High human-caused mortality in GPS-tracked red kites across Europe

Supplementary Information

Supplementary Note 1: LIFE EUROKITE

Project: Cross-border protection of the red kite in Europe by reducing human-caused mortality (LIFE18 NAT/AT/000048)

Project duration: 07/12/2019 - 31/01/2027

Coordinating beneficiary: Central European Society for Raptor Protection (MEGEG)

The core idea of the LIFE EUROKITE project is to use tracking technology to identify the spatial habitat use of the red kite (Milvus milvus), as well as other birds of prey species (white-tailed eagle, *Haliaeetus albicilla*, eastern imperial eagle, *Aquila heliaca* and black kite, *Milvus migrans*), and quantify the key mortality causes in Europe, with a focus on causes related to human activities (anthropogenic). The main goal of the LIFE EUROKITE project is to provide information that allows to take action to reduce anthropogenic mortality of red kites.

The main project objectives are:

1) Quantify the relative importance of different human caused mortality in red kites across their European range.

2) Significant reduction of impact of poisoning (reducing the rate of poisoning cases by 5% on EU-level).

3) Identification and resolution of problematic cases involving electrocution / collision.

4) Reduction of other anthropogenic reasons of mortality.

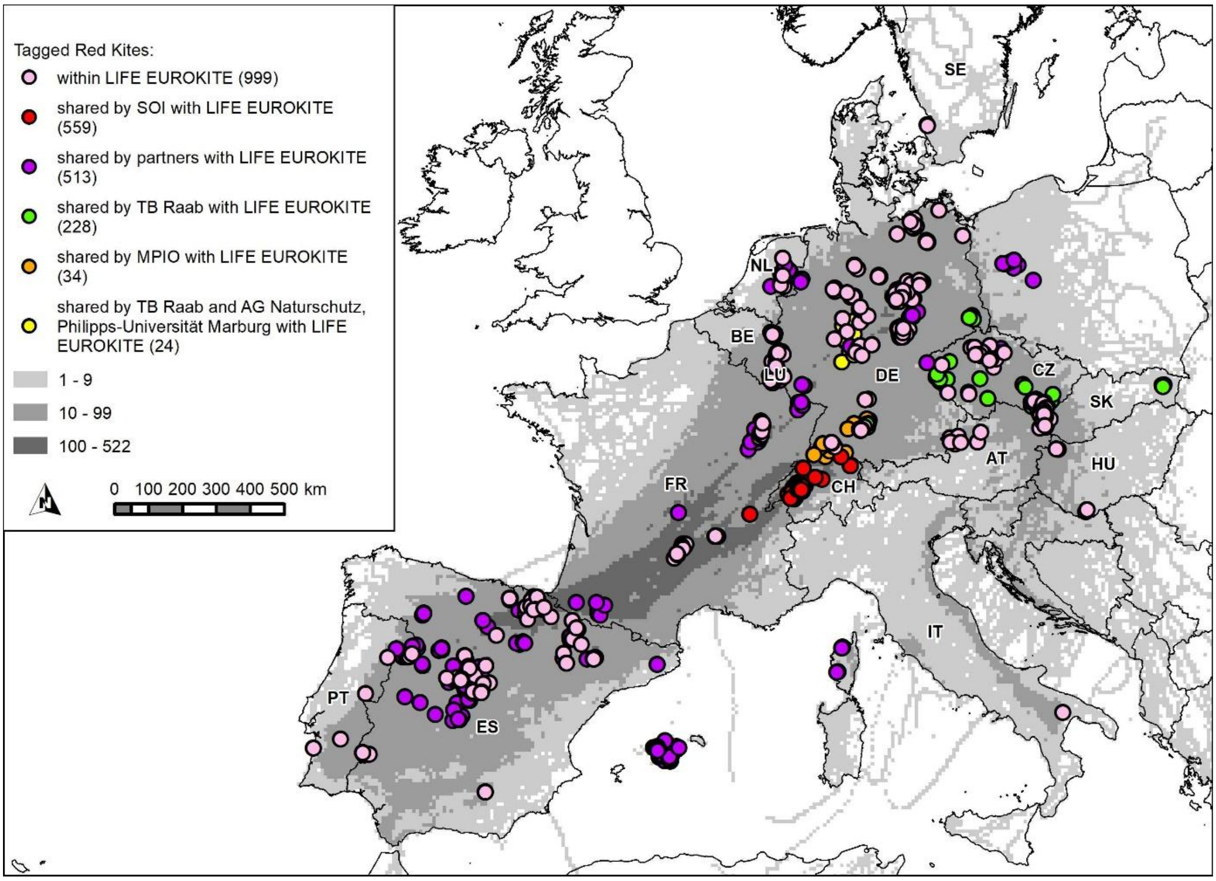
5) Population reinforcement in Spain halts range loss and identifies the factors causing a decline of the local breeding population, possibly associated with climate change.

6) Provide a systematic and easy-to-follow method to collect information on the causes of morbidity and death in raptors. Generate interest in the long-term acquisition of continent-wide data to see how such threats to raptors change over long-time scales.

7) Make recommendations for conservation of raptors according to the major outcomes.

The LIFE EUROKITE project attempts to acquire a representative sample of mortality in red kites. This is achieved by using high-resolution GPS tracking (Fig. 1), allowing fast and precise locating of dead birds (details on how to detect mortality events can be found in Supplementary Note 3 and Panter et al.[1]. Tagging was conducted between 01/01/2013 and 31/12/2022 in continental Europe by more than 50 cooperation partners (1,358 tagging events) or directly within the LIFE EUROKITE project (999 tagging events). Supplementary Fig. 1 shows the locations where the birds were tagged and information which partner organization or LIFE EUROKITE tagged the kites.

Furthermore, the LIFE EUROKITE project has a network of regional partners that are available to conduct ground searches for tagged carcasses and retrieving them. A detailed overview of all project partners, project co-financers and cooperation partners is presented in Supplementary Figs. 2 and 3.



Supplementary Fig. 1. Overview of tagging locations of red kites between 2013 and 2022 by the LIFE EUROKITE project and cooperation partners in continental Europe, colour-coded by the organisation responsible for the tagging (refer to legend). Numbers in brackets indicate the number of tagging events. The grey area shows the number of different individuals for which tracking points were present in the respective 10x10 km² grid square.

Supplementary Fig. 2. Overview of project partners and co-financiers of the LIFE EUROKITE project.

Cooperation partner

This project is co-financed by the LIFE Nature Programme of the European Union

Supplementary Fig. 3. Overview of cooperation partners of the LIFE EUROKITE project.

Supplementary Note 2: Tagging of red kites

In total, 2,346 red kites were tagged in continental Europe between 2013 and 2022 by the LIFE EUROKITE project and cooperation partners. Of those, 1,554 were tagged as nestlings and fledglings (typically between day 40 and 60 of their life), 330 birds were tagged at an older age but up to the end of the second calendar year (termed 'subadult') and 473 in the third calendar year or older (adult). Eleven of the tagged red kites have been tagged twice during this period, as the transmitter failed or when they were taken into a rescue centre, leading to 2,357 tagging events in total.

The number of birds tagged in each country by each organisation is given in Supplementary Table 1, with the tagging locations of red kites shown in Supplementary Fig. 1, split by responsible organisation. An overview of the yearly tagging efforts is presented in Supplementary Table 2.

Devices were sourced from different companies providing modern GPS-UHF-GSM transmitters. Details are given in Supplementary Table 3.

Supplementary Table 1. List of red kite tagging events by country and organisation or person who had the rights for the data of this logger between 2013 and 2022 in continental Europe.

Project (cooperation) partner	Country	Number
Central European Society for Raptor Protection (MEGEG) & TB Raab GmbH	Austria	71
TB Raab GmbH	Austria	36
MEGEG, Stef van Rijn, TB Raab GmbH & Natagora	Belgium	28
TB Raab GmbH, Stef van Rijn & Natagora	Belgium	4
Stef van Rijn & Natagora	Belgium	15
ANITRA System s.r.o.	Czech	9
MEGEG, CSO, VFU & TB Raab GmbH	Czech	57
TB Raab GmbH & VFU	Czech	88
MEGEG, TB Raab GmbH & LPO	France	46
CEN Corse -Conservatoire d'Espaces Naturels de Corse	France	10
Institut Méditerranéen de Biodiversité et d'Écologie (IMBE), Aix Marseille	France	28
Ligue pour la Protection des Oiseaux (LPO)	France	6
Schweizerische Vogelwarte (SOI)	France	2
MEGEG, TB Raab GmbH, Thomas Pfeiffer, RMZ & some other local and regional	Germany	385
Landschaftspflegeverband „Grüne Umwelt" e. V. & RMZ	Germany	4
Hessisches Ministerium für Wirtschaft, Energie, Verkehr, Wohnen und ländlichen	Germany	6
Max-Planck-Institute for Animal Behavior (MPIAB)	Germany	34
ÖKOTOP - Büro für angewandte Landschaftsökologie	Germany	30
Rotmilanzentrum (RMZ)	Germany	19
TB Raab GmbH, Thomas Pfeiffer, RMZ & some other local and regional partner	Germany	64
TB Raab GmbH und AG Naturschutz, Philipps-Universität Marburg	Germany	24
Thomas Pfeiffer	Germany	9
MEGEG, TB Raab GmbH & pro vertes	Hungary	9
MEGEG	Italy	1
MEGEG, natur&ëmwelt a.s.b.l & Stef van Rijn	Luxembourg	21
natur&ëmwelt a.s.b.l & Stef van Rijn	Luxembourg	13
Naturschutzsyndikat SICONA & Stef van Rijn	Luxembourg	4
Stef van Rijn	Luxembourg	16
MEGEG & Stef van Rijn	Netherlands	10
Stef van Rijn	Netherlands	33
Adam Mickiewicz University in Poznań (PULS)	Poland	27

MEGEG & AMUS	Portugal	5
Palombar & Biodiversity Research Institute (CIS-University of Oviedo-Principality of Asturias)	Portugal	1
MEGEG, RPS & TB Raab GmbH	Slovakia	7
TB Raab GmbH & RPS	Slovakia	7
BirdLife Spain (SEO)	Spain	87
BOKU - University of Natural Resources and Life Sciences & Biodiversity Research Institute (CSIC-University of Oviedo-Principality of Asturias)	Spain	5
MEGEG, TB Raab GmbH, AMUS, SEO & some other local and regional partner	Spain	357
Diputación Foral de Álava (DFA)	Spain	18
GOB - Grup Balear d'Ornitologia I Defensa de la Naturalesa	Spain	61
Grupo de Rehabilitación de la Fauna Autóctona y su Hábitat (GREFA)	Spain	108
TB Raab GmbH, SEO & some other local and regional partner	Spain	29
Universidad Autónoma de Madrid	Spain	3
MEGEG, TB Raab GmbH & Uni. Lund	Sweden	3
Schweizerische Vogelwarte (SOI)	Switzerland	557
Total		**2,357**

Supplementary Table 2. Yearly numbers of red kites tagged by age class across Europe. Eleven of the 2,346 tagged red kites were tagged twice during this study, as the transmitter failed or when they were taken into a rescue centre, leading to 2,357 tagging events in total.

Age class				
Year	Nestling	Subadult	Adult	Total
2013	21	4	5	30
2014	11	2	10	23
2015	65	3	25	93
2016	154	5	46	205
2017	201	4	39	244
2018	174	11	64	249
2019	159	26	55	240
2020	231	25	31	287
2021	223	83	96	402
2022	315	167	102	584
Total	1,554	330	473	2,357

Supplementary Table 3. Overview of types of GPS-UHF-GSM transmitters used for tagging of the red kites analysed in this study.

source company	number of tags	website	access date
Anitra	667	https://anitracking.com	09.05.2024
Ecotone	629	https://www.ecotone.bio	09.05.2024
Ornitela	606	https://www.ornitela.com	09.05.2024
Milsar	184	https://milsar.com	09.05.2024
Interrex	103	https://interrex-tracking.com	09.05.2024
e-obs GmbH	77	https://e-obs.de	09.05.2024
Aquila	27	https://aquila-it.pl	09.05.2024
Wimbitek	24	https://www.wimbitek.com	09.05.2024
Movetech	21	https://movetech-telemetry.com	09.05.2024
Microwave	12	https://www.microwavetelemetry.com	09.05.2024
North Star	5	https://www.northstarst.com	09.05.2024
Lora	2	https://copernitech.com	09.05.2024

When a post-fledging kite was caught, the individual was aged based on moult and plumage characteristics. The age in calendar years is distinguishable until a kite is three calendar years based on the moult and presence of different generations of feathers: the juvenile ones are grown in the nest, and the adult ones are grown during the subsequent moulting processes[2]. All tagging followed ethical guidelines from the respective countries.

Tagging procedure

As part of this study, 1,526 nestlings or fledglings were taken from the nest and ringed and tagged on the ground. Of these, 1,506 red kites were tagged as fledglings leading up to and including the age of 70 days, and 20 red kites were tagged as fledglings after the 71st day. In most cases, nestlings were taken back to the nest after 15 - 30 min. In case the fledglings were found injured, these individuals were brought to rescue stations for rehabilitation and were, in most cases, released with a satellite tag after some days or weeks.

Adult breeding birds (n = 332) were captured close to the breeding place with a net on the ground, in most cases using a live or stuffed Eurasian eagle owl (*Bubo bubo*) or Eurasian goshawk (*Accipiter gentilis*) to attract the adult breeding pair. The used lure differed between cooperation partners and followed regional laws and ethical guidelines. About 15 – 30 min after catching, breeding birds were released with ring and transmitter.

Non-breeding red kites (213 subadults and 105 adults) were captured with different methods (clap net on the ground or activated from a distance at species-specific feeding sites, using carrion to attract them) after the breeding period while foraging on the ground at feeding places, mainly during September in Germany and during the winter in Spain. After capture, they were released with ring and transmitter.

The age of subadults and adults was determined based on plumage characteristics and moult[3].

Recovered red kites (12 fledglings, 64 subadults and 36 adults) were released from rescue centres, mainly in Spain and Germany, after ringing and tagging. Additionally, 16 juveniles and 53 subadults from the UK were tagged and released as part of a reintroduction effort in Spain.

In nearly all cases, tags were fitted as backpack-type "harnesses"[4] on the back of the red kites using Teflon ribbon spanning 9 – 11 mm in width. The detailed method was discussed and agreed upon beforehand with all project partners and cooperation partners. In most countries, we used a method to fix the satellite tag for the entire life of the bird, but in some cases the cooperation partner used a method where the tag fixation had a breaking point, so it was possible that the satellite tag can fall from the bird completely on its own (tag lost). Such tag loss usually occurred after 2 to 4 years. Only birds that died before losing the tag were included in the assessment.

Tagging weight and ethics considerations

The median weight of tagged nestlings and fledglings was 950 g [Q1: 890 g, Q3: 1020 g], for subadult and adult birds 983 g [Q1: 900 g, Q3: 1058 g]. The weight of tags varied between 20 and 30 g depending on the respective radio transmitter that was used (approximately 2 - 3 % of the birds' weight). For each tagged bird, the tag weight relative to the body mass at tagging followed the local regulations (typically below 3 % of the body weight for soaring birds)[4,5].

Tagging data resolution and data

This data collection resulted in a dataset with 185 million datapoints with associated metadata. The temporal resolution of the GPS positions typically ranged between one position per hour to one position per second (relative datapoint counts: 15 min – 1 h: 3 %; 5-15 min: 12 %,1-5 min: 6 %; 5 s – 1 min: 3 %, <5 s: 74 %) depending on the device settings and remaining battery life. During bad light conditions (e.g., at night) and low battery level the time resolution can temporarily be reduced to once every few hours, leading to gaps in data (>1 h: 2 %).

Supplementary Note 3: Carcass retrieval and determining mortality causes (LEAP)

For the evaluation of mortality cases, we applied LEAP, a recently developed standardized protocol for assessing mortality for tagged birds[1]. Here, we summarize the idea and basic LEAP method briefly and would ask to refer to Panter et al.[1] for more detailed insights and information.

Tagged birds in the LIFE EUROKITE project database were checked up to twice daily for any mortality events. We used the GPS positions and sensor data (i.e., temperature and accelerometer activity) to check for any signs of mortality (e.g., ceasing of natural movements and a drop in temperature). Checks were done manually and/or automatically using various platforms provided by different satellite tag companies (Anitra, Ornitela, E-obs, Interrex, Ecotone, etc.) that have a mortality alert feature.

If movement data indicated that a tagged bird had died, regional collaboration partners (95 people from 34 countries) were instructed to carry out a ground search and retrieve the carcass from the last known location. The search and its documentation were standardized, and a form was provided. The last known GPS position and location of death along with information collected there in the field (e.g., proximity to and types of anthropogenic infrastructure or human activity such as poisoned bait, etc.) were also used to assist in the assessment of the cause of death. Once the carcass was recovered, a veterinarian prepared a pathological report (a standardized form is provided in Panter et al.[1]).

To determine the mortality cause, LEAP integrates three different sources of data: (1) GPS tracking, (2) evidence from the mortality location, and (3) necropsy results. Additionally, a corresponding certainty score is assigned to reflect the level of available information and the associated confidence of the assessment. Details about the certainty levels “certain”, “probable”, “possible” and “inconclusive” and guidelines how they are assigned are presented in Panter et al.[1].

This procedure was performed from 2019 onwards for all birds shared with the LIFE EUROKITE project, even if they had been tagged before. As about one quarter of the evaluated red kites died from 2013 to 2018, before the LIFE EUROKITE project, and the data was shared by partners, the mortality assessment process was not yet standardized in the detailed documentation presented here. However, all available information that was gathered for those cases was utilized in the same way for assessment of the mortality reason according to LEAP.

15 birds (not included in the total 979 evaluated mortality cases) were excluded from the mortality evaluations due to abnormalities, such as dying too soon after tagging (alive less than 3 days after being released from a rescue station) or the bird not having moved over a distance of at least 2 km from the tagging release place, in case the logger sent for less than 21 days. These issues indicated that the birds were not healthy at release or reintroduction (9 cases total). In the other 6 excluded cases, no data was ever received from the tag, indicating technical problems from the start.

Supplementary Note 4: Classifying causes of mortality

We classified causes of mortality at three different hierarchical levels[1]. At the highest level, they can be separated into natural mortality and anthropogenic mortality. Natural mortality is due to means that would also normally occur and without direct human influence, e.g., starvation. Anthropogenic mortality means all causes that were directly caused by human influence, e.g. collision with vehicles or energy infrastructure. In total, we differentiated 13 different main categories of causes of mortality (separated into 5 natural and 8 anthropogenic categories, see Supplementary Fig. 4 and 5). Main categories were further subdivided into 48 subcategories, that were assigned where detailed information on the mortality cause is available, e.g., the substance responsible for poisoning, where on a powerline the electrocution took place, which predator was responsible. In case a new rare cause of death was observed, e.g., collision with an airplane, this subcategory was added under "anthropogenic (other)" or "natural (other)". While the main categories could often be determined with great certainty by evaluating tracking data, with indications at the scene of death and pathological examination, it was often much more difficult to determine the exact cause of death, e.g., which predator was responsible in a predation case. In total, this led to 61 different mortality categories that were assigned.

In some cases, an assessment of the cause of mortality was not possible. Reasons for this include that no carcass could be found, the analysis was inconclusive or the final result was pending (for example due to bird flu limiting options for necropsy procedures), the lifetime of the tag expired before the death of the bird (sudden stop due to tag malfunction) or the tag was dropped by the bird while still alive (tag lost).

The analysis in this work was based on the main categories, due to the higher sample sizes and certainty of unambiguous classification: Our assessments were made based on "primary" causes of death, i.e., based on assessments of evidence collected during carcass retrieval, analysis of GPS positions and pathological outcomes. Therefore, secondary mortality causes, e.g., underlying diseases, were not accounted for.

Natural causes of mortality

Natural mortality reasons observed in this study were divided into five main categories (Supplementary Fig. 4 middle): predation, trauma, disease, starvation and other natural causes, a category including rare cases not associated with the other main categories. The subcategories are given in Supplementary Fig. 4 (right). In the following, these categories and their respective subcategories are briefly summarised.

Predation

Predation is defined as the process by which one individual kills another in order to obtain food[6]. Red kites have a wide range of natural predators, including eagle owl, Eurasian goshawk and a few eagle species. These fast and agile predatory birds either strike the red kites in the air or kill the juveniles in the nests. The juveniles can also be predated by raccoons or martens, which can kill the juveniles either in the nest or just prior to fledging[7,8,9].

Predation by foxes is not a relevant cause of death for red kites, because only in cases where a fledgling is falling from the nest on the ground or the bird is in a bad state beforehand, the predation can happen. For fledglings, falling out of the nest is often the reason predation happens, compare 16.8% "fledgling accident" and 66.5% "predation" for fledglings of conclusive cases in this study (Europe) to 37% "fallen from the nest" and 40% "predation" in

Brandenburg[10], where in such cases the falling from the nest was classified as the cause of mortality.

Natural causes	Predation	Goshawk
		Eagle owl
		Racoon
		Eagle
		Hawk
		Fox
		Other
	Trauma	Fallen out of nest
		Tree broken
		Destruction of aerie due to e.g. gale force wind
		Fight with other raptor
	Disease	Mixed infection
		Parasitic infection
		Bacterial infection
		Viral infection
		Mycotic infection
	Starvation	Starvation
	Other natural reasons	Fledgling accident
		Siblicide
		Natural (details unclear)

Supplementary Fig. 4. Classification of the natural causes of mortality into main- (middle) and subcategories (right). Main category was determined for each conclusive case; if the available information provides the opportunity, a more detailed subcategory was assigned. Based on Panter et al.[1].

Tracking data can provide useful indications for predation, for example by providing the time of death (see Supplementary Note 3), as well as movements of the bird before and after its death, and strong fluctuating metadata while being eaten by a predator. If the bird is moved immediately after its death, predation is highly likely, while movement hours or days after the death are related to scavenging.

The predator species that might have killed the red kite can best be determined based on indications found based on tracking data, in the field and laboratory, if a carcass could be retrieved. On the one hand, the time of day when the bird died is relevant and can be well assessed from tracking data, mainly from the accelerometer and pitch/roll metadata (see examples in Panter et al.[1]). The Eurasian goshawk tends to hunt red kites during the day, while the eagle owl poses a predation threat only at night. A strong indication of the species feeding on the carcass can be provided by the victim's feathers: if the so-called plucking place can be found, characterized by many feathers, the feathers can be inspected. If they are complete (as if they had been pulled out), this indicates predation by a bird, either eagle owl or Eurasian goshawk[11,12]. If the feathers look bitten off or chewed, then the predator/scavenger is most likely a mammal. However, the possibility of scavenging from either species groups should be considered when assessing potential predator species.

Information at the scene of death and the state of the carcass can also provide valuable information: if the bird carcass or remains are found below the nest of a predator species, e.g., eagle owl or Eurasian goshawk, predation by this species is likely. If the head was cut off, this presents an indication for a kill by an eagle owl if the carcass is fresh[13]. The Eurasian goshawk typically plucks many feathers, especially those on the breast of their prey. Eurasian goshawks also often pluck the feathers before bringing the prey to their own nest. Plucking happens hidden in trees or on the ground, sometimes even in the red kite nest. This clearly differentiates the goshawk from the eagle owl, which brings the whole carcass to their own nest, so a lot of bigger feathers can be found in and under the nest. Damage on the tree bark of a nesting tree, e.g., traces or merely punctures (sometimes combined with chipped off bark on the ground) are indicative of mammalian predators.

During the necropsy, there are more signs that give strong indications of the type of predator that killed a kite. If the skull is open, it was likely another raptor (e.g., Eurasian goshawk) as they like to eat the brain. It is, however, difficult, and often impossible, to say for certain from necropsy alone which species was responsible. Scavenging and predation is easily differentiated by pathological indications, such as intra vital pathological alterations vs. post-mortem scavenging or feeding.

Regarding the evaluation of the certainty of predation cases, this information can be used as guidelines. If the necropsy shows predation, a “certain” evaluation can be made. If we find the carcass of the bird under the nest of a Eurasian goshawk, supported by tracking data, the evaluation is also considered as certain. If the satellite tag was found in the nest of an eagle owl, it is also probable (very likely) that the owl is the killer, but with some uncertainty in the absence of information about the time of death. With help of the tracking data, it is generally possible to distinguish between those cases from the time of transport to the nest relative to the time of death. If we find the satellite tag in a black kite nest and find a plucking place, a kill by goshawk is possible, as the black kite only acts as scavenger for red kites and the plucking place points to a goshawk.

In summary, predation can be determined from the combination of tracking data, case form information and necropsy, however, determining the responsible predator species can often be challenging.

Trauma

Trauma is caused by a situation in which the bird suffers physical damage, resulting in death. Trauma can occur when juvenile birds fall out of the nest, when trees or individual branches break off due to storms and hit the bird, by the destruction of the aerie, for example due to gale force winds, or during a fight with other raptors, for example in the air. Injuries, such as wounds caused by fighting, are often unspecific at first glance and can usually only be confirmed with certainty by an examination in the laboratory using x-ray etc., consequently making determination of the exact trauma challenging. However, the examination of the surroundings around the scene of death may generally provide indications, such as wind damage to trees caused by storms.

Disease

Diseases can lead to death for red kites of all ages. The exact causes of disease usually cannot be determined at the scene of death, but only by a pathological examination in the laboratory. A distinction is made between mixed, bacterial, parasitic, viral (caused by a virus) and mycotic infections (caused by fungi).

Starvation
Historically, starvation has not been a significant mortality cause for red kites[10]. Red kites are opportunistic and generalist scavengers and predators, feeding on a varied diet that includes small mammals, birds, and carrion. They are well-adapted to finding food, and their populations are generally stable when there is an adequate supply of prey and suitable foraging habitats.

However, red kites can be affected by changes in their environment, such as habitat loss and climate change, leading to food scarcity and potential starvation. When insufficient food is available during the breeding period, competition between siblings can cause the weaker one to starve. High population density also leads to an increased risk for food competition among breeding red kites and thus nestling starvation. The weather can also play a decisive role, because it has been shown that red kites do not feed their chicks when it rains. As fledglings require lots of food in the development stages, the onset of starvation can occur after only 24 hours. Therefore, food availability in the form of carrion, voles, but also small birds, earthworms, amphibians, reptiles and fish, is crucial for the survival rate of red kite fledglings. For healthy adult red kites, starvation does generally not pose a threat[8,9,14].

Other natural reasons
Other natural causes of death include mostly fledgling accidents (e.g., falling out of the nest resulting in death), but also cases of siblicide.

Anthropogenic mortality reasons
Various studies have showed that bird populations are strongly influenced by anthropogenetic factors[15,16,17], which is especially pronounced for birds of prey at the top of the food chain. Human activities and infrastructure have an ever-increasing impact on the mortality of raptors, directly as cause of death or indirectly by habitat degradation and reduction or climate change. The main sources of direct anthropogenic mortality detected for red kites in Europe are presented in the following, divided into 8 main categories (Supplementary Fig. 5 middle) and 28 subcategories (Supplementary Fig. 5 right). Based on tracking data, collisions (with power lines, wind energy turbines, vehicles on roads and rails) can be typically seen very well in the metadata (if the temporal resolution is sufficient). Sometimes, the birds do not die immediately but after some delay from their injuries. Such cases are still assessed as deaths related to their collision.

Power Lines
Power lines pose two different types of threat to birds: first, the bird can collide directly with the power line or the towers/pylons of the power line, leading to fatal injuries. We separated collision with power lines in "collision with power line" if it was not clear which part of the power line the kite collided with (power line cable or tower). Secondly, contact, or sometimes just the approximation, with the high-voltage cable can lead to electrocution, which can cause small marks to severe burns, mostly to feet and legs, and a smell of burned flesh. From evaluating the visible state of the carcass, followed by forensic diagnosis, and where the collision/electrocution occurred, a clear distinction between those reasons is possible[18].

Anthropogenic causes	**Power line**	**Collision with power line**
		Collision with power line cable
		Collision with tower
		Electrocution on power line
		Electrocution on distribution pole
		Electrocution on interchange or transformer
		Electrocution on train power lines
	Wind turbine collision	**Collision with rotor blades**
		Collision with tower
	Poisoning	**Anticoagulants / Coumarin derivatives**
		Cholinesterase inhibitors (Carbofuran)
		Lead
		Other substances
		Landfill
	Shooting/Trapping	**Shooting**
		Trapping
	Drowning	**In water tank**
		In slurry tank
		Others
	Rail traffic	**Rail traffic collision**
	Road traffic	**Road traffic collision**
		Collision with car
	Anthropogenic (other)	**Collision with airplane**
		Collision with agricultural machine
		Tree was cut down
		Fixation of logger
		Anthropogenic trauma
		Unknown – Traceable human intervention

Supplementary Fig. 5. Classification of the anthropogenic causes of mortality into main- (middle) and subcategories (right). Main category was determined for each conclusive case, if the available information provides the opportunity, a more detailed subcategory was assigned. Based on Panter et al.[1].

Wind turbine collision

The ongoing transition towards renewable energy motivated by combatting the effects of climate change, particularly through the construction of wind turbines, is considered a risk factor for birds[19,20,21]. Birds may collide with the rotor blades, or in rare cases with the wind turbine towers[22]. Cases of wind turbine collisions are associated with a high mortality risk due to severe trauma. In addition to the position of the carcass in the immediate vicinity of wind turbines, there are also injuries present that are characteristic for collisions. For instance, in collisions with rotor blades, complete body parts such as the head or wings are often severed by a clean cut.

From tracking data with high temporal and spatial resolution (1 data point per second) taken specifically in the vicinity of wind power stations, additional insights into avoidance behaviour can be gained[23]. The red kite often avoids individual wind turbines as well as rotor blades. These findings suggest a reduced collision risk in the range of 98% to 99,2% compared to flight behaviour without avoidance[23,24,25]. In the Europe-wide database the red kite is ranking on place 5 under birds collided with wind turbines, and in Germany on second place immediately after the common buzzard (*Buteo buteo*)[26], although it needs to be kept in mind that these data are based on opportunistic, and non-standardized collections. Tracking data can also enable a clear determination of the mortality reason of birds found dead below wind power stations[1], as not every such death is necessarily caused by said turbine[27].

Rail traffic

Raptor species regularly scavenge the trails for food carcasses, increasing their vulnerability to collisions. In addition to collision with the overhead lines already described in "Power lines", birds also collide directly with trains[28,29]. Even more importantly, as red kites typically feed on carrion, other dead animals lying on the tracks can attract the birds, which then collide with incoming trains when preoccupied with feeding. The strong impact of collisions with trains can lead to pronounced fractures. The extent of the fractures can be detected at the forensic examination. For deaths suspected to be caused by rail traffic, the behaviour of the bird before the deadly event can give indications, such as time spend on the rails prior to the collision.

Road traffic

Wildlife-vehicle collisions cause harm to a lot of bird species and other animals and humans worldwide[30,31,32]. Road traffic is a high risk for birds depending on its location and wider environment. A plentiful supply of food along the road from insects and carcasses encourages birds to stay close to the road, which eventually leads to their death. Regular heavy traffic often has less influence on the number of fatalities than individual cars or trucks driving particularly fast. In cases where it was known that the collision was with a car, it was assessed as “collision with car”, otherwise as “road traffic collision”.

Poisoning

Raptors are commonly poisoned through deliberately placed poison baits, such as carcasses, eggs and meat[33], laced with various toxic substances. Birds consume the baited food and ingest the poisons. The illegal use of poison is an untargeted method, also affecting other species than intended[34,35]. There are different types of poisoning events, including those caused by anticoagulants/coumarin derivatives (sedative, rodenticides), cholinesterase inhibitors (carbofuran, insecticides), lead, and other harmful substances. Birds also come in contact with poisons on landfills. One indication of poisoning is finding several dead birds within several hundred metres. Dead flies and other insects on and around the dead bird can also suggest poisoning. In addition, poisoned birds often have remnants of food in their beaks. The discovery of granular-like violet or blue substances or visible bleeding, as seen with rodenticides, is considered a clear sign of poisoning. Aldicarb, which can be used as often as carbofuran in some regions, presents as smooth black granules visible on the carcass. On the other hand, cramped claws are not a definitive sign of poisoning. A pathological and toxicological examination in the laboratory is often required to identify the type of poison.

Shooting/Trapping

In many countries, hunting is not only a tradition and cultural practice but has also become a pastime. Illegal shooting of non-game species is a prominent threat of global conservation relevance[36]. Recent work has shown that in the western United States of America, raptors are illegally shot with far greater frequency than was previously recognized[36]. Furthermore, people's aversion to large raptors plays a role because they perceive these birds as a threat to their domestic or ground-nesting birds. Whether a bird has been killed by a gunshot can usually only be determined through a laboratory x-ray examination, as the entry wounds are often difficult to detect beneath the plumage. Birds that are first caught by traps and then killed are also considered in this category.

Drowning

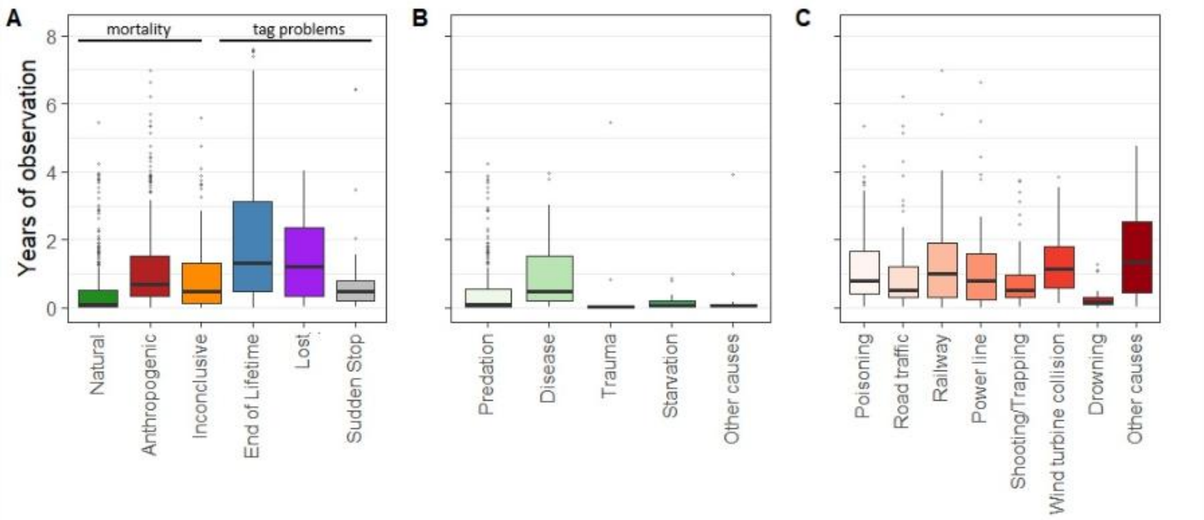
In arid areas, the drowning of raptors in small reservoirs on farms can be a significant cause of mortality[37]. Water and manure tanks pose a dangerous trap for red kites and other birds. Birds attempting to use the tanks as a water source often cannot accurately gauge the water level. Because they have no solid ground to push off from in the water, they are unable to take off and end up drowning. In the case of manure tanks, there is also the added risk of wing adhesion, preventing them from flying.

Other anthropogenic reasons

Other anthropogenic causes of death include when the kite's death was directly associated with the satellite tag (e.g., getting caught with the harness). This problem occurred once for the birds included in this study. Collisions with aircraft, which can occur primarily during take-off and landing but also in the air, and collisions with agricultural machinery, are also encompassed within this category. Other anthropogenic causes of death also include fatalities due to tree felling or other traceable human interventions, as well as cases of anthropogenic trauma, where the detailed cause could not be determined conclusively, but natural trauma could be ruled out.

Supplementary Note 5: Tag operation statistics

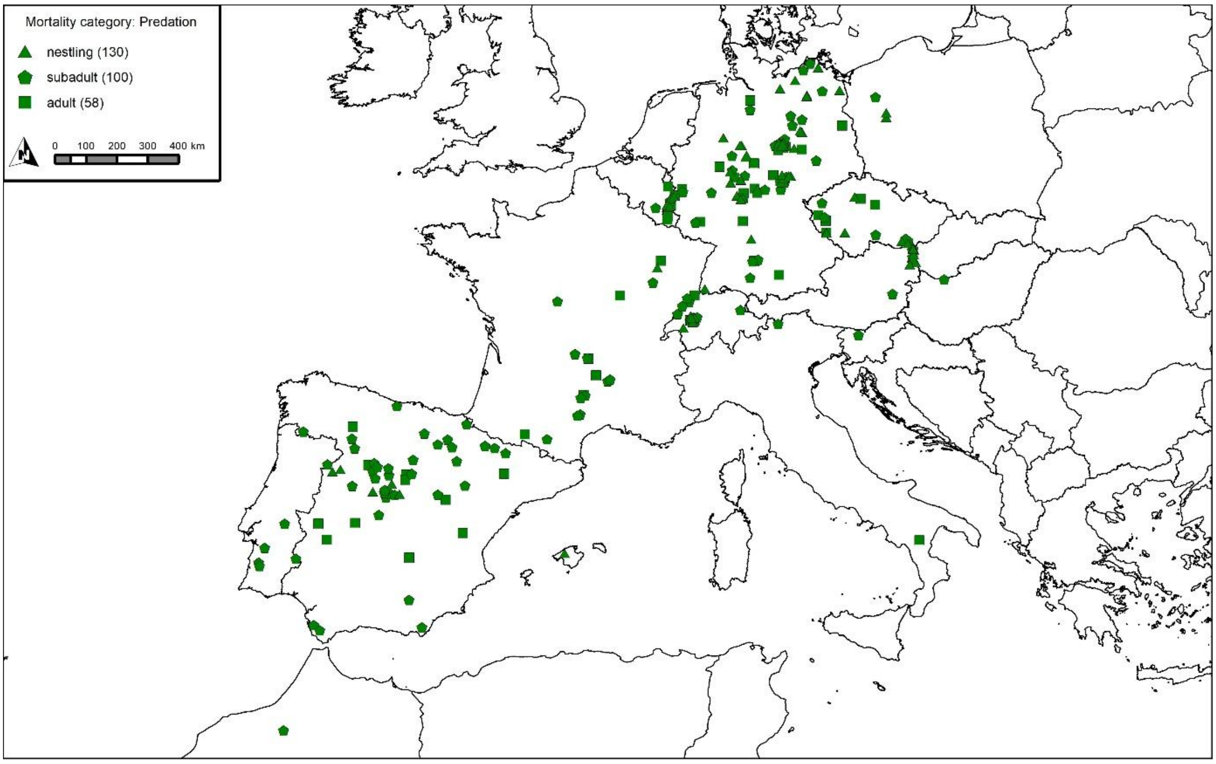
Supplementary Fig. 6 shows the average time of tag operation for different causes of mortality as well as for tag problems. The time was counted from the day of tagging to the day of mortality, stop of tag operation or loss.



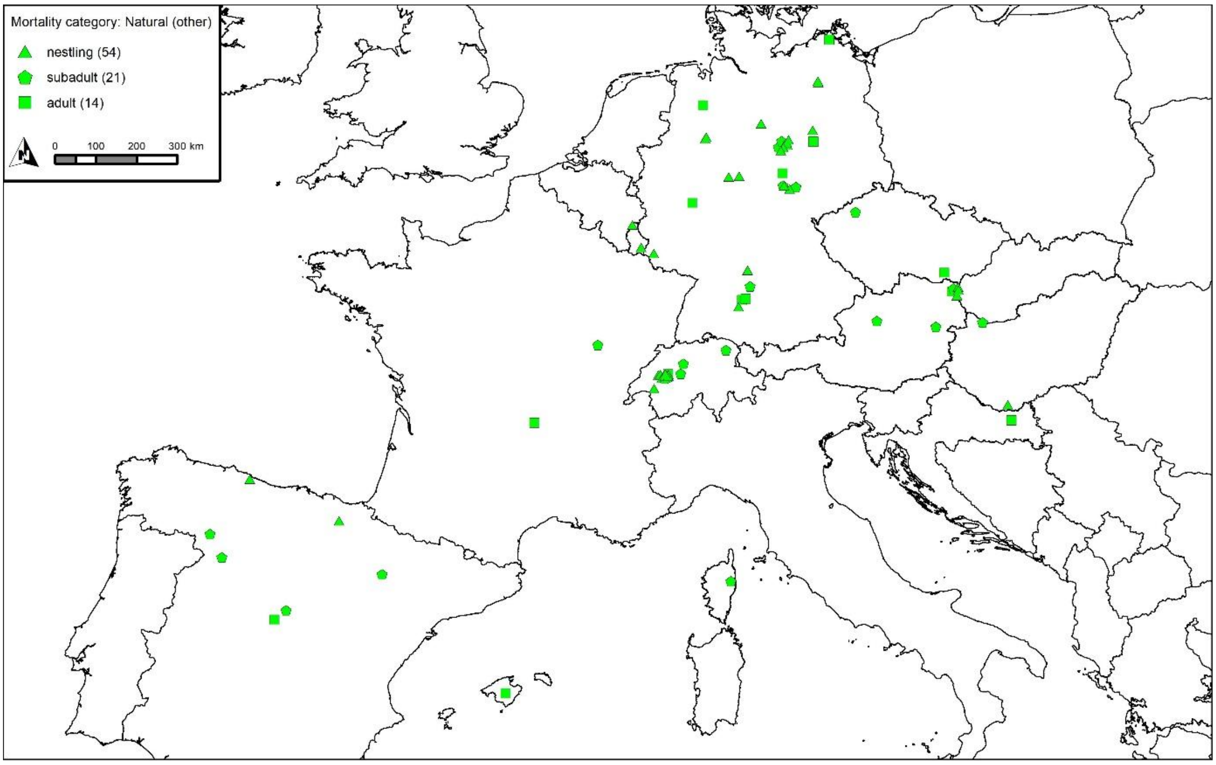
Supplementary Fig. 6. Average times of tag operation/GPS observation of birds: (**a**) observations times for natural, anthropogenic and inconclusive mortality cases and tag problems. (**b**) observation times for natural mortality cases. (**c**) observation times for anthropogenic mortality cases.

Supplementary Note 6: Maps for red kite mortality causes

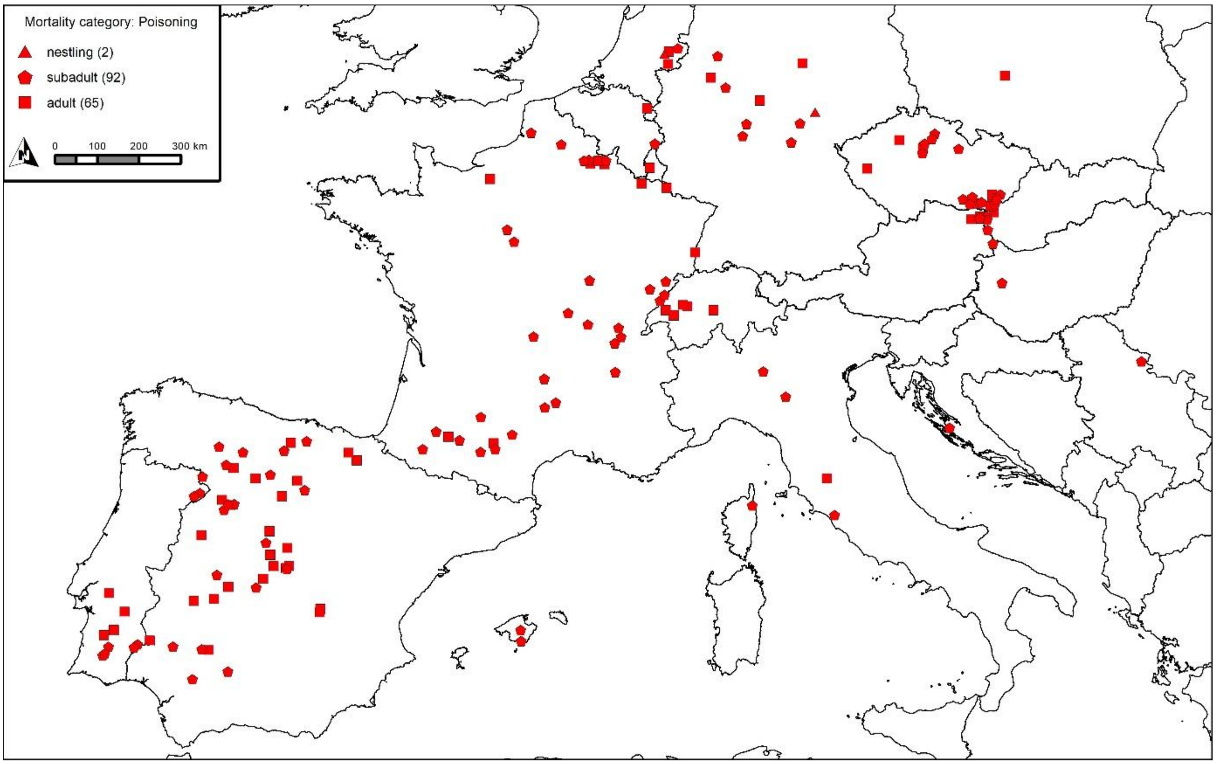
The following supplementary figures (Supplementary Figs. 7-16) show the locations of red kite mortality cases of all studied age classes (nestling, subadult, adult) from natural and anthropogenic causes across Europe, corresponding to Figure 2 of the main text.



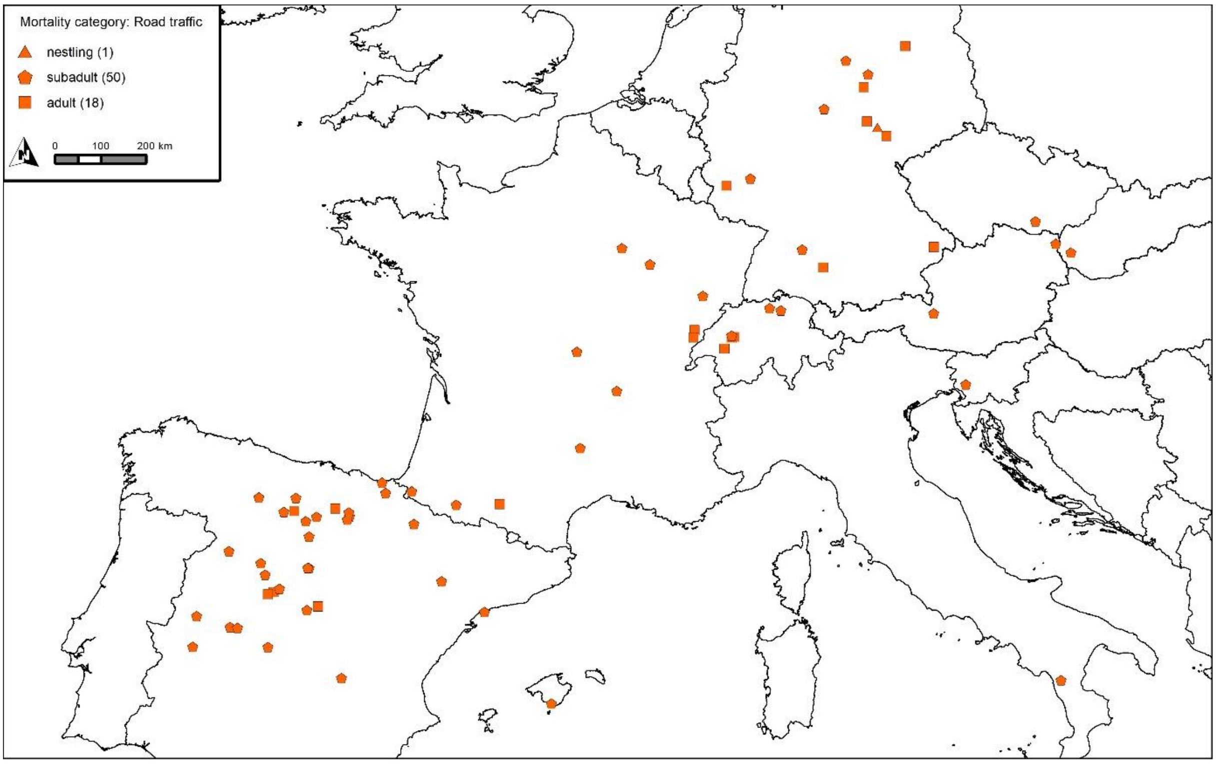
Supplementary Fig. 7. Mortality cases from predation for nestlings, subadults and adults.



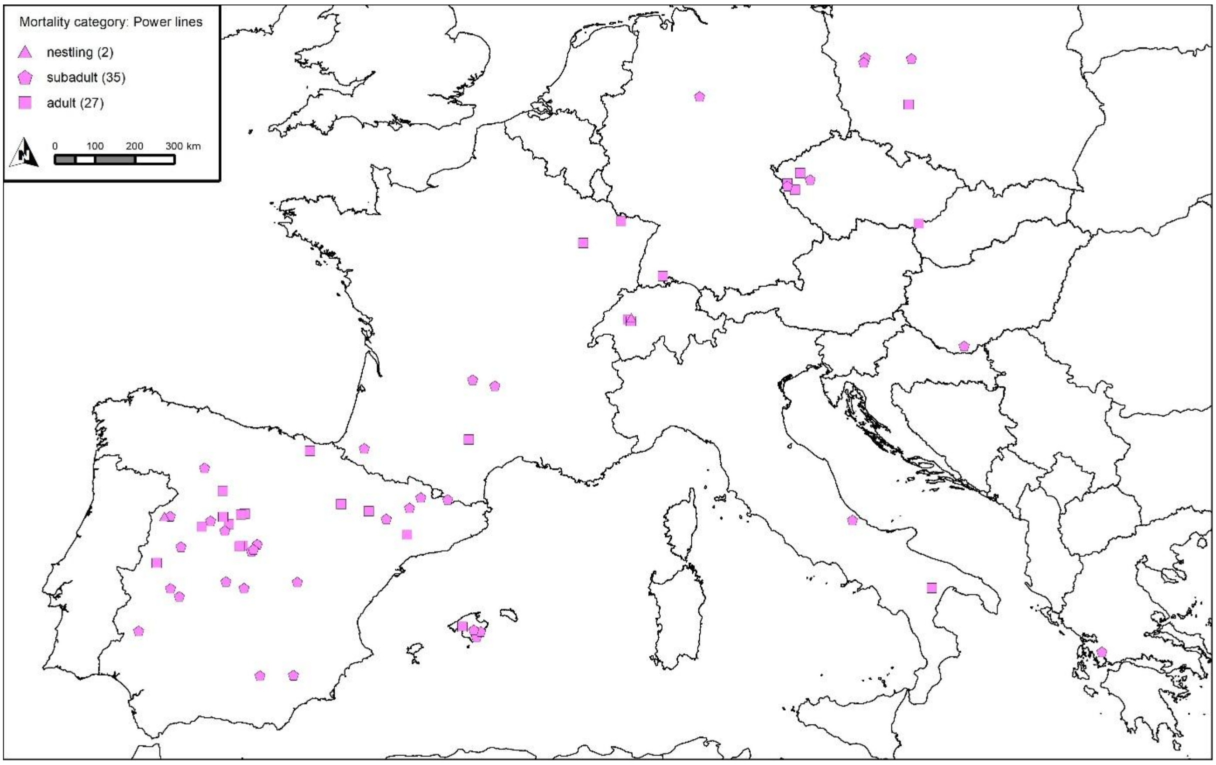
Supplementary Fig. 8. Mortality cases from other natural causes for nestlings, subadults and adults.



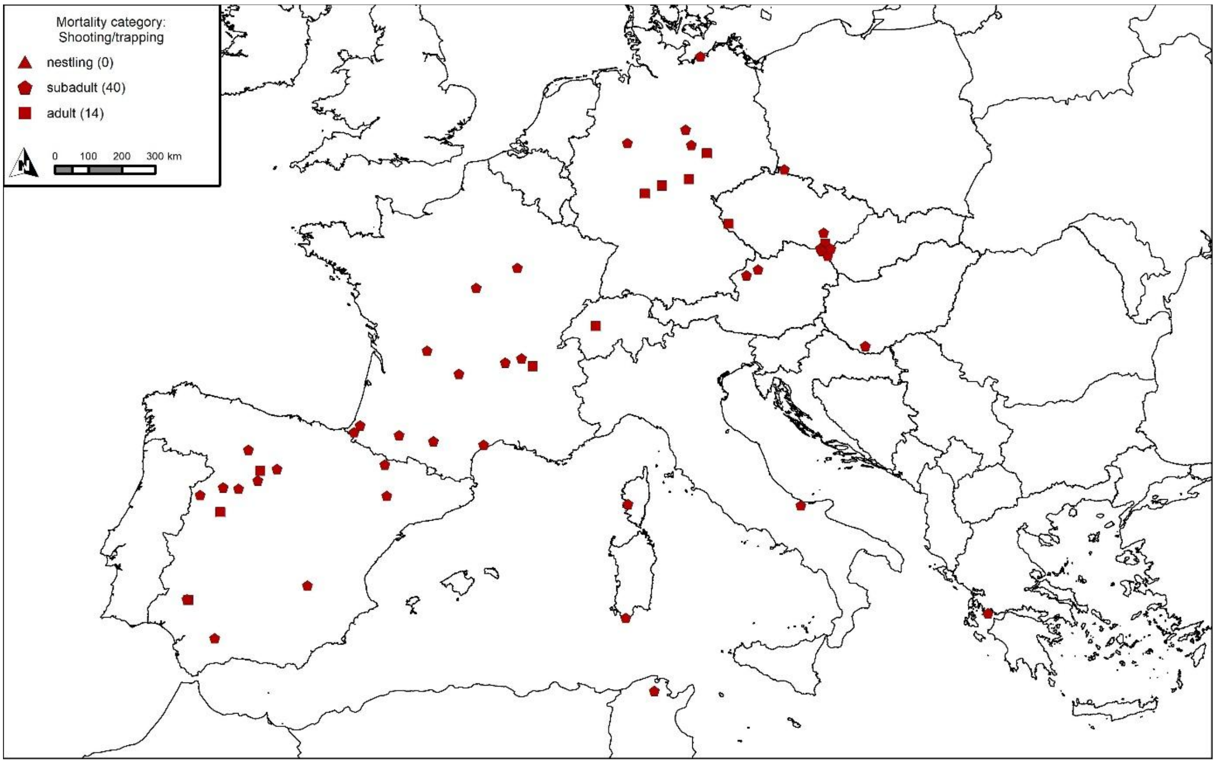
Supplementary Fig. 9. Mortality cases from poisoning for nestlings, subadults and adults.



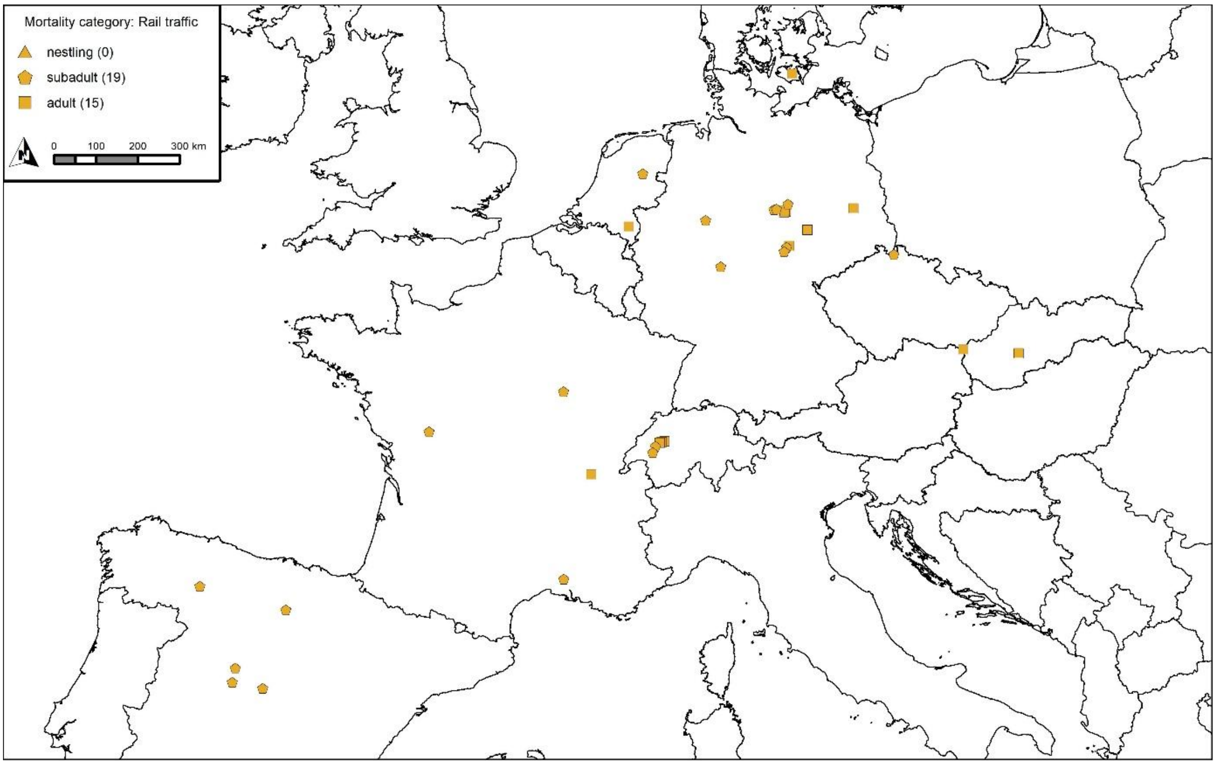
Supplementary Fig. 10. Mortality cases from road traffic for nestlings, subadults and adults.



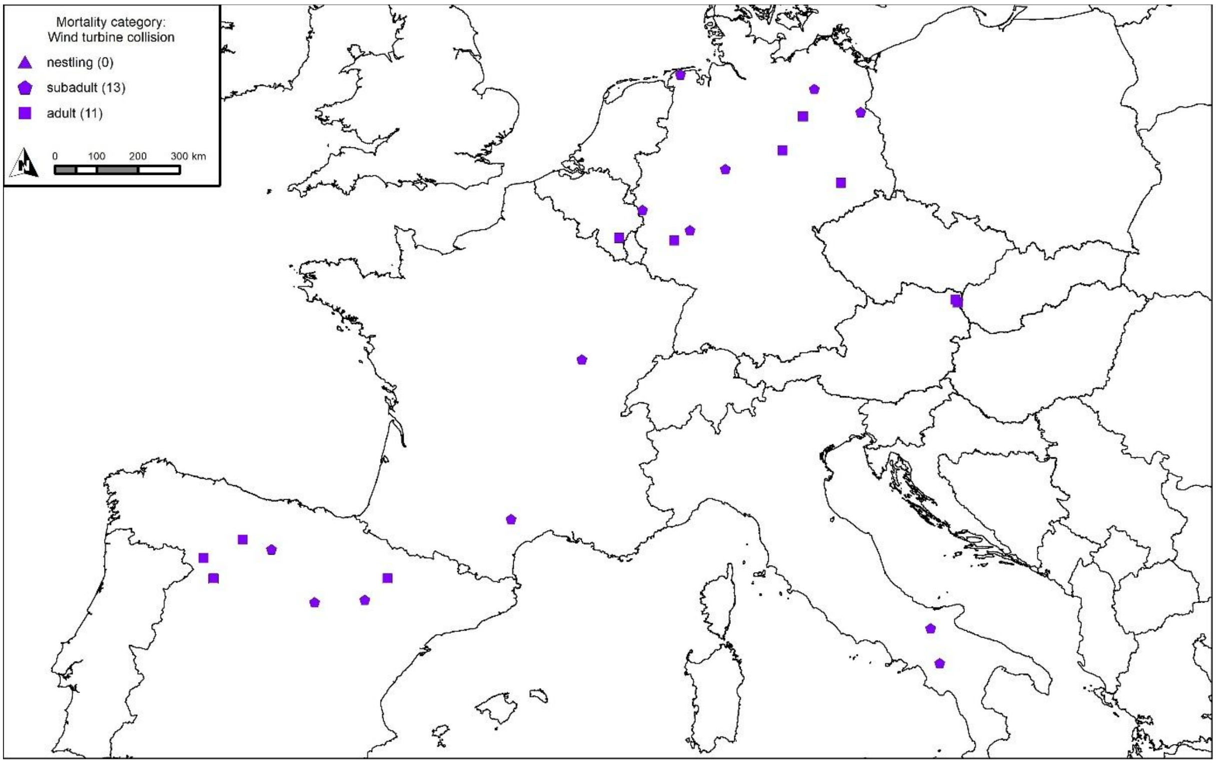
Supplementary Fig. 11. Mortality cases from power lines for nestlings, subadults and adults.



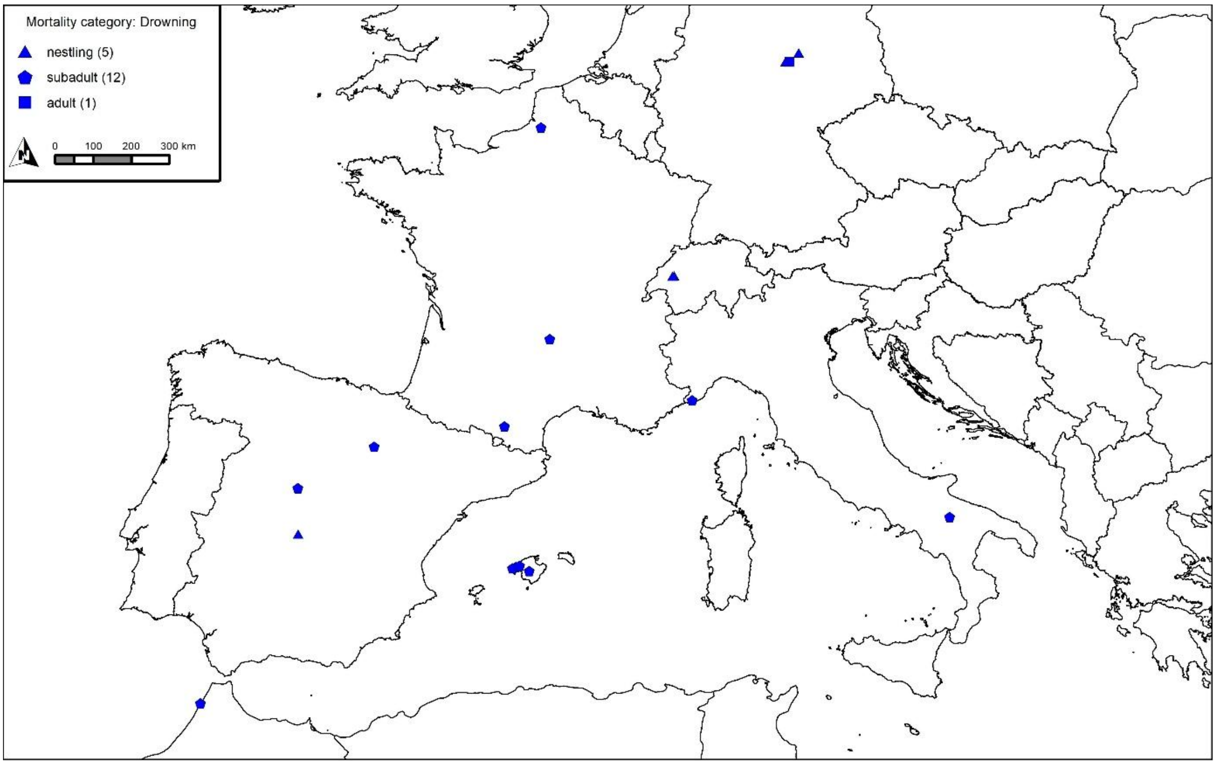
Supplementary Fig. 12. Mortality cases from shooting/trapping for nestlings, subadults and adults.



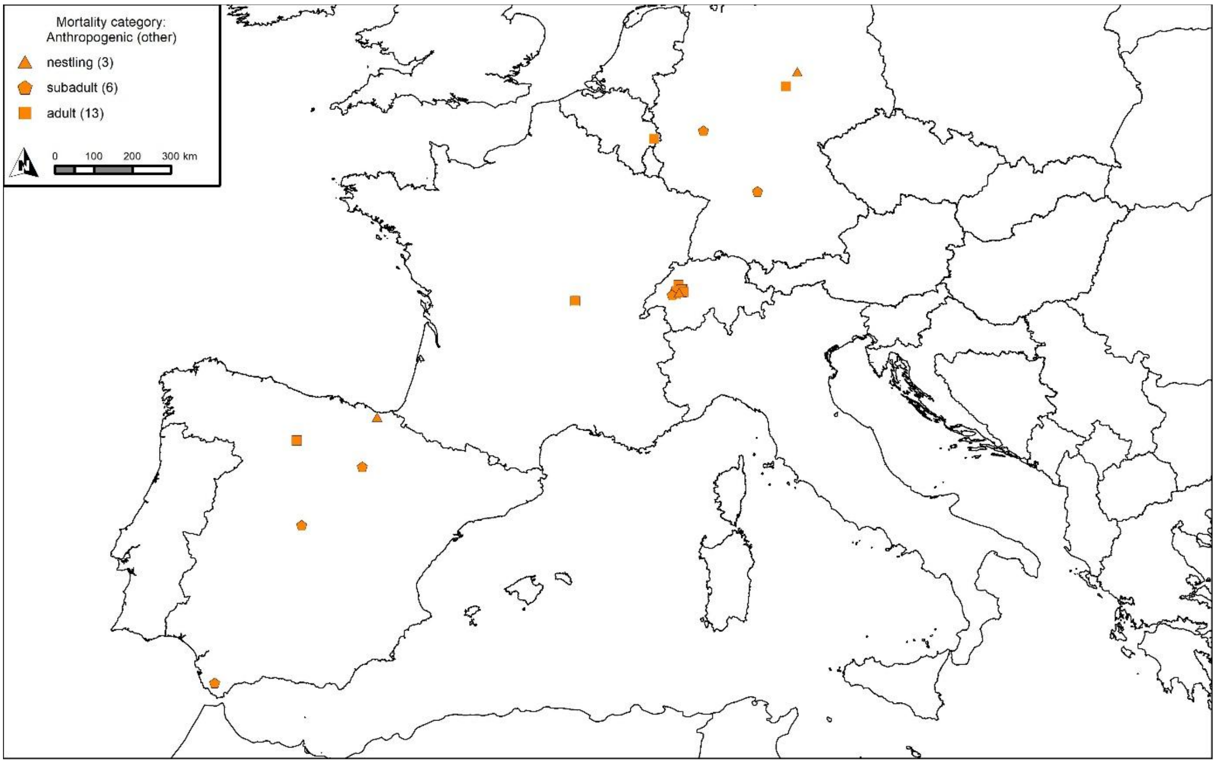
Supplementary Fig. 13. Mortality cases from rail traffic for nestlings, subadults and adults.



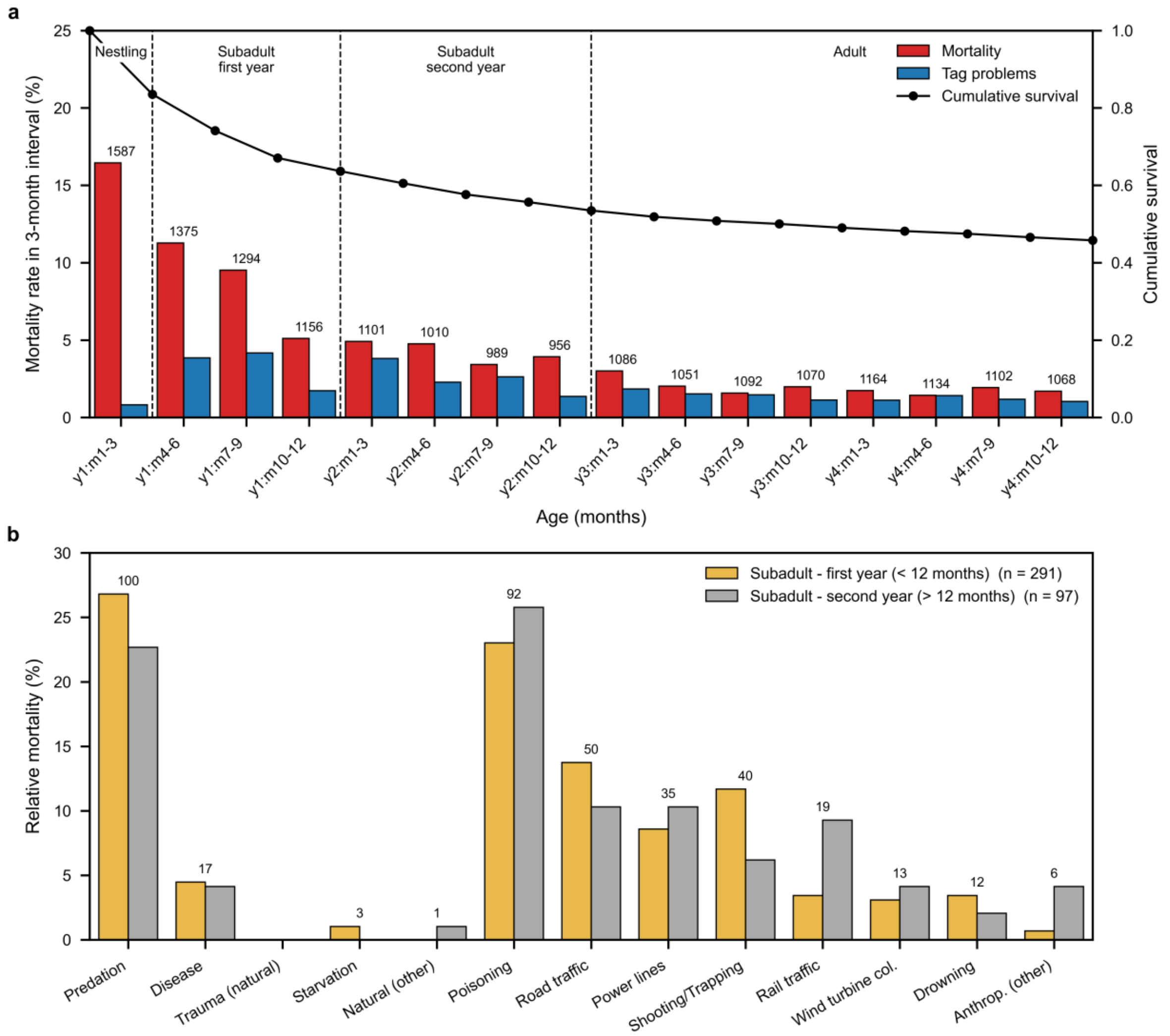
Supplementary Fig. 14. Mortality cases from wind turbine collision for nestlings, subadults and adults.



Supplementary Fig. 15. Mortality cases from drowning for nestlings, subadults and adults.



Supplementary Fig. 16. Mortality cases from other anthropogenic causes for nestlings, subadults and adults.



Supplementary Fig. 17. Age-specific mortality patterns and causes of death in GPS-tracked red kites. (a) Mortality rate (%) calculated over 3-month intervals across age classes, with cumulative survival shown as a black line. Red bars indicate confirmed mortality events and blue bars indicate tag failures. Sample sizes for each interval are shown above bars. Vertical dashed lines denote transitions between age classes (nestling, subadult first year, subadult second year, and adult). (b) Relative contribution (%) of different mortality causes for subadults in their first year (< 12 months) and second year (> 12 months). Numbers above bars indicate the number of recorded mortality events for each cause.

Supplementary Note 7: Partners of the EUROKITE project

As the LIFE EUROKITE project is based on international cooperation of scientists, NGOs, authorities and companies, many people of diverse backgrounds contributed to this study in different ways. The European Union provided the majority of the funding for this project via the LIFE Nature program (60%). Grid operators (15.8%), nature conservation NGOs (9.2%), authorities (8.8%) and renewable energy companies (6.2%) contributed funding for projects, mostly invested in protection measures and tagging of red kites. Supplementary Figs. 2 and 3 present all project partners and co-financers. Contributors from private companies and NGOs were largely responsible for tagging birds and providing data to the project, data analysis and interpretation were conducted by co-authors working at consulting companies and universities, and writing of the manuscript was performed by authors working for independent research institutions. Supplementary Table 4 provides a detailed overview of each author's contribution and affiliations (English name) as well as the category of that institution.

Supplementary Table 4. List of authors and respective contribution to the manuscript with affiliation and category of the institution. A) Tagged birds within the project or shared tagging data with the project. B) Gathered and assessed data for determining mortality causes. C) Assisted with data analysis, interpretation or writing of the manuscript. *These authors did the main work of the manuscript (writing the manuscript and analysing the data).

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Stefan Vadura	x			EVN AG	Grid operator
Anne-Gaelle Verdier	x			LPO France	NGO
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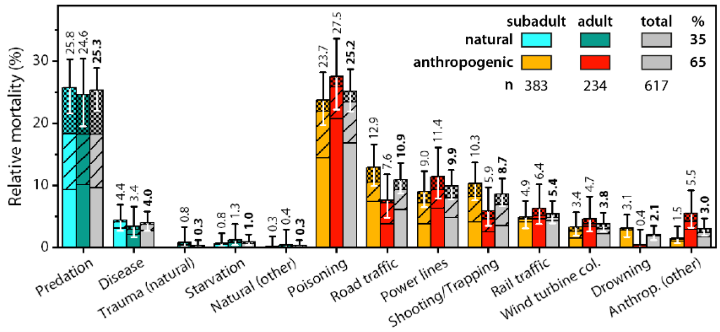
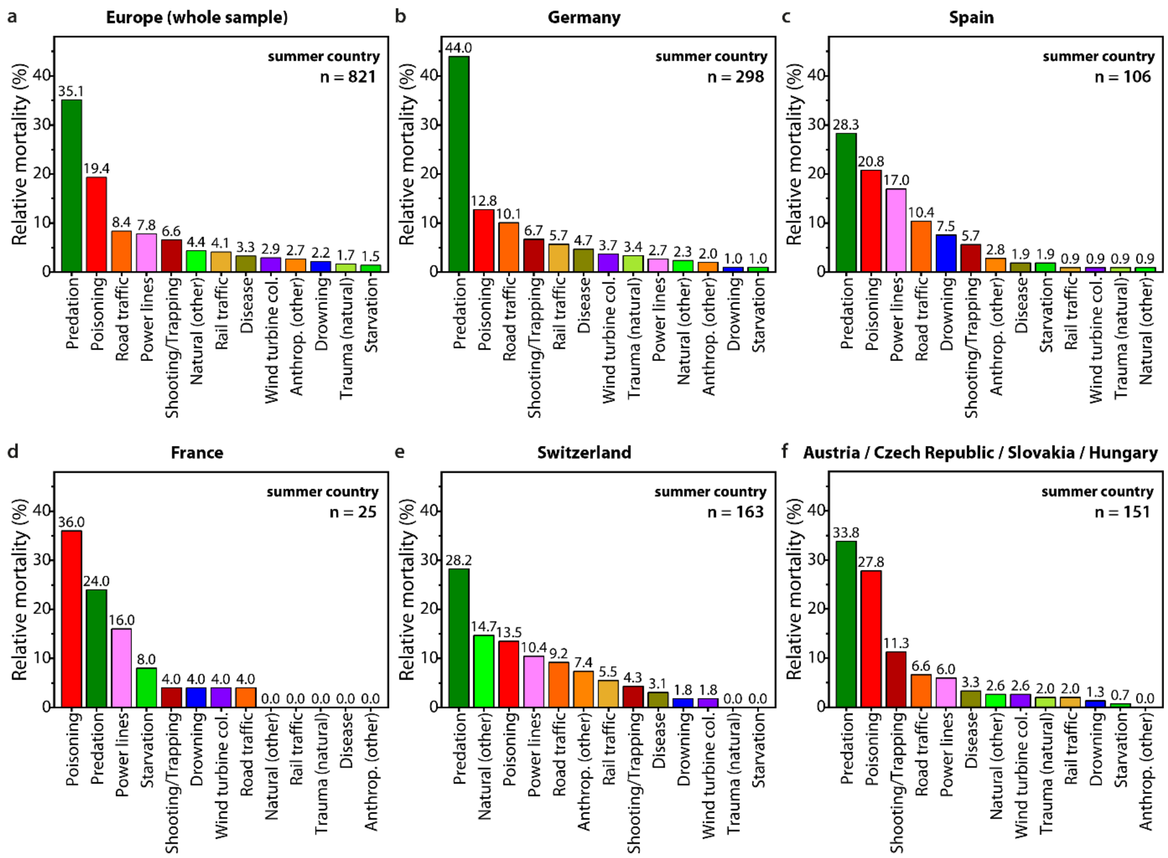
Supplementary Note 8: Further Statistical Data



country	sample size	population (bp)	weight factor
Austria	40	126 - 185	0.079
Belgium	15	360 - 410	0.521
Czech Republic	72	250 - 250	0.070
France	24	2003 - 3117	2.165
Germany	215	14000 - 16000	1.416
Hungary	2	7 - 11	-
Italy	1	425 - 515	-
Luxembourg	19	90 - 90	0.096
Netherlands	20	14 - 14	0.014
Poland	8	650 - 720	1.738
Slovakia	4	22 - 27	-
Spain	93	2312 - 2354	0.509
Switzerland	111	2800 - 3500	0.576

Supplementary Fig. 18. Population-corrected proportion of causes of death by age class for conclusive-mortality cases for red kites in Europe from 2013-2022 weighted by the ratio (weight factor - normalized) between the number of birds tagged (sample size) in each summer country relative to the midpoint of the estimated range of breeding pairs (bp) in that country (Aebischer & Scherler 2021). The pattern within each bar represents proportions of certainty classes, where solid colours indicate high certainty ('certain'), hashed colours 'probable' and grated 'possible'. The number above each bar indicates the percentage for that cause and age class relative to all 979 mortality cases, and the error bars show 95% confidence intervals based on pooling all conclusive cases. Data from countries with a sample size < 8 (orange) were excluded from the analysis to prevent bias. For calculating the weight factor, the mean population estimate of breeding pairs was used.



Supplementary Fig. 19. Mortality causes in red kites (*Milvus milvus*) across Europe, where all age classes (nestling, subadult, adult) and certainty classes (certain, probable, possible) are pooled. The causes are ordered by occurrence for each summer country of the deceased individuals: (**a**) the whole sample (Europe), (**b**) Germany, (**c**) Spain, (**d**) France, (**e**) Switzerland, and (**f**) Austria, the Czech Republic, Slovakia and Hungary (AT/CZ/SK/HU). Colours highlight differences in rank orders of mortality categories among summer countries.

AT/CZ/SK/HU

	Predation	Natural (other)	Poisoning	Road traffic	Power line	Shooting/Trapping	Rail traffic	Wind turbine collision	Drowning	Anthropogenic (other)
France	0.98	0.95	0.98	0.77	0.46	0.47				
Germany	0.09	0.98	<0.01	0.46	0.40	0.46	0.29	0.77		
Spain	0.77	0.77	0.29	0.75	0.19	0.29			0.29	
Switzerland	0.98	0.90	0.10	0.49	0.37	0.29	0.29	0.95		0.99

France

	Predation	Natural (other)	Poisoning	Road traffic	Power line	Shooting/Trapping	Rail traffic	Wind turbine collision	Drowning	Anthropogenic (other)
AT/CZ/SK/HU	0.98	0.95	0.98	0.77	0.46	0.47				
Germany	0.47	0.93	0.19	0.49	0.12	0.75	0.99	0.98		
Spain	0.95	0.76	0.46	0.59	0.98	0.90			0.82	
Switzerland	0.98	0.84	0.29	0.49	0.95	0.90	0.99			0.99

Germany

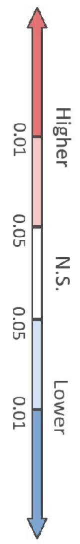
	Predation	Natural (other)	Poisoning	Road traffic	Power line	Shooting/Trapping	Rail traffic	Wind turbine collision	Drowning	Anthropogenic (other)
AT/CZ/SK/HU	0.09	0.98	<0.01	0.46	0.40	0.46	0.29	0.77		
France	0.47	0.93	0.19	0.49	0.12	0.75	0.99	0.98		
Spain	0.29	0.77	0.47	0.90	<0.01	0.75	0.29	0.40	0.10	0.98
Switzerland	0.09	0.90	0.82	0.99	0.03	0.68	0.99	0.61		0.09

Spain

	Predation	Natural (other)	Poisoning	Road traffic	Power line	Shooting/Trapping	Rail traffic	Wind turbine collision	Drowning	Anthropogenic (other)
AT/CZ/SK/HU	0.77	0.77	0.29	0.75	0.19	0.29			0.29	
France	0.95	0.76	0.46	0.59	0.98	0.90			0.82	
Germany	0.29	0.77	0.47	0.90	<0.01	0.75	0.29	0.40	0.10	0.98
Switzerland	0.75	0.92	0.78	0.92	0.77	0.99	0.29		0.29	0.29

Switzerland

	Predation	Natural (other)	Poisoning	Road traffic	Power line	Shooting/Trapping	Rail traffic	Wind turbine collision	Drowning	Anthropogenic (other)
AT/CZ/SK/HU	0.98	0.90	0.10	0.49	0.37	0.29	0.29	0.95		0.99
France	0.98	0.84	0.29	0.49	0.95	0.90	0.99			0.99
Germany	0.09	0.90	0.82	0.99	0.03	0.68	0.99	0.61		0.09
Spain	0.75	0.92	0.78	0.92	0.77	0.99	0.29		0.29	0.29



Supplementary Fig. 20. Comparisons of mortality causes between country of death (bold) and the summer country. Numbers in cells represents adjusted P-values (see Supplementary Table 6), with shading indicating whether the mortality proportion is significantly higher (red) or lower (blue) in the country of death relative to the summer country. Darker colours correspond to stronger significance (<0.01), lighter colours to weaker significance (0.01–0.05). White cells indicate no significant difference. Missing values are due to small samples sizes preventing any meaningful statistical analyses.

Supplementary Table 5: Overview of red kite mortality reasons: 'n' is the sample size for known mortality causes. In AT/CZ/SK/HU, the individual samples sizes for death location and summer country are Austria (n = 23; 40), the Czech Republic (n = 42; 72), Slovakia (n = 11; 4) and Hungary (n = 5; 2). The 'Cum. A.' column gives the cumulative proportion of anthropogenic causes of mortality in the respective death location and summer country. Natural causes of death are: Predation ('Pred'), Disease ('Dis.'), Starvation ('Starv.'), Natural Trauma ('Trau.') and Natural Other ('NOt.'). Causes of death due to anthropogenic influences are: Poisoning ('Pois.'), Road Traffic ('Road.'), Powerlines ('Pow.'), Wind turbine collisions ('WT'), Shooting/Trapping ('Shoot.'), Railway traffic ('Rail.'), Drowning ('Drow.') and other anthropogenic causes ('AOt.'). Mortality causes are given in proportions, lower and upper bound of the 95% confidence interval (CI) in parentheses. For country specific evaluations, mortalities due to Disease, Starvation and Natural Trauma were pooled under Natural Other due to low sample sizes.

	n	Cum. A. %	Natural % (95% CI)				
death location			**Pred.**	**Dis.**	**Trau.**	**Starv.**	**NOt.**
Germany	121	48.8	41.3 (32.9-50.3)	-	-	-	9.9 (5.7-16.7)
France	102	78.4	18.6 (12.2-27.4)	-	-	-	2.9 (1-8.7)
Spain	203	73.9	23.2 (17.9-29.5)	-	-	-	3 (1.3-6.4)
Switzerland	52	65.4	23.1 (13.6-36.4)	-	-	-	11.5 (5.3-23.4)
AT/CZ/SK/HU	81	74.1	17.3 (10.5-27.1)	-	-	-	8.6 (4.2-17)
origin							
Germany	215	59.5	34 (27.9-40.5)	-	-	-	6.5 (3.9-10.7)
France	24	70.8	20.8 (8.9-41.3)	-	-	-	8.3 (2.1-27.9)
Spain	93	72.0	23.7 (16.1-33.3)	-	-	-	4.3 (1.6-10.9)
Switzerland	111	75.7	18.9 (12.7-27.3)	-	-	-	5.4 (2.4-11.5)
AT/CZ/SK/HU	118	73.7	19.5 (13.3-27.6)	-	-	-	6.8 (3.4-13)
subadult	388	73.7	25.8 (21.7-30.4)	4.4 (2.7-6.9)	0 (0-100)	0.8 (0.2-2.4)	0.3 (0-1.8)
adult	236	76.8	24.6 (19.5-30.5)	3.4 (1.7-6.6)	0.8 (0.2-3.3)	1.3 (0.4-3.9)	0.4 (0.1-2.9)
total	**624**	**77.1**	**25.3 (22.1-28.9)**	**4 (2.7-5.9)**	**0.3 (0.1-1.3)**	**1 (0.4-2.1)**	**0.3 (0.1-1.3)**

	Anthropogenic % (95% CI)							
death location	**Pois.**	**Road.**	**Pow.**	**Shoot.**	**Rail.**	**WT.**	**Drow.**	**AOt.**
Germany	7.4 (3.9-13.7)	9.9 (5.7-16.7)	1.7 (0.4-6.4)	6.6 (3.3-12.7)	11.6 (7-18.6)	8.3 (4.5-14.7)	0.8 (0.1-5.6)	2.5 (0.8-7.4)
France	38.2 (29.3-48)	10.8 (6.1-18.4)	6.9 (3.3-13.7)	12.7 (7.5-20.7)	3.9 (1.5-10)	2 (0.5-7.5)	2.9 (1-8.7)	1 (0.1-6.6)
Spain	21.7 (16.5-27.9)	16.3 (11.8-22)	18.2 (13.5-24.1)	6.9 (4.1-11.3)	2.5 (1-5.8)	3.4 (1.7-7.1)	3 (1.3-6.4)	2 (0.7-5.1)
Switzerland	15.4 (7.9-27.9)	11.5 (5.3-23.4)	3.8 (1-14.1)	5.8 (1.9-16.4)	9.6 (4.1-21.1)	0 (0-5.8)	0 (0-5.8)	19.2 (10.7-32.2)
AT/CZ/SK/HU	39.5 (29.5-50.5)	4.9 (1.9-12.4)	8.6 (4.2-17)	14.8 (8.6-24.3)	3.7 (1.2-10.9)	2.5 (0.6-9.3)	0 (0-3.7)	0 (0-3.7)
summer country								
Germany	17.2 (12.7-22.9)	13.5 (9.5-18.7)	3.7 (1.9-7.3)	9.3 (6.1-14)	7.9 (5-12.3)	5.1 (2.9-9)	0.5 (0.1-3.2)	2.3 (1-5.5)
France	37.5 (20.8-57.8)	4.2 (0.6-24.4)	16.7 (6.4-36.9)	4.2 (0.6-24.4)	0 (0-12.5)	4.2 (0.6-24.4)	4.2 (0.6-24.4)	0 (0-12.5)
Spain	23.7 (16.1-33.3)	11.8 (6.7-20.1)	18.3 (11.7-27.5)	6.5 (2.9-13.6)	1.1 (0.2-7.2)	1.1 (0.2-7.2)	7.5 (3.6-15)	2.2 (0.5-8.2)
Switzerland	19.8 (13.4-28.3)	13.5 (8.3-21.2)	14.4 (9-22.2)	6.3 (3-12.6)	8.1 (4.3-14.9)	2.7 (0.9-8)	0.9 (0.1-6.1)	9.9 (5.6-17)
AT/CZ/SK/HU	35.6 (27.5-44.6)	8.5 (4.6-15)	7.6 (4-14)	14.4 (9.1-22)	2.5 (0.8-7.6)	3.4 (1.3-8.7)	1.7 (0.4-6.5)	0 (0-2.5)
subadult	23.7 (19.7-28.2)	12.9 (9.9-16.6)	9 (6.5-12.3)	10.3 (7.7-13.8)	4.9 (3.1-7.5)	3.4 (2-5.7)	3.1 (1.8-5.4)	1.5 (0.7-3.4)
adult	27.5 (22.2-33.6)	7.6 (4.9-11.8)	11.4 (8-16.2)	5.9 (3.5-9.8)	6.4 (3.9-10.3)	4.7 (2.6-8.2)	0.4 (0.1-2.9)	5.5 (3.2-9.3)
total	**25.2 (21.9-28.7)**	**10.9 (8.7-13.6)**	**9.9 (7.8-12.5)**	**8.7 (6.7-11.1)**	**5.4 (3.9-7.5)**	**3.8 (2.6-5.7)**	**2.1 (1.2-3.6)**	**3 (2-4.7)**

Supplementary Table 6. Pairwise comparisons of different mortality categories between **countries of death** (natural: predation, others; anthropogenic: poisoning, shooting, electrocution or collision with power lines, collisions with road traffic or rail traffic, wind turbine collision, drowning, others. Countries for which mortality categories are being compared are shown in column 'Country #1' and 'Country #2'. Countries are 'AT/CZ/SK/HU' (Austria, the Czech Republic, Slovakia and Hungary, pooled), Germany, Spain, France and Switzerland. Sample size given in column 'n', P-values in column 'P' and FDR-corrected P-values are given in column 'P (adjusted)'. Significant differences (P < 0.05) in mortality categories between countries are highlighted in orange4.

Mortality category	Country #1	Country #2	n	P	P (adjusted)
Shooting/Trapping	AT/CZ/SK/HU	Germany	202	0.0619	0.2028
Poisoning	AT/CZ/SK/HU	Germany	202	0.0000	0.0000
Rail traffic	AT/CZ/SK/HU	Germany	202	0.0610	0.2028
Wind turbine collision	AT/CZ/SK/HU	Germany	202	0.1074	0.2948
Predation	AT/CZ/SK/HU	Germany	202	0.0005	0.0091
Power line	AT/CZ/SK/HU	Germany	202	0.0341	0.1657
Natural (other)	AT/CZ/SK/HU	Germany	202	0.7610	0.9944
Road traffic	AT/CZ/SK/HU	Germany	202	0.2078	0.4301
Shooting/Trapping	AT/CZ/SK/HU	France	183	0.6858	0.9944
Poisoning	AT/CZ/SK/HU	France	183	0.8609	0.9944
Rail traffic	AT/CZ/SK/HU	France	183	0.9392	0.9944
Predation	AT/CZ/SK/HU	France	183	0.8144	0.9944
Power line	AT/CZ/SK/HU	France	183	0.6535	0.9944
Natural (other)	AT/CZ/SK/HU	France	183	0.1074	0.2948
Road traffic	AT/CZ/SK/HU	France	183	0.1621	0.3903
Shooting/Trapping	AT/CZ/SK/HU	Spain	284	0.0411	0.1862
Poisoning	AT/CZ/SK/HU	Spain	284	0.0025	0.0227
Rail traffic	AT/CZ/SK/HU	Spain	284	0.5709	0.9624
Wind turbine collision	AT/CZ/SK/HU	Spain	284	0.6720	0.9944
Predation	AT/CZ/SK/HU	Spain	284	0.2785	0.5478
Power line	AT/CZ/SK/HU	Spain	284	0.0489	0.1862
Natural (other)	AT/CZ/SK/HU	Spain	284	0.0479	0.1862
Road traffic	AT/CZ/SK/HU	Spain	284	0.0160	0.0941
Drowning	AT/CZ/SK/HU	Spain	284	0.9852	0.9944
Shooting/Trapping	AT/CZ/SK/HU	Switzerland	133	0.1203	0.3085
Poisoning	AT/CZ/SK/HU	Switzerland	133	0.0042	0.0330
Rail traffic	AT/CZ/SK/HU	Switzerland	133	0.1768	0.4012
Predation	AT/CZ/SK/HU	Switzerland	133	0.4124	0.7487
Power line	AT/CZ/SK/HU	Switzerland	133	0.2953	0.5712
Natural (other)	AT/CZ/SK/HU	Switzerland	133	0.5843	0.9711
Road traffic	AT/CZ/SK/HU	Switzerland	133	0.1706	0.3947
Anthropogenic (other)	AT/CZ/SK/HU	Switzerland	133	0.9879	0.9944
Shooting/Trapping	Germany	France	223	0.1243	0.3120
Poisoning	Germany	France	223	0.0000	0.0000
Rail traffic	Germany	France	223	0.0461	0.1862
Wind turbine collision	Germany	France	223	0.0558	0.1994
Predation	Germany	France	223	0.0003	0.0091
Power line	Germany	France	223	0.0692	0.2150

Natural (other)	Germany	France	223	0.0507	0.1870
Road traffic	Germany	France	223	0.8321	0.9944
Shooting/Trapping	Germany	Spain	324	0.9214	0.9944
Poisoning	Germany	Spain	324	0.0014	0.0178
Rail traffic	Germany	Spain	324	0.0021	0.0224
Wind turbine collision	Germany	Spain	324	0.0680	0.2150
Predation	Germany	Spain	324	0.0006	0.0107
Power line	Germany	Spain	324	0.0004	0.0091
Natural (other)	Germany	Spain	324	0.0124	0.0815
Road traffic	Germany	Spain	324	0.1139	0.3005
Anthropogenic (other)	Germany	Spain	324	0.7610	0.9944
Drowning	Germany	Spain	324	0.2328	0.4657
Shooting/Trapping	Germany	Switzerland	173	0.8352	0.9944
Poisoning	Germany	Switzerland	173	0.1146	0.3005
Rail traffic	Germany	Switzerland	173	0.7065	0.9944
Wind turbine collision	Germany	Switzerland	173	0.9867	0.9944
Predation	Germany	Switzerland	173	0.0238	0.1274
Natural (other)	Germany	Switzerland	173	0.7490	0.9944
Road traffic	Germany	Switzerland	173	0.7490	0.9944
Anthropogenic (other)	Germany	Switzerland	173	0.0010	0.0154
Shooting/Trapping	France	Spain	305	0.0945	0.2787
Poisoning	France	Spain	305	0.0024	0.0227
Rail traffic	France	Spain	305	0.4815	0.8355
Wind turbine collision	France	Spain	305	0.4747	0.8355
Predation	France	Spain	305	0.3661	0.6857
Power line	France	Spain	305	0.0104	0.0719
Natural (other)	France	Spain	305	0.9944	0.9944
Road traffic	France	Spain	305	0.2024	0.4301
Drowning	France	Spain	305	0.9944	0.9944
Shooting/Trapping	France	Switzerland	154	0.1909	0.4217
Poisoning	France	Switzerland	154	0.0049	0.0358
Rail traffic	France	Switzerland	154	0.1674	0.3947
Predation	France	Switzerland	154	0.5156	0.8817
Power line	France	Switzerland	154	0.4566	0.8163
Natural (other)	France	Switzerland	154	0.0453	0.1862
Road traffic	France	Switzerland	154	0.8877	0.9944
Anthropogenic (other)	France	Switzerland	154	0.0028	0.0238
Shooting/Trapping	Spain	Switzerland	255	0.7715	0.9944
Poisoning	Spain	Switzerland	255	0.3177	0.6047
Rail traffic	Spain	Switzerland	255	0.0276	0.1417
Wind turbine collision	Spain	Switzerland	255	0.9866	0.9944
Predation	Spain	Switzerland	255	0.9908	0.9944
Power line	Spain	Switzerland	255	0.0209	0.1174
Natural (other)	Spain	Switzerland	255	0.0154	0.0941
Road traffic	Spain	Switzerland	255	0.4015	0.7403
Anthropogenic (other)	Spain	Switzerland	255	0.0001	0.0023
Drowning	Spain	Switzerland	255	0.9877	0.9944

Supplementary Table 7. Pairwise comparisons of proportions of mortality for particular categories between **summer countries** (natural: predation, disease, others; anthropogenic: poisoning, shooting, electrocution and collision with power lines, collision with road and rail traffic, wind turbine collision, drowning, others). Countries for which mortality categories are being compared are shown in column 'Country #1' and 'Country #2'. Countries are 'AT/CZ/SK/HU' (Austria, the Czech Republic, Slovakia and Hungary, pooled), Germany, Spain, France and Switzerland. Sample size is given in column 'n', P-values in column 'P' and FDR-corrected P-values are given in column 'P (adjusted)'. Significant differences (P < 0.05) in mortality categories between countries are highlighted orange.

Mortality category	Country #1	Country #2	n	P	P (adjusted)
Shooting/Trapping	AT/CZ/SK/HU	Germany	333	0.1593	0.4568
Poisoning	AT/CZ/SK/HU	Germany	333	0.0002	0.0081
Rail traffic	AT/CZ/SK/HU	Germany	333	0.0615	0.2860
Wind turbine	AT/CZ/SK/HU	Germany	333	0.4706	0.7688
Predation	AT/CZ/SK/HU	Germany	333	0.0059	0.0853
Power line	AT/CZ/SK/HU	Germany	333	0.1290	0.3965
Natural (other)	AT/CZ/SK/HU	Germany	333	0.9250	0.9844
Road traffic	AT/CZ/SK/HU	Germany	333	0.1772	0.4568
Shooting/Trapping	AT/CZ/SK/HU	France	142	0.1993	0.4741
Poisoning	AT/CZ/SK/HU	France	142	0.8591	0.9771
Predation	AT/CZ/SK/HU	France	142	0.8803	0.9819
Power line	AT/CZ/SK/HU	France	142	0.1724	0.4568
Natural (other)	AT/CZ/SK/HU	France	142	0.7866	0.9505
Road traffic	AT/CZ/SK/HU	France	142	0.4814	0.7697
Shooting/Trapping	AT/CZ/SK/HU	Spain	211	0.0725	0.2860
Poisoning	AT/CZ/SK/HU	Spain	211	0.0625	0.2860
Predation	AT/CZ/SK/HU	Spain	211	0.4640	0.7688
Power line	AT/CZ/SK/HU	Spain	211	0.0230	0.1909
Natural (other)	AT/CZ/SK/HU	Spain	211	0.4440	0.7669
Road traffic	AT/CZ/SK/HU	Spain	211	0.4211	0.7515
Drowning	AT/CZ/SK/HU	Spain	211	0.0567	0.2860
Shooting/Trapping	AT/CZ/SK/HU	Switzerland	229	0.0513	0.2860
Poisoning	AT/CZ/SK/HU	Switzerland	229	0.0086	0.0994
Rail traffic	AT/CZ/SK/HU	Switzerland	229	0.0733	0.2860
Wind turbine	AT/CZ/SK/HU	Switzerland	229	0.7632	0.9502
Predation	AT/CZ/SK/HU	Switzerland	229	0.9125	0.9844
Power line	AT/CZ/SK/HU	Switzerland	229	0.1050	0.3651
Natural (other)	AT/CZ/SK/HU	Switzerland	229	0.6651	0.9041
Road traffic	AT/CZ/SK/HU	Switzerland	229	0.2255	0.4874
Anthropogenic	AT/CZ/SK/HU	Switzerland	229	0.9875	0.9950
Shooting/Trapping	Germany	France	239	0.4129	0.7484
Poisoning	Germany	France	239	0.0208	0.1860
Rail traffic	Germany	France	239	0.9856	0.9950
Wind turbine	Germany	France	239	0.8402	0.9771
Predation	Germany	France	239	0.2003	0.4741
Power line	Germany	France	239	0.0122	0.1176
Natural (other)	Germany	France	239	0.7355	0.9274
Road traffic	Germany	France	239	0.2198	0.4874

Shooting/Trapping	Germany	Spain	308	0.4112	0.7484
Poisoning	Germany	Spain	308	0.1885	0.4741
Rail traffic	Germany	Spain	308	0.0462	0.2860
Wind turbine	Germany	Spain	308	0.1279	0.3965
Predation	Germany	Spain	308	0.0740	0.2860
Power line	Germany	Spain	308	0.0001	0.0054
Natural (other)	Germany	Spain	308	0.4509	0.7669
Road traffic	Germany	Spain	308	0.6908	0.9041
Anthropogenic	Germany	Spain	308	0.9246	0.9844
Drowning	Germany	Spain	308	0.0080	0.0994
Shooting/Trapping	Germany	Switzerland	326	0.3552	0.6756
Poisoning	Germany	Switzerland	326	0.5621	0.8224
Rail traffic	Germany	Switzerland	326	0.9494	0.9950
Wind turbine	Germany	Switzerland	326	0.3165	0.6118
Predation	Germany	Switzerland	326	0.0051	0.0853
Power line	Germany	Switzerland	326	0.0011	0.0281
Natural (other)	Germany	Switzerland	326	0.6937	0.9041
Road traffic	Germany	Switzerland	326	0.9950	0.9950
Anthropogenic	Germany	Switzerland	326	0.0056	0.0853
Shooting/Trapping	France	Spain	117	0.6764	0.9041
Poisoning	France	Spain	117	0.1749	0.4568
Predation	France	Spain	117	0.7700	0.9502
Power line	France	Spain	117	0.8544	0.9771
Natural (other)	France	Spain	117	0.4329	0.7608
Road traffic	France	Spain	117	0.2927	0.5854
Drowning	France	Spain	117	0.5667	0.8224
Shooting/Trapping	France	Switzerland	135	0.6894	0.9041
Poisoning	France	Switzerland	135	0.0671	0.2860
Rail traffic	France	Switzerland	135	0.9859	0.9950
Predation	France	Switzerland	135	0.8293	0.9771
Power line	France	Switzerland	135	0.7784	0.9505
Natural (other)	France	Switzerland	135	0.5847	0.8373
Road traffic	France	Switzerland	135	0.2269	0.4874
Anthropogenic	France	Switzerland	135	0.9848	0.9950
Shooting/Trapping	Spain	Switzerland	204	0.9662	0.9950
Poisoning	Spain	Switzerland	204	0.5075	0.7849
Rail traffic	Spain	Switzerland	204	0.0490	0.2860
Predation	Spain	Switzerland	204	0.4095	0.7484
Power line	Spain	Switzerland	204	0.4562	0.7669
Natural (other)	Spain	Switzerland	204	0.7165	0.9170
Road traffic	Spain	Switzerland	204	0.7194	0.9170
Anthropogenic	Spain	Switzerland	204	0.0395	0.2860
Drowning	Spain	Switzerland	204	0.0421	0.2860

Supplementary Table 8. Comparing proportion of each mortality cause within the country of death to that among birds spending the summer in that country. Countries are 'AT/CZ/SK/HU' (Austria, the Czech Republic, Slovakia and Hungary, pooled), Germany, Spain, France and Switzerland. Sample size is given in column 'n', P-values in column 'P' and FDR-corrected P-values are given in column 'P (adjusted)'. Differences with low unadjusted P < 0.05 are highlighted yellow.

Mortality category	Country	n	P	P (adjusted)
Shooting/Trapping	AT/CZ/SK/HU	199	0.9361	0.9889
Poisoning	AT/CZ/SK/HU	199	0.6383	0.9889
Rail traffic	AT/CZ/SK/HU	199	0.8129	0.9889
Wind turbine	AT/CZ/SK/HU	199	0.8571	0.9889
Predation	AT/CZ/SK/HU	199	0.9007	0.9889
Power line	AT/CZ/SK/HU	199	0.9656	0.9889
Natural (other)	AT/CZ/SK/HU	199	0.9368	0.9889
Road traffic	AT/CZ/SK/HU	199	0.8952	0.9889
Shooting/Trapping	Germany	336	0.3938	0.9889
Poisoning	Germany	336	0.0148	0.7097
Rail traffic	Germany	336	0.4618	0.9889
Wind turbine	Germany	336	0.6410	0.9889
Predation	Germany	336	0.5684	0.9889
Power line	Germany	336	0.7106	0.9889
Natural (other)	Germany	336	0.8386	0.9889
Road traffic	Germany	336	0.8795	0.9889
Anthropogenic	Germany	336	0.9889	0.9889
Drowning	Germany	336	0.9788	0.9889
Shooting/Trapping	France	126	0.2546	0.9889
Poisoning	France	126	0.8787	0.9889
Predation	France	126	0.9627	0.9889
Power line	France	126	0.2255	0.9889
Natural (other)	France	126	0.4484	0.9889
Road traffic	France	126	0.0316	0.7579
Drowning	France	126	0.7325	0.9889
Shooting/Trapping	Spain	296	0.8874	0.9889
Poisoning	Spain	468	0.8201	0.9889
Rail traffic	Spain	812	0.4890	0.9889
Wind turbine	Spain	1500	0.3482	0.9889
Predation	Spain	2876	0.9793	0.9889
Power line	Spain	5628	0.9557	0.9889
Natural (other)	Spain	11132	0.8894	0.9889
Road traffic	Spain	22140	0.8738	0.9889
Anthropogenic	Spain	44156	0.9860	0.9889
Drowning	Spain	88188	0.9088	0.9889
Shooting/Trapping	Switzerland	163	0.8941	0.9889
Poisoning	Switzerland	261	0.5485	0.9889
Rail traffic	Switzerland	457	0.7882	0.9889
Predation	Switzerland	849	0.7963	0.9889
Power line	Switzerland	1633	0.1957	0.9889
Natural (other)	Switzerland	3201	0.7002	0.9889
Road traffic	Switzerland	6337	0.9032	0.9889
Anthropogenic	Switzerland	12609	0.8079	0.9889

Supplementary Table 9. Comparisons of absolute rates of mortality for particular causes between countries of death for red kite **adults**. Countries are 'AT/CZ/SK/HU' (Austria, the Czech Republic, Slovakia and Hungary, pooled), Germany, Spain, France and Switzerland. Sample size is given in column 'n', P-values in column 'P' and FDR-corrected P-values are given in column 'P (adjusted)'. Significant differences (P < 0.05) in mortality categories between countries are highlighted orange.

Mortality category	Country #1	Country #2	n	P	P (adjusted)
Shooting/Trapping	AT/CZ/SK/HU	Germany	567	0.3796	0.8347
Poisoning	AT/CZ/SK/HU	Germany	567	0.0001	0.0037
Rail traffic	AT/CZ/SK/HU	Germany	567	0.6993	1.0000
Wind turbine	AT/CZ/SK/HU	Germany	567	0.7685	1.0000
Predation	AT/CZ/SK/HU	Germany	567	0.3494	0.8347
Power line	AT/CZ/SK/HU	Germany	567	0.0339	0.1881
Natural (other)	AT/CZ/SK/HU	Germany	567	0.6993	1.0000
Road traffic	AT/CZ/SK/HU	Germany	567	0.9833	1.0000
Anthropogenic	AT/CZ/SK/HU	Germany	567	0.9938	1.0000
Drowning	AT/CZ/SK/HU	Germany	567	0.9938	1.0000
Shooting/Trapping	AT/CZ/SK/HU	France	759	0.2114	0.5881
Poisoning	AT/CZ/SK/HU	France	759	0.0889	0.3557
Rail traffic	AT/CZ/SK/HU	France	759	0.4042	0.8347
Wind turbine	AT/CZ/SK/HU	France	759	0.9903	1.0000
Predation	AT/CZ/SK/HU	France	759	0.6834	1.0000
Power line	AT/CZ/SK/HU	France	759	0.4004	0.8347
Natural (other)	AT/CZ/SK/HU	France	759	0.4042	0.8347
Road traffic	AT/CZ/SK/HU	France	759	0.9911	1.0000
Anthropogenic	AT/CZ/SK/HU	France	759	0.9909	1.0000
Drowning	AT/CZ/SK/HU	France	759	1.0000	1.0000
Shooting/Trapping	AT/CZ/SK/HU	Spain	785	0.1427	0.4756
Poisoning	AT/CZ/SK/HU	Spain	785	0.0813	0.3535
Rail traffic	AT/CZ/SK/HU	Spain	785	0.9896	1.0000
Wind turbine	AT/CZ/SK/HU	Spain	785	0.5695	1.0000
Predation	AT/CZ/SK/HU	Spain	785	0.2267	0.5965
Power line	AT/CZ/SK/HU	Spain	785	0.8212	1.0000
Natural (other)	AT/CZ/SK/HU	Spain	785	0.2349	0.6024
Road traffic	AT/CZ/SK/HU	Spain	785	0.9873	1.0000
Anthropogenic	AT/CZ/SK/HU	Spain	785	0.9937	1.0000
Drowning	AT/CZ/SK/HU	Spain	785	1.0000	1.0000
Shooting/Trapping	AT/CZ/SK/HU	Switzerland	513	0.0484	0.2550
Poisoning	AT/CZ/SK/HU	Switzerland	513	0.0000	0.0002
Rail traffic	AT/CZ/SK/HU	Switzerland	513	0.1896	0.5881
Wind turbine	AT/CZ/SK/HU	Switzerland	513	0.9904	1.0000
Predation	AT/CZ/SK/HU	Switzerland	513	0.0016	0.0258
Power line	AT/CZ/SK/HU	Switzerland	513	0.0073	0.0667
Natural (other)	AT/CZ/SK/HU	Switzerland	513	0.0598	0.2860
Road traffic	AT/CZ/SK/HU	Switzerland	513	0.9908	1.0000
Anthropogenic	AT/CZ/SK/HU	Switzerland	513	0.9842	1.0000
Drowning	AT/CZ/SK/HU	Switzerland	513	1.0000	1.0000
Shooting/Trapping	Germany	France	1060	0.4921	0.9648
Poisoning	Germany	France	1060	0.0090	0.0747
Rail traffic	Germany	France	1060	0.2099	0.5881
Wind turbine	Germany	France	1060	0.9892	1.0000
Predation	Germany	France	1060	0.1180	0.4369

Power line	Germany	France	1060	0.1333	0.4721
Natural (other)	Germany	France	1060	0.2099	0.5881
Road traffic	Germany	France	1060	0.7342	1.0000
Anthropogenic	Germany	France	1060	0.6566	1.0000
Drowning	Germany	France	1060	0.9932	1.0000
Shooting/Trapping	Germany	Spain	1086	0.4883	0.9648
Poisoning	Germany	Spain	1086	0.0025	0.0307
Rail traffic	Germany	Spain	1086	0.9849	1.0000
Wind turbine	Germany	Spain	1086	0.7351	1.0000
Predation	Germany	Spain	1086	0.0036	0.0359
Power line	Germany	Spain	1086	0.0147	0.0982
Natural (other)	Germany	Spain	1086	0.0601	0.2860
Road traffic	Germany	Spain	1086	0.3208	0.8020
Anthropogenic	Germany	Spain	1086	0.8661	1.0000
Drowning	Germany	Spain	1086	0.9936	1.0000
Shooting/Trapping	Germany	Switzerland	814	0.2143	0.5881
Poisoning	Germany	Switzerland	814	0.7697	1.0000
Rail traffic	Germany	Switzerland	814	0.0280	0.1650
Wind turbine	Germany	Switzerland	814	0.9870	1.0000
Predation	Germany	Switzerland	814	0.0000	0.0002
Power line	Germany	Switzerland	814	0.9777	1.0000
Natural (other)	Germany	Switzerland	814	0.0139	0.0982
Road traffic	Germany	Switzerland	814	0.0280	0.1650
Anthropogenic	Germany	Switzerland	814	0.1369	0.4721
Drowning	Germany	Switzerland	814	0.9934	1.0000
Shooting/Trapping	France	Spain	1278	0.8374	1.0000
Poisoning	France	Spain	1278	0.7691	1.0000
Rail traffic	France	Spain	1278	0.9945	1.0000
Wind turbine	France	Spain	1278	0.9900	1.0000
Predation	France	Spain	1278	0.4090	0.8347
Power line	France	Spain	1278	0.2176	0.5881
Natural (other)	France	Spain	1278	0.8886	1.0000
Road traffic	France	Spain	1278	0.6325	1.0000
Anthropogenic	France	Spain	1278	0.5396	1.0000
Drowning	France	Spain	1278	1.0000	1.0000
Shooting/Trapping	France	Switzerland	1006	0.8729	1.0000
Poisoning	France	Switzerland	1006	0.0024	0.0307
Rail traffic	France	Switzerland	1006	0.8729	1.0000
Wind turbine	France	Switzerland	1006	0.9999	1.0000
Predation	France	Switzerland	1006	0.0032	0.0357
Power line	France	Switzerland	1006	0.0633	0.2878
Natural (other)	France	Switzerland	1006	0.3613	0.8347
Road traffic	France	Switzerland	1006	0.1155	0.4369
Anthropogenic	France	Switzerland	1006	0.3725	0.8347
Drowning	France	Switzerland	1006	0.9999	1.0000
Shooting/Trapping	Spain	Switzerland	1032	0.6067	1.0000
Poisoning	Spain	Switzerland	1032	0.0001	0.0037
Rail traffic	Spain	Switzerland	1032	0.9877	1.0000
Wind turbine	Spain	Switzerland	1032	0.9881	1.0000
Predation	Spain	Switzerland	1032	0.0134	0.0982
Power line	Spain	Switzerland	1032	0.0010	0.0202
Natural (other)	Spain	Switzerland	1032	0.3609	0.8347

Road traffic	Spain	Switzerland	1032	0.2006	0.5881
Anthropogenic	Spain	Switzerland	1032	0.0866	0.3557
Drowning	Spain	Switzerland	1032	1.0000	1.0000

Supplementary Table 10. Comparisons of absolute rates of mortality for particular causes between countries of death for red kite **subadults**. Countries are 'AT/CZ/SK/HU' (Austria, the Czech Republic, Slovakia and Hungary, pooled), Germany, Spain, France and Switzerland. Sample size is given in column 'n', P-values in column 'P' and FDR-corrected P-values are given in column 'P (adjusted)'. Significant differences (P < 0.05) in mortality categories between countries are highlighted orange.

Mortality category	Country #1	Country #2	n	P	P (adjusted)
Shooting/Trapping	AT/CZ/SK/HU	Germany	1121	0.0433	0.2547
Poisoning	AT/CZ/SK/HU	Germany	1121	0.0004	0.0104
Rail traffic	AT/CZ/SK/HU	Germany	1121	0.1405	0.4546
Wind turbine	AT/CZ/SK/HU	Germany	1121	0.9831	1.0000
Predation	AT/CZ/SK/HU	Germany	1121	0.0470	0.2613
Power line	AT/CZ/SK/HU	Germany	1121	0.1985	0.6015
Natural (other)	AT/CZ/SK/HU	Germany	1121	0.5395	1.0000
Road traffic	AT/CZ/SK/HU	Germany	1121	0.8095	1.0000
Anthropogenic	AT/CZ/SK/HU	Germany	1121	0.9929	1.0000
Drowning	AT/CZ/SK/HU	Germany	1121	1.0000	1.0000
Shooting/Trapping	AT/CZ/SK/HU	France	1357	0.5161	1.0000
Poisoning	AT/CZ/SK/HU	France	1357	0.7153	1.0000
Rail traffic	AT/CZ/SK/HU	France	1357	0.5888	1.0000
Wind turbine	AT/CZ/SK/HU	France	1357	0.9897	1.0000
Predation	AT/CZ/SK/HU	France	1357	0.8554	1.0000
Power line	AT/CZ/SK/HU	France	1357	0.8012	1.0000
Natural (other)	AT/CZ/SK/HU	France	1357	0.0929	0.3718
Road traffic	AT/CZ/SK/HU	France	1357	0.7273	1.0000
Anthropogenic	AT/CZ/SK/HU	France	1357	1.0000	1.0000
Drowning	AT/CZ/SK/HU	France	1357	0.9879	1.0000
Shooting/Trapping	AT/CZ/SK/HU	Spain	1493	0.0134	0.1489
Poisoning	AT/CZ/SK/HU	Spain	1493	0.0000	0.0020
Rail traffic	AT/CZ/SK/HU	Spain	1493	0.7760	1.0000
Wind turbine	AT/CZ/SK/HU	Spain	1493	0.9889	1.0000
Predation	AT/CZ/SK/HU	Spain	1493	0.6379	1.0000
Power line	AT/CZ/SK/HU	Spain	1493	0.2517	0.6803
Natural (other)	AT/CZ/SK/HU	Spain	1493	0.0224	0.1724
Road traffic	AT/CZ/SK/HU	Spain	1493	0.2159	0.6349
Anthropogenic	AT/CZ/SK/HU	Spain	1493	0.9889	1.0000
Drowning	AT/CZ/SK/HU	Spain	1493	0.9855	1.0000
Shooting/Trapping	AT/CZ/SK/HU	Switzerland	1030	0.9821	1.0000
Poisoning	AT/CZ/SK/HU	Switzerland	1030	0.0005	0.0104
Rail traffic	AT/CZ/SK/HU	Switzerland	1030	0.8687	1.0000
Wind turbine	AT/CZ/SK/HU	Switzerland	1030	1.0000	1.0000
Predation	AT/CZ/SK/HU	Switzerland	1030	0.3147	0.7676
Power line	AT/CZ/SK/HU	Switzerland	1030	0.9883	1.0000
Natural (other)	AT/CZ/SK/HU	Switzerland	1030	0.4309	0.9576
Road traffic	AT/CZ/SK/HU	Switzerland	1030	0.3035	0.7588
Anthropogenic	AT/CZ/SK/HU	Switzerland	1030	0.9944	1.0000

Drowning	AT/CZ/SK/HU	Switzerland	1030	1.0000	1.0000
Shooting/Trapping	Germany	France	1760	0.1136	0.4209
Poisoning	Germany	France	1760	0.0005	0.0104
Rail traffic	Germany	France	1760	0.1684	0.5263
Wind turbine	Germany	France	1760	0.1409	0.4546
Predation	Germany	France	1760	0.0108	0.1349
Power line	Germany	France	1760	0.2474	0.6803
Natural (other)	Germany	France	1760	0.2236	0.6389
Road traffic	Germany	France	1760	0.5093	1.0000
Anthropogenic	Germany	France	1760	0.9918	1.0000
Drowning	Germany	France	1760	0.9910	1.0000
Shooting/Trapping	Germany	Spain	1896	0.8694	1.0000
Poisoning	Germany	Spain	1896	0.4551	0.9894
Rail traffic	Germany	Spain	1896	0.0313	0.1978
Wind turbine	Germany	Spain	1896	0.0220	0.1724
Predation	Germany	Spain	1896	0.0175	0.1591
Power line	Germany	Spain	1896	0.0316	0.1978
Natural (other)	Germany	Spain	1896	0.0874	0.3707
Road traffic	Germany	Spain	1896	0.0890	0.3707
Anthropogenic	Germany	Spain	1896	0.5717	1.0000
Drowning	Germany	Spain	1896	0.9831	1.0000
Shooting/Trapping	Germany	Switzerland	1433	0.9886	1.0000
Poisoning	Germany	Switzerland	1433	0.0765	0.3707
Rail traffic	Germany	Switzerland	1433	0.0869	0.3707
Wind turbine	Germany	Switzerland	1433	0.9866	1.0000
Predation	Germany	Switzerland	1433	0.0012	0.0168
Power line	Germany	Switzerland	1433	0.9933	1.0000
Natural (other)	Germany	Switzerland	1433	0.8609	1.0000
Road traffic	Germany	Switzerland	1433	0.3919	0.9115
Anthropogenic	Germany	Switzerland	1433	0.5095	1.0000
Drowning	Germany	Switzerland	1433	1.0000	1.0000
Shooting/Trapping	France	Spain	2132	0.0531	0.2796
Poisoning	France	Spain	2132	0.0000	0.0020
Rail traffic	France	Spain	2132	0.6690	1.0000
Wind turbine	France	Spain	2132	0.6466	1.0000
Predation	France	Spain	2132	0.4218	0.9576
Power line	France	Spain	2132	0.0979	0.3765
Natural (other)	France	Spain	2132	0.8807	1.0000
Road traffic	France	Spain	2132	0.2633	0.6930
Anthropogenic	France	Spain	2132	0.9869	1.0000
Drowning	France	Spain	2132	0.8553	1.0000
Shooting/Trapping	France	Switzerland	1669	0.9752	1.0000
Poisoning	France	Switzerland	1669	0.0006	0.0104
Rail traffic	France	Switzerland	1669	0.6441	1.0000
Wind turbine	France	Switzerland	1669	0.9917	1.0000
Predation	France	Switzerland	1669	0.3563	0.8482
Power line	France	Switzerland	1669	0.9892	1.0000
Natural (other)	France	Switzerland	1669	0.2785	0.7141
Road traffic	France	Switzerland	1669	0.1390	0.4546
Anthropogenic	France	Switzerland	1669	0.9937	1.0000
Drowning	France	Switzerland	1669	0.9903	1.0000
Shooting/Trapping	Spain	Switzerland	1805	0.9771	1.0000

Poisoning	Spain	Switzerland	1805	0.0271	0.1936
Rail traffic	Spain	Switzerland	1805	0.8960	1.0000
Wind turbine	Spain	Switzerland	1805	0.9862	1.0000
Predation	Spain	Switzerland	1805	0.0784	0.3707
Power line	Spain	Switzerland	1805	0.9700	1.0000
Natural (other)	Spain	Switzerland	1805	0.1228	0.4386
Road traffic	Spain	Switzerland	1805	0.0168	0.1591
Anthropogenic	Spain	Switzerland	1805	0.8008	1.0000
Drowning	Spain	Switzerland	1805	0.9819	1.0000

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