BALKAN VULTURES POISON STUDY

Review of the problem of poison use
and vulture poisoning in the Balkan Peninsula

BALKAN
ANTI-POISONING
PROJECT

BALKAN ANTI-POISONING PROJECT

BALKAN VULTURES POISON STUDY

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MAVA FONDATION POUR LA NATURE

VCF VULTURE CONSERVATION FOUNDATION

ΔΟΣ ΔΕΛΑΝΙΑΝ ΟΡΝΙΘΟΛΟΓΙΚΑΛ ΣΟΣΙΕΤΥ

PPNEA Protection and Preservation of Natural Environment in Albania

NAŠE PTICE

ФДФФ FWFF

GREEN BALKANS greenbalkans.org

Bulgarian Society for the Protection of Birds

BIRDS OF PREY CONSERVATION SOCIETY

BIOM UDRUGA / ASSOCIATION

Ορνιθολογική HELLENIC ORNITHOLOGICAL SOCIETY

WWF® ΕΛΛΑΣ

МАКЕДОНСКО ЕКОЛОШКО ДРУШТВО

Museum Macedonicum Scientiarum Naturalium

aquila nature conservation association

DRUŠTVO ZA ZAŠTITU I PROUČAVANJE PTICA SRBIJE

INSTITUTE FOR NATURE CONSERVATION OF SERBIA

ЗАВОД ЗА ЗАШТИТУ ПРИРОДЕ СРБИЈЕ

The Balkan Vulture Poison Study was prepared by the Vulture Conservation Foundation (VCF) within the framework of the Balkan Anti-Poisoning Project (BAPP), an integral part of the Mediterranean Anti-Poisoning Project – MAPP (Fighting poisoning – reducing vulture (and other scavengers and predators) mortality due to the use of poison baits and lead ammunition across the Mediterranean), funded by the MAVA Foundation and coordinated by VCF. This study is purposed to serve as a regional anti-poisoning technical protocol, corresponding to Activity 1.6 of the MAPP project, and to facilitate the creation of national Anti-Poison Road Maps in the Balkan countries.

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Geographical scope:

This study reflects on the illegal practice of using poisonous substances in the environment and vulture mortality induced by it in the following countries of the Balkan Peninsula: Albania, Bosnia and Hercegovina, Bulgaria, Croatia, Greece, Macedonia (FYR) and Serbia, as well as different challenges related to prevention of wildlife poisoning that exist in these countries.

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Acronyms and abbreviations

BAPP	Balkan Anti-poisoning Project
BPCS "Grifon"	Birds of Prey Conservation Society
BPSSS	Bird Protection and Study Society of Serbia
BPPS	Birds of Prey Protection Society
BSPB	Bulgarian Society for Protection of Birds
BVAP	Balkan Vulture Action Plan
CMS	Convention on Migratory Species
DDT	Dichloro-diphenyl-trichloroethane
FWFF	Fund for Wild Flora and Fauna
HOS	Hellenic Ornithological Society
MAPP	Mediterranean Anti-Poisoning Project
MES	Macedonian Ecological Society
NGO(s)	Non-Governmental Organization(s)
PCB	Polychlorinated Biphenyls
SOP	Standard Operational Procedures
VCF	Vulture Conservation Foundation
Vulture MsAP	Vulture Multi-species Action Plan
WWF	World Wide Fund for Nature

1. Introduction

Poison is the single most important threat to vultures in the Balkans, and has contributed to the regional extinction or severe depletion of all the species in the region. VCF has been working for more than a decade in the region, in close collaboration with conservation NGOs from each country, and has acquired practical experience in vulture conservation through the implementation of the Balkan Vulture Action Plan (BVAP) and knowledge of the poisoning issues there.

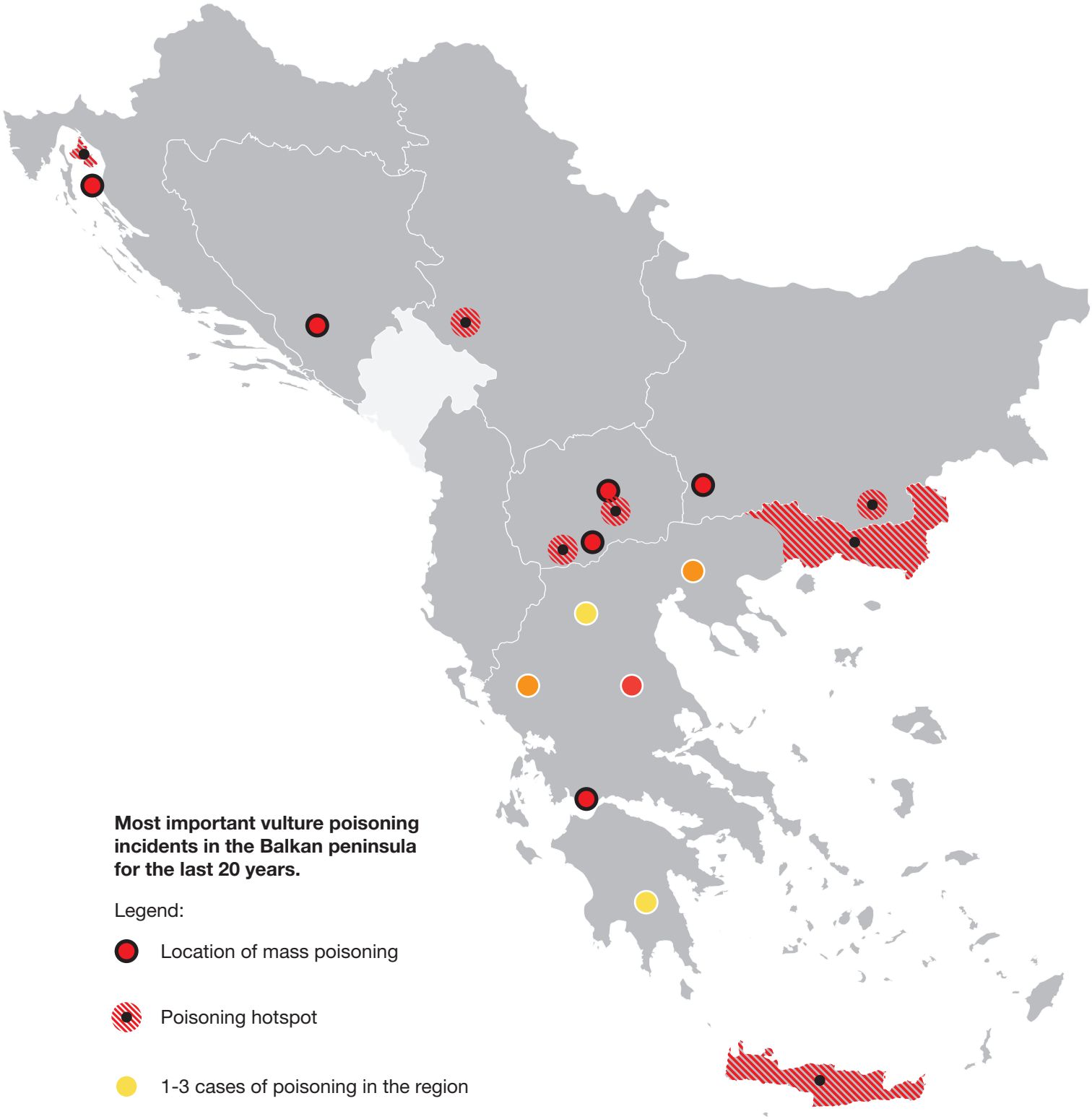
The vulture populations of the Balkan Peninsula and surrounding regions reached a critical conservation status at the end of the 20th and beginning of the 21st century mainly because of the use of poisonous substances in the environment, despite several valiant attempts to save and protect the last remaining populations. Of the four species, the Bearded Vulture (*Gypaetus barbatus*) and Black Vulture (*Aegypius monachus*) are now on the edge of regional extinction, with the first one virtually gone from the Balkan Peninsula. The last population of Bearded Vultures in the region, on Crete (Greece), numbers around 6 breeding pairs and the Black Vultures in Dadia-Lefkimi-Soufli Forest National Park, NE Greece, 21-35 pairs (Andevski 2013). The number of Egyptian Vultures (*Neophron percnopterus*) has declined by more than 50 % in the last ten years, and continues to decline. This species is still present in Bulgaria, Macedonia (FYR), Greece and Albania, totaling around 70 breeding pairs (Valevski et al. 2015). The population of Griffon Vulture (*Gyps fulvus*) has also been depleted and the species has disappeared from many countries (Albania, Bosnia & Herzegovina and Montenegro), whilst in the rest, isolated and small populations are highly threatened (continental Greece and Macedonia). Strong populations are present in Serbia, numbering up to 200 breeding pairs, and about 90 pairs in Croatia, while the populations in Bulgaria and Crete are showing signs of increase in the last years. An estimated total for this species in the region is up to 700 pairs.

During the 50s and 60s, and in some of the countries until the 90s, poisoning was a legal practice sponsored and carried out by governmental authorities in order to control populations of wild predators. These were dark decades for wildlife and especially for vulture species, not only in the Balkan countries but also across the Mediterranean. The use of poison for poisoning wildlife become illegal by the end of the 80s or the beginning of the 90s (depending of the individual country) with the ratification of the Bern Convention banning this practice.

At present this practice is illegal in Europe, including the Balkans, but it is still in use by local people as a quick and affordable “solution” for resolving the conflicts with predators and other wildlife. The main driver for such an intensive use of the poison is the conflict between livestock breeders and mammalian predators, mainly wolves. Also an important driver for the use of poisons is the conflict between hunters and predators, predominantly jackals and foxes, but also feral dogs, in commercial hunting areas (Andevski 2013). Another common driver, depending on the country, is also the local disputes between land users. Its widespread use has also been facilitated by the poor enforcement of the legislation, the black market of banned pesticides and the relative free availability of poisoning substances on the markets.

This study provides an overview of the situation with the use of poisonous substances in the environment and its effects on vulture populations and wildlife in general in each of the Balkan countries. Its objective is to collect and analyze the data from the Balkan region and identify regional aspects of the poisoning problem, but also recognize the particularities in each country and propose general actions.

Wildlife poisoning is a serious problem, which needs to be investigated in detail and conservation actions need to be carefully planned and implemented in order to achieve desirable results. For e.g., Spain is the European country with the biggest experience in combating wildlife poisoning incidents (more than 20 years of hard work in this field). During the last two decades of anti-poisoning work in Spain, a lot of achievements were met, but it was also concluded that the use of poison can only be reduced and controlled up to a certain level, but will probably never disappear entirely. It is therefore important to continue with the efforts to fight against poison use on different levels.



Most important vulture poisoning incidents in the Balkan peninsula for the last 20 years.

Legend:

- Location of mass poisoning
- Poisoning hotspot
- 1-3 cases of poisoning in the region
- 4-6 cases of poisoning in the region
- 7 or more cases of poisoning in the region

2. Approach and Methodology

For the preparation of this study a simple but informative questionnaire was prepared, requesting information regarding: historical data about poisoning incidents, number of poisoning cases recorded during the last 15 years, current situation in the country, relevant legislation and proposal for future anti-poison actions. The questionnaire was distributed among the national entities working on vulture conservation in the region, most of which participated in the development of the BVAP (collaborating with the VCF for many years), as well as relevant organizations active in the field of bird conservation. Seven questionnaires were distributed (one for each country involved), with a total of 15 organizations contributing with relevant information.

The information integrated in this study was also collected within the first phase of the Balkan Anti-Poison Project (BAPP) in 2018, during which National Anti-Poison Working Groups were established in Albania, Bosnia & Hercegovina, Croatia and FYR Macedonia, comprising of relevant governmental authorities and nature conservation NGOs, with a mandate to draft the National Anti-Poison Road maps. Meetings of these relevant national stakeholders were organized in each project country during the initial phase of the BAPP, except in Greece, for which there is already an established Anti-poison Task Force and a developed national anti-poisoning strategy (Table 1). During the course of the meetings a thorough gap analysis of the current situation with illegal use of poisonous substances in the environment was conducted and priority actions for each country defined. Results of these meetings enabled us to prioritize future conservation efforts needed and were used as a baseline for developing the National Anti-Poison Road maps. The majority of the data compiled for these strategic documents was incorporated in this study. After receiving the information, the same was edited and structured within this document.

Bulgaria and Serbia are officially not involved in the BAPP and financed by the Mava Foundation and the information from these countries, which was integrated in this study, was collected mainly through conduction of several other conservation projects. The data from Bulgaria was compiled during the implementation of Action A5 from the Life Project "Bright Future for Black Vulture in Bulgaria" (LIFE14 NAT/BG/000649) and the implementation of the Action A7 from the Life Project: RE-Vultures (LIFE14 NAT/NL/000901), contribution was provided from both project teams. For Serbia, most of the data was obtained during the implementation of the project "Civil Society for improvement of integration of Serbia in EU" conducted by BPSSS.

It is important to mention that not all countries have the information available in a structured form, so some of the questionnaires' replies, as well as outputs of the meetings with relevant stakeholders within the BAPP, were more complete and informative compared to others.

On the other hand, some countries also have available well-structured and systematically collected data in form of national reports on bird mortality, technical reports from conservation projects and national databases for bird mortality data, from which data was extracted for the purpose of this study. Additionally, information from several published papers, relevant to wildlife poisoning and vulture mortality induced by it, was also incorporated. However, this study should be seen as a starting point, as it represents a first attempt to collect and analyze the problem with poisoning on a regional scale. The study can be regularly updated, as soon as more information is available.

The situation with vulture poisoning, and wildlife poisoning in general, of each Balkan country is presented in a different chapter for the current country in alphabetic order.

Table 1. List of National meetings of relevant stakeholders organized within the BAPP

Date	Location	Organizer
15.05.2018.	Tirana, Albania	Albanian Ornithological Society
17.05.2018.	Skopje, Macedonia (FYR)	Macedonian Ecological Society/ BirdLife Macedonia
29.05.2018.	Zagreb, Croatia	Association BIOM/BirdLife Croatia
31.05-01.06.2018.	Sarajevo, Bosnia and Herzegovina	Ornithological Society "Naše ptice"

3. Overview of the situation with vulture and other wildlife poisoning in individual countries

The use of poisonous substances and poison baits for the purpose of extirpating various wildlife, as well as undesirable domestic animals, is a familiar and well documented practice in the Balkan countries. Over the course of the last 50 years this practice has led to severe population declines of all vulture species and has brought the majority of them to the brink of regional extinction (Bearded Vulture, Black Vulture). Even though this practice has been clearly forbidden under the national legislation of each country (except Albania) for more than 30 years, it is still a deeply rooted and quite common practice for resolving conflicts with wildlife, especially in rural areas, and continues to represent the most severe threatening factor for the remaining vulture populations in the region and the biggest obstacle for their recovery towards former distribution range. Vultures, as obligatory scavengers, continue to be victims of poison and poison baits intended for other animals, primarily mammalian predators.

This chapter depicts the current situation and specifics with the use of poisonous substances in the environment for each county, as well as reflects on the use of this practice in the past. It provides an overview of all known and available data relevant to vulture poisoning, including known drivers for poison use, most commonly used chemical compounds (identified through conduction of toxicological analysis), as well as of the current legal framework of each country. It is important to note that the quality and amount of available data used for this study differs significantly among countries and is related primarily to the conservation efforts invested by the NGO sector through implementation of various projects related to wildlife poisoning. Additionally, the most important and relevant anti-poison initiatives are also listed. The more efforts invested in detection of poison baits and monitoring of wildlife poisoning results in more vulture poisoning incidents being found and documented. The inconsistency in available data from the majority of the countries prevents us from making accurate estimates of the trend of this practice in the Balkans.

Table 2. Summary of the known and available data about vulture poisoning used in this study

Country	Total # poisoning incidents (# poisoning incidents from 2008-2017)	Total # vultures killed (# vultures killed from 2008-2017)	Main driver	Most common substance	Anti-poison actions currently in place
Albania	unknown	unknown	unknown	unknown	-
Bosnia and Herzegovina	1 (0)	GV: 167-207* (0)	conflict with predators	Carbofuran	-
Bulgaria	21 (9)	GV: 49 (34) EV: 17 (6) CV: 3 (1) BV: 4 (0)	conflict with predators	Carbofuran; Methomyl	Canine Teams; Capacity building and increase of awareness efforts;
Croatia	12 (6)	GV:120-139 (7)	conflict with predators and introduced game animals	Carbofuran	-
Greece	188 (89)	GV: 269 (92) EV: 22 (6) CV: 28 (4) BV: 1 (0)	conflict with predators and dogs	Carbofuran & Methomyl	Anti-poison Task Force; Canine Teams; Capacity building and increase of awareness efforts;
Macedonia (FYR)	38 (5)	GV: 221-372 (17-27) EV: 64-74 (3) BV: 1 (0)	conflict with predators	Methomyl	-
Serbia	10 (2)	GV: 18 (8)	conflict with predators	Kreozan (dimethyl-creasol)	BirdCrime Task Force; Capacity building and increase of awareness efforts;

* part of the data is based on estimations from published papers;
GV-Griffon Vulture; EV-Egyptian Vulture; CV-Cinereous/Black Vulture; BV-Bearded Vulture;

3.1 Albania

Contributors: **Taulant Bino[1], Besjana Sevo[1], Mirjan Topi[2]**

[1] *Albanian Ornithological Society (AOS)*
[2] *Protection and Preservation of Natural Environment in Albania (PPNEA)*

Introduction

Unlike the majority of countries from the region, where poisoning and incidents of suspected poisoning related to vulture mortality are relatively well documented, drivers for poison use and substances used identified, Albania has no official records related to wildlife poisoning. This fact contributes to the overall picture that this conservation issue does not officially exist in the country. On the other hand, Albania has experienced extinction of all of its vulture species, a part from the remaining, dwindling population of around 10-11 breeding pairs of Egyptian Vultures. Disappearance of entire national populations of vulture species during the 20th century, as it was documented in many other neighboring countries, is associated with the use of poison baits in the natural environment, which is why we can reasonably suspect that similar circumstances existed or still exist in Albania.

Historical data on the use of poison in the natural environment

Although there are no official records available related to wildlife poisoning, there are indications that poison baits laced with *strychnine* were regularly used in rural areas for elimination of wild predators (mainly wolves) during the 20th century, similar to the rest of the countries in the region.

Current situation in the country

The current situation with the use of poison in the natural environment is vague. The biggest obstacle relevant for this conservation issue is that it is not precisely defined in the current legislation of the country, in spite of Albania having ratified the Bern Convention in the 90s. Since wildlife poisoning is not mentioned within existing national legislation as an illegal activity, no official records, documentation or relevant database exists, neither within governmental organizations or nature conservation NGOs. Therefore, responsibilities of governmental institutions relevant to wildlife poisoning and other bird crime issues (except illegal hunting-hunting prohibited on all species) are unclear on all levels of enforcement and there are no procedures or protocols related to reporting of poisoning incidents. Consequently, awareness of the severity of the problem of the use of poison in the natural environment and the danger that it poses both to wildlife and human health is very low. It is important to note also that there is a notable lack of knowledge, capacities and resources within governmental institutions, related to conduction of toxicological analyses of animals suspected to have died of poisoning.

According to the very limited information available, there are strong indications that the use of poison substances in the natural environment in Albania presently can be attributed to:

- Intentional use of poison, with poison baits to eliminate wild predators (wolves, jackals, foxes) from the vicinity of rural settlements.
- Intentional use of poison to resolve conflicts with stray and feral dogs in rural areas and neighborly conflicts.

There are indications from hunters that conflicts between wild predators (mainly wolves and jackals) and livestock breeders are becoming more frequent since the national hunting ban has been enforced in 2014. And, since there are no alternative official methods of population management enforced by relevant governmental institutions, it is believed that the populations of predators, as well as damages they inflict upon livestock, are increasing, which is why local livestock breeders often resort to poisoning as an easy and affordable method. In addition to this, there are no compensatory measures in place for damages inflicted by wildlife, which further deepens the conflict. However, concrete data needed to support these indications is lacking

and efforts should be made to further investigate them, as they potentially represent the most significant threat that vultures might face in Albania.

In addition to these sources of wildlife poisoning, there are indications that misuse and inadequate application of various pesticides and rodenticides used in agriculture for control of rodent and pest populations is quite frequent and that it potentially represents a hazard for vultures and other wildlife, but more concrete data is needed to confirm these suspicions. Also, there are no information available related to veterinary products used in livestock breeding.

In order to successfully address the threat of wildlife poisoning in Albania, efforts need to be invested firstly in adaptation of current national legislation related to nature conservation in order to precisely define these activities as illegal and accordingly punishable under the penal and criminal code. Since there are no official records related to wildlife poisoning available, it is necessary to conduct a study of the state and scope of the use of poison in the environment and wildlife affected by it in order to establish an idea of the severity of this threat. Furthermore, significant efforts need to be made towards awareness raising of both general public and relevant governmental institutions, from decision makers to enforcement bodies, and also towards capacity building. Training relevant to detection, reporting, sampling and further processing of poisoning cases needs to be provided for police officers, environmental and veterinary inspectors and according protocols developed. Also, detailed training needs to be provided towards conduction of toxicological analysis, which is of crucial significance for further legal proceedings of poisoning incidents.

Legal framework

The use of poisonous substances or poison baits in the environment for the purpose of capturing or killing of animals is not precisely defined within existing national legislation of Albania as a prohibited activity.

Law No. 10 006, dated 23.10.2008 "On wild fauna protection": Article 13. of Chapter III, regarding Specific measures for the conservation of wild birds, states that the conservation and adaptation of wild birds in the territory of the Albanian Republic is enhanced by ensuring a favorable ecological, scientific and cultural conservation status that prohibits killing or intentional trapping by any kind of method. Poisoning might be included in the above mentioned law as it refers to killing of birds with any kind of method. Also, Article 19. (Chapter IV), in regards to prohibited activities, states that extermination of wild fauna and their populations is also prohibited.

Relevant international treaties and conventions that Albania is parties to:

Convention on the Conservation of European Wildlife and Natural Habitats (Bern, 1979): Ratified by Albania in 1999, it prohibits the use of any non-selective means of capture or killing as well as of means that may induce local extinction or heavily disturb the populations of a species, namely means listed in Annex IV", while in Annex IV of the same Law, which is entitled "Prohibited means and methods of hunting and other forms of exploitation", "Poisons and poison or tranquilizing baits" are included.

Table 3. Overview of the governmental authorities relevant to Anti-Poison work in Albania

Institution	Responsibility	Level of enforcement
Ministry of Tourism and Environment – Biodiversity and Protected Areas Directorate	Legislative.	national
National Inspectorate for Environment and Forests	Investigation, Law enforcement.	national
Ministry of Agriculture and Rural Development – Food Safety and Veterinary Institute (ISUV)s	Conduction of necropsies and toxicological analysis.	national
Regional Agencies of Protected Areas	Detection, Law enforcement.	regional

3.2 Bosnia and Herzegovina

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Ornithological Society "Naše Ptice"

Introduction

The first data on the effects of poisoning on birds, especially on vultures, was noted in Othmar Reiser's works published in the end of 19th and first years of 20th century, when it was pointed out that it is necessary to regulate the use of poisons to prevent the killing of Bearded Vultures and Griffon Vultures. Especially a big problem was the uncontrolled use of poison for exterminating large carnivores, mainly wolves in the mid-20th century. The last major poisoning event was observed at the beginning of the 90s when entire colonies of Griffon Vultures were poisoned. In the last 15 years the problem of poisoning is still present, although almost no cases of massive deaths of birds have been officially reported to the relevant institutions. There are no systematic records or relevant database related to poisoning incidents in the country nor to vulture mortality as such.

Historical data on the use of poison in the natural environment

There is very little available data related to wildlife poisoning in general, and even fewer data related to vulture poisoning from Bosnia and Herzegovina, although the use of poisonous substances for control and extermination of various mammalian predators is well documented. In the past, the common cause of death for scavenger birds was the availability of poisoned food (poisoned dead animals or poison baits) in the natural environment. From the middle of the 19th to the middle of the 20th century *strychnine*[1] was extensively used for the control of wolf populations. The poisoning was not selective and was affecting many other different species as well. Another reason for using poison was the control of population of feral and stray dogs. Large, organized poisoning actions, with the use of strychnine and *hydrogen cyanide* were carried out after the II World War. It is estimated that around 220 vultures (mainly Griffon Vultures) were poisoned throughout Bosnia and Hercegovina during 1959 alone (Mardešić & Dugački *in* Marinković, 1999).

The practice of illegal placing of poison baits in the environment for the same reasons continued throughout the 80s and 90s. During the period of 1980-1991, 97 Griffon Vultures were poisoned in eastern Hercegovina (Marinković *et al*. 2007). It was proven that in some incidents *Furadan* (Carbofuran) and hydrogen cyanide were used.

No cases of vulture poisonings were recorded for more than 20 years in Bosnia and Herzegovina (no vulture species currently breed in B&H; only vagrant birds are present) but several cases of poisoning of other raptors were recorded.

The last recorded incident of massive poisoning of vultures in Bosnia and Herzegovina was recorded on June 26th 1991. in Blagaj, where the last breeding population of Griffon Vultures used to breed, on cliffs towering above the Buna river. Thirty Griffon Vultures were found poisoned after feeding on an animal carcass laced with Furadan, which was placed in order to eliminate stray and feral dogs from the vicinity of local settlement, according to official reports. This single poisoning incident wiped out the last breeding population in the country and the species hasn't recovered since.

[1] Strychnine: is a highly toxic substance, colourless, bitter crystalline alkaloid used as a pesticide, particularly for killing small vertebrates.


EKOLOGIJA:

Presudio bojni otrov

POMOR KOLONIJE ORLOVA U BLAGAJU

NESVAKIDAŠNJI EKOLOŠKI INCIDENT

Pomor orlova

EKOLOŠKI INCIDENT U HERCEGOVINI

Orlovi više ne lete

Namjerno ili ne, Ahmet Gološ, stanovnik Bune, uništio cijelu populaciju endemski zaštićenih ptica ● Trideset orlova otrovalo se pesticidom kojim je bila poprskana životinjska strvina ● Zvaničnici se još ne oglašavaju

Освета орловима

Photo 1. Newspaper articles from the Griffon Vulture poisoning incident in Blagaj.
Source: Ornithological Society "Naše Ptice".

Current situation in the country

There is very little available current information regarding wildlife poisoning in general, and even less about poisoning incidents relevant to vulture mortality, the drivers behind it and the substances most frequently used. Based on available data, poison is used mainly in the form of chemical substances (pesticides) for "pest" control in agriculture. Therefore, the majority of the cases of wildlife poisoning can be contributed to unintentional poisoning. Poisonous substances are mostly used by farmers, most of them insufficiently informed about proper usage and application. There are legal protocols that prescribe the proper manner and amount of use of these substances, however adequate enforcement of these protocols is completely lacking or is restricted to large, commercial farms. There is no control of the application of these substances by small farmers and farmsteads. Furthermore, it is important to note that the procurement of banned substances is very much present in the country and is often conducted through social networks (Facebook), various web sites, indicating that a black market for these substances exists.

However, intentional use of poison baits for elimination of feral, stray or hunting dogs is still frequently reported, both in rural and urban areas, and potentially poses a significant threat for vultures foraging in Bosnia and Hercegovina. On the other hand, data about the use of poison baits for elimination of wild predators (wolf, jackal) is lacking and needs to be further investigated in order to assess if it poses a potential threat for vultures.

Activities such as education of crop farmers for proper use of poison substances or promotion of "bio-agriculture" could help improve the situation with unintentional poisoning of wildlife. Similar educational and awareness raising activities should be conducted towards the general public for the use of poison baits for eliminating unwanted animals from the environment. However, development and legal adoption of protocols for processing cases of wildlife poisoning, which would also describe the responsibilities of each relevant authority, more effective enforcement of anti-poison legislation, as well as increased efforts of responsible authorities in early detection of poisoning cases is crucial for long-term improvement. These actions would greatly facilitate the legal proceedings of these cases and their culprits. Bosnia and Hercegovina has a very complex bureaucratic apparatus, with often conflicting legislation in place on different levels of governance (federal level, entity level, cantonal level). Additionally, each level of governance has its own government, ministries, environmental inspectorates and enforcement agencies, with joint actions and cooperation rarely being carried out. These circumstances are making it difficult to precisely define jurisdictions among these relevant stakeholders.

No specific survey for poisoned wildlife animals was done, nor records of such incidents systematically kept and therefore, it is necessary to first conduct a study of the state and scope of the use of poison in the environment and wildlife affected by it, take action to raise awareness and incentive programs for the transition to other forms of agriculture.

Legal framework

Wildlife poisoning and the use of poisonous substances is clearly defined in the existing legislation in Bosnia and Herzegovina as an illegal activity.

Existing national legislation relevant to wildlife poisoning in Bosnia and Herzegovina:

FEDERATION OF BOSNIA AND HERZEGOVINA – FEDERAL LEVEL.

Law on nature protection: Article 119. of the Law on nature protection prohibits the use of all methods for capturing and killing of wild animal species which can cause local extinctions or severe disturbance of populations of those species, which includes the use of poison baits.

Hunting law: Article 29. of the Hunting law prohibits the intentional poisoning of game animals. Exceptionally, the Federal Minister, based on request from interested parties (inspectorate, hunting association etc.), may authorize the use of poison for elimination of certain species of game animals if they threaten human health, health of domestic animals or survival of protected species of game animals. This authorization must state the method, timeframe and persons responsible for placing poison baits. Article 84. determines the penalty of 1.000-1.500 KM for all citizen who violate Article 29. Furthermore, Article 52. of the same Law prohibits unethical methods of hunting, which among other means and methods includes the use of poison baits.

REPUBLIKA SRPSKA – ENTITY LEVEL.

Law on nature protection: Prohibits all activities which contribute to disturbance of the favorable condition of populations of wild species, destroying or damaging their habitat, litter, nesting or disturbing their life cycle, or favorable condition, among other things, by the use of poison baits.

Hunting law: Article 16. of this law prohibits the use of poison baits as a method for hunting or control of populations of game animals.

DISTRICT BRČKO – REGIONAL LEVEL.

Law on nature protection: Prohibits all activities which contribute to disturbance of the favorable condition of populations of wild species, destroying or damaging their habitat, litter, nesting or disturbing their life cycle, or favorable condition, among other things, by the use of poison baits.

Hunting law: Article 13. of this law prohibits the use of poison baits as a method for hunting or control of populations of game animals.

Relevant international treaties and conventions that Bosnia and Herzegovina is parties to:

Convention on the Conservation of European Wildlife and Natural Habitats (Bern, 1979): ("Official Gazette of Bosnia and Hercegovina No. 8/08 – 47 – annex). It prohibits the use of any non-selective means of capture or killing as well as of means that may induce local extinction or heavily disturb the populations of a species, namely means listed in Annex IV", while in Annex IV of the same Law, which is entitled "Prohibited means and methods of hunting and other forms of exploitation", "Poisons and poison or tranquilizing baits" are included.

Table 4. Overview of the governmental authorities responsible for Anti-Poison work in B&H

Institution	Responsibility	Level of enforcement
The Ministry of Foreign Trade and Economic Relations – Directorate for plant protection	Legislative.	federal
Republic Directorate for inspection affairs	Investigation, Law enforcement.	entity level – Republika Srpska
Federal Directorate for inspection affairs	Investigation, Law enforcement.	federal
Cantonal Inspectorates	Investigation, Law enforcement.	regional/cantonal level
Agricultural institute of Republika Srpska	Conduction of toxicological analysis.	entity level – Republika Srpska
Faculty of Veterinary Medicine - Institute for sanitary control of food and environmental protection	Conduction of necropsies and toxicological analysis.	federal
Federal Police Directorate	Law enforcement.	federal
Police Directorate of Republika Srpska	Law enforcement.	entity level – Republika Srpska
Border Police	Law enforcement.	federal

3.3 Bulgaria

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Introduction

During the middle of the 20th century, after the establishment of Agricultural Cooperatives in the country in 1945., the use of poison baits was widely and systematically used to control populations of wild predators and raptors. This practice was reinforced by the first State law on control of "pest" animals from 1948., although vultures were listed as useful birds and forbidden to harm and kill. In the beginning of the 90s Bulgaria ratified the Bern Convention and this practice was finally banned. Additionally, the establishment of the Natura 2000 network in Bulgaria and hence the incorporation of the Birds and Habitats Directive further reinforced national legislation. However, although randomly distributed spatially and temporally, the illegal use of poison baits is still practiced as a method for extirpation of wild predators, birds of prey, feral and stray dogs, and any other unwanted animals (e.g. wild boar, horses etc.). Detection of poisoning incidents very much depends on the efforts invested in surveying the field for signs of poisoning or poisoned animals. Recently, through implementation of several Life projects, significant progress has been made in detection of poisoning, proper processing of poisoned animals, development of anti-poison awareness campaigns and judicial processing of poisoning incidents. Since the beginning of the 21st century systematic records and documentation of poisoning incidents have been kept, especially those related to vulture mortality, by national NGOs working on bird conservation in the country. Although Bulgaria is not officially included in the BAPP project, it is a key country for the perseverance and recovery of vulture populations in the region.

Historical data on the use of poison in the natural environment

Data relevant to wildlife poisoning in Bulgaria dates from the very beginning of the 20th century, when *cyanide* or *arsenic* were used to kill indiscriminately any mammalian predators and birds of prey. During the middle of the 20th century *strychnine* was introduced and widely and systematically used by forestry officers, veterinary officers and hunters for such purposes in a nationalized and centralized economy of the country. After 1962 vultures were listed as protected species, but the main reason for their decline – the use of poison baits was not officially banned.

No specific survey on poisoned wildlife animals was conducted, nor records of such incidents kept, until the 90s, when BSPB project members in the Eastern Rhodopes started to conduct toxicological analyses of dead vultures. However, this practice was intensively introduced in wildlife conservation in Bulgaria since 2003 with the appointment of National working group on poisoning incidents which was coordinated by FWFF within the BVAP. The FWFF, Green Balkans, BSPB, BPPS, Balkani Wildlife Society and others work on their own projects and in co-ordination against poison baits use in the natural environment.

Current situation in the country

The main reasons for the use of poisonous substances and poison baits in Bulgaria are related to elimination from natural environment of:

- Wolf – the top conflict predator with livestock breeders and game keepers. This conflict and

consequent illegal poison baits use leads to more than 80% of the cases of poisoning of vultures in Balkans (Parvanov et al. 2018).
- Other wild mammalian predators (bear, jackal, fox) when in conflict with livestock breeders and game keepers.
- Feral and homeless dogs, that are unwanted in the vicinity of villages, towns or homesteads.
- Shepherd dogs, unwanted by hunters because of conflicts with their dogs.
- Hunting dogs as a direct action against their owners.
- Aggressive dogs in the villages or the towns, no matter if they are homeless or not;
- Feral and homeless cats, which are killed within the villages and the towns sometimes non-deliberately;
- Wild boars, to prevent potential damages to crop fields or vegetable gardens.
- Free ranging livestock (e.g. horses) to prevent potential damages to crop fields or vegetable gardens.
- Birds of prey that prey on domestic doves and competition pigeons.

Depending on the reasons shown above, there are several different groups of the society that most frequently use poison to kill wildlife, domestic animals or livestock: hunters, game keepers, livestock breeders, dove and pigeon keepers, farmers, or just people that like to kill (often on the margins of the society). The situation with poison use is very much dynamic and incidents may appear randomly in space and time. The most important areas however (hotspots for poisoning) are those in which large carnivores (wolf, jackal, bear) are frequently present and especially areas with extensive animal husbandry. It is more efficient to focus anti-poison actions to areas where certain conservation dependent species are present. However, a national anti-poison campaign covering all target groups is crucial for combating this issue long-term. There is no restriction to season when it comes to wildlife poisoning, but the vultures are usually affected in March-May, when the livestock is about to be moved to summer pastures. Poison baits could be used at any time of the year, but it seems they have a higher impact over conservation dependent species in certain periods, which differs from species to species, depending on their foraging habits.

During the period 1979-2011 38 mortality cases of Griffon Vulture were registered, of which 16 of them are due to poisoning (Demerdzhiev et. al. 2014). Most recent incident with massive vulture poisoning in Bulgaria occurred in March 2017 in Kresna gorge (Peshev et al. 2018). The number of dead griffons found amounted to 18, and it was estimated that at least 30 birds may have died, which was a significant blow to the local population, which had been restored there after years of conservation work by FWFF (Photo 2.).

Photo 2. Poisoninig incident in Kresna gorge in 2017: 30 Griffon Vultures poisoned with Carbofuran due to conflicts with wolves.
Source: FWFF/Hristo Peshev

The Griffon Vultures found dead constituted the bulk of the local breeding population. Interestingly, poisoned birds were found from 1 m from the bait to up to 65 km from it, with the most found at about 20 km, where the roosting and breeding sites were situated. The relevant authorities confirmed that the substance used for poisoning was Carbofuran and it is proved that the motive behind this incident was conflicts with wolves.

Although *strychnine* is no longer available for commercial use, any Category I pesticide sold in agricultural pharmacies is in use for wildlife poisoning. Mostly Carbamates and Organophosphates are used and more often *etilen-glycol* (antifreeze) as well. The focus here should be given to stricter control of legally used pesticides and their application in agriculture, where conservation dependent species may be poisoned in arable areas where these substances are applied legally. These actions should be planned species by species and site by site because substances that are lethal for one species may not be too dangerous for others (related to the way of application and introduction in the food chain) and vice versa. Furthermore, it is crucial to establish a stricter control of illegally imported substances such as Methomyl which are widely used, mainly by livestock breeders for extirpation of predators and by pigeon keepers for extirpation of Peregrine and Saker Falcon.

National legislation of Bulgaria strictly forbids the use of poison baits to kill hunting and protected species. The action of setting poison baits on its own is forbidden, but poorly described and addressed in existing legislation and thus differently interpreted and often not applicable. In the Criminal Code, owning highly toxic substances without permission is considered illegal. However, all these measures are not enough and additional explanatory texts and justifications should be included in existing legislation. On the other hand, a very well described protocol for action when poisoning incidents with wildlife occur, or could occur should be developed and all relevant stakeholders introduced to it. Bulgaria is one of the rare countries from the region which has developed such protocols in the past. Updating and further development and legal adoption of such a protocol, which would describe the proper procedure for processing poisoning incidents and the responsibilities of each relevant authority, would greatly facilitate the legal proceedings of these cases and their culprits. Additionally, improvement of existing toxicological analyses which are conducted on poisoned animals and broadening the scope of substances that they analyze will also undoubtedly contribute to this.

The establishment of a unified national database for recording and storing information regarding vulture and other wildlife poisoning incidents is key for conducting adequate spatial analysis, determining the scope and severity of poisoning and defining hotspots for poisoning in the country and subsequently directing conservation actions and efforts where they are most needed.

For the long term viability of anti-poison work, it is necessary to work more intensively on conflict resolution issues between relevant stakeholders and wildlife. Promoting best practices and solutions already developed and implemented in other countries (i.e. Spain) related to animal husbandry and conflicts with predators, as well as introduction of compensation and prevention programmes to avoid these conflicts, would significantly contribute to minimizing the drivers for the wildlife poisoning. Additionally, the conduction of public awareness and educational campaigns, on both local and national level, is also very important for successful resolution of these issues. An important step in the process of mitigating conflicts between wild predators and humans, especially livestock breeders, is to establish better management and conservation of wild ungulate populations in the country. By reinforcing populations of wild ungulates, originally the primary food source for wild predators, damages that these animals inflict upon livestock could decrease significantly. This would contribute to less poison being used in the natural environment and more safe food available for the vultures. Also, establishing safe supplementary feeding site for vultures is an important conservation measure for short-term recuperation of vulture population.

Anti-poison activities implemented in the country

The majority of conservation work conducted in the country, related to combating poisoning as the main threat for vulture populations, increasing food availability, as well as addressing other conservation needs of vultures, was boosted within the Balkan Vultures Action Plan and carried out through implementation of several projects, with increased importance of LIFE programme of EU (Table 5.).

Table 5. Overview of current Life projects relevant to vulture conservation in Bulgaria

Project	Target species	Relevant conservation implications	Period	Beneficiary
"The Wolf Full- The Lamb Alive" BG 2004/016-782.01.03.03– PHARE programme Bulgaria-Greece	Egyptian Vulture	- Compensation of owners of depredated livestock - Safe supplementary feeding stations; - Facilitation of stakeholder involvement; - Provision of livestock guarding dogs; - Provision of electric fences for livestock facilities; - Awareness raising Anti-poison campaigns;	2005-2007	Municipality of Strumyani, FWFF
Predators, people and their livestock in peaceful coexistence: Reducing the threat to wolves, bears and vultures from humans and poison, Bulgaria - Winner of the Whitley Award donated by WWF-UK in memory of Sir Adrian and Lady Holman	Griffon Vulture, Egyptian Vulture	- Compensation of owners of depredated livestock - Safe supplementary feeding stations; - Facilitation of stakeholder involvement; - Provision of livestock guarding dogs; - Provision of electric fences for livestock facilities; - Awareness raising Anti-poison campaigns;	2007-2009	FWFF
Return of the Neophron - Urgent measures to secure survival of the Egyptian Vulture (*Neophron percnopterus*) in Bulgaria and Greece. **LIFE10 NAT/BG/000152**	Egyptian Vulture	- Safe supplementary feeding stations; - Facilitation of stakeholder involvement; - Awareness raising Anti-poison campaigns;	2011-2016	BSPB
LIFE for Kresna Gorge – Conservation of Birds of Prey in Southwest Bulgaria. **LIFE11 NAT/BG/363**	Griffon Vulture, Black Vulture, Egyptian Vulture	- Compensation of owners of depredated livestock - Safe supplementary feeding stations; - Facilitation of stakeholder involvement; - Provision of guarding dogs; - Provision of electric fences for livestock facilities; - Shifting from sheep and goats to cattle to minimize depredation; - Introduction of autochthonous breeds of livestock for better prevention from predators; - Awareness raising Anti-poison campaigns;	2012-2016	FWFF

Project	Target species	Relevant conservation implications	Period	Beneficiary
Vultures Return in Bulgaria – LIFE08NAT/BG/278	Griffon Vulture, Black Vulture, Bearded Vulture	- Compensation of owners of depredated livestock - Safe supplementary feeding stations; - Facilitation of stakeholder involvement; - Provision of guarding dogs; - Provision of electric fences for livestock facilities; - Shifting from sheep and goats to cattle to minimize depredation; - Introduction of autochthonous breeds of livestock for better prevention from predators; - Awareness raising Anti-poison campaigns;	2009-2015	Green Balkans, FWFF
Vultures back to LIFE - Bright Future for Black Vulture in Bulgaria **LIFE14 NAT/BG/000649**	Black Vulture	- Safe supplementary feeding stations; - Reinforcement of wild ungulate populations; - Reinforcement of livestock numbers of local farmers; - Reintroduction; - GPS tracking of Griffon Vultures to monitor poison use	2015-2022	Green Balkans, FWFF
LIFE RE-Vultures - Conservation of Black and Griffon Vultures in the cross-border Rhodopes mountains **LIFE14 NAT/NL/000901**	Black Vulture; Griffon Vulture	- Reinforcement of wild ungulate populations; - Anti-poison dog unit; - Environmental education actions; - Facilitation of stakeholder involvement;	2016-2021	RRF, BSPS, WWF BG
Egyptian Vulture New LIFE - Urgent Action to Strengthen the Balkan Population of the Egyptian Vulture and Secure Its Flyway **LIFE16 NAT/BG/000874**	Egyptian Vulture	- Research on the impact of agriculture chemicals and Identify as poisoning agents and evaluate the use of veterinary drugs to inform response strategy; - Engagement to secure appropriate changes of legislation regarding the use of dangerous pesticides and vet medicine products; - Establishment of a pan-Balkan network of stakeholders against wildlife poisoning; - Evaluation of the magnitude of damages to Egyptian Vulture due to poisoning; - Safe vulture feeding sites;	2017-2022	BSPB

Legal framework

The use of poisonous substances and poison baits for the purpose of capturing and killing of wildlife is clearly defined in the existing national legislation of Bulgaria as a prohibited activity.

Existing national legislation relevant to wildlife poisoning in Bulgaria:

Biological Diversity Act (State Gazette No. 77/9.08.2002)**:** Article 44. prohibits the use of poison, poisoned or anesthetic baits (Annex 5) for capturing or killing any species listed in Annex 4 of the Biological Diversity Act.
Relevant EU legislation - Directive 79/409/EEC of the Council of April 2, 1979 on the conservation of wild birds and Directive 92/43/EEC of the Council of May 21, 1992 on the conservation of natural habitats and wild fauna and flora were integrated into the above mentioned national legislation.

Law for hunting and protection of game (SG. 78/26 Sep 2000, amend. SG. 26/20 Mar 2001, amend. SG. 77/9 Aug 2002, amend. SG. 79/16 Aug 2002)**:** Article 65. prohibits the use of poisonous or anesthetic substances, as well as baits with such substances as a means or method in hunting.

Penal Code: According to article 237. (Amend., SG 28/82; SG 89/86; SG 86/91; SG 85/97; amend., SG 92/02) who kills or catches such game in time of prohibition, in a prohibited place or by prohibited means, shall be punished by corrective labor for up to six months or by a fine of one hundred to three hundred levs, as well as by revoking of rights according to art. 37, item 7.

Relevant international treaties and conventions that Bulgaria is parties to:

Convention on the Conservation of European Wildlife and Natural Habitats (Bern, 1979): Ratified by Bulgaria on 25.01.1999, in force for Bulgaria since 01.05.1991 (State Gazette [1] 23/1995). It prohibits the use of any non-selective means of capture or killing as well as of means that may induce local extinction or heavily disturb the populations of a species, namely means listed in Annex IV", while in Annex IV of the same Law, which is entitled "Prohibited means and methods of hunting and other forms of exploitation", "Poisons and poison or tranquilizing baits" are included.

Table 6. Overview of the governmental authorities responsible for Anti-Poison work in Bulgaria

Institution	Responsibility	Level of enforcement
Ministry of Environment and Water	Legislative.	national
Executive Environment Agency (ExEA)	Legislative, Law enforcement.	national
Regional Inspectorates of Environment and Water	Law enforcement.	regional
Bulgarian Food Safety Agency (BFSA)	Law enforcement.	regional

3.4 Croatia

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Introduction

The first known poisoning campaigns in Croatia started after the II World War, but were present for years before, as a legal method that hunters used in order to extirpate mammalian predators, primarily wolves and foxes. *Strychnine* was commonly used in an attempt to resolve the issue of wolf predation on sheep and other livestock. Although the use of poison baits for predator control was banned in 1972, the practice never stopped among the local livestock breeders. The baits are usually placed in an attempt to eliminate stray dogs, wolf packs, jackals, bears or wild boars, which may inflict major damages to the shepherds and farmers.

Concerning vulture population, the biggest problems started during the second half of 1980s, when hunters brought wild boars (*Sus scrofa*) to the Kvarner Islands. During the same period an increasing number of jackals (*Canis aureus*) and bears (*Ursus arctos*) started to cross from the mainland to islands and to inflict damages on lambs and other livestock. When Ministry of Environmental and Nature Protection gave the order to hunters for the elimination of all introduced species from all islands in Croatia, hunters refused to remove them. Wild boars, jackals and bears killed thousands of sheep (not only lambs) and shepherds became desperate. So, the easiest way for them to eliminate this threat was to place poison in sheep carcasses. Although poison use has been prohibited in Croatia by the National Hunting Act of 1972, it is still practiced, especially after the failure of the government to enforce the legislation related to removal of introduced and invasive game animals (wild boar) from Kvarner islands. Furthermore, different banned substances (notably Carbofuran) can still easily be acquired on the black market from neighboring countries.

Historical data on the use of poison in the natural environment

The existing data relevant to vulture poisoning and mortality in Croatia is more available and better organized than in comparison with some other countries from the region and poisoning incidents are better documented. Systematic records related to vulture mortality have been kept by NGOs, while a centralized database is still lacking.

A good example of the extent of wildlife poisoning in Croatia is Gorski kotar (small part of Croatia – 1.273 sq.km), where during the 40-year period (1946-1985) 26 brown bears and 177 wolfs were found poisoned, while during 1961-1972 3.6 wolves/year were poisoned (Frković in Sušić 2000). These poisoning incidents were a part of the governmental sponsored poisoning campaigns, which started after the II World War, similar to other countries in the region.

In the period from 1996-2013, in the Rescue Centre for Griffon Vultures (established and governed at that period by organization Grifon), 157 Griffon Vultures arrived, 31 of which died, and 12 of them had significant neurological symptoms. In the same period, 59 dead vultures were found (of which 17 in one incident of poisoning on the island of Rab in 2004), and 23 specimens (39%) were analyzed. It is proved and well documented that poisoning of vultures in Croatia is a reality and that poisonous substances (pesticides and rodenticides) from the group of carbamates and organophosphates (*Carbofuran, Methomyl, Deltamethrin*) (Sabočanec et al. 2005, Ćurić et al. 2008) were used. Some analyses had shown that organochlorine hydrocarbon residues such as DDT and its isomers and PCB congeners were determined in muscle and liver of dead Griffon Vultures (Međugorac et al. 2001).

It is estimated that a number of 300-500 Griffon Vultures have been poisoned during the period of the last 50 years, as there are 159-190 recorded in the period 1985-2013 (Sušić 2000, Sušić 2002, Lukač 2004). Therefore, we can be certain that poisoning is one of the most probable causes for extinction of the Egyptian and Black Vulture from Croatia.

Current situation in the country

In the last 20-25 years, the primary reason of poison use in Croatia has been to eliminate large carnivores (notably jackals, wolves and bears) and the damages that they inflict upon livestock breeders, but also poisoning of rats during the legal treatment of tourist areas (i.e. islands where vultures breed) with rodenticides. Consequently, shepherds and other livestock breeders were the target group for implementation of anti-poisoning campaign during the period 2001-2010, and recently poisoning is present on an individual level only. The use of rodenticides is regular in many regions of the country, and there is evidence of its direct impact on vultures. Based on the few analyses, *Methomyl* and *Carbofuran* were the most frequently used substances involved in illegal use of poison. The last known case of massive poisoning of vultures documented in the country took place on the Island of Rab, where one shepherd laced a sheep carcass with poison (December 2004) because losses to livestock (sheep) inflicted by recently introduced jackal and wild boar on the island. The total number of birds that were killed during the poisoning incident was two Common Buzzards and 17 Eurasian Griffons (Photo 3.). Toxicological tests showed that the poison was *Carbofuran* (Pavoković and Sušić 2005, Ćurić et al. 2008).

Photo 3. Dead Griffon Vultures from a single poisoning incident with Carbofuran, on the Island of Rab, December 2004 (Kvarner Archipelago, Croatia).
Source: Grifon – Birds of Prey Conservation Society

Methomyl is also a widely used systemic insecticide from the carbamate group which is used for wildlife poisoning. In October 2004, the carcass of a young Griffon Vulture with a 2-day history of convulsions, vomiting, tremor, seizures, propulsions and lack of co-ordination was presented to The Faculty of Veterinary Medicine, University of Zagreb. Toxicological analysis revealed the presence of 9.3 mg of methomyl, 6.7 mg of methomyloxime and 6.1 mg of deltamethrin per kg of stomach content. Methomyl is a carbamate pesticide regularly used to control a wide range of insects on plants and animals, and is classified by the US Environmental Protection Agency (EPA) in group I according to toxicity (Tomlin 2000). Furthermore, the fact that carbamate poisoning is usually regarded as reversible and that the vulture did not respond to therapy, but died one day after it was found, supports the hypothesis of a high oral dose. The amount of 6.1 mg of deltamethrin per kg of stomach content is too small for causing an intoxication and, despite the possibility of synergistic action with methomyl, it was not considered to be significant in this case (Ćurić et al. 2008).

During the above mentioned period, the primary reasons of poison use in Croatia can be attributed to:

- Intentional use of poison substances, with poison baits, to kill predators (jackals, wolves, martins).
- Intentional use of poison substances, with poison baits, to eliminate introduced game animals (wild boars) and predators (jackals) on island ecosystems.
- Intentional use of poison substances, with poison baits, to eliminate stray or unwanted dogs or cats.
- Intentional use of poison substances to resolve human-human conflicts (poisoning of hunting and shepherd dogs, livestock).

Insufficient evidence exists related to unintentional poisoning due to inadequate use of legally sold substances (pesticides, rodenticides) to eliminate rodent or pest populations exists, as well as to unintentional poisoning due to veterinary products used for treatment of livestock, especially sheep which are the main food source for the breeding Griffon Vulture population, and lead poisoning. Therefore, it is difficult to determine if these products could have a significant impact on vultures in Croatia.

Thanks to the social pressure after the massive poisoning incident on the Island of Rab, as well as the extensive anti-poisoning campaign which was conducted during the period of 10 years, wildlife poisoning in the area has been significantly reduced. The conflict between livestock breeders and introduced wild boars as game animals on island ecosystems, where existing Griffon Vulture population breed and mostly forage, seems to represent the most important potential threat for poisoning to occur in the natural environment. There are reports that shepherds on Kvarner Islands are sustaining heavy losses, especially of lambs, due to predation by wild boars. Another problem could also arise with wolf packs, as their number is increasing in other areas of Croatia, which are inside of the foraging area of Griffon Vultures.

Anti-poison activities implemented in the country

During the period 2001-2010 the BPCS “Grifon” focused their efforts to the *Anti-poisoning campaign,* as well as the *Campaign for the removal of alien species* (game animals) which were brought (during 1980s) for the purposes of hunting to Kvarner islands. Although Ministry of Environmental and Nature protection established a *Committee for the problematic of illegal poisoning in nature* in 2001, work of the Committee was stopped in 2003 when the political changes influenced the structure of the ministries.

Significant publicity and awareness raising campaigns have been organized and conducted in order to address the issue of wildlife poisoning, with the involvement of numerous stakeholders, such as NGOs for nature protection, shepherds coop, police, nature protection inspection and Veterinary University in Zagreb. A Union of 35 NGOs was organized within the County (Kvarner’s NGO Union) and raised *Campaign for removal of alien species from Kvarner islands*. Great help was provided with the visit of Mr Juan José Sánchez Artés and Mr Michel Terrasse in February 2005, who helped to increase awareness at the State level regarding illegal poisoning of wildlife and alien species. During this anti-poison work the islands most affected by introduced game animals were determined and an intensive media campaign was carried out which assembled relevant NGOs and other organizations to press local authorities and government to recognize the existence of the problem that is illegal poisoning and to endorse the decision that the alochtonic species should be removed. Protests of sheepherders from islands of Rab, Krk and Cres were organized in Rijeka (County capital) to raise the issue (Photo 4.).

Photo 4. Protest of shepherds from Rab, Krk and Cres islands, organized as a part of the extensive Anti-poisoning campaign which had run during the period of 10 years (2001-2010).
Source: Grifon – Birds of Prey Conservation Society

Legal framework

Croatia has good legislation in place related to the use of poison substances in the natural environment and wildlife poisoning is clearly defined as an illegal activity, punishable under Criminal law.

Existing national legislation relevant to wildlife poisoning in Croatia:

Nature Protection Act: Published in Official Gazette of the Republic of Croatia 80/13, 15/18. Nature Protection Act transposes the Birds Directive into Croatian legal system and represents a general framework for the protection of wild birds in Croatia. Nature protection Act prohibits the use of all means, arrangements or methods that can cause the local disappearance or a significant decline in population numbers of a species. In particular, use of poisons and poison baits is prohibited (Article 66) and is an infraction punishable by fine not to exceed 500,000.00 HRK for legal entity or 50,000.00 HRK for natural persons (Article 227). Deliberate killing or capture by any method, if not in accordance with the Nature Protection Act, is also an infraction punishable by fine not to exceed 200,000.00 HRK for legal entity or 30,000.00 HRK for natural persons (Article 228).

Hunting Act: Published in Official Gazette of the Republic of Croatia 140/05, 75/09, 153/09, 14/14, 21/16, 41/16, 67/16, 62/17 it prohibits large-scale or non-selective means and methods, including poison, for hunting game (Article 64) which are punishable by fine not to exceed 100,000.00 HRK (Article 96).

Criminal Code: Destruction of protected natural values, game poaching and killing or torture of animals are felonies according to the Croatian Criminal Code (Official Gazette of the Republic of Croatia 125/11, 144/12, 56/15, 61/15, 101/17). The following articles are relevant to vulture poisoning:

According to the Article 200 paragraph 1 of the Criminal Code whoever, contrary to regulations, kills or destroys a specimen of a protected species of an animal shall be punished by imprisonment not exceeding three years. According to the paragraph 2 of the same Article whoever commits the same offence against a strictly pro-

tected wild species of an animal shall be punished by imprisonment from six months to five years.

According to the Article 204 paragraph 2 of the Criminal Code whoever hunts game in such a manner or by such means that cause their massive destruction or by using prohibited accessory equipment, shall be punished by imprisonment not exceeding three years.

According to the Article 205 of the Criminal Code whoever kills an animal without a justified reason or severely maltreats it, inflicts unnecessary pain on it or puts it through unnecessary suffering, shall be punished by imprisonment not exceeding one year, or two years if the offence is committed out of greed.

Relevant international treaties and conventions that Croatia is parties to:

Convention on the Conservation of European Wildlife and Natural Habitats (Bern, 1979): Ratified with the Act on Ratification of the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) (Official Gazette of Republic of Croatia -IT 6/00). It prohibits the use of any non-selective means of capture or killing as well as of means that may induce local extinction or heavily disturb the populations of a species, namely means listed in Annex IV", while in Annex IV of the same Law, which is entitled "Prohibited means and methods of hunting and other forms of exploitation", "Poisons and poison or tranquilizing baits" are included.

Table 7. Overview of the governmental authorities responsible for Anti-Poison work in Croatia

Institution	Responsibility	Level of enforcement
Ministry of Environment and Energy (Directorate for Nature protection and Directorate for Inspectional Affairs)	Legislative.	national
Inspectorate for nature conservation	Investigation, Law enforcement.	national
Environmental inspectorate	Investigation, Law enforcement.	national
Ranger service of protected areas and nature reserves	Detection, Law enforcement.	regional
Croatian Agency for the Environment and Nature	Operates Injury and Mortality reporting system for the strictly protected species. Responsible for development of reporting protocols.	national
Ministry of Agriculture (Directorate for Forestry, Hunting and Wood Industry)	Legislative.	national
Ministry of the Interior	Investigation, Law enforcement.	national
State's Attorney Office of the Republic of Croatia	Investigation, Law enforcement.	national
Center for forensic research "Ivan Vučetić"	Conduction of toxicological analysis.	national

3.5 Greece

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Introduction

In Greece, the use of poison baits for predator control (mainly mammals such as foxes or wolves, but occasionally also birds, insects, etc.) was completely banned in 1993. However, in the following years after this banning took place, deliberate poisoning for the same purpose continued illegally in most regions where predators were still present. Moreover, poison was used not only to kill wild animals but also dogs (feral, stray, shepherd and hunting dogs). National populations of vultures, large raptors and mammal predators were thus seriously affected by the perpetuation of this practice.

Farmers, livestock breeders and hunters usually stand accountable for this human-wildlife conflict. The drivers behind these conflicts vary among damages and losses to crops, livestock flocks and game animals, but also involve exclusively human conflicts among different stakeholder groups (i.e. local disputes). Although agricultural and stockbreeding cooperatives and hunting clubs are formally against the use of poison baits, the practice is still widespread among these groups.

The absence of a clear-cut and comprehensive legal framework addressing the illegal use of poison baits greatly hinders the resolution of the problem.

Historical data on the use of poison in the natural environment

The use of poison baits was a common practice in Greece since the beginning of the 20th century. Since 1939 the use of strychnine to cull foxes and other "vermin" species was regulated with annual circulars published by the Ministry of Agriculture. As from 1969 and until 1981, the Forestry Services were in charge of the culling and systematically used baits made of *strychnine* that were placed during the night and collected in the morning. After this, strychnine was substituted with *potassium cyanide*, in order to avoid secondary poisoning, which had already been observed to have severely affected raptors and other scavenger populations. Literature records for instance state that 75 jackals were killed in October 1931 in Samos, while 5108 wolves and jackals were culled in the whole country during the years 1933-1939 (most of them believed to be killed with the use of poison baits). According to the Ministry of Agriculture, during the period 1971-1979, 700-800 wolves were culled each year, while the numbers of foxes ranged from 40.000 to 74.000 individuals per year from 1974- 1981.

After pressures from environmental associations, and following Nature protection policies defended in the European Union, the use of poison baits was finally completely banned in 1993. However, people in rural areas were so accustomed with the practice that despite its prohibition, and owing to the lack of law enforcement, the use of poison baits still endures as a traditional practice for resolving conflicts with wildlife.

The survival of many protected species has been directly threatened by the use of poison baits. Many scavenging birds of prey went extinct in different areas of Greece or declined greatly due to the use of poison baits. The Bearded Vulture (*Gypaetus barbatus*) went extinct from mainland Greece and is now found only in the island of Crete (Xirouchakis *et al.* 2001). The distribution range of the Black Vulture (*Aegypius monachus*), is now restricted to Thrace, mainly in and around the National Park of Dadia-Lefkimi-Soufli (Xirouchakis & Tsiakiris 2009; Skartsi *et al*. 2012; Vasilakis *et al.* 2016). The population of the Griffon Vulture (*Gyps fulvus*) in mainland Greece has crashed, mostly because of the poison baits (Legakis & Maragou 2009), as well as that of the Egyptian Vulture (*Neophron percnopterus*) with only five breeding pairs remaining in the whole of the country (LIFE16 NAT/BG/000874).

Current situation in the country

Unlike the majority of the countries from the region, Greece has invested significant efforts towards combating wildlife poisoning. Illegal poisoning of wildlife in Greece is very common, and has led several species to the brink of extinction. These circumstances conditioned the creation of the Anti-Poison Task Force, which was formed in 2012 and consists of environmental NGOs (ARCTUROS, Hellenic Society for the Protection of Nature, Hellenic Ornithological Society (HOS), Callisto, WWF Greece and Hellenic Wildlife Care Association ANIMA) and the Natural History Museum of Crete. Since 2014, under the framework of LIFE+ project "The Return of the Neophron", HOS is coordinating the Task Force and managing the Poison Incidents Database. The main objective of the Task Force is to promote proposals and institutional changes to eradicate the killing of wildlife by poison baits and to make known the extent of this conservation problem at local and national level. The continuous efforts of the Task Force members to collect as much information as possible is supporting the further development of the database and provides a better perception of this practice's characteristics, as well as its underlying reasons. A consistent and continuously updated database represents an extremely valuable tool for combating wildlife poisoning and can lead to the identification of hot spots for poisoning and consequently to a better prioritization and more efficient utilization of the relevant authorities' already limited resources. Until now, poisoning incident data collection is carried out mainly by the members of the Task Force and secondly by the public authorities. It should be noted that there was no uniform recording protocol before 2012 and that data collection was inconsistent.

Under the scope of the "Return of the Neophron" Life project, the Anti-Poison Task Force produced a very detailed technical report on the illegal use of poison baits in Greece (Ntemiri & Saravia 2016). This document contains well-structured and systematically collected data and gives insight into the current situation with the use of poison baits in the country. Significant amount of information available from this report was integrated in this study.

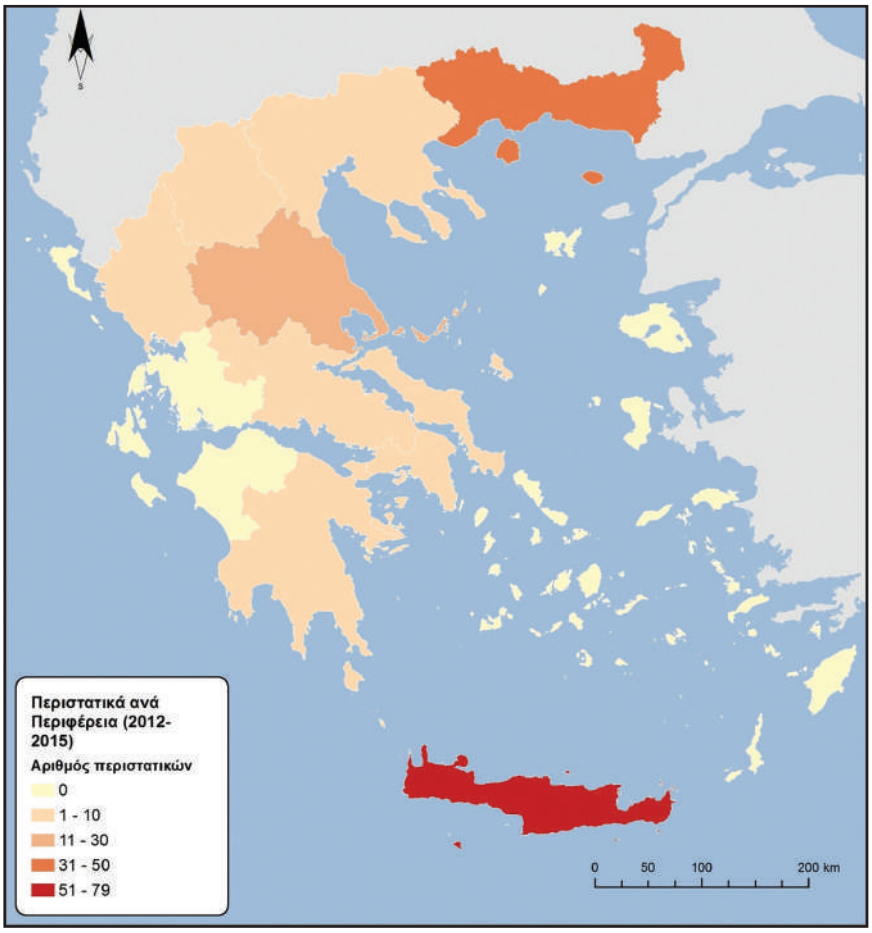

Figure 1. Map of poisoning incidents in Greece for the period 2012-2015; **Source:** Ntemiri, K. & Saravia, V. (2016) The illegal use of poison baits in Greece. 2012-2015. Hellenic Ornithological Society/BirdLife Greece, Athens, 43 p.

From early 2012 to late 2015, 207 poisoning incidents were recorded in total, from which 163 incidents involved the use of poison baits in the environment. According to the available data gathered by the members of the Task Force, Crete is the region with the highest number of poisoning incidents (78) recorded during this period. Eastern Macedonia and Thrace follow with 32 incidents and Thessaly with 30 (Figure 1.). Regarding the regions of Western Greece, Ionian Islands and South Aegean, there is a lack of knowledge as no data is available, while there is a very small number of incidents in the rest of the regions (less than 10 incidents).

The use of poison baits in the natural environment is a year-round practice. However, in terms of seasonal variation there are mainly two peaks during the year regarding poison use in the natural environment: one in April, and another one in September – October. This trend leads us to the conclusion that poison bait use is not a random and aimless practice, but systematic and deliberate. Most poisoning incidents occur in September. This increase may be connected with the opening of the hunting season in late August and mid-September (when the hunting season opens for mammals). April is second with the number of incidents, probably due to fox extermination after the end of the hunting season, when hunting dogs are trained and exercised. The driving force for poison bait use is also the intense dispute between hunters and livestock breeders, the latter using poison baits to dissuade hunters from using their pastures for hunting or dog training, the former to eliminate shepherd dogs that can attack and harm their dogs during hunting. Frequent use of poison baits during spring may be also caused by the start of extensive grazing in montane ecosystems. In other areas such as Crete, a peak might happen when the sheep are lambing in order to protect the newborns from crows.

It is not always possible to verify and confirm the driver behind the use of poison baits. It is important to note that in 61% of the documented poisoning incidents (Figure 2.) the motive remains unclear. Available data on the motives come from land users' testimonies and found evidence. The most common driver for the use of poison baits, according to the best available data, is local disputes between land users. For the period 2012-2015, local disputes account for 10% of the incidents. Typical examples of such disputes are the use of poison baits targeting shepherd dogs when there's a risk that these may kill hunting dogs, as well as disputes between neighboring livestock breeders over the property or right of use of grazing pastures. A major motive for poison bait use is the damage to animal production (6%) caused mainly by bears and wolves. Livestock breeders and farmers, as the main victims of damages and losses inflicted by wildlife, with easy access to the most commonly used poisoning compounds (i.e. pesticides), are usually considered as one of the main responsible groups for deliberate poisoning. However, the issue is a complex phenomenon, in which other social groups are also involved and interact, especially in rural areas.

Poison baits are often put by individual hunters for the control of the fox population (7%, elimina-

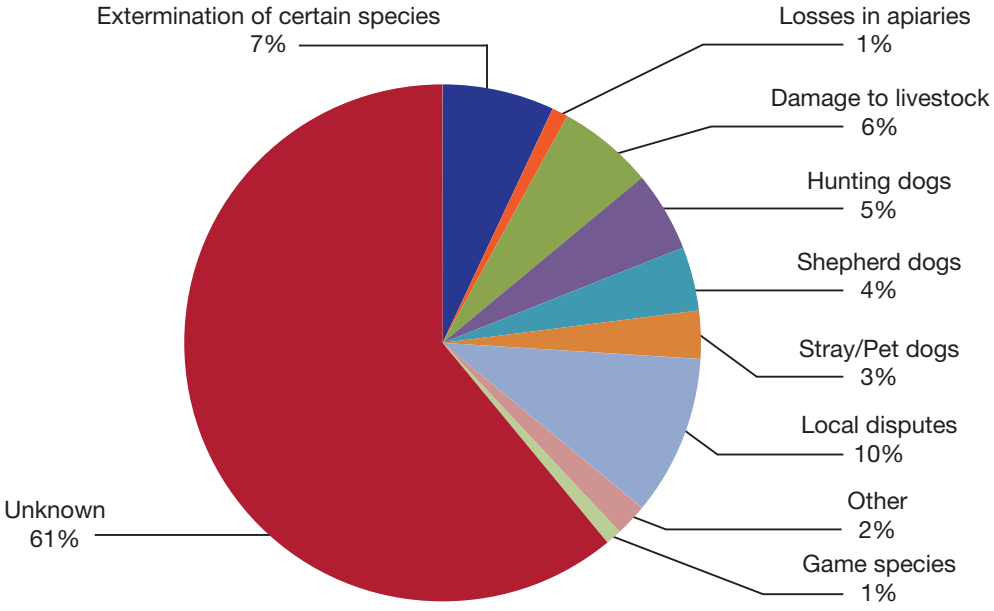

Figure 2. Drivers behind poison bait use in Greece for the period 2012-2015.
Source: Ntemiri, K. & Saravia, V. (2016) The illegal use of poison baits in Greece. 2012-2015. Hellenic Ornithological Society/BirdLife Greece, Athens, 43 p.

Photo 5. Poisoned Griffon Vulture at the Agrafa Mountains in central mainland Greece, June 2018.
Source: HOS

tion of competitive predators). The fox is considered to be the main limiting factor in the hunting of hares and it also poisoned to facilitate hunting dogs to train and chase hares, as they may chase foxes instead of the desired quarry. Apart from the aforementioned land users, farmers may also put poison baits if bears, wild boars or even smaller mammals, like badgers and martens, cause damage to their crops. Poison bait use for the control of stray dog population inside or outside of settlements is a common practice. In this case, this practice aims to control the presence of abandoned hunting, shepherd or pet dogs. In addition, beekeepers may place poison baits to protect their beehives from bears.

Available data indicates that scavenger birds of prey are most affected by poison bait use, as 88 individuals have been found poisoned (30%). Vultures and eagles like the Golden Eagle (*Aquila chrysaetos*) are indirectly poisoned when feeding on animals that have died of poison bait ingestion. More specifically, at least 31 Griffon, one Black Vulture and five Egyptian Vultures (in three separate incidents) were poisoned during this period (Figure 3.).

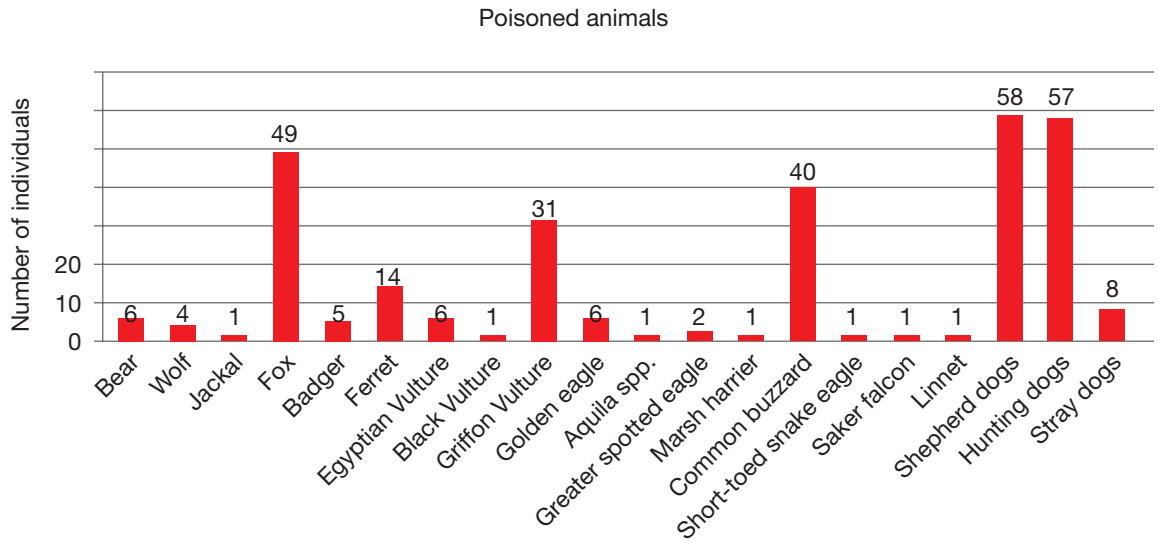

Figure 3. Overview of species poisoned in Greece during the period 2012-2015.
Source: Ntemiri, K. & Saravia, V. (2016) The illegal use of poison baits in Greece. 2012-2015. Hellenic Ornithological Society/BirdLife Greece, Athens, 43 p.

During the investigation of poisoning incidents which occurred during this period no baits were found in the majority of them (78%). In cases where poison baits were found, the most widespread type is the use of a piece of meat, often a liver or a sausage, laced with an approved or illegal pesticide. For large carnivores, like the wolf, whole carcasses of livestock laced with poison are commonly found to be used. *Cyanide* poison baits are frequently found as a capsule covered with wax. This type is different to the others in that it doesn't cause secondary poisoning, meaning an animal feeding on a poisoned animal will not be poisoned itself. Cyanides are extremely toxic and when the capsule breaks they can cause instant death though inhalation, digestion or skin contact.

Available information on substances used for poison baits is scarce, as toxicological analyses are rarely performed. Out of 163 incidents, toxicological analyses were performed only in 27 cases (16,6%). The low number of toxicological analyses is mainly due to the following reasons: specimens were in advanced state of decay and unsuitable for toxicological analysis; civilians who reported poisoning incidents to the Task Force were unwilling to proceed with official complaints or had already buried or destroyed the specimens and as a result, no samples could be taken for toxicological analyses; In some cases, forestry and veterinary services were unable (as they were undermanned or due to lack of funds) or unwilling to handle poisoned animals and take or send samples (claiming difficulty in finding the culprit/ extra bureaucracy). The procedure for conduction of toxicological analyses is also hindered by the fact that to date there is no clear legislative framework to define the competent services for the safe handling of poisoned animal incidents (animal removal, extraction of samples and delivery to specialized labs for analyses). Also, the existence of only one laboratory in the country that can perform such analyses causes great delays as they may take several months to be completed and results sent to relevant authorities. The financial crisis is making the situation even more complex, as the regional forestry and veterinary services are undermanned and funds are scarce.

The results of the conducted toxicological analyses, showed that phytosanitary products are most frequently used for wildlife poisoning. These include approved and legally available products but also products banned at national, European or international level. Carbamates are the toxin group that is found in most of the incidents (40,7%). *Carbofuran*, which was banned in 2008, has been used in seven poisoning incidents (25,9%) and it is also responsible for the poisoning of two Egyptian Vultures, six Griffon Vultures. Another active substance of the same group is *Methomyl* which has been detected in four incidents (14,8%). The use of Methomyl in powder form was banned in Greece in 2008 but its use was reapproved in liquid form in early 2013. Organochlorides come second in frequency, including the banned *Endosulfan* that has been detected in three incidents (11,1%). Organophosphates (*Phorate* and *Chlorpyrifos*) have been detected in two incidents (7,4%). *Cyanide* capsules covered with wax are still commonly used. These capsules were detected in six incidents, whether alone or with other ingredients.

Anti-poison activities implemented in the country

During 1990-2010 anti-poison actions and campaigns had been implemented in the framework of six Life projects for the Brown bear, the Wolf and the Black Vulture. After 2010 the following LIFE projects have been implemented or are still under implementation, which involve anti-poison campaigns and actions addressing other conservation needs of the species. It is important to note that Greece is the only country from the Balkan region for which a National Strategy Against Wildlife Poisoning has been developed by the Anti-poison Task Force, under the scope of the Return of the Neophron Life Project and has been submitted to the relevant authorities. This strategic document, currently under revision for endorsement by relevant government authorities, represents a sound foundation for future conservation work related to wildlife poisoning.

Unlike the majority of the countries in the Balkans, conservation NGOs in Greece have managed to form Canine Teams (Anti-poison dog units) which greatly facilitated their efforts in combating wildlife poisoning. Apart from being a preventive means, the Canine Teams contribute to the dissemination and increase of awareness regarding this conservation problem and they also assist the competent authorities in their pre-trial work, collecting findings that can be used as evidence during the investigation and the judicial procedure. More specifically, for the period 2014-2017, the Canine Teams operating in Central Greece and Thrace carried out 276 patrols, covering 623 km and detecting 127 poisoned animals and 133 poison baits in 70 of these patrols, which correspond to 56 poisoning incidents. The most common species found poisoned was the shepherd dog with 57 deaths followed by the fox with 27 deaths. During the first two years that the Canine Teams were active (2014-2015), 28% of the total poisoning events recorded in the database were detected thanks to the use of the Teams, proving just how effective these units can be and underlining the importance of having such a tool in the fight against poison.

Table 8. Overview of implemented and current projects in Greece relevant to wildlife poisoning

Project	Target species	Relevant conservation implications	Period	Beneficiary
PINDOS/GREVENA - Demonstration of Conservation Actions for *Ursus artcos** and habitat type 9530* in Northern Pindos N.P., Grevena Prefecture, Greece **LIFE07 NAT/GR/000291**	Brown bear	- Work on eliminating drivers of human-wildlife conflict; - Facilitation of stakeholder involvement; - Awareness raising Anti-poison campaigns;	2009-2012	Region of Western Macedonia - Sub-regional office of Grevena
Innovation against poison - Innovative actions against illegal poisoning in EU Mediterranean pilot areas. **LIFE09 NAT/ES/000533** * after Life action only on Crete.	Black Vulture; Bearded Vulture; Egyptian Vulture	- Development of information base of poisoning incidents; - Facilitation of stakeholder involvement; - Development of technical guidelines on combating illegal poisoning; - Awareness raising Anti-poison campaigns;	2010-2015	University of Crete–Special Account for Research (UoC), ARCTUROS
ARCTOS/KASTORIA - Improving conditions of bear-human coexistence in Kastoria Prefecture, Greece - Transfer of best practices. **LIFE09 NAT/GR/000333**	Brown bear	- Reduction of human caused mortality (including poisoning); - Facilitation of stakeholder involvement; - Awareness raising Anti-poison campaigns;	2010-2015	Region of Western Macedonia
Return of the Neophron - Urgent measures to secure survival of the Egyptian Vulture (*Neophron percnopterus*) in Bulgaria and Greece. **LIFE10 NAT/BG/000152**	Egyptian Vulture	- Safe supplementary feeding stations; - Facilitation of stakeholder involvement; - Anti-poison dog unit; - Awareness raising Anti-poison campaigns; - Development of an Action Plan for the species; - Development of National Strategy Against Wildlife Poisoning.	2011-2016	HOS, WWF Greece
LIFE ARCPIN - Conservation actions for improving conditions of human-bear coexistence in Northern Pindos **LIFE12 NAT/GR/000784**	Brown bear	- Reduction of human caused mortality (including poisoning); - Facilitation of stakeholder involvement; - Awareness raising Anti-poison campaigns;	2013-2017	Municipality of Grevena
LIFE RE-Vultures - Conservation of Black and Griffon Vultures in the cross-border Rhodopes mountains **LIFE14 NAT/NL/000901**	Black Vulture; Griffon Vulture	- Reinforcement of wild ungulate populations; - Anti-poison dog unit; - Environmental education actions; - Facilitation of stakeholder involvement;	2016-2021	HOS, WWF Greece
Egyptian Vulture New LIFE - Urgent Action to Strengthen the Balkan Population of the Egyptian Vulture and Secure Its Flyway **LIFE16 NAT/BG/000874**	Egyptian Vulture	- Research on the impact of agriculture chemicals and Identify as poisoning agents and evaluate the use of veterinary drugs to inform response strategy; - Engagement to secure appropriate changes of legislation regarding the use of dangerous pesticides and vet medicine products; - Development of local action plans against wildlife poisoning; - Establishment of a pan-Balkan network of stakeholders against wildlife poisoning; - Evaluation of the magnitude of damages to Egyptian Vulture due to poisoning; - Safe vulture feeding sites; - Pilot testing of measures for livestock breeders and farmers against predators - Patrols with Canine Teams - Facilitation of stakeholder involvement; - Environmental education and awareness raising	2017-2022	HOS, WWF Greece

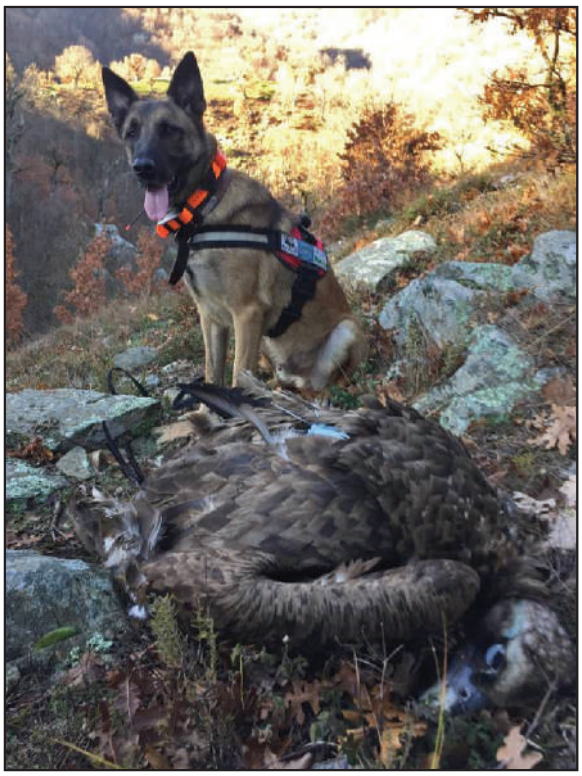

Photo 6. Poisoned Black Vulture found by a Canine Team in Thrace, December 2017.
Source: E.Kret/WWF Greece

Legal framework

The use of poison baits is strictly prohibited in Greece under national legislation due to the extensive negative consequences to wildlife, especially to rare and endangered species. There are special provisions that regulate everything about legal poison use (special procedures, terms, prerequisites and criteria that would allow this practice).

Existing national legislation relevant to wildlife poisoning in Greece:
The present legal framework for the fight against poison baits is determined by the provisions of **Presidential Decree 67/1981** "On the protection of indigenous Flora and Wild Fauna and on the determination of the coordination procedure and the Control on their Research" (OGG 23/v. A'/30.01.1981) », which was issued under authorization of article 16 of Law 998/79. Article 9 of P.D. 67/1981 provides that "Toxic substance or any other poison use for the elimination of identified harmful species is prohibited, as these substances endanger protected species of wild fauna and indigenous flora".

Penal code: Refers to "Poisoning of livestock fodder", according to which any person who intentionally poisons pastures, meadows, lakes or other sites of livestock watering is sentenced to a minimum of six months imprisonment. If this act caused deaths or serious and permanent damage to livestock of another person, then the maximum sentence is ten years incarceration. 2. Any person who is unintentionally found guilty of the criminal act of par. 1 is sentenced to a maximum of two years imprisonment or to pay a fine.

Law 1300/1982-On preventing and suppressing animal stealing and animal killing: animal killing is punished under the provisions of article 1 par.2 Law 1300/1982 with a minimum sanction of a two (2) year imprisonment and a fine (OGG 129/v. A'/13.10.1982).

Joint Ministerial Decision 37338/1807/E.103 /01.09.10 «Definition of measures and procedures on the conservation of wild birds and their habitats, in compliance with the provisions of Directive 79/409/EEC, "On the conservation of wild birds" of the European Council of April 2nd 1979, as codified by Directive 2009/147/EC.. », (OGG 1495 / v. B' / 06.09.2010)**:** Article 8, par. 1 («Prohibited hunting gear/means») states that during hunting, capturing or killing birds, the use of any means, installation or method of mass and non-selective capturing or killing that may cause local extinctions of a species is prohibited, especially these means, installations or methods cited in Annex III (case 1) of article 14. Poison bait or tranquilizer use is among these methods. According to article 11 par. 2.a.c., offenders of the aforementioned article are sentenced to a fine of 100 to 300 Euros. Moreover, according to article 11 par. 2.b.c., offenders of the aforementioned article are sentenced to up to a year imprisonment and a fine.

Relevant international treaties and conventions that Greece is parties to:

Convention on the Conservation of European Wildlife and Natural Habitats (Bern, 1979): Ratified by Greece under Law 1335/1983 "Ratification of International Convention on the conservation of European wildlife and natural habitats" (OGG 32/v. A'/14.03.1983). It prohibits the use of any non-selective means of capture or killing as well as of means that may induce local extinction or heavily disturb the populations of a species, namely means listed in Annex IV (article 8 of the Ratification Law).Annex IV of the same Law, includes "Poisons and poison or tranquilizing baits" as "Prohibited means and methods of hunting and other forms of exploitation".

Table 9. Overview of the governmental authorities responsible for Anti-Poison work in Greece

Institution	Responsibility	Level of enforcement
Forest Service	Detection, information campaigns related to best practices in reducing losses inflicted by wildlife.	national
Veterinary Service	disposal and transport of dead animals.	national
The Centre of Athens Veterinary Institutions	Conduction of necropsies and toxicological analysis.	national
Ministry of Environment and Energy	Legislative.	national
Ministry of Rural Development and Food	Legislative.	national
Public Prosecutor's Office	Law enforcement.	national

3.6 Macedonia (FYR)

Contributors: **Nenad Petrovski[1], Metodija Velevski[2], Emanuel Lisičanec[3]**

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Introduction

Organized poisoning campaigns against wolf populations started to take their toll among vultures in Macedonia since 1947. Although the use of poison baits for predator control was banned in 1985, the practice never stopped among the local livestock breeders, and the baits are usually placed after wolf packs inflict major damages to the farmers. The wolf population in Macedonia seems to be on continuous increase since 1965 (unpublished data of the Ministry of Agriculture, Forestry and Water Economy of the Republic of Macedonia) and with the decreasing numbers of livestock, intensification of this conflict is on the rise. Poisoning of feral dogs is also common in and around most of the rural and urban settlements, and some of their carcasses are occasionally available for vultures on the settlements dumping sites. As a result of the practice of poison use, which is most frequent in the period between February and April, an estimated number of 1000-3000 Griffon Vultures have been poisoned since 1947 till today (more than 100 in the last 14 years), and unknown number of Egyptian Vultures (about 10 in the last 14 years). Poison use is likely one of the underlying causes for extinction of the Bearded and Cinereous Vultures from Macedonia.

Historical data on the use of poison in the nature

The first recorded poisoning of Griffon Vultures in Macedonia is from the now trans-boundary Shar Planina Mt, where hundreds of birds were poisoned in the period 1947-1954 (mostly on the territory of Kosovo, Naumov 1981). Since then such practice has been often present in Macedonia, and Grubač (2000) mentions poisoning of about 100 vultures and Eagles around Prilep in 1979. Reasons for the use of poison in the past were almost exclusively related to state-supported poisoning actions aimed at wolves, but a single case of use of rodenticides for pest control responsible for loss of the pre-migratory flock of Egyptian Vultures in 1992 is also very important to note.

Although poison use has been prohibited in 1985, it is still practiced as an affordable and effective method for elimination of undesirable animals and wildlife, especially after different pesticides become readily available on the market in high concentrations for low prices. By then, the Black and Bearded Vulture became extinct as breeding species in the country and only individual vagrant birds were occasionally recorded. A single pair of Bearded Vultures endured in the country until 1985, when the female died from poisoning and with it the species practically became extinct from the Balkan region (except the island population on Crete). At the beginning of the 21th century populations of both Griffon Vultures and Egyptian Vultures declined strongly, chiefly because of the illegal use of poisonous bait for the control of predators and feral dogs, but also as a result of food shortage, habitat loss and disturbance.

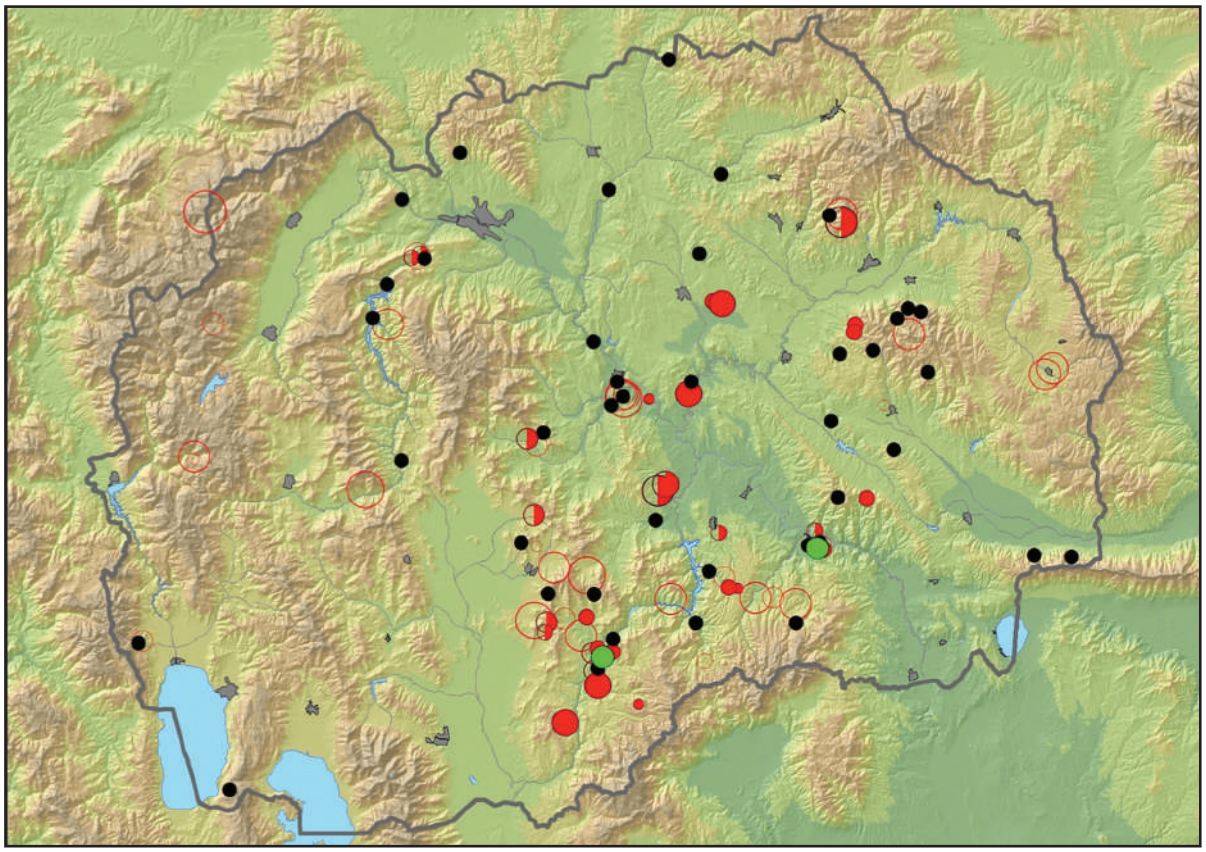

Figure 4. Known cases of poisoning of Vultures and Eagles in Macedonia (FYR) for the period 1947-2013. Empty circles: cases before 1985 (ban of poison use for carnivore control); half-full circles – period between 1985-2000, full circles – period between 2001 and 2013. Black spots: former Griffon Vulture colonies. Green circles: Griffon Vulture Colonies in 2013. After Grubač et al. (2008), with supplements.
Source: Macedonian Ecological Society.

Current situation in the country

Wildlife poisoning incidents in Macedonia are generally well documented, drivers and stakeholders identified. Relevant institutions keep records of all wildlife poisoning cases which were legally processed, while MES keeps track of poisoning and suspected poisoning incidents and mortality of birds of prey which occurred in the last 15 years. Additionally, MES has also compiled all available data regarding vulture poisoning incidents which occurred in the country during the last 30 years. During this period, the primary reasons of poison use in Macedonia can be attributed to:

- Intentional use of poison, with poison baits, to kill predators (wolves, jackals, foxes).
- Intentional use of poison, with poison baits, to eliminate feral and stray dogs from local communities.
- Intentional use of poison (rodenticides) to reduce or eliminate rodent populations.
- Intentional use of poison (insecticides) to reduce damages to beekeepers - mainly targeted at martins (Martes sp.).
- Intentional use of poison to resolve human-human conflicts between neighbors.

Locally, the use of poisoned seeds to eliminate pigeons before planting, with lethal consequences for Imperial Eagles, has also been noted. The use of rodenticides is regular in many regions of the country, but evidence of impact on vultures and large eagles is still lacking.

Consequently, livestock breeders, hunters, farming communities and locally honey-producers should be the target group for implementation of anti-poison activities. Low awareness of decision makers and relevant governmental institutions, as well as general public greatly contributes to the fact that wildlife poisoning is still not being perceived as a hazard for human health and as a criminal activity in general. Therefore, it is imperative that continuous awareness raising actions are carried out.

Based on the evidence of recorded poisoned vultures and other birds of prey, the use of poison in the recent period (2002-2014) seems unevenly distributed, being more frequent in the regions of Mariovo, Tikves, Ovce Pole and likely Plackovica Mt. (see Figure 1 for the hotspots). These areas are one of the most important agricultural areas in the country, which could be the reason for more frequent conflicts with various wildlife. All but two of recent recorded cases (n=17, 2001-2013) have taken place in the period February – April (the exceptions being July 2012 and October 2013). Resent data (2014) also pinpoints poisoning of wild boars that inflict damage to the crops as potential risk in some region.

According to the few toxicological analyses of poisoned birds officially conducted by relevant authorities and field inquiries, *Methomyl* is the most frequently used pesticide (fungicide) involved in wildlife poisoning. The concentration of 90% is illegally sold on the market, while lower concentrations, and also other products, are legally distributed in agricultural pharmacies.

Before the breeding season in 2011, a poisoning occurred at the feeding place “Vitacevo”, where three adult Egyptian Vultures were found poisoned (Photo 7.). The case was reported to the authorities, anathomo-pathological analyses proved that the birds died from poisoning, while toxicological analysis of the food remains (sheep carcass laced with poison) done by the Department of criminal techniques (within the Ministry of internal affairs) confirmed Methomyl as the source of poisoning. Further investigation was unable to identify the culprits responsible for this incident.

There is some overlap and uncertainties with jurisdiction between legal bodies regarding prevention, control and investigation of poison use. Firstly, the proper procedure for reporting wildlife poisoning incidents is unclear, mainly which institution needs to be contacted first. Therefore, more efficient, clear-cut legal protocols for describing responsibilities in reporting, investigating and processing cases of wildlife poisoning need to be developed and distributed within all responsible institutions to precisely define jurisdiction of each one within national legislation and avoid overlaps. Also, communication and information change between responsible institutions and sectors related to jurisdiction, responsibilities need to be enhanced. A part from this, the development of organized systems and protocols related to reporting, collecting and disposal of dead animals would be very useful in reducing the number of unsafe food for vulture consumption, thus reducing the probability of poisoning to occur.

Clear-cut protocols and Standard Operational Procedures related to duties and responsibilities of existing governmental laboratories about processing poisoned animals, as well as accredited protocols and security measures in sampling are lacking and need to be developed to facilitate their work. To facilitate the entire process of the legal proceedings of poisoning incidents a referent laboratory, within existing institutions, for processing cases of wildlife poisoning needs to be officially designated by relevant decision makers. There are at five laboratories within existing institutions with sufficient capacities and personnel expertize to conduct toxicological analysis. With some additional funding, resources and capacity-building towards equipment the laboratories will be able to conduct thorough toxicological analysis and investigate cases of wildlife poisoning since personnel expertise already exists.

There is urgent need to consolidate the legislation and clearly identify the competences of the responsible authorities, avoiding overlap, ensure technical capabilities (laboratories) and know-how. An over-reaching national anti-poisoning strategy, incorporating in-field procedures and investigation protocol is highly needed. Awareness raising activities should be continued, and deepened down to level of individual stakeholder group. Low awareness of decision makers and general public is primarily the reason why wildlife poisoning is not perceived as a hazard for human health and as a criminal activity in general.

Photo 7. Poisoning incident in Vitacevo 2011: 3 Egyptian Vultures poisoned.
Source: Macedonian Ecological Society.

Anti-poison activities implemented in the country

The anti-poison activities in Macedonia began in 2006, when 4 workshops were held for representatives of the different inspectorates (ca 120 people attending in total), and ca 20 educational lectures in the villages. In 2008, 15 shepherd dogs were provided to the livestock breeders in the region of Mariovo (the region with most frequent use of poisonous baits), and in 2010 another two workshops were held for the inspectorates (ca 60 more people). Educational lectures were continued in the period 2008-2009, for the villagers in the vulture regions within the scope of the BVAP.

In 2012 capacity-building training was held for veterinarians for anatomo-pathological analyses and basic toxicological analyses at the Veterinary Faculty in Skopje. Food provision might be considered as one of the antidote activities, ensuring safe food for the vultures, but there is no proof for the efficiency of this measure in Macedonia, as the trend of the Vultures continued to decline (actually, this trend was only shortly reversed for the Griffon Vultures in the period 2006-2009, when intensive actions against poison use were undertaken in the field.)

Legal framework

Macedonia overall has good legislation in place related to the use of poison substances in the natural environment, where wildlife poisoning is clearly defined as an illegal activity, punishable under Criminal law.

Existing national legislation relevant to wildlife poisoning in Macedonia (FYR):

Hunting law: Article 54. states that hunting is prohibited by any means which can lead to massive losses to populations of game animals, including the use of poisonous substances.

Law on nature protection: Article 43. prohibits the use of non-selective means of capturing and shooting of wild species, as well as use of substances that may cause local exhaustion or serious disturbance of the populations of those species, in accordance with the international agreements ratified by the Republic of Macedonia, and in particular: poison and tranquilizing substances and poison and tranquilizing baits.

Law on plant protection products: Although this law does not particular refer to wildlife poisoning, it is relevant because it describes the legal use and application of toxic substances in agriculture. Inadequate use and application of these phytosanitary products are often a source of unintentional poisoning of various wildlife.

Criminal law: Article 230. refers to persons who store, disintegrate or keep hazardous waste that has the property of explosiveness, reactivity, inflammability, extravagance, toxicity, infectivity, carcinogenicity, mutagenicity, teratogenicity, ecotoxicity or toxicity release property through chemical reactions and biological reproduction. Under the Criminal law they are liable to be penalized by prison sentence from one to five years.

Relevant international treaties and conventions that Macedonia (FYR) is parties to:

Convention on the Conservation of European Wildlife and Natural Habitats (Bern, 1979): Ratified with the Law on Ratification ("Official Gazette of the Republic of Macedonia no. 49/97) and entered into force in 1999. It prohibits the use of any non-selective means of capture or killing as well as of means that may induce local extinction or heavily disturb the populations of a species, namely means listed in Annex IV", while in Annex IV of the same Law, which is entitled "Prohibited means and methods of hunting and other forms of exploitation", "Poisons and poison or tranquilizing baits" are included.

Table 10. Overview of the governmental authorities responsible for Anti-Poison work in Macedonia (FYR)

Institution	Responsibility	Level of enforcement
Ministry of Environment and Physical Planning	Legislative.	national
Ministry of Agriculture, Forestry and Water Economy	Legislative.	national
Agency for Food and Veterinary	Conduction of necropsies and toxicological analysis.	national
State Environmental Inspectorate	Investigation, Law enforcement.	national
State Inspectorate for Forestry and Hunting	Investigation, Law enforcement.	national
Police	Pre-investigation procedures, investigation, Law enforcement.	national

3.7 Serbia

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Introduction

Poisoning was identified as the main cause of disappearance and decline of vulture populations in Serbia from the late 19th to early 21st century, but poisoning incidents were poorly documented and recorded. Birds are most often a collateral damage of poison intended for some other species regarded as vermin, while birds of prey are common victims of intentional and non-intentional poisoning. Since the beginning of the 21st century, poisoning and suspected poisoning incidents with birds in Serbia have been better documented and recorded by both responsible governmental institutions and relevant national NGOs. Bird Protection and Study Society of Serbia (BPSSS) has compiled and analyzed all available data relevant to illegal killing or harming of birds, including poisoning, within the Report on illegal shooting, poisoning, trapping, possessing and trade of wild birds in the Republic of Serbia for the period 2000-2017 (Ružić *et al* 2017), making this data publicly available. Excessive and inadequate use of legal, but also illegally sold pesticides like *Furadane* (Carbofuran) and *Kreozane*[1] is still a common practice in the country.

Although Serbia is not officially included in the BAPP project, it is a key country for the perseverance and recovery of vulture populations in the region.

Historical data on the use of poison in the nature

First cases related to the use of poison for wildlife in Serbia were recorded during the end of the 19th and beginning of the 20th century in Vojvodina and some parts of Eastern Serbia, when *strychnine* was used to eliminate wolfs. A period of massive organized, government sponsored legal poisoning actions against wolf and other carnivore populations followed. Poisoning actions were carried out throughout the country after the II World War, during the period 1947-1976, which led to massive poisoning and disappearance of Griffon Vultures and other vulture species in Serbia, similarly to other countries in the region (Grubač 1998, 2000). A part from strychnine, *hydrogen cyanide*, was also commonly used. Results of this action were obvious to measure with the catastrophic decline, range constriction and complete disappearance of vultures and other scavenger species from the country.

Poisoning of wolves and other mammalian predators was the main reason for extinction of the Griffon Vulture from the majority of its former breeding range in Serbia (Marinković 1999, Grubač 2000). It is estimated that around 700 vultures were poisoned in Serbia during poisoning actions in 1959 (Mardešić & Dugački in Marinković, 1999). Since 1975 the poisoning of wolfs and other carnivores is officially illegal in the country. By then the local communities, especially in rural areas became accustomed to the use of poison to resolve conflicts with wildlife and the practice, although significantly less frequent than in the past, is still very much present and causes significant losses to populations of many species. Since 1980 the illegal practice of poisoning of stray dogs, wolves and other wildlife was continued and caused mortality of numerous Griffon Vultures.

Current situation in the country

There has not been a recorded incident of vulture poisoning in Serbia for the past 10 years. Governmental engagement in preservation of the last breeding colonies of Griffon Vulture in Serbia which were facing extinction due to illegal wildlife poisoning during the 80s and 90s was crucial for the survival of the species. Special nature reserves were created, providing safe food within supplementary feeding stations, public awareness campaigns and monitoring has been conducted by both governmental and NGO sector, which greatly contributed to eliminating poison bait use in the region of the country where vultures were still present. Additionally, depopulation and the consequent reduction in population of livestock re-

[1] Frequently used herbicide (dimethyl-cresol)

duced the conflicts with wild predators, and with it the use of poison for resolving those conflicts. The last known case of vulture poisoning (6 poisoned Griffon Vultures) in the country was recorded in 2008 in Trešnjica gorge, near the breeding colony of the species (Photo 8.).

Photo 8. Dead Griffon Vulture, poisoned with kreozan in Trešnica gorge, Serbia, 20.06.2008.
Source: Bratislav Grubač

However, wildlife poisoning is still very much present and well documented, especially that related to birds, in numerous regions in Serbia, especially in the vicinity of commercial hunting grounds, (Figure 5.) and remains the most severe potential threat for vulture populations in the country. BPSSS has established a Bird Crime Task Force for several years which works actively at detecting and reporting all incidents associated to illegal killing and harming of wild birds, both to the relevant authorities and general public. Also, they have developed a database for keeping records of individual poisoning incidents, their associated legal proceedings and penal administrations, which makes analysis of the scope and severity drivers and stakeholders associated with wildlife poisoning possible. There had been a total of 169 individual poisoning incidents officially recorded and reported to the proper authorities since the year 2000 (Figure 6.). The top three bird species most affected by poisoning incidents so far are the Common Buzzard (*Buteo buteo*), Black-headed Gull (*Larus ridibundus*), White-tailed Eagle (*Haliaetus albicilla*) (Ružić *et al* 2017).

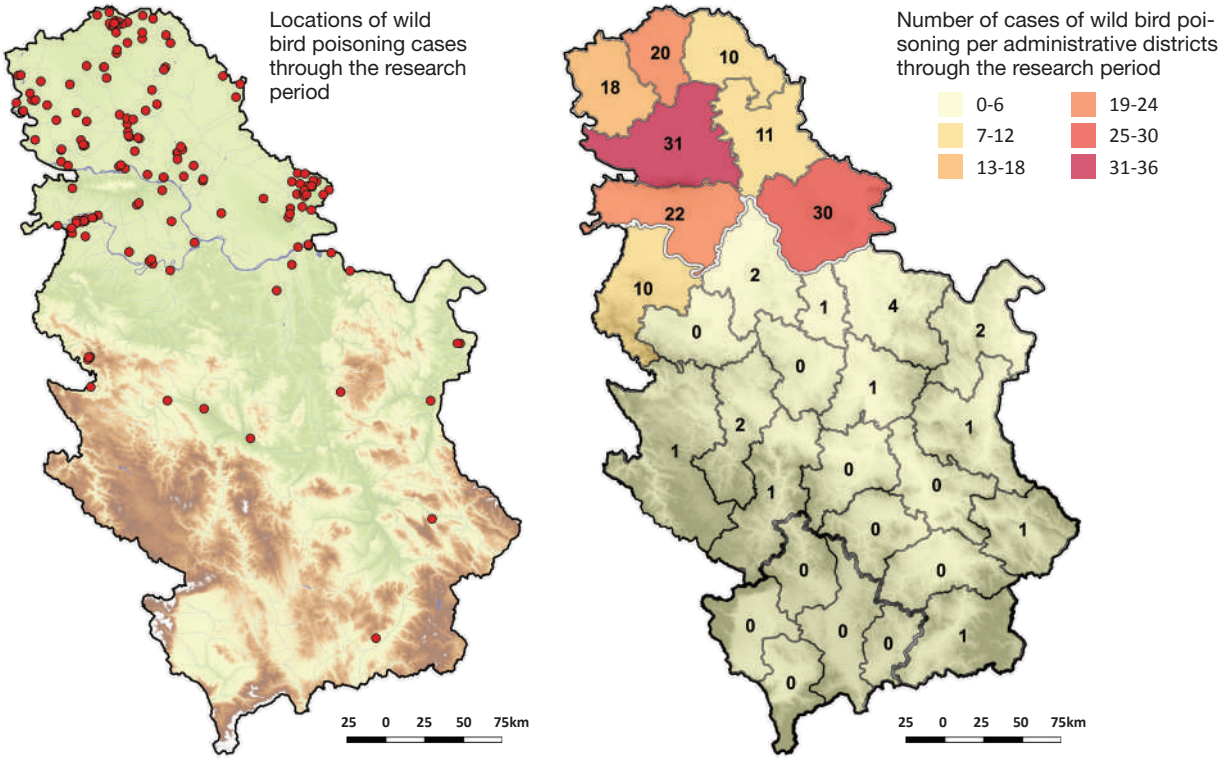

Figure 5. Overview of poisoning incidents with wild birds per administrative districts in Serbia for the period 200-2017.
Source: Ružić, M., Mirić, R., Vračarić, M., Rajković, D., Rajkov, S., Knežević, S., Stanojević, N., Mišković, M., & Pantović, U. (2017): Report on illegal shooting, poisoning, trapping, possessing and trade of wild birds in the Republic of Serbia for the period 2000-2017. Bird Protection and Study Society of Serbia, Novi Sad.

Poisoning of birds in Serbia can be differentiated on intentional poisoning, aimed at a certain bird species or group of species (raptors), or unintentional poisoning, where birds are not the primary target. Within unintentional poisoning, based on the different drivers that motivate poison use, we can distinguish between:

- Unintentional poisoning, with poison baits, to kill predators: Poison is mainly used to resolve conflicts between mammalian predators (jackals, foxes and wolves) and hunters and livestock breeders. Mostly entire animal carcasses (mostly pig and sheep) are laced with toxic substances, such as *Furadan*, and placed usually within commercial hunting areas or at the outskirts of rural areas and individual farmsteads. This type of poisoning is still most dominant today and responsible for the majority of poisoning incidents.

- Unintentional poisoning, with rodenticides, to reduce or eliminate rodent populations: Excessive use and inadequate application of rodenticides, aimed at achieving better results in controlling rodent populations in agriculture is very common and widely distributed in Serbia. These toxic compounds are most often used in much higher quantities then prescribed by the manufacturer. Poison baits for rodents, usually in form of corn seeds, are placed on wide agricultural surfaces, instead only around rodent holes, and are thus much more available to other wildlife. Secondary poisoning by ingesting poisoned rodents is also very common.

- Unintentional poisoning, with poison baits, to eliminate feral and stray dogs from local communities: Poison baits are primarily used to eliminate the damages that feral and abandoned dogs can inflict upon livestock in local communities.

On the other hand, there are frequent cases where birds are considered as a nuisance or vermin and are deliberately poisoned. This is associated with conflicts that pigeon fanciers have with damages inflicted by birds of prey. Poison is usually smeared over live pigeons which are then released in the vicinity of the nest of breeding birds during the rearing period, increasing the chances that the poisoned food also reaches the clutch. Goshawks, Peregrine and Saker falcons are the primary targets for this type of poisoning. These incidents are also frequent during winter period, when wintering birds from other populations arrive and the amount of conflicts with pigeon fanciers increase.

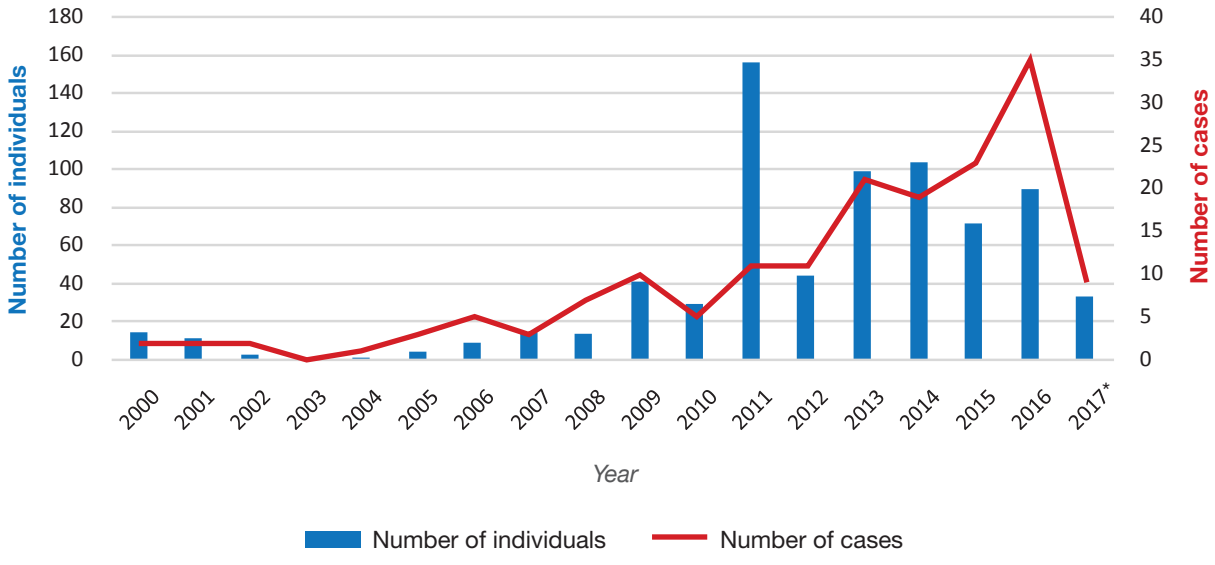

Figure 6. Number of poisoned birds found and poisoning incidents recorded in Serbia from 2000-2017.
Source: Ružić, M., Mirić, R., Vračarić, M., Rajković, D., Rajkov, S., Knežević, S., Stanojević, N., Mišković, M., & Pantović, U. (2017): Report on illegal shooting, poisoning, trapping, possessing and trade of wild birds in the Republic of Serbia for the period 2000-2017. Bird Protection and Study Society of Serbia, Novi Sad.

Combating wildlife poisoning in Serbia, which is recognized as one of the most important threatening factors for birds in the country, primarily depends on much stricter enforcement of existing legislation by relevant governmental authorities, especially legislation related to the control of production, trade and application of pesticides and similar chemical compounds used in agriculture. Banned substances are relatively available on the existing black market and can also be advertised even through social networks such as Facebook.

There are uncertainties with responsibilities and jurisdiction of some relevant institutions regarding prevention, control and investigation of poisoning incidents. Therefore, more efficient and clear-cut legal protocols for describing responsibilities in reporting, investigating and processing cases of wildlife poisoning need to be developed and distributed within all responsible institutions to precisely define responsibilities and jurisdiction of each one within national legislation and avoid overlaps. Also, communication and information change between responsible institutions and sectors related to jurisdiction, responsibilities need to be enhanced. A part from this, the development of organized systems and protocols related to reporting, collecting and disposal of dead animals would also be very useful in reducing the number of unsafe food for vulture consumption, thus reducing the probability of poisoning to occur.

A vital part for legal proceedings of poisoning incidents is the conduction of proper toxicological analysis. Efforts have to be made to increase the capacities and resources that referent laboratories have at their disposal for such analysis.

Anti-poison activities implemented in the country

Within the project Balkan Vulture Action Plan in Serbia during 2004-2008, ICNS organized anti-poison activities, mainly related to awareness raising, including: educational presentations, distribution of promotional materials (leaflets) in order to engage with relevant stakeholders (farmers, hunters, inspection, policy and media) and sampling of poisoned birds.

First organized efforts towards monitoring and combating wildlife poisoning and other bird crime related issues in the country were made by BPSSS in 2014, with the establishment of their Bird Crime Task Force within the organization. Since then, annual surveys have been conducted in the northern part of the country (Vojvodina Province) during winter period when wildlife poisoning most frequently occurs. However, it is important to note that a large number of poisoning cases reported to the relevant authorities by BPSSS are based on information received from concerned citizens. After three years work on detection, reporting and monitoring of legal proceedings of bird crime related case, a database was created and a Report on illegal shooting, poisoning, trapping, possessing and trade of wild birds in Serbia was created in 2017, making this data publically available.

Table 11. Overview of implemented and current projects in Serbia relevant to wildlife poisoning

Project	Target species	Relevant conservation implications	Period	Beneficiary
Review the scale, scope and impact of illegal killing of birds in the Mediterranean	Birds	First estimates produced for illegal killing of birds	2014	BPSSS
Civil Society for improvement of integration of Serbia in EU	Birds	Establishment of database for bird crime	2017	BPSSS
PannonEagle Life Conservation of the eastern imperial eagle by decreasing human-caused mortality in the Pannonian Region. **LIFE15 NAT/HU/000902**	Eastern Imperial Eagle	Combating wildlife poisoning (warding, surveillance)	2016-2022	BPSSS
Stop poisoning of birds of prey in Serbia – safe environment for birds and people	Birds of prey	Combating wildlife poisoning (surveillance, detection, awareness and media campaigns)	2018-2019	BPSSS

Legal framework

Serbia has good national legislation in place related to the use of poison substances in the natural environment, where wildlife poisoning is clearly defined as an illegal activity, punishable under Criminal law.

Existing national legislation relevant to wildlife poisoning in Serbia:

Law on nature protection: Article 79. prohibits the use of certain means of catching and killing wild species animals endangering and harassing their populations and/or habitats, disrupts their well-being and can cause their local disappearance, which include the use of poison or tranquilizing baits.

Law on hunting and game animals: Article 22. prohibits the use of phytosanitary substances and other chemical substances in quantities and dosages that can cause damages to game animals, as well as intentional poisoning of game animals.

Criminal law: According to article 269., whoever, by violating these regulations, kills, hurts, tortures or otherwise abuses animals, shall be punished by a fine or imprisonment not exceeding one year. Additionally, according to article 276., whoever hunts game animals whose hunting is forbidden or who hunts without a special permit a particular game animal for which hunting requires such a permit or who hunts in a manner or means that inflicts mass destruction of game animals, shall be punished by imprisonment for a term not exceeding three years.

Relevant international treaties and conventions that Serbia is parties to:

Convention on the Conservation of European Wildlife and Natural Habitats (Bern, 1979): Ratified with the Law on Ratification ("Official Gazette of the Republic of Macedonia no. 49/97) and entered into force in 1999. It prohibits the use of any non-selective means of capture or killing as well as of means that may induce local extinction or heavily disturb the populations of a species, namely means listed in Annex IV", while in Annex IV of the same Law, which is entitled "Prohibited means and methods of hunting and other forms of exploitation", "Poisons and poison or tranquilizing baits" are included.

Table 12. Overview of the governmental authorities responsible for Anti-Poison work in Serbia

Institution	Responsibility	Level of enforcement
Ministry of Environmental Protection	Legislative.	national
Ministry of Agriculture, Forestry and Water management	Legislative.	national
Veterinary Inspection	Investigation, conduction of necropsies and toxicological analysis.	national
Environmental Inspection	Investigation, Law enforcement.	national
Hunting Inspection	Investigation, Law enforcement.	national
Institute for nature conservation of Serbia	Investigation, Law enforcement.	national
Institute for nature conservation of Vojvodina Province	Investigation, Law enforcement.	regional
Police	Pre-investigation procedures, investigation, Law enforcement.	national

4. Conclusions

The illegal use of poison continues to be the single most important threat to vultures in the Balkans and current limiting factor for their recovery in the region. It also affects numerous other wildlife and domestic animals, and because of its common and frequent use in various forms it represents a severe threat to human health as well. The most common type of wildlife poisoning present in the Balkan region is the intentional placement of poison baits for the purpose of killing wild, feral or in some cases domestic animals. Presently, the use of poison baits or poisoning of animals is illegal in the Balkans, but is still commonly practiced by local people as a quick and relatively affordable "solution" for resolving conflicts with wildlife. Although the motives behind most of the vulture poisoning incidents remain undiscovered, the majority of well documented incidents indicate that the main driver of poison use in the Balkans are conflicts with predators (mainly jackals and wolves, but also foxes, bears) feral and stray dogs and the damages they cause to livestock breeders, farmers and to game animals in commercial hunting areas (Figure 7.).

The most commonly used substances for wildlife poisoning are pesticides: Carbamates and Organophosphates (*Carbofuran*, *Methomyl*, *Deltamethrin*), some of them being legal for use in agriculture for other purposes. The national laws strictly regulate the use of these substances, but ultimately this is not enforced in practice. The use of illegal substances, such as *Carbofuran,* which was banned more than 10 years ago, is still present in most of the Balkan countries, which closely relates with the illegal trafficking of these substances. These illegal substances are occasionally even advertised on the internet and sold publicly, indicating that a significant stockpile exists and that control of illegal trade of these substances does not represent a priority for relevant governmental enforcement agencies.

Unintentional poisoning due to inadequate application of chemical substances used mostly in agriculture, such as rodenticides, is also a frequent issue in the Balkan countries and it affects numerous species of wildlife. However, there are very few well documented cases of these poisoning incidents and much effort needs to be invested in research and monitoring in order to determine the scope and severity of this potential threat to vultures. Similarly, the severity of unintentional poisoning of vultures due to ingestion of lead particles and residues from shot game animals is not known.

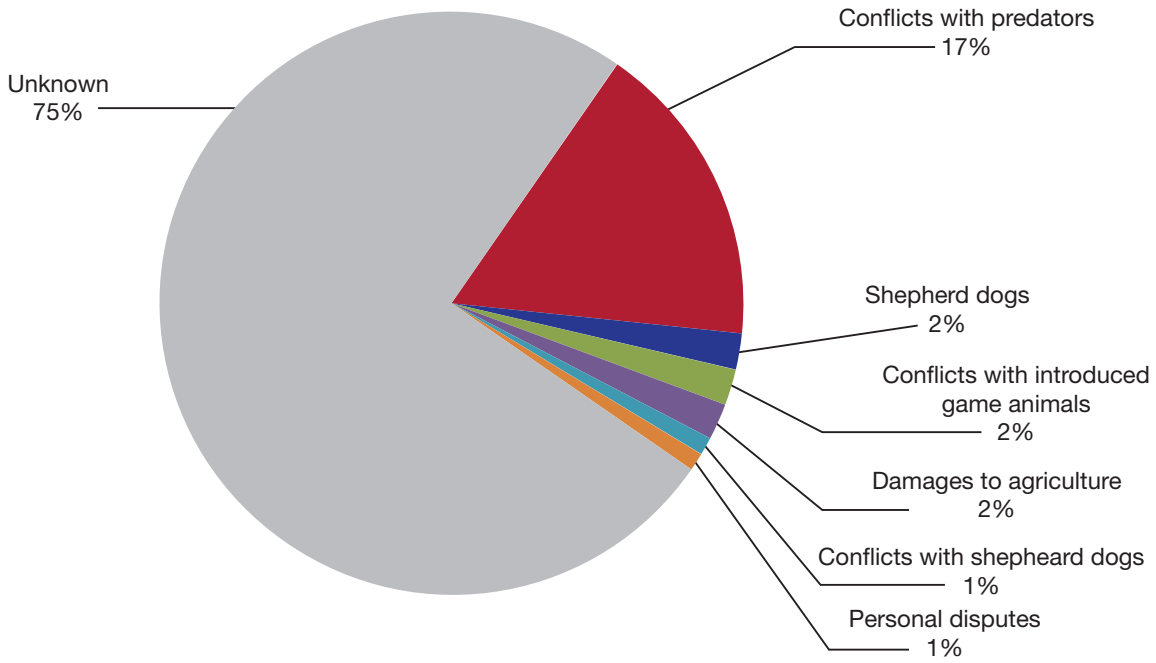

Figure 7. Drivers behind poison use in the Balkans

During the course of the last 20 years 227 poisoning incidents with vulture mortality have been registered throughout the Balkans and in the majority of these incidents more than one individual bird has been found poisoned. It is important to note that 76 % of the data on vulture poisoning originates from Greece. A part from the fact that the use of poisonous substances in the environment is still a common practice, conservation NGOs in Greece have invested significant efforts towards active detection and documentation of poisoning incidents, which also significantly contributed to the existing amount of data on vulture poisoning. Based on the available data, a total of 465 vultures have died from poisoning during this period, 385 Griffon Vultures, 36 Egyptian Vultures, 12 Black Vultures and one Bearded Vulture. This data are not estimates, but concrete data obtained from poisoning and incidents of suspected poisoning from the region. From the presented data for the last 20 years (Figure 8.) we can conclude that an average of 23 vultures are poisoned annually on the Balkan peninsula. If we take into account that approximately only 20 % of poisoning incidents are ever discovered and documented, we can estimate that about 115 vultures are potentially being poisoned annually throughout the Balkans. Therefore, based on the presented data, we can conclude that wildlife poisoning is the most significant threat for vulture populations in the Balkans. This factor has to be taken into account when planning any conservation initiatives regarding vultures, especially re-stocking and reintroduction initiatives.

During the last 15 years of vulture conservation actions and initiatives, several concrete anti-poison activities were implemented in the region. In the very beginning of the Balkan Vulture Action Plan, in 2002 a document was prepared: Balkan Antidote Programme (Actions Against the Illegal Use of Poison in the Natural Environment), short document highlighting the importance of National Strategies Against the Poison and listing activities that needs to be implemented by selected entities from each country. Later on, in 2004 a small grant from DG Environment EC was approved: “Seminar on anatomic-pathological and toxicological analyses of poisoning in the fauna in the natural environment” organized by FWFF – Sofia, Bulgaria. Lectures by Spanish experts were given to vets and biologists from the region (Bulgaria, Macedonia, Greece and Serbia). The same grant programme in 2006 secured funds for organizing specific anti-poison workshops with: environmental agencies, forestry, hunting and Police inspectors in Macedonia within the project “Strengthen national capacity for vulture conservation in Macedonia” implemented by MES – Macedonia. At the 2nd BVAP workshop (2006) a Balkan Anti-Poison Working Group was established. This group included representatives from each country, entities working on poison issues (mainly conservation biologists).

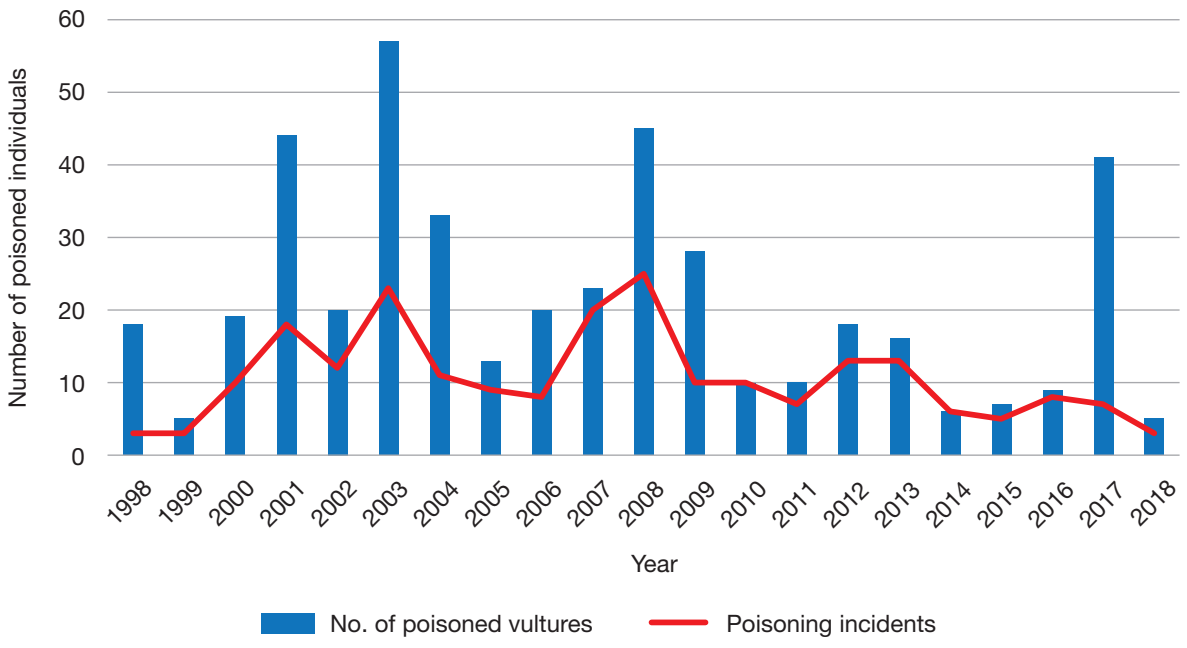

Figure 8. Number of poisoned individuals and number of vulture poisoning incidents in the Balkans during the last 20 years.

In 2012 VCF received a grant from WWF – Netherlands for organizing the: "Training seminar on toxicological and pathological analysis of presumably poisoned animals" (Vets Against Poison) in Skopje, Macedonia. Experts from Spain come to present the anti-poison activities implemented in Spain and also made practical demonstration of pathological and toxicological methods to the 30 participants from the Balkan countries (Bulgaria, Greece, Macedonia, Serbia and Croatia). With this seminar for the first time veterinary experts in pathology and toxicology took part of the Balkan Anti-Poison Working Group. During the implementation of the different projects aimed towards vulture conservation within the region, several incidents of poisoning occurred. These poisoning cases were noted and analyzed mainly by the nature conservation NGOs, unfortunately without much implication of the relevant national governmental authorities. The observed lack of protocols on how to deal with wildlife poisoning incidents and the lack of established routines and means for toxicological analyses meant that most of those cases never resulted in any judicial investigation and penal consequences.
Other implemented anti-poison action from the region:

- Compensation measures for the livestock breeders suffering from the damage of wild predators – "potential poisoners"

- Public awareness and education for the local people in areas where poison is frequently used.

- Specific training seminars for stakeholders such as livestock breeders, hunters, environmental agents, vet toxicologists and pathologies.

All these activities gave very promising results at local level. However, the experience with these poisoning incidents suggests that lack of capacity is not the main problem; rather it lies with the low awareness, and correspondingly an insufficient engagement of the relevant governmental institutions, including enforcement agencies (police), and the often vague and/or weak legislation. From past experience, but also best practice examples accumulated during the good Spanish experience in combating the use of poison in the natural environment, we can conclude that the priority for the Balkan region is to engage and work together with relevant governmental institutions, including the enforcement agencies.

The Balkan Anti-poisoning Project (BAPP), which represents an integral part of the Mediterranean Anti-Poisoning Project (MAPP) spearheaded by VCF, was launched in early 2018. with and aim to secure real and continued engagement of the relevant national governmental authorities in the Balkan region against illegal wildlife poisoning and increase their capacity to counteract it. Poisoning has been recognized as the single most important threat that vulture populations are facing worldwide within the Vulture Multi-species Action Plan (Vulture MsAP), a crucial strategic document for conservation of Old World vultures, approved by the Convention for Migratory Species (CMS) in 2017. The BAAP project is directly contributing into the implementation of the Vulture MsAP by implementing anti-poisoning actions in Albania, Bosnia and Herzegovina, Croatia, Greece and Macedonia. One of the main objectives of this project is to establish national anti-poison working groups, comprised of representatives from relevant governmental institutions and conservation NGOs, and to develop national anti-poison road maps in these five selected countries which will set a baseline for future conservation relevant to combating wildlife poisoning.

Overall, the problems in the fight against wildlife poisoning in the Balkan region can be attributed to:

Low awareness

There is a significant lack of knowledge and awareness about the severity of wildlife poisoning and the threat that it represents not only to wildlife (vultures in particular) and the fact that it is not only a nature conservation issue, but also a serious threat to the general public health and requires a multidisciplinary approach and efforts by different stakeholders in order to address it. Low awareness is present not only amongst governmental institutions responsible for processing and legal proceedings of wildlife poisoning incidents, but also general public, which is why in many countries it has a low priority for enforcement agencies, judiciary system and consequently often inadequate penal consequences.

In some countries (Albania in particular) wildlife poisoning is still not recognized as a conservation issue at all, as it is not included in any relevant legislation. This is a clear example that in countries where nobody is looking for cases of wildlife poisoning, it does not officially exist or represent a hazard in the natural environment, despite the fact that most of the vulture species and their populations have gone extinct.

Continuous awareness raising of general public, but also of governmental authorities is crucial for successful implementation of specific actions for detection of poison baits and poisoned animals in the field. These are the very first steps which need to be taken in order to address this most significant conservation issue for the vulture guild and also for numerous other wildlife. These kind of actions are lacking in most of the Balkan countries (except Greece and Bulgaria).

Even though this is not a problem affecting only the vulture guild, we must admit that vultures are perfect indicators for wildlife poisoning in the natural environment, especially Griffon Vultures (the most common vulture species). Therefore, vulture conservation entities (Nature Conservation NGOs) have a key role in identification of the problem and the awareness raising among all relevant decision makers and stakeholders.

Insufficient engagement of the relevant governmental institutions and enforcement agencies

Having low awareness of the problem that wildlife poisoning represents it is not surprising that relevant governmental authorities are poorly engaged in detection and prevention of this conservation issue. In most of the Balkan countries wildlife poisoning is regarded as a serious threat to vultures, manly or only by the bird conservation organizations. On the other hand, placing poison baits in the natural environment is well defined in the existing national legislation in all Balkan countries (except Albania) as strictly forbidden and punishable according to the criminal or penal code of the country. Also, the use and proper procedures related to acquisition and application of various pesticides used in agriculture, which can be a significant source of unintentional poisoning, are well defined within the existing legislation. Therefore, much efforts need to be invested in engaging with relevant authorities and decision makers towards stricter law enforcement.

One of the key stakeholders, especially in pre-investigation procedures, are police and environmental inspectorates and efforts need to be invested in engaging with them. Broadening the issue of poison use in the natural environment: associating it with the danger to the human health, the illegal traffic of banned substances or the illegal use of the allowed substances (pesticides) could help in raising the interest of the governmental institutions towards better law enforcement. Also, organizing training courses and seminars in order to exchange best practice experience from countries which have a long tradition in effectively combating wildlife poisoning such as Spain might prove very useful.

Enforcement of environmental laws has very low priority for the judiciary system in most of the Balkan countries, which is why there are almost no convictions for wildlife poisoning or minimal sentences are carried out. Therefore, it is necessary that much more educational work, training and exchange of best practices from other countries is directed at public prosecutors.

It is important to note that in the majority of the Balkan countries law enforcement and capacities (proper disposal stations) related to disposal of dead animals and their byproducts is very low. There is almost no control of disposal of dead animals from individual farmsteads in rural areas and they are often dumped on the outskirts of settlements, making this unsafe food available for vultures and other species that feed on carrion. Development of organized systems and protocols related to reporting, collecting and disposal of dead animals is therefore very much needed.

Often vague, inadequate and/or weak legislation

Unclear legislation is also an important reason for the low engagement of relevant governmental authorities in most of the Balkan countries. This is mainly associated with unclear responsibilities and jurisdictions of enforcement bodies. Therefore, more efficient, clear-cut legal protocols for describing responsibilities in reporting, investigating and processing cases of wildlife poisoning need to be developed and distributed within all responsible institutions to precisely define jurisdiction of each one within national legislation and avoid overlaps. Modification of the national legislation or official endorsement of such official protocols would be a good solution for this. Furthermore, development of Accredited protocols/Standard Operational Protocols (SOP) and security measures in sampling and processing poisoned animals is also needed in order to facilitate the work of enforcement agencies in the field. Also, communication and information exchange between responsible institutions and sectors related to jurisdiction, responsibilities need to be enhanced in order to facilitate further judiciary proceedings of wildlife poisoning incidents. Additionally, modification of the countries penal code towards enforcing stricter penal and administrative measures related to poisoning incidents would be a significant step towards deterrence of the illegal use of poison baits in the natural environment.

Despite the prohibition of the use of poison baits and substances in the environment, which is a fundamental decision, what is required first of all is the recognition of the extent and the severity of the problem. For this purpose, it is necessary to develop unified national databases, containing information about drivers and methods of poison use. Furthermore, the designation of national anti-poisoning strategies will contribute to this direction. In this way, the existing prohibition will be accompanied by a context of actions with the necessary connection of relevant organizations and authorities.

Lack of resources and capacities

It is evident that there is a significant lack of knowledge in most of the countries of the region when it comes to dealing with poisoning incidents on several levels: detection (surveying for poison baits or death animals), sampling, conduction of necropsies on dead animals and toxicological analysis, and finally judiciary process and legal proceedings of poisoning incidents.

Significant efforts need to be invested in improving pre-investigation procedures. SOP for processing wildlife poisoning need to be developed, or existing ones improved, to facilitate the work of police officers in the field and further judiciary process.

According to the legislation of most of the Balkan countries (Macedonia, Croatia, Serbia, B&H), official toxicological analysis can only be conducted by designated governmental laboratories and their results are the only ones valid for court proceedings. Lack of resources is mainly associated with insufficient funds available from the government towards conduction of toxicological analysis, which is a prerequisite for further official legal proceedings of wildlife poisoning cases. In some countries (Macedonia) there isn't a referent national laboratory officially designated by the government for this purposes which complicates the issue. On the other hand, it is important to note that there is sufficient staff expertise within these institutions for conducting necropsies and toxicological analysis, but additional training and exchange of best practice experience from other countries would be beneficial. Toxicological analysis should be performed promptly in order to diagnose poisoning. Without the results of these tests, which are the soundest evidence that the animal died of poisoning or any other cause, even if the poisoning incidents end up to court, they cannot be finally prosecuted.

5. Recommendations

Albania

The situation with the use of poisonous substances in the environment in Albania for the purpose of resolving conflicts with various wildlife differs significantly from the rest of countries in the region. There is a complete lack of data associated with poisoning incidents at all and no official records of these activities exist within relevant governmental institutions, nor within NGOs. Furthermore, wildlife poisoning isn't clearly defined in existing legal framework and consequently it is not included in the Penal or Criminal code of the country. Therefore, the proposed recommendations for Albania are mainly related to establish a good baseline for the future development of anti-poison work in the country.

Increase and improve relevant information about wildlife poisoning:

- A thorough study of the impact of illegal poison use on vulture species and other wildlife needs to be undertaken in order to determine the frequency of occurrence of these illegal activities, drivers behind poison use in the natural environment and stakeholders involved.
- Establish a centralized database containing all incidents of wildlife poisoning, specifying with precision all available data: location, date, affected wildlife, substances used, (results of the necropsies and toxicological analyses), actions taken, results of legal proceedings of poisoning incidents etc. Such databases enable the user to assess the scope and severity of wildlife poisoning, as well as to define potential hotspots for these illegal activities and plan appropriate conservation actions.

Advocate for adaptation and improvement of current national legal framework:

- Improvement of existing legislation is a prerequisite for any future conservation work related to combating wildlife poisoning. These activities must be clearly defined as illegal and punishable under the national Criminal law or Penal code.
- Develop national anti-poisoning strategies, relevant to the specific issues occurring in the country, and advocate for its incorporation in the national legislation.

Awareness raising activities:

- Significant efforts need to be made to raise awareness of the general public and governmental authorities of the problem doing so by means of media campaigns and promotional work.
- Conduct environmental education campaigns targeting all stakeholders relevant to potential use of poison baits and substances in the environment. These campaigns should stress the impact of poisons on threatened species and human health risks, plus the penalties which can apply, as well as the benefits of the presence of predators and scavengers in the ecosystem.

Capacity building and networking:

- Significant efforts are needed towards capacity building and training of legal and technical personnel and law enforcement officers of the governmental authorities related to this matter, as well as the personnel of relevant NGOs. Training ranging from detection of poison baits and poisoned animals in the field, conduction of toxicological analysis to prosecution and legal proceeding of poisoning incidents are essential.

Bosnia and Hercegovina

Increase and improve relevant information about wildlife poisoning:

- A thorough study of the impact of illegal poison use on wildlife needs to be undertaken in order to determine the frequency of occurrence of these illegal activities, drivers behind poison use in the natural environment and stakeholders involved. This will enable us to define the potential severity of this practice for vagrant birds, as no vulture species currently breed in B&H, as well as for populations in neighboring countries.
- Establish a centralized database containing all incidents of wildlife poisoning, specifying with precision all available data: location, date, affected wildlife, substances used, (results of the necropsies and toxicological analyses), actions taken, results of legal proceedings of poisoning incidents etc. Such databases enable the user to assess the scope and severity of wildlife poisoning, as well as to define potential hotspots for these illegal activities and plan appropriate conservation actions.

Awareness raising activities:

- Significant efforts need to be made to raise awareness of the general public and governmental authorities of the problem doing so by means of media campaigns and promotional work.
- Conduct environmental education campaigns targeting all stakeholders relevant to potential use of poison baits and substances in the environment. These campaigns should stress the impact of poisons on threatened species and human health risks, plus the penalties which can apply, as well as the benefits of the presence of predators and scavengers in the ecosystem.

Advocate better law enforcement, adaptation and improvement of current national legal framework:

- Develop national anti-poisoning strategies, relevant to the specific issues occurring in the country, and advocate for its incorporation in the national legislation.
- Develop operational protocols for responsible authorities related to legal processing of wildlife poisoning cases, responsibilities and jurisdiction of all responsible governmental institutions. An additional and specific difficulty in B&H is the complicated bureaucratic apparatus, involving federal, entity-level and cantonal governments with often conflicting legislation and unclear jurisdiction.
- Establish better cooperation and information exchange between relevant governmental institutions and NGOs in order to ensure more efficient enforcement of relevant national legislation.
- Establish a national Task Force for combating wildlife poisoning, comprised of representatives from relevant governmental institutions and NGOs of both federal and entity-level.

Capacity building and networking:

- Significant efforts are needed towards capacity building and training of legal and technical personnel and law enforcement officers of the governmental authorities related to this matter, as well as the personnel of relevant NGOs. Training ranging from detection of poison baits and poisoned animals in the field, conduction of toxicological analysis to prosecution and legal proceeding of poisoning incidents are essential.
- Encourage cooperation and coordination between various sectors involved, including experts of the Environmental authorities, public prosecutors, law enforcement officers, environmental NGOs, hunting associations, farming associations and the media on all levels (federal, entity-level, cantonal).
- Set up channels for fluid exchange of information with the law enforcement officials, Public Prosecutors' Office with other relevant governmental authorities and NGOs to coordinate joint action.

Bulgaria

Non-governmental organizations in Bulgaria have been very active in the field of vulture conservation, including the struggle with illegal poisoning. The course of implementation of projects and in initiatives related to vulture conservation in Bulgaria have defined the following activities as priority actions to be developed and implemented in the future in order to combat wildlife poisoning more effectively.

Increase and improve relevant information about wildlife poisoning:

- Establish a unified database containing all incidents of wildlife poisoning, specifying with precision all available data: location, date, affected wildlife, substances used, (results of the necropsies and toxicological analyses), actions taken, results of legal proceedings of poisoning incidents etc. Such databases enable the user to assess the scope and severity of wildlife poisoning, as well as to define potential hotspots for these illegal activities and plan appropriate conservation actions.

Advocate better law enforcement, adaptation and improvement of current national legal framework:

- Improve the legislation related to wildlife poisoning and vulture conservation towards stricter penalties and legal ramifications.
- Develop a commonly agreed and legal protocol for responsible authorities related to legal processing of wildlife poisoning cases, responsibilities and jurisdiction of all responsible governmental institutions.
- Development of a commonly agreed National Action plan against wildlife poisoning and advocate for its incorporation in the national legislation.

Awareness raising activities:

- Continue to raise awareness of the general public and governmental authorities of the problem doing so by means of media campaigns and promotional work.

- Continue to conduct environmental education campaigns about the impact of poisons on threatened species and human health risks, plus the penalties which can apply, as well as the benefits of the presence of predators in the ecosystem, targeting livestock breeders, hunters, gamekeepers and other stakeholders relevant to potential use of poison baits and substances in the environment.

Active conservation measures:

- Continue with the introduction and reinforcement of wild ungulates species (Ibex, Fallow Deer, Chamois, Red deer) to provide natural prey for the predators and vultures and to decrease depredation of livestock.
- Advocate for shifting from sheep and goats to cattle raising in certain areas.
- Establish a network of Permanent safe supplementary feeding sites for vultures and eagles.
- Continue with active detection and surveillance of the use of poison baits in the environment using Canine Teams.

Croatia

Awareness raising activities:

- Significant efforts need to be made towards raising awareness of the general public and governmental authorities of the magnitude of the problem with illegal poisoning and addressing the conflict between social groups involved is a way to prevent poisoning. If the drivers for the use of poison baits are eliminated, then the incidents of poisoning will be reduced.
- Conduct environmental education campaigns targeting all stakeholders relevant to potential use of poison baits and substances in the environment. These campaigns should stress the impact of poisons on threatened species and human health risks, plus the penalties which can apply, as well as the benefits of the presence of predators and scavengers in the ecosystem.

Advocate better law enforcement, adaptation and improvement of current national legal framework:

- Develop national anti-poisoning strategies, relevant to the specific issues occurring in the country, and advocate for its incorporation in the national legislation.
- Develop operational protocols for responsible authorities related to legal processing of wildlife poisoning cases, responsibilities and jurisdiction of all responsible governmental institutions and advocate for their official endorsement by relevant governmental authorities.
- Advocate the enforcement of ministerial decision to eradicate introduced and invasive game animals on island ecosystems.
- Establish a national Task Force for combating wildlife poisoning, comprised of representatives from relevant governmental institutions and NGOs.

Increase and improve relevant information about wildlife poisoning:

- Establish a centralized database containing all incidents of wildlife poisoning, specifying with precision all available data: location, date, affected wildlife, substances used, (results of the necropsies and toxicological analyses), actions taken, results of legal proceedings of poisoning incidents etc. Such databases enable the user to assess the scope and severity of wildlife poisoning, as well as to define potential hotspots for these illegal activities and plan appropriate conservation actions.

Capacity building and networking:

- Encourage improvement of cooperation and coordination between various sectors involved, including experts of the Environmental authorities, public prosecutors, law enforcement officers, environmental NGOs, hunting associations, farming associations and the media.
- Set up channels for fluid exchange of information with the law enforcement officials, Public Prosecutors' Office with other relevant governmental authorities and NGOs to coordinate joint action.

Greece

Similar to Bulgaria, the NGO sector in Greece has been very active in conducting numerous anti-poison actions through several projects, including the use of several Canine Teams, establishment of national Task Force devoted to combating wildlife poisoning and a centralized database for wildlife poisoning. The course of implementation of these projects and conservation initiatives related to vulture conservation have defined the following activities as priority actions to be developed and implemented in the future.

Advocate better law enforcement, adaptation and improvement of current national legal framework:

- Develop operational protocols for responsible authorities related to legal processing of wildlife poisoning cases, responsibilities and jurisdiction of all responsible governmental institutions and advocate for their official endorsement by relevant governmental authorities.
- Advocate for official governmental endorsement of the developed National Anti-poisoning strategy.
- Advocate for more efficient management of poisoning incidents by governmental authorities: In most cases, the competent authorities do not deal with poisoning events due to lack of staff, expertise, and awareness of the problem.

Active conservation measures:

- Increase efforts to promote and enforce application of preventive measures: granting subsidies for electric fences is recommended in order to protect livestock capital from wildlife predation, as well as for usage of Greek shepherd dogs as livestock guards.
- Improve the compensation system for damages to crop production and livestock.
- Increase efforts towards warding: In poison hot spot areas or those that host species vulnerable to poisoning joint patrols should be carried out systematically by wardens, gamekeepers and rangers of the management bodies of protected areas in order to deter people from using them as well as to increase chances of locating poison baits or poisoned animals.

Awareness raising activities:

- Significant efforts need to be made towards raising awareness of the general public and governmental authorities of the magnitude of the problem with illegal poisoning and addressing the conflict between social groups involved is a way to prevent poisoning. If the drivers for the use of poison baits are eliminated, then the incidents of poisoning will be reduced.
- Conduct environmental education campaigns targeting all stakeholders relevant to potential use of poison baits and substances in the environment. These campaigns should stress the impact of poisons on threatened species and human health risks, plus the penalties which can apply, as well as the benefits of the presence of predators and scavengers in the ecosystem.

Macedonia

Advocate better law enforcement, adaptation and improvement of current national legal framework:

- Develop national anti-poisoning strategies, relevant to the specific issues occurring in the country, and advocate for its incorporation in the national legislation.
- Develop operational protocols for responsible authorities related to legal processing of wildlife poisoning cases, responsibilities and jurisdiction of all responsible governmental institutions and advocate for their official endorsement by relevant governmental authorities.
- Develop Accredited protocols/Standard Operational Procedures (SOP) and security measures in sampling and processing poisoned animals.
- Establish a national Task Force for combating wildlife poisoning, comprised of representatives from relevant governmental institutions and NGOs.
- Develop organized systems and protocols related to reporting, collecting and disposal of dead animals is needed.
- Designate a referent laboratory, within existing institutions and laboratories, for processing cases of wildlife poisoning.

Awareness raising activities:

- Significant efforts need to be made towards raising awareness of the general public and governmental authorities of the magnitude of the problem with illegal poisoning and addressing the conflict between social groups involved is a way to prevent poisoning. If the drivers for the use of poison baits are eliminated, then the incidents of poisoning will be reduced.
- Conduct environmental education campaigns targeting all stakeholders relevant to potential use of poison baits and substances in the environment. These campaigns should stress the impact of poisons on threatened species and human health risks, plus the penalties which can apply, as well as the benefits of the presence of predators and scavengers in the ecosystem.

Capacity building and networking:

- Encourage improvement of cooperation and coordination between various sectors involved, including experts of the Environmental authorities, public prosecutors, law enforcement officers, environmental NGOs, hunting associations, farming associations and the media.

- Set up channels for fluid exchange of information with the law enforcement officials, Public Prosecutors' Office with other relevant governmental authorities and NGOs to coordinate joint action.

Serbia

Advocate better law enforcement, adaptation and improvement of current national legal framework:

- Develop national anti-poisoning strategies, relevant to the specific issues occurring in the country, and advocate for its incorporation in the national legislation.
- Develop operational protocols for responsible authorities related to legal processing of wildlife poisoning cases, responsibilities and jurisdiction of all responsible governmental institutions and advocate for their official endorsement by relevant governmental authorities.
- Invest efforts to officially include representatives from relevant governmental institutions into the existing BirdCrime Task Force and advocate for its official endorsement by relevant governmental authorities.
- Advocate for enforcement of stricter deterrence measures, such as higher penal and criminal penalties.
- Advocate for more efficient management of poisoning incidents by governmental authorities: In most cases, the competent authorities do not deal with poisoning events due to lack of staff, expertise, and awareness of the problem.

Awareness raising activities:

- Continue with conducting awareness raising activities and media campaigns towards the general public and governmental authorities of the magnitude of the problem with illegal poisoning.
- Conduct environmental education campaigns targeting all stakeholders relevant to potential use of poison baits and substances in the environment. These campaigns should stress the impact of poisons on threatened species and human health risks, plus the penalties which can apply, as well as the benefits of the presence of predators and scavengers in the ecosystem.

Capacity building and networking:

- Encourage improvement of cooperation and coordination between various sectors involved, including experts of the Environmental authorities, public prosecutors, law enforcement officers, environmental NGOs, hunting associations, farming associations and the media.
- Set up channels for fluid exchange of information with the law enforcement officials, Public Prosecutors' Office with other relevant governmental authorities and NGOs to coordinate joint action.

Active conservation measures:

- Increase efforts towards warding: In poison hot spot areas or those that host species vulnerable to poisoning joint patrols should be carried out systematically by wardens, gamekeepers and rangers of the management bodies of protected areas in order to deter people from using them as well as to increase chances of locating poison baits or poisoned animals.

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Annex 1.

Overview of vulture poisoning and suspected poisoning incidents in the different countries of the Balkan peninsula from available sources.

Overview of vulture poisoning and suspected poisoning incidents in B&H from available sources:

Species	No. of poisoned individuals	Date/ Period	Location	Type of poisoning	Main driver	Substance
Griffon Vulture	40-80	1980-1991	Stolac, Blagaj	unknown	conflicts with feral and stray dogs	unknown
Griffon Vulture	97	1980-1991	Popovo polje	unknown	conflicts with wolves and stray dogs	furadan (Carbofuran), hydrogen cyanide
Griffon Vulture	30	26.06. 1991	Blagaj	incidental	conflicts with feral and stray dogs	furadan (Carbofuran)

Overview of vulture poisoning and suspected poisoning incidents in Bulgaria from available sources:

Species	No. of poisoned individuals	Date/ Period	Location	Type of poisoning	Main driver	Substance
Bearded Vulture	1	1901	Buhovo – Sofia District	incidental	conflicts with wolves	unknown
Bearded Vulture	1	09.02.1903	Erulska Planina	incidental	conflicts with wolves	unknown
Bearded Vulture	2	1958	Bodrinishte - Blagoevgrad District	incidental	conflicts with wolves	unknown
Black Vulture	2	1984	Krumovgrad, Kardzhali	Incidental	conflicts with wolves	Luminal
Griffon Vulture	11	May 1996	Madzharovo, Haskovo	incidental	conflicts with wolves	CB/OPH
Egyptian Vulture	2	1997	Madzharovo, Haskovo	unknown	unknown	unknown
Griffon Vulture	2	16.04.2003	Studen Kladenets, Krumovgrad	Unknown	Conflicts with wolves	Zink phosphate
Griffon Vulture	1	05.05.2003	Letovnik, Momchilgrad	unknown	conflicts with wolves	OPH
Egyptian Vulture	5	2003	Krumovgrad, Kardzhali	unknown	unknown	unknown
Egyptian Vulture	2	2003	Chernoo-chene, Kardzhali	unknown	unknown	unknown

Species	No. of poisoned individuals	Date/ Period	Location	Type of poisoning	Main driver	Substance
Egyptian Vulture	2	2004	Jenda, Kardzhali	unknown	Conflicts with wolves	CB/OPH
Griffon Vulture	1	14.01.2006	Studen Kladenets, Krumovgrad	unknown	Conflict with wolves	CB/OPH
Egyptian Vulture	1	15.10.2007	Krumovgrad, Kardzhali	unknown	unknown	unknown
Griffon Vulture	3	10.05.2010	Rakitna, Simitli	incidental	Poisoned Wild boar served on feeding site for vultures	CB/OPH
Egyptian Vulture	2	10.08.2011	Madzharovo, Haskovo	unknown	unknown	unknown
Egyptian Vulture	1	11.05.2012	Ivanovo, Ruse	unknown	unknown	unknown
Egyptian Vulture	1	27.04.2013	Ivanovo, Ruse	unknown	unknown	unknown
Egyptian Vulture	1	01.12.2013	Rakitna, Simitli	incidental	A goat killed by wolves given as food for vultures in the cage	CB/OPH
Black Vulture	1	01.12.2013	Rakitna, Simitli	Incidental	A goat killed by wolves given as food for vultures in the cage	CB/OPH
Griffon Vulture	1	10.10.2016	Strazhets village, Krumovgrad municipality	incidental	conflicts with wolves	Lannate
Griffon Vulture	30	12.03.2017	Kresna gorge, Simitli	incidental	conflicts with wolves	Carbofuran

Source: National Anti-Poison Working Group data base - FWFF; Green Balkans; BSPB.

Overview of vulture poisoning and suspected poisoning incidents in Croatia from available sources:

Species	No. of poisoned individuals	Date/ Period	Location	Type of poisoning	Main driver	Substance
Griffon Vulture	10-20	<1988	Krka and Zrmanja canyons	unknown	unknown	unknown
Griffon Vulture	5-10	<1988	vicinity of Dubrovnik	unknown	unknown	unknown
Griffon Vulture	5	1988	Island of Krk	unknown	unknown	unknown
Griffon Vulture	1	1989	Island of Cres	unknown	unknown	unknown

Species	No. of poisoned individuals	Date/ Period	Location	Type of poisoning	Main driver	Substance
Griffon Vulture	40	1993-1999	Island of Krk	unknown	unknown	unknown
Griffon Vulture	14	1997	Paklenica NP	unknown	unknown	unknown
Griffon Vulture	6-10	2000	Paklenica NP	unknown	unknown	unknown
Griffon Vulture	10	2001	Island of Cres	unknown	conflict with allochthone game animals	unknown
Griffon Vulture	4	2002	Island of Cres	unknown	conflict with allochthone game animals	unknown
Griffon Vulture	1	October 2004	Island of Cres	unknown	conflict with allochthone game animals	Methomyl
Griffon Vulture	17	December 2004	Island of Rab	incidental	conflict with allochthone game animals	Carbofuran
Griffon Vulture	2	April 2016	Island of Krk	incidental	conflict with jackals	Carbofuran
Griffon Vulture	1	October 2016	Island of Krk	incidental	conflict with jackals	Carbofuran
Griffon Vulture	1	October 2016	Island of Krk	unknown	conflict with jackals	unknown
Griffon Vulture	1	January 2017	Island of Krk	unknown	conflict with jackals	unknown
Griffon Vulture	1	February 2017	Island of Krk	unknown	conflict with jackals	unknown
Griffon Vulture	1	October 2017	Island of Krk	unknown	conflict with jackals	unknown

Source: Association BIOM/BirdLife Croatia; Grifon – Birds of Prey Conservation Centre.

Overview of vulture poisoning and suspected poisoning incidents in Greece from available sources:

Species	No. of poisoned individuals	Date/ Period	Location	Type of poisoning	Main driver	Substance
Griffon Vulture	30	31.12.1968	Thessaly	unknown	unknown	unknown
Griffon Vulture	2	31.12.1995	Crete	incidental	damages to beehives	unknown
Griffon Vulture	14	31.12.1991	Thessaly	incidental	personal disputes	unknown
Griffon Vulture	4	31.12.1992	Crete	unknown	unknown	unknown

Species	No. of poisoned individuals	Date/ Period	Location	Type of poisoning	Main driver	Substance
Black Vulture	8	31.12.1993	Thessaly	unknown	unknown	unknown
Griffon Vulture	4	31.12.1993	Crete	unknown	unknown	unknown
Griffon Vulture	10	31.12.1993	Crete	unknown	unknown	unknown
Griffon Vulture	5	31.12.1994	Epirus	unknown	unknown	unknown
Griffon Vulture	1	31.12.1994	Crete	unknown	unknown	unknown
Griffon Vulture	1	31.12.1994	Crete	unknown	unknown	unknown
Black Vulture	7	31.03.1995	Eastern Macedonia & Thrace	unknown	unknown	Carbofuran
Black Vulture	1	23.03.1995	Eastern Macedonia & Thrace	unknown	unknown	unknown
Griffon Vulture	15	31.12.1995	South Aegean	unknown	unknown	unknown
Egyptian Vulture	2	1997	Epirus	unknown	unknown	unknown
Black Vulture	1	1998	Eastern Macedonia & Thrace	incidental	damages to crops/orchards	Carbofuran
Egyptian Vulture	2	1998	Eastern Macedonia & Thrace	incidental	damages to crops/orchards	Carbofuran
Griffon Vulture	6	31.12.2001	Epirus	unknown	unknown	unknown
Griffon Vulture	1	30.04.1999	Crete	unknown	unknown	unknown
Griffon Vulture	1	31.03.2000	Crete	unknown	unknown	unknown
Griffon Vulture	1	15.03.2000	Crete	unknown	unknown	unknown
Bearded Vulture	1	04.09.2000	Crete	incidental	damages to livestock	Fenthion
Griffon Vulture	1	21.09.2000	Thessaly	unknown	unknown	unknown
Griffon Vulture	1	29.09.2000	Crete	unknown	unknown	unknown
Griffon Vulture	1	28.10.2000	Crete	unknown	unknown	unknown
Griffon Vulture	1	17.12.2000	Crete	unknown	unknown	unknown
Egyptian Vulture	1	31.12.2001	Epirus			unknown

Species	No. of poisoned individuals	Date/ Period	Location	Type of poisoning	Main driver	Substance
Black Vulture	1	31.12.2001	Eastern Macedonia & Thrace	unknown	unknown	unknown
Black Vulture	1	05.02.2001	Eastern Macedonia & Thrace	unknown	unknown	unknown
Griffon Vulture	1	10.08.2001	Crete	unknown	unknown	unknown
Griffon Vulture	1	04.09.2001	Crete	unknown	unknown	unknown
Griffon Vulture	1	06.09.2001	Crete	unknown	unknown	unknown
Griffon Vulture	1	18.09.2001	Crete	unknown	unknown	unknown
Griffon Vulture	1	28.09.2001	Crete	unknown	unknown	unknown
Griffon Vulture	1	28.10.2001	Crete	unknown	unknown	unknown
Griffon Vulture	1	01.11.2001	Crete	unknown	unknown	unknown
Griffon Vulture	1	15.11.2001	Crete	unknown	unknown	unknown
Egyptian Vulture	1	2002	Epirus	unknown	unknown	unknown
Griffon Vulture	1	01.08.2002	Crete	unknown	unknown	unknown
Griffon Vulture	1	01.08.2002	Crete	unknown	unknown	unknown
Griffon Vulture	1	05.08.2002	Crete	unknown	unknown	unknown
Griffon Vulture	1	17.08.2002	Crete	unknown	unknown	unknown
Griffon Vulture	1	20.08.2002	Crete	unknown	unknown	unknown
Griffon Vulture	1	18.09.2002	Crete	unknown	unknown	unknown
Griffon Vulture	1	25.09.2002	Crete	unknown	unknown	unknown
Griffon Vulture	1	10.10.2002	Crete	unknown	unknown	unknown
Egyptian Vulture	2	2003	Thessaly	incidental	conflict with shepherd dogs	unknown
Egyptian Vulture	1	2003	West Macedonia	unknown	unknown	unknown
Egyptian Vulture	1	31.05.2003	West Macedonia	unknown	unknown	unknown

Species	No. of poisoned individuals	Date/ Period	Location	Type of poisoning	Main driver	Substance
Egyptian Vulture	2	2003	Thessaly	unknown	unknown	unknown
Black Vulture	1	2003	Eastern Macedonia & Thrace	incidental	conflict with shepherd dogs	Methomyl
Black Vulture	1	2003	Eastern Macedonia & Thrace	incidental	damages to crops/orchards	Methamidophos
Griffon Vulture	1	01.08.2003	Crete	unknown	unknown	unknown
Griffon Vulture	1	06.08.2003	Crete	unknown	unknown	unknown
Griffon Vulture	1	03.09.2003	Crete	unknown	unknown	unknown
Griffon Vulture	1	09.09.2003	Crete	unknown	unknown	unknown
Griffon Vulture	1	12.09.2003	Crete	unknown	unknown	unknown
Griffon Vulture	1	23.10.2003	Crete	unknown	unknown	unknown
Griffon Vulture	1	25.10.2003	Crete	unknown	unknown	unknown
Griffon Vulture	1	05.11.2003	Crete	unknown	unknown	unknown
Griffon Vulture	1	05.12.2003	Crete	unknown	unknown	unknown
Griffon Vulture	1	07.12.2003	Crete	unknown	unknown	unknown
Griffon Vulture	1	07.01.2004	Crete	unknown	unknown	
Griffon Vulture	1	2004	Eastern Macedonia & Thrace	unknown	unknown	Methyl-Parathion
Griffon Vulture	1	26.06.2004	Crete	unknown	unknown	unknown
Black Vulture	1	2004	Eastern Macedonia & Thrace	incidental	conflict with shepherd dogs	Carbofuran
Griffon Vulture	1	19.10.2004	Crete	unknown	unknown	unknown
Griffon Vulture	1	12.11.2004	Crete	unknown	unknown	unknown
Griffon Vulture	1	15.11.2004	Crete	unknown	unknown	unknown
Griffon Vulture	7	26.11.2004	Crete	unknown	unknown	unknown

Species	No. of poisoned individuals	Date/ Period	Location	Type of poisoning	Main driver	Substance
Griffon Vulture	1	15.12.2004	Crete	unknown	unknown	unknown
Griffon Vulture	1	28.07.2005	Crete	unknown	unknown	unknown
Griffon Vulture	1	01.08.2005	Crete	unknown	unknown	unknown
Griffon Vulture	1	08.08.2005	Crete	unknown	unknown	unknown
Griffon Vulture	1	16.09.2005	Crete	unknown	unknown	unknown
Griffon Vulture	1	10.10.2005	Crete	unknown	unknown	unknown
Griffon Vulture	2	15.01.2006	Crete	unknown	unknown	unknown
Griffon Vulture	12	30.04.2006	West Greece	incidental	damages to game species	unknown
Griffon Vulture	1	22.03.2006	Crete	unknown	unknown	unknown
Griffon Vulture	1	20.07.2006	Crete	unknown	unknown	unknown
Griffon Vulture	1	14.08.2006	Crete	unknown	unknown	unknown
Griffon Vulture	1	30.08.2006	Crete	unknown	unknown	unknown
Griffon Vulture	1	15.09.2006	Crete	unknown	unknown	unknown
Griffon Vulture	1	03.10.2006	Crete	unknown	unknown	unknown
Egyptian Vulture	2	2007	Thessaly	incidental	damages to crops/orchards	unknown
Griffon Vulture	1	10.06.2007	Crete	unknown	unknown	unknown
Griffon Vulture	1	03.07.2007	Crete	unknown	unknown	unknown
Griffon Vulture	1	10.07.2007	Crete	unknown	unknown	unknown
Griffon Vulture	1	11.07.2007	Crete	unknown	unknown	unknown
Egyptian Vulture	2	2007	Epirus	unknown	unknown	unknown
Griffon Vulture	1	15.07.2007	Crete	unknown	unknown	unknown
Griffon Vulture	1	18.07.2007	Crete	unknown	unknown	unknown
Griffon Vulture	1	21.07.2007	Crete	unknown	unknown	unknown

Species	No. of poisoned individuals	Date/ Period	Location	Type of poisoning	Main driver	Substance
Griffon Vulture	1	25.07.2007	Crete	unknown	unknown	unknown
Griffon Vulture	1	25.07.2007	Crete	unknown	unknown	unknown
Griffon Vulture	1	28.07.2007	Crete	unknown	unknown	unknown
Black Vulture	2	2007	Eastern Macedonia & Thrace	incidental	personal disputes	unknown
Griffon Vulture	1	06.10.2007	Crete	unknown	unknown	unknown
Griffon Vulture	1	13.10.2007	Crete	unknown	unknown	unknown
Griffon Vulture	1	18.10.2007	Crete	unknown	unknown	unknown
Griffon Vulture	1	08.01.2008	Pelloponese	unknown	unknown	unknown
Griffon Vulture	1	09.04.2008	Crete	unknown	unknown	unknown
Griffon Vulture	1	19.07.2008	Crete	unknown	unknown	unknown
Griffon Vulture	1	29.07.2008	Crete	unknown	unknown	unknown
Griffon Vulture	1	31.07.2008	Crete	unknown	unknown	unknown
Griffon Vulture	1	01.08.2008	Crete	unknown	unknown	unknown
Griffon Vulture	1	120.8.2008	Crete	unknown	unknown	unknown
Griffon Vulture	1	120.8.2008	Crete	unknown	unknown	unknown
Griffon Vulture	1	15.08.2008	Crete	unknown	unknown	unknown
Griffon Vulture	1	25.08.2008	Crete	unknown	unknown	unknown
Griffon Vulture	1	06.09.2008	Crete	unknown	unknown	unknown
Griffon Vulture	1	09.09.2008	Crete	unknown	unknown	unknown
Griffon Vulture	1	10.09.2008	Crete	unknown	unknown	unknown
Griffon Vulture	1	18.09.2008	Crete	unknown	unknown	unknown
Griffon Vulture	1	14.10.2008	Crete	unknown	unknown	unknown
Griffon Vulture	1	15.10.2008	Crete	unknown	unknown	unknown

Species	No. of poisoned individuals	Date/ Period	Location	Type of poisoning	Main driver	Substance
Griffon Vulture	1	24.10.2008	Crete	unknown	unknown	unknown
Griffon Vulture	1	29.10.2008	Western Greece	unknown	unknown	unknown
Griffon Vulture	1	03.11.2008	Crete	unknown	unknown	unknown
Griffon Vulture	1	05.11.2008	Crete	unknown	unknown	unknown
Griffon Vulture	1	08.11.2008	Crete	unknown	unknown	unknown
Griffon Vulture	1	16.11.2008	Crete	unknown	unknown	unknown
Griffon Vulture	1	29.08.2009	Crete	unknown	unknown	unknown
Griffon Vulture	1	01.09.2009	Crete	unknown	unknown	unknown
Griffon Vulture	1	2009	Crete	unknown	unknown	unknown
Griffon Vulture	1	2009	Crete	unknown	unknown	unknown
Griffon Vulture	1	2009	Crete	unknown	unknown	unknown
Griffon Vulture	1	2009	Crete	unknown	unknown	unknown
Griffon Vulture	1	2009	Crete	unknown	unknown	unknown
Griffon Vulture	1	11.12.2009	Central Macedonia	unknown	unknown	unknown
Griffon Vulture	1	19.12.2009	Crete	unknown	unknown	unknown
Griffon Vulture	1	2010	Crete	unknown	unknown	unknown
Griffon Vulture	1	2010	Crete	unknown	unknown	unknown
Griffon Vulture	1	2010	Crete	unknown	unknown	unknown
Griffon Vulture	1	2010	Crete	unknown	unknown	unknown
Griffon Vulture	1	2010	Crete	unknown	unknown	unknown
Griffon Vulture	1	2010	Crete	unknown	unknown	unknown
Griffon Vulture	1	2010	Crete	unknown	unknown	unknown
Griffon Vulture	1	2010	Crete	unknown	unknown	unknown

Species	No. of poisoned individuals	Date/ Period	Location	Type of poisoning	Main driver	Substance
Griffon Vulture	1	2010	Crete	unknown	unknown	unknown
Griffon Vulture	1	2010	Crete	unknown	unknown	unknown
Griffon Vulture	1	2011	Crete	unknown	unknown	unknown
Griffon Vulture	1	2011	Crete	unknown	unknown	unknown
Griffon Vulture	1	13.09.2011	Crete	unknown	unknown	unknown
Griffon Vulture	1	2011	Crete	unknown	unknown	unknown
Griffon Vulture	2	2012	Eastern Macedonia & Thrace	incidental	damages to livestock	unknown
Griffon Vulture	1	2012	Crete	unknown	unknown	unknown
Griffon Vulture	2	2012	Eastern Macedonia & Thrace	incidental	damages to livestock	Carbofuran
Egyptian Vulture	1	17.04.2012	Thessaly	incidental	damages to livestock	unknown
Griffon Vulture	1	2012	Crete	unknown	unknown	unknown
Griffon Vulture	1	2012	Crete	unknown	unknown	unknown
Black Vulture	1	2012	Eastern Macedonia & Thrace	incidental	damages to livestock	unknown/ probably rodenticides
Griffon Vulture	1	2012	Crete	unknown	unknown	unknown
Griffon Vulture	1	2012	Crete	unknown	unknown	unknown
Griffon Vulture	1	2012	Crete	unknown	unknown	unknown
Griffon Vulture	1	2012	Crete	unknown	unknown	unknown
Griffon Vulture	1	2013	Crete	unknown	unknown	unknown
Egyptian Vulture	2	01.04.2013	Central Macedonia	incidental	damages to livestock	Heptachlor, Endrin aldehyde, Carbofuran
Griffon Vulture	1	2013	Crete	unknown	unknown	unknown
Griffon Vulture	1	2013	Crete	unknown	unknown	unknown

Species	No. of poisoned individuals	Date/ Period	Location	Type of poisoning	Main driver	Substance
Griffon Vulture	1	2013	Crete	unknown	unknown	unknown
Griffon Vulture	1	2013	Crete	unknown	unknown	unknown
Griffon Vulture	1	2013	Crete	unknown	unknown	unknown
Griffon Vulture	2	01.9.2013	Central Macedonia	unknown	unknown	Carbofuran
Griffon Vulture	2	01.9.2013	Central Macedonia	incidental	damages to livestock	Carbofuran
Griffon Vulture	1	2013	Crete	unknown	unknown	unknown
Griffon Vulture	1	2013	Crete	unknown	unknown	unknown
Griffon Vulture	1	2013	Crete	unknown	unknown	unknown
Griffon Vulture	1	2014	Crete	unknown	unknown	unknown
Griffon Vulture	1	2014	Crete	unknown	unknown	unknown
Griffon Vulture	1	2014	Crete	unknown	unknown	unknown
Griffon Vulture	1	2014	Crete	unknown	unknown	unknown
Griffon Vulture	1	2014	Crete	unknown	unknown	unknown
Griffon Vulture	1	2014	Crete	unknown	unknown	unknown
Griffon Vulture	2	24.04.2015	Eastern Macedonia & Thrace	incidental	damages to livestock	Carbofuran
Egyptian Vulture	2	16.07.2015	Thessaly	unknown	unknown	Chlorpyrifos
Griffon Vulture	1	2015	Crete	unknown	unknown	unknown
Griffon Vulture	1	2015	Crete	unknown	unknown	unknown
Griffon Vulture	1	2015	Crete	unknown	unknown	unknown
Griffon Vulture	1	2016	Crete	unknown	unknown	unknown
Griffon Vulture	1	2016	Crete	unknown	unknown	unknown
Griffon Vulture	1	2016	Crete	unknown	unknown	unknown
Griffon Vulture	1	2016	Crete	unknown	unknown	unknown

Species	No. of poisoned individuals	Date/ Period	Location	Type of poisoning	Main driver	Substance
Griffon Vulture	5	19.04.2017	Western Greece	unknown	unknown	unknown
Black Vulture	2	08.12.2017	Eastern Macedonia & Thrace	incidental	conflicts with wolves	unknown
Black Vulture	1	08.03.2018	Eastern Macedonia & Thrace	incidental	conflicts with predators	unknown
Griffon Vulture	3	14.05.2018	Western Greece	incidental	conflicts with wolves	unknown
Egyptian Vulture	1	01.07.2018	Thessaly	unknown	unknown	unknown

Source: Database of Anti-Poison Task Force of Greece.

Overview of vulture poisoning and suspected poisoning incidents in Macedonia (FYR) from available sources:

Species	No. of poisoned individuals	Date/ Period	Location	Type of poisoning	Main driver	Substance
Bearded Vulture	1	march 1985	Tikves reservoir	unknown	unknown	unknown
Griffon Vulture	6-10	1985	Sogle, Babuna	incidental	conflicts with wolves	unknown
Griffon Vulture	6-10	1985	Jablanica	incidental	unknown	unknown
Griffon Vulture	21-50	1985	vicinity of Prilep	incidental	conflicts with wolves	unknown
Griffon Vulture	6-10	1986	Nebregovo	incidental	conflicts with wolves	unknown
Griffon Vulture	6-10	1987	Sogle, Babuna	incidental	conflicts with wolves	unknown
Griffon Vulture	6-10	1988	Sliva, Selecka Mt.	incidental	conflicts with wolves	unknown
Griffon Vulture	6-10	1988	Crna Reka, Mariovo	incidental	conflicts with wolves	unknown
Griffon Vulture	6-10	1989	Canishte, Manastir, Cebren - Mariovo	incidental	conflicts with wolves	unknown
Griffon Vulture	21-50	1991	Osogovo Mt.	incidental	conflicts with wolves	unknown
Griffon Vulture	2	1992	Matka	incidental	conflicts with wolves	Strychnine
Egyptian Vulture	60-70	1992	Dubrovo, Negotino	incidental	control of rodent populations	unknown

Species	No. of poisoned individuals	Date/ Period	Location	Type of poisoning	Main driver	Substance
Griffon Vulture	2-5	1992	Bonce	incidental	unknown	unknown
Griffon Vulture	3	1995	Matka	incidental	conflicts with wolves	unknown
Griffon Vulture	21-50	1996	Slive, Ruen, v. Sirkovo	incidental	conflicts with wolves	unknown
Griffon Vulture	11-20	1998	v. Sirkovo, Kavadarci	incidental	conflicts with wolves	unknown
Griffon Vulture	2-5	1999	v. Vatasa, Kavadarci	incidental	conflicts with wolves	unknown
Griffon Vulture	2-5	2000	Demir Kapija	incidental	unknown	unknown
Griffon Vulture	1	2001	v. Kocilari	incidental	unknown	unknown
Griffon Vulture	12	2001	Mariovo	incidental	conflicts with wolves	unknown
Griffon Vulture	2	2001	v. Erdzelija, S. Nikole	incidental	unknown	unknown
Griffon Vulture	4	2002	Konecka Planina	incidental	conflicts with wolves	unknown
Griffon Vulture	3	2002	Plackovica Mt.	incidental	unknown	unknown
Griffon Vulture	3	2003	Demir Kapija	incidental	unknown	unknown
Griffon Vulture	3	2003	Mariovo	incidental	unknown	unknown
Griffon Vulture	2	2003	Mariovo	incidental	unknown	unknown
Griffon Vulture	14	2003	v. Erdzelija, S. Nikole	incidental	unknown	unknown
Griffon Vulture	7-15	2003	Demir Kapija	incidental	conflicts with wolves	unknown
Griffon Vulture	2	2005	Mariovo	incidental	unknown	unknown
Griffon Vulture	4	2005	Plackovica Mt.	incidental	unknown	unknown
Griffon Vulture	19	2009	v. Zovik	incidental	conflicts with wolves	unknown
Griffon Vulture	1	2007	Vitacevo	incidental	unknown	unknown
Egyptian Vulture	1	2007	Vitacevo	incidental	unknown	unknown
Griffon Vulture	11-20	2008	v. Bekirlija	incidental	conflicts with wolves	unknown
Egyptian Vulture	3	2011	Vitacevo	unknown	unknown	Methomyl

Species	No. of poisoned individuals	Date/ Period	Location	Type of poisoning	Main driver	Substance
Griffon Vulture	1	2011	Vitacevo	unknown	unknown	Methomyl
Griffon Vulture	4-5	2012	Mariovo	incidental	unknown	unknown
Griffon Vulture	1	2017	Tribor	unknown	unknown	unknown

Source: Database of Macedonian Ecological Society; data compiled by MES and Aquila.

Overview of vulture poisoning and suspected poisoning incidents in Serbia from available sources:

Species	No. of poisoned individuals	Date/ Period	Location	Type of poisoning	Main driver	Substance
Griffon Vulture	1	1988	Muškovine, Mileševka gorge	unknown	unknown	unknown
Griffon Vulture	1	1999	Pavlovića brod, Uvac gorge	unknown	unknown	unknown
Griffon Vulture	3	02.06. 2000.	Uvac gorge, vicinity of breeding colony	incidental	conflicts with wolves	unknown
Griffon Vulture	1	February 2001	Goranići, Uvac gorge	incidental	conflicts with wolves	unknown
Griffon Vulture	1	24.03. 2001.	Međani, Mileševka gorge	unknown	unknown	unknown
Griffon Vulture	1	13.11. 2005.	Goveđak, Sjenica	incidental	conflicts with stray and feral dogs	kreozan (dimethyl-cresol)
Griffon Vulture	1	November 2005	Ugao, Pešter	incidental	conflicts with stray and feral dogs	unknown
Griffon Vulture	1	August 2007	Trešnjica gorge, Ljubovija	unknown	unknown	unknown
Griffon Vulture	2	20.06. 2008.	Trešnjica gorge, Ljubovija	incidental	conflicts with stray and feral dogs	kreozan (dimethyl-cresol)
Griffon Vulture	6	2008	Trešnjica gorge, Ljubovija	incidental	conflict with mammalian predators	unknown

Source: Database on bird crime of Bird Protection and Study Society of Serbia, Bratislav Grubač.

Annex 2.

List of used tables, photos and figures

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BALKAN VULTURES POISON STUDY

Review of the problem of poison use
and vulture poisoning in the Balkan Peninsula

BALKAN
ANTI-POISONING
PROJECT