Cycling tourism in the cross-border part of the Carpathians on the example of the Transboundary Biosphere Reserve «Eastern Carpathians»: current state and development prospects

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Abstract. Bicycle tourism is recognized as one of the sustainable types of tourism due to its safety for the environment. In recent years, its attractiveness is growing, which is due to the formation of healthy and helpful habits in the development of the personality in combination with the realization of cultural-cognitive, sports, emotional, educational, and other motives of the trip. Restrictions on international travel caused by the COVID-19 pandemic make bicycle tourism one of the available leisure and active recreation types. For the development of bicycle tourism, nature conservation areas of the border are actively involved, however, the analysis of recent publications shows that the problem of combining nature protection and their recreational functions is not yet sufficiently resolved, and the issues of bicycle infrastructure development and popularization of bicycle tourism require more attention in terms of the implementation of the sustainable development concept in Ukraine. The purpose of the work is to study the Transboundary Biosphere Reserve «Eastern Carpathians» of the Ukrainian-Polish-Slovak border to use its territories in the organization of bicycle tourism and to study the international experience of popularizing bicycle tourism and the possibility of its implementation in Ukraine. According to the research results, it was established that the Ukrainian Carpathians have all the necessary conditions for the development of cycling tourism, which is implemented with the support and assistance of the European Union. Every year in the Ukrainian Carpathians there are more and more bicycle routes of different difficulty categories: from calm easy routes along the banks of rivers to breathtaking bicycle routes with sharp ascents and descents, in total there are about 50 bicycle routes, most of the routes have markings and accesses for downloading in GPS trackers. The development of bicycle tourism in the Carpathians is supported by many projects, in particular, the projects «VeloKraina», «VeloKarpattia»: development of infrastructure for bicycle tourism in the Lviv Region, «VeloKosiv», «Green Route», «EvroVelo» and others, which are accompanied by the development of infrastructure and intensive development of bicycle tourism in the Carpathian region and its popularization among Ukrainian and foreign tourists. In general, the Carpathian region has great potential for the development of cycling tourism, and the territory of the Eastern Carpathians transboundary biosphere reserve has dozens of paved routes for cyclists of various levels of difficulty, ranging from easy infrastructure for beginners to difficult mountain routes for professionals. Most of the cycling routes are laid along the borders with Ukraine and Slovakia, some routes run through the territory of Poland and Slovakia, but none of them unites the territory of Ukraine, Poland, and Slovakia. Therefore, we propose to extend the cycle route SNINA-SLOWAC-JA (Poland-Slovakia) to the Uzhan National Nature Park and unite the territories of three countries (Ukraine, Poland, and Slovakia) within the International Biosphere Reserve «Eastern Carpathians». In addition, to extend the Trasa Torfowisko Tarnawa–Błękitna Aleja cycle track on the territory of the «Sianu Valley» Landscape Park, which is also expedient to combine with the territory of the «Nadsyan» regional landscape park, located in the southwestern part of the Lviv region, within the Sambir district, near the border with Poland. Since the full-scale invasion of Russian troops on the territory of Ukraine, there are of course no safe places for recreation, however, it is relatively safe in the Carpathians, because it is far enough from the zone of active hostilities, there are no military facilities and critical infrastructure there. In general, almost all hiking and cycling routes and all types of active recreation are currently available in the Carpathians, and the spread of bicycle tourism, the construction of bicycle paths, and the development of new bicycle routes in the Carpathians will contribute to the formation of significant socio-economic and ecological advantages in the country.

Keywords: bicycle tourism, Carpathian region, Transboundary Biosphere Reserve «Eastern Carpathians».
Велотуризм у транскордонній частині Карпат на прикладі транскордонного біосферного резервату “Східні Карпати”: сучасний стан та перспективи розвитку

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Анотація. Велосипедний туризм визнаний одним зі сталих видів туризму завдяки своїй безпеці для навколишнього середовища. Протягом останніх років його привабливість зростає, що зумовлено формуванням здорових і корисних звичок у розвитку особистості в поєднанні з реалізацією культурно-пізнавального, спортівного, емоційного, освітнього та інших мотивів подорожжі. Викликані пандемією COVID-19 обмеження у здійсненні міжнародних подорожей роблять велосипедний туризм одним із доступних видів проведення дозвілля й активного відпочинку. Для розвитку велотуризму активно залучаються природоохоронні території транскордонного регіону, однак, аналіз останніх публікацій засвідчує, що проблема поєднання природоохоронної та її рекреаційної функції ще недостатньо розкрита, а питання розвитку велосипедної інфраструктури та популяризації велотуризму потребують більшої уваги у вумовах реалізації концепції сталого розвитку в Україні. Метою роботи є дослідження транскордонного біосферного резервату “Східні Карпати” українсько-польсько-словачького прикордонного використання його територій в організації велосипедного туризму та вивчення міжнародного досвіду популяризації велотуризму і можливості його реалізації в Україні. За результатами досліджень встановлено, що Українські Карпати мають всі необхідні умови для розвитку велотуризму, який реалізується за підтримкою та сприяння Європейського Союзу. З кожним роком у Українських Карпатах з’являється все більше веломаршрутів різної категорії складності: від елементарних до складних маршрутув, від легкої інфраструктури для початківців до складних гірських трас для професіоналів. Велика частина веломаршрутів резервату “Східні Карпати” має всі необхідні умови для розвитку велотуризму, який реалізується за підтримки та сприяння Європейського Союзу. Загалом, Карпатський регіон має великий потенціал для розвитку велотуризму, а територія транскордонного біосферного резервату “Східні Карпати” має десятки прокладених маршрутів для велосипедистів різного рівня складності, починаючи з легких маршрутів до складних гірських трас для професіоналів.

Загалом, велотуризм у Карпатах має великий потенціал для розвитку, адже це достатньо далеко від зони активних бойових дій, там немає військових об’єктів та критичної інфраструктури. Загалом, у Карпатах на даний час доступні майже усі пішохідні та велосипедні маршрути та усі види транспортних засобів. Велика частина веломаршрутів прокладена вздовж кордонів з Україною та Словаччиною, частина трас пролягає чарез територію Польщі та Словаччини, від легкої інфраструктури для початківців до складних гірських трас для професіоналів. Велика частина веломаршрутів резервату “Східні Карпати” має всі необхідні умови для розвитку велотуризму, який реалізується за підтримки та сприяння Європейського Союзу. Загалом, Карпатський регіон має великий потенціал для розвитку велотуризму, а територія транскордонного біосферного резервату “Східні Карпати” має десятки прокладених маршрутів для велосипедистів різного рівня складності, починаючи з легких маршрутів до складних гірських трас для професіоналів.

Ключові слова: велосипедний туризм, Карпатський регіон, транскордонний біосферний резерват “Східні Карпати”.

Introduction

Bicycle tourism is recognized as one of the sustainable types of tourism due to its safety for the environment. Its attractiveness is due to the formation of healthy and useful habits in the development of personality in combination with the realization of cultural-cognitive, sports, emotional, educational, and other motives of travel. Restrictions on international travel caused by the COVID-19 pandemic make bicycle tourism one of the available types of leisure and active recreation.

According to the International Cycling Union (Union Cycliste Internationale..., 2023), the number of cyclists will continue growing strongly, and the problems of environmental pollution, traffic jams, and stress but also in ensuring savings on the use of infrastructure (Cycling for All..., 2023). To this end, the 2030 Agenda was adopted, approved by the UCI Steering Committee, and presented to the 2022 UCI Congress. In which the strategy for the development of bicycle tourism in the world for the coming years is presented (AGENDA 2030..., 2023). Therefore, the problem of promoting bicycle tourism in the world is quite urgent.

Analysis of recent research and publications.

Theoretical and practical aspects of the organization of bicycle tourism are highlighted in the works of Yu. Grabovskyi, O. Scalia, T. Scalia, V. Dekhtyar, Yu. Shchur, and O. Dmytruk. The publication of O. Kono- plyanyk, I. Zasedka, and P. Romaniv is devoted to the problems and prospects of the development of bicycle tourism. P. Cox and J. Berridge highlighted ways...
of promoting bicycle tourism (Cox, 2012; Berridg, 2012). In the publications of Vetskovskiy M., Szpara K., Zawilinska B., Wilkonska A., etc. the experience of the development of bicycle tourism in the border areas of Poland is considered (Vetskovskiy, 2010, 2011; Szpara, Zawilinska, Wilkonska, 2015).

For the development of bicycle tourism, nature conservation areas of the border are also actively involved, and certain features of the development of recreation and tourism in cross-border regions were studied by R. Grishko, O. Gulych, N. Kolenda, V. Kyfyak, R. Mazurets, M. Malska, Yu. Migushchenko. In general, various aspects of the functioning of transboundary biosphere reserves were studied by such scientists as A. Horun, A. Zagorodniy, V. Naida, I. Pavlova, G. Parchuk, and S. Stoyko. However, in the domestic and foreign literature, insufficient attention is paid to the issue of the bicycle tourism development within the boundaries of transboundary biosphere reserves. The analysis of recent publications proves that the problem of combining nature protection and recreational functions is not yet sufficiently revealed and has further research prospects, and the issues of bicycle infrastructure development and popularization of bicycle tourism require more attention in the context of the implementation of the concept of sustainable development in Ukraine (Redko, Rososhyk, 2020).

The purpose of the work is to study the Transboundary Biosphere Reserve «Eastern Carpathians» of the Ukrainian-Polish-Slovak border for the use of its territories in the organization of bicycle tourism and to study the international experience of popularizing bicycle tourism and the possibility of its implementation in Ukraine.

Research objectives: to determine the place and significance of cycling tourism in the structure of the functioning of Transboundary Biosphere Reserve (TBR); to characterize the existing tourism potential of the TBR; to analyze the objects of the recreational zone of the parks for their use in bicycle tourism; to study the international experience of popularizing bicycle tourism and the possibility of its implementation in Ukraine.

Research material and methods

Information about the objects of the nature reserve fund of Ukraine, Poland, and Slovakia, the functioning of transboundary biosphere reserves, and the tourist use of natural complexes served as source materials. Also, information from the official websites of the Union Cycliste Internationale (Union Cycliste Internationale..., 2023), the Sports Tourism Federation of Ukraine (Sports Tourism Federation of Ukraine..., 2023); European Union of Cycling Tourism (UECT) (European Union of Cycling Tourism..., 2023); Cycling Commissions of the Polish Tourist and Local History Society (Cycling Commissions of the Polish Tourist..., 2023) and other official sources, including cycling associations, tourist organizations, and local administrations. The research used a complex and systematic approach, as well as a comparative and descriptive method.

Results and their analysis

Bicycle tourism belongs to the types of active recreation, which has many varieties. Its advantage is the significant intensity of traffic, which allows you to see much more compared to hiking or mountain tourism. A bicycle is a very convenient means of transportation, so travelers have the opportunity to cover long distances at a fairly significant speed, get to know the region during a short trip, and visit interesting objects located at a considerable distance from each other.

The Ukrainian Carpathians have all the necessary conditions for the development of cycling tourism, which is implemented with the support and assistance of the European Union. Every year in the Ukrainian Carpathians there are more and more cycling routes of different difficulty categories: from calm easy routes along the banks of rivers to breathtaking cycling routes with sharp ascents and descents. Currently, bicycle tourism in the Carpathians is one of the most popular types of recreation and sports. On the territory of the Ukrainian Carpathians, there are about 50 cycle tracks. Most routes have markings and accesses for downloading to GPS trackers. The routes are laid in different areas: through mountain passes and valleys, plains, and settlements, where unique views of the picturesque Carpathians open up (CYCLING TOURISM..., 2018).

The development of bicycle tourism in the Carpathians is supported by many projects, particularly the «VeloKraina» project, which creates infrastructure for this type of tourism and popularizes it among Ukrainian and foreign tourists. This project covers the territory of the Ivano-Frankivsk, Transcarpathia, and Chernivtsi regions. The main settlements from where the cycling routes are based are Polyanytsia, Yaremche, Vorokhta, Yablunytsia, Verkhovyna, Kolomyja, Kosiv, Rakhiv, Vyzhnytsia.

On each route, the organizers have installed signposts, wooden gazebos for rest, and bicycle racks near shops and cafes. This project also offers its guests the opportunity to stay in comfortable hotels, a network that has been built since its organization, many of
which also provide bicycle rental (Cycling tourism within the project «VeloKraina»,..., 2016).

Within the framework of the «VeloKraina» project, a bicycle ecological tourist route was created for the «Kozakova Dolyna» tract, which is located on the territory of the national reserve of the same name. And for very experienced cyclists, the most difficult and most mountainous route, «Kulny», leading to Mount Kukul, is suitable. This is an extreme route with a length of 52 kilometers, with a steep descent. In general, mountain bike routes differ in length, level of difficulty, and height differences. They will appeal not only to beginners but also to thrill seekers. For those who ride a bicycle for the first time, «VeloKraina» specialists have developed a simple two-hour walking route. It begins in Yaremche, crosses the Prut River on a bridge, leads through the villages of Piddil and Dora.

For cycling enthusiasts, Yaremche is a great starting point for radial trips. Yaremche is crisscrossed with routes of various difficulty levels with signposts, and the railway will help you get to bike paths in other settlements (Tatariv, Mykulychyn, Vorokhta). The route 301 particularly has been laid from Yaremche «Bilyi Kam»; Route 302 «Malvyov»; Route 303 «Lehenda»; Route 304 «Ohliadovy»; Route 305 «Zhinco Slozy»; Route 306 «Bahrivet» and others.

From Vorokhta: Route 315 «Pid starymy mostamy»; Route 313 «Iabluntske vyndokolo»; Route 316 «Kulny»; Route 318 «Ryzhi»; Route 314 «Vorokhtianskyi»; Route 317 «Pid Hoverlu»; Route 319 «Kryvopilski polonyny» and others.

Mykulychyn also offers cyclists two «VeloKraina» routes with signposts and many forest roads along which you can build your bicycle route. From Mykulychyn, you can make a linear cycling trip along mountain roads (NOT on the highway) to Vorokhta, Kosmacha, or Yaremche (Dora). In particular: Route 307 «Stara zaliznytsia» Mykulychyn – Prutets Chernyshivskyi River; Route 308 «Polonyny» Mykulychyn – Polonyny – Prutets Chernyshivskyi River.

Politically oriented bicyclists will find the journey from Tatariv to Zhnetiska Waterfall fascinating. In that place, the incredible mountain nature is complemented by other attractions – estates of political and business figures of our country. In Tatariv, there are two marked cycling routes for cyclists starting from the Tatariv railway station. However, being based in Tatariv, you can easily make radial forays to the neighboring areas, having studied the cycle paths of Vorokhta, Mykulychyna, and Yabluntsia. In particular: Route 311 «Prezydentskyi»; Route 312 «Na Bukovel».

Yabluntsia is also a good place for bicycle trips. The most popular are the radial trips to Bukovel, Vorokhta, and Transcarpathian Lazeshchyyna (along the old road, which goes further north than the new one). The undoubted advantage of Yabluntsia is its height, and therefore the incredible beauty of the panorama.

And in Polyanytsia, cycle tourists can rent bicycles at the Bukovel bike park, there are cross-country and downhill bicycles, rovers for women and children, and bicycle tours. The «Bukovel» bicycle park offers routes of varying difficulty, springboards, narrow crossings, and various natural obstacles in the middle of the wild forest – here everyone can both learn to ride steeply and improve their skills. Today, this bike park is almost the only place in Ukraine that is professionally prepared for fans of extreme riding. Now, there is a «blue» track for beginners, a «red» track for experienced cyclists, and a «black» track for experts. (OPENING BIKE PARK «BUKOVEL»,..., 2022).

In Kosovo, for example, the «VeloKosiv» project has been implemented, the main purpose of which is:

- development and popularization of bicycle trips through the mountains and settlements of the Kosiv district among Ukrainian and foreign tourists;
- formation of a high level of cycling culture and safety;
- promotion of cycling and an active lifestyle.

The website https://velokosiv.if.ua collects information on tourist facilities of the district — museums, natural attractions, bicycle rentals; bicycle estates of green tourism; gps-tracks, detailed descriptions, videos and photos of bicycle routes, and much other supporting information (Relax on a bicycle in the Carpathians..., 2023).

You can read more about the listed bicycle routes in the catalog published as part of the «VeloKraina» project, which is implemented by the public organization «Center for Social and Business Initiatives» of the city of Yaremche with the participation of partner organizations of Ukraine and Romania.

Thanks to the «VeloKraina» project, in the territory of the Yaremchan city council, Verkhovyna, Kolomiysky, Kosivskyi, Nadvirnianskyi, and Snyatinskyi districts, the formation of the infrastructure for bicycle tourism was started, particularly, the development and description of more than 50 bicycle routes (radial and circular with a length of 7-60 km, various complexity) with a total length of 1350 km; issued tourist maps and catalogs, presentation booklets. In addition to the development and identification of bicycle routes, the project takes care of the organization of bicycle park-
ing in the tourist centers of the Carpathians, helps the owners of hotels and estates to equip their facilities to meet the needs of bicycle tourists, and also supports local entrepreneurs who intend to work in the bicycle rental business (VeloKraina Yaremche region..., 2023).

As part of the project «Velokarpatiia: development of infrastructure for cycling tourism in the Lviv region», a bicycle path is being built from the village of Slavsko to the village of Volosyanka with the arrangement of start and finish locations. The length of the bike path will be 6.8 km, 3 km have already been built today. It is planned to arrange the start and finish locations, as well as to develop a suitable bicycle quest. The project is aimed at the development of the tourist infrastructure of the mountain areas of the Lviv region, the development and popularization of active recreation, and the creation of safe conditions for cyclists who travel through the mountain areas.

As part of the project, a new MTB cycle track (mountain bike, or MTB) has already been built in Pohar, 2.14 km long, equipped with 24 ski jumps. The bicycle track was built using the existing terrain, with turns with conra clones and the installation of about 30 various wooden and earthen structures on it: springboards of the «drop», «double-humped springboard», «wallride», «trampoline with a table», «turn with a counter hill» type, as well as the necessary wooden structures. It should be noted that the construction of the cycle track and cycle track is being carried out as part of the implementation of the regional development project, which is being implemented at the expense of the state budget funds received from the European Union, regional and local budgets in partnership with the Department of Tourism and Resorts of the Lviv Regional State Administration and the Slavic United Territorial Community (Lviv region develops infrastructure..., 2022).

Also, within the framework of the project «Velokarpatiia: the development of infrastructure for cycling tourism in the Lviv region» a bicycle quest «Slidamy Chuhaistera» was developed, for which a phone application is required, with the help of which the participant will scan the QR code and receive the task. The estimated time of passage is two hours (In the footsteps of the Brave Soldier Shveik). The route «Slidamy pryahod bravoho voiaka Shveik» takes place. It is attended by both Polish and Ukrainian cyclists – cycling enthusiasts. According to tradition, the participants of the bicycle raid visit Ukraine. The purpose of the International Bicycle Raid is to attract attention (promotion) to the border areas, to learn about the history and culture of the people living in the areas of the former Austro-Hungarian Empire, to improve the provision of tourist services, and to promote cultural tourism and active recreation, by organizing a bicycle race along the route «Slidamy pryahod bravoho voiaka Shveik». The venue of the event is the international bicycle route Greenway R63 (Poland – Ukraine – Slovakia – Hungary). The organizers of the action are the Starosambir District Council, and the Beschad Society of Cyclists. The target group is cyclists from Ukraine, Poland, Slovakia, and Hungary. You can find out more about this on the STAROSAMBIR NEWS website. (STAROSAMBIR NEWS..., 2012)

Nature conservation areas of the Ukrainian-Polish border, where three Transboundary Biosphere Reserves operate: «Eastern Carpathians», «Roztochshia» and «Western Polissia» particularly, the International Biosphere Reserve «Eastern Carpathians» – the first reserve in the world, are actively involved in the development of bicycle tourism united the territories of three countries (Ukraine, Poland, and Slovakia).

A biosphere reserve is a territory of terrestrial, coastal, and marine ecosystems or their combination, which is recognized by UNESCO’s Man and the Biosphere (MAB) international program.

Purpose of the reserve creation: demonstration of balanced relations between humanity and the biosphere, preservation of genetic resources, diversity of biological species, ecosystems, and landscapes, promotion of sustainable socio-economic development of this region, dissemination of environmental education and personnel training, conducting research, and environmental monitoring and implementation of joint activities. Obtaining the status of a transbound-
ary biosphere reserve is a recognition in the international arena of significant natural, landscape, and cultural values and their significant role in the overall system of environmental protection.

The main issues resolved within the framework of cross-border cooperation are coordination of work in the field of environmental protection, joint economic cooperation, cultural and information exchanges, as well as coordination of work in emergencies.

When the reserve is created, cross-border cooperation in the field of environmental protection will be intensified, including the implementation of joint projects related to solving ecological problems in the border zone, the development of tourism, and the cultural communication of the population (Biosphere Reserves..., 2023).

Although the main task of the biosphere reserve is the preservation of biological diversity, biological resources, and their sustainable use, the central element in the development and activity of tourism in the transboundary biosphere reserves is the availability and development of tourist routes, the laying, and marking of bicycle routes and ecological trails. When laying out the route, it is advisable to choose those legacy objects that are typical for the given landscape and in which tourism development is allowed. The purpose of cycling routes and ecological trails is to create a feeling among tourists of their relationship with the natural environment, tourists become one with living and non-living nature.

The establishment of ecological trails and bicycle routes within transboundary biosphere reserves can solve two important tasks. First, to provide visitors of nature protection institutions with the most complete familiarization with its landscapes, valuable natural and cultural objects, etc., and second, to minimize the impact of recreation on the natural environment of protected areas. The last task is of particular importance since limiting the negative impact of tourists on the natural environment is possible only with permissible values of recreational loads. Ecological and educational trails and bicycle routes limit these loads due to the distribution of the recreational flow on the territory of nature protection institutions (Zapovidna sprava..., 2003).

In this article, we will analyze the current state and trends in the development of bicycle tourism within the boundaries of the Transboundary Biosphere Reserve «Eastern Carpathians».

Transboundary Biosphere Reserve «Eastern Carpathians»

The territory of this reserve is located in the Eastern Carpathians. It consists of three national parks and three landscape (natural) parks in three countries:

- «Bieszczady» National Park (in Polish – Bieszczadzki Park Narodowy) and two Landscape Parks that surround it — «Tsisniansko-Vetlinsky» Landscape Park (in Polish – Ciśniańsko-Wetliński Park Krajobrazowy) and Landscape Park «Sianu Valley» (in Polish – Park Krajobrazowy Doliny Sanu) in Poland (more than 50 % of the area);
- «Uzhan» National Natural Park (in Ukrainian – Ужанський національний природний парк) and «Nadsyan» Regional Landscape Park (in Ukrainian – Надсянський регіональний ландшафтний парк), based on which the «Boykivshchyna» National Natural Park (Ukrainian – Національний природний...)

The Map of the Transboundary Biosphere Reserve «Eastern Carpathians» (East Carpathian Biosphere Reserve..., 2023).
park «Бойківщина») was created in 2019 (respectively in Zakarpattia and Lviv regions of Ukraine) (almost 30% of the area).

- «Poloniny» National Park (in Slovak – Нárodнý park Poloniny) with adjacent territories in Slovakia (almost 20% of the area).

The reserve is part of the UNESCO program «Man and the Biosphere». It covers an area of 2,080.89 km² (1,087.24 km² is the Polish part, 407.78 km² is the Slovak part, and 585.87 km² is the Ukrainian part). It was originally established as a Polish-Slovak cross-border reserve (1992). In 1998, it was expanded at the expense of Ukrainian parks, becoming the world’s first tripartite biosphere reserve. The International Biosphere Reserve «Eastern Carpathians» is a unique reference forest of the UNESCO heritage, well-preserved mountain meadows, monuments of sacred architecture, and natural monuments. It is also the first reserve in the world that united the territories of three countries (Ukraine, Poland, and Slovakia) (Cross-border Ukrainian-Polish-Slovak..., 2023).

Thus, the Polish part of the Transboundary Biosphere Reserve «Eastern Carpathians» is represented by the «Bieszczady» National Park and two Landscape Parks that surround it — «Tsisniansko-Velitsinsky» Landscape Park and Landscape Park «Sianu Valley».

«Bieszczady» National Park

Bieszczady is currently one of the least populated mountainous regions in Europe, but it is extremely interesting. The Bieszczady National Park (the third largest national park in Poland. Located in the Subcarpathian Voivodeship, in the extreme southeast part of the country, near the border with Ukraine and Slovakia) is located on the Polish territory in Bieszczady.

The park was created on August 4, 1973. At that time, its area was only 59.55 km², but now the territory of the park is 292.02 km² and includes the highest areas of the Polish part of the Bieszczady massif. The highest point of the park is Mount Tarnytsia, the height of which is 1,346 m above sea level. In 1992, the park and its surrounding areas became part of the Biosphere Reserve «Eastern Carpathians» with a total area of 2132.11 km² (Bieszczady National Park..., 2023).

The meadows and mountain meadows of Bieszczady National Park can be conquered in various ways. First of all, it is worth riding horses. There is a horse farm in the village of Volosatomu, which maintains the selection of Hutsul horses. Here are all services in the field of horse tourism (http://www.konie-bieszczady.pl/) horse riding courses and raids on tourist routes, the total length of which on the territory of Bieszczady National Park is 142 km.

Hiking enthusiasts can try their hand at walking with special sticks, which is a new, fashionable, enjoyable, and pleasant form of recreation and physical activity. Nordic Walking comes from Scandinavia, and its roots go back to the 20s of the past century. The main advantage of the Scandinavian Walk is the involvement of the most body muscles, which translates into an increase in the body efficiency level and a general improvement in the condition of the person taking a walk. There are almost no contraindications for Scandinavian walking, you can walk at any age, at any time of the year, and everywhere. A Scandinavian walk will appeal to everyone thanks to the clean air, a wonderful landscape, and a large selection of routes (tourist paths, forest roads, Sanu Valley) (Bieszczady National Park..., 2023).

Tourists visiting the Bieszczady National Park are obliged to travel only along designated routes, i.e. public roads, marked tourist trails (132 km in total), and special natural and natural-historical trails. All public roads accessible to vehicular traffic passing through the park are also used by pedestrians.

Therefore, all other areas of the park, located outside the boundaries of marked paths and paths, are closed to pedestrian, bicycle, and car traffic. This also applies to internally paved park roads, e.g. «cones» (Bieszczady National Park..., 2023).

For connoisseurs of bicycle trips, many bicycle routes and bicycle paths have been laid out in the Park (Table 1.) (Bicycle tourism..., 2021).

On the territory of Bieszczady National Park, you can ride a bicycle on public roads and (after paying an entrance fee) on marked bicycle routes (Table 2.). Due to the safety of park visitors and the negative impact of mountain bikes on natural resources, cycling is prohibited on the footpaths.

**Table 1. Bicycle paths of Bieszczady National Park**

<table>
<thead>
<tr>
<th>№</th>
<th>Area</th>
<th>Length, km</th>
<th>Road category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bukowiec-Beniowa-Wiata in the valley of Bear Stream – Bukowiec</td>
<td>19.0</td>
<td>Gravel/dirt road</td>
</tr>
<tr>
<td>2</td>
<td>Tarnawa Niza – Dzwiniacz Gorny – Tarnawa Nizna («Tarnawa» walking and cycling path), partly in the area of Stuposian Forestry</td>
<td>11.5</td>
<td>Asphalt/tile/gravel road</td>
</tr>
<tr>
<td>3</td>
<td>Tarnawa Wyzna – Sokoliki (pedestrian and bicycle path «Sokoliki»)</td>
<td>2.5 (back using the same route)</td>
<td>Asphalt-ed/dirt road</td>
</tr>
</tbody>
</table>
Table 2. Bicycle routes that pass through public roads

<table>
<thead>
<tr>
<th>№</th>
<th>Area</th>
<th>Length in km (within the park)</th>
<th>Road category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Berezki-Ustrzyki</td>
<td>19.0</td>
<td>Provincial road</td>
</tr>
<tr>
<td></td>
<td>Górné-Berehy</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Górné-Wetlina</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Berehy Górné-Naścizne</td>
<td>5.0</td>
<td>County road</td>
</tr>
<tr>
<td></td>
<td>Ustrzyki Górné-Wolosate</td>
<td>5.0</td>
<td>Provincial road</td>
</tr>
<tr>
<td>4.</td>
<td>Tarnawa-Bukowiec</td>
<td>7.0</td>
<td>PGL LP road open to traffic</td>
</tr>
<tr>
<td>5.</td>
<td>Nasieczne-Przysłup Carynski</td>
<td>4.0</td>
<td>Communal road</td>
</tr>
<tr>
<td>6.</td>
<td>Zatwarnica – Suche Rzeki</td>
<td>3.0</td>
<td>Communal road</td>
</tr>
</tbody>
</table>

About 75 km of public roads and several fragments of fortified internal roads of the Bieszczady National Park are defined in the Protection Tasks of the Bieszczady National Park and in the Regulations on Visits, based on which the Park can be visited by bicycle. Bicycle luggage is prepared for the convenience of cyclists, and seasonal mountain bike rental is available in Tarnawa Nizhny.

Bike parking allows you to combine a bike ride with a hike and leave your bike in a safe place when you go hiking and nature trails. They are located in Wolosate (parking lot), Ustrzyki Górné (entrance to the path to Polonina Carynska), Brzegi Górné (near the ticket office), on Przekecz Wyznianska (parking lot), in Bukowiec (near the parking lot and the end of the cycle path – near the shelter in the valley of the Nedzvedza River), in Dzvinia Górné and Suhe Rzeki. There is no charge for the use of bicycle parking. The park has mountain bike rentals in Tarnawa Nizhny. Terms and conditions of rental and fees are available on the website (Bicycle tourism..., 2021).

You can find a detailed description and maps of all trails within the park on the website (In the Bieszczady National Park..., 2023).

«Tsisniansko-Vetlinsky» Landscape Park

Landscape Park is located in Western Bieszczady, west of Bieszczady National Park and «Sianu Valley» Landscape Park. Together with them, it is part of the Transboundary Biosphere Reserve «Eastern Carpathians». «Tsisniansko-Vetlinsky» Landscape Park is a buffer zone of Bieszczady National Park from the west. The park was created in 1992, now it covers an area of 51,461 hectares and 83% of forest cover. The park's highest peaks reach almost 1,200 m above sea level and are characterized by a multi-tiered arrangement of mountain vegetation. It has two new reserves (Tsisniansko-Vetlinsky Landscape Park..., 2023).

Bicycle tourism is very actively developing in the «Tsisniansko-Vetlinsky» Landscape Park, dozens have been paved, marked, and equipped, a detailed description of which, as well as their map, can be found on the website: Traseo (cycling tourism in the Tsisniansko-Vetlinsky Landscape Park..., 2023).

Most of the cycling routes are laid along the borders with Ukraine and Slovakia, for example: BIESZCZADY I BESKID NISKI, POLACZYK-RAJSKIE-LUTOWISKA-SMOLNIK-USTRZYKI GORNE-WETLINA-SMEREK, WANKOWA-HOTEL-WETLINA-CISNA-SER-PENTYNY-WANKOWA, BIESZCZADY 04, ROWEREM PRZEZ BIESZCZADY, MYCZKOWCE – TARNAWA GORNA – CISNA — MYCZKOWCE, PETLA BIESZCZADZKA, WIELKA PETLA BIESZCZADZKA and others.

Part of the routes runs through the territory of Poland and Slovakia, for example, SNINA-SLOWACJA (length 87.1 km) (Fig. 2.) and others. Although, none of them unites the territory of Ukraine, Poland, and Slovakia (Traseo SNINA-SLOWACJA..., 2023).

Therefore, we propose to extend the SNINA-SLOWACJA cycling route to the Uzhan National Nature Park and to unite the territories of three countries (Ukraine, Poland, and Slovakia) within the Transboundary Biosphere Reserve «Eastern Carpathians».

Landscape Park «Sianu Valley»

Landscape park in the northern part of the Bieszczady Mountains, in the Subcarpathian Voivodeship. It covers the Otrit ridge, the valley of the upper Sian in the section from Benyova to the Solinsky Lake, and
the northern slopes of the main ridges of Bieszczady. In the south, it borders the Bieszczady National Park and is its natural buffer zone. In the east, it borders the Ukrainian Nadsan Regional Landscape Park, and in the west—with the «Tsitiansko-Vetlinsky» Landscape Park. Together with them, it is part of the Trans-boundary Biosphere Reserve «Eastern Carpathians».

About 80% of the park’s area is covered with forests, mainly mountain Carpathian beech forests. Almost half of the forests are plantations 100 years old or older. The park also has shelters for rare large mammals—bison, bear, and lynx. Almost all domestic reptiles live here, including the aesculapius (San Valley Landscape Park..., 2023).

Many cycling routes have been laid on the territory of the landscape park, some of which also run along the Ukrainian border. In particular: Track Torfowisko Tarnawa–Blekitna Aleja (beginning: Muczne); Track via the Beaver Observation Point (beginning: Muczne); Track Torfowisko Tarnawa–Beaver observation point (beginning: Smolnik); Track via Beaver observation point (beginning: Za Sanem), a detailed description and maps of which are available on the Komoot website (Bicycle routes around the San Valley..., 2023).

We propose to extend the 54 km Track Torfowisko Tarnawa–Blekitna Aleja (beginning: Stuposia-ny) (Fig.3) (On a bike in Bieszczady..., 2023), which it is also expedient to combine with the territory of the «Nadsyan» Regional Landscape Park, located in the southwestern part of the Lviv region, within the boundaries of the Sambir district, near the border with Poland.

In the Ukrainian part of the transboundary biosphere reserve is located the «Stuzhitsa-Uzhok» site of the UNESCO World Natural Heritage site «Primitive beech forests and ancient forests of the Carpathians and other regions of Europe», territories of the Emerald Network of Europe UA000032 «Uzhan National Natural Park» and UA0000118 «Nadsan Regional Landscape Park» (based on which the «Boikivshchyna» National Nature Park was created in 2019).

Tourism is developing rapidly here. Cultural events include festivals, in particular, dedicated to the promotion of unique natural, cultural, and historical objects of the region. In 2017, the international ethno-eco-festival «Pralis-Fest» was launched in the Uzhan National Nature Park, which popularizes and supports nature-reserved areas, the livelihood of local communities, their lifestyle, traditional farming and the ethno-cultural heritage of the region, and promotes the establishment of cross-border cooperation.

Six wooden churches of the 17th and 18th centuries are a kind of visiting card for the development of cultural tourism in the region: Church of St. Basil the Great, 1703, p. Salt; Church of the Intercession of the Holy Virgin, 1645, Kostryno; Church of St. Arch. Mykhailo, 1745, p. Narrow; the church of St. arch. Mykhailo, 1700, the village of Vyshka; the church of St. Ivan the Forerunner, 1679, Sukhii village; the church of St. Nicholas the Wonderworker, 1655, p. Thick Church of St. Arch. Mykhailo (1745), located in the village of Uzhok, is included in the UNESCO world cultural heritage «Wooden churches of the Carpathian region in Poland and Ukraine» (UNESCO world cultural heritage..., 2023).

The Uzhan National Nature Park is located within the Ukrainian Carpathians, on the territory of the Velikobereznya district of the Transcarpathian region. The park was created in September 1999 for the preservation, reproduction, and rational use of the natural landscapes of the Eastern Beskids, based on protected objects in the upper reaches of the Uzh River.

In 2007, the beech forests of the Uzhan National Nature Park have included in the nomination «Beech forests of the Carpathians» and declared a UNESCO World Heritage Site. In 2009, the park joined the EURO PAC Federation, known as the «Federation of Nature and National Parks of Europe», which unites more than 370 protected areas in Europe (Uzhan National Natural Park..., 2023).

The Uzhan National Nature Park is located in picturesque mountain valleys connected by railways and roads, so the park is both easily accessible and remote from industrial centers. Traditional life, crafts, culture, and cuisine have been preserved in mountain
villages. Recreational activities are aimed at creating conditions for the development of tourism. For this purpose, many recreation areas have been arranged, 17 pedestrian ecological and educational routes with a total length of more than 140 kilometers and 5 ecological trails have been developed (a detailed description of which is available at the link: Routes Uzhanskyi National Natural Park (Routes Uzhanskyi National Natural Park..., 2023). There is also a network of recreation areas with rest areas and tent fields, gazebos, and cradles. Observation and information platforms have been set up at the Uzhotsk Pass and the entrance to the park from the Lviv region. The Uzhan National Park is working on the development of cross-border pedestrian crossings with Poland and Slovakia with the prospect of creating cross-border hiking and cycling routes within the Eastern Carpathians International Biosphere Reserve (Recreation Uzhan National Natural Park..., 2023).

«Boykivshchyna» National Natural Park

It was created in April 2019 to preserve the genetic, species, and landscape diversity of the Ukrainian Carpathians, other natural complexes, and objects that have important nature protection, scientific, aesthetic, recreational, and health benefits.

The territory of the national natural park includes 12,240 hectares of state and communal lands, namely: 10,623 hectares of state and communal lands, which are provided to the national natural park for permanent use, including with seizure from land users, and 1,617 hectares of state-owned lands state enterprise «Boryn Forestry», which are included in the territory of the park without removal.

Many tourist routes have been laid out on the territory of the Park, including ecological trails and bicycle routes:

1. Path of active tourism «Benyova-Boberka border bicycle trip» (35 km long) Lviv region, Sambirsky district, Benyova village, Boberka village. NPP «Boykivshchyna», Syankiv Forestry.

2. The ecological and educational trail at the Borynya village. NPP «Boykivshchyna», forest nursery.

3. Historical-local history trail «Historical and natural secrets of the Babinets tract». Lviv region, Sambir district, Borynya village, 32 Voyakiv UPA street. NPP «Boykivshchyna Mezhihirske, Syankivske forestry.


Potentially, all settlements on the territory of the Park have a high recreational potential due to the location in the mountainous area, and the agricultural direction of employment of the local population, which can provide the needs of tourists and vacationers with environmentally friendly products of home production, the presence of balneological and recreational resources in Rozluch, rich in historical and cultural of the heritage of western Boykivshchyna — a significant number of monuments of sacred art, which are architectural monuments of national significance, are located within the Park (National Nature Park «Boykivshchyna»..., 2023).

The Slovak part of the Transboundary Biosphere Reserve «Eastern Carpathians» is represented by the «Poloniny» National Park.

«Poloniny» National Park

«Poloniny» National Park — a national park in the northeast of Slovakia, on the border with Poland and Ukraine, in the Bukovske Vrhy mountain system. Founded in October 1997. The area of the park is 298.05 km²; the buffer zone — is 109.73 km². It is part of the UNESCO World Heritage site — the Beech Forests of the Carpathians and the ancient beech forests of Germany. The park is located in the Snina district of the Prasias region. Poloniny is located on the Slovak-Polish-Ukrainian border and is
directly adjacent to the Polish «Bieszczady» National Park and the Ukrainian «Uzhan» National Natural Park, which along with it is part of the Eastern Carpathians Biosphere Reserve.

The highest point of the park is 1208 m above sea level and is located at the point where the borders of three countries: Slovakia, Ukraine, and Poland meet. Polonyny is the easternmost and sparsely populated territory of Slovakia. Hiking trails for tourists start from several villages (Polonyny (National Park, Slovakia)..., 2023).

Most of the park is made up of the Bukovsky Hills, which are an ideal place for active tourists and cyclists. About 300 km of hiking trails are arranged on the territory of the park, often equipped with stairs, chains, and bridges. There are about 350 caves in the Park, but only the Dobshin ice cave is open for visitors, with a length of 1232 m, is one of the largest ice caves in Europe (Slovak Paradise..., 2023).

Tourism in Polonyn does not have long-standing traditions. The first documented trip to this territory was made by the Ukrainian poet and traveler Yakiv Holovatskyi* in 1839. He described his experiences in the message «Letters from an unknown country L.» *(Yakiv Holovatskyi, Markiyan Shashkevych, and Ivan Vahylevych were representatives of the so-called «Russian Three», who were the first to raise the issue of organizing local history trips in Western Ukraine, while they directly traveled a lot, collecting the most interesting material about the life, culture, folklore of the Western Ukrainian peoples, which was later published by them in the almanac «The Mermaid of Dnieper», which was published in 1837).

In the Polish «Illustrated Guide to Galicia» of 1914, we find the first described tourist routes to Russky through Roztoki Gurny and from Polish Wetlina to the Ryabu rock. He states that tourism here is very weak, and there is a lot of game in the forests. The route is about 6,000 kilometers long, and part of it passes through eastern Slovakia. Several promotional events were held, and the tourist guide «Carpathian Bicycle Route» and a special web resource were published www.cyklopo.sk.

In particular, the bicycle path that runs from the border with Ukraine leads to Ubli and Sninsk fishing grounds. Its length is 34 km. On the way, cyclists are advised to visit the Andy Warhol Museum in Medzylaborc, the Andrey Smolak Gallery in Sni, several old wooden churches in Shmigovka and Grabova Roztoka, and the Snina Fishermen. Further, the bike path leads towards the Polish border to the city of Ciesna (32 km) and further to Bardejov, Presov, and to the Tokaj region on the border with Hungary (Sit down and ride in the EU..., 2023).

Issues related to the development of bicycle tourism in the cross-border territories of the Carpathians are discussed at numerous international conferences. In particular, the scientific conference «Carpathian Mobility» was recently held in the Slovak city of Sni, the event was organized by the Pryasiv Autonomous Region and dedicated to the discussion of the HUSKROUA project «Carpathian Mobility» on improving accessibility in the SK-UA cross-border region. Its goal is to support the idea of building a multifunctional tourist bike path in the border regions of the Transboundary Biosphere Reserve «Eastern Carpathians».

Additional advantages of this project are the beginning of cooperation with Ukrainian partners, who are also to build a 1.9 km long bicycle path along the dam in the village of Veliky Berezny, to mark and clear a 240 km cycle route on the territory of the Uzhan National Park and the Veliko Bereznya community «Uzhan Trail». The aim is to develop jointly the potential, as well as to exchange know-how in the field of development of tourist destinations and

In 2017, the 310 km long EUROVELO 11 bicycle route named «Carpathian Bicycle Route» (Karpatycka cykloturysticka cesta) was officially opened in the Kosohice region of Slovakia, which connects the region of Tokaj on the border with Hungary and Ublija on the border with Ukraine and passes through the territory of the National Park «Polonyny». 239,574 euros from the Norwegian Financial Mechanism (Norway Grants) were used to implement the project.

In general, this project is part of a large European route, which should connect the Norwegian city of Nordkapp with Athens, Greece, via a bicycle path. The route is about 6,000 kilometers long, and part of it passes through eastern Slovakia. Several promotional events were held, and the bicycle tour guide «Carpathian Bicycle Route» and a special web resource were published www.cyklopo.sk.
related services. Currently, 150 km of the tourist route has already been marked, and the completion of the works is expected in May 2023. However, taking into account the state of war in Ukraine, the project may be extended, reports the representative of the Transcarpathian Regional Council.

In general, the conference discussed the prospects for the development of tourism in border national parks – the «Bieszczady» National Park (Poland), the «Poloniny» National Park (Slovakia), the «Uzhan» National Natural Park (Ukraine), the pros and cons of the development of cycling tourism, the cooperation of national nature parks with local self-government bodies and others (Carpathian mobility..., 2021).

**Within the framework of the international meeting, the Ukrainian and Slovak sides also discussed a new concept of uniting four natural parks with hiking (and later cycling) tourist routes.**

Among the many issues discussed was the development of the tourism industry in border regions of Ukraine and Slovakia. The management of Pryashiv region already knows that Transcarpathia region is planning to test the system of expedited admission of tourists to routes and their identification. The concept was the project of uniting four natural parks of neighboring states with hiking tourist routes. These are the «Poloniny» National Park (Slovakia), the «Uzhan» National Natural Park (Ukraine), the «Bieszczady» National Park, and the «Tsisniansko-Vetlinsky» Landscape Park (Poland).

In order to unify the parks and routes of the countries with further fixation at the international level, a mandatory element is the development of the border infrastructure – the checkpoint «Zabrid» – «Ulich», located on the border of Ukraine and Slovakia. As a result of the meeting, there is a clear understanding of the strategy and further actions in this direction. The project of uniting four natural parks is the result of a meeting of the leaders of the border regions of Ukraine and Slovakia (The project of unification of four nature parks..., 2021).

In February 2022, a meeting of the Public Organization «FORZA» with representatives of the district state administration, the district council, and communities of Rakhiv district took place, at which consultations were held on the concept of long-distance bicycle paths in Transcarpathia region, community plans for planning, designing, and arranging local bicycle paths were discussed as well as the requirements and standards of Ukraine regarding the planning and design of bicycle infrastructure.

As the cross-border Project «Bike AcceNT: bicycle accessibility unites territories» was presented, it is important to note that the project is financed by the European Neighborhood Instrument within the framework of the Hungary-Slovakia-Romania-Ukraine cross-border cooperation program. They emphasized the inclusion of this spatial plan in the Development Strategy of the Ivano-Frankivsk Region for 2021-2027. The project is aimed at improving the accessibility of the Slovak-Ukrainian cross-border region for cyclists by creating prerequisites for cross-border mobility and raising awareness of the importance of the bicycle as an ecologically clean and climate-sustainable means of transport (PRESENTATION OF THE CROSS-BORDER PROJECT..., 2022).

The organization of cross-border cooperation in the field of tourism, entrepreneurship, ecological sphere, energy saving, and infrastructure development is also supported by the Association – Euroregion «Carpathians», created in 2007. Its branches are located in Poland, Slovakia, and Ukraine. It includes local self-government bodies of regions and areas located on the territory of Prykarpattia. For example, from Poland – the Subcarpathian Voivodeship (including the city of Krosno), from Ukraine – 4 regions (Ivano-Frankivsk, Lviv, Chernivtsi, and Transcarpathia region). Each of the participating countries, whose territories lie in the Carpathians, considers them as a common value worthy of the attention of the whole world. Based on the cultural and natural wealth of the region, as well as prospects for the development of tourism, even a whole brand of CARPATTIA was born.

For example, the Euroregion «Carpathians» in Poland organized a «Study Tour w klimacie ETNO» (a study tour of the border territories of Poland and Slovakia in ETNO style, the length of the route reached 900 km!), which had its ethno-color: journalists were shown the following places of the Carpathians, where the cultural and historical monuments of the peoples who inhabited the mountains long ago, including the Boyki and Lemki, are preserved. This idea (in ethnic style) can also be used in the development of new cross-border cycling routes (Getting to know the Carpathians..., 2022).

In the Kosiv district of the Ivano-Frankivsk region, with the assistance of the association – Euroregion «Carpathians», **two tourist routes «Karpatski medovi stezky»** were also developed, one for pedestrians, the other for bicycles. Both trails combine tourist sites related to the history and modern locations of beekeeping. The bicycle route with a total length of more than 50 km includes 30 local apiaries, locations where apitherapy is carried out, cultural and natural sights of the Kosiv district. We are sure that bicycle tourism fans will like this route.
You can visit locations related to beekeeping in the Kosiv region without a bicycle. A pedestrian route has also been developed, which stretches for almost 7 km so that you can cover this route in approximately 2.5-3 hours. Both ways are marked.

The tourist routes were developed within the framework of the project «Karpatska bdzhola – spilni zakhody iz zberezhenia unikalnoi pryrodnoi spadshchyny v ukrainsko-polskomu prykordonniі», which is implemented by the Euroregion Association «Carpathians-Ukraine» together with the public organization of the Association of Beekeepers «Carpathian Eco Pasika», Kolochava village council, Stowarzyszenie na Rzecz Rozwoju i Promocji Podkarpacia «Pro Carpathia» with the financial support of the European Union (Two «sweet» routes..., 2021).

All routes in the Carpathian region are marked, based on the Carpathian color system, although there is also an Alpine one – digital. Thus, in Transcarpathia, with the support of the Swiss-Ukrainian forestry development project FORZA, about 230 km of tourist routes have been marked under the general name Transcarpathian Tourist Route. Marking is also done by the public, coordinating this work with local authorities. This is how they work in Lviv Region, Ivano-Frankivsk Region, Transcarpathia Region, and other regions interested in developing active tourism.

As for the convenience of cyclists, various cycling applications for navigation have been developed, the most popular of which are: Komoot, Maps. Me, Ride With GPS, TrailForks, ViewRanger, etc. (15 Best Cycling Apps..., 2020).

In general, in recent years, projects for the development of cycling tourism have been implemented in Ukraine: «VeloKraina», «Green Route», «EuroVelos», etc., which are accompanied by the development of infrastructure. All this led to more intensive development of bicycle tourism in the Carpathian region, which is characterized by picturesque landscapes, numerous lakes and waterfalls, and developed bicycle infrastructure (Nekrasov, 2010).

Therefore, a bicycle is not just a convenient means of transportation, but also a source of exciting impressions, positives, learning about the history and culture of the region, adventures, and a guarantee of excellent physical shape. Choosing a bicycle tour to the Carpathians for your vacation, you are guaranteed to get bright and unusual impressions, a charge of incredible strength and energy, and strengthen your body!

Cycling trips in the mountains have several undeniable advantages: the opportunity to see more of the Carpathians beauty than outside the car window or on foot; getting a complete picture of the surrounding species from smells to sounds; strengthening your health and stamina. Cycling in the fresh Carpathian air helps to stay in good shape for a long time and to feel energetic and happy.

Unfortunately, at present time, a third of the objects of the natural reserve fund of Ukraine have been damaged due to the full-scale, aggressive war that the Russian Federation launched against Ukraine on land, sea, and air space on February 24, 2022. As a result of the invasion of Russian troops, our natural heritage will suffer significant damage, in particular, damage to ecosystems and the looting of Ramsar sites. About 200 territories of the Emerald Network with an area of 2.9 million hectares are under threat of destruction. Currently, more than 500 cases of ecocide have been recorded and about 2,000 facts of the destruction of the Ukrainian environment as a result of the military aggression of the Russian Federation have been discovered. The largest number of these crimes occurred in Kyiv Region, Slobozhan Region, Donetsk Region, and southern Ukraine. However, almost all regions of Ukraine suffer from the actions of the Russian military, and a full picture of the environmental damage will be available only after the war (Terebukh, Pankiv, Roik..., 2022).

At the moment, of course, there are no safe places for recreation in Ukraine, however, it is relatively safe in the Carpathians, because it is far enough from the zone of active hostilities, and there are no military facilities and critical infrastructure. Also, this is a great alternative for family vacations in Ukraine, as most families cannot travel abroad due to the current state of war in the country. In addition, it is in the Carpathians that you can rest your body and soul, get rid of constant psychological stress, and get healthy during active recreation in the fresh air, amid untouched nature. However, even high in the mountains, there are wartime rules that must be followed (where and how you can rest, as well as the list of current prohibitions in different regions of the country is at the link of the State Tourism Development Agency). In general, almost all hiking and cycling routes and all types of active recreation are currently available in the Carpathians (Hiking in the Carpathians..., 2022).

Since the full-scale invasion of Russian troops into the territory of Ukraine, the Carpathian region has become a refuge for temporarily displaced persons from the territory of active hostilities. The State Agency for the Development of Tourism of Ukraine (DART) supported the «Shelter» initiative to provide information on the availability of beds for refugees, ensured high-quality coordination and coordinated activities between regional state administrations and local...
self-government bodies regarding the accommodation and organization of food for displaced persons by coordinating the activities of the tourist environment and cooks, as well as conducting free excursions for them, a large part of which are cycling trips in the Carpathians (PUBLIC REPORT...., 2022).

Conclusions

Therefore, the results of the study of the international experience of the development of bicycle tourism in the border areas attest to the feasibility of popularizing and actively promoting bicycle tourism in the Ukrainian part of the Carpathians, which will ensure not only an increase in the attractiveness of the destination for tourists but also a social effect, which is manifested in the development of social infrastructure and concern for the health of the population. Taking into account that the first steps in the development of bicycle infrastructure in the Carpathians have already been taken, ways of development and popularization of bicycle tourism are proposed, which require the development and application of innovations.

In general, the Transcarpathian region has great potential for the development of cycling tourism thanks to its mountainous terrain, picturesque landscapes, and modern cycling routes. The territory of the Transboundary Biosphere Reserve «Eastern Carpathians» has dozens of paved routes for cyclists of various levels of difficulty, ranging from easy infrastructure for beginners to difficult mountain routes for professionals.

Most of the cycling routes are laid along the borders with Ukraine and Slovakia, some routes run through the territory of Poland and Slovakia, but none of them unites the territory of Ukraine, Poland, and Slovakia. Therefore, we propose to extend the cycle route SNINA-SŁOWACJA (Poland-Slovakia) to the Uzhan National Nature Park and unite the territories of three countries (Ukraine, Poland, and Slovakia) within the Transboundary Biosphere Reserve «Eastern Carpathians».

We also propose to extend the cycle path Track Torfowisko Tarnawa–Blekitna Aleja (beginning: Stuposiany) on the territory of the Landscape Park «Sianu Valley» (Park Krajobrazowy Doliny Sanu), with a length of 54 km, which is also advisable to combine with the territory of the Nadsyan Regional Landscape Park, located in the southwestern part of the Lviv region, near the border with Poland.

The development of bicycle tourism in the Carpathian borderlands is facilitated by the presence in the region of a large number of bicycle shops, clubs, and organizations, recreation centers that offer bicycle rental, bicycle tours, and bicycle races, as well as cultural-historical and eco-tourist routes that pass through the main cities and villages region and offer bicycle tourists to see numerous sights and experience the true culture of the region, as well as opportunities for active recreation and learning about the environment in nature-protected border areas.

The spread of bicycle tourism, the laying of bicycle paths, and the development of new bicycle routes in the Carpathians will contribute to the formation of significant socio-economic and ecological advantages in the country, in general. They are related to the formation of a healthy lifestyle among the population. This will make it possible to relieve the central part of settlements from cars and also contribute to reducing the anthropogenic load on the natural environment. The use of bicycle transport will contribute to the diversification of tourists’ leisure time, can become an additional source of income, and is an important step towards a safe future.

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