

Increasing the attractiveness of the Zádielska dolina (“Zadiel Gorge“) in the area of modern climbing as a tourism development support tool

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Abstract

The Zádielska dolina (“Zadiel Gorge“) belongs to the most beautiful and from a natural science perspective to the most interesting landscape formations of the Slovak Karst. The area represents the National Nature Reserve in the National Park and is part the European Network of Protected Areas NATURA 2000. The site is characterized by climbing activity. This article provides suggestions of attractiveness in the field of climbing that respect the development of tourism in accordance with nature and landscape conservation. The basis for the proposals were theoretical knowledge, thorough analysis of the area and own experience with the issue. Recommendations from other climbing places and identification of problems between climbing and nature, have been key for us in making appropriate proposals. The increasing interest in adventure tourism, including climbing, means a global trend in tourism and therefore it is necessary to pay close attention to this issue.

Keywords: Zádielska dolina (“Zadiel Gorge“), climbing, development, protected area

INTRODUCTION

People are looking for opportunities how to overcome obstacle between themselves and nature. The infinite diversity, size and amount of climbing terrain, some of which are also accessible for tourists, others only for the most skillful individuals, predetermine the breadth of climbing activities. Climbing has long been a full-fledged sport with its own competition rules.

Zádielska dolina (“Zadiel Gorge“) is a magnificent place with a climbing potential that has been in use since the beginning of the last century. Moreover, the site is comparable in terms of natural conditions, especially geomorphological, with the other most popular climbing localities. However, the possibility of climbing activity is not sufficient. There exist other factors that affect the attractiveness of the site.

Therefore, our goal is to create a proposal that will increase the attractiveness of the Zádielska dolina (“Zadiel Gorge“), that can motivate the visitor to choose this climbing place and which will have a decisive importance to the local economy.

STUDY AREA

Different landscapes of the Slovenský kras (“Slovak Karst“) are valleys and gorges. Zádielska dolina (“Zadiel Gorge“) with an area of 214,73 ha is situated over the village Zádiel. It is a gateway to the southeastern part of the geomorphological unit Slovenský kras (“Slovak Karst“) (Mihálik & Ponec, 2006). In the east it borders on the Zádielska planina (“Zadiel plateau“), which has the smallest area in the Slovenský kras (“Slovak Karst“). To the

West of the valley is morphologically sharply bounded the Horný vrch ("Plateau of Upper Hill") (Kliment & Lacika, 2009). The plains are built with limestones and dolomites (Mello et al., 1997; Mello, 1997). To the north borders Zádielska dolina ("Zadiel Gorge") on the geomorphological unit Volovské vrchy ("Volovec Mountains"). The southern border consists of the Turnianska kotlina ("Turnianska basin") and the Košická planina ("Kosice basin") (Bánész, 1994).

The narrow Gorge, with a minimum width of 10 m was eroded by the cascading river Blatnica ("Blatnica"). It rises in the Volovské vrchy ("Volovec Mountains") at an altitude of about 950 m (Čech, 2015). The perpendicular and overhanging walls tower over both sides of the 3 km long valley (Fig.1). From the bottom to the top edge of the plateau is the height difference 250-300 m (Mihálik & Ponec, 1981).

The west side comprise of Červená skala ("Red rock") with Ostrý chrbát ("Sharp Ridge"), behind them are Trojuholníková Stena ("Triangle Wall") with Kolova Veža ("Kolova Tower") and Šunový chrbát ("Sunovy Ridge"), upper are Čertova stena ("Devil's wall"), Lavínová Veža ("Lavin's Tower") and Kozí Chrbát ("Goat's Ridge"). At the end of the valley is situated Mesačná stena ("Monthly wall"). The eastern side begins with Orliá Veža ("Eagle's Tower"), Prídavkova veža ("Pridavkova Tower"). Next, there is Zubatá veža ("Toothed Tower"), Predná and Zadná veža ("Front and Back Tower"), and Oltár ("Altar Rock"), Trojkráľový hrebeň ("Tripleking Ridge") and Májová stena ("May's Wall") (Baláž & Pukanský 2013). In the middle of the valley is a remarkable rock formation called Cukrová Homôľa ("Sugar Tower"). This isolated rock-shaped tower reaches a height of about 105 m (Bizubová, 2008).

There are also caves in the rocks of Zádielska dolina ("Zadiel Gorge"). Among the most famous caves belong: Tajná jaskyňa ("Mysterious Cave"), Erna ("Erna Cave"), Zrnov Previs ("Zrnov Overhang



Fig. 1 Huge walls of Zádielska dolina ("Zadiel Gorge") (source: own photo)

Cave"), Kráľovská and Kostrová jaskyňa ("Royal and Skeletal Cave") (Ďurček, 1989).

We rank the Zádielska dolina ("Zadiel Gorge") among a slightly warm, damp-to-highland area. There is a significant climatic inversion (Jakál, 2002). The local climate of the bottom is markedly different from the upper edges of the gorge. The lower part is cooled down and humidified by a stream flowing through the valley (Ďurček, 1989). Higher altitudes like the sunny edges of the plains, have been occupied by thermophilous and dry-loving species (The Administration of National Park Slovak Karst).

CONSERVATION AREA

In the territory of the Zádielska dolina ("Zadiel Gorge") is in force Legislative document on nature and landscape conservation of the Slovak Republic - the Act of the National Council of the Slovak Republic No. 543/2002 Coll. on Nature and Landscape Protection as of 1 January 2003.

There are overlapping protected areas with varying degrees of protection. National Park provides the gorge the highest level of protection. Zádielska dolina ("Zadiel Gorge") pertains to the National Park of Slovak Karst, which represent our largest karst area. We classify it in the plain type of karst, which is characterized by high-lying plateaus. These platforms are bordered by steep slopes to the bottoms of

the adjoining valleys, gorges, basins, like the case of the Zádielska dolina ("Zadiel Gorge") (Rozložník, 1998).

Zádielska dolina ("Zadiel Gorge") is one of ten national nature reserves of the aforesaid national park. It includes the most precious parts of nature in terms of nature conservation at national level and moreover in terms of European importance. It was declared in 1954 as a national nature reserve. The subject of protection is a unique relief and the natural geobiocenosis of the Slovenský kras ("Slovak Karst") with the representation of rare endemic, relict species of flora and fauna. The justification for the protection is scientific-research, educational, cultural-educational (Bánesz, 1994).

Another pillar of conservation for our territory is Natura 2000. Their introduction means a new layer of protected areas of European significance (Šubová et al., 2010). NATURA 2000 results from the need to protect the common natural heritage, which is important for the whole of Europe, to take care of its protection and to support those activities, which are in the interests of nature protection (Vološčuk, 2005). NATURA 2000 system consists of 2 types of territory: Protected Bird Areas and Territories of European Importance. Our subject area is part of the Protected Bird Area Slovenský kras ("Slovak Karst") and the Territory of European Importance Horný vrch ("Upper Hill") (Tomaškinová, 2013).

MOUNTAINEERING AND ITS PRESENT IN THE ZÁDIELSKA DOLINA ("ZADIEL GORGE")

Mountaineering expresses activity that lead to the top of the mountain. It takes place in various mountaineering terrains (Frank, 2007). Depending on the terrain, we distinguish different categories of mountaineering: sport climbing on the rocks, winter climbing,

climbing on indoor walls, bouldering, mountain climbing, ice climbing and more.

For the needs of our work we define the sport climbing because the Zádielska dolina ("Zadiel Gorge") is characteristic of this climbing type. Sport climbing is one of the fastest growing branch of mountaineering. The basic principle consist in the effort to cope with the climbing movement (Long, 2010).

In order to be able to concentrate as much as possible on the movement, the anchors are permanently fixed in the rock walls (Procházka, 1990).

Like other sport disciplines climbing has its own rules for performance ratings. Performance in mountaineering is not only a problem solving by physical strenght, but also a reconciliation of physical strenght with will and courage, while the overall level of human psyche is important (Frank, 2007). The basic tool for assessing difficulty is the classification scale. The UIAA grading scale links to our territory. The mentioned scale begins with the difficulty I and upwards is open.

In Slovakia we find several climbing sites that are known for this branch of mountaineering. Besides the Zádielska dolina ("Zadiel Gorge") there are the following areas: Súľovské skaly ("Sulov Rocks"), Višňové ("Visnove"), Kalamárka ("Kalamarka"), Porúbka ("Porubka"), Turne ("Turne"), Prečín ("Precin") and others. World significant sport climbing area are for instance southern France, where are known the areas of Verdon and Buoux, Spain and its areas Siurana, Oliana, Italy and its climbing area Arco, Paklenica in Croatia, the Island of Greece Kalymnos, Osp and Mišja peč in Slovenia and others.

Sports climbing in the discussed valley began in the year 1902. At that time was the first climb on Cukrová Homoľa ("Sugar Tower") (Baláž & Pukanský, 2013). Annually, new climbing routes have been added to sites not yet mentioned. Nowadays there is the possibility to climb

in 18 sectors. We can choose from 337 climbing routes.

The suitable time for climbing is from April to November. The sector Oltár ("Oltar") is characterized by the highest number of routes, specifically 50 climbing routes. There are 30 climb on the popular Cukrová Homoľa ("Sugar Tower"). The lighter routes than the difficulty VII is 86. Most of them are in the sector Oltar ("Oltar") and the sector Trojkráľový Hrebeň ("Tripleking Ridge"). The routes of difficulty VII and VIII is 126. The highest number we can find also in the sector Oltár ("Oltar") and in the sector Zadný komín ("Back Tower). The hard routes than the difficulty VIII is characteristic of 125 routes, mainly in the sectors Projekty ("Projects") and Sokolie ("Falcon's").

With regard to nature conservation, mountaineering is permitted from 1 July to 31 January at the most visited sectors of the National Nature Reserve of Zádielska dolina ("Zadiel Gorge). Other sectors are open either earlier or later than 1 July. Mountaineering will be allowed in another period, if the site of nesting migratory change.



Fig. 2 Climb Cukrová homoľa ("Sugar Tower") (source: own photo)

Motivations that drive climbers to choose climbing locality

The climbers are looking for sites that are attractive to this sport. The main motivation for a visit climbing locality is the possibility of climbing

together with the geomorphological conditions of the area. The sites with geomorphological importance and with a certain form of tourist attractiveness represent many advantages. They reduce visitor pressure on traditional roads. They also extend the seasonality of tourism (Panizza 2007; Mazúrek & Škodová, 2011). But the fact that it is possible to climb in the area is not enough. There are other factors that affect the choice of the climbing site. One university in Germany devoted to this issue. In the following table we show their summary (Tab. 1).

Knowing the motives can help us to create a destination that becomes more attractive (Woratschek, 2007).

Possible risk between climbing and conservation area

When using these climbing sites, we shouldn't forget about the possible risks associated with the dynamic nature of the environment. Within the climbing activity we distinguish a possible damage caused by climbing or indirectly caused damage resulting from climbing activities before and after climbing (Hanemann, 2000). Mailänder (1999) identified several problem areas, which may be damaged as a result of climbing. **1.** Access to the climbing route **2.** The place where climbing activity begins **3.** Climbing wall (rock) **4.** The place where the climbing activity ends **5.** Way down from the point where the climbing activity ends.

It is important to assess the possible negative impact on the rock biotope. It is also relevant to consider the vulnerability of fauna and flora in the climbing area and their ability to regenerate (Bichlmeier, 1991).

According Hanemann (2000) possible negative impacts caused by climbing activity include: **1.** Mechanical impact – climbing, climbers to the rocks, soil erosion, manual intervention **2.**

Tab. 1 Dimensions of motivation

Dimensions of motivation	Motives
Looking for a new climbing area	New climbing experience Nex climbing routes and rock structure
Infrastructure of tourism (for climbing site)	Cheap accomodation Safety of climbing routes Access to climbing routes Easily accessible location (road information) Availability of information
Condition of climbing	Optimal climate Choice of climbing routes and closure of sectors
Calm and rekreation	Calm and recreation
Unsociable	Avoiding places which are usually crowded with tourists
Leisure activity a sports activities other than climbing	Other sports activities than climbing Leisure activity
„Climbing scene“	Place where can people with same intent meet Special event Accomodation for climbers and family atmosphere
New country	New place New culture Regional cuisine

Material impact - garbage and faeces **3.** Visual / acoustic impact - visual change in biotope structure, noise and disturbance.

Cases of negative impacts of climbing activity on fauna and flora include: **1.** Loss of individual plants **2.** Diminished area of the plant population **3.** Displacement of vulnerable species **4.** Reassignment of animals that are sensitive to noise (owl, owl) **5.** Prevention of stunning, **6.** Loss of species (Hanemann, 2000).

Negative impacts can be mitigate by zoning the area. It can be a solution for nature conservation and fulfil the climber's requirements. For instance a three-dimensional zonation concept is applied in the Frankenjura climbing site in Germany. The area is divided into a zone where climbing is not allowed, to a zone where climbing is permitted on existing routes and to a zone where climbing is permitted without any restriction.

Another option for nature conservation which is also introduced in our locality is the closure. This means closure for a certain period of time, in a certain part of the site (Hanemann, 2000).

Every form of regulation in the climbing area requires adequate awareness of climbers. This should be mediated by all means of communication: climbing guide,

journal with climbing topics, public media, information boards and others.

COMPARING THE ZÁDIELSKA DOLINA (“ZADIEL GORGE“) WITH THE VISITED FOREIGN CLIMBING SITE

For comparison, but especially for inspiration how climbing site can look, we choose the Grand Paklenica Canyon. Due to the fact that it is comparable with the Zádiel Gorge from the point of view of nature conservation and the rarity of this area. Owing to its unique natural features was declared National park of Velka Paklenica in 1949. The main reason for declaring was the protection of the largest and best preserved forest complex in Dalmatia, which was exposed to the risk of over-exploitation (Čujič, 2017). Although it is a national park, guardian express an understanding for the realization of climbers.

To highlight the climbing potential of Zádielska dolina (“Zadiel Gorge“) in comparison with the most visited climbing site in Croatia, we evaluate some of the features that characterize the climbing area. We work with information: the beginning

Tab. 2 Zádielska dolina (“Zadiel Gorge“) with comparison to Grand Paklenica Canyon. Their features that characterize the climbing area.

Climbing site	The beginning of the climb history	Number of climbing routes	The well-liked rock	The rock type	The access to the rocks
Zádielska dolina (“Zadiel Gorge“)	1902	360	Cukrová Homôľa (“Sugar Tower“)	limestone	good
Grand Paklenica Canyon	30 years of the 20th century	400	Anica Kuk	limestone	very good

of the climbing history, the number of climbing routes, the well-liked rock, the rock type and the access to the rocks (Tab. 2).

ANALYSIS

Access to the area

Currently, the transport infrastructure is provided mainly by individual car due to the irregularity of the transport lines and their absence during the weekend. Besides, railway was redirected to the final terminal in Moldava nad Bodvou which is 13.5 km distant from the Dvorníky-Zádiel railway station.

The main road connecting Košice - Moldav - Rožnava - Zvolen belong to the 1st class no. 50. This route represent a supraregional national importance and it is also included in the international European network E 571. At the beginning of Zádielska dolina (“Zadiel Gorge“) there is a parking lot for visitors, with the capacity about 50 cars.

Tourist attractions in the destination

There are several hiking trails in the area, which are uniqueness in every season. The village Zádiel is the most suitable starting point for the gorge. There is a popular educational walkway of Zádielska dolina (“Zadiel Gorge“). Walking routes are mostly less demanding, accessible year-round and no time-consuming. In the end of Gorge is significant crossroad of hiking trails, which is oriented to many natural features of the Slovak Karst. Zádielska

dolina (“Zadiel Gorge“) is also a part of cycling circuit, which is suitable for mountain bikers.

Alternative routes of cultural, natural or other character can mitigate the pressure of visitors to the area. The possibility of further activities positively influences selection our locality. List of tourist attraction near the area of Zádiel Gorge: Turniansky hradný vrch (“Turniansky castle hill“), Hájske vodopády a Hájska dolina (“Waterfall of Haj and Haj valley“), Hrhovské rybníky (“Hrhov ponds“), Moldavské múzeum (“Moldava Museum“), Premonštrátsky kláštor v Jasove (“Premonstratension monastery in Jasov“), Jasovská jaskyňa (“Jasov Cave“), Krásnohorská jaskyňa (“Krasnohorska Cave“), Mauzóleum Andrassyovcov v Krásnohorskom Podhradí (“Andrassy Mausoleum in Krasnohorske Podhradie“).

There is a tourist information centre in the National Park of Slovak Karst in the district town of Rožnava at Square of Miners. Only an information monitor is installed in Zádielska dolina (“Zadiel Gorge“). It provides useful information about the gorge, walkway over gorge and about the accessible nearby caves.

Lodging and gastronomic facilities in the destination

Within the National Park Slovak Karst is the use of accommodation services low and represents an average of only 18% per year. The average number of overnight stay is about two days. These low values are in consequences of the absence of supplementary services, deficient quality of service in

accommodation facilities (Štupákova, 2013).

Nowadays, in the village of Zádiel, is only one accommodation facility. In order to increase the accommodation options, we analyzed them within the radius of 15 km. We obtained 11 additional accommodation facilities, whose capacity is 151 beds higher. The accommodations are in particular of a lower category. Category "hotel" is absent here. In addition to that, there is a shortage of typical accommodation for active people, like camps and tourist hostel.

We also identified gastronomic facilities in the places where the accommodations are located. Together we have choice of 10 gastronomic facilities.

PROPOSAL

The unlimited use of the country in which climbing takes place can lead to environmental damage. But legitimate closures as well as infrastructure measures can regulate visitors. At the same time, the improvement of the infrastructure in the sense of a marked path and a book guide which will complement the orientation of the area, can be one of the factors that will decide on the preference of the climbing site. In our proposals for improving the infrastructure we proceed from the research about the Monte Leone Rocca Doria climbing area and the problematic areas between climbing and nature according Mailänder. The basis for the proposal is also an analysis of motivation for site selection, carried out by the German University in the Frankenjura climbing area. We focused mainly on those we consider to be deficient in the area. Furthermore, on the basis of our own experience we add justified points that will improve the infrastructure of the Zádielska dolina ("Zadiel Gorge"). Another inspiration for making this place more attractive in the field of climbing is the Grand Paklenica Canyon climbing site in

Croatia.

Marked path

Strengthening of paths to the rocks and their marking can result in diminish of soil erosion. Especially, further variations of the trails can be avoided and access to rocks can be easier and more evident. One of the conditions following from the Act on Nature and Landscape Protection Act commands to use only existing paths. There are no signs in the territory that would give a direction to climbers to use only an existing walkway along the road to the sectors. Rock sectors of Zádiel are not accessible directly from the tourist path and are not visible due to the rich tree crowns. Another important thing is that the sectors are not interconnected, but they have a separate path for everyone. Therefore, simple minimalist guidelines will be designed, which will be located just at the point where it is necessary to turn off the tourist path leading across the gorge to the sector.

Tourism signs will contain the name of the sector and the note: with the permission of climbing members of SHS James and foreign organized climbers. The next trail description will not be in the terrain. So that it does not offer visitors who have come to the valley for another purpose, such as climbing, for forbidden exploration of the route. Trail description will be given in the location guide, which is a necessary tool for every climber. For this purpose, we need a more detailed approach to the sectors and therefore a new climbing guidebook will be our next point of proposal.

Climbing guide book

Each climbing site has a book guide. The climbing guidebook of Zádielska dolina ("Zadiel Gorge") was issued in 2016 at a cost of 400 pieces. In the near future will be proposed a new sophisticated climbing guidebook. The reasons for this change is the designation of new roads, but especially the more accurate processing of navigation to sectors which is inadequate. We also

propose to add a guide to information on constraints in individual sectors that would increase the knowledge about the regulation of climbing activity in the gorge.

Information panel

In the field is placed on a wooden carrier under the name of the national nature reserve laminated paper about climbing activity in the Zádielska dolina (“Zadiel Gorge”). Unfortunately, providing information is already 8 years old and two times changed by the District Office in Košice and the Department of Environmental Care. As well, it is situated in a place which in our opinion and experience has a very low ability to capture visitors and climbers attention.

In connection with this reality, it will be suggested that all necessary information to ensure nature protection through the information panel and corresponding signs be placed in the parking lot, or in starting points. This includes in particular information on constraints in the sectors. In addition, points about the appropriate behavior of the climber will be proposed as part of the panel. Besides, the panel will be complemented by a drawing of climbing sectors in the valley, compulsory climbing equipment, and information about camps or other types of accommodation that can prevent wild bed down and help make the local region economically beneficial.

Awareness of ice climbing

Winter months are an opportunity for climbers to ice climbing. Ice is located in the gorge, behind a climbing cottage. Ice is not a natural character, but it is built on the basis of a built system that draws water from the Blatnický stream. The ice is about 15 m high. It offers 4 to 7 climbing routes. The number of routes depends on how wide ice can be built, what is affected by temperature stability below zero.

The proposal is focused on improvement awareness of this attraction through e-marketing tools (Fig. 3).

Ice climbing can help extend seasonality

in the climbing community. For tourists, it can be motivation and it may not be the main reason for a visit to the site, but at least an attraction that will increase their tourism rating in the Zádielska dolina (“Zadiel Gorge”) in the winter months.



Fig. 3 Proposal of presentation material – Ice climbing in Zádielska dolina (“Zadiel Gorge”) (source: own photo)

CONCLUSIONS

In the past, words like mountaineers, mountaineering were very closely related to nature, place of stay and movement in it, its thorough protection, defense and improved. Even today we must not forget the message of those who were there long time ago, who set the goals, which we are trying to accomplish. Zádiel Gorge has a beautiful climbing history. But the fact that it provides the possibility of climbing is not enough at present. The choice of a climbing site also affects other factors that make it more attractive.

Therefore, the main goal was to make the Zádiel Gorge more attractive through climbing by creating suggestions that would have deciding importance in choosing this climbing site. Work was also intended to

create an attractive location that will be a turning point in the local economy and will be a supportive tool for the development of tourism.

Zádiel Gorge can attract thousands of tourists every year and that through the possibility of climbing activity, the development of tourism there will be achieved.

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