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LANDSCAPE CHANGES AS A CONSEQUENCE OF TRANSFORMATIONAL PROCESSES IN THE MODEL AREAS OF THE TATRA NATIONAL PARK (SLOVAKIA) AND THE PRIELBRUSIE STATE NATIONAL PARK (RUSSIA)

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Abstract

This paper focuses on the dynamics of landscape changes in the context of social transformation processes of two model areas: the Tatra National Park in the Western Carpathians in Slovakia and the Prielbrusie State National Park in the Caucasus Mountains in Russia. In both model areas transformation processes, which have been especially operating in Slovakia since 1989 and in Russia since 1992, are analysed and the key driving forces of landscape changes are revealed. The paper identifies specific weaknesses (problem issues), strong points (positive examples) and conflicts of interests for both model areas. The main activities influencing the vulnerability of natural values and also limitations affecting the location of tourist facilities in both national parks are discussed and compared.

Key words: landscape change, national park, Tatra National Park, Prielbrusie State National Park, transformation processes

Introduction

Changes in a landscape reflect the dynamics and evolution of a territory, with each change having a cause and genesis. Landscape changes either result from natural processes or they are due to anthropogenic activities. Man-made changes were monitored to evaluate the consequences of the transformation processes on a landscape.

The transformation processes influencing landscapes especially from social and environmental point of view are important for national park management. These comprise a complex of processes resulting in changes (transformations) in a landscape (Khoroshev et al., 2009).

In 2008 and 2009, special research activities on the identification of land use, land use conflicts, evaluation of the current system of national park management and measures supporting sustainable development were undertaken in two national parks: the Tatra National Park in Slovakia and the Prielbrusie State National Park in Russia (Fig. 1).

These national parks were chosen as model regions because of their well-developed system of altitudinal belts, their high potential for natural disasters and heavy recreational load. The Tatra National Park (TANAP) is located in the highest part of the Western Carpathians and the Prielbrusie State National Park is located within the highest areas of the Caucasus. Research herein is connected with previous projects and expertise in which the authors of the paper were involved in previous years. The Russian team members participated in preparation of the basis for the "Prielbrusie", National Park, in creating the Atlas of this Park, and several scientific projects including "Assessment of grazing impact and industrial pollution on landscapes" in 1992-1994 (Khoroshev, 1998), and the "Investigation of spatial-time organisation in zones of the debris flow and avalanche activity" in 2003-2008 (Petrushina, 2008). The Slovak team members participated in elaboration of the strategic study "Towards sustainable development of the Tatra region (Huba et al., 2005); and in the study "Landscape ecological spatial optimisation and functional land use of the Tatra Biosphere Reserve in 2005-2006" (Izakovičová et al., 2008).

The aim of this paper is to present a comparison of development of the TANAP and Prielbrusie National Park areas based on the transformation processes causing changes in landscapes and to compare these two model areas to limit further location of tourist facilities.



Fig. 1. Location of the Tatra National Park in Slovakia and the Prielbrusie State National Park in Russia (source: <http://www.mapyeuropy.eu/fotogaleria/59.jpg>)

Methods

For evaluation and comparison of landscape changes as consequences of transformation processes of the national parks we decided to use the DPSIR model (OECD, 1991) as a method of evaluating a situation in the environment via environmental indicators (EEA, 1999, Wascher et al., 2005). Thus, the methodology is principally derived from steps identifying the following indicators:

- **Driving force** (social, demographic and economic development of society and related changes in lifestyle and demands on the environment)
- **Pressure** (pressure on the environment caused by human activities)
- **State** (data on environmental quality of particular environmental elements and other qualitative-quantitative parameters of natural sources)
- **Impact** (data documenting environmental damage)
- **Response** (information and data pointing to measures by which society reacts to negative changes in the environment).

This methodology is often specifically modified in practice (e.g. Spilanis et al., 2009; Glekas et al., 2008). E.g. it is used as a sequence of the steps: **Driving force – Pressure – State – Response** (DPSR).

Since this paper refers to the work of Khoroshev et al. (2009), dealing with management of the TANAP in Slovakia and the Prielbrusie NP in Russia national parks in the context of the social transformation processes, the methodology was adapted. Transformation processes determined in the work of Khoroshev et al. (2009) present the main driving forces accepted in this paper.

Although the methodological steps are principally derived from DPSIR methodology they are modified as follows:

- 1st step: Characterization of the two model areas.
- 2nd step: Characteristics of tourism and its interaction with nature protection in both national parks.

- 3rd step: Identification of driving forces and pressures on the natural environment. The influence of transformation processes on landscapes and the resultant impacts causing changes in the landscape.
- 4th step: Evaluation and comparison of spatial limits and other limiting factors for alternative tourist facility locations in both national parks.

The results obtained were based on existing research, expertise, planning documentation, field research and consultation with responsible persons, e.g. from administrative bodies of the national parks and other collaborating organisations and institutions.

Characteristics of the model areas

Both the model national parks, the TANAP and Prielbrusie NP have areal, linear and point sources of anthropogenic activities. The landscapes in various altitudinal belts differ in plant cover structure, biomass, soil thickness and humidity. These, together with various azonal factors, result in the high heterogeneity of landscape reactions to similar anthropogenic loads. Both areas are particularly occupied by legally protected natural areas with limited use of natural resources. Table 1 gives a summary of the basic characteristics of these national parks.

Table 1. Selected characteristics of the national parks: the Tatra National Park and the Prielbrusie State National Park

Characteristics of the national parks	The Tatra National Park (Slovakia)	The Prielbrusie State National Park (Russia)
Total area	104503 ha	101200 ha
Present ownership structure	52% of the land is owned by the state, the remainder (48%) is owned by private owners and by local communities	62.5% of the land is owned by the state, the remainder (37.5%) is owned by private owners or communities
Elevation range	610 m (Spišská Belá) – 2655 m (Gerlachovský štít)	1480 m (Chelmas river mouth) – 5642 m (Elbrus)
The highest permanent settlement	Štrbské Pleso (1355 m)	Terskol (2130 m)
Dominant types of landforms	<ul style="list-style-type: none"> • Glacial and paleoglacial landforms • glaciofluvial landforms • erosion landforms • karst forms of relief • talus cones • denudation landforms • fault slopes 	<ul style="list-style-type: none"> • glacial and paleoglacial landforms • glaciofluvial landforms • erosion landforms • mudflow and avalanche cones • talus cones • volcanic landforms • denudation landforms • fault slopes
Mountain ranges	26 km (in the High Tatras), 14 km (in the Belianske Tatras) and 37 km (in the Western Tatras)	The Main Caucasus range (32 km) and Bokovoi range (30 km)
Number of lakes and mineral springs	<ul style="list-style-type: none"> • more than 120 lakes (they are a result of glacial activity during the last Glacial period) • several tens of mineral and thermal springs (9 localities with geothermal and 4 with mineral water) 	<ul style="list-style-type: none"> • near 10 rather big and some small lakes (mainly of glacial genesis) • near 100 mineral and thermal springs with total debit of 50 mil. litres per day
Number of natural reservations and their whole area	<ul style="list-style-type: none"> • 27 National nature reserves (37977.13 ha) • 24 Nature reserves (1063.34 ha) • 3 National nature monument (caves) • Natural monument (11.18 ha) • others (7.24 ha) 	<ul style="list-style-type: none"> • 55327 ha (74.1%) – the reserve zone • 15984 ha (21.4%) – the recreation zone • 3340 ha (4.5%) – the economy zone

The Tatra National Park

TANAP is located in the Northern part of Slovakia, on Slovakia's northern border with Poland and it is in the administrative territory of Žilina and Prešov regions. It is in the area of the Western and Eastern Tatras which consist of the High Tatras and Belianske Tatras.

The TANAP represents the first national park in Slovakia founded in 1948 and it was established by the Act of the Slovak National Council No. 11/1948 on December 18th 1948. The Park is important for its unique alpine and subalpine ecosystems, its diverse flora and fauna with many endemic species, a mountain range formed by glaciers and also for its mountain's usage for beneficial therapy, recreation and sport.

From 1987, the Western Tatras were affiliated to TANAP by Governmental Regulation No. 12/1987 and the total area of the national park and its protective zone was adapted through Governmental Regulation No. 58/2003. According to this regulation, the total area of TANAP is 1045 km², which includes 738 km² area of national park and 307 km² protective zone.

The first proposed zoning system for the TANAP was instituted in 1967 and the second one emanated from the zoning system of the Tatra Biosphere Reserve as a part of the nomination letter in 1990-1991. A new proposal for a zoning system was submitted for public discussion in 2004. This utilised current methodology based on scientific criteria including naturalistic evaluation based on originality and authenticity. This is, however still under discussion with private and community input. According to the new zoning system, the "A" Zone will account for only 54% of the TANAP total area. It was confirmed by the IUCN mission in Slovakia in April 2005 (IUCN, 2005) although TANAP fulfils only some of the primary management objectives for an IUCN II National Park and protected area. Two critical points were noted: the first concerned exploitation in the national park area where only about 52% of the total area represents the reserve zone and the second questioned adequate provision of environmentally and culturally compatible spiritual, scientific, educational and recreational and visitor management (Huba et al., 2005; Izakovičová et al., 2008).

A proposal for a new zoning system for the TANAP (Fig. 2) is as follows (Vološčuk et al., 2004; Rules of material of the VIII. Committee meeting of the Slovak Government, 2006):

- **A zone** – This represents a zone lacking active human interference and comprises a territory of the most precious natural heritage where the strictest 5th degree of protection is applied. This A zone protection is especially important in the highest regions of the national park which form a compact core of the park. Moreover, well preserved representative ecosystems in the lower parts are also included, giving the A zone a scattered character in these parts.
- **B zone** – This zone has active management measures, because it comprises territories with significant natural heritage which require considered, reasonable and mild regulations to preserve and sustain this heritage. Regions included in the B zone can be found in lower parts, especially around the A zone. The B zone also comprises well preserved biotopes such as meadows and turf biotopes with scarce and endangered plant species. The 4th degree of protection, in which human interference is allowed only under particular strict circumstances, is applied here in order to preserve these scarce endangered species.
- **C zone** – This zone has more significant socio-economical usage with more significant ecosystem disturbances and natural environment changes due to human activities. These include significantly changed forest areas, permanent grasslands, settlements and recreation centres. The C zone can be found especially in the lower peripheral regions of the national park. The 3rd degree of protection is applied here.

- **D zone** – represents a protected TANAP area with the least restrictions of the 2nd degree of protection within the national park. This zone is represented by a cultural landscape with scattered natural heritage on which nature protection is focused. Prevailing agricultural land is succeeded by forest land and settlements. The protection aims at facilitating and supporting sustainable cultivation without exploitation of the territory which preserves natural, landscape, cultural and historical values. The protection also conserves characteristic landscape scenery, it improves landscape ecological stability and maintains biodiversity while improving significant biotopes' and species' conditions.

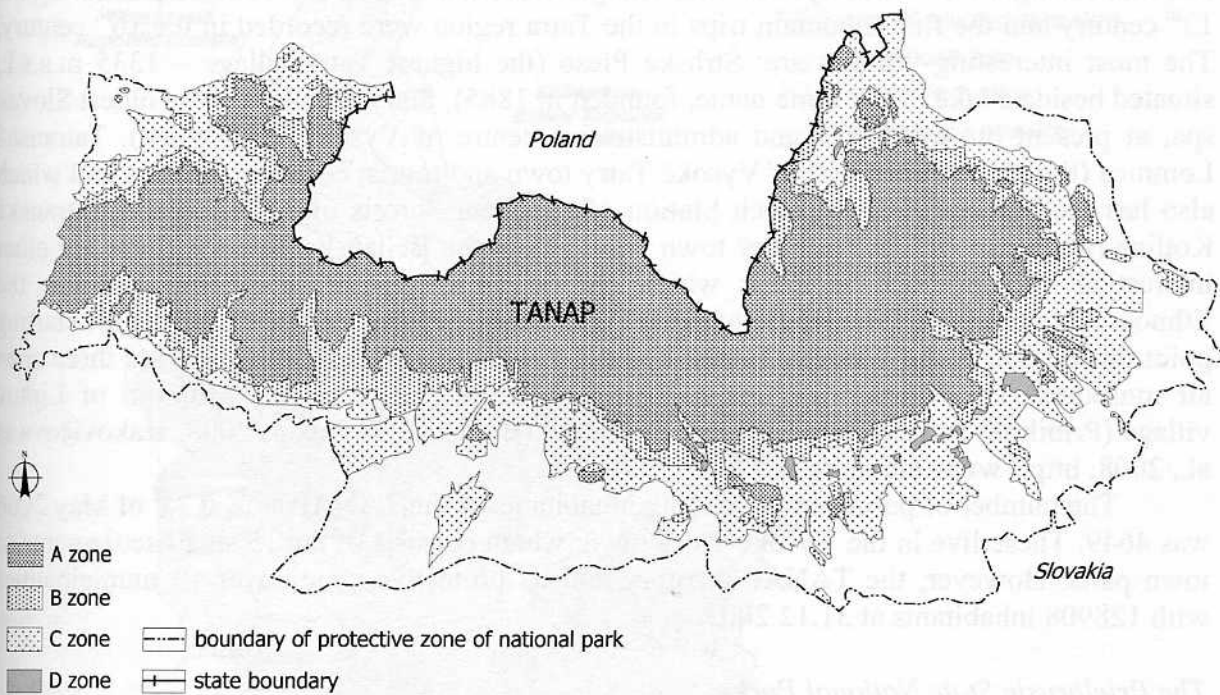


Fig. 2. Proposal of the functional zoning system of the TANAP (source: Vološčuk et al., 2004; Land use plan of the High Tatras township, 2008)

TANAP is divided into several zones according to altitude: from a pine forest zone to a subalpine dwarf-pine area, through an alpine cleared area to a sub-nival zone situated below the snowfall area. The vegetation is species rich due to diverse geological and relief conditions, climate and formation after the glacial period. Approximately 1300 higher plant species, 900 species of algae, 700 species of lichens and more than 500 species of mosses can be found there. The flora comprises 37 endemic species, especially glacier relicts and 41 West Carpathian and 57 Carpathian endemic species. Typical representatives of the TANAP flora are e.g.: *Primula farinosa*, *Delphinium oxyspalum*, *Dryas octopetala*, *Arctous alpina*, *Ranunculus reptans*, *Primula halleri* subsp. *platyphylla*, *Oxytropis campestris* ssp. *tatrae*, *Ranunculus altitatrencensis*, *Dianthus nitidus*, *Papaver tatricum* etc. (www.spravatanap.org).

Many animal species typical for mountain regions live in the TANAP (e.g.: *Capreolus capreolus*, *Cervus elaphus*, *Marmota marmota latirostris*, *Microtus nivalis mirhanreini*, *Lynx lynx*, *Canis lupus*, *Ursus arctos*, *Felis silvestris*, *Aquila chrysaetus*, *Falco peregrinus*, *Falco tinnunculus*, *Glaucidium passerinum*, *Bubo bubo*, *Strix aluco*, *Lutra lutra*, *Salmo trutta* etc.), however several endemic species can be found there as well (www.spravatanap.org). The most precious endemic species is *Rupicapra rupicapra tatrica*, the population of which has been decimated to approximately 200 individuals during the last decades and today it is facing extinction.

The TANAP territory is also attractive because of its geomorphologic conditions and this relatively small territory concentrates several types of landforms. This comprises a lot of glacial forms such as nunataks, karlings, troughs, cirques, mutons, various moraines and terraced glaciofluvial fans, and also debris flows, block seas or distinct cryogenic forms of relief including polygonal and girland soils and hillocks. Lime-stones are interconnected with the following karst forms of relief; abysses, karren, canyons, gaps, caves, springs and waterfalls.

The Tatra region is inhabited by the same nations as in the rest of Slovakia. From a historical developmental viewpoint, the Tatra region was settled mainly by Germans from Saxonia during the 12th century. The first villages were founded on the Tatra slopes during the 13th century and the first mountain trips in the Tatra region were recorded in the 16th century. The most interesting villages are: Štrbské Pleso (the highest Tatra village – 1335 m.a.s.l., situated beside a lake of the same name, founded in 1885), Starý Smokovec (the oldest Slovak spa, at present the town area and administrative centre of Vysoké Tatry town), Tatranská Lomnica (the largest town part of Vysoké Tatry town and tourist centre in the area and which also has the Museum and Research Station of the State Forests of TANAP) and Tatranská Kotlina (town part of Vysoké Tatry town with a spa in the Belianske Tatras). There are other interesting villages such as Ždiar which is the centre of goral's folklore and has the Ethnographic museum "The House of Ždiar" opened in 1973 and there is Zuberec, the starting point for tourism in the Western Tatras. In the TANAP and its surrounds there are three open air museums: The Museum of Orava Village (Brestová/Zuberec), the Museum of Liptov village (Pribilina) and the Tatra Museum in Poprad (Bohuš sr., Bohuš jr. 2008; Izakovičová et al., 2008; <http://www.tatry.sk>).

The number of permanently abiding inhabitants of the TANAP area at 2nd of May 2006 was 4649. These live in the Vysoké Tatry town, which consists of the 15 small settlements or town parts. However, the TANAP territory and its protective zone cover 19 municipalities with 128908 inhabitants at 31.12.2003.

The Prielbrusie State National Park

The Central Caucasus can be characterised as a region with contradictory unique natural landscapes and heavy anthropogenic impact. The typical economic activity and only sources of profit of the indigenous population are pasturing and cattle. The current increase in private live-stock causes irreversible changes in landscapes leading to erosion and loss of productivity.

The Prielbrusie NP is administratively positioned in the upper parts of the Elbrus and Zolskiy regions of the Kabardino-Balkar Republic in the central part of the Great Caucasus. The Prielbrusie NP is in the highest part of the Caucasus and it is located at the borders with the Russian Karachaevo-Cherkessia Republic and with Georgia (Fig. 1). It occupies the upper parts of the Baksan and the Malka river basins whose sources are at the margins of the Elbrus glaciers.

This National park was established by Russian Federation Law № 407 on the 22nd of September 1986 and some changes followed in 1995. Hence, all Russian national parks, including this one, are the responsibility of the federal government. The main aim of the Prielbrusie NP is the conservation of its unique nature and the development of sustainable ecological recreation and tourism. This region is a specialised alpinist and tourist "Mecca" due to the position of the Elbrus Mountain which is the highest throughout Russia and Europe.

The Prielbrusie NP falls within the IUCN category II for protected areas – National Parks (www.biodiversity.ru). In the east it is connected to the adjacent Kabardino-Balkar reserve and it has the following three functional zones:

- The reserve zone accounts for 553.27 km² (74.1%)
- The recreational zone covers 159.84 km² (21.4%)
- The economic activity zone has 33.40 km² (4.5%).

These functional zones and regimes of legitimate land use are poorly marked, with natural boundaries restricting accessibility to strictly protected areas. The existing functional zoning system of the Prielbrusie NP is shown in Figure 3.

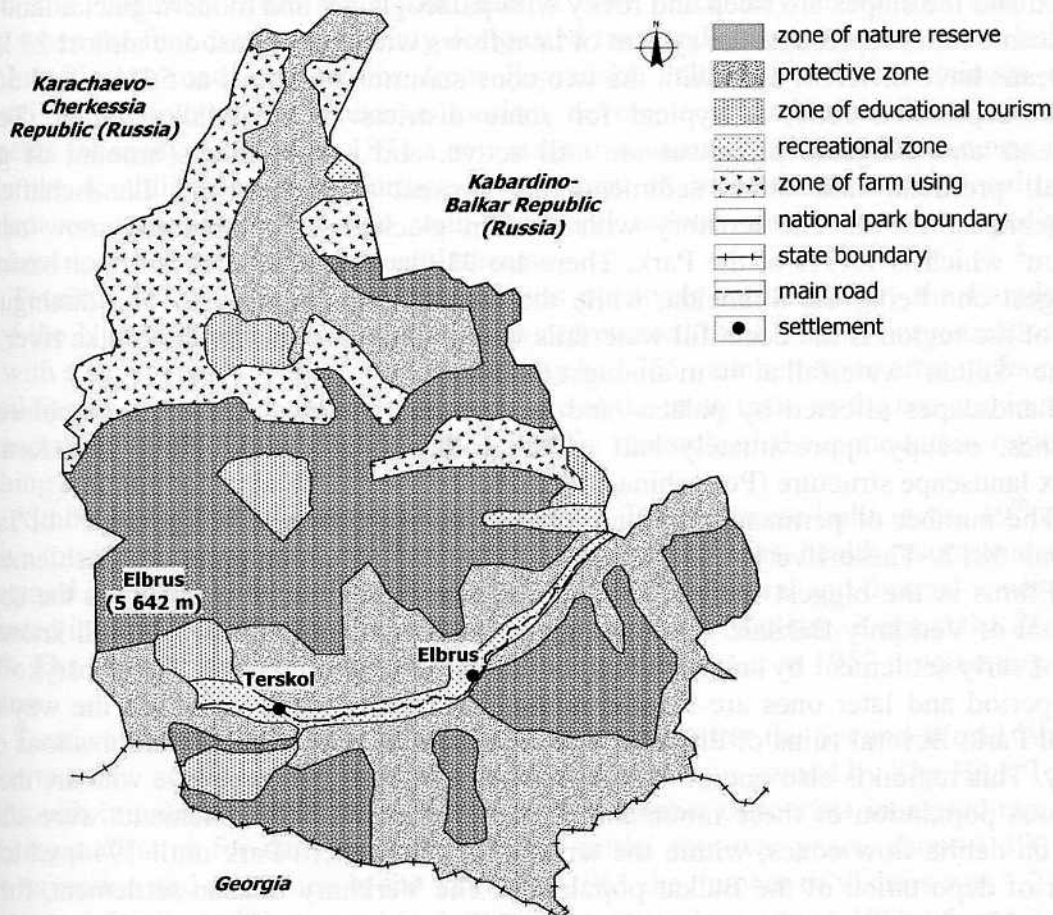


Fig. 3. Functional zoning system of the Prielbrusie State National Park (Source: Bašorov, 2007)

A new zoning system was prepared in 2009, and this included changing the national park boundaries in the northern and the eastern part of the Park. Its northern part is to be reduced while its eastern territory enlarged thus connecting it to the neighbouring „zapovednik“ Kabardino-Balkar reserve, which is situated east of the national park. This will significantly enlarge the current area of the national park. Since it is very attractive and expected to exceed its tourist carrying-capacity within seasons, it is therefore necessary to create zoning with strict specifications concerning the possibilities and the forms of landscape use.

Several complex and botanic sites of nature reserves have been identified within the territory of Prielbrusie NP due to its diverse and unique nature, and 63 species of animals, 111 species of birds and 111 species of plants are already under legal protection. Distinguishing features of the region include the altitudinal landscape zonality, slope-facing vegetation contrasts, winding zonal boundaries and landforms altered by intensive geomorphic processes. High mountainous glacio-nival, meadow and less forested landscapes with pine (*Pinus hamata*) and birch (*Betula pendula*, *Betula Litwiinova*) dominate in the Park and there

are steppes on the south-facing slopes. The vegetation is diverse with rare and endemic species, especially the sub-alpine belt which has 21 species including: *Betula raddeana*, *Daphne baksanica*, *Rhododendron caucasica* and *Fritillaria caucasica* etc. The fauna is also rich with 63 species of mammals (bears, *Panthera pardus*, *Nyctalus lasiopterus*, etc.), 111 species of birds (*Gypaetus barbatus*, *Lyrurus mlokosiewiczze*, *Accipiter brevipes* etc.) and a great number of insects. The region is the centre for the distribution of aurochs.

In this region, mountain ridges are higher than 3000-3500 m, valleys are deeply dissected and the slopes are steep and rocky with palaeoglacial and modern glacial landforms. The volcanic relief represents the system of lava flows with the longest one almost 23 km and the plateaus have different ages with the two cone summits of Elbrus at 5621m and 5642 m. The lake-depression relief is typical for some districts in the Malka valley. Tectonic movements and exogenic processes are still active, and a tremendous amount of glacial, colluvial, proluvial and other sediments are present (Gletcher und Landschaften des Elbrusgebietes, 1998). The territory with modern glaciers and permanent snow occupies 155.5 km² which is 15.3% of the Park. There are 93 glaciers in the Baksan river basin, with the longest one being the Shkhelda, while the Malka basin has only 8. The distinguishing feature of the region is the beautiful waterfalls with the highest ones in the Malka river basin, with The "Sultan" waterfall at 40 m amongst them.

Landscapes affected by palaeo- and modern debris flows, and often combined with avalanches, occupy approximately half of the valley floors in the Park, thus forming a complex landscape structure (Petrushina, 1992).

The number of permanent abiding inhabitants in Prielbrusie NP at the 1st of January 2006 was 5812. These live in the Elbrus municipality, which consists of 5 settlements of which Elbrus is the biggest with 3373 inhabitants and there are 444 living in the separate settlement of Verkhniy Baksan. These are all in the Baksan valley which is well known as a region of early settlement by ancient people, even in the Palaeolithic era. The "Sosryko" stand of this period and later ones are located in the lower part of this valley on the way to the National Park. Several ruins of different historical periods remind us of colonizations of this territory. This region is also one of the original homes of the Balkar people who are the main indigenous population of these mountains. Twenty of their small settlements were situated, mainly on debris flow cones, within the territory of the modern Park until 1944, which was the year of deportation of the Balkar population. The Verkhniy Baksan settlement, formerly known as Urusbievo, was the centre of a large Balkar community for several hundred years, and the first tourists to this region at the end of the 19th century stood in the guest rooms of the domestic leader.

Characteristics of tourism in interaction with nature protection in both national parks

History of tourism development

Both model territories are influenced by two basic approaches towards landscape maintenance: nature protection and tourism. Tourism is influenced by several concrete steps of transformation processes, which significantly influence the landscape and cause changes to it. The following paragraphs give a brief description of tourism characteristics in each national park.

The Tatra National Park

The year 1839 can be considered to be the beginning of tourism in TANAP when a house for a cold-water-cure was brought to Smokovec. The house was named Priessnitz and placed next to Rainer and Alžbeta springs, currently known as Smokovecká kyselka.

TANAP tourism has developed at differing rates since 1833. A butcher and innkeeper from Spišská Sobota called Jan Juraj Reiner and his wife significantly contributed to initial activities connected with tourism. They helped to build the first tourist paths, one of them being a path to the "Five Springs" emerging from a root of Slavkovský štít and also a path to Karlov Posed above Starý Smokovec, built in 1850. (Körnerová et al., 2005)

Development of the walking-tourist-routes in the TANAP was connected with the possibility of protection from harsh weather conditions. Pastoral and woodsman sheds retained this "cosiness" from the second half of the 17th century. It was not until the 19th century when the first dwellings directly designated for wanderers and tourists were built.

Insufficient road connections from Popradská valley to the mountainous regions presented an obstruction to intensive tourism development and creation of recreational settlements for many decades. In 1871 a new stage in tourism developed due to a new railway built in the foothills. However, further development of recreational tourist localities was dependent on their interconnection with road and railway networks, and especially on interconnections between individual settlements.

Tourism development in the TANAP was positively influenced by the foundation in 1873 of the Ugrian Carpathian Society, which represented the 8th tourist organization in the world with a super-regional character. The society had 765 members soon after its foundation. The building of tourist cottages and paths was one of the main tasks of the society, in addition to organization of trips and observations, scientific research of these mountain regions and publishing activities.

Although the first tourist centres and spas in TANAP were built in the 19th century, intensive tourism development together with development of spas, health resorts and sanitary areas started at the beginning of the 20th century. Important mineral and thermal water springs are located in Starý Smokovec, Dolný Smokovec, Tatranské Matliare, Kežmarské Žľaby and Lendak. The town of Vysoké Tatry had its first special legal Act in 1957 proclaiming it to be a spa area.

Tourism in the High Tatras developed very rapidly after the Second World War. This was due to a new administrative structure and to competencies gained by The High Tatras. A breakthrough in tourism occurred in 1948 when the number of tourists increased rapidly due to the slogan "Tatras for daily breaders". In the initial post-war years, about 4 500 people sought recreation and relaxation in the Tatras. In 1961 the number of visitors was 1.2 mil., in 1978 it was 1.6 mil., and the record highest number of visitors was in 1988 when 5.1 million attended. The current number of visitors is about 3-3.5 mil. per year and even this number exceeds the carrying capacity.

Transportation and tourist infrastructure together with recreation and accommodation facilities had been gradually built. The main tourist centres and attractions are Štrbské Pleso – Solisko I, Hrebienok, Skalnaté Pleso, Popradské Pleso, Lomnický štít, Rysy and Kriváň. They also include the Tichá, Kôprová, Roháčska and Žiarska valleys, plus mountain skiing areas, mineral and thermal springs, mountain scenic outlooks, carst landforms, caves, waterfalls, cultural and historical monuments and living museums of folk architecture.

The State National Park Prielbrusie

The first tourist centres in Prielbrusie NP were built in 1935. Although some alpinist camps were constructed in the 50 health resorts from the 1930's, more intensive tourist development started in 1960-1970s.

Currently, there are about 350,000 visitors per year with most visiting the national park in winter. There was a higher number of visitors in the era of the former Soviet Union, but since „*perestrojka*“ the number of domestic visitors is decreasing and the number of foreign visitors is increasing.

The main tourist centres and attractions are: the Elbrus Mountain, Cheget Mountain, Valley of the river Baksan, canyons (Adyr-Su, Irik and Adyl-Su etc.), mountain skiing areas, mineral and thermal springs, lakes (e.g. Bashkara, Syltran and Donguz-Orun), mountain scenic outlooks, volcanic landforms, glaciers, passes and waterfalls. In the national park area there are the two small museums, one of war and the other folk. Some interesting monuments are also located in this region. The first honours topographer A.V. Pastukhov who was the first to map Elbrus and others commemorate Killar Khashirov and Akhie Sottaev who guided expeditions up Elbrus mountain in 1829 and 1868.

The recreation impact began in the 1930's with building of some alpinist and tourist centres. The famous "Priyut-11" was constructed in 1938 on the slopes of Elbrus at an altitude of 4150 m. During the period of the Second World War and deportation of the local population, recreation decreased until the late 1950's – early 1960's when the motorway was constructed in the Baksan valley. This period was characterized by a recreation revival and the active construction of recreational buildings and cable lifts. The unique Neutrino observatory, scientific stations of the Moscow State University, the High mountain geophysical institute of Nalchik and the medico-biological station of the Ukraine Academy of Science appeared at this time. More than 120 ha of forests were cut as a result of this recreational impact and environmental pollution also increased. The development of infrastructure was carried out in the 1970s-1980s. More than 3.5 million people visited Prielbrusie NP in the 1980's, and by the late 1980s the number was a thousand times higher than in 1955, while the number of cars increased by 2-2.5 times. Although a slight decrease in recreation occurred in the 1990s resulting in conservation of recreational facilities, the last decade has been characterized by intensive recreation, especially in recreational construction and expansion of settlements. Currently seven alpinist bases and more than 30 hotels are now situated within the park area.

Comparison of tourism development in the two national parks

Tourism is one of the most important driving forces influencing the appearance and landscape use in both national parks. Additional characteristics concerning tourism development in the two national parks and their comparison are given in table 2. Selected characteristics deal with development of infrastructure for ecological tourism and these indicate the huge pressure of visitors in selected areas.

Table 2. Selected characteristics of tourism development and its pressure in the TANAP and Prielbrusie NP

Characteristics of tourism development	The Tatra National Park	Prielbrusie State National Park
Development of infrastructure for ecological tourism		
Length of tourist path, trails and instructive trails	20 main marked paths. More than 650 km very good marked tourist paths. The longest one is "Tatranská magistrála" at 46 km was constructed in 1931-1937. Tourists can use 12 marked paths for climbing to peaks higher than 2000 m. In the territory of TANAP and its protective zone there are 8 instructive trails.	Summary length of trails for one-day trips on foot is about 35 km, but educational information is very poor. The longest possible route for one-day trip is about 20 km and it covers an elevation range of 800 m. Most routes lead to glaciers, so visitors must return by the same route. Most paths for amateur visitors are 1-4 km long. Horses are used to cover greater distances.
Development of cycle tours/ mountain bike routes	At present there are more than 200 km cycle tours. They are connected to the international Poland-Slovak cycling artery. New parts of mountain bike routes are under construction.	Only limited bike routes. There are no constructed mountain bike routes.

Characteristics of tourism development	The Tatra National Park	Prielbrusie State National Park
Information centres	Information centres are located in all tourist centres and they are an integral part of the tourist agencies. The main information centres are in the Vysoké Tatry town areas of Starý Smokovec, Štrbské Pleso, Tatranská Lomnica, Poprad, and Kežmarok etc.	Information is dispersed among small shops and hotels. The scientific potential of institutions performing research in the park is only to a limited extent. However, the creation of an information centre is planned.
Instructive trails	More than 12 educational trails exist: Zverovka, Skalnaté Pleso – Hrebienok, the path to Belianska cave; Štrbské Pleso – Hincovo Pleso, Podmuráň; Roháčske Plesá and Juráňová valley etc.	These are not present.
Development of infrastructure supporting intensive pressure of tourism in high mountain areas		
Accessibility of the national parks by public transport	TANAP has a transit location near the highway linking the west and east of Slovakia. Circle motorways are accessible in the closest vicinity. Visitors have a good choice of ways to reach the park. Very good accessibility to the area directly by international railway and motorway, and Poprad airport is in close. There is also good local transportation. In 1986 a narrow-gauge cogwheel railway Štrba – Štrbské Pleso was built. Starý Smokovec is the main station in TANAP. This railway has a total twenty stations and stops.	The park has limited connection by the only motorway along the Baksan river valley to the national transport system. The motorway ends near the cable way at the Elbrus foothills in the narrowest section of the valley. The nearest railway station at Nalchik is 90 km from the border of the park; the nearest airports are 90 km for Nalchik and 160 km for Mineralnye Vody. However, transport load on the motorway is high only on weekends. There is a need for more parking, though suitable space is limited. Connections with the neighbouring valleys are outside the park and are accessible for special rough-terrain cars only. Most local transportation is by private taxis and tourist coaches.
Cable railways (cabin lifts) and chair lifts	Štrbské Pleso – Solisko I (2135 m long chair lift with capacity of 450 persons per hour), chair lift Štrbské Pleso – Solisko II and other chair lifts, chair lift Mostíky with capacity of 1350 persons per hour, cabin lift Lomnické Sedlo 1 138 m long (with capacity of 900 persons per hour), cabin lift Tatranská Lomnica – Skalnaté Pleso 3707 m long (with capacity of 900 persons per hour), cabin lift Tatranská Lomnica – Skalnaté Pleso 4 166 m long (750 persons per hour) and ground cabin lift to Hrebienok 1937 m long (with capacity of 800 persons per hour).	Elbrus area – 2 cabin lifts work on the pendulum principle – from Azau (2350 m) to St. Krugozor (2916 m) (constructed in 1967) and 2 up to 3450 m (station Mir) (1978), parallel gondolas cabin lifts started from the beginning of 2007 with a capacity of 2400 persons per hour. 1 chair lift up to 3780 m (station Gara-Bashi). Cheget mountain – 3 chair lifts, 2 (pair chairs and mono chair) from 2100 m to 2750 m was constructed in 1963, and 1 mono chair from 2750 m to 3000 m.
Ski-lifts	Several ski-lifts: Štrbské Pleso, Hrebienok, Nový Smokovec, Skalnaté Pleso, Tatranská Lomnica, Ždiar.	Several ski-bugels on the Elbrus and Cheget slopes up to a height of 3000 m.
Identification of visitors pressure in selected areas		
Most populated landforms	Ancient moraines and glaciofluvial fans (“glaciofluvial terraced fans”).	River terraces, glaciofluvial terraces, ancient mudflow cones and ancient moraines are the most suitable landforms for construction building. Due to the lack of safe areas, parts of the settlements and farmyards are located within the zones of mudflow and snow avalanche risk.

Characteristics of tourism development	The Tatra National Park	Prielbrusie State National Park
Most agriculture-attractive landscapes	Lowest deforested foothill (the only agricultural landscape)	Steppes and alpine meadows on steep slopes and plateaus are the main pasture areas for sheep, horses and cows. Irrigated steppes on river terraces and mudflow cones are used for hay-making and growing vegetables, up to elevations of 1900 m.
Landscapes with most developed tourist infrastructure	Spruce forests.	Most tourist facilities are located within the pine forest's altitudinal belt, on river terraces and on ancient mudflow cones at elevations of 1800–2350 m.

Influence of transformation processes on national parks and resulting pressure on landscape changes

Examples of social transformation processes

The common principal economic and political transformation processes acting as positive or negative driving forces were determined. These processes started in Slovakia in 1989 and in Russia in 1992. Table 3 shows a summary of presumed positive and negative impact examples of the principal social transformation processes reported in more detail by Khoroshev et al. (2009).

Table 3. Examples of principal social transformation processes and their presumed impacts on nature conservation, landscape changes, support of sustainable tourism and management in both national parks (source: Khoroshev et al., 2009 – modified)

1) Privatisation of land and changes in all sectors of social life

Positive impacts: restitution of land and real estate to the owners; new possibilities for territorial development.

Negative impacts: although the major share of land in protected areas is private this ownership is complicated and highly fragmented.

2) New economic conditions and introduction of local market economy

Positive impacts: gradual improvement and spreading of services for visitors and local inhabitants; making new information centres and tourist marked paths especially in the TANAP.

Negative impacts: large areas of forests were cut as a result of recreational impact such as especially the building of winter sports infrastructure; intensive pressure by different lobby groups to influence planning documentation and also the results of decision-making processes.

3) Rapid urbanisation

Positive impacts: upgrading accommodation and other services; possible improvement of better residential conditions due to infrastructure and other services for local inhabitants.

Negative impacts: Commercial and recreational sites sprawl, with huge impacts on the landscape character and its; The number of visitors and extent of infrastructure now exceeds the carrying capacity limit.

4) Fundamental structural changes of local and regional governance and shift of competencies from the national to the regional level

Positive impacts: most powers in the social and environmental area were shifted to regional and local levels, increasing local and regional self-governance.

Negative impacts: the existing governance structure is still hampered by low law enforcement and conflicts with ethics and beliefs; There is no principal authority in the TANAP and conflicting competencies and jurisdictions between state agencies such as forestry and national park management have increased.

5) New legislation and policies on land use planning, regional planning, the environment, agriculture, water management, nature, and landscape protection

Positive impacts: new legislation and policies have been implemented for social change and transformational processes; Slovakia, as a member of the EU, has implemented new rules in national legislation because of compulsory integration with EU legislation.

Negative impacts: remarkable overgrowth of urban structure into recently vacant land, new mixed patterns and short-term oriented projects lacking strategic plans and adequate systems of zonation for both national parks.

6) New institutions and rules supporting democratisation, partnerships and information centres for visitors

Positive impacts: There are now new possibilities for local people to participate in civic associations with initiatives to process the preparation of strategic documents and to enter into decision making processes; the reinforcement of local partnerships, public movements and initiatives against proposals of new investments which would have negative impacts; TANAP and the Tatra National Park in Poland signed the Memorandum of Mutual Cooperation in February 2007.

Negative impacts: In both national parks there is an absence of appropriate measures for encouraging sustainable developmental behaviour of private and community owners. In Prielbrusie NP there is the lack of cooperation between the bordering nations.

The main changes in landscapes under the impact of tourism and other anthropogenic activities

The following are the main changes observed in the national parks' landscapes in the last decades, due to anthropogenic impacts such as tourism, buildings and transport infrastructure:

- The emergence and expansion of anthropogenic-modified landscape units, including anthropogenic erosion forms especially throughout Prielbrusie NP and also in small areas of the TANAP.
- The decrease in boundaries of landscape zonal types such as the alpine and forest ones as a result of recreation and construction-building in Prielbrusie NP.
- Intensified and uncontrolled grazing in the upper part of the Baksan valley which caused the deteriorating ecological state of mountain landscapes and the expansion of territories with a high and intense degree of pastoral degradation. These processes are clearly indicated by the low productivity, grass density and height, the abundance of grazing-tolerant species and by the soil destruction and erosion. The reduction in forest recovery rates was also shown to be a result of intensive grazing in the Prielbrusie NP.
- The decrease in forests and their biodiversity as a result of recreational impacts in both NPs.
- The intensification of natural processes including avalanches, debris flows and erosion, mainly in the last decades and especially in Prielbrusie NP.

The combination of modified and practically unchanged landscapes makes this region of great interest in the study of natural and anthropogenic impacts on mountain nature and ecological education.

The Tatra National Park

The *main weakness* of the national park is that the TANAP administration has only limited competencies with little decision-making jurisdiction. This lack identifies a negative trend of centralisation in the nature management since management plans of protected areas are only advisory documents and none of their parts is mandatory. There are inappropriate forest operations here, mass tourism and a large proportion of land within the protected areas in private ownership. TANAP has no Advisory Council within the TANAP Administration.

Main ecological conflicts: There is no integrated approach to strategy and management of the national park between the TANAP Administration, the TANAP State Forest Enterprise and municipalities. The high number of visitors often causes disturbance to wildlife and nature values. The biggest challenges facing the park are connected with strong pressure of economic exploitation as in forestry, hunting, building and tourism. There is conflict concerning the landscape's potential expansion of tourist infrastructure and the subsequent

potential land use. This is important for Spruce forests because of the strong conflict of interests within nature protection and the ecological carrying capacity is filling.

The mountain service's centre for avalanche prevention presents the statistical average over the last 25 years of the potential avalanche danger that 3 people out of every 20-25 have died. In the Tatra region, around 1042 avalanche lines are currently registered.

System of compensation or renting of the land: Governmental Regulation No. 438/2005 and subsequent regulations and directions do not contain appropriate measures for encouraging sustainable behaviour from private and community owners.

The current governing structure is still traumatised by past relationships, particularly by inefficient institutional design and non-robust governance of the resources. The situation in the TANAP is critical compared to other Slovak national parks. This is decidedly due to local conflicting institutional design between state agencies such as the forest and park managements increasing the intensive pressure over this area.

Problems with the national park land use increased after 1989 because new nature reserves were established and the land was returned to the original owners during restitution. Consequently, only 52% of land in the TANAP is now owned by the state. Additionally, a lot of land which is not state-owned has large settlements and technical infrastructure which is divided for territorial management between two Slovak Republic Government departments. These are the Ministry of the Environment and the Ministry of Agriculture and this division of responsibility greatly distinguishes TANAP from national parks in well-developed world states (Koreň, 2005).

Intense public discussion concerning the future development of the Tatra region began especially after 19th November 2004 when an acutely severe windstorm affected some 12,000 ha of the national park. This has been correctly described as a "major calamity" for the local area and its people, and also for the whole of Slovakia. This discussion raised the following important issues:

- The inappropriate forest operations, from logging to restoration
- The inappropriate development of mass tourism, from the expansion of existing tourism facilities to the development of new ski resorts
- This windstorm therefore resulted in new challenges and discussions about the best ways to manage the national park in the future; locally, regionally and nationally. This was not only momentous in Slovakia but it also raised international interest and concern.

The discussion also focused on the topic of active versus passive management, with both management types entailing advantages and risks. Active management is costlier with a higher negative impact of degradation for forest ecosystems, and it also lacks guarantees of controlling bark beetle outbreak. Passive management is cheaper and it represents the natural regeneration of forest ecosystems. Although this includes bark beetle outbreak and possible further wide spread calamity, the death of mother trees is not connected with the disintegration of forest ecosystems (please see more in Khoroshev et al., 2009).

The Prielbrusie State National Park

The Great *weakness* here is its low level of infrastructure for ecological tourism. This includes the lack of arranged ecological trails, the absence of a nature museum, lack of ecological information and insufficient information on the nature protection status and corresponding restrictions.

The *main* reason for land use *conflicts and ecological problems* in the Prielbrusie NP is generated by its topography and geomorphic processes. The spatial pattern of the young neotectonically uplifting mountain range is manifested in the limited space of valley bottoms

which are less than 1 km wide almost everywhere in the park, and by the absolute dominance of steep slopes. The concentration of tourist facilities and local settlements and agriculture in the valley bottom is unavoidable despite the high risk of snow avalanches, mudflows, landslides and earthquakes. Theoretically, volcanic eruptions also can not be excluded since volcanic phenomena such as hot mineral springs and sulfur emergence still occur and the last eruption of the Elbrus dates back only to 400 years ago.

This area is favourable for active debris flows of different types with magnitudes of 100,000-3,000,000 m³ or more, and also for widespread avalanches with almost 400 hundred avalanche basins. Cheget Mountain is renowned for its 6-7 avalanche basins per km (Zalikhonov, 1971, Akifyeva et al., 1987). Contemporary glaciers are retreating and this promotes the formation of new periglacial landforms, including ice-cored moraines and lakes which are potential sources of glacial outburst floods (Seinova, Zolotarev, 2001; Chernomorets et al., 2003; Seinova et al., 2007). In recent decades, increased debris flow activity including catastrophic events has been observed. Enhanced activity is a result of intensive ablation of glaciers and snow melt due to hot summers and episodic heavy rains.

A system of compensation or renting of land has not yet been solved in the national park.

Evaluation and comparison of spatial limits and other limiting factors for alternative tourist facility locations in the Prielbrusie National Park and the TANAP

The number of tourists in both national parks and the spread of tourist activities cause serious conflict with nature protection demands. This is especially important for the highlands, where the tourist concentration exceeds carrying ecological capacity, and this is exacerbated by the increasing demand by investors for further building construction. This raises the question whether development possibilities for increased tourism in model territories of the national park within sustainable development limits can be considered objective.

Spatial limits of further distribution of infrastructure for tourism development

Although the Prielbrusie NP has no alternative locations for tourist facilities, the TANAP is quite the opposite with alternatives for distribution of infrastructure for tourism development within its protected area and also outside its territory. It has lot of alternatives because most hotels are located on relatively gentle slopes of moraine landforms at the foothills of the High Tatras. In addition, cities and settlements such as Poprad and Tatranská Štrba in Podtatranská valley which extends along the High Tatras range provide many opportunities for accommodation in the close neighbourhood of the TANAP, and there are also excellent transport connections. TANAP provides opportunities to disperse tourists between several valleys with comparable landscape structure, while the Prielbrusie NP has to concentrate all its visitors within the Baksan valley near the southern Elbrus foothills. The Malka river valley, also partly included in the park is presently almost inaccessible for ordinary transport. Nevertheless, investors display interest in developing tourism there near the northern Elbrus foothills in the near future.

Unlike the TANAP the Prielbrusie NP regime allows cattle grazing and limited market gardening. Intersecting areas of interest cause conflicts between tourism and livestock-breeding. In comparison with the TANAP, whose core is geologically created from granites and crystalline schist and whose mantle consists of limestones and dolomites, the Prielbrusie NP has a larger alpine meadow area on the slopes and volcanic plateaus and also in the valley floors. However, pastures previously used for everyday grazing in the upper reaches of the Baksan valley are not used now and these are being replaced by modern tourist facilities. The special state border regime with limited tourist access provides opportunities for grazing in

distant valleys. More distant pastures such as the Donguzorun, Yusengi, Adylsu valleys undergo higher grazing loads than previously and horse numbers increased as a response to the demand for new tourist attractions. The demand for beef, mutton and wool at tourist attractions supports livestock-breeding, despite cooperation within the wool-processing industry flourishes on the plains rather than in the mountain areas. In perspective, the preservation of traditional livestock-breeding inside the national park could provide facilities for agri-tourism with involvement of visitors in the local inhabitants' everyday lives.

For most visitors, close contact with the Moslem Balkar ethnos is the most important experience in multicultural and multinational communication. This aboriginal nation inhabits only four Central Caucasian mountain valleys in Russia, and only 3000 of their total population of 108,000 live outside the Kabardino-Balkar Republic. Although globalisation embraces the Balkars, preservation of their national, cultural and religious traditions is the prerequisite for development of cultural tourism. This would certainly be an original supplement to traditional mountain tourism and alpinism, since traditional souvenirs including national clothes and household goods are extremely popular with visitors.

The opportunity for multicultural communication with local people is the most important advantage over the TANAP since it is inhabited by the same nations as in the rest of Slovakia with more or less similar traditions. The Prielbrusie NP urgently needs a Balkar museum to support this native nation of the Central Caucasus and to preserve their cultural diversity in particular in the present-day context of aggressive globalization.

Natural disasters and inaccessibility are the main limiting factors in the allocation of tourist facilities in the Prielbrusie NP, while livestock-breeding currently competes with tourism for available space. The future will decide whether traditional land use will be completely replaced by the tourist industry or if adaptation to tourism needs occurs. The combined interests of nature protection and tourism development won over traditional livestock-breeding in the High Tatras in the 1940s, and presently only nature protection and aesthetic priorities limit further expansion of tourist facilities along the foothills there. The sensible combination of settlement patches and intact nature matrix ensures the preservation of landscape and biodiversity.

Other factors limiting expansion of infrastructure for tourism development

Snow avalanches and expected trends in climate change, as shown in Table 4, are among the limiting and threatening factors which should be considered in further development of tourism infrastructure.

Table 4. Natural threats for life, health and tourism infrastructure identified in the TANAP and Prielbrusie NP

Natural threats	The Tatra National Park	The Prielbrusie State National Park
Climatic trends in relation to recreation development	Warming shortens winter and extends the summer season.	Warming favours a retreat of glaciers and the upslope expansion of pine forests. However, increases in winter precipitation and snow avalanche activity prevent pine forest expansion. Areas with avalanche risk expand, resulting in a decrease in pine forest landscapes in river valleys. Avalanche-free areas decrease. Glacier retreat favours catastrophic mudflows and the formation of dammed lakes.

Natural threats	The Tatra National Park	The Prielbrusie State National Park
Natural threats for life and health	Constant windstorms similar to the most tremendous one in 2004, slope modelling, avalanches (1042 avalanche slides are registered within the High Tatras, mainly snow avalanches, and less Rock falls and Mudflows).	The high level of ultraviolet radiation. Rock falls. Snow avalanches. Steep slopes. Landslides. High stream velocity. Mudflows. Ice-dammed periglacial lakes. Frost above the snow line and Glacial cracks.
Natural threats to hotels and landscape – source of threat	Snow avalanches, windstorms Mudflows.	Snow avalanches, mudflows, erosion. Generating landscape – glaciers, alpine meadows, stream channels. Transit landscapes – dwarf birch and coniferous forests, subalpine, alpine meadows.

Conclusions

The studied model national parks share many principal problems resulting in conflict between nature protection and land use, and especially between tourism and management. Table 5 presents the strengths and weaknesses of the national parks according to IUCN criteria, and selected management aspects and conditions for tourism development. The listed strengths serve as positive examples which should be followed by other national parks.

Both national parks need to solve the zoning problem which would give a clear definition of acceptable land use. Syngé (2004) claims that zoning is the heart of many national parks management. Indeed, in most parts of the crowded European continent, it is arguable that a large protected area which includes strict protection is only possible through the use of zoning. Zoning is the principal method used to deploy visitors, and hence it is critical in achieving the appropriate combination of concentration and dispersal.

The land use in both national parks is significantly limited by unique natural heritage which should be considered in newly prepared zonings. Consequently these should be respected in landscape plans and further tourism development plans and other development plan documents. Both relief and natural land forming processes such as avalanches and landslides significantly limit regional development in the Prielbrusie NP. As well as stations under Elbrus, tourism and tourist infrastructure is mainly currently concentrated along the main road in the Baksan river valley which connects the settlements of Elbrus, Tegenekli, Terskol and Azau. The characteristic feature of tourism development in the Prielbrusie NP is its centralisation around the main spindle, the Baksan river. This territory is being currently attacked not only by avalanches but, from a tourism point of view, also by specialist farming such as individual livestock breeding. Several tourist localities are found north of this line, however there is an absence of infrastructure there, especially road networks and good quality tourist paths. Additionally, intense tourist development also exists in the valleys south of the Baksan river, and thus outside the natural preserves. This territory is currently not used for recreation and relaxation due to the unfavourable socio-political conditions which have created a barrier at the Russian/Georgian border. Adequate tourism development in the Prielbrusie NP in the northerly-southerly direction resulting from newly prepared zoning would reduce pressure on current tourism centres. Moreover, services and facilities in only partly used localities could be finished. The problem of landscape development in a particular direction (north-south or east-west) is not observed in TANAP, despite its location on territory encompassing the two neighbouring states of the Slovak Republic and Poland. This international border does not present any barriers. On the contrary, managements of both the Polish and Slovak Tatra National Parks aim at common regulation of landscape use. This aim should ensure the creation of conditions for the long-term maintenance of a common protected area crossing national boundaries and forming this bilateral national park ("Twin-

Park“). These agreed conditions will respect the aims and roles of national parks and will meet international criteria for national parks according to IUCN – II categories. This approach results from one of the main principles of the 2007 Memorandum of Mutual Cooperation between the managements of the TANAP in Slovakia and the Tatra National Park, known locally as the Tatrzański Park Narodowy, in Poland. This principle is completely expressed in point No 3: “Coordination and Mutual Agreement in Common Interests”.

Table 5. Summary of strengths and weaknesses of the national parks according to IUCN criteria, selected management aspects and conditions for tourism development

National parks	Examples of strengths	Examples of weaknesses
Prielbrusie NP (Russia)	<p>Prielbrusie NP corresponds to IUCN category II for protected areas (National Park). The high proportion area is in zone A – reserve zone which accounts for 74.1%</p> <p>The new zonation under preparation could maintain interconnection of the national park with the neighbouring „zapovednik“ Kabardino-Balkar reserve.</p> <p>Prielbrusie NP is managed by the Elbrus municipality which is responsible for the introduction of a general Plan.</p> <p>The Scientific-Technical Council was established in the framework of the Prielbrusie NP, and it consists of representatives of all important local and regional entities.</p> <p>The Elbrus Municipality cooperates with the Prielbrusie, NP. It has its own representatives on the Scientific-Technical Council, and at the same time it has to control the fulfilment of the major tasks of the NP.</p> <p>Prielbrusie, NP is an independent juridical body and it can make decisions and negotiate directly with other stakeholders</p> <p>There is a great opportunity for multicultural communication with the local Balkar people. The Prielbrusie, NP is certainly the best place to locate the Balkar museum.</p>	<p>In Prielbrusie NP there is a lack of trans-boundary (national border) cooperation. This boundary is a barrier to the development of tourism.</p> <p>Prielbrusie NP has no Visitors' Order. There is only a limited monitoring system of visitors and the quality of services performed.</p> <p>In Prielbrusie NP there is only a low level of infrastructure for ecological tourism (e.g. lack of arranged ecological trails and please see more in table 2), the absence of a nature museum, lack of ecological information and insufficient information on nature protection status.</p> <p>In the NP there are strong limits for alternative locations for tourist facilities.</p> <p>Prielbrusie NP has limited connection by the only motorway along the Baksan river valley. After “perestrojka” there has been very limited regular public transport and most transportation is performed by private taxis and tourist coaches.</p> <p><i>Comments: these above mentioned aspects are mainly weaknesses for tourism development, but not for nature protection.</i></p>
TANAP (Slovakia)	<p>The managements of Slovak TANAP and Polish TANAP adopted a Cooperation Memorandum in February 2007.</p> <p>TANAP has a Visitors' Order, which was approved in 1999, and a new one is under preparation.</p> <p>The number of tourists in mountain regions has been monitored in TANAP since 1972.</p> <p>In TANAP there are 20 very well marked main tourist paths and more than 200 km cycle tours are available as in table 2.</p> <p>Information centres are located in all tourist centres and they are an integral part of the tourist agencies.</p> <p>TANAP has very good accessibility by public transport and visitors have a good choice of ways to reach the park by road or rail transport.</p>	<p>TANAP fulfils only some of the primary management objectives for an IUCN category II protected area (National Park).</p> <p>In TANAP according to the new zoning system, Zone “A” will still only account for about 54% of the total area. Adoption of a zoning proposal, prepared and discussed by interested parties in 2006, has been constantly postponed. The current date set for its adoption is October 2010. There has been strong pressure to change the original zoning proposal and a move to define a tourist zone which would transgress the A zone.</p> <p>There is no supreme authority in the TANAP and there are still traumatic conflicting ideals between state agencies such as forestry and national park management. An integrated approach to the strategy and management of the national park between the TANAP Administration, the State Forests of TANAP</p>

National parks	Examples of strengths	Examples of weaknesses
		and municipalities is lacking. The TANAP Administration has only an advisory/expert role in the management of land within the national park. The major share of land in protected areas is in private hands and at the same time there is complicated and highly fragmented ownership.

Unlike in Prielbrusie NP, tourism and its infrastructure in the TANAP are distributed evenly throughout the whole territory. The main reason for this is accessibility of the tourist centres due to good road and railway networks. When the TANAP zoning proposal is compared to that of Prielbrusie NP, there is a greater tendency to concentrate tourism in only several centres of the TANAP which are situated outside the natural preserves. Moreover, these centres should not be located in proximity to territories with the highest level of protection. Indeed, there are possibilities to localise recreation centres outside these territories in TANAP and this is in contradistinction to possibilities available to Prielbrusie NP. Despite this, there are many new tourism plans designated directly into these susceptible areas overlapping the A zone.

The greater part of both national parks is under the higher levels of nature protection. Moreover, Prielbrusie NP plans to extend its borders and connect its eastern territory with the nearby nature reserve of Kabardino-Balkar reserve which borders Georgia in the south. Both national parks currently have the chance to influence further future utilization especially by adopting appropriate new zoning. This should then lead to well-directed changes in landscape use.

Conflicts in landscape management should no longer exist if nature protection becomes and remains a priority. Additionally, activities connected with tourism development must be supported in localities directly designated for this purpose. Therefore it is of the utmost importance to pay special attention to these decisions in order to administer landscapes rationally, intentionally and systematically so that sustainable development is always the main target.

The Tatra National Park in Poland has been preserving its natural landscape-friendly character for many years by intentionally building only small family hotels. This behaviour is a wonderful example of what can be achieved in sustainable development by co-operative planning. Finally, and most importantly, zoning is strictly respected in the Polish Tatras and no big investment enterprises are planned there in the near future.

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