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EUROPEAN BISON IN THE UZHANSKYI NATIONAL PARK (UKRAINIAN CARPATHIANS): FORMATION OF A NEW LOCAL POPULATION

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European bison, new population, protected areas, Carpathians

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Abstract

The history of the disappearance from natural habitats of the European bison (*Bison bonasus*) and restoration of its populations in the Ukrainian Carpathians is described. The appearance of the European bison in the territory of the Uzhanskyi National Nature Park, which is part of the international biosphere reserve 'Eastern Carpathians', is considered. The area where the bison appeared is adjacent to Poland and Slovakia, and its migration routes cross the Ukrainian–Polish–Slovak border. The paper describes and summarises all cases of observation known to the author to date of individuals of the European bison and traces of their presence in the biotopes of Uzhanskyi National Nature Park, as well as the results of monitoring using camera traps from 2021 to winter 2025. Photographic evidence of bison individuals was obtained, which became indisputable proof of the presence of this species in the Park. The migration routes of these animals pass in two directions: in the south-east—from the Slovak National Park 'Poloniny'; and in the northwest—from the Polish National Park 'Bieszczady'. There is a trend of the bison returning to the forests of the Uzhanskyi NNP. Cases of observations have become more frequent not only of their traces but also of the animals themselves. At present, bison enter the Park's territory in different seasons: in summer, autumn, and in winter of 2025; some individuals remained to winter. Due to favourable climatic conditions, sufficient food reserves, and low anthropogenic load, there is a high potential for the settlement of the European bison and the formation of its stable transboundary Uzhanskyi subpopulation. The bison can play an important role in the functioning and maintenance of the diversity of natural ecosystems of the Uzhanskyi NNP, and its appearance has further raised the conservation significance of the territory of the Park. At this stage, it will be important to continue to monitor the spatial distribution of animals, to establish the age and sex structure of the emerging population (if the process of bison acclimatisation continues), as well as its numbers, and to establish its transboundary migration routes in adjacent territories.

Cite as

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Зубр в Ужанському національному парку (Українські Карпати): формування нової локальної популяції

Неля Коваль

Резюме. В роботі коротко описано історію зникнення з природних біотопів найбільшого з ссавців Європи зубра європейського (*Bison bonasus*) та як відбувалося відновлення його популяцій у європейських країнах і в Українських Карпатах. Розглянуто появу зубра європейського на території Ужанського національного природного парку, який є частиною міжнародного резервату біосфери «Східні Карпати». Територія, на якій появився зубр є суміжною з польською і словацькою і на україно-польсько-словацькому прикордонні проходять його міграційні шляхи. В роботі описано та узагальнено всі відомі автору на сьогодні випадки спостереження особин зубра вропейського та слідів його перебування у біотопах Ужанського НПП та результати моніторингових досліджень з використанням фотопасток за період з 2021 по зиму 2025 роки включно. Було отримано фотознімки особин зубра, які стали беззаперечним доказом присутності даного виду на території Парку. Міграційні шляхи цих тварин проходять у двох напрямах: у південно-східному — з сусіднього словацького національного парку «Полоніни» і у північно-західному — з сусіднього польського національного парку «Бещади». Спостерігається тенденція повернення зубра в ужанські ліси. Почастішали випадки спостережень не тільки їх слідів, а й самих тварин. В даний час зубри заходять на територію Парку в різні періоди року: влітку, осінню, а взимку 2025 р. окремі особини залишилися зимувати. Завдяки сприятливим кліматичним умовам, достатністю харчових запасів, низькому антропогенному навантаженню існує високий потенціал для поселення зубра європейського і формування його стабільної транскордонної ужанської субпопуляції. Зубр для Ужанського національного природного парку може відіграти важливу роль для функціонування і підтримання різноманіття природних екосистем і його поява підняла ще вище природоохоронну значимість території Ужанського НПП. На даному етапі важливим буде продовжити проводити постійний моніторинг просторового розміщення тварин для встановлення вікової і статевої структури формуючої популяції (якщо процес приживання зубрів буде продовжуватися) та її чисельності та встановити його транскордонні міграційні шляхи на суміжних територіях.

Ключові слова: зубр європейський, заповідні території, формування нової популяції, Карпати.

Introduction

The largest animal in Ukraine, the European bison (*Bison bonasus*), had began to disappear in Ukraine by the beginning of the 18th century [Smagol 2022]. Excessive hunting and deforestation have led to the decline of these animals in their natural habitat in many countries. After the Second World War, only 54 bison remained in European zoos [Pucek *et al.* 2002]. This species has become a symbol of the movement for the conservation of endangered and rare species in the world, as its return to nature in the 20the century was the result of cooperation between scientists from many countries. Reintroduction programmes implemented in European protected areas have saved the bison from extinction [Kryzhanivsky 2006; Perzanowski & Marszalek 2012]. In Ukraine, this was supported by the relevant provisions of the law on the ratification of the 'Framework Convention on the Protection and Sustainable Development of the Carpathians', adopted in 2004 (URL).

The process of the species' reintroduction into forest ecosystems began in 1952 in the Belovezhskaya Pushcha (Belarus). Today, its largest population exists along the Polish–Belarusian border [Pucek *et al.* 2002]. The return of the bison through reintroduction to the Eastern Carpathians began in the late 1950s and early 1960s [Perzanowski & Marszalek 2012]. In Ukraine, this process began in the mid-1960s, when 41 individuals of this species were introduced to the Ukrainian Carpathians [Kryzhanivsky 2006; Smagol 2022].

The aim of this work is to summarise the currently known cases of European bison encounters and registrations of its tracks in the Uzhanskyi National Nature Park (NNP) in the context of the formation of a single population group in the transboundary territory of the 'Eastern Carpathians' international biosphere reserve (Ukraine, Poland, and Slovakia).

Historical background

The European bison (*Bison bonasus* Linneus, 1758) belongs to the family Bovidae Gray, 1821 and is one of two species of the genus *Bison* Smith, 1827. Sometimes it is considered part of the genus *Bos*, as *Bos bonasus* [Groves & Grubb 2011; Zagorodniuk & Kharchuk 2020]. The subspecies *Bison bonasus hungarorum* Kretzoi, 1946 lives in the Carpathians [Pucek *et al.* 2002].

The bison is a rare species included in all editions of the Red Data Book of Ukraine (1980, 1994, 2009), and in 2021 received the status of 'endangered in nature'. In the IUCN Red List, the species is categorised as NT ('near threatened'). The species is proposed to be included in the IV edition of the Red Data Book of Ukraine under the category (according to the IUCN terminology) 'endangered' (CR) [Zagorodniuk & Barkaszi 2018] and to consider the Carpathians to be the region of distribution of the most resistant populations.

In Ukraine, bison populations exist in many regions, except for Transcarpathia. In ancient times, bison were not rare animals in Zakarpattia, as evidenced by the Velikovardyan registers of King Andrew II (1205–1235), and they inhabited forests in the valleys of the Uzh and Borzhava [Turianyn 1975*a*–*b*]. Bison had inhabited mountain forests and grazed on subalpine meadows until the end of the 16th century; the last bison was killed in the Marmarosh Mountains in 1864 [Turianyn 1975*a*].

Since 1965, Ukraine has been working to create free populations of bison, including in the Carpathians [Parnikoza *et al.* 2010]. That year, the bison were brought from the Bialowieza Forest to the 'Maidan' hunting farm, which borders with the Uzhanskyi Park[1]. As a result of this first wave of reintroduction, three populations were created—bukovinska, skolivska (maydanska), and nadvirnianska [Smagol 2022]. In late 1990, there was a rapid decline in the numbers of most Ukrainian bison populations and some even went extinct (including the Carpathian ones), which was facilitated by 'selective shooting' by foreign hunters. At the time, a joint order of the Ministry of Ecology and the State Committee of Forestry of Ukraine 'On Approval of the Action Plan for the Conservation of Bison in the Fauna of Ukraine' was in force to support this species [Kryzhanivsky 2006].

In the Bieszczady National Park (Poland) and the National Park 'Poloniny' (Slovakia), which border the Uzhansky NNP, bison conservation programmes funded from the state budget and extrabudgetary funds were launched during this period, which contributed to the growth of bison populations [Perzanowski & Marszalek 2012; Perzanowski & Wołoszyn-Galęza 2019]. Obviously, this provoked the migration of individuals to the Ukrainian side, which is the subject of this article.

As of 2020, the number of bison in the Carpathians amounted to almost 19% of the European metapopulation, and over the past 10 years the number of bison in free-ranging herds in the Carpathians has almost tripled thanks to the implementation of a number of international projects[2].

Materials and Methods

The data on bison encounters were collected in 2021–2025 in the territory of the Uzhanskyi NNP, which includes five departments: Kostrynske, Zhornavske, Lubnyanske, Novostuzhytske, and Uzhotske (they are marked in different colours in Fig. 1). The paper presents the materials of the author's own observations, those of the inspectors of the departments, and data from camera traps. The author's own observations of traces of the species were recorded during route surveys, and the observations of inspectors were reported to the author orally with a detailed description of the date and place of findings.

Since 2022, camera traps have been used to monitor the fauna, which were installed in places where large mammals were likely to be recorded as part of the project 'Support to Protected Areas in Ukraine', using the monitoring methodology proposed by the Frankfurt Zoological Society. In 2022, the project 'Winter Monitoring of Large Carnivores' was launched, which also accumulated related information about the ungulates recorded by camera traps.

[1] This farm was closed in the 1990s.

[2] Data based on the report by O. Maryskevych et al. 'Monitoring of free-ranging bison herds in the Carpathians' at the conference 'XVIII All-Ukrainian Scientific Taliyev Readings' (Kharkiv, 2022).

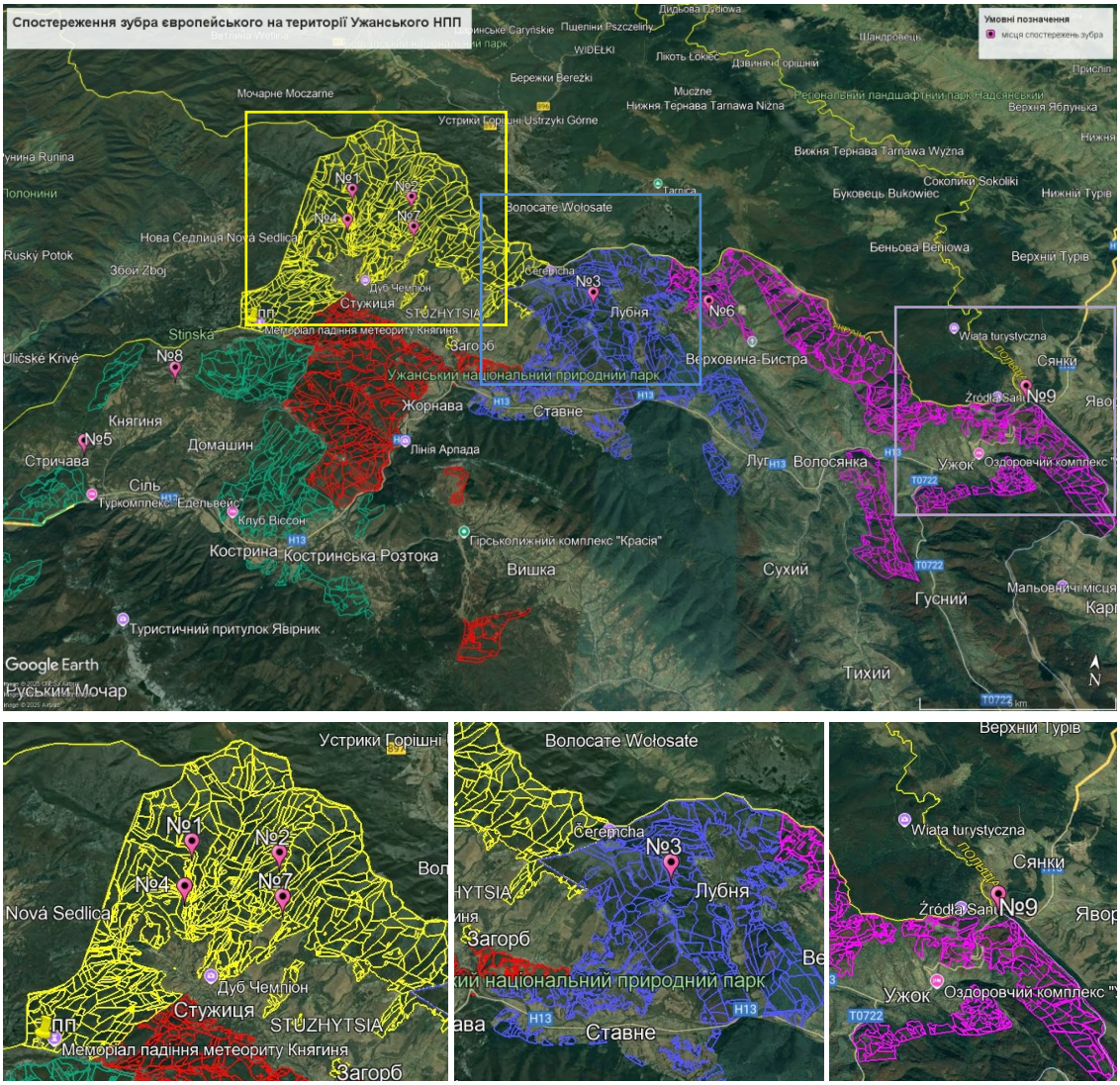

Fig. 1. Map of observations of the european bison in the Uzhanskyi NNP in 2021–2025. Colours indicate the Park's departments: yellow—Novostuzhytske department; green—Kostrynske department; red—Zhornavske department; blue—Lubnyanske department; and purple—Uzhotske department.

Рис. 1. Карта спостережень перебування зубра європейського на території Ужанського НПП протягом 2021–2025 років. Кольорами позначено: жовтим — Новостужицьке відділення; зеленим — Костринське відділення; червоним — Жорнавське відділення; синім — Лубнянське відділення; ліловим — Ужоцьке відділення.

In the summer of 2023, we also launched the 'Summer mammal monitoring', during which we collected data in the form of photographs of all fauna that were registered by camera traps and created a database with registrations of all species. Camera traps were installed, monitored, and batteries and memory cards were replaced in conjunction with departments inspectors.

Results and Discussion

The appearance of bison

The idea of returning the bison to historical sites has been considered since the creation of the Uzhanskyi National Park. In 2013, the Park's employees, with the support of colleagues from the Institute of Ecology of the Carpathians NAS of Ukraine (O. Maryskevych) and the National Forestry

University of Ukraine (P. Khoyetskyi), developed the first important document—'Terms of reference for the *Bison* reintroduction programme in the Uzhanskyi NNP for the period 2013–2015'.

The aim of this programme was to create a transboundary demographically stable subpopulation of bison in the international biosphere reserve 'Eastern Carpathians'. It was planned to build a stationary enclosure to create the conditions necessary for the breeding of a reproductive group of bison under semi-free conditions, and for future breeding and further reintroduction of animals into the wild. The place for the enclosure was chosen to be in the territory of the Novostuzhytske department of the Park on an area of 4.5 hectares. The plan was to bring bison from breeding farms, using finances from nature conservation funds and our Polish neighbour, the Bieszczady National Park. They also conducted a study on the prospects for bison in the selected area, taking into account the landscape conditions and vegetation [Khoyetskyi *et al.* 2014].

In 2014, work on the enclosure was stopped. Over the next few years, the Park's employees did not see these animals. By 2020, the number of bison in the Bieszczady Park had increased to more than 700 individuals [Olech & Perzanwski 2022].

At the same time, the first information about bison entering Ukrainian territory appeared. Starting from 2021, the Park's inspectors reported 'huge cow-like tracks'. According to one of the inspectors of the Novostuzhytske department, he recorded tracks of bison in the autumn of 2021 and 2022 in the vicinity of Stuzhytsia in an abandoned collective farm orchard (Fig. 1, *point 7*), where the animals consumed apples. In September 2022, a local resident of Velykyi Bereznyi provided photographs of an adult male bison captured by his camera trap in the border area adjacent to Slovakia (Fig. 1, *point 8*). We also received an oral report from him that at the same time, a female with a calf was spotted not far from the place where the camera trap was located. This was the first reliable evidence of bison entering the Park from Slovakia.

The first observations of bison tracks were made by the author on 24 November 2022 (Fig. 1, *point 1*; Fig. 3*a*) in the Novostuzhytske department, on a forest road [Koval 2024]. On the camera traps installed throughout the Park in the winter of 2022, the animals were first observed on 20 August 2024 in the same department; then photographs of two bison were obtained from a trap set on a forest glade in a beech–fir forest (Fig. 1, *point 2*; Fig. 3*b*). A lone bison was registered in the summer of 2024 in the territory of the Lubnyanske department: the animal grazed in the meadows of Mount Cheremkha, on the border with Poland. These are hay meadows at an altitude of 700–900 m, which had been regularly mown until 1990, after which they began to overgrow with shrubs, birch, alder, willow, and mountain ash (Fig. 2*a*). We installed a camera trap here, which recorded an adult male bison on 13 October 2024 at the edge of a beech forest at an altitude of almost 900 m (Fig. 1, *point 3*; Fig. 3*c*).

The obtained photographs of bison proved the presence of this species in the Park. Information from the border guard service about camera-trapping of the bison was published in the local media (Mukachevo.net) on 07 November 2024: it was reported that 'the animal came from the national park located on the neighbouring side,' i.e. from the Slovak National Park 'Poloniny' (Fig. 3*a*).

In November 2024, with the arrival of early winter and the first snow, a pair of bison actually settled at the Novostuzhytsia feeding site (Fig. 1, *point 4*; Fig. 2*c*, *f*; Fig. 3*d*), where inspectors set up feeders and stacks of fresh hay and salt. There are two streams nearby that bison use for watering. The traces of their stay are also visible here: excrements and beds, as well as almost completely eaten fresh haystacks. In the neighbouring feeding area, the animals also ate the fresh hay laid out in the troughs, while last year's hay in the stacks remained untouched. The area that was once used as an enclosure for bison is now successfully used by them, which shows that it was once successfully selected for the needs of this species (Fig. 3*b, d, f*). A camera trap installed at this site recorded a female bison visiting the feeder day after day until late April 2025 and eating fresh hay (Fig. 3*d*).

Park scientists received from the Park's security service a report of new records of bison tracks in the Kostrynske department in July 2014—near the village of Strychava (near the border with Slovakia) (Fig. 1, *point 5*). In September 2024, the border guards of the Knyahynyanska outpost reported a bison in the overgrown meadows near the village of Kniahynia (Fig. 1, *point 8*). Already in

2025, on 29 January 2025, in the vicinity of the village of Verkhovyna Bystra, near the border with Poland, traces and excrements were noticed in the Uzhotske department (Fig. 1, *point 6*). In January 2025, a video from a local resident who filmed two bison grazing on the edge of the forest near the road on the Uzhotsky Pass from his car was posted on an online source (Fig. 1, *point 9*).

Fig. 2. Places and traces of bison presence in the Park: (*a*) a meadow on Mount Cheremkha, where bison grazed; (*b*) a meadow in the Novostuzhytske department, allocated in 2013 for an enclosure, which is now being used by bison; (*c*) traces of bison feeding at a trough; (*d*) a route to a stream for watering; (*e*) bison 'saving' a whole haystack; (*f*) coniferous trees fed on by bison.

Рис. 2. Місця і сліди перебування зубрів у Парку: (*a*) лука на горі Черемха, на якій паслися зубри, (*b*) лука в Новостужицькому відділенні, відведена в 2013 р. під вольєр, яку сьогодні освоюють зубри, (*c*) харчування зубрів біля годівниці, (*d*) витоптаний зубрами маршрут до потічку на водопій, (*e*) так зубри «врятували» цілу копицю сіна, (*f*) поїдання зубрами хвойних дерев.

Fig. 3. Photo-recordings of bison in the Uzhanskyi National Park: (*a*) bison recorded by a camera trap in the territory adjacent to Slovakia (summer 2022); (*b*) bison recorded by a camera trap in the Novostuzhytske department (summer 2024); (*c*) bison recorded by a camera trap in the Lubnianske department (autumn 2024); (*d*) a female bison recorded by a camera trap at the feeding ground in the Novostuzhytske department.

Рис. 3. Фотореєстрації зубра в Ужанському нацпарку: (*a*) зубр, зареєстрований фотопасткою на суміжній території зі Словаччиною (літо 2022 р.), (*b*) зубри, зареєстровані фотопасткою в Новостужицькому відділенні (літо 2024 р.), (*c*) зубр, зареєстрований фотопасткою в Лубнянському відділенні (осінь 2024 р.), (*d*) самка зубра, зареєстрована фотопасткою на підгодівельному майданчику в Новостужицькому відділенні.

Status of the bison in the Park

The available data and their spatial analysis suggest that the territory of the Uzhanskyi Park is used by bison from two neighbouring populations: 1) from the south-western Slovak side, from the 'Poloniny' NP; and 2) from the north-western and northern side, from the Polish Bieszczady side.

The data on bison sightings in the Park are presented in Table 1.

The restoration of the bison population in Transcarpathia was due to the migration of individuals from the neighbouring Slovak and Polish territories, where there are significant populations. Thanks to this, a local population has begun to form, although it is premature to draw conclusions about the numbers and the fact of formation of the bison population in the Uzhanskyi NNP.

The habitats for these animals in the Park are certainly promising and favourable. The warming climate is contributing to a decrease in snow cover, which makes it easier to forage, which is essential for their survival in winter. The territory of the Park is rich in meadows, which were once regularly mown, but today, due to the cessation of management, they are overgrown with willow (*Salix*) and alder (*Alnus*) bushes, as well as with rowan (*Sorbus*) closer to the upper border of the forest. There are enough food resources important for the European bison in the Park, and there is virtually no competition with other ungulates, such as the red deer (*Cervus elaphus*) and European roe deer (*Capreolus capreolus*). Based on the distribution of excrements of these three species of ungulates in meadows, we can state that they use the territory together, i.e., without conflicts.

Table 1. Observation data of the European bison in the territory of the Uzhanskyi NNP in 2021–2025
Таблиця 1. Дані спостережень зубра на території Ужанського НПП протягом 2021–2025 років

Record localities	Date	Coordinates	Type of record	Biotope	Source
Novostuzhytske department	24.11. 2021	49.06323; 22.57525	footprints on a forest road of a single individual	beech forest with a mixture of fir, sycamore, ash	author's data
Novostuzhytske department, outskirts of Stuzhytsia	autumn 2022	(n/a)	observation of individuals	an abandoned collective farm garden	inspectors of the Novostuzhytske department
Uzhhorod Raion, outskirts of Knyahynya	September 2022	(n/a)	registration of one individual (male) with a camera trap	hayfield on the border with beech forest with a mixture of birch and alder	information from a local resident
Kostrynske department, outskirts of Strychava	July 2024	48.961523; 22.496291	observation of the tracks of one individual	road in the middle of a mixed forest	inspectors of the Kostrynske department
Kostrynske department, outskirts of Kniahynia	September 2024	48.986296; 22.524400	observation of one individual	mountain meadow	information from the border guard service
Novostuzhytske department	20.08.2024	49.060377; 22.606936	registration of two individuals with a camera trap	a clearing in the middle of a beech and fir forest	author's data
Lubnianske department	13.10.2024	49.026320; 22.703040	registration of one individual (male) with a camera trap	border of beech-fir forest and overgrown mountain meadow	author's data
Novostuzhytske department	22.01.2025	49.050190; 22.577410	traces of animals, food, bedding	feeding platform in the meadow	author's data
Uzhhorod Raion, Uzhok Pass	26.01.2025	49.00477; 22893299	video (online source), two individuals	the edge of a beech and fir forest	information from the local resident
Uzhotske department, outskirts of Verkhovyna Bystra	29.01.2025	49.027351; 22.75205	observation of tracks and excrement of one individual	road in an overgrown meadow	inspectors of the Uzhotske department
Novostuzhytske department	05.02.2025	49.051190; 22.578410	registration of one individual (female) with a camera trap	feeding platform in the meadow	author's data

The border regime affects the restriction of movement of local residents and the development of recreation, which ensures a low level of anthropogenic impact. Hunting is not allowed in the Park, and border control makes poaching impossible. The only constraint to the expansion of the bison is the presence of a large number of settlements and transport infrastructure. Thus, there is a significant potential for the permanent settlement of bison and the formation of a stable local population.

Prospects of the formation of a stable transboundary subpopulation

In 2021–2025, there was a clear trend towards the return of the bison to the Uzhanskyi forests. Cases of observations of not only their tracks but also the animals themselves have become more frequent. Currently, bison enter the Park at different times of the year—mainly in summer and autumn, and some individuals stayed here in the winter of 2024–2025. There is a need to develop and implement a management plan for the Uzhanskyi bison population and ensure its survival through various biotechnical and conservation measures. At the current stage, it is important to continue monitoring and establishing the age and sex structure of the population and the dynamics of its numbers. Also, to create new feeding grounds if bison come to the Park in winter, and to feed them with hay and root vegetables, and to control possible fluctuations in the population.

If the bison settle permanently within the Park, genetic monitoring will become important in the future to control possible sources of population replenishment. It will also be important to coordinate efforts to conserve the transboundary population of the species, which should be considered within the framework of the 'Action Plan for the Conservation and Restoration of the European bison (*Bison bonasus* L.) in Ukraine' (Order of the Ministry of Ecology of Ukraine No. 557 of 2022) and as a basis for developing a unified bison monitoring programme in the protected areas of the Eastern Carpathians. Important steps in this direction were the approval of the 'Monitoring Programme for European bison (*Bison bonasus* L.) for the Ukrainian part of the 'Eastern Carpathians' and adjacent territories' at the scientific and technical councils of the 'Skole Beskids' NNP (21.07.2023), Uzhanskyi NNP (14.09.2023), and Boykivshchyna NNP (14.03.2024).

The European bison in the Uzhanskyi Park can play an important role in maintaining the diversity of natural ecosystems, as it is a forest species that needs open spaces for grazing. By eating self-seeding trees and shrubs it stops the processes of secondary succession of overgrown meadows [Perzanowski & Wołoszyn-Galęza 2019]. The appearance of the European bison increases the conservation significance of the Uzhanskyi NNP as a migration corridor for the exchange of individuals between the territories of neighbouring countries—Slovakia, Poland, and Ukraine.

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Declarations

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Conflict of interests. The author has no conflicts of interest to declare relevant to the content of the article.

Handling of materials. The study was carried out in compliance with the current legislation on working in protected areas and with living animals.

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