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Resource losses to Ukrainian tourism caused by full-scale Russian aggression

Abstract: This article examines the concepts of urbicide and ecocide as a part of the violent policy against the state of Ukraine since the beginning of the full-scale Russian-Ukrainian war and their influence on tourism. We analyse their impact on natural recreational and tourist resources, such as land, air, river networks, and biotic and landscape diversity. Special attention is paid to protected areas of regional and national importance included in Ukraine's 'natural reserve fund' and to sites of international importance that are part of the World Network of Biosphere Reserves. The article provides information about recorded crimes in different regions of Ukraine concerning historical and cultural heritage. Since 24 February 2022, at least 569 cultural heritage sites have been destroyed due to the war, including 170 monuments of national and local importance, 146 valuable historical buildings and cultural heritage sites, and 58 memorial monuments and works of art. We analyse losses in hospitality infrastructure relative to their zoning category determined by proximity to active fighting. The paper highlights the most urgent issues of the post-war restoration of Ukraine's tourism sector, particularly facility staffing issues and ethical considerations when commemorating war events. Research methods: collection, analysis and the generalisation of information from official and research media sources concerning the loss of natural, historical, cultural and infrastructural resources suffered by tourism as a result of Russia's military aggression in Ukraine from 24 Feb 2022 to 01 July 2023. Results: summary of the losses to tourism destination resources and infrastructure in Ukraine by region and type of impact, and a proposed framework for planning the post-war recovery of different kinds of tourism in Ukraine.

Keywords: ecocide; historical and cultural heritage; natural reserve fund; Russian-Ukrainian war; tourism; tourist infrastructure; urbicide

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INTRODUCTION

The article aims to analyse and summarise tourism resource losses in Ukraine during the active phase of the Russian military aggression starting from 24 February 2022, both

spatially and temporally. The main research questions considered by the authors are related to the loss of recreational and tourist resources, along with historical and cultural resources and tourist infrastructure.

Russia's aggression against Ukraine started in 2014 with the occupation of the Crimean Peninsula and parts of the Donetsk and Luhansk Regions. On 24 February 2022, Russia launched a full-scale invasion of Ukraine that has become the largest and the deadliest military conflict in Europe since World War II. The impact of the war is reflected in every aspect of national life and economy, including tourism.

The scale of the conflict, unprecedented in modern times, means that Europe has neither established methods for evaluating the harm sustained to a country's tourism sector nor any proven recipes for its subsequent post-war recovery. We consider recent experiences accumulated by other countries that have overcome and are overcoming the consequences of military conflicts. In Europe, the most significant similarities with Ukraine can be seen in Croatia, Slovenia, and Bosnia and Herzegovina following the Balkan wars of the 1990s. In some countries, we can observe a cynical feature of tourism, capable of turning anything into an exploitable resource, including objectively terrible history and artefacts, such as those of war and war crime locations (Boyd, Reddy, Kulshreshtha, Nica, 2023; Yoshida, Bui, Lee, 2016). However, normal recovery has proved possible and efficient. Croatia, in particular, now carries the image of a large seaside resort not associated with military culture (Arnaud, 2016). Ukraine may not have the same opportunity of "forgetting" the war, as the military threat from Russia is likely to remain imminent to its neighbours even after the end of current hostilities. We must consider the experience of countries whose tourism industry operates under the constant danger of aggravating security, particularly studying tourism in Israel (Mansfeld, 1999) and post-war tourism in the Persian Gulf (Hollier, 1991).

Since the beginning of the Russian invasion of Ukraine in 2014, the Ukrainian tourism industry has been negatively impacted by the hostilities. Reviews of the environmental impact in the Donetsk and Luhansk Regions are provided in Kravchenko, Vasyliuk, Voit-sikhovska and Norenko, 2015, and for the later stages of the hybrid war, in a study by the "Environment-People-Law" organisation (ICO EPL, 2018). After the onset of the full-scale war on 24 February 2022, most of the Ukrainian territory has suffered significant damage. During different stages of the war, direct hostilities covered up to 18% of Ukraine's area previously home to recreational, cultural, and historical interest tourism destinations. The impact of the war has been felt outside of the country as well. According to UNWTO estimates, the global tourism industry is losing about \$14 billion as a result of Russia's aggression against Ukraine (UNWTO, O.S., 2022).

The defining feature of the Russian army's strategy is cruelty towards the environment, captured by the term "ecocide," as well as towards cities and their civilian population, captured by the term "urbicide." Ukrainian law defines ecocide as "mass destruction of plant or animal life, the poisoning of atmospheric and water resources, as well as committing other acts that may cause ecological disasters" (under Article 441 of the Criminal Code of Ukraine). The concept of urbicide has been known since the 1960s, thanks to the works of Moorcock (1963). In recent years, the term "military urbicide" has been introduced into academic usage and should be understood as the destruction of buildings, urban areas, and the cultural heritage of cities, including public spaces, city quarters, and cult and religious buildings, as an attempt to erase history. In Ukraine, the issue of military urbicide is the focus of attention for many researchers. In particular,

Mezentsev and Mezentsev (2022) highlight the following types of destruction of urban spaces:

- direct urbicide (destruction of symbolic and ordinary everyday sites, such as physical structures);
- indirect urbicide (most often caused by the occupation of cities and the loss of urban identity by its inhabitants);
- deferred urbicide (implemented through a pattern of the non-return of inhabitants to occupied cities and the destruction of the collective human experience of place).

In modern warfare, as noted in the work of Slyvka (2021: 56), cities become the primary target of “organised violence not only because of their strategic importance but also because of urbanisation, which transfers interpersonal conflict to places with a concentration of population, industry, production and social infrastructure.”

The onset of the full-scale war in Ukraine shifted the dynamics and goals of formal tourism research in the country. Since that time, several specialised conferences and similar events have been organised by the Institute of Geography of the National Academy of Sciences of Ukraine and Taras Shevchenko National University of Kyiv, with the participation of the Yuri Fedkovich National University of Chernivtsi and Petro Mohyla Black Sea National University: Online Forum “Geostrategy of Ukraine in the 21st Century” (1 April 2022); Spring Seminar on Social Geography (19 May 2022); All-Ukrainian Round Table “Museum Cultural Heritage of Ukraine in the Conditions of Military Urbicide” (20 May 2022); Online Discussion “Ukraine after Urbicide: Restoration of Cities and Communities” (7 October 2022); and the International Scientific and Practical Conference “War and Tourism” (11 November 2022). Peculiarities and consequences of occupation urbicide, using the example of the city of Kherson, are analysed in detail in the work of Malchukova and Pylypenko (2022). Problems of cultural heritage site destruction and their preservation for tourism are highlighted in the publications of Buchko (2022) and Liubitseva and Kochetkova (2022).

Detailed analysis of various types of impact at all stages of military operations on the state of wetlands in Ukraine is given in the article “Military activity and wetland-dependent wildlife: a warfare ecology perspective” by Grimes, Kneer and Berkowitz (2023). The impact of the current phase of a full-scale war on the natural reserve fund in various regions of Ukraine is analysed in the work of Parkhomenko and Vasyliuk (2022). They describe the state of the sites at the beginning of the Russian invasion. Recommendations for safe monitoring of protected areas by the state during the war and in the post-war period using methods of remote sensing and GIS are proposed in work by Bondar, Finina and Shevchenko (2022) while Zatserkovnyi, Savkov, Pampukha and Vasetska suggest analysing forest fires using remote sensing (2020). The state of biodiversity will follow research methods developed by Kozlova, Pestova, Patrusheva and Shvedeniuk (2019) and Kozlova, Stankevich, Svideniuk and Andreiev, 2021.

The research analysis on “war and tourism” gives grounds to divide it into two areas: 1) study of the war as a factor in the actual suspension of tourist activity, and 2) research into the development of military tourism.

This article is structured as follows. In the Methods and Data Sources section, we describe data collection challenges in a time of war, our sources of information and our motivation for selecting those sources. The following sections contain detailed descriptions of the losses suffered by the Ukrainian tourism sector since the onset of the active phase of the war in Ukraine, organised into three categories: losses to environmental

resources, losses to historical and cultural resources, and losses to tourism infrastructure. In the Discussion section, we focus on identifying what solutions will be needed to revive Ukrainian tourism.

METHODS AND DATA SOURCES

Research methods used in the paper include the collection and systematisation of recent public information about the losses to Ukraine in the war with the Russian Federation, determining relevant information about tourism losses based on the monitoring of military operations, and classification of these losses and their territorial location with further analysis relative to the pre-war situation. The authors collected, analysed and monitored the impact of the war on tourism resources and infrastructure between 22 March and 1 July 2023 for a total of 16 months of active hostilities within the territory of Ukraine.

It should be noted that using only official tourism-related statistics in Ukraine does not provide a complete and accurate assessment of resource losses due to the war. The country's tourism regulatory body has yet to establish a stable tradition. It has changed fifteen times since its independence in 1991, having been a subdivision in youth and sports, culture, the economy and infrastructure ministries. The challenges of active war further exacerbate the lack of efficiency and consistency in collecting tourism-related statistics, hence our reliance on other open-source tourism information and official sources. The state tourism regulatory body in Ukraine, the State Tourism Development Agency, transferred from the Ministry of Culture and Information Policy to the Ministry for Communities, Territories and Infrastructure Development, does not currently collect, generalise or analyse statistical information. Therefore, the basis for comparison is the statistical information of the State Statistics Service of Ukraine. The primary sources of information about tourism resources are the State Register of Landmarks in Ukraine, Wikimapia, Booking.com, and other internet sources containing information about the consequences of military actions. Statistical calculation data from the National Tourism Organization of Ukraine, which tries to close specific gaps in the "statistical vacuum" for analytical research, were also used.

To analyse the losses of historical and cultural monuments, we used materials from the "Recorded War Crimes" website supervised by the Ministry of Culture and Information Policy. The website was created as a database to which cases of military uricide against cultural heritage sites are constantly added. Using the cartographic method, we investigated regional and temporal characteristics of natural reserve fund sites of Ukraine according to internet sources. To analyse the nature and dynamics of military operations, we chose online resources: Deep State Map (DeepstateUA) and Liveuamap (*Mapa viiny v Ukraini*). They are informative and reliable, objectively reflect the temporal features of the war, and successfully complement each other, allowing us to form an accurate picture of past events; upon request, spatial information can be supplemented with detailed descriptions. The map layers offer information about the frontline position, freed territories and the locations of artillery shelling and drone and missile attacks. The resources offer detailed descriptions of all destructive weapons used by both the aggressor and defence while recording the timing of all listed attacks. Everything related to spatial, quantitative and descriptive information about the Nature Reserve Fund is quite well presented on the map of the Nature Reserve Fund of Ukraine in the regional section on the "Nature of Ukraine" portal. Matching the maps of military activities with

protected structures and territories allowed us to develop an exact chronology of impact on natural and historic landmarks. The accuracy of the map is sufficient to achieve the set goal. The comparison of maps of combat operations and the Nature Reserve Fund is quite correct because they are made on the same basis as the Open Street Map.

The authors realise that reliance on open resources may cause biases and gaps in the collected data since considerations of wartime information control may obfuscate some details about location and level of destruction. We have made every possible effort to ensure our choice of sources is as correct and thorough as possible. In particular, we have been able to corroborate information about natural losses in the south of Ukraine (Ivory Coast of Sviatoslav and Buzkii Gard national parks) through personal observation by one of the authors (located in Mykolaiv) able to visit the sites heavily affected by shelling and other hostile actions in 2022 and 2023.

The primary justification and motivation of the presented research is the need to continuously monitor tourism-related statistical and descriptive information to ensure it remains in line with how tourist activity is accounted for in other European countries. Many of the above-described resources only offer real-time information, which may not be available in full detail later when the military situation changes. To achieve our objectives, we record all tourism-relevant information as accurately and precisely as possible as the situation develops. Unfortunately, we have to resort primarily to remote evaluation of the war's impact on tourism since in-person participation is dangerous or inaccessible because of ongoing military activities.

Our categorisation of losses into three main categories (natural resource losses, historical-cultural resource losses, and tourism infrastructure damage) is aligned with standard tourism research methodology. Some of the more specific terms, such as ur-bicide or ecocide, are not formally recognised by international criminal law (Palarczyk, 2023). The world's reaction to war damage to the natural resources of Ukraine is secondary relative to the reaction to loss of life and direct economic losses. We are afraid that some of the damage sustained by nature will take years to manifest itself fully, and it will need significant effort to comprehend and reverse the harm. This means that the tourist appeal of war-damaged regions will remain suppressed, impacting inbound tourism for years.

RESULTS OF THE STUDY

Losses of natural tourist and recreational resources

By their nature, military actions constitute an unexpected major threat to protected natural areas. The consequences depend on the intensity and duration of the active phase and location relative to the front line.

Protected areas and territories that serve as a basis for tourism development can effectively perform recreational functions only under guaranteed dedicated nature-protective conditions. They are extremely vulnerable to outside influence and require special treatment and protection from representatives of local communities, state authorities, scientists and relevant specialists. Leaving sites without observation or control over natural landscapes in conditions of extreme anthropogenic load can lead to their transformation, loss of tourist attractiveness and degradation.

The problem of preserving the natural reserve fund during the war is critical and requires constant, comprehensive monitoring.

At the beginning of the full-scale offensive, Russian troops moved by road. At this stage, protected areas were mostly undamaged, with a few exceptions, but in places where hostilities dragged on, the Russians changed their tactics and prepared for prolonged confrontation. For this purpose, they created bases and fortifications. Accordingly, they moved deep into protected areas, occupying forests and other landscapes, including those located on the territories of the natural reserve fund.

- In terms of time and type, the military influence is as follows:
- regular shelling with missiles and drones;
- active, regular fire attacks;
- relatively rapid passage (without delay) of Russian troops;
- prolonged occupation;
- Kakhovka Dam destruction.

The degree of damage to nature reserve fund sites and other territories attractive for the development of tourism will depend on where they are located.

Undoubtedly, any military action is dangerous for all components of the environment. However, the impact's nature can differ:

5. Physical destruction or damage due to shelling, missile attacks, UAVs, fire and the passage of heavy military equipment. Damage is suffered by all components of the environment without exception (national natural parks: Dvorichanskyi, Holy Mountains, Ivory Coast of Sviatoslav).
6. Damage and disturbance by a blast wave may result in complete or partial damage to vegetation, destruction of birds' nests, and the like (national natural parks: Kamianska Sich, Nizhny Dnieper, Desna-Starohutskyi).
7. Contamination of land and water by the remains of destroyed military equipment, fuel and lubricants, air pollution as a result of fires at infrastructure facilities and in natural landscapes, explosions of ammunition, mineral fertiliser warehouses, debris accumulation (biosphere reserves: Black Sea, Danube; national natural parks: Ivory Coast of Sviatoslav, Nizhny Dnieper, Dvorichanskyi, Great Meadow, Kamianska Sich).
8. Noise impact, which is extremely dangerous for animals, especially in the spring and summer during breeding; there are sensitive species that stop nesting and alien species take their place. Among mammals, the jackal is becoming more widespread, especially since favourable conditions developed (overgrowth of former pastures and meadows, frequent deaths of wild animals and people) (national natural parks: Dvorichanskyi, Great Meadow, Desna-Starohutskyi, Holy Mountains).
9. Change of microrelief from building fortification structures (biosphere reserves: Askania Nova, Black Sea; national natural parks: Dzharylhach, Oleshky Sands, Holy Mountains, Great Meadow).
10. Death of animals from mines and tripwires (national natural parks: Dvorichanskyi, Holy Mountains).
11. Death of flora and fauna as a result of a significant rise in the water level on the Dnipro River after the dam was blown up, flooding riverbanks (national natural parks: Nizhny Dnieper, Oleshky Sands, Ivory Coast of Sviatoslav).
12. Drainage of the land previously covered by the Kakhovka Reservoir, resulting in a catastrophic drop in groundwater levels near the reservoir (national natural parks: Great Meadow, Kamianska Sich).

We illustrate the damage sustained using the example of the Ivory Coast of Svyatoslav National Nature Park, which was recently assessed personally and in interviews with park workers by one of the authors. The area was occupied in March 2022, and a substantial part of its territory remains occupied at the time of this publication. We have confirmed that heavy arms and military fortification activities damaged over 20 km of protected sand beaches along the coast. Over 130 large-scale fires, often repeatedly affecting the same region, destroyed approximately 5000 hectares of forest. A more detailed assessment of the harm sustained by the park will be possible only after 'de-occupation' and demilitarisation of the area.

The worst consequences, which for the most part are still unknown, will likely occur in protected areas that remain under occupation (Table 1).

Table 1. The central nature reserve fund sites that have come under occupation

Sites under occupation	Nature reserves	Biosphere reserves	National natural parks	Regional landscape parks
Sumy Region				
quantity	none	none	1 (partially)	1
area, ha	0.00	0.00	23,360.10	98,857.90
Kyiv Region				
quantity	none	1	1	none
area, ha	0.00	226,964.70	14,836.0	0.00
Chernihiv Region				
quantity	none	none	1	1
area, ha	0.00	0.00	9,665.8	6,122.70
Kharkiv Region				
quantity	none	none	1	5
area, ha	0.00	0.00	3,131.20	19,130.70
Mykolaiv Region				
quantity	none	1	1	2
area, ha	0.00	681.00	35,223.14	2,712.60
Kherson Region				
quantity	none	2	5	none
area, ha	0.00	141,881.40	166,691.90	0.00
Zaporizhzhia Region				
quantity	none	none	2	none
area, ha	0.00	0.00	94,882.92	0.00
Donetsk Region				
quantity	1	none	2 +1 partially	none
area, ha	3,129.70	0.00	61,309.95	0.00
Luhansk Region				
quantity	1	none	none	none
area, ha	5,403.00	0.00	0.00	0.00
Crimea				
quantity	7	none	1	14
area, ha	74,533.1	0.00	10,900.00	41,346.1

Total				
quantity	8	3	13+2 partially	23
area, ha	83,065.70	369,527.10	420,001.01	168,170.00

Source: authors' own compilation

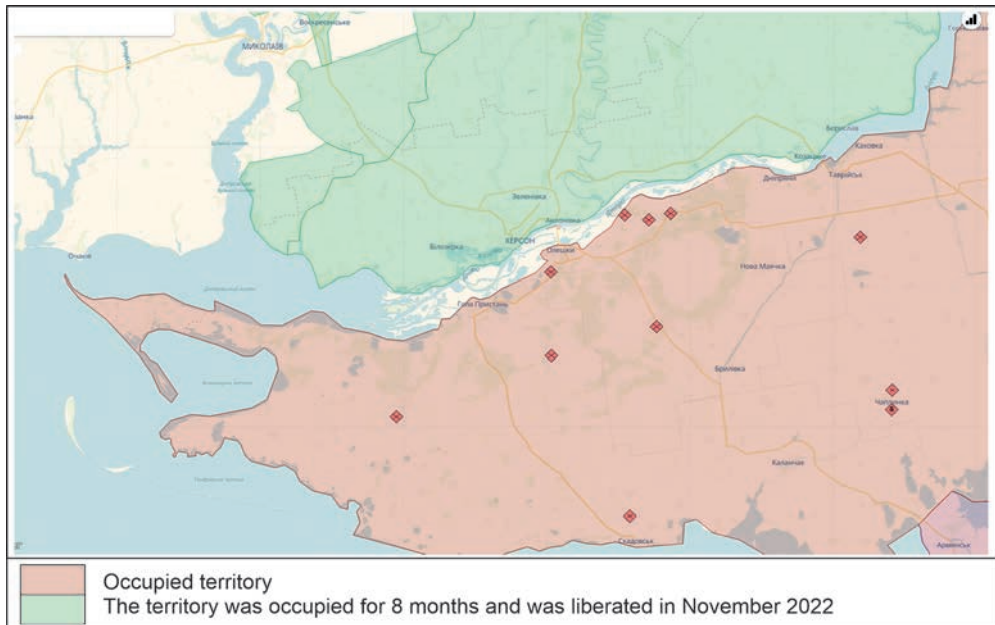
Tourism sites in the Kherson Region suffered the heaviest impact from the war, largely occupied by the aggressor (Fig. 1).

The most impacted by the war are natural tourism resources in the Kherson region, concentrated on the Black Sea coast and the Dnieper-Buh Estuary. Before the war, these territories were rich with attractions for several types of tourism: environmental, active, educational, recreational, health and rural.

Two of five Ukrainian biosphere reserves remain under occupation after 19 months: Askania Nova and Black Sea, so do five national nature parks: Azov-Syvasky, Dzharylgat-skyi, Kamianska Sich, Nizhny Dnieper, and Oleshky Sands (Fig. 2).

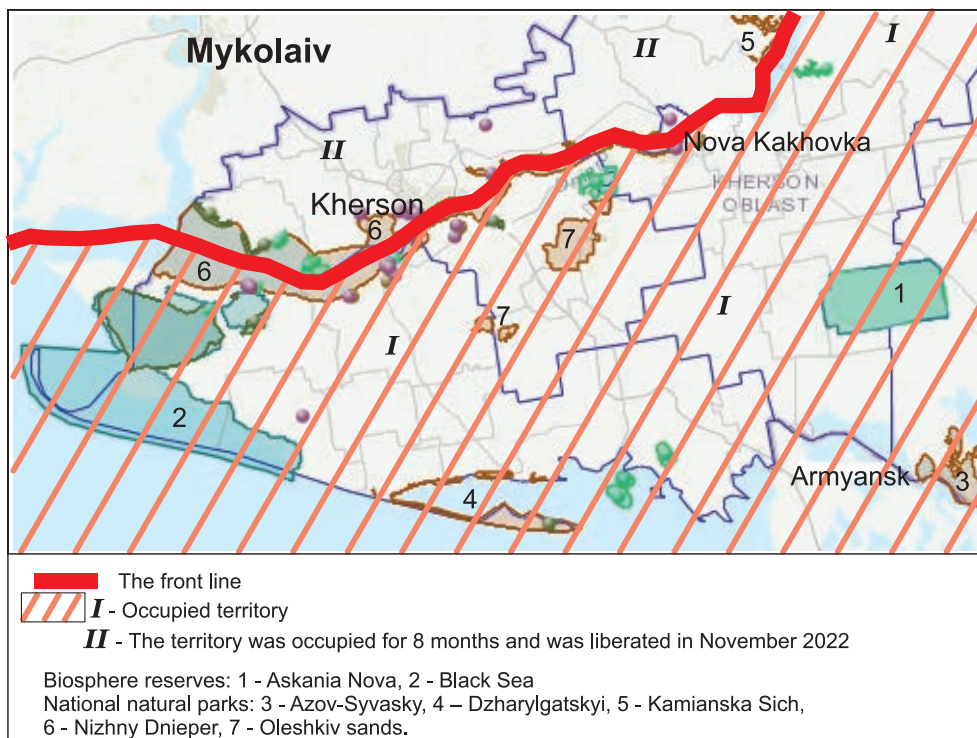
As of November 2023, 812 protected natural resource sites have been damaged by the war; the damaged sites are 900,000 hectares or 22% of the total area of nationally protected natural territories. According to the Ministry of Environmental Protection and Natural Resources of Ukraine, 514 nature-protected sites taking 800,000 hectares are still under occupation. Both estimates are subject to a high degree of uncertainty as a significant part of Ukrainian territory is taken up by ongoing heavy fighting, and even more significant parts are unapproachable because of the unprecedented number of land mines.

Figure 1. Military situation in Kherson region as of 01 September 2023



Source: DeepStateUA

Figure 2. Protected territories of the Kherson region in the military conflict zone (as of 01 September 2023)



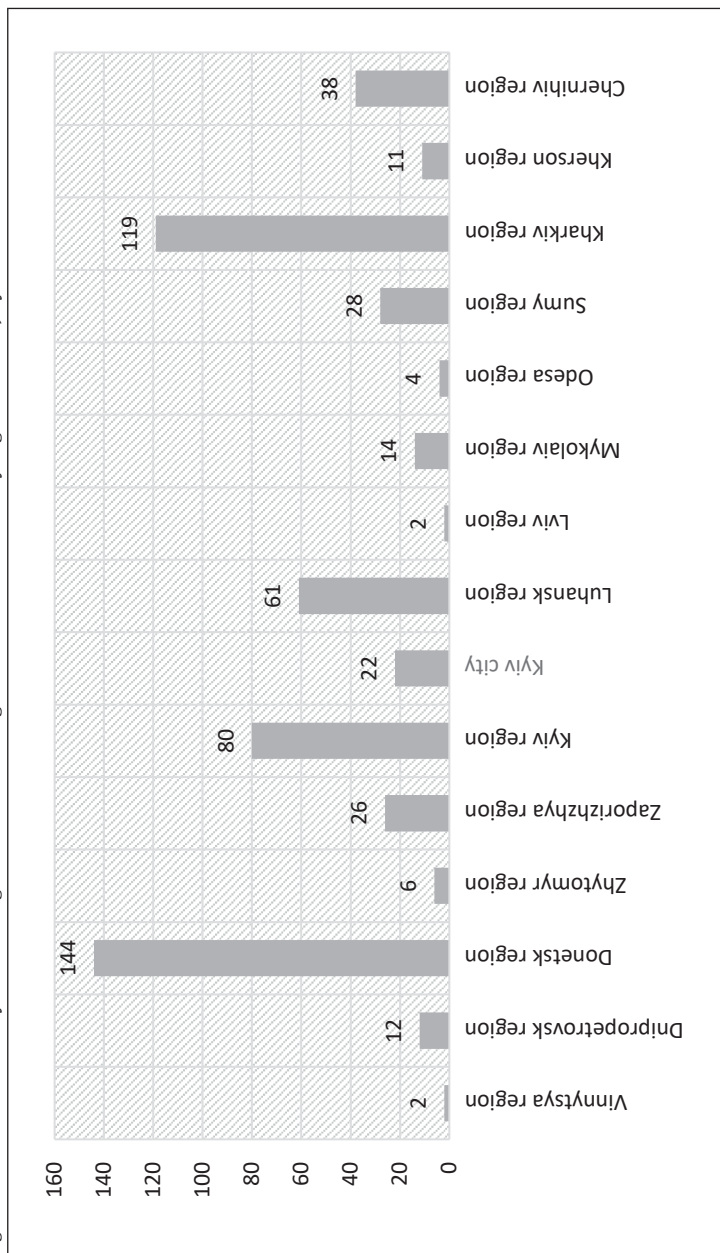
Source: authors' original work overlying DeepStateUA maps

Long-term damage to natural habitats and landscape preserves will impact future tourism as a large proportion of areas damaged by Russian aggression will not be available for recreational use for decades.

HISTORICAL AND CULTURAL HERITAGE LOSSES

The concept of urbicide is an interpretation of a specific violent policy against urban areas that has been taking place since the beginning of the full-scale Russian-Ukrainian war. Direct or indirect destructive consequences for cultural and historical heritage and loss of identity by cities prompted us to turn to an analysis of the current situation. 14 February 2022 marked the beginning of large-scale military urbicide in Ukraine. The occupation of cities and towns and long-term military action have had a lasting multidimensional impact on all civilian life and communication capabilities and have led to numerous casualties and the destruction of individual buildings, residential areas and entire settlements. Even more vulnerable were cultural heritage sites, which the occupiers have been trying to destroy with particular brutality and spite. Urbicide is carried out through artillery shelling, attacks by enemy aircraft, guided missiles and crewless aerial vehicles from air and water, and directly by various types of weapons in the temporarily occupied regions of Ukraine.

Figure 3. Number of destroyed or damaged historical heritage landmarks in Ukraine by region as of 01 July 2023



Source: compiled by the authors

During the year of full-scale war, 569 cultural heritage sites were damaged or destroyed in 15 administrative regions. Figure 3 shows the distribution of cases of military uricide by region (as of 1 July 2023).

Among known sites of architecture, urban planning and monumental art, the largest share of cultural heritage damage (26% of the total in Ukraine) is in the Donetsk Region, where 144 historical and cultural monuments have suffered. As the result of bombardments in March 2022, the facades and windows of architectural monuments of local importance – buildings that are part of the architectural ensemble of the Sviatohirsk Lavra and the Sviatohirsk Cave Monastery dating from the nineteenth to early twentieth centuries – were damaged. The Assumption Cathedral and hotel buildings were damaged. During the months of the war, such attacks were repeated multiple times, destroying these buildings.

In the city of Mariupol, located in the temporarily occupied territory, 99 historical and cultural heritage sites were damaged. The whole world was shocked by the horrifying footage of military uricide in this city, most prominently, the destruction of the Mariupol Drama Theater that served as a shelter for hundreds of civilians, primarily women and children. As a result of numerous shellings and fires, the facades, windows and interiors of the Mariupol Museum of Local Lore were damaged. The museum was located in a historical building, the so-called “House of Invalids,” constructed in 1916–1920 and in operation since 1920. The general condition of the museum collections is still unknown; the fire damaged some, and some of the exhibits were taken to Donetsk by the Russian invaders. The Mariupol Museum of Local Lore consisted of seven exhibition halls, including an academic library with 17,000 books. The collection totalled more than 53,000 exhibits. As a result of a direct hit by a Russian aerial bomb, a branch of the Mariupol Museum of Local Lore – the Arkhyp Kuindzhi Art Museum – was destroyed. It was in a historical building, the former Hiatsyntov manor, built in the Art Nouveau style in 1902. In addition to the works of Arkhyp Kuindzhi, the museum exhibited paintings by famous world-class artists: Ivan Aivazovskyi, Mykola Bendryk, Leonid Hadi, Mykola Hlushchenko, Mykhailo Derehus, Andrii Kotska, Tetiana Yablonska. The museum’s collection had “approximately 2000 exhibits, including painting, decorative and applied art, graphics and sculpture” (Kunytskyi, 2022).

In the Kharkiv Region, 119 monuments of cultural heritage were lost (22%) as the result of military uricide. The city of Kharkiv suffered the destruction of the Freedom Square; the Palace of Industry, a constructivist building (1928) and candidate for inclusion on the UNESCO World Heritage List; the Kharkiv State Academic Opera and Ballet Theater; the Kharkiv Philharmonic; the Kharkiv Art Museum (built in 1912).

The Hryhorii Skovoroda National Museum in the Kharkiv Region was also destroyed. In total, eight large museums were damaged there as a result of military uricide. For example, on 9 March in Kharkiv, an explosive wave damaged the windows and facades of the Kharkiv Art Museum of 1912 (a classicist building with baroque and modern elements), an architectural landmark of local importance. The fine art collection of this museum is one of the largest in Ukraine, with more than 25,000 exhibits that were visually unaffected as a result of the shelling. However, their storage has been complicated by inappropriate conditions (humidity, temperature). There are works by Dürer, Repin, Semiradsky, Dutch graphic artists and several other renowned artists.

In the Kyiv Region, 80 historical and cultural heritage sites were destroyed and damaged; the most affected were religious buildings and museums (7). During the occupation

of the settlement of Ivankiv in the Kyiv Region at the very beginning of the full-scale invasion, missile attacks by Russian fighter aircraft resulted in the burning of the historical building of the nineteenth-century Ivankiv Historical and Local History Museum. The vast majority of the museum exhibits were lost. Fortunately, residents saved several unique works by Ukrainian folk artist Mariia Prymachenko (hidden privately). Russian shelling in March 2022 damaged windows, facades, interiors and exhibitions of the Museum of Borodianshchyna Local Lore (functioning since 2016 in a modern building). The number of lost museum exhibits and books from the Borodyansk Central Library in the same building remains unknown.

In the Luhansk Region, 61 incidents of military uricide regarding cultural heritage have been recorded, primarily religious buildings.

Thirty-eight cases of destruction of cultural heritage have been confirmed in Chernihiv Region. In particular, in Chernihiv, Russian invaders destroyed the Vasyl Tarnovskiy Museum of Ukrainian Antiquities building of the late nineteenth century. The Chernihiv Regional Youth Library has been located there for the past half-century.

In the Sumy Region, 28 cultural heritage sites were damaged. In Trostianka, Okhtyrka District, on 27 March 2022, Russian shelling damaged the facades and windows of the architectural monument and urban planning of national importance: the ancient manor of L.E. Koenig (end of the eighteenth century to 1870) where the "Trostanetskyi" museum and exhibition centre is located. The amount of damage caused is UAH 5 million.

As a result of shelling on 9 March 2022, the facades, windows and ceilings of an architectural monument of local importance, the building of the Okhtyrka City Museum of Local Lore (beginning of the twentieth century) in the Sumy Region, were damaged. The Russian invaders later looted the exhibits (the extent of the losses is still unknown). The museum collection included almost 10,000 items related to local nature, history and culture.

In the Zaporizhzhia Region, 26 cultural heritage sites of various types were damaged. Among them, the following suffered the most losses: the railway station building in Zaporizhzhia, the Meleshkov Manor (1910s), and the sanatorium building (1930–1950) on the island of Khortytsia. Artillery shelling by the Russians on 7 March 2022 damaged the walls of the Popov Estate historical and architectural museum-reserve in Vasylivka near Zaporizhzhia.

Twenty-two monuments of cultural heritage were damaged or destroyed in Kyiv, most of all museums, and all on 10 October 2022 as a result of massive missile attacks on the city centre. In particular, the buildings on Tereshchenkivska Street, where the Bohdan and Varvara Khanenky National Museum of Art, Kyiv Art Gallery, and the Pavlo Tychyna Museum-Apartment are located.

The facades, windows and roofs of the Taras Shevchenko National Museum; the Archaeological Museum of Taras Shevchenko Kyiv National University; the Pedagogical Museum; the National Museum of Natural History; the Museum of Prominent Figures of Ukrainian Culture on Saksahanskoho Street; the Ukrainian House on Khreschatyk Street, which houses part of the collections of the Kyiv History Museum, were damaged.

The Ministry of Culture and Information Policy (MCIP) keeps statistics on cultural property damaged due to the Russian Federation's full-scale war, separately from cultural infrastructure and cultural heritage. By the end of June 2023, damage to 1520 cultural infrastructure sites was verified, of which almost a third were destroyed. In particular, 727 clubhouses, 571 libraries, 82 museums and galleries, 25 theatres and philharmonics,

and 115 art schools and colleges. In total, facilities in 216 territorial communities were affected.

Regarding cultural heritage, according to MCIP, 623 immovable cultural heritage sites were damaged or destroyed between 24 February 2022 and 30 June 2023 as a result of the war. Of them, 80 are of national importance, and 484 are of local importance. Of these, there are 186 architectural monuments, 184 architecture and urban plan sites, 166 historical sites, 21 architecture and history buildings, 17 monumental art sites, 17 urban monumental art locations, 16 archaeology sites, six architecture and urban planning history sites, five urban plan sites, two science and technology sites, and one garden and park artistic monument.

Almost the entire territory of Luhansk and significant parts of the territories of the Kherson, Zaporizhzhia and Donetsk Regions are under temporary occupation, which makes it impossible to calculate the exact number of cultural heritage monuments damaged during the hostilities and occupation.

Russian aggression in Ukraine threatens UNESCO-protected historical landmarks in Ukraine. For nearly a decade, Russia has occupied the ancient city of Chersonesus in Crimea. The state of the historical-cultural site and protected features within is unknown. A Russian missile attack on Lviv on 06 July 2023 destroyed a residential building situated in the buffer zone of the World Heritage site "Lviv-historic Centrum Ensemble." The Historic Centre of Odesa was added to UNESCO World Heritage in early 2023. Since then, Odesa has suffered multiple missile and drone attacks. Thus, 28 buildings with the protected architectural landmark were damaged in a single missile attack on 23 July 2023. On 27 September 2023, Russian missiles destroyed the structure of the sea terminal and the "Odesa" hotel, both within the UNESCO-protected zone.

TOURIST INFRASTRUCTURE LOSSES

In this analysis, from all the components of tourist infrastructure, we will consider only accommodation facilities both operating year-round (hotels, sanatoria) and seasonal (health camps, resorts, camping sites, etc.); in the southern regions, it is the seasonal ones that constitute the facilities and resources of recreational and tourist activity.

The regional analysis of tourism infrastructure losses is based on the authors' zoning of the national territory following the course of military operations, taking into account the following criteria: 1) Russia's military aggression against Ukraine can be divided into two phases: Phase I – since 2014, the occupation of Crimea, the war in the eastern Luhansk and Donetsk Regions and the subsequent positional war in this region; Phase II – from 24 February 2022, marked by military actions in the north (Kyiv, Chernihiv Regions), east (Kharkiv, Sumy, Luhansk, Donetsk Regions) and south (Kherson, Mykolaiv, Zaporizhzhia Regions); 2) territories that are not subject to a military threat; 3) the current military situation.

I. De-occupation zone – Kyiv (mainly its northern part), Chernihiv, Sumy, Kharkiv, and the east of the Mykolaiv Region. These territories were subjected to active hostilities in the first two months of the war and were subsequently liberated from the Russian invaders. The consequences of hostilities and occupation remain; reconstruction and memorialisation work is underway. Although no regional centre was occupied, Chernihiv, Sumy, Kharkiv, Mykolaiv and Kyiv suffered destruction due to constant shelling. In Chernihiv, the Ukraine Hotel in the city centre was destroyed (Hlushchenko, 2022),

fragments of a downed rocket hit the Alfavito Hotel in Kyiv (Hryshyna, 2023), hotels in Mykolaiv (Klosova, 2022) and Kharkiv (*Russia destroys 12 Ukrainian hotels*, 2023, Fedorkova, Bohdan, 2022) were destroyed by bombings. Some hotels and restaurants in the large agglomerations were also destroyed, especially along highways of international importance (for example, M06 and M07 in a 50-kilometer zone from the city of Kyiv (*Polovyna hoteliv*, 2022)). In addition, territories used for suburban recreation are mined, and it will take up to 70 years to clear them (Ruban, 2023; *U DSNS nazvaly*, 2022).

II. The zone with territories subjected to constant fire by surface-to-air missile systems and artillery, increasing both the frequency and area of destruction. This zone includes 1) de-occupied territories, where the constant shelling is accompanied by destruction caused by combat operations and mines: Kharkiv (border communities), Sumy (border communities), Mykolaiv (eastern part), Kherson (the Dnipro's right bank, the city of Kherson), the Luhansk and Donetsk Regions. According to different security situations, we highlight a) border areas that suffer from constant shelling from the territory of the Russian Federation – in this border strip, there are small villages, and there is no tourist infrastructure; b) front-line settlements, such as Kherson, which was liberated by Ukrainian troops on 11 November 2022, and since then it has been constantly under artillery shelling. Currently, the consequences of the war include damaged recreational areas and mines. According to the estimates of the local authorities, it will take at least ten years to clear the right bank of the Kherson Region (*Skilky chasu potrebuvatyme roz-minuvannia*, 2023). Although one hotel in Kherson (*Vnaslidok obstrilu Khersona*, 2022) is known to have been destroyed, the statistics will be updated as long as artillery shelling continues. 2) Territories with no occupation or active hostilities: south of Dnipropetrovsk, north of Zaporizhzhia and south of Mykolaiv. Cases of damage to hotel infrastructure in Zaporizhzhia (*Deviat raket nakryly Zaporizhzhia*, 2022), Nikopol (Lutsenko, 2022) and Kramatorsk (*Suma zbytkiv velychezna*, 2022) are known.

III. The occupation zone of the Russian Federation in Phase II of the war: 1) territories not subjected to significant destruction – the south of Zaporizhzhia, south-west of Donetsk and the left bank of Kherson. The territories of regions that have access to the Black and Azov Seas and, especially after the annexation of Crimea, which actively developed sanatorium treatment and recovery and seaside recreation, remain occupied. Before the large-scale invasion, the Zaporizhzhia and Kherson Regions paid considerable attention to tourism development. They considered this industry promising both from the point of view of providing income for local communities and improving the image and investment attractiveness. In the Kherson Region, there were more than 1000 recreation, wellness and accommodation facilities (including 49 children's facilities, 60 green tourism homesteads, and 51 hotel complexes) with a total of more than 100,000 beds; in the Zaporizhzhia Region, there were more than 550 temporary accommodation facilities, including 437 recreation facilities, 56 hotel-type facilities, eight wellness centres and complexes, 24 sanatoria, six resorts, three tourist shelters, 28 children's camps (*Stratehiia rehionalnoho rozvytku Zaporizkoi oblasti*, 2019; *Stratehiia rozvytku Khersonskoi oblasti*, 2019). It can be argued that most of the accommodation facilities listed in the official statistics are in the occupied territory (Honcharova, 2022; Yankovskyi, Badiuk, 2023). However, the actual number of accommodation facilities is higher than the official number: some were not officially registered, and residents actively rented out their housing, which accounted for a significant percentage of the income of local families in resort settlements. Calculations made according to the authors' methodology,

offers of accommodation facilities (Booking.com) for 2021, and information from Google Maps and Wikimapia made it possible to calculate the approximate number of facilities that are currently under occupation by the Russian Federation in Phase II of the war and did not suffer significant destruction. Thus, there were 659 accommodation facilities in the Kherson Region, of which more than 320 were located on the occupied Black Sea coast east of Kherson, including in the largest resort centres of Zaliznyi Port, Skadovsk, etc. There were 331 accommodation facilities in the Zaporizhzhia Region. Currently, the entire Ukrainian part of the coast of the Sea of Azov is occupied. On the mainland part of the coast, more than 1082 accommodation facilities are under occupation in such well-known resort centres as Kyrylivka, Prymorsk, Azovske, Berdiansk (Zaporizhzhia Region), Urzuf and Yalta (Donetsk Region).

Many recreation centres are located on the bank of the Dnipro from its mouth to the town of Nova Kakhovka. There are at least 340 accommodation facilities in the occupied territories of the Kherson and Zaporizhzhia Regions. As a result of the destruction of the Kakhovska hydropower plant by the Russian invaders, the most significant ecological disaster in modern Europe, in actual ecocide, all natural-recreational and historical-cultural sights and tourism infrastructure on the right and left banks of the Kherson Region, in the Mykolaiv Region were destroyed; and territories adjacent to the Dnipro, as well as the Black Sea coast within Mykolaiv and Odesa Regions where mines, debris, animal corpses and other consequences of the disaster were washed up and will remain unusable for a long time.

Currently, the described territories are not involved in hostilities, but the accommodation facilities are closed or looted, or Russian military personnel live in them. Accommodation facilities where the occupants are based are being targeted by Ukrainian forces (Zabozhko, 2023; *Pid Berdianskom*, 2023). Beaches and recreational areas are mined, and active construction of military fortifications is underway, which destroys recreational landscapes, turning them into those formed under the influence of or for military operations (potentially, after de-occupation, they can serve as display sites). However, as the experience of the city of Kherson shows, these settlements will be destroyed as a result of either hostilities or shelling if the frontline passes close. It can be assumed that the southern territories of Ukraine, occupied now, will not be safe for tourists and suitable for recreation for a long time after the war; 2) territories affected by active hostilities: Mariupol and its surroundings and the cities of Sieverodonetsk, Lysychansk, Rubizhne in the Luhansk Region. In Mariupol, before the war, the goal was to develop historical, cultural, ethnic, beach and business tourism. The reconstruction of the city's beaches and the construction of the Maryland water park were planned. Mariupol had 53 apartments, five apart-hotels, 18 hotels, 13 mini-hotels and nine hostels (*Stratehiia rozvytku m. Mariupolia*, 2021). It can be considered that these are completely lost (*Do 98% budivel Mariupolia zruinovani*, 2022) because even those accommodation facilities in which buildings have survived will not be used for their intended purpose in coming years and may further be demolished. Other resort centres near Mariupol suffered less damage, but accommodation facilities there are barely functioning.

Eastern regions of Ukraine had a less developed tourist infrastructure. Currently, it can be stated that up to ten accommodation facilities have been destroyed from the city of Rubizhne to the cities of Sieverodonetsk and Lysychansk, as these cities have been effectively destroyed.

IV. The combat zone (as of 01 July 2023) stretches along a line from the Kinburn Spit along the left bank of the Dnipro River to the villages of Kamianske – Piatykhvatky – Myrne – Novodarivka (Zaporizhzhia Region), Vuhledar (Donetsk Region) – Marinka – Vodiane – Kruta Balka – Krasnohorivka – Shumy – Klishchiiivka – Bakhmut – Orikhovo – Vasylivka – Vesele (Donetsk Region), Zolotarivka – Bilohorivka (Luhansk Region) – Torske (Donetsk Region), Novoselivske (Luhansk Region), Pershotravneve – Dvorichna (Kharkiv Region), along the left bank of the Oskil River to the border with the Russian Federation. The settlements around which the fighting is currently going on will be destroyed, just like Bakhmut. This city also sought to develop recreational, event, cultural, sports and rural tourism. The city had already developed wine-gastronomic tourism associated with the Artwinery Private Joint-Stock Company. Excursions with tasting several varieties of sparkling wine produced at the factory were held on the territory (*Stratehiia rozvytku Bakhmutskoi*, 2020). This enterprise was destroyed, and the fate of the cave sanatorium in the town of Soledar, 15 km from Bakhmut, is unknown.

V. The zone that has not been affected by military operations but is subject to Russian missile attacks is the western part of the country (Zhytomyr, Khmelnytskyi, Ternopil, Rivne, Volyn, Lviv, Zakarpattia, Chernivtsi Regions); central (Vynnytsia, Kirovohrad, Cherkasy) and the Odesa Regions. The infrastructure there is partially destroyed. In particular, the Black Sea coast is undergoing purposeful destruction: a hotel in Odesa was destroyed by bombings (*Obstril Odesy*, 2022), a recreation centre at the Serhiivka Resort (*Serhiivka near Odesa*, 2022), and the Zatoka resort is bombed precisely to destroy the tourist infrastructure, according to local authorities (Kozova, 2022).

VI. The zone occupied during the first phase of the Russian aggression: the Crimean Autonomous Republic, parts of the Luhansk and Donetsk Regions. Resource losses in this zone are tough to determine due to the duration of the occupation, uncertainty, fragmentary information, and the impossibility of verification.

DISCUSSION

Issues that need an urgent solution:

1) Personnel support is necessary for the post-war development of tourism in Ukraine since interest after the war will translate into tourist demand, which must be met at a high-quality level and thus requires professionally trained specialists.

Paying tribute to research into tourist resources as a necessary component of tourism, we note that tourism can be described as a creative type of human activity where the final result depends on the level of professionalism of everyone involved in the creation and implementation of the tourist product, that is, the primary resource in tourism is its professionally trained personnel, able to generate new ideas and implement them.

Unfortunately, there are no official statistics on the number of people employed in the tourism sector. In this case, we rely on the data of the National Tourism Organization of Ukraine (NTOU) for 2020. According to it, more than half a million, or 4% of the working population, are employed in visitor services, of whom 38,200 people are directly employed in accommodation facilities and almost 20,000 in the tourism industry (*Natsionalna turystychna orhanizatsiia Ukrainy*, 2020). Currently, it is impossible to say what kind of personnel losses tourism has suffered due to military actions, but the fact that there are can be stated with certainty. As a result of COVID-19 and the abrupt stopping of tourist activity in 2020, an outflow of personnel to other spheres began. As a result

of Russian military aggression, some of those employed in tourism went abroad, some were evacuated to western, safer regions, some fell into occupation zones, some are in the war zone, and some are fighting at the front line. The civilian population of Ukraine suffers losses as a result of the constant shelling of towns and villages, so there is a high probability that, unfortunately, people who worked in tourism could have died. Therefore, it can be stated that tourism in Ukraine has suffered significant personnel losses.

Since 1990, an updated system of personnel training for tourism has been formed in Ukraine. It has been based on university education (mainly geographically based). After adopting the first industry standard for training tourist personnel in 2004, the number of higher education institutions (HEIs) that train personnel for tourism and hotel and restaurant (hospitality) businesses began to grow exponentially. Higher education institutions of economic, pedagogical, agricultural, sports and other specialisations joined. Today, academic degrees for the tourism industry can be gained at 118 HEIs of the country located in each region (*Vstup.OSVITA.UA*). Each region has the potential to restore human resources for the tourism industry.

Higher education institutions have been damaged as a result of the shelling: buildings of the Taras Shevchenko National University of Kyiv (Kyiv), the main building of the V.N. Karazin Kharkiv University, the O.M. Beketov Kharkiv National University of Urban Economy (Kharkiv), all universities in Mykolaiv, and others. Despite the destruction, universities ensure the educational process (mainly online).

2) Ethical issues related to memorialising the events of the Russian-Ukrainian war and rebuilding destroyed settlements, especially cities. Russia's military tactics in Ukraine are aimed at the genocide of the Ukrainian people, inflicting significant human losses and destruction not only of industrial facilities but primarily of housing. This tactic of the Russians, tested in several "hot spots" on the planet which experienced Russian intervention, is urbicide, that is, it is aimed at the destruction of a settlement together with the inhabitants and its historical and cultural heritage. During the war in Ukraine, the Russian aggressor has destroyed as much as 80–90% of the cities of Mariupol, Bakhmut (Donetsk Region), Rubizhne, Sieverodonetsk, Lysychansk, Popasna (Luhansk Region), Iziium (Kharkiv Region), Okhtyrka (Sumy Region) and caused significant damage to Kharkiv, Chuhuiev, other cities of the Kharkiv Region, as well as Sumy, Chernihiv and Kyiv. In the south, Mykolaiv, the cities of Dnipropetrovsk, Zaporizhzhia and Odesa Regions were shelled. Virtually no region of Ukraine is safe, and during military operations and shelling, accommodation facilities are destroyed along with housing and industrial enterprises.

3) The National Council for the Recovery of Ukraine from the Consequences of War has prepared a draft Plan for the Recovery of Ukraine, including sections on infrastructure, tourism and resorts (*Natsionalna rada z vidnovlennia Ukrainy, 2022*). Such a document is a positive development in determining guidelines for the revival of the tourism and recreation industry, although its current format is insufficiently rigorous or concrete. According to the authors, the critical points of the post-war recovery of tourism should be, above all, a change in the attitude towards the industry, which is presently only secondary and of no strategic importance for the country. Tourism is a mechanism aimed at strengthening the positive image of Ukraine, which is now forming. In the future, the path of development of domestic tourism is seen in the positioning of the country as one of courageous, talented and hardworking people, capable of developing the newest branches of the economy, creative industries (such as tourism) aimed at building

a new post-war Ukraine, while providing a decent standard of living for its citizens. The emphasis of state tourism policy should shift from centralisation to regionalisation with the opportunity for regions to actualise existing potential to attract investments in tourism to ensure compliance with the requirements of the international market for tourist services. The state regulator should deal with issues of legal support for tourism activities, and the regional authorities, together with businesses, should work on forming a modern, competitive tourist product which will satisfy both domestic and foreign consumers with its quality.

CONCLUSIONS

Since the beginning of the full-scale Russian-Ukrainian war, the aggressor has pursued an aggressive policy of urbicide aimed at destroying cities in an attempt to erase the history and culture of Ukraine. As of 1 July 2023, Ukrainian officials have recorded partial or complete destruction of 170 monuments of national and local importance, 146 valuable historical buildings and cultural heritage sites, and 58 memorial monuments and works of art. According to the Hague Convention of 1954, the destruction of cultural heritage is a war crime for which responsibility is stipulated; 569 such crimes had been committed in Ukraine by Russian aggressors by 01 July 2023. Later, parts of three UNESCO World Heritage sites were damaged or destroyed. The largest, most impacted regions in the earlier stages of the war were the Donetsk, Kharkiv and Kyiv Regions, with heavy fighting affecting the Kherson and Zaporizhzhya Regions later in the war. The most significant losses to tourist infrastructure happened along the Azov and Black Sea coasts and the Dnipro River downstream from Nova Kakhovka, where a large reservoir was emptied due to the destruction of the Kakhovka Dam.

The complete consequences of military actions and the full extent of damage cannot be evaluated yet, as a large part of the country remains under occupation, and destruction persists as the war continues. A full understanding of biotic and landscape diversity loss will come in a few years due to systematic monitoring observations. The longer the war lasts, the more damage it causes and the more consequences we will have in the future. Accurate recording and analysis of damage and changes to tourism-relevant resources and infrastructure is critical for understanding the impact of the war on the Ukrainian economy and is necessary to ensure quicker recovery after the war ends. Some of the damage, especially that to the environment and ecosystems, may continue long after the end of the war itself, further degrading the economy and public well-being.

War in Ukraine exposes gaps and imperfections in international law. It may become a catalyst in recognising the crimes of ecocide and urbicide and the corresponding responsibilities of individuals, organisations and states, just as fallout from the Second World War led to the Convention on the Prevention and Punishment of the Crime of Genocide.

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