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LETTER FROM THE CONSERVATION FRONTLINE

Urban Bat Rescue Crisis in Eastern Europe: A New Challenge for Bat Conservation

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The team of the Ukrainian Bat Rehabilitation Center dedicates this report to our volunteer Anastasia Kolvakh, who tragically lost her life during a Russian missile attack on February 1st 2024 in the city of Poltava.

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In countries of the European Union and Associated Members, bats are subject to strict legal protection (the Habitats Directive, Council Directive 92/43/EEC (Council of Europe. 1979)). This rigorous protection was prompted by a significant decline in bat populations across Europe during the second half of the 20th century (Stebbings 1988; Hutson et al. 2001). Modern European bat conservation approaches include habitat protection and management (Kyheröinen et al. 2019), protection of existing roosts, artificial roosting solutions (Marnell and Presetnik 2010; Mitchell-Jones et al. 2007), mitigation of infrastructure impacts (Rodrigues et al. 2015; Matthews et al. 2024) and rehabilitation and rescue efforts.

Bat rescue initiatives in Ukraine began in 1999 in Kyiv (Golenko 2010) and Kharkiv cities (Vlaschenko 1999). One of the key challenges for bat rescue and rehabilitation in Ukraine (and the whole of Eastern Europe) is the harsh winter climate, which prevents immediate release and requires maintaining bats in artificial hibernation conditions until spring. From the beginning, particularly in Kharkiv, the demand for bat rescue was high (hundreds of bats). This number steadily increased, surpassing 1000 individuals by 2011. In response to this growing need, the Bat Rehabilitation Center of Feldman Ecopark (Kharkiv) was established in 2013 (Vlaschenko and Prylutska 2018). Since 2017, groups of hundreds of bats have been rescued from other cities, with numbers exceeding 2000–2500 per annum. Further, in 2021 the project expanded into the Ukrainian Bat Rehabilitation Center (UBRC), scaling up the best bat rehabilitation practices nationwide. The need for specialised bat rehabilitation centres extend beyond Ukraine, with similar initiatives also established in other Eastern European countries (e.g., Shpak 2023).

The UBRC team has implemented an advanced, country-wide monitoring system for bat rescues and data collection (e.g., Hukov et al. 2020; Vlaschenko, Hukov, et al. 2023; Prylutska et al. 2023). The central facilities in Kharkiv are equipped with an operational contact centre (helpline), specialised infrastructure for summer and winter bat rehabilitation (Vlaschenko and Prylutska 2018), and a highly trained team of biologists and veterinarians. This central system is further supported by a network of local rehabilitation centres which are based in zoos, universities, natural history museums, animal rescue centres and national parks, and are reinforced by volunteers. Despite the established infrastructure for bat rescue in the country, the number of animals requiring rescue continues to rise. This upward trend culminated in a record number of bat rescues during the winter season of 2023–2024, when 6437 bats were rescued (Shulenko et al. 2025). The highest number of groups of the Common noctule, *Nyctalus noctula*, ever rescued (between 1500 and 1700 individuals) was recorded in 2024.

The figures show where numerous bat aggregations are typically found during winter in apartments, mainly in the loggias of multi-story buildings (Figure 1). Sometimes, bats roost in the outer coverings of open balconies, leading to tragic outcomes when they are thrown outside by flat owners (Figure 2). However, the main colonies typically hide in deep crevices between concrete slabs (Figure 3), where their numbers can reach several thousand.

A summary of bat records in Ukraine compiled by the UBRC team over a 10-year period (2011–2022) was previously published in Prylutska et al. (2023). The dataset includes 20,948 individual records representing 16 bat species. The highest number of records is of *N. noctula* ($n = 15{,}889$), mostly recorded during winter months, followed by the Serotine bat, *Eptesicus serotinus* ($n = 2017$), and the Kuhl's pipistrelle, *Pipistrellus kuhlii lepidus* ($n = 2001$). *Nyctalus noctula* became a wintering species in Ukraine only 30–40 years ago, while *P. k. lepidus* is a species from Central Asia that extended its range around 25 years ago. For this communication, we combined all our data on bats rescued in Kharkiv (1999–2024) with historical records from 1948 to 1991 (about 30,000 records) to demonstrate the drastic increase in bat rescue records in this single urban area (Figure 4). Together, *N. noctula* and *P. k. lepidus* account for more than 90% of the recorded individuals, with both species having adjusted to urban landscapes in Ukraine (and Eastern Europe in general) in the past 30–40 years (Godlevska 2015; Kravchenko et al. 2020). *Nyctalus noctula* has adjusted to the urban environment as a wintering species, while *P. k. lepidus* has established itself as a resident species (Vlaschenko, Rodenko, et al. 2023).

a

b

FIGURE 1 | One of the typical examples of overwintering bats entering indoor spaces in multi-story buildings through external openings in loggias (balconies); (a) bat rescue operation; (b) part of a wintering aggregation of *Nyctalus noctula* under the plastic ceiling of a loggia.

Different bat species exhibit preferences for various types of roost, including factors such as building material, building age, and building height (e.g., Hukov et al. 2020). However, the majority of the most abundant bat records are associated with prefabricated concrete standardised multi-story buildings (Figure 5) which were widely constructed across the former USSR and extended to the western borders of the former Warsaw Pact region. These concrete prefabricated buildings proliferated in the late 1970s and the 1980s, when they came to dominate urban districts (Figure 5) or even entire small towns. As the Soviet system began to decline, the quality of construction deteriorated, leading to an increase in cavities and unsealed crevices, which in turn provided additional roosting opportunities for bats.

Most Central European countries that inherited these types of buildings have already completed programs for renovating and insulating them (Jamska 2014; Deleva et al. 2025). As a result, many of these buildings have either lost their suitability as bat roosts or had their roosting spaces replaced with bat boxes (Jamska 2014). In contrast, Ukraine has not yet initiated similar programmes at the national level. The situation is further complicated by the ongoing full-scale war, which has caused the destruction or damage of thousands of buildings across the country (Vlaschenko, Shulenko, et al. 2023). The longer these buildings remain unrepaired, the greater the likelihood that they will be occupied by bats, as they continue to offer suitable roosting opportunities.

We hypothesise that districts of multi-story concrete buildings, constructed during the late Soviet era and left without renovation for 30–40 years, are inhabited by enormous numbers of bats in Ukraine. We suggest that bat populations in these buildings (on a country-wide scale) may range from hundreds of thousands to millions of individuals. These buildings and districts have become an integral part of the life cycle of these bats, with local populations exhibiting a high level of roost site fidelity (Vlaschenko et al. 2020).

We emphasise an urgent need for targeted conservation measures to protect urban bat populations in Ukraine. We call on stakeholders, including government authorities, urban planners, and international donors, to ensure that funding for the renovation and

FIGURE 2 | Winter roosting site of *N. noctula*, demolished during renovation works (January 2024, Poltava city), resulting in approximately 1500 bats (both living and dead) being thrown out; (a) view of the balcony showing the flooring and external panelling used by bats for hibernation, (b) bats from the colony thrown onto the snow, (c) general view of the building where the incident occurred, (d) rescued alive bats from the colony placed into boxes awaiting evacuation to Kharkiv bat-rehabilitation facilities.

FIGURE 3 | An example of a building with wintering *N. noctula*, and a hidden entrance to the roosting site (Kharkiv city).

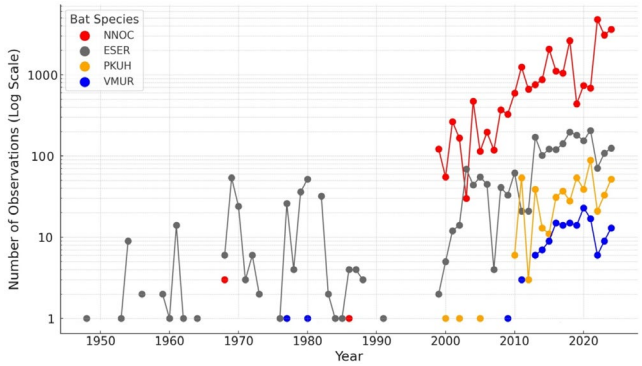

FIGURE 4 | Multiyear trends of bat records (Number of Observations) for the four most common bat species (*E. serotinus*—ESER, *N. noctula*—NNOC, *P. kuhlii*—PKUH, and *Vespertilio murinus*—VMUR) in Kharkiv city from 1948 to 2024 (on a logarithmic scale).

insulation of multi-story buildings is not allocated without prior environmental assessments. These assessments should identify and protect, or mitigate the impact on, bat roosting sites. Moreover, it is essential to support educational programmes within the construction industry to raise awareness of bats and the legal requirements for their protection. Without such measures, in the next decade, we risk wiping out shelters for hundreds of thousands of bats of recently formed urban bat populations.

Author Contributions

Conceptualisation: A.V., A.S., M.Y., V.B., K.Z., A.P., K.K. Funding acquisition: A.V., A.P., K.K., A.S., M.Y., V.B. Bat rescue and rehabilitation activities: All co-authors participate or participated in practical bat rescue and rehabilitation efforts. Writing – original draft: A.V. Review and editing: All co-authors reviewed and approved the final manuscript.

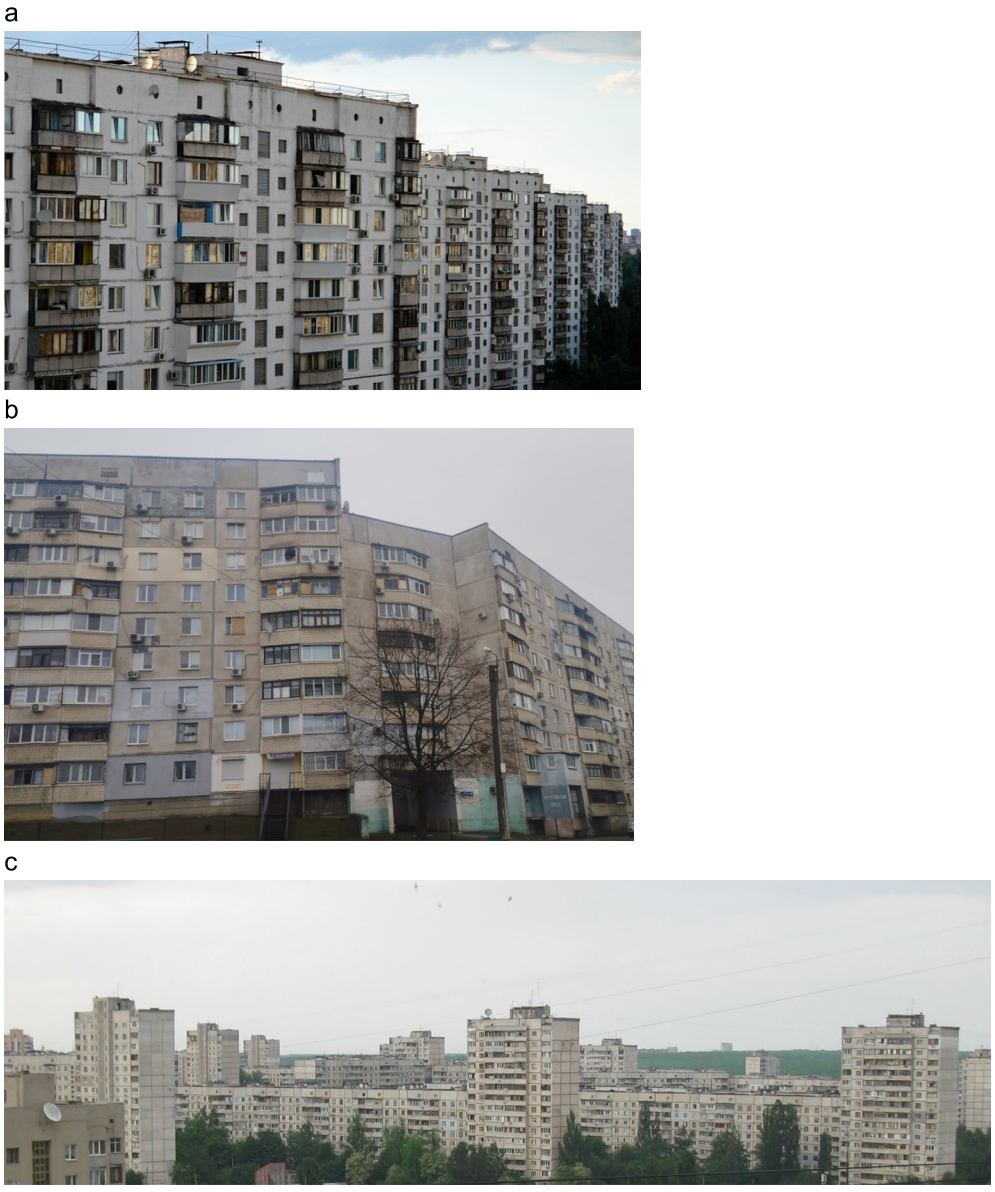

FIGURE 5 | Examples of pre-fabricated concrete standardised multi-story buildings erected in the late Soviet Union; (a) general view of a line of such buildings, (b) a building from which wintering colony (about 1000 *N. noctula*) was rescued in January 2018 (Kharkiv city), (c) general view of the urban landscape (Kharkiv city) composed of such buildings.

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