# YES OR NO TO THE REOPENING OF THE BELIANSKE TATRAS FOR TOURISM?

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**Abstract**

In recent decades, recreational intensity in protected areas has increased considerably. Due to the impact of climate change, tourists are increasingly looking for alpine areas where the climate is cooler. Therefore, the question arises whether to open the limestone Belianske Tatras, which have been closed to tourists since 1978 due to destruction by mass tourism, again. Alpine ecosystems are generally considered to be sensitive and fragile to disturbance and slow to recover, due to short growing season and a harsh climate, in combination with poor soil conditions. In 1993, the National Park/Biosphere Reserve Administration opened one one-way hiking trail in the territory, since 2009 it has been accessible in both directions. However, it turns out that human recreational activities, such as walking, cause direct mechanical disturbance of natural ecosystems with undesirable effects on vegetation. That's why we conducted experimental trampling in the territory with monitoring of regeneration in selected communities, in 2008 in original communities and in 2022 in regenerated communities. The results showed that although communities respond somewhat more resiliently to trampling, this is at the expense of losing some species, with mosses and lichens responding with a delayed response and species loss.

**Key words:** experimental vegetation trampling, vegetation resistance, hiking, national park, biosphere reserve

## Introduction

The number of visitors to high mountains is increasing worldwide (Buckley, 2000). At the same time, it is expected that the high mountain region will become “even more popular with tourists” due to climate change, because the mountainous region “will be colder than the lower areas”. This issue opens up the issues of the carrying capacity of tourist trails and the trampling of vegetation, which are important foundations for sustainable tourism in mountain protected areas.

It has long been known that high protected mountain ranges serve as foci of species richness, species endemism with a number of preserved relicts, and that they are areas of high conservation value (Dinerstein et al., 2024). Such areas include the Belianske Tatras. They are part of the Tatra Mountains, the highest part of the Carpathians, located in the northern part of Slovakia on the border with Poland. The Tatras on the Slovak side were included in the Tatra National Park in 1949, in the Tatra Biosphere Reserve in 1993. The Belianske Tatras were declared a national nature reserve in 1991. They are the highest limestone mountains in Slovakia. The development of tourism in Tatras began to emerge in 1871 (Vaňová et al., 2023).

However, the Belianske Tatras have been closed to tourists since 1978, due to the extensive destruction of the area by mass tourism. The exception is the trail leading through Monková valley to Kopské saddleback, which has been accessible in one direction since 1993 and in both directions since 2008 as an educational trail. However, the question of reopening the Belianske Tatras to tourists has recently been raised. In this article, we consider the restoration of the Belianske Tatras for tourists and propose measures for the currently accessible trail. The carrying visitation of the hiking trail has been exceeded, therefore we recommend implementing constant monitoring of the trail's traffic and the effects of erosion on the trail and its surroundings. We do not recommend opening the trails that have been closed to tourism since 1978.

## Materials and methods

### *Study area*

The studied area is the Belianske Tatras, a limestone part of the Tatras in northern Slovakia (Fig.1).


Fig. 1: The Belianske Tatras. Source: Mapy.cz.

In July 2024, we evaluated the hiking trail leading from the Studnička rest place (1.350 m ASL) through the Kopské saddleback (1.750 m ASL) to Široké saddleback (1,825 m ASL). We divided the studied trail into 17 sections (Fig. 2). In the vicinity of this part of the trail, experimental trampling of selected plant communities of the subalpine level took place.


Fig. 2: The hiking trail in the Belianske Tatras. Source: Mapy.cz.

The trail passes through a spruce forest, a belt of mountain pine, mountain and alpine meadows, where sheep used to graze up to an altitude of 2000 m above sea level in the past. The surface of the trail is mostly bare, made up of soil and small stones, with drains. In the alpine zone, the trail is lined with overhangs of vegetation. There are several side trails and illegal shortcuts in its vicinity.

In the lower and middle parts the trail passes through periglacial-decline alluvial cone and flysch lithofacies, in higher altitudes it continues to the Carpathian Keuper, Ramsau Dolomites and in the Kopské saddleback it passes through variegated clayey shales, sandstones, marly shales and limestones (verfen). In the vicinity of the Vyšné Kopské saddleback (1.933 m a.s.l.) the trail passes through Allgäu layers and Baboš quartzites. On silicate substrates the trail passes through cambizem, typically acidic, from 800 to 1.300 to 1.400 m a.s.l. and with podzols, typical from 1.300 to 1.400 m a.s.l. to the upper soil surface and on carbonate substrates through typical leached rendzines and organozems above 1.700 m a.s.l. organic soil rendzina (Račko, 1998).

***Methods***

We base our assessment on the abiotic and biotic carrying capacity of the trail (Gedeonová et al., 2024), the average daily visitation of the trail in 2024 (source: Tatra National Park Administration), the carrying capacity of the trail (Gedeonová et al., 2024) and on experimental trampling research on selected communities around the trail, which took place in 2008 in the original community (Piscová 2008; Piscová et al., 2021) and in 2022 in the regenerated community (Piscová et al., 2023a, b; Sedlák, 2025). In Fig. 3, we present recommendations for hiking trail management in terms of carrying capacity and daily average trail traffic.

**Results**

While the carrying capacity of the trail in the lower part is 64 tourists per day, in the higher part (above 1.750 m a.s.l.) the trail can carry only a maximum of 51 tourists per day (Gedeonová et al., 2024). The carrying capacity limit was exceeded in 2024, in the lower part by 35 tourists per day, in the higher part by 27 tourists per day (Tab. 1).

Tab. 1: Average daily traffic (Gedeonová et al., 2024) and permitted carrying visitation of the trail.

| Study area | Hiking trail | Average daily visitation | Maximum allowed number of tourists |
|---|---|---|---|
| Belianske Tatras | Studnička rest area – Kopské saddleback | 99 | 64 |
| | Kopské sadleback – Široké saddleback | 78 | 51 |

If the maximum allowed number of tourists was not exceeded, the trail would be carrying in terms of abiotic and biotic properties in most sections (only the highest parts on the steep slope achieve low carrying capacity) (Fig. 4). However, the trail cannot sustain the average daily traffic of 2024 in the long term, so we recommend reducing and monitoring traffic on the trail in the area. As this is a sensitive geological subsoil and steep slopes, we recommend monitoring erosion on the trail and especially around the rest areas (Fig. 5, 6). Since the carrying capacity of the ridge trail, which has been closed since 1978, is low and very low (Piscová, 2008) and there are several endemic species in the area, we do not recommend reopening the trail.

| | Below average | Average | Exceeded |
|---|---|---|---|
| **Very high** | maintain current trail traffic | maintain current trail traffic | maintain current trail traffic (if it exceeds less than 50% of the carrying capacity), but monitor erosion of the trail and surrounding area |
| | | | to reduce the hiking trail traffic by 50% (if it exceeds more than 50% of the carrying capacity), or leave the hiking trail accessible only in one direction |
| **High** | maintain current trail traffic, but monitor erosion of the trail and surrounding area | maintain current trail traffic, but monitor erosion of the trail and surrounding area | maintain current trail traffic (if it exceeds less than 50% of the carrying capacity), but monitor erosion of the trail and surrounding area |
| | | | to reduce the hiking trail traffic by 50% (if it exceeds more than 50% of the carrying capacity), or leave the hiking trail accessible only in one direction |
| **Middle** | maintain current trail traffic, but monitor erosion of the trail and surrounding area | maintain current trail traffic, but monitor erosion of the trail and surrounding area | to reduce the hiking trail traffic by 50% (if it exceeds more than 50% of the carrying capacity), or leave the hiking trail accessible only in one direction |
| | | | to close a hiking trail for the public |
| **Low** | to reduce the hiking trail traffic by 50%, or leave the hiking trail accessible only in one direction | to reduce the hiking trail traffic by 50%, or leave the hiking trail accessible only in one direction | to close a hiking trail for the public |
| **Very low** | to close a hiking trail for the public | to close a hiking trail for the public | to close a hiking trail for the public |

Fig. 3: Recommendations for hiking trail management in terms of carrying capacity and daily average trail traffic.

| Part of the trail | Sections | Exceeded average daily trail traffic in 2024 | If average daily trail traffic |
|---|---|---|---|
| Zadné Meďodoly valley (from the Studnička respring place to the Kopské saddleback) | A | current trail traffic monitor erosion | current trail traffic monitor erosion |
| | B | one-way or reduce to 50 % | current trail traffic monitor erosion |
| | C | one-way or reduce to 50 % | current trail traffic monitor erosion |
| | D | current trail traffic monitor erosion | current trail traffic monitor erosion |
| | E | one-way or reduce to 50 % | current trail traffic monitor erosion |
| | F | current trail traffic monitor erosion | current trail traffic monitor erosion |
| | G | one-way or reduce to 50 % | current trail traffic monitor erosion |
| | H | one-way or reduce to 50 % | current trail traffic monitor erosion |
| | I | current trail traffic monitor erosion | current trail traffic monitor erosion |
| | J | one-way or reduce to 50 % | current trail traffic monitor erosion |
| Part from the Kopské saddleback to the Vyšné Kopské saddleback | K | one-way or reduce to 50 % | current trail traffic monitor erosion |
| | L | one-way or reduce to 50 % | current trail traffic monitor erosion |
| | M | one-way or reduce to 50 % | current trail traffic monitor erosion |
| | N | one-way or reduce to 50 % | current trail traffic monitor erosion |
| Part from the Vyšné Kopské saddleback to the Široké saddleback | O | close | one-way or reduce to 50 % |
| | P | close | one-way or reduce to 50 % |
| | R | one-way or reduce to 50 % | current trail traffic monitor erosion |

Fig. 4: Recommendations for trail management with the maximum permitted number of tourists and average daily trail traffic in 2024.

Fig. 5: (left). Destruction by erosion and the formation of vegetation overhangs (Piscová, 23.6.2010).
Fig. 6: (right). Sliding of the hiking trail in the section K (Piscová, 6 July 2009).

## Discussion

When deciding on the reopening of an area, we can base our decisions on the biotic and abiotic properties of the carrying capacity of the area and determine the daily permitted trail traffic. But the trampling of vegetation is questionable, where individuals react differently in different communities. According to Sedlák's research (Sedlák, 2025), regenerated communities respond to trampling more resistant than the original ones, but this response is at the expense of the extinction of some species of mosses, lichens and hemicryptophytes in regenerated communities. If the area were to be reopened to tourism, group movement of tourists outside of rest areas and trails should be prevented.

## Conclusion

In the Belianske Tatras area, we recommend monitoring the number of tourists on the educational trail and its carrying visitation. We also recommend monitoring erosion on the trails and in their surroundings. However, we do not recommend reopening the remaining part of the Belianske Tatras to tourism.

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## Souhrn

Belianske Tatry patří mezi nejvyšší vápencová pohoří na Slovensku. Jsou součástí Tater, které byly v roce 1949 prohlášeny za národní park a v roce 1993 za bilaterální biosférickou rezervaci s Polskem. Belinanske Tatry jsou zároveň národní přírodní rezervací od roku 1991. Po uzákonění národního parku, území sloužilo zejména pro turistiku. Kvůli enormnímu množství turistů a rozsáhlé destrukci území, byly však Belianske Tatry od roku 1978 pro veřejnost uzavřeny. Chodník vedoucí Monkovou dolinou přes Široké sedlo, do Kopského sedla zpřístupnili až v roce 1993 jednosměrně, od roku 2008 stezka funguje jako naučná a obousměrná. V současnosti probíhají časté diskuse, zda zpřístupnit území pro turisty opět. Na základě našich více výzkumů konstatujeme, že zpřístupněná stezka

dosahuje převážně střední únosnosti v nižších polohách a nízkou únosnost ve vyšších polohách. Jeho únosná návštěvnost je však překročná a stezka podléhá na více částech destrukci. Zregenerovaná společenství v okolí chodníku reagují na sešlapování odolnější než původní, ale na úkor vyhynutí některých druhů mechů, lišejníků a hemikryptofytů v těchto společenstvích. Jelikož uzavřená stezka, vedoucí hřebenem je málo únosná a náchylná k destrukci a sešlapováním je ohroženo několik endemických druhů, znovuzpřístupnění Belianských Tater pro turisty nedoporučujeme.

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