of visitors will not present any problems. No new constructions to increase the sleeping capacity are planned, and current facilities will only be reconstructed (Buzinkay 1993).

August 25, 1993
The "Complex Study" was introduced at the end of June 1993. **The Ministry of the Environment had serious objections** and showed that many problems (such as alternative localities, water supplies, nature protection, waste - assumed to be 87,484 tons) have not discussed sufficiently. Moreover, no expert opinions from the administrations of the High and Low Tatra National Parks were added to the Study (Višváder 1993).

October 1 - 11, 1993
During this period, the Central Statistical Institute of the Slovak republic did research on public opinion

(1,228 persons) about the Candidature. 54 % of people agreed, 28 % were against. The number of negative responses increased with education. Of people who attained a basic education, 24 % were against the Olympics, but the Candidature was not popular among 40 % of those, who completed the high school education. The basic reasons for were positive promotion of Slovakia in the world and financial gain, the basic reasons against were damage to the environment and a financial burden to the state (Okáliová 1994).

October 13, 1993
Proceedings at the Ministry of the Environment and Ministry of Land Mangement resulted in their negative reactions to the Study (Anonymous 1993). J. Haščák, mayor of the town " High Tatras" (this town is an artificial administrative unit composed from several smaller towns and settlements lying inside the High Tatra NP) says, that "nature must suffer as little as possible" (Šimo and Zerer 1994).

January 19, 1994
"Protection of the nature is one of the basic priorities, and, for example, in the High Tatra National Park, space will be only utilized which is already used for sporting activities" (Petro in Bartek 1993). Organisers say that protection of the native fauna of the Tatras is one from the most important priorities. They suggest completion of the drainage network in the region (Anonymous 1994b).

A political decision to allow the Candidature for WOG in the territory of the national parks would violate many current laws of the Slovak republic (Tóthová in Anonymous 1994e).

January 20, 1994
"In the territory of the High Tatras, there will be no damage to the nature" says Ing. Gállová, Head of the Regional Institute of Environment of the "town High Tatras" (Anonymous 1994g; protection of nature is mainly managed by this Institute in the High Tatras, and not by the Administration of the Tatra National Park, atypically compared to the management of the majority of national parks in the world). **"Four exceptions** to existing laws would be neccessary in the territory of the Low Tatra National Park, and **five** in the High Tatra National Park" says the Minister of the Environment (Anonymous 1994h).

January 24, 1994
" I estimate, that 3,000 m2 of the forest will be cut in the territory of Štrbské pleso, the High Tatras" says P. Spitzkopf, Head of the Section for landscape protection of the Administration of the Tatra National Park (Anonymous 1994i).

January 25, 1994
When the five members of the Slovak delegation visited Lausanne, Ch. A. Samaranch, the Head of I.O.C. said (besides others), that it would not be good, if the Olympic Games were charged with damage to the natural environment (Souček 1994).

February 7, 1994
The Heads of the Forestry section of the Ministry of Land Management have not changed their opinion, and **do not agree with the cutting of forest** in the Low Tatra National Park (Sedlák 1994).

March 17, 1994
Organisers say that in the strictly protected regions of the National Parks, only essential works will be performed. I think that some quotations from the thoughts of the organisers are the best indication to the well educated reader, of how these rich centres of alpine and mountain biodiversity would be managed: "Cut trees (of the age of 50 and more years) will be replaced by an area 8 times greater (by plantation of young trees). The root system of cut trees will be preserved and hence any erosion will be prevented" (Magyarova 1994). Information of this type is frequently offered to mass media, mainly to newspapers.

April 25, 1994
"In Štrbské pleso, we plan to build only two **new** hotels" says mayor of Poprad (Anonymous 1994l).

June 1994
The final decision of the Administration of the Tatra National Park to the latest version of the "Complex Study is negative".The directory of **the Tatra National Park does not agree with the organisation of WOG 2002 in the core areas of the High Tatras** (Spitzkopf 1994).

General review of the Study and landscape architecture (M. Marenčák)

INTRODUCTORY NOTES

The renewed candidature of the Slovak republic for the Winter Olympic Games of 2002 again introduces several core Olympic sport disciplines into the core or buffer zones of two national parks of Slovakia - the High Tatra National Park (hereinafter TANAP) and the Low Tatra National Park (hereinafter NAPANT). The localities Štrbské Pleso and Jasná lie in a very exposed environment, which is in, or neighbouring to the most valuable natural habitats of the parks.

The core zone contains many state nature reserves and protected natural monuments. With regard to this fact, the submitted study "WOG 2002 in Poprad" (herinafter the Study) is inadmissible. Moreover, the Study contradicts the main principles of the "Programs of care for TANAP and NAPANT", official governmental documents. Among others, the programs say:

- new urbanisation next to the natural sites is inadmissible, especially in the immediate area of the most intensively protected natural areas
- new constructions are not acceptable, especially those liable to cause further destruction and changes to the forests, terrain configuration, and hydrology (including applications of new chemicals for ski route preparation)
- organisation of high density meetings and enterprises is not acceptable within the territory of the national park
- it is important to exclude all activities, which threaten the ecosystems of National Parks.

For an illustration of potential negative influences of WOG-2002 within the territory of National Parks,

I present a census of numbers that might attend the Olympic competitions in the course of 10 -14 days at the localities Jasná, Štrbské Pleso, Tatranská Štrba, and Závažná Poruba. The sum is from 648,000 to 688,000 persons (modified from the pages 11-13, 44-49, 50-66, 127-153 of the Study). By contrast to this big enterprise, the International Ascent of Youth of the Mountain Rysy amounted only from 3,000 to 5,000 visitors; the activity was shown to be dangerous for fragile Carpathian ecosystems, and the banning of this meeting by the administration of TANAP is regarded as a success for nature protection.

Moreover: New buildings, which would be constructed for the Olympic purposes, make 5,000 m2 of the new area in Jasná (core of the NAPANT) and Závažná Poruba. In Štrbské Pleso and Tatranská Štrba (Biosphere Reserve TANAP), the area for new constructions is not evaluated. In the Štrbské Pleso, Jasná, Pavčina Lehota, Závažná Poruba, a development of new parking places has been suggested, for 5,300 cars and 258 buses.

Background

The next file of the matters, which connect to the problem of the seriousness and lack of bias of the Study, is:

a. The chief-author of the Study is also the author of two previous studies on WOG, from 1990 and 1992, which may lead to biased, one-side uniformity of selection of the locality for Games and solution of olympic centres.

b. The steering committee for the Candidature to WOG 2002 ordered another study " Final model of site situation of sport disciplines and supplementary equipment" (so called C - alternative, page 2 of the Study) in the same - first author of the Study; they did this without the participation of the Slovak Architecture Board, because the Board had critical comments to the form of elaboration of "Applyement" of this material.

c. "The proposal of the down-hill ski trail FIS II - centre Jasná" was elaborated by the Urbion - Company, Bratislava with a participation of the author of the Study; this again raises doubt as to whether the Study is unbiassed to the ecological consequences of this construction

d. Study affirms, that individual architectonic and urbanistic solution "**is practically impossible to evaluate by the E.I.A. methods**", so " the aim was not fulfiled for input of Ministry of Environment by its concrete requests in the time of Study preparation, and not only at the end of the Study elaboration, in the role of an institutional reviewer (page 6)."

e. The study does not solve any possible consequences of :

- possible crash-situations (epidemics, fires, critical deficit of drinking-water, etc.), which could be a reason for an exclusion of the sport centre from the Olympic competitions, because the Study does not present any other (compensatory) localities for individual sport disciplines
- in the Study, no approximate budget is shown for preparation, realisation, working, and maintenance of so called ecological constructions and landscape preparations; also investment in some constructions are not presented (e.g. in the centre of Tatranská Štrba, transfer of ATC, requested transfer and exclusion of railway halls, and liquidation of small, usually private constructions for recreation in the surroundings of the railway station Tatranská Štrba)
- the Study offers no technical solution to the management of non-conventional traffic route from the parking place in Pavčina Lehota to Jasná, across the rocky narrow passage at the end of the valleys Repiská and Machnaté, and also across the limestone canyon in the State nature reserve Demänovská dolina (NAPANT).

f. Suggestion for the removal of the gravels near the village Batizovce, recultivation of the area, and consequently, localisation of new big centre of recreation with 1,200 beds and appropriate equipment for sports and recreation, is also disputable for following reasons:

- there will be needed to open new site for gravel exploitation for suggested new constructions
- until the present time, the planned line of highway D1 crossing this area at the section Tatranská Štrba - Poprad - Janovce, has not been resolved.

g. In the Study,there is not possible to find any data, if new suggested locality Závažná Poruba for sledge or toboggan competitions (page 13) has requested length and overheight, because according to sledge experts, "the authors did not receive any data, and so they decided alone, for territorial and urbanistic reasons, the most useful locality close to the ski resort Opalisko..."(page 16). The same problems may occur in this locality, as at the originally planned locality Dolný Smokovec- Pod Lesom - Nová Lesná, where the alternative for sledge routes had to be excluded (pages 15-16 of the Study).

h. At the end of the Block C, part 18, pages 182-230 of the Study, named "Complex ecological evaluation of the solution of WOG and consequences for environment of regions and national parks", we read, that "the collective of authors realizes, that unbiased ecological evaluation of concrete sport and other disciplines requires a wider temporal and scientific basis for the evaluation of consequences on unspoiled and settled country in the regions of Liptov and Spiš (page 228, point 18.6., Conclusions) from possible realisation of offered candidature".Also in the introduction of this section, the authors mention: "Although the authors of the Study were very disposed to consider ecological criteria, ecological evaluation of plans for the organisation of WOG 2002 may only be successful if the foundation works are carefully monitored ". Both above quotations are evidence, that ecological problematics, protection of nature and environment were not sufficiently evaluated until now (although the Candidature was officially posted). It has not been shown that the organisation of WOG 2002 in the Tatras well protect the area from ecological damage.

i. Section 22 "Evaluation of Conclusions from the Meeting on Elaborated Suggestion of Solution of Ski-route FIS II - centre Jasná", has not been submitted with the conclusions from the Meeting at the Regional Institute of Environment in L. Mikuláš, where the negative position of the Slovak Commission for Environment (No. 1106/oop-92 from 12th August 1992) was on the agenda.

This is the data, on the basis of which, the author of this review-sections, elaborated his report.

DETAILED COMMENTARY TO THE SPECIFIC SECTIONS OF THE STUDY

Part. 2. "Wider regional relations". In this chapter, the inevitability of air port development in Poprad (page 8) is presented. For Tatra National Park, the current working of the air port is one of the stressful barrier elements in the protected - buffer zone of Tatra National Park. (Tatrania- atelier 1993). From this point of view, the affirmation of the authors of the Study, that: "the program of solution of WOG is elaborated.... also with aim of decreasing the burden to TANAP and NAPANT from high seasonal density of visitors; and (from) those activities, which have in the past been incorrectly situated in important ecological area" (understand protected cores of the parks, page 9), is, at least, non-convincing. The aim is "to minimalise interference in the natural environment and in the territories of the TATRA and LOW TATRA NPs." (page 11). Probably this is a reason, why the authors placed the sport disciplines in the national park areas and their protected-buffer zones in Tatranská Štrba and Závažná Poruba (pages 11 - 12); and proposed the second centre without any expert reports on sledging or tobogganing (see point g, of the first part of this review). But the main winter sport olympic disciplines, which depend on mountain areas, are clearly situated in the natural environment of the National Parks: Štrbské Pleso (ski jumping, ski-running 5 kms, 10 kms, 15 kms, Nordic combination) and in Jasná (Alpine disciplines). Finally, the mentioned centres Tatranská Štrba (biatlon) and Závažná Poruba (acrobatic skiing, sledging, tobogganing) also lie on the borders of TANAP or NAPANT, and some equipment will directly interfere with the area of the national parks. The following locations are relevant to these submissions:

Buildings and new constructions

Štrbské Pleso (pages 44 - 49 of the Study)

- construction of the new centre in the middle of Štrbské Pleso
- modernisation of the FIS stadium
- forest cutting for the ski-runs, which are excluded from the Štrbské lake
- the establishment of access routes and stands for TV cameras parallell to the ski-runs in the forest complexes of Štrbské Pleso as far as the estuary of biologically vital Furkotská valley
- finalisation of the construction of the FIS area, eventually an increase in the capacity of beds

Tatranská Štrba (pages 50 - 54)

- construction of biathlon stadium and translocation of the current auto-technic-complex
- construction of the hotel complex with a roof, designed for skiing (because the roof is southerly oriented, will probably require artificial snow equipment; the carriage off skiers to the rooftop is not specified (perhaps by ski hoist on the roof or by the lift inside the building?). Concerning the many possibilities of skiing in the surrounding area, this project looks to be, at least, meaning less.
- to translocate the railway halls and liquidate illegally constructed recreation buildings in the surroundings of the railway station in Štrba

Jasná (pages 55 - 60)

- completion of the last stretch of the ski area Záhradky and and Koliesko (core of the NAPANT)
- construction of the new non-conventional transport terminal in the area Tri domky
- destruction of the old chairlift Koliesko - Luková - Chopok and its compensation by modern mountain chairlift on the new line
- construction of the system of artificial snow on "selected routes for competitions" (how many, and which, is not specified)

Závažná Poruba (pages 61 - 66)

- construction of areas for toboggans and sledge with a new stadium
- construction of the system of artificial snow on two tracks for alpine skiing, and icing of toboggan track.

All these plans mean drastic interference into the natural environment, considerable activity in the building of new constructions, and potentially, long-termed increase of visitor numbers with all subsequent negative phenomena.

Hotels

In the wider territory, the Study suggests completion of 44 more localities, establishment of a new centre of recreation and touristic industry in space Batizovce - Borik (note that in the Borik, there is a highly biologically valued state nature reserve) with 1,200 beds for recreation, construction of a big spa and rehabilitation of the TATRATHERMAL area close to Stará Lesná; construction of a new bath and recreation centre for 4,000 visitors per day with 1,000 beds. This lies not far from the village Liptovská Kokava, where the potencial dispersal of visitors would disturb the last pocket of tranquillity in the valleys of the West Tatras - component of the TANAP, rationalisation of the traffic system in Jánska valley (page 98, why? At present, the valley is closed to public transport with the main aim of protecting the water sources and nature of the NAPANT); "completion of accommodation capacity by the new constructions" in the centre Donovaly (page 100 of the Study, in spite of known lack of the sources of water): "strengthening the function of the main input centres" to the Tatras - of Poprad and L. Mikuláš (page 106 of the Study, which means increasing visitors numbers to the High and Low Tatras). New planned car-route "Small Tatra Round" would probably form a barrier to the migration of animals between the High Tatras and massif Kozie Chrbty lying in the Kráľovohoľské Low Tatras, and between West Tatras (High Tatras) and Ďumbier Low Tatras.

In the sub-Tatras-region, the organisation of WOG 2002 would require 6,080 beds for the tourist industry (pages 108 - 110 of the Study); will undoubtedly

increase visitor numbers to both National Parks; the extension of the state highways I/18 from Svit to Poprad and from Ružomberok to Ivachnová, and a replacement of the state highway I/67 from Poprad to Kežmarok.

Traffic and transport

In the core areas of both national parks, noice will be increased by the suggested heliports in all olympic centres, i.e. also in Štrbské Pleso and Jasná.

There are insufficient details on "new traffic system of mass transportation of people" in the new corridor T. Štrba - Mengusovce - Borik - Batizovce - Svit - airport Poprad - Poprad - Matejovce - Veľká Lomnica (page 137). The insufficiency mainly concerns the direction of the route, capacity, and technical realisation. The authors say, that by this system, "the pressure of the permanent increase of the traffic capacity will be lowered in the mountains area. But the authors do not explain, how. Moreover, reading page 140, their conclusion sounds unconvincingly. On page 140, there is written: "We suggest transporting the people from Tatranská Štrba to Štrbské Pleso (note, this is mountain area) by the cog railway..... which requires.... the lengthening of some rails.... including the station in Štrbské Pleso". The authors also write: "Public transport by Tatra electric railway .... also requires an increase in the transport capacity, so the points of Tatranské Zruby, Tatranská Polianka and Štôla must be developed". **This clearly means, that in spite of the development of the new traffic system in a new corridor within submontane area, the capacity of public transport will be also increased in the mountain area.**

In the part 15 "Suggestion of the traffic transport during WOG", we may find very interesting data on transport capacity. The authors assume, that the daily amount of transported people to Štrbské Pleso will be 20,000 visitors (page 139), although in other parts of the Study (e.g. page 11), they say, that 10,000 persons will watch the Nordic competitions.

Besides noted new constructions (pages 49-66), the new building-plots will be required on the territory of the National Parks:

- Štrbské Pleso

Besides the mentioned legthening of railway, new parking place for 140 buses for public transport is required (page140), as the current parking place will only be used for service transport

- Tatranská Štrba

Parking place for 28 buses and 1,600 cars (new parking place for 1,000 cars easterly from railway station and for 28 mentioned buses)

- Štôla

Parking place for 1,500 cars

- Jasná

Two parking places, each for 200 cars (Záhradky and Lúčky), and one for 100 cars (Tri domky). In the case of permanent public bus transport, parking places for 28 buses and 1,600 cars is required close to the village Pavčina Lehota. Realisation of suggested one-rail cog railway (pages 146 - 150) or one-rail cable railway will require the construction of a great covered hall and depot close to the village place in Pavčina Lehota, terminal in Tri domky (Jasná), and appropriate works in the rail preparation and construction

- Závažná Poruba

New parking place for 28 buses and 1,600 cars.

The development of the above listed new traffic constructions would surely meant great changes in the urban or unspoiled country areas of the sub-Tatranian regions Spiš and Liptov. The authors of the Study say: "... all investment suggestions... would contribute to the protection and creation (?) of the environment, mainly in the territory of the National Parks." (page 153.)

Management of water supplies

The solution to water management problems is ecologically unevaluated. The sources of water would be in the valley Čierny Váh for the expected demand in the regions Spiš and Liptov, although we know, that from the valley, the great quantity of waters is drawn from the nature in the current time, in spite of important ecological and protective function of this valuable locality in NAPANT.

The assumption that the capacity of water-main is sufficient in Jasná in the current time, and that it will suffice for Games, is at the very least irresponsible (page 161 of the Study). No account (balance and capacity of water sources) is taken of the water demand for artificial snow on the ski trails in Jasná (page 162). Moreover, the authors do not address the fact, that artificial snow would be needed during the calednar months when the deficit in surface water is at its highest. In the case of the realisation of a WOG centre in Jasná under Chopok, no solution has been probably proposed for the water supply for drinking or other technical reasons. It is without any dispute, **that big damage in the natural environment will occur** (Klaučo 1992).

The project of water management in the planned Olympic centre Závažná Poruba does not balance water consumption and water sources. The communal water-main is the only source of drinking water in the village; and there are no supplementary local water sources. Authors of the Study suggest connection to water-supply DN 500 from the village Liptovská Porúbka. The matter of the construction of a small artificial lake is also very problematic. Water sources for artificial snow or ice-making requires are not available in this limestone area of National Park. The only possible source would be the river Váh, but it is more than 3 km distant.

The idea that liquid disposal waste from the centre Liptovský Trnovec will flow into the dam Liptovská Mara, is also to be questioned, because in this space, the priority of the dam is recreation (page 166).

Documentation

From part 17 of the Study " Construction complexes and their connection to the current territorial plans", we may conclude, that the great amount of "territorial-plan preparations" depends upon "the possibility of organising WOG 2002". In concrete, this means the completion of a very problematic territorial plan - ÚPN VUC High Tatras, West Tatras, Orava and Spišská Magura (author - Igor Petro, also the chief-author of

the of the WOG Study). The local and state regional administrations received the proposal of this territorial plan with doubts; and for the solution of partial problems, considerations will have to be taken of 19 other territorial-plan documents and specific studies (pages 178 - 179). This looks to be a wide field for the future work of the authors of this Study.

It also looks to be superfluous to elaborate a document No. 15 "Detailed ecological evaluation of the solution of WOG at the level of plans of territorial plans, from the point of view of consequences for natural environment and with special attention for natural environment of National Parks", because the Candidature was posted without it, i.e. without regard to possible devastation of nature.

Nature protection

I recommend the part 18. of the Study (Complete ecological evaluation of the solution of WOG and consequences for the environment of regions and National Parks "for attention to ecologists, nature protectors, natural and landscape scientists. In the introduction of this part, the authors state, that localities selected for downhill competitions in Jasná and for Nordic disciplines in Štrbské Pleso lie at the border of very fragile ecosystems in spruce vegetation level of TANAP and NAPANT, and they say that biocoenoses of world significance may be threatened in both National Parks. Later, in spite of the above,they claim: " The current version of complete Study of suggestion of candidature for WOG in 2002 also contains such architectural and urbanistic solutions, which need not be modified in a great extent", and in the next moment, the authors indicate the potential risks: "ecological evaluation of plans for organisation of WOG 2002 may only be successful under the assumption of a consistent overview of the foundation works (see part I, paragraph h. of this review). The arbitrary compensatory solutions are likely to involve a long chain of unforseen destructions of the natural environment" (quotations from page 183 of the Study).

Contradictions abound in all areas of the Study. It is questionable whether such a long and general description of the nature of the Tatras (pages 184 - 187) is necessary, where we can also find such sentences: "Without any doubts, the glacier fields are among the most valuable sites. Tichá and Žiarska valleys developed in this way would offer amazingly varied possibilities for the travel industry" (page 186). But we also know, that Tichá and Kôprová valleys possess rare zones of tranquillity, and serve as a refuge for large mammals at the border of West and Central Tatras. The protected localities of chamois are also in Žiarská valley.

Although the authors give relatively truthful data on the preparation and construction works at these localities, with features of the slope movements or solifluction (page 189); and although the section 18.3 "Overall ecological situation of the region concerned for WOG 2002 in Slovakia" (pages 190-192) shows the possible risks which could arise from this big enterprise for both national parks, the full situation is not laid out. For example, the following data are missing: attention to new non-conventional system of public transport across the narrow passage in Demänovská valley; and problems of water sources for artificial snow in Jasná (from point of view of water balance). The authors naively suggest, that artificial snow making and preparation of downhill tracks can be performed without chemicals (pages 191-192). For usage of these chemicals see below review by Šoltés.

I consider the list of specially protected regions of nature as irrelevant (pages 193-198), because the activities connecting to WOG 2002 only involve 19 from 260 mentioned localities.

I have no special comments pertaining to the pages 199-206 of the Study, besides this question. From which source did the authors find the title "Route of the Heroes of Dukla" (page 202), when from the sentence, in which this title is used, it can be easily deduced, that it is the Route of Freedom.

To pages 207 - 209, I have no special comments, but the part 18.5.3. is full of contradictions. For example, on the same page (211), the authors talk about the serious threat to the centre of the Biosphere reserve TANAP (run trails are oriented across the State nature reserve; a request of water source for artificial snow from Štrbské Pleso lake); and consequently they describe the possibilities, by which such interference could be ostensibly "mitigated". I consider the following statements illogical: "From the ecological point of view, only two solutions are possible for the whole area (Štrbské Pleso). The first is the complete exclusion of ski resorts (including all ski-equipments) from the area. The second is to obtain permission to modernise the area, with new measures for nature protection (page 211).

These well meant "Ecological conditions for realisation of the intention" are naive in many respects (7,8,9,10,11,12); moreover, the authors do not realise, that dismantling constructions also demand intensive working and transport activities during their construction or liquidation.

The section "Burden of the natural environment of TANAP - Štrbské Pleso", does not set out, why the optimal winter visitation (3,170 persons per day) may "increase for 50 %, i.e 4,755 persons per day" (page 214). The last sentence of the part 18.5.3. is very lame: "If the all rules of transport, temporal and, space regulation of visitors are respected, the suggested single (?) burden of territory would not cause devastation of ecosystems of Mlynická and Furkotská valleys or the centre of Štrbské Pleso" (pages 214 and 215). But a simple calculation (derived from the information on pages 11 or 139) shows, that this exponed territory of TANAP will be receiving from 240,000 to 280,000 persons during those 12 days of WOG. From the ecological point of view, the situation in the centre Tatranská Štrba may be comparable (pages 215 and 216). **The examination of secondary negative influences is not complete, and cannot be measured from any data in the Study.**

In the section 18.5.5. , the authors accurately describe the environment in Jasná as well as the potential threat to hydrological, geological, ecological stability and landscape picture of this central area of NAPANT (pages 216 and 217). In spite of detailed analysis of possible risks from development of the new downhill track FIS II (pages 218 -221), the authors do not unambiguously recommend the abandonment the project. In the section "Ecological conditions for realisation of the FIS II track preparation",

no plantation of young trees is required for the borders of the cut corridor. The authors do not mention, that the reconstruction of downhill tracks and cable ways would entail considerable disruption, with earth-moving and the transport of building materials. Their conclusion, that "modernisation of existing cableways would reduce damage to the vegetation cover from traffic between funiculars", (page 222) does not sound convincing.

In the section D "Evaluation of equipment for snow, construction of retaining lakes and artificial snow" (pages 223 and 224), as noted earlier, we cannot find the balances of the water sources and water demand. No estimate of the minimum level level of water flow in the rivers and streams of NAPANT for WOG is proposed. In the section "Ecological conditions for the provision of artificial snow", the authors only mention the general rules for the construction of the equipment and buildings needed for the snow-making. Heavy noice from the equipment, and ecological problems from the subsequent thawing are not considered in the Study.

An interesting division of opinion among authors can be found in the sections E " Civils" and F "Public transport". In the first, the authors state, that the power network for cable-ways and snow-making equipment "... must lie underground. Although **great destruction of vegetation cover and soils will occur,** this is the only possible way."(page 224). Later (pages 224 and 225), they do not object to non-conventional transport systems. Such systems require much above the ground construction, at great cost to the natural landscape. One example is the State nature reserve Demänovská valley.

When the authors evaluated the alternative "of public transport by buses with catalytic converters to the centre of Jasná (Otupné)" as ecologically useful, they omitted to mention the negative consequences of winter preparation of roads. After the winter season, more than 2/3 of spread materials usually remain within 30 m of the road, even when special lorries are used for cleaning the road. **Possible accidents and transport breakdowns are also not cosidered**.

In the section G. "Pressure on the natural environment in the Demänovská valley" from visitors, the authors show insufficient concern for the consequences of the presence of 180,000 persons per 12 days in the centre of the National Park.

Evaluation of the public works in Závažná Poruba, where a new stadium for 10,000 visitors would be constructed is also not complete. The authors only state, that "measures will be needed to solve the problem of stadium construction" (page 277). Moreover, the consequences for landscape are not mentioned.

From the enclosed maps of the Štrbské Pleso (where the evaluation omitted potential damage caused by ski-run trails outside Štrbské Pleso), Tatranská Štrba, Jasná, Závažná Poruba, the clear threat to the area can be recognised. In their Conclusion (18.6.), the authors demean the value of their own work, when on the page 228, part 18 is admitted to be incomplete. The authors request "a wider long-term and scientific basis of evaluation for the natural and built up areas Spiš and Liptov, if the Candidature for WOG 2002 is successful".

In this review, I do not comment upon parts 19, 20, and 21. Part 22 was commented in the first section of this review (paragraph i.).

In the conclusion, I consider it important to repeat the total number of potential visitors in the centres during WOG:

- Jasná		180,000
- Tatranská Štrba		72,000
- Závažná Poruba		156,000
- Štrbské Pleso	from	240,000 to 280,000
total	from	648,000 to 688,000.

Flora

BRYOPHYTE VEGETATION (R.Šoltés)

Interest of Slovakia for Olympic games in 2002 is comprehensible motivated by idea to be "visible" to the world outside.

Praiseworthy is the effort of authors to eliminate as much as possible sport events from the National Parks. The authors were partially successful but, to exclude all sport events from National Parks is impossible because of lack of suitable terrain.

In spite of effort for complex assesment of environmental consequences of Olympic games, some aspects were overlooked by the authors. My paper details some aspects of potential decline in bryophyte taxonomic and ecological diversity:

- close to residential district of Poprad town is a remnant of marshy bryophyte vegetation with endangered vascular plant species *Primula farinosa.* In spite of its proximity to a housing estate the locality still thrives and it seems as if the water management was not disturbed. In this locality, the Study proposed an olympic village. In the event of realisation of this project the best way to preserve the locality would be to rebuild it into "mini botanic garden".
- removal of some old trees is unavoidable by infrastructure construction. The bark of old trees is available substratum for some mosses listed as endangered, rare or threatened in regional scale. When realization of Olympic games become actual is necessary to map all valuable phorophytes and to strive to save them.
- it is vital to avoid the use of ammonium chloride for snow making; this is a strong poison for cryptogamic vegetation.

LICHEN VEGETATION (Z. Kyselová)

Olympic games has became an expensive sport and social enterprise. Construction of infrastructure and high concentration of visitors is a negative environmental interference. Some events are planned to take place in National Parks. The Environmental Ministry as a responsible body should elaborate a set of ecological principles to evaluate the study.

Faults and contradictions of the Study

One important result of the planned construction ought to be to spread the number of visitors over the course of the year. Proposed high-capacity accommodation centres will only increase the seasonal rush.

The necessary parking place for 140 buses in the Štrbské Pleso is not pinpointed in the Study and its ecological consequences are not evaluated. Parking places for individual cars are available outside the National Park, but the admittance of individual cars to the ski resort Štrbské Pleso is becoming controversial. Parking areas of large capacity must be excluded from the proximity of the core area of the Biosphere Reserve.

Questionable is the proposal to build Downhill race track FIS II, in spite of bad experiences with Downhill race track FIS I:
- poor snow condition in the subalpine and alpine region where due to windward facing the snow is often blown away.
- progressive soil erosion, often caused by insufficient maintenance of the tracks. Similarly bad experiences are with another down hill race track Jelení grúň.

Biodiversity decline

The realisation of the olympic centre in Štrbské Pleso, area FIS and new pattern of ski trails within resort Štrbské Pleso **assume removal of some old trees, phorophytes and many rare and endangered epiphytic lichens**, such as *Hypogymnia farinacea, H. bitteri, Evernia divaricata, Microcalicium ahlneri*, (only four known localities in Tatra Mts. and Slovakia as well), *Arthonia punctiformis* (one recent locality in Slovakia), species of the *Bryoria* and *Usnea genera*.

The recent chairlift in the Jasná centrum consists of two sections. The proposal is to rebuild it into one unit. This solution is unsuitable because the upper part is utilized less frequently and often is out of action due to unsuitable weather or snow conditions. Its reconstruction would increase number of skiers to the windward exposed area of high-altitude grassland and dwarf forests, characterized by poor snow conditions. Consequently, the biodiversity decline is unavoidable because of damage of epiphyte plant communities, tearing of dwarf pine roots and branches, damage of soil cover etc.

The authors expressed an apprehension about the overgrowth of both track borders by weed species of *Calamagrostis* genera. Species of *Calamagrostis* genera are not weed species but indigenous grass species, the overgrowth of the entire downhill race track would be welcomed. On the other hand, here are no plans for track surface reclamation.

Biosphere Reserve Tatry

The Biosphere Reserve Tatry was established on February 15, 1993. Some of the events are to be performed close to the core zone. The evaluation of noise (30 000 visitors daily close to the core zone) is absent in the Study.

VASCULAR PLANTS VEGETATION (A .Šoltésová)

The leading idea of the Study is the assumption that geographical position, natural beauties and cultural - historical heritage of Slovakia in the case of Olympic games will promote the attractions of the country from a touristic point of view. The High Tatra Mountains are surely the most attractive territory in Slovakia and authors are convicted that organisation of Olympic games in 2002 will accelerate the equipment of sport resorts and tourist centres to higher levels of quality. But we are entitled to have some doubt about this quality because of experiences with the organisation of a World Championship in Nordic Events in 1970. The consequences of that will be visible for a long time. The evaluation of negative influence of this enterprise is shown in papers of Chudíková (1976) and Šoltésová *et al.* (1993).

Biosphere Reserve Tatry

In the core zone of Biosphere Reserve, the international competitions and top sport activities are excluded. The complex study placed some events (track events) just in the core zone and ski jumps are situated in the area between the core and buffer zones. Most planned events are dependent on perfect snow conditions. Unfortunately in the main ski resorts during the last years we have noticed poor snow conditions; therefore, chemical snow preparation is unavoidable. In the case of the Olympic Games the sport resort Štrbské Ples would suffer hardly from high concentration of visitors within 12 days. During World Championship in Nordic Events in 1970 it was only 8 days. Moreover, training for track events and biathlon are planned in other parts of the National Park, in Podbanské.

Herb layer damage

The infrastructure construction and removal of old equipment will unavoidably cause destruktion of the herb layer. The ski trails, crossing the Lake Štrbské pleso is proposed to be cancelled. This proposal is welcomed but, on the other hand, the new solution includes assumption of clear-cutting through a small forest stand. This reality is suppressed in the Study. With respect to snow preparation, ski tracks made this way would endanger some vascular plant species mentioned on the "Regional Red List", occurring on small "Slepé pleso" bogs, e.g. *Oxycoccus palustris, Oxycoccus microcarpus, Carex limosa* and others. Close to the ski track is a localized protected habitat "Rašelinisko" with more critical endangered species, e. g. *Andromeda polifolia*. Here the authors of the study noticed critical endangered plant species *Arctospahylos uva-ursi*. This statement is confused, as the mentioned species is growing only in the Velická dolina Walley.

Low Tatra National Park

We have to quote a few sentences from studies of the Olympic centre "Jasná" in the Low Tatra National Park: "For the competition programme, only the second trails posses problems. Current downhill race trails FIS, slalom trails, giant slalom trails and super G trail are equipped to technical parameters which would match those required for 2002." In further place we can read: "Current sport equipment and services offered, are as yet not adequate to those in other mountain sport resorts of the world". To what extent be environmental conditions in the forest and non-forest ecosystems would be influenced we can learn from the following. The forest management of vulnerable mountain forest and dwarf forest cannot be subordinate to sport interests. The afforestation of

old unsuitable downhill track is not equivalent compensation for a felled corridor for new track even if the new forested area is larger. We have to take into account that recently deforested areas in the surrounding of the ski resort Jasná **have endangered geological stability** (Midriak 1993) of the territory as well as the stability of the forest ecosystem. The reason is fragmentation of forest in the past due to downhill track corridors. These forests than cannot fulfil their water-bearing, soil-protective, anti-avalanche and other functions and are easily eroded by wind. More over, the planned downhill trail FIS II is facing windward and even in the case of excellent snow conditions the upper part would suffer from lack of snow because of blowing away. Threatening example is a downhill trail from Mt. Solisko to Štrbské Pleso ski resort, which is under-utilized from above mentioned reasons.

Faults and contradictions of the Study

Bôrik Hill is an attractive habitat for flora; some precious plant species are found here. There are only a few cottages and a ski lift in the surroundings, but one may find here a huge quantity of rubbish in the locality of regional critically endangered plant species like *Adenophora liliifolia, Campanula carpatica* and *Aster scepusiensis*. These species are listed as vulnerable, endangered or endemic respectively on the national scale as well. Intention to build up an accommodation centre with more than 1000 beds is in contradiction to the nature protection policy. All mentioned species are attractive and may be overcollected, because their populations have been considerably reduced. The authors of the study have neglected this reality and state: "In the valley occur some small-scale state nature reserves, the Bôrik and Jelšin are localized close to sport and service centre Batizovce", **without commentary or, the setting of any conditions for protection.**

Strange that in the list of proposed or legalized natural reserves established before or after 1990, both of the above mentioned are absent. Another contradiction: Authors insist the use of unregulated tracks in the fragile natural reserve Furkotská dolina as admissible. But the same authors suggest changing the pattern of tracks within the ski resort Štrbské Pleso with the presumption of clear-cutting.

Plans to control the visitor rush involve building up the temporary parking place. The only possible solution is to place this parking place out of the biosphere reserve. The authors have forgotten to draw up the temporary parking place out of biosphere reserve.

Poor elaboration of the Study

Many of the natural reserves' names are confused, some of the reserves legalized in the past are listed among those established after 1990 and conversely. The list of protected areas includes some reserves cancelled in 1986, e. g. Dlhý les, Skalnatý potok, Javorina and others. The list of legalized and proposed protected areas is confused, some of the legalized protected areas are missing in the list, e.g. Kozí chrbát, on the other hand, the protected area Roháčské plesá is listed twice. The enumeration of protected areas in the text is often not in accordance with their enumeration in the enclosed maps. **The drawings of protected areas in the maps do not correspond to reality.**

Fauna (M. Janiga)

Besides two or three vague sentences about the presence of Marmot, Chamois, Capercaillie, and Black Grouse on the northern slopes of Mt. Chopok, **the Study does not present any data on the fauna,** one of the most important components of the concerned ecosystems. Many species of invertebrates and vertebrates live in the areas where the WOG-2002 would be organised. It is not possible to mention all known species which live here and which may be threatened by development of a further tourist industry. I have selected some systematic groups and species which may serve as bioindicators of the consequences of human activities in the National Parks. I would like to draw attention to the locality of Štrbské Pleso, lying in the core area of the TANAP. The localitymay be the model for similar problems in other valleys of the Tatras.

Soil fauna

As also discussed by the other authors of our study, the organisers of the WOG-2002 assume many constructions of chairlifts in the mountain and alpine areas on the northern slope of the Mt. Chopok (for example, page 59 of the Study). Material for constructions includes concrete, wood, steel, and plastics (page 59). Investigations of several skiing resorts in Austria clearly evidenced that preparations of ski slopes destroys the vegetation, the top soil, and the life within it (Cernusca 1992). Although the authors suggest planting the lines after the destruction of some old chairlifts, this only looks like an idea, because the current fragments of the forest are weakened and their area decreases between the current chairlifts and downhill tracks (for example the forest between the chairlift to Luková and the track "Majstrovská"). Moreover, succession in the raw soils at high altitudes proceeds extremely slowly, so that a functioning soil system is lost for years. Further investigations in Austria on the ecological impact of snow preparation indicated that soil freezing during the winter is more pronounced in conventionally prepared ski runs, compared to natural snow cover. Artificial snow generally prevents freezing of lower soil horizonts due to the larger snow mass per unit area. The duration of snow cover on these sites until spring can lead to oxygen depletion below the snow cover and can damage vegetation (Cernusca 1992). Disturbances due to the shearing effect of skis on hilltops are serious, since the damage is repeated year after year. Overheating, dessication, and erosion during the summer impair the edaphic conditions still further. Meyer (1993) found that on such bare spots in a subalpine meadow, the abundance of earthworms *(Lumbricidae)* was diminished by 85 %. **Compaction of the snow cover by snowmobiles on ski runs reduces the abundance of the whole soil fauna** *(Aranei, Chilopoda, Coleoptera, Diptera, Hymenoptera, Insecta* - larvae) by 70 %.

Spiders are good indicators, if the compaction of the ski runs by snowmobiles damages the natural ecosystems in the Štrbské Pleso. New runs are planned by the authors of the Study, and the fauna of spiders is rich in this territory (Svatoň 1983). Many rare and very rare species occur at this site, and from Svatoň's work, I only mention several of them: *Gnaphosa montana, Clubiona reclusa,Philodromus vagulus, Arctosa leopardus, Trochosa spinipalpis, Trochosa terricola, Pirata piraticus, Dolomedes fimbriatus, Hahnia difficilis, Robertus lividus, Cyphepeira folium, Bolyphantes luteolus, Leptorhoptrum robustum, Leptyphantes pulcher, Erigone vagans, Lessertinella carpatica, Pelecopsis elongata.*

One who knows the beauty and richness of nature in the area of kettles under Mt. Dereše in the Low Tatras, may ask, how it is possible that the authors of the Study may **suggest the idea to overflow the part of this beautiful nature** (page 162 of the Study). It lies in the core of the NAPANT. The Low Tatra National Park was formed for the protection of these natural ecosystems. Although the authors inform us that the artificial lake would change the microclimate of the valley, flood protected flowers, and the growing period for vegetation, they do not say anything about changes in the water regime of the valley, about loss of the refuges and sites of food for marmots, chamois, bears (bilberries - M. Janiga, pers. observ. of fecals), Ring Ouzels, Rock Pipits. They do not give us any prognoses on the loss and changes in the species composition of the soil and other invertebrate fauna, etc.

Lampetra planeri (Bloch.)

This cyclostomat species still lives in some places of Velický or Batizovský streams. It is the Baltic element of fauna in the buffer zone of the High Tatras, and it is assumed, that its numbers have decreased in the last 20 - 30 years. On page 207 of the Study, the authors state that the natural ecosystems would be not damaged in the area of Poprad town. According to the plans of the organisers, the big shopping centre and parking sites will be constructed close to Velický stream. The part of the stream which lies between the two suggest construction in the locality where the species still rarely occurs. Although the authors plan to place sewage disposal here (page 82), we cannot find where in the Study, how the current level of purity of the stream will be preserved from the massive construction work at this locality. The same goes for the locality of Batizovce, where a large centre with a hotel of 1,200 beds and other enterprises is specifically detailed, but the authors only mention that the site does not have sewage disposal, and that the situation requires its construction

Pisces in the Štrbské lake

The authors plan to take water for artificial snowing of the ski resorts from Štrbské lake. They assume that the water level will not decrease more than 2 cm (page 211 of the Study). But no data from ichthyologists or other zoologists can be found in the Study. What does this mean for fish and invertebrate fauna in the lake? Current studies examining the water of the lake, show that it is under the significant stress due to tourism impact. In the past, the lake was oligotropic, today, as a consequence of increasing settlement and the growing tourism industry in the area, it shows a transition between an oligotrophic and a mesotropic lake (Holčík and Nagy 1986). It is here that we find interesting contradictions in the Study. On page 158 of the Study it is stated that current sewerage and the new sewage disposal are, and will be, sufficient for WOG-2002, while on page 210 it is stated that the sewerage of the whole urbanized area is not reliably sufficient for current times.

Nowadays, seven species of fish live in the Štrbské lake. The species *Coregonus lavaretus* (L.) sensu *lato*, introduced in 1929, was rediscovered only in 1984, its existence was thus unknown for a full 55 years. It was introduced into the lake from a population in southern Bohemia where it had been introduced from the Miedwie lake in Poland. Štrbské lake is probably one of a few localities where the original form of the species lives. In other European lakes, the forms of the species is highly hybridized (Holčík and Nagy 1986).

Triturus montandoni (Boul.)

In the area, where the new ski trails are assumed, the distribution of this Carpathian endemic species of Newt is highly probable. The Montandon's Newt found here lives in a wide variety of waters, including Jamské and Štrbské lakes, Furkotská valley, etc. (Lác 1969). In wooded country, it lives under fallen trees or wood, and does not winter deeply in the ground. We can assume, that cutting of trees, and certainly the construction of new ski trails, will negatively influence the habitat of the species.

Ciconia ciconia L.

The White Stork could serve as a good bioindicator of the changes in the biodiversity in the subtatra region. A considerable spatial fluctuation has been noted in the occurrence of the White Storks in the territory of Slovakia over the last sixty years. Lowland populations destabilised, and dispersed, while in the mountain regions, the numbers of storks increased (Štollmann 1988). The species is decreasing in western Europe due to urbanization of habitat and contamination of agricultural fields. It likes wet meadows and fields with frogs and rodents. The bird lives in Poprad - Veľká, Stará Lesná, Matejovce, Veľká Lomnica and other villages, where new hotels and traffic constructions are planned. Its occurrence may well indicate, if the economic development of subtatra regions damages the last fragments of wild nature, or, if the town planners cooperate with naturalists, and save the relative richness of nature in Poprad and Liptov basins.

Tetrao tetrix L.

Winter and spring tourism appears to be responsible for the decline of Black Grouse in Slovakia (Karč 1989). The comparison between the spatio-temporal distribution of skiers and the grouse in the Savoie Alps also suggests the birds' exclusion from their best wintering areas due to disturbance (Miquet

1986). In the Low Tatras, the cable-collision mortality may also be a determining factor. I personally found a dead young cock with a broken wing under the chairlift to Luková, on the northern slope of Mt. Chopok in the Low Tatras. The data from the Savoie Alps may be a good indication, of what will negatively affect the Grouse when the ski resort in Demänovská valley will be developed. Miquet (1990) posseses the data on 58 deaths of the Grouse from wire collision; 88 % of them occurred in winter. Fog and woody habitat increased the frequency of accidents, and dead males predominated over females. Collisions were more frequent on ski-tows and electric lines than on chairlifts because of their poor visibility.

The high number of visitors, intensive building works, reconstructed ski-tows and chairlifts, etc. **will surely damage even more the Black Grouse population in the Jasná region.** The same may be awaited in the High Tatras, west of the Štrbské pleso where the species occurs (Michelčík and Kráľ PB 1993).

Tetrao urogallus L.

In the database of the Tatra National Park Biodiversity Program, **we have sufficient evidence that planned ski runs will considerably cross the sites of occurrence of the Capercaillie.** We monitor the locality between Štrbské and Jamské lakes as the suitable habitat for this species (Kaiser PB 1993, Michelčík PB 1993, 1994, Gáborík PB 1993). Cutting of the forest for the new ski runs will surely disturb the birds, and will fragment their mating sites. Telemetric monitoring of the Capercaillie in Sweden clearly revealed that the birds like elevated areas with forests older than 60 - 70 years (Rolstand and Wegge 1987). When the amount of old forest is reduced, it may become unsuitable for the Capercaillie population. In autumn, the birds eat high amount of bilberry fruits (Rolstad 1988) which are usually collected by people in the settled areas. The expected increase in the number of visitors will seriously limit the habitat and feeding opportunities of this beautiful bird in the locality.

Passerine birds

Many species of small birds cross the Low Tatras and High Tatras on migration. In October 1972, many passerine species died due to intensive artifitial night lights applied in the locality of Štrbské Pleso. Collisions with reflectors were frequent (Mihál 1976). It is highly probable, that the construction works on the chairlifts in the Jasná centre, and the reconstruction of the skiing centre in Štrbské pleso will be also in nights. The period between the years 1995 and 2002 looks as very short for the building of all suggested constructions in the Study. Mainly in the last years of the works, the significant damage of the flying fauna (birds, butterflies, etc.) can occur, if the constructions will be light up. But in the Study, no data can be found on the collisions of this type, although the authors claim many times, that the nature of the National Parks would be not damaged.

If the authors realise all of the suggestions written in the Study, then it is certain, that the organizers will be stressed for time. On pages 177 to 179 of the Study, a list of many serious ecological problems is presented, but the authors suggest that the problems would be solved before the start of building activities. Moreover, each larger construction must be valued by E.I.A. law, and this evaluation will take much of the organizers' time.

Marmota marmota L.

As desribed in the previous sections, it is without a doubt, that the authors of the Study plan new urbanization and construction in the territory of Štrbské pleso (reconstruction of ski-jumps, sport stands - page 85, construction of the entry complex - page 173, increase of the parking sites - page 152, etc.).

In the Mlynická and Furkotská valleys (state nature reserves in the area of the TANAP), colonies of Marmots live (Kráľ PB 1993, Kaiser PB 1993; PB quotations are data from database the Tatra National Park Biodiversity Program). The Marmot habitat in valleys can be easily reached by chairlift from the Štrbské pleso. In good weather, the trail from the Mt. Predné Solisko is used by a large number of hikers. I assume, that the number of visitors will increase in these valleys in a few next years after the Olympics. In the valleys with high tourism, the escape distance of marmots significantly desreases. The animals posses more different kinds of activities during feeding (Novacký 1981). Such colonies may be more vulnerable to attacks by Foxes, and Blahout (1971) assumes that there is a correlation between tourism and Fox predation on Marmots. Marmots do not only take refuge from their natural enemies such as the Fox or the Golden Eagle, but also when they are disturbed by humans. The opinion that they are very adaptable and therefore hardly affected by tourism is widespread, but recent studies have shown that the presence of hikers can have a negative impact on foraging (Neuhaus *et al.* 1989). It takes some time for Marmots to resume their activities after they have taken refuge, and it can be assumed that a succession of such events would increase the winter mortality and reduce their fitness (Anderson *et al.* 1976). Mainini *et al.* (1993) showed that escape of Marmots increased with cross-country hiking, and was even greater, when the hikers were accompanied by dogs. I have no doubt, that a comparable situation to Štrbské Pleso will also occur in the Low Tatra National Park in the summer. The Study plans the reconstruction of chairlifts of the Mt. Chopok what will increase the capacity of visitors. I think, that the colonies living close to the mountain chain Chopok - Dereše, will be highly disturbed.

Rupicapra rupicapra (L.)

Ski area development has been shown to have adverse environmental effect on Chamois at Mt. Solisko, which lies northerly to the village Štrbské Pleso, and it is connected with this settled area by chairlift. The downhill race, which runs parallel to the chairlift, was built in 1970, for the World Championship in Nordic Events. The coniferous forest was cut on the edge between Mlynická and Furkotská valleys. The race usually does not have sufficient snow (Hlaváč 1994). Although the chairlift is often not used, its construc-

tion and the public activity disturbe the daily movements of Chamois in winter (Blahout 1977). Our current data show that Chamois in the both valleys, may occur in February (proposed months for the Olympics) in the ecotones between alpine meadows and the upper part of the pine forest or in the higher parts of the Mt. Solisko (Michelčík PB 1994). But the authors of the Study assume, that the training trails of the visitors may be in a wider area of these valleys.

A stressful situation for chamois may occur at the northern slope of Mt. Chopok. The Study assumes there will be heavy construction between 1996 and 2002, with the destruction of the old chairlift and the building of the new one. The new lift will lie several metres westerly, in the new undamaged alpine meadows, and not in the old eroded line. The Chamois often cross the line from one to another kettle of the Mt. Chopok (pers. observ.), mainly in the summer and autumn. The new ski rails and higher density of visitors will surely intensify the fragmentation of chamois habitat in the Low Tatras.

Big carnivores

February, March, April are the months, when the Lynx (*Lynx lynx* L.) and Wolf (*Canis lupus* L.) frequently occur in the Štrbské pleso and its surroundings. The Lynx was monitored in Mlynická valley, on the slope of the Mt. Solisko and sometimes not far from the settlements (Fabián PB 1992, 1994, Michelčik PB 1993, 1994, Gáborík PB 1993, Kapitáň PB 1993). Wolves are frequently seen not far from settlemets or roads (e.g. Gáborík PB 1994). Their tracks were found close to sites where the ski runs will be prepared (Gorka PB 1993, Michelčík PB 1993). If we assume, that the Olympics would be in February, then 30,000 of visitors would surely influence the behavior of these carnivores.

In this ski resort, the Brown Bear (*Ursus arctos* L.) will also be adversely affected by visitors. Bears are present here from March to the November (Gáborík PB 1993, Kaiser PB 1993, Kráľ PB 1993). Often females with young are observed (Kráľ PB 1993). The cutting of trees for ski runs will intensify further fragmentation of bear habitats biotopes.

As a consequence, there will be adverse interactions with people. **Urbanization of the region may attract bears searching for food near settlements.** The same phenomenon may occur at the Jasná ski centre in the Low Tatras. Chairlift service men remember these conflicts when bears collided around the interstation Luková a few years ago.

Living conditions of wild carnivores will be increasingly limited also in the other centres of the High Tatra National Park, where the further constructions would be licensed. Starý Smokovec will be completed with a swimming-pool, sauna, etc.; Dolný Smokovec by heliport, administration building, new motel, etc. (page 90 of the Study), Tatranská Lomnica would have for example an athletic track, tennis hall, new motel, riding path, etc. (page 91). These plans for new construction are not legal in the Nationa Park under current law, and all these intentions of the authors do not relate to the idea (and promises !!!) that no more construction will be built inside the High Tatra National Park.

Biota of the Olympic centre Poprad

From the point of view of the biota, the centre at L. Mikuláš looks to be better planned (pages 31-43 of the Study) than the centre at Poprad (pages 20-30 of the Study). As mentioned above, by Šoltés, the planned Olympic village will damage the biotope of the rare flower *Primula farinosa*. The authors of the Study seem unaware of great efforts in 1990 and 1991 of the Institute of Environment in Poprad for saving this locality. The locality could be included as a natural garden in the "Olympic village". In contrast to this solution, the authors plan a "botanic garden" in "extensively urbanized area at the embankment of the river Poprad". The authors do not specify what type of "botanic garden" will be constructed at this highly macadamized area. Moreover, the authors do not say, what will become of one of the few old parks close to railway station when the big traffic information centre is built. In the Olympic village and venue in Poprad, the authors want to "complete the exterior" with a plantation of coniferous trees (page 23). They do not say what will happen to these young trees in 2002 under the pressure of a high number visitors in this fenced area.

Notes to the economic management of the WOG - 2002

On page 324 of the Study, the authors assume a total income of 11,944 million Sk. The expenditures for sport complexes and operation are estimated at 7,818 million Sk. This is probably the minimum value, because expenses for some alternative constructions, like a cog railway in Demänovská valley, are not included in the list of final calculations. The subtraction of those two numbers is 4,126 million Sk, and this number is the predicted net profit from the Olympics (page 328). The number is also often used in the press to inform the public (see above). But on page 309, more expenditures are listed for construction of the press centre, all hotels, etc., on overall sum of 6,988 million Sk. The authors did not include these 7 thousand million Sk to the above calculations, which clearly indicates that they accept a deficit. Using their numbers, the overall expenses would be 14,806 million Sk, and the **deficit 2,862 million Sk**. On page 326, the authors want "to define the conditions under which the possible deficiency would be paid by state and regions". **The authors clearly expect that the nation will not profit from, but will pay for, their plan**.

In the Study, we can also find **fundamental** mistakes. For example, the total of the expenses on page 309 is 6,988 million Sk, and not 6,188. Moreover, the authors continue to use this error in further text (page 320).

The data on the development of the information system for the Olympics are also very vague. I do not mean the application software, which will be bought, but I think about the contents of databases. On pages 292 - 295, the authors list a large number of categories which would be included in the unified information system. I know that many of the mentioned data are not yet "in the computers", and the scientific workers and other experts know well that the construction of the databases will make many years. The authors mention more than 100 general categories like TV,

photography, education, industry, etc. Of course, such databases are often licensed.

At the end of my contribution, I would like to mention one feature of the Study. On many pages (for example, page 304), we can find sentences, which sound like political proclamations. It looks as though the authors are trying to use the social and ethnic feelings of the Slovak nation for the acceptance of their plans. I consider that the way is not loyal to the people, who have paid and will pay the authors' project. These types of studies need to be more pragmatic and rational, because the current Winter Olympic Games are really big enterprises. If we consider the national point of view, then our review brought clear evidence that the project is against national interests. **The nation would finance the destruction of its own nature of strategic value and world (Biosphere reserve) significance.**

Conclusions

We do not think that the Study is an accurate source base for any decision to propose Slovakia for WOG 2002, for the following reasons:

1. The authors imagine, that the organisation of olympic ski competitions in the centres Jasná and Štrbské Pleso can be performed without damage to abiotic and biotic components of Tatra National Park and Low Tatra National Park. If the organisation of these ski competitions cannot be localized outside these sites then the candidature of Slovakia for WOG will involve land degradation and devastation of these naturally valuable habitats.

2. The Study does not fully examine the problematics of geomorphology, soil protection, hydrology, protection of flora and fauna, forestry, environment and landscape image of the sub-Tatra regions Liptov and Spiš. The study offers no satisfactory or consistent solution to all potential conflicts of interest.

3. Those sections in the Study, in which the specific ecological problems are described, are not complete. They do not merit any unambiguous conclusions about the possibility of WOG organisation in the Tatras.

4. The authors calculate possible profit of 4.126 Billions Sk. Hitherto all Olympic games suffered a loss (Trémion 1992) including the one in Albertville, despite previously constructed infrastructure. The localization of sport events directly in protected areas is unacceptable from the point of view of nature protection. The desire to be "visible" can be fulfiled in sporthall events, and this would contribute to regional prosperity more than the destruction of valuable environment. In fact, the reduction of sports activities in the Tatra National Park would be welcomed. The most important thing is not to limit unfavourable ecological consequences but to prevent them. The purpose of our National Parks is to protect the precious environments and not to organise the international competitions.

One must recognize that **the authors of this review are not against the development of sub-Tatra regions**, especially of the towns of Poprad and L. Mikuláš. But any development must be sensitive to the protection of the last fragments of natural habitats. Many different smaller sport enterprises exist, which could help to solve the development of the infrastructure of this region, and in many of them, Slovakia has good traditions (e.g. ice-hockey).

But in our time of continuous damage to the planet, when the natural resources of the country play increasing roles in the healthy development of the nation, we believe that big enterprises are not needed in the core areas of the National Parks; especially, if these projects result in significant damage to nature. We would be very glad, if our statement would be taken as purely scientific, and not a basis for any political speculation.

In terms of the Winter Olympic Games, we think that the future will show that they can be only held at existing ski courses, so as to avoid further unnecessary destruction of the mountain environment. Up until now, they caused serious damage to nature in many mountains of the world (Watanabe *et al.* 1990, FRAPNA 1991, Janiga 1991). We also think that international organisations like European Parliament, IUCN or I.O.C. will have to use an international **academic scientific** group or groups, which would be responsible for the examination of damage to nature in regions proposed as candidates for WOG, and thus **would prevent possible greater conflicts of interests. Moreover, such a group would also exclude the political dimension of the problem.**

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