

**PREPRINT**

*Author-formatted, not peer-reviewed document posted on 26/01/2026*

DOI: <https://doi.org/10.3897/arphapreprints.e186201>

# **Wildlife at Risk: A Media-Based Analysis of Wildlife Poaching in Romania**

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# 1 **Wildlife at Risk: A Media-Based Analysis of Wildlife Poaching in Romania**

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## 7 **Abstract**

8 The conservation of endangered species is under growing threat from poaching, which has  
9 become more complex and widespread globally. In Romania, escalating human-wildlife conflicts  
10 and diminishing public support for wildlife are driving an increase in poaching. Moreover, the  
11 country lacks a centralized and official database to monitor and document poaching events. In  
12 this study, we aim to contribute to the understanding of poaching in Romania by (1) identifying  
13 the wildlife species most affected by poaching, exploring the incentives behind illegal hunting  
14 and fishing, and assessing the methods involved; (2) analyzing the spatial distribution of  
15 poaching to identify hotspots of illegal hunting and fishing; and (3) proposing practical and  
16 ethical strategies to mitigate and prevent poaching. We examined poaching incidents reported in  
17 Romania by national media between 2007 (following the country's accession to the European  
18 Union) and 2024. A series of statistical analyses, including Correspondence Analysis (CA), were  
19 conducted to explore patterns within the collected data. The findings indicate that ungulates and  
20 aquatic species are primary targets of poaching, largely driven by economic motivations  
21 associated with the trade in meat and other animal-derived products. In addition, protected  
22 species such as large carnivores are frequently targeted by poachers due to human-wildlife  
23 conflicts, especially those involving livestock predation and low levels of tolerance among local  
24 communities. The spatial analysis identifies key poaching hotspots requiring urgent intervention.  
25 This study provides a comprehensive overview of poaching in Romania, contributing to the  
26 development of a national anti-poaching strategy with policy-relevant recommendations for  
27 decision-makers.

28

## 29 **Keywords**

30 poaching, illegal hunting, illegal fishing, mass media, biodiversity, Romania

31

## 32 **1. Introduction**

33 Poaching creates a significant challenge in the conservation of endangered species (Chapron &  
34 Treves, 2016; Estes et al., 2011; Rizzolo et al., 2017) due to its growing complexity and global  
35 reach (Carter et al., 2017). Widespread poaching significantly contributes to the decline of  
36 species globally (Challender & MacMillan, 2014; Ghoddousi et al., 2017; Morton et al., 2021)  
37 damaging ecological interactions and the functionality of ecosystems (Estes et al., 2011).

38 Understanding the complexity of poaching is essential for developing effective conservation  
39 practices and strategies to address the social challenges it presents (Montgomery, 2020; Neagu &  
40 Rozyłowicz, 2025). Confronting poaching is difficult, as it is driven by diverse social, cultural,  
41 and economic incentives (Carter et al., 2017; Nellemann et al., 2014). Key drivers encompass  
42 poverty, the absence of alternative economic opportunities (Duffy et al., 2016; Hübschle, 2017;  
43 Lunstrum & Givá, 2020) and a widespread distrust of authorities (de Juan et al., 2022).  
44 Furthermore, local communities' lack of acceptance, along with fear, significantly contributes to  
45 the increase in illegal hunting incidence (Browne-Nuñez et al., 2015; Carter et al., 2017; Eliason,  
46 1999, 2020).

47 Romania hosts an impressive biodiversity, including a substantial number of protected species  
48 (Ioja et al., 2010; Stanciu et al., 2023). The conservation of habitats and species in Romania is  
49 achieved primarily under provisions of the EU Habitats and Birds Directives (Council of the  
50 European Communities, 1979; European Commission, 1992), which is mandatory after the  
51 country joined the European Union in 2007. Hunting and fishing are regulated in Romania by  
52 Law No. 407/2006 on Hunting and Game Protection and Law No. 176/2024 on fishing and the  
53 protection of living aquatic resources. These norms establish what is legally defined as poaching  
54 (Parliament of Romania, 2006, 2024a).

55 The increasing incidences of human-wildlife conflicts and the declining acceptance of wildlife  
56 are contributing to a rise in poaching within Romania (Salvatori et al., 2020; Successful Wildlife  
57 Crime Prosecution in Europe, 2022). Identifying and prosecuting poaching events is a complex  
58 procedure (Chapron & Treves, 2016; Kahler et al., 2013), requiring substantial resources  
59 (Challender & MacMillan, 2014) and advanced technologies (Kammaing et al., 2018). Presently,  
60 Romania lacks an official database for recording events of illegal hunting (Successful Wildlife  
61 Crime Prosecution in Europe, 2022). Furthermore, notwithstanding the significant ecological and  
62 social impacts (Cardoso et al., 2021), few national studies focus on poaching events. This is due

63 largely to a lack of data (Duffy et al., 2016), resulting in critical knowledge gaps and an  
64 underestimation of the poaching threats (Lavadinović et al., 2021).

65 Mass media plays an important role in communicating information with public about  
66 biodiversity conservation efforts (Maxwell et al., 2016; Morini et al., 2023; Toivonen et al.,  
67 2019) and in shaping perceptions of wildlife (MacFarlane & Rocha, 2020). When official data is  
68 deficient, mass media reports can become a useful resource for documenting poaching events.  
69 These reports are often used for data extraction in various studies focused on illegal hunting,  
70 such as those conducted by Datta (2022), Easter et al. (2023), Engelbrecht (2020), Morini et al.  
71 (2023), and Paudel et al. (2022).

72 In this study, we aim to contribute to improving the understanding of poaching in Romania by  
73 (1) identifying the wildlife species most affected by poaching, exploring the incentives behind  
74 illegal hunting and fishing, and assessing the methods involved; (2) analyzing the spatial  
75 distribution of poaching to identify hotspots of illegal hunting and fishing; and (3) proposing  
76 practical and ethical strategies to mitigate and prevent poaching.

77 This study offers significant insights into vulnerable species that need enhanced protection from  
78 illegal hunting and fishing practices. Additionally, it explores a seldom-discussed aspect of  
79 poaching: the incentives behind it (Lavadinović et al., 2021), which can vary based on various  
80 factors, such as species poached or standard of living (Janssen et al., 2024). Understanding these  
81 incentives is essential for addressing the root causes of environmental crimes (Duffy et al.,  
82 2016). Our findings can serve as a foundation for the development of a poaching mitigation  
83 strategy, providing useful insights for policymakers (Chapron & Treves, 2016).

84

## 85 **2. Methods**

86 To understand poaching events in Romania, we conducted a comprehensive analysis of mass  
87 media articles published between 2007 (following the country's accession to the European  
88 Union) and 2024, focusing on national and local online publications (Sakurai et al., 2013). Our  
89 analysis includes 58 local publications, ensuring that there was at least one publication from each  
90 county in Romania, as well as eight prominent national-level publications.

91 We used keywords “poaching”, “illegal hunting”, and “illegal fishing” (in Romanian language)  
92 to search for relevant articles. We only included articles that reported on events that occurred  
93 between 2007 and 2024. We found a total of 7,558 articles reporting poaching events. We further

94 reviewed article titles to exclude those that were unrelated to poaching, occurred outside of  
95 Romania, or fell outside the analyzed period. We also removed duplicate articles to ensure no  
96 poaching events were counted more than once.

97 After finalizing the filtering process, the database encompassed 1105 articles addressing  
98 poaching. For each event we recorded: (1) location and date of the event, (2) species involved,  
99 grouped in categories (*ungulates, large carnivores, other mammals, fish and other aquatic*  
100 *species, birds and unknown*), (3) type of poaching event reported (i.e., individuals apprehended  
101 while poaching, investigations conducted at allegedly poachers' residences or belongings,  
102 keeping a wild animal in captivity, or the use of unauthorized/rigged trap), (4) methods used by  
103 the poachers (such as rigged traps, shooting, hunting using edged or blunt weapons, fishing by  
104 various methods, poisoning) (Datta, 2022; Zisadza et al., 2025), (5) incentives behind the actions  
105 (Easter et al., 2023; Zisadza et al., 2025), as understood from the text of the article (such as  
106 commercialization of meat and animal-derived products, trophy hunting, self-defense, low  
107 tolerance), and (6) the final legal solution of the event. Data was grouped into categories and  
108 coded for statistical analyses.

109 Although the analysis covered 1105 media articles on poaching, the number of poaching events  
110 exceeded the number of reviewed articles. This is because some media articles reported multiple  
111 distinct poaching events, either involving species from different taxonomic groups (e.g., a hare  
112 and a chamois) or involving different methods or incentives. In such instances, each distinct  
113 event was counted in the database.

114 The analysis of poaching in Romania is still in its early stages, hindered by a lack of official data  
115 (Successful Wildlife Crime Prosecution in Europe, 2022). Our research is based on media  
116 coverage of poaching events, which may not fully represent reality due to underreporting or  
117 overreporting driven by a newsworthiness bias (Dempster et al., 2022; Paudel et al., 2022;  
118 Weidmann, 2015). Furthermore, updates on the resolution of these events are seldom made  
119 public (Velin et al., 2021), complicating our understanding of how authorities address and  
120 manage poaching.

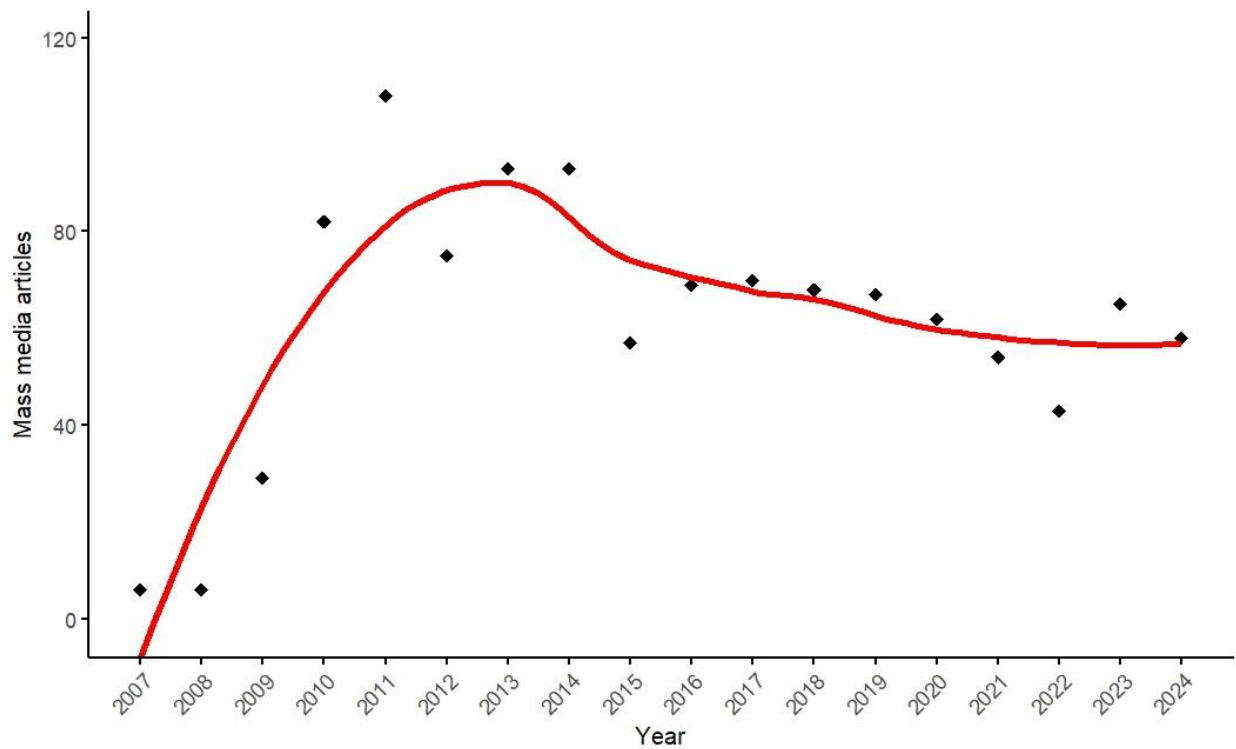
121 To visualize the time distribution of poaching events and the distribution of events by taxa, we  
122 utilized the ggplot2 R package (Wickham, 2016). We used the networkD3 R package to create a  
123 Sankey diagram illustrating the relationship between the methods used in poaching events and  
124 the species affected (Allaire et al., 2025).

125 To analyze the relationship between the variables statistically, we performed a Correspondence  
126 Analysis (CA) using the FactoMineR R package (Lê et al., 2008). Correspondence Analysis is a  
127 valuable tool commonly used in ecological studies (Greenacre, 2010a; van Dam et al., 2021) for  
128 effectively visualizing data association with data (Greenacre, 2010b). We examined two  
129 dimensions of the CA plot: one that compares poaching event typologies with the categories of  
130 species involved, and another that looks at the underlying incentives for poaching in relation to  
131 the targeted species. We analyzed the proximity of variables within the two dimensions of the  
132 plot, where shorter distances between variables indicate a stronger similarity (Greenacre, 2017).  
133 This method enabled us to identify patterns of poaching events based on the species categories.  
134 We also conducted a spatial analysis to identify regional hotspots of poaching across different  
135 species categories (Liang et al., 2023). The findings from the spatial analysis were illustrated  
136 using cartographic materials created in ArcGIS Pro 3.1.3 (Esri Inc.) by using vector data (i.e.,  
137 county boundaries), available on the website of the Romanian Government (Data.Gov.Ro, 2024).

138

### 139 **3. Results**

140 We identified 1105 mass media articles reporting poaching events from 2007 to 2024. Between  
141 2010 and 2014, there was a notable increase in the number of poaching-related articles, with a  
142 peak in 2011, which accounted for 108 articles (i.e., 9.77%) (Figure 1).



144

145 Figure 1 – Temporal distribution of poaching-related media articles in Romania (2007-2024).

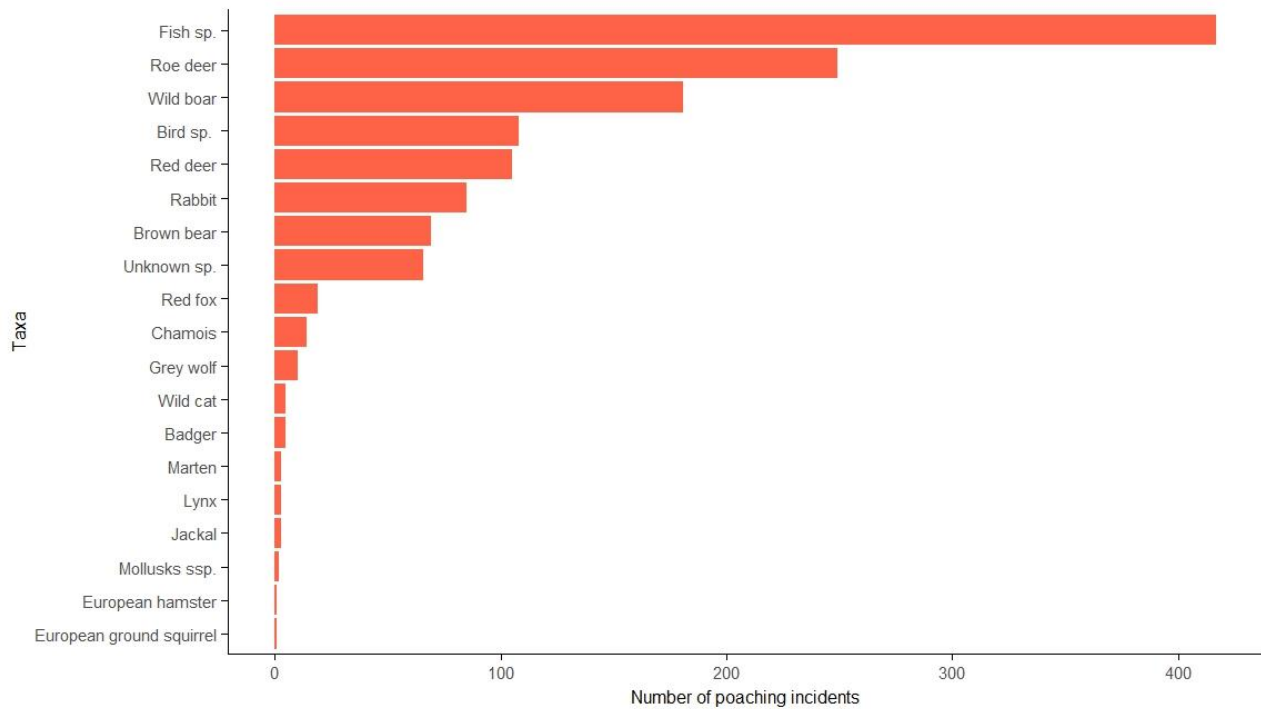
146

147 Ungulate species were the most frequently reported in poaching events, appearing in 461 articles  
 148 (i.e., 41.72%). The most reported poached species was the roe deer (*Capreolus capreolus*),  
 149 mentioned in 249 articles (i.e., 22.53%), followed by the wild boar (*Sus scrofa*), mentioned in  
 150 181 articles (i.e., 16.38%).

151 Fish and other aquatic species are the second most poached group, with 373 articles (i.e.,  
 152 33.76%) reporting poaching. Illegal fishing events often involve the Prussian carp (*Carassius*  
 153 *gibelio*), mentioned in 70 articles (i.e., 6.33%), followed by the sturgeon species in 43 articles  
 154 (i.e., 3.89%).

155 Mammals (excluding large carnivores and ungulates) were mentioned in 114 articles (i.e.,  
 156 10.32%) that reported poaching. The most poached species was the hare (*Lepus europaeus*),  
 157 recorded in 85 articles (i.e., 7.69%), followed by the red fox (*Vulpes vulpes*), which was recorded  
 158 in 19 articles (i.e., 1.72%). Bird species were the subject of 100 articles (i.e., 9.05%). The most  
 159 frequently mentioned species was the common pheasant (*Phasianus colchicus*), which was  
 160 featured in 39 articles (i.e., 3.53%).

161 Large carnivore species accounted for 78 articles reporting illegal hunting (i.e., 7.06%), with the  
 162 majority involving the brown bear (*Ursus arctos*) in 69 articles (i.e., 6.24%) and the gray wolf  
 163 (*Canis lupus*) in 10 articles (i.e., 0.90%). 66 articles on poaching (i.e., 5.97%) involved  
 164 unspecified taxa. In these articles, general terms such as "game," "animal," or "trophy" were  
 165 used. The frequency of each species mentioned in the articles about poaching is illustrated in  
 166 Figure 2.  
 167

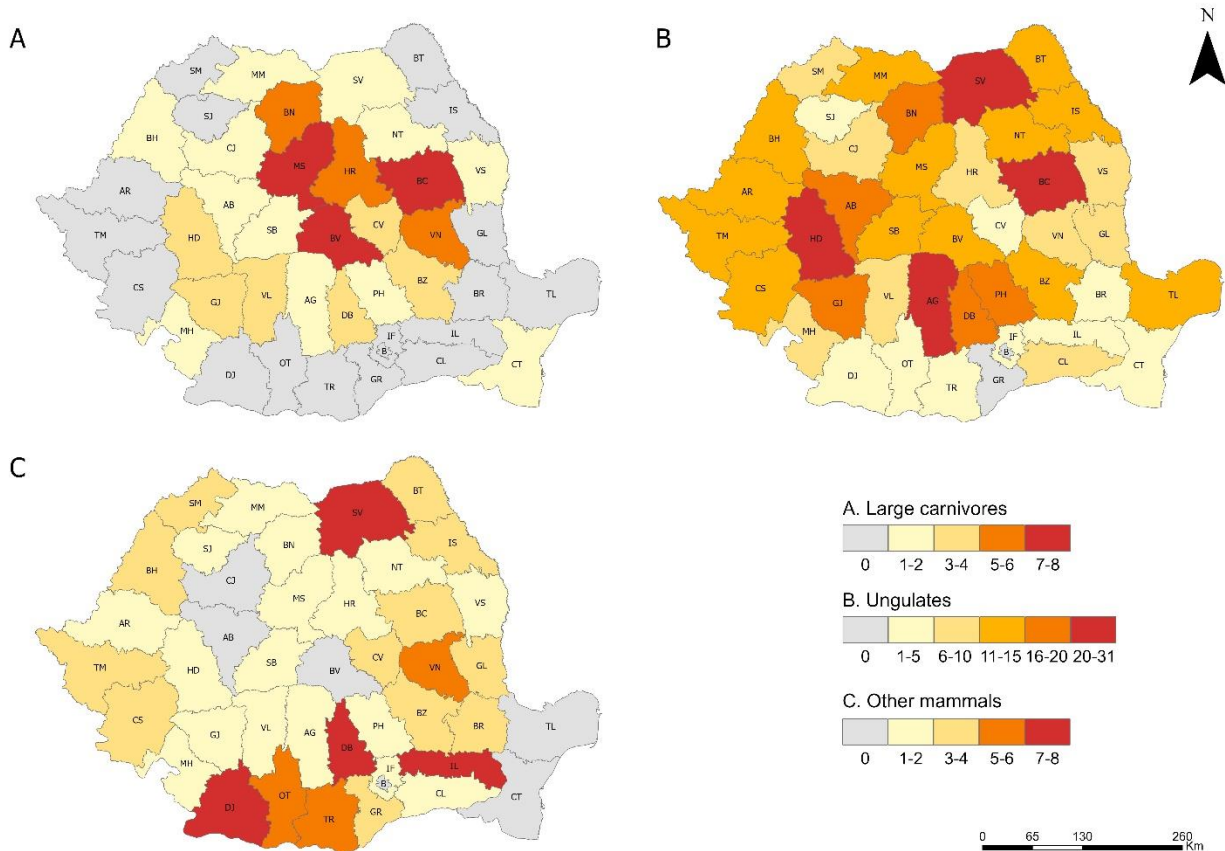


168  
 169 Figure 2 – Taxa reported in mass media articles addressing poaching events from 2007 to 2024 in  
 170 Romania.  
 171

172 In terms of spatial distribution, the highest number of events were reported in Tulcea County,  
 173 which overlaps the Danube Delta, with 103 articles (i.e., 9.32%), followed by Bacau County with  
 174 66 articles (i.e., 5.97%) and Hunedoara County with 43 articles (i.e., 3.89%). The lowest  
 175 percentages were reported in Bucharest (capital city), Ilfov, Giurgiu, and Covasna counties, with  
 176 each recording fewer than 1% of the total reviewed articles.

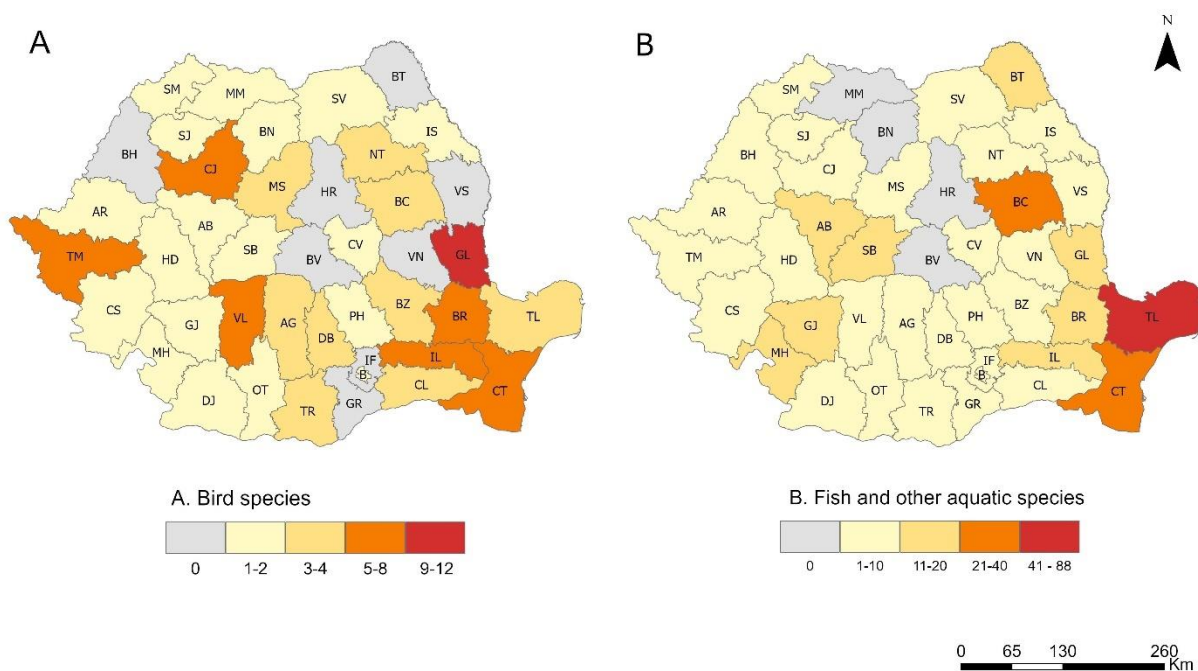
177 Bacau County reported the highest number of events involving ungulates, totaling 31 articles  
 178 (i.e., 6.72% of ungulate-related articles), followed by Hunedoara with 28 articles (i.e., 6.07%). In  
 179 the case of large carnivores, Mures County recorded eight articles (i.e., 10.26% of large

180 carnivore-related articles), while both Brasov and Bacau counties documented seven articles  
 181 each (i.e., 8.97%). Illegal hunting events involving other mammal species were also reported,  
 182 particularly in the southern and southeastern regions of Romania. The highest number of such  
 183 reports were recorded in Dolj and Dambovita counties (eight articles each, i.e., 7.02% of  
 184 mammal-related articles), followed by Ialomita and Suceava (seven articles each, i.e., 6.14%)  
 185 (Figure 3).



186  
 187 Figure 3 – Distribution of mammal poaching events in Romania, as reported by mass media  
 188 between 2007 and 2024 (A – large carnivores, B – ungulates, C - other mammals).

189  
 190 Illegal fishing was the most prevalent in Tulcea County, with 88 media articles addressing this  
 191 issue (i.e., 23.59% of illegal fishing-related articles). Bacau County recorded 22 articles (i.e.,  
 192 5.90%) and Constanta County 21 articles (i.e., 5.63%). For bird species, Galati County had the  
 193 highest number of events reported in the mass media, totaling 12 articles (i.e., 12% of bird-  
 194 related articles), followed by Braila with 8 articles (i.e., 8%) (Figure 4).

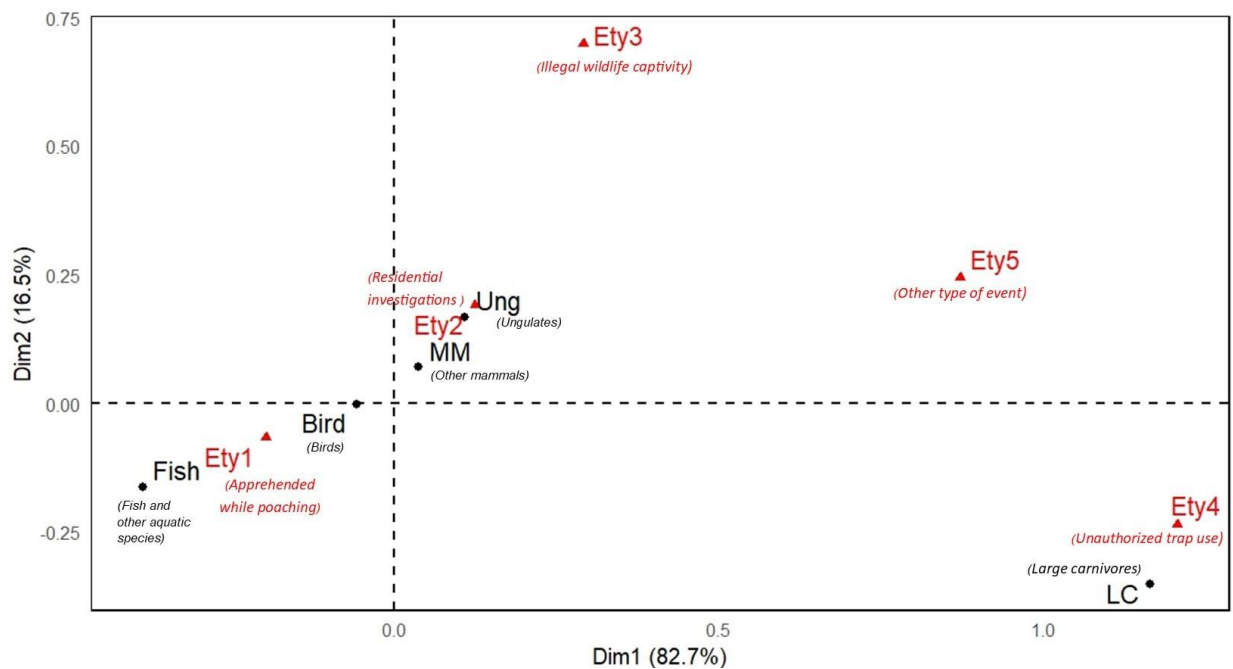


195  
 196 Figure 4 – Distribution of fish and other aquatic species and bird species poaching events in  
 197 Romania, as reported by mass media between 2007 and 2024 (A – bird species, B – fish and  
 198 other aquatic species).

199  
 200 We classified the poaching-related articles into five distinct event types, based on the nature of  
 201 the event reported. The most common type involved individuals apprehended while conducting  
 202 illegal hunting or fishing, reported by 787 articles (i.e., 71.22%), followed by residential  
 203 investigations conducted at the residences of suspected poachers in 215 articles (i.e., 19.46%).  
 204 The remaining 11.22% of events involved the use of unauthorized/rigged traps (88 articles, i.e.,  
 205 7.96%), unauthorized captivity of protected wildlife species (28 articles, i.e., 2.53%), and other  
 206 types of events (eight articles, i.e., 0.72%).

207 The Correspondence Analysis used to explore the relationship between the species categories and  
 208 poaching event types explains 99.2% of the data variance (Dimension 1: 82.7%, Dimension 2:  
 209 16.5%) (Figure 5). Dimension 1 reveals a strong association between large carnivore species and  
 210 poaching events that involve the use of unauthorized/rigged traps (Ety4). Conversely, Ety1 (i.e.,  
 211 individuals apprehended while conducting unauthorized hunting or fishing) aligns closely with  
 212 fish and other aquatic species (Fish) and bird species (Bird). Ety2 (Residential investigations

213 conducted at the residences of suspected poachers) positions itself centrally, near other mammal  
 214 species (MM) and ungulate species (Ung).

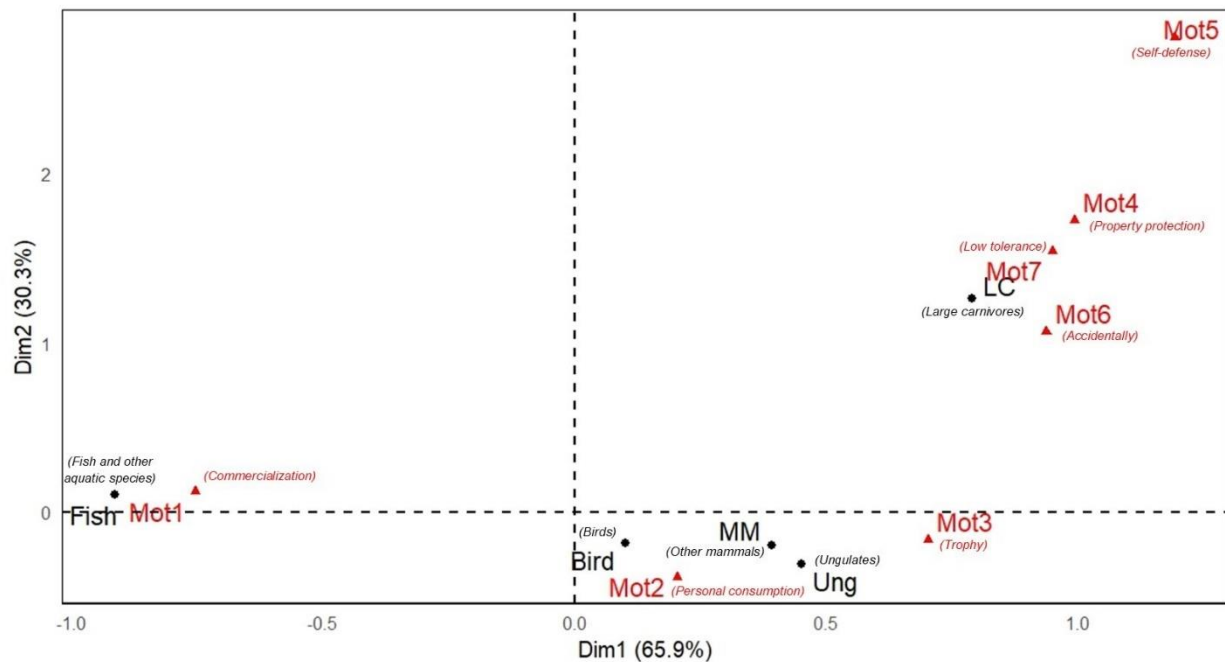


215  
 216 Figure 5 – Correspondence Analysis plot showing the relationship among species categories  
 217 (black dots) and poaching event types (red triangles). Ety1 - Individuals apprehended while  
 218 conducting unauthorized hunting or fishing; Ety2 - Residential investigations conducted at the  
 219 homes of suspected poachers; Ety3 - Unauthorized captivity of protected wildlife species; Ety4 -  
 220 Use of unauthorized/rigged traps; Ety5 - Other type of event.

221  
 222 In 650 (i.e., 58.82%) of the media articles analyzed, the incentives behind poaching were unclear  
 223 and were therefore categorized as *unknown*. The other 455 (i.e., 41.18%) of articles, for which at  
 224 least one incentive was identified, were grouped into seven categories. The primary incentive  
 225 included the commercialization of meat and animal-derived products, noted in 212 media articles  
 226 (i.e., 19.19%), the individual use of meat and animal-derived products, present in 137 articles  
 227 (i.e., 12.40%), and trophy hunting, which appeared in 131 articles (i.e., 11.86%).

228 We also conducted a Correspondence Analysis (Figure 6) to explore the relationship between  
 229 species categories and the underlying incentives behind poaching events (Mot 1 – Mot 7). The  
 230 analysis revealed that the two dimensions explain 96.2% of the variance, with Dimension 1  
 231 accounting for 65.9% and Dimension 2 accounting for 30.3%. On the right side of Dimension 1,

232 Mot 4 (protection of property, livestock, and crops), Mot 5 (self-defense), Mot 6 (accidents or  
 233 species misidentification claimed by the accused poacher), and Mot 7 (low tolerance toward the  
 234 species) are tightly grouped around large carnivores (LC). In contrast, Mot 1 (commercialization  
 235 of meat and animal-derived products), positioned on the left side, is closely aligned with fish and  
 236 other aquatic species categories (Fish). Mot 2 (individual use of meat and animal-derived  
 237 products) and Mot 3 (trophy hunt) are more common for birds, ungulates, and other mammal  
 238 categories.



239 Figure 6 - Correspondence Analysis plot showing the relationship between species categories  
 240 (black dots) and poaching incentives (red triangles). Mot 1 - commercialization of meat and  
 241 animal-derived products; Mot 2 - individual use of meat and animal-derived products; Mot 3 –  
 242 trophy hunt; Mot 4 - protection of property, livestock, and crops; Mot 5 – self-defense; Mot 6 -  
 243 accidents or species misidentification claimed by the accused poacher; Mot 7 – low tolerance  
 244 toward the species.  
 245

246 We evaluated the methods employed by poachers, categorizing them into 12 distinct groups  
 247 (Table 1). Of these groups, ten methods were applied to terrestrial mammal and bird species, one  
 248 was related to fish and other aquatic species, and one category included articles where the  
 249

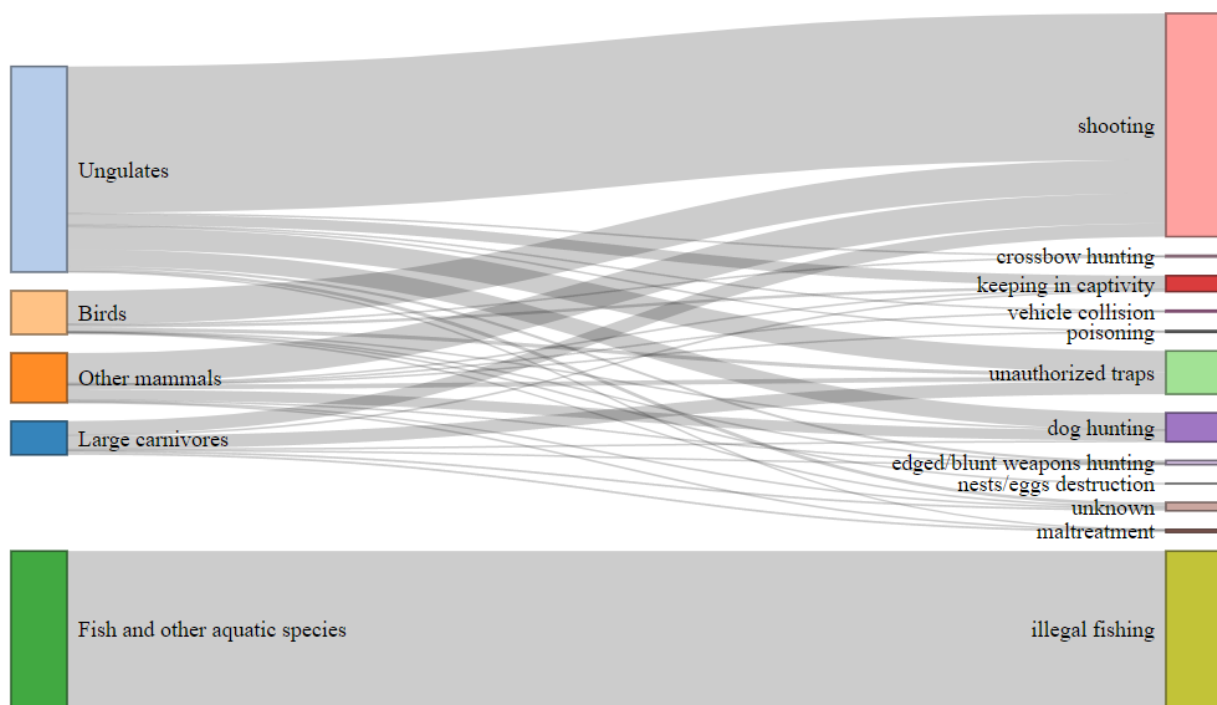
250 methods used were unclear (Table 1, Figure 7). Several articles described multiple methods (e.g.,  
 251 the use of rigged traps alongside shooting).

252

253 Table 1 – Methods used in poaching events as reported by Romanian mass media (2007-2024).

Method	Number of articles	%
Shooting	497	44.98
Illegal fishing	373	33.76
Use of unauthorized/rigged traps	104	9.41
Hunting with dogs	78	7.06
Capturing and keeping in captivity	36	3.26
Unknown method	28	2.53
Hunting with edged or blunt weapons (e.g., knives, axes, clubs)	10	0.90
Maltreatment of the animal	7	0.63
Hunting with a crossbow	5	0.45
Intentional collision involving a motor vehicle	4	0.36
Poisoning	4	0.36
Intentional destruction of nests or eggs	1	0.09

254



255

256 Figure 7 – Sankey diagram illustrating the types of methods used in poaching by species  
 257 categories.

258 **4. Discussion**

259 In Romania, poachers primarily target ungulate and fish species due to the value of their meat  
 260 and derived products (Gandiwa et al., 2013; Zhang et al., 2008; Zisadza et al., 2025). Protected  
 261 species, such as large carnivores, are also illegally hunted, mainly for trophies, and due to the  
 262 low tolerance within local communities (Pop, 2019; Pop et al., 2025).

263 Ungulate species are the most frequently involved in poaching events in Romania, particularly  
 264 the roe deer (*Capreolus capreolus*) and wild boar (*Sus scrofa*). These species are mainly targeted  
 265 for trophy hunting and bushmeat (Gandiwa et al., 2013; Hoffman & Cawthorn, 2012; Zisadza et  
 266 al., 2025). The highest rate of poaching for ungulate species occurs during the cold months  
 267 (January–March; October–December), primarily due to the reduced agricultural activity, which  
 268 represents a significant source of food and income for local communities. Poaching events  
 269 involving ungulate species are also incentivized by the desire for trophies. A concerning issue  
 270 regarding trophy hunting is that poachers typically target larger specimens, which are deemed  
 271 more valuable (Milner et al., 2007; Palazy et al., 2012).

272 Ungulate species can turn out to be problematic due to overpopulation and crop damage (Carpio  
 273 et al., 2021) which leads to reduced acceptance among local communities (Kansky et al., 2014).  
 274 However, excessive hunting of these species disrupts the ecosystems, particularly by impacting  
 275 predator populations due to a reduction in their food sources (Carbone et al., 2011; Ghoddousi et  
 276 al., 2017; Kachel et al., 2017). Moreover, this can force large carnivore species seeking  
 277 alternative food sources that are easier to obtain, such as livestock, generating human-large  
 278 carnivore conflicts (Khorozyan et al., 2015; Soofi et al., 2019).

279 The brown bear (*Ursus arctos*) was the primary target of poachers among large carnivores, with  
 280 69 reported events, far surpassing the combined total of the other three species: the gray wolf  
 281 (*Canis lupus*), the Eurasian lynx (*Lynx lynx*), and the jackal (*Canis aureus*). In Romania,  
 282 although brown bears are a strictly protected species (Government of Romania, 2007), a yearly  
 283 harvesting quota of 426 individuals has been established for 2024 and 2025 for population  
 284 management. An additional 55 permits are reserved for off-quota hunting when bears pose a  
 285 direct threat to human safety or damage property (Parliament of Romania, 2024b; Pop et al.,  
 286 2025). Despite these regulations, brown bear management remains inadequate, failing to promote  
 287 coexistence (Neagu & Rozyłowicz, 2025) and leading to instances of poaching.

288 Since the large carnivores are socially controversial (Chapron et al., 2014) due to an increase in  
289 conflicts in Romania (Hartel et al., 2019; Neagu et al., 2022; Pătru-Stupariu et al., 2020),  
290 poachers often resort to setting up rigged traps, such as snares, to entrap individuals that venture  
291 close to human settlements (Becker et al., 2024; Pop, 2019). Using such unethical methods may  
292 also endanger other species entrapped and not targeted (Masolele, 2018). Furthermore, out of the  
293 seven articles reporting poaching events that involved animal maltreatment, four involved brown  
294 bear cubs, and one involved a lynx kitten, highlighting the declining human acceptance of these  
295 species.

296 The hare (*Lepus europaeus*) is the most frequently mentioned species from the *other mammals*  
297 category. Poachers hunt it particularly for its meat and often for commercial purposes. The most  
298 used methods are shooting and hunting with trained dogs, a technique long utilized by the  
299 nobility for harvesting hares (Pedersen et al., 2024). Although the hare is not listed as a protected  
300 species, its population may decline due to poaching, intensive agricultural use, and harmful  
301 practices, like stubble burning during the breeding period (Dhami et al., 2023; Smith et al.,  
302 2005). These factors also negatively affect other species, including the European hamster  
303 (*Cricetus cricetus*), the European ground squirrel (*Spermophilus citellus*), and various bird  
304 species. These species serve as primary prey for mesopredators such as the red fox (*Vulpes*  
305 *vulpes*) or the golden jackal (*Canis aureus*) (Lanszki et al., 2006; Lloveras et al., 2012);  
306 therefore, the hare's overexploitation can disrupt predator population dynamics (Lindström et al.,  
307 1994; Panek, 2013).

308 The southeastern region of Romania reported the highest concentration of bird poaching events,  
309 particularly in Galati, Braila, Tulcea, Constanta, and Ialomita counties, which collectively  
310 account for one-third of all avian poaching events. Galati County alone recorded the most events.  
311 This concentration correlates with the region's rich wetland ecosystems, including numerous  
312 lakes, Natura 2000 Special Protection Areas (SPAs), and Ramsar sites such as the Small Wetland  
313 of Braila. This region encompasses the Danube Delta, a UNESCO Biosphere Reserve and  
314 Ramsar site (Council of Europe, 2000), and is traversed by the Via Pontica migration corridor, a  
315 critical stopover for numerous strictly protected migratory bird species (LIFE Safe Grid for  
316 Burgas, 2025). The abundance and diversity of bird species in these internationally recognized  
317 protected areas make them attractive targets for poachers (Bairlein, 2016; Vickery et al., 2014).

318 The common pheasant (*Phasianus colchicus*) was the most frequently reported poached bird  
 319 species. This alien gamebird was introduced for hunting due to the high value of its meat (Gao et  
 320 al., 2024; He et al., 2021; Societatea Ornitologica Romana, 2025) and is currently subject to  
 321 regulated hunting in Romania, with seasonal restrictions (Parliament of Romania, 2006).  
 322 Furthermore, 24 articles documented poaching of strictly protected species for which hunting is  
 323 prohibited throughout the year, including the mute swan (*Cygnus olor*), red-breasted goose  
 324 (*Branta ruficollis*), red-footed falcon (*Falco vespertinus*), and hawk species (*Accipiter* spp.).  
 325 Poaching incentives differed substantially across species groups. While most gamebird and  
 326 waterfowl poaching was economically incentivized (e.g., driven by meat consumption or trade),  
 327 raptor persecution stemmed primarily from human-wildlife conflict. Low tolerance for these  
 328 predators, which prey on domestic poultry and trigger economic losses, was the primary driver of  
 329 illegal killings. In contrast, songbirds, including the song thrush (*Turdus philomelos*), starling  
 330 (*Sturnus vulgaris*), and skylark (*Alauda arvensis*), were captured using rigged traps for the pet  
 331 trade (de Oliveira et al., 2020; Nijman et al., 2018).

332 Among fish and other aquatic species, the common carp (*Cyprinus carpio*) was the most  
 333 frequently poached, typically harvested in large quantities using prohibited monofilament nets  
 334 that exceeded the recreational fishing limit of 5 kg per day (Parliament of Romania, 2024). As  
 335 indicated by the correspondence analysis, illegal fishing was predominantly driven by economic  
 336 incentives, with commercial-scale operations using banned equipment such as monofilament  
 337 nets.

338 Forty-three media articles documented sturgeon poaching, a particularly concerning trend given  
 339 that all sturgeon species are strictly protected under international agreements, including the Bern  
 340 Convention (Council of Europe, 1979) and CITES (CITES, 1973). The Danube River hosts the  
 341 last remaining functional populations of beluga (*Huso huso*), Russian sturgeon (*Acipenser*  
 342 *gueldenstaedtii*), and stellate sturgeon (*Acipenser stellatus*) (Ludwig et al., 2023). Nearly half of  
 343 the reported sturgeon poaching events occurred in Tulcea County, which encompasses the  
 344 UNESCO-designated Danube Delta Biosphere Reserve. Economic incentives dominated these  
 345 events, driven by a high market demand for sturgeon meat and caviar (Congiu et al., 2023;  
 346 WWF-CEE, 2024). This illegal but lucrative occupation may be fueled by limited local economic  
 347 opportunities and resistance to conservation regulations imposed within the protected area  
 348 (Teodorescu & van den Kommer, 2020).

349 Addressing poaching requires a multidisciplinary approach, as existing laws are often  
350 inadequately enforced (Challender & MacMillan, 2014; Fukushima et al., 2021; Gandiwa et al.,  
351 2013). Furthermore, there are several knowledge gaps due to the difficulty of monitoring and  
352 documenting poaching events (Cardoso et al., 2021; Fukushima et al., 2021).

353 Most mass media articles offer limited information regarding the resolution of events, often  
354 lacking any follow-up. In 84.16% of events, it was only reported that the equipment used in  
355 poaching, as well as the game or fish involved, was confiscated, and that a criminal case would  
356 be opened.

357 The enforcement of existing legislation, particularly in protected areas, is often emphasized for  
358 reducing poaching events (Critchlow et al., 2017; Plumptre et al., 2014). Although it is proven  
359 that law enforcement in protected areas is not enough` to protect wildlife (Hilborn et al., 2006),  
360 many studies indicate that the population size of various species is larger in protected areas,  
361 compared to those without such protection, due to the existing restrictions and regulations  
362 (Geldmann et al., 2013; Kachel et al., 2017). For example, Hegerl et al. (2017) conducted a study  
363 comparing two protected areas that had similar ecological characteristics but different protection  
364 regimes: a national park and a forest reserve. The results indicated that the national park, which  
365 had stricter regulations and more resources, had a considerably greater abundance of mammal  
366 populations compared to the forest reserve.

367 Periodic anti-poaching patrols conducted by rangers in protected areas demonstrated a reduction  
368 in poaching events (Flesher & Laufer, 2013; Moore et al., 2021). Increasing the number of  
369 rangers in Romania's protected areas could enhance anti-poaching patrol efforts (Appleton et al.,  
370 2022). In the town of Baile Tusnad (Harghita county, Romania), local authorities, with the  
371 support of the community, have established properly equipped intervention teams to respond  
372 when brown bears enter the city (Papp et al., 2023). Similar anti-poaching teams could be formed  
373 to monitor regions affected by poaching by identifying potential individuals and rigged traps,  
374 which are often used for the illegal capture of animals in Romania (Pop, 2019).

375 The rise in poaching events has necessitated the development of various technologies to identify  
376 and combat this issue (Bondi et al., 2018). One method for detecting poaching events is the use  
377 of trap cameras, which are increasingly utilized in wildlife monitoring (Green et al., 2023), as  
378 they provide a non-invasive approach (O'Connell et al., 2011). Analyzing and processing video  
379 footage requires a considerable amount of time (Glover-Kapfer et al., 2019; Young et al., 2018),

380 which may lead to some relevant sequences being overlooked (Green et al., 2023; Scotson et al.,  
381 2017). To address this issue, some researchers have turned to public engagement by  
382 implementing citizen science projects (Green et al., 2023; Meek & Zimmermann, 2016), such as  
383 the eBird project (Callaghan & Gawlik, 2015; Sullivan et al., 2014). Implementing such projects  
384 in Romania may assist in identifying poaching events (Pernat et al., 2024) by tracking trends in  
385 population distribution and pinpointing possible hotspots of decline (Cornell Lab of Ornithology,  
386 2025; Horns et al., 2018), potentially due to poaching. Furthermore, engaging volunteers in the  
387 field may deter poachers and encourage greater community engagement (Peterson et al., 2025).  
388 Due to the increasing prevalence of artificial intelligence (AI), various techniques have been  
389 studied for their effectiveness in detecting poaching events (Di Minin et al., 2018; Xu et al.,  
390 2019). For example, Xu et al. (2019) employed a machine learning algorithm to analyze texts  
391 shared on social media related to ivory or pangolin trafficking, which led to the identification of  
392 53 suspicious media posts. Although investigating social media posts to detect poaching events  
393 may be a useful tool, doing so manually is time-consuming; however, machine learning  
394 algorithms can significantly enhance the effectiveness of this process (Di Minin et al., 2018;  
395 Kulkarni & Di Minin, 2023; Lynam et al., 2025). In Romania, several poaching events have been  
396 discovered following public complaints about various media posts that showcased animals being  
397 tortured or hunted illegally. Thus, a specialized AI tool scanning public social media platforms in  
398 Romania may identify other possible events of poaching in the future.

399 While enforcing anti-poaching actions remains essential, it is equally important to develop  
400 strategies that enhance the tolerance of local communities and promote coexistence (Cooney et  
401 al., 2017). This presents a challenge for conservationists and authorities, as they must balance the  
402 needs of local communities and the affected species (Savage et al., 2010). Therefore,  
403 collaboration among stakeholders is essential for preventing conflicts that could lead to increased  
404 poaching events (Moshier et al., 2019).

405 Although local communities' involvement in the decision-making process is uncommon in  
406 Romania (Manolache et al., 2018; Nita et al., 2018, 2022), such initiatives may assist in reducing  
407 the acceptance of poaching and foster new economic opportunities (Biggs et al., 2017; Cooney et  
408 al., 2017; Di Minin et al., 2022). Preventive strategies should not only focus on developing  
409 actions against poaching, but also on addressing the socio-economic needs of individuals driven  
410 to poach, which is often overlooked (Challender & MacMillan, 2014; Duffy et al., 2016).

411 Authorities must look beyond the legal aspects of poaching, which frequently contribute to the  
412 negative portrayal of poachers, and tackle the underlying socio-economic drivers, such as  
413 poverty and lack of economic alternatives (de Jong & Butt, 2023; Massé, 2019). These issues can  
414 be addressed by creating viable livelihood opportunities, such as jobs linked to local wildlife  
415 management or ecotourism (e.g., birdwatching, guided tours, aquaculture) (Battista et al., 2018;  
416 Teodorescu & van den Kommer, 2020) or even providing financial support or community  
417 benefits. This is especially important in areas with limited economic diversity, such as fishing  
418 communities, where people resort to poaching to sell the meat and derived products.

419

## 420 **Conclusions**

421 Our findings indicate that the high demand for bushmeat, animal-derived products, and trophies  
422 on the black market remains the primary driver of poaching events in Romania. This is available  
423 particularly in the case of ungulate and fish species, which are among the most sought-after by  
424 poachers due to their commercial value (Gandiwa et al., 2013; Zhang et al., 2008). Furthermore,  
425 the results emphasize the broader challenges facing Romanian wildlife, namely the low tolerance  
426 level towards large carnivores, which are often involved in conflicts (Neagu et al., 2022; Pătru-  
427 Stupariu et al., 2020). This issue also extends to other taxa, such as ungulates, that are frequently  
428 associated with agricultural damage (Linnell et al., 2020) or predatory birds that are perceived as  
429 threats to poultry.

430 Understanding these incentives is essential for addressing the root causes of the problem  
431 (Montgomery, 2020). With this knowledge, authorities can develop targeted prevention and  
432 intervention strategies that are tailored to specific incentives (e.g., trophy hunting versus  
433 subsistence hunting) to develop appropriate responses and reduce the likelihood of future events  
434 (Bergseth et al., 2017; Duffy et al., 2016; Kühl et al., 2009).

435 Our study also highlights regions where poaching must be managed more carefully by  
436 authorities. For instance, in the case of large carnivores, most poaching events were reported in  
437 the central and eastern Carpathians, which are known for a high density of carnivores (Pop et al.,  
438 2018; Popescu et al., 2017). On the other hand, the Danube Delta continues to attract poachers  
439 targeting protected bird and fish species, endangering their conservation (Bairlein, 2016; Vickery  
440 et al., 2014). Furthermore, this highlights the issue of residents resorting to illegal activities due

441 to the lack of economic alternatives in the area (Successful Wildlife Crime Prosecution in  
 442 Europe, 2022).  
 443 The inadequate enforcement of existing laws (Challender & MacMillan, 2014; Fukushima et al.,  
 444 2021; Gandiwa et al., 2013), along with limited resources for expanding the workforce dedicated  
 445 to anti-poaching efforts, such as anti-poaching patrols (Moore et al., 2018), and insufficient  
 446 funding for innovative monitoring technologies (e.g., drone and AI-based systems), significantly  
 447 hinders the prevention of poaching events (Challender & MacMillan, 2014). These challenges  
 448 are further exacerbated by the deficiency of credible official data and the absence of evidence-  
 449 based strategies (Lavadinović et al., 2021), which undermines conservation efforts and  
 450 intensifies poaching pressure on Romania's wildlife, thereby contributing to biodiversity loss.  
 451 While this research has several limitations due to its reliance on media-based analysis, it  
 452 nevertheless provides an important foundation for future studies on poaching in Romania.  
 453 Collectively, this work can assist authorities in building evidence-based anti-poaching strategies  
 454 and intervention protocols to reduce the poaching incidence in Romania.

455

#### 456 **Acknowledgments**

457 This work was supported by a grant from the Romanian Ministry of Education and Research,  
 458 CNCS-UEFISCDI, project number PN-IV-P1-PCE-2023-1119 (Harmonia), within PNCDI IV.

459

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