IDENTIFICATION OF THREATS IN URBAN GREEN SPACES IN WARSAW BY THE USE OF A VOLUNTEERED GEOGRAPHIC INFORMATION (VGI) TOOL

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Abstract

Urban green spaces are attractive public areas, and a sense of safety is crucial for their use. In addition to their benefits, they may also pose certain risks that limit accessibility and willingness to use them. The study aimed to identify and analyse the hazards reported by residents of Warsaw (Poland) in parks and green squares and their immediate surroundings, using the National Map of Security Threats (NMST) in 2025. The types of hazards and the scale of their occurrence in access to and use of green spaces were taken into account. The results show that 59 reports were identified in the NMST concerning 23 parks and 10 green squares. Residents considered the most troublesome threats to be alcohol consumption by other users in parks and green squares, and incorrect parking on routes leading to them. They also pointed to the groups of young people at risk of demoralisation gathering in green spaces and their surroundings, which may pose a threat to other users. Despite the overall limited number, the reports indicate real hazards that affect users' sense of security and their willingness to visit green spaces, resulting in practical conclusions for local authorities and managers to shape parks and green squares by eliminating crime-prone areas.

Key words: parks and green squares, users, threats, public security, greenery

Introduction

Urban green spaces play a crucial role in enhancing well-being for city residents (Dietz et al., 2025). Providing contact with nature in highly urbanised areas improves mental health and reduces stress (Wood et al., 2017). Urban parks and green squares are also recreational spaces that contribute to improving physical health (Jimenez et al., 2021; WHO, 2024). People's exposure to greenery positively influences the amount of physical activity they regularly engage in (Persson et al., 2018), while high-quality green spaces better support users' time spent outdoors. However, urban parks and green squares can also be sites of various threats to their users, arising from factors such as maintenance, cleanliness, or other users' inappropriate behaviour (Kimic, Polko, 2022b; Polko, Kimic, 2022). Personal security is one of the key aspects affected by perceptions of urban green spaces, which play an important role for city residents (Polko, Kimic, 2021). In the face of perceived danger, people tend to avoid public spaces, including green spaces, which are affected by this behaviour.

Nowadays, publicly available tools for Volunteered Geographic Information (VGI) have become a method of data collection in which geospatial content is generated by non-professionals using online mapping systems. Those systems offer an opportunity to collect spatially referenced information on hazards to urban public spaces, including green spaces (Brown et al., 2018; Hooper, Edwards, 2024). Identifying undesirable behaviours among users may help eliminate hazards and thus improve accessibility and safety of parks and green squares. The National Map of Security Threats (NMST), implemented in Poland in 2016, is a GIS-based, publicly available digital tool for crime and hazard mapping that engages citizens in shaping local security by reporting hazards from a list of categories in their neighbourhoods (KMZB, 2025; Polko, 2022). This provides insights into common threats to human life, health, property, and public order, as perceived by its users, and accounts for their spatial distribution (Polko, Kimic, 2024).

The study aimed to determine whether the city residents of Warsaw (Poland) report hazards in green spaces and their immediate surroundings (access zones) that could affect the safety of reaching and using them.

Material and methods

Parks and green squares formally designated as urban green spaces in Warsaw served as the study area. Both the space within their borders and the immediate surroundings of the entrance zones were analysed.

To achieve the above-mentioned aim, the National Map of Security Threats (NMST) was used. The study accounted for 27 available types of hazards recorded in green spaces (parks and green

squares) and their immediate surroundings in 2025. At the first stage, they were divided into three main groups:
1. Hazards occurring in the immediate vicinity of green areas, primarily related to road traffic (roads and their use), including 9 types: incorrect parking, inappropriate road infrastructure, poor traffic management, speeding, illegal car racing, unguarded railway crossings, unguarded level crossings, driving off-road in forest areas, and road accidents involving forest animals.
2. Hazards occurring in the immediate vicinity and in green areas, primarily related to social behaviours, including 7 types: acts of vandalism, alcohol consumption in prohibited places, homeless persons requiring assistance, groups of minors at risk of demoralisation, places of dangerous entertainment activities, use of intoxicants, begging.
3. Hazards occurring in green spaces, primarily related to water bodies, including 4 types: wild bathing areas, dangerous places in water areas, dangerous places on water, drowning; related to vegetation including 4 types: destruction of greenery, illegal tree felling, burning of meadows, illegal rubbish dumps; related to the presence of animals (wild and domestic) including 3 types: stray dogs roaming around, animal abuse, poaching.
At the second stage, the hazards were identified through the individual map study and then linked to the green spaces. The quantitative analysis indicated which hazards were reported most frequently in and around each park and green square, enabling the selection of those requiring intervention to improve safety.

Results
Based on data collected from NMST in 2025 for Warsaw, a total of 59 hazards have been reported in and around green spaces. The hazards were identified in 23 parks (Table 1) and 10 green squares (Table 2). Most of them belong to two categories occurring in the immediate vicinity of green spaces and are related to:
- road traffic (roads and their use) and include 5 of the available 9 types: incorrect parking, inappropriate road infrastructure, poor traffic management, speeding, and illegal car racing.
- social behaviours and include 4 of the available 7 types: acts of vandalism, alcohol consumption in prohibited places (also identified in green areas), homeless persons requiring assistance, and groups of minors at risk of demoralisation.

The hazards occurring in green spaces were identified only in those related to vegetation, and include only 1 of the available 4 types: destruction of greenery.

The most frequently reported hazards across all identified green spaces were: alcohol consumption (21 reports) and improper parking (18 reports). The others did not exceed 6 reports in each type and are thus classified as incidental.
Five types of transport-related hazards (roads and their use) were identified in around 22 green spaces: 15 parks and 7 green squares. The most common problem was illegal parking near 10 parks and 4 green squares. Inappropriate road infrastructure was identified near 3 parks and 3 green squares, and poor traffic management near 2 parks. Speeding occurred directly adjacent to 2 parks and 1 green square. Illegal racing was identified near only 1 park. At the same time, two types of hazards were reported only near 3 of the 23 parks and 2 of the 10 green squares, whilst in other locations, one case of each type was reported.
Four types of hazards associated with social behaviours were identified in the vicinity of 14 green spaces: around 9 parks and 5 green squares. The most frequently reported issue was alcohol consumption, which affected 21 green spaces and occurred both within their boundaries and in their surrounding areas. These incidents were recorded in 7 parks, with repeated incidents occurring in 4 of them. Only one such incident was recorded in the surrounding area. Few incidents related to alcohol consumption were identified in the 5 green squares.
Gatherings of minors at risk of becoming delinquent were rarely reported. Such incidents were identified as recurring only in one park (three times) and as a one-off incident in the vicinity of another park. No such reports were recorded in or around green squares. Acts of vandalism were not reported in parks; such incidents occurred only once at the green square. As for reports concerning homeless people requiring assistance, such cases were also rarely reported. They occurred in the vicinity of one park and one green square.
Risks associated with vegetation were reported in only one park, and these concerned damage to greenery.

Tab. 1: Hazards identified in and around parks in Warsaw, by the number of reports (Source: KMZB, 2025).

Park name	Types of hazards									
	Related to transport (roads and their use)					Related to social behaviour in green space (in) / around green space (out)				Related to vegetation
	incorrect parking	inappropriate road infrastructure	poor traffic management	speeding	illegal car racing	acts of vandalism	alcohol consumption in prohibited places	homeless persons requiring assistance	groups of minors at risk of demoralisation	destruction of greenery
Moczydło Park	1			1					1 / out	
Skaryszewski Park				1						
Fosa Park	1									
Żołnierzy Żywiciela Park	2		1							
Stawy Kellera Park	1									
Olszyna Park							1 / in			1
Z. Herbert Park							2 / in			
Sady Żoliborskie Park	1									
St. Żeromski Park		1								
Świętokrzyski Park									3 / in	
Forty Korotyńskiego Park							2 / in			
Linde Forest							1 / out			
Stawy Brustmana Park	1						1 / in			
Krasińskich Garden			1		1					
J. Kusociński Park		1								
Szczęśliwicki Park	1									
Skaryszewski Park	4						6 / in			
Polish-German Gardens							1 / in			
Pole Mokotowskie Park							2 / in			
I. Jarocka Park	1									
F. Acher Park		1								
Park Pięciu Sióstr								1 / out		
Lasek na Kole	1									
Total:	**14**	**3**	**2**	**2**	**1**	**-**	**15**	**1**	**4**	**1**

Table 2. Hazards identified in and around green squares in Warsaw, by the number of reports (Source: KMZB, 2025).

Green square name	Types of hazards									
	Related to transport (roads and their use)					Related to social behaviour in green space (in) / around green space (out)				Related to vegetation
	incorrect parking	inappropriate road infrastructure	poor traffic management	speeding	illegal car racing	acts of vandalism	alcohol consumption in prohibited places	homeless persons requiring assistance	groups of minors at risk of demoralisation	destruction of greenery
A. Scholtz Square		1				1				
St. Skibniewski Cubryna Square		1								
A.W. Żurowski Square							1 / in			
Senior Square	1						1 / in			
M. and A. Radziwiłł Square	1									
Sybiraków Square	1									
Nelson Mandela Square							1 / in			
Pies Fafik Square							1 / in			
Więźniów Politycznych Stalinizmu Square		1								
Grzybowski Square	1			1			1 / in	1 / out		
Total:	**4**	**3**	**-**	**1**	**-**	**1**	**5**	**1**	**-**	**-**

Discussion

The surroundings of urban green spaces in big cities are characterised by extensive road infrastructure and heavy traffic. The results showed that the majority of reports to the NMST in areas around parks and green squares concerned illegal parking, which limits pedestrian movement and access to green spaces. Traffic hazards are compounded by inappropriate road infrastructure and driver behaviours (e.g., speeding) (Luo et al., 2022). The accumulation of these hazards reduces the sense of safety on the route to green spaces, significantly limiting their accessibility for pedestrians.

The behaviour of other users is a significant factor influencing the sense of safety in parks and green squares (Polko, Kimic, 2022), as evidenced by the high number of reports concerning alcohol

consumption in and around green spaces. Parks are regarded as attractive places for engaging in prohibited activities, especially for young people at risk of demoralisation (Townshend, Roberts, 2013). Urban green spaces provide casual, open-air, often 'hidden' and secure locations to consume alcohol, away from formal, structured, and more expensive venues (Khazaei et al., 2026). Alcohol consumption is perceived as a problem also associated with other negative outcomes, such as litter, noise nuisance, and violence (Polko, Kimic, 2022; de Loyola González-Salgado et al., 2023).
Reported only once, damage to greenery may indicate either an absence of such negative behaviour in other green spaces, or that such behaviour is tolerated, or that users do not regard it as a threat to their safety. This issue is often overlooked in research (Loughran, 2020), although the destruction of greenery by people in parks is a complex and multifaceted problem ranging from direct, intentional vandalism to careless, everyday behaviour (Ostoić et al., 2024). At the same time, key findings indicate that actions such as damaging trees reduce the sense of safety in green spaces (Kimic, Polko 2022a; Polko, Kimic, 2022).

Conclusion

Based on data collected by NMST in Warsaw in 2025, the most common hazards identified in and around green spaces included alcohol consumption in prohibited areas and incorrect parking on roads leading to parks and green squares. The next two were the poor condition of road infrastructure on the route to green spaces and the gathering of minors at risk of demoralization. These hazards should be considered significant for green space users, and therefore, their elimination should be a priority.
The functioning of the NMST tool, including the ongoing analysis of reports documenting hazards, is important for identifying the real safety situation in green spaces and in their immediate surroundings. This source is crucial for improving the accessibility and safety of urban parks and green squares today, even if the tool has some limitations: collected data is available only within the last 30 days, and the tool's design allows reporting only threats from a closed list of categories.

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Souhrn
Městské zelené plochy jsou atraktivními veřejnými prostory a pro jejich využívání je zásadní pocit bezpečí. Kromě svých přínosů mohou však představovat i určitá rizika, která omezují jejich dostupnost a ochotu je využívat. Cílem studie bylo identifikovat a analyzovat nebezpečí, která nahlásili obyvatelé Varšavy (Polsko) v parcích a na zelených náměstích a v jejich bezprostředním okolí, a to s využitím Národní mapy bezpečnostních hrozeb (NMST) z roku 2025. Byly zohledněny typy rizik a rozsah jejich výskytu v souvislosti s přístupem do zelených ploch a jejich využíváním. Výsledky ukazují, že v NMST bylo identifikováno 59 hlášení týkajících se 23 parků a 10 zelených náměstí. Obyvatelé považovali za nejobtížnější hrozby konzumaci alkoholu ostatními uživateli v parcích a na zelených náměstích a nesprávné parkování na cestách vedoucích k nim. Upozornili také na skupiny mladých lidí ohrožených demoralizací, které se shromažďují v zelených prostorech a jejich okolí, což může představovat hrozbu pro ostatní uživatele. Navzdory celkově omezenému počtu poukazují hlášení na reálná rizika, která ovlivňují pocit bezpečí uživatelů a jejich ochotu navštěvovat zelené prostory, což vede k praktickým závěrům pro místní samosprávy a správce, aby formovali parky a zelená náměstí tak, že odstraní oblasti náchylné ke kriminalitě.

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