



Update on technological advances to detect and monitor Illegal Killing, Taking and Trade of Wild Birds

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Contributions from Luke Ozsanlav-Harris, Juan Serratos Lopez, BirdLife partners and co-authors

Joint Meeting of Bern Convention SFPs and CMS MIKT on Illegal Killing, Taking and Trade of Wild Birds

13-15 May 2025, Bonn, Germany



Update on technological advances to detect and monitor Illegal Killing, Taking and Trade of Wild Birds



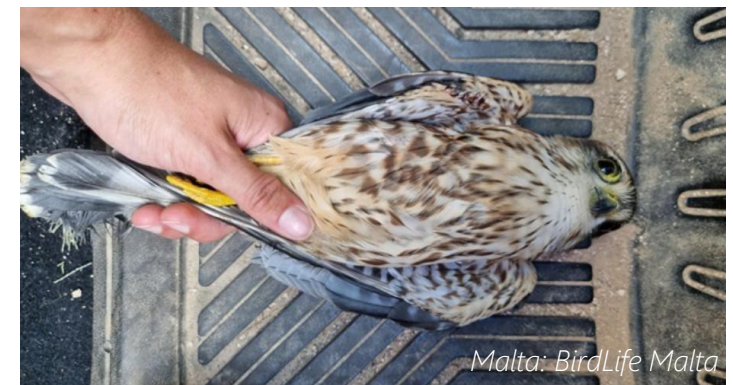
- Using info from tracked birds to learn more about IKB
- New technologies that can help in detecting & monitoring IKB



Identifying causes of mortality using tracking data

Identifying causes of mortality using tracking data

- Continuing increase in use of tracking technology
- Focus often on movement or other aspects of ecology
- But can deliver important information on mortality especially when multi-species datasets compiled
- Tracked birds as sentinels of threats in the flyway
- What tracked migratory birds die from indicates prevalence and relative importance of different threats



Summary information

| | | | | | | | |
|--|--|----------------------|----------------------|------------------------|----------------------|----------------------|----------------------|
| Contact information | | | | | | | |
| Personal Name: | Current affiliation: | | | | | | |
| Email: | | | | | | | |
| Projects under which these data were collected (if applicable): | | | | | | | |
| Species: | | | | | | | |
| Total number of birds tagged: | <input type="text"/> | | | | | | |
| Total number of tagged birds where the satellite transmission signal failed for: | <table border="1"> <tr> <td>1) An unknown reason</td> <td><input type="text"/></td> </tr> <tr> <td>2) A technical failure</td> <td><input type="text"/></td> </tr> <tr> <td>3) A mortality event</td> <td><input type="text"/></td> </tr> </table> | 1) An unknown reason | <input type="text"/> | 2) A technical failure | <input type="text"/> | 3) A mortality event | <input type="text"/> |
| 1) An unknown reason | <input type="text"/> | | | | | | |
| 2) A technical failure | <input type="text"/> | | | | | | |
| 3) A mortality event | <input type="text"/> | | | | | | |

Mortality Information

Tagging information

| Location | | | | | | | | | |
|----------------|------------------|---------------|---------------------------|-----|-----|---------------|--------------|-----------------|--------------------|
| Transmitter ID | Transmitter type | Individual ID | Species (scientific name) | Age | Sex | X (longitude) | Y (latitude) | Date of tagging | Country of tagging |

Mortality event

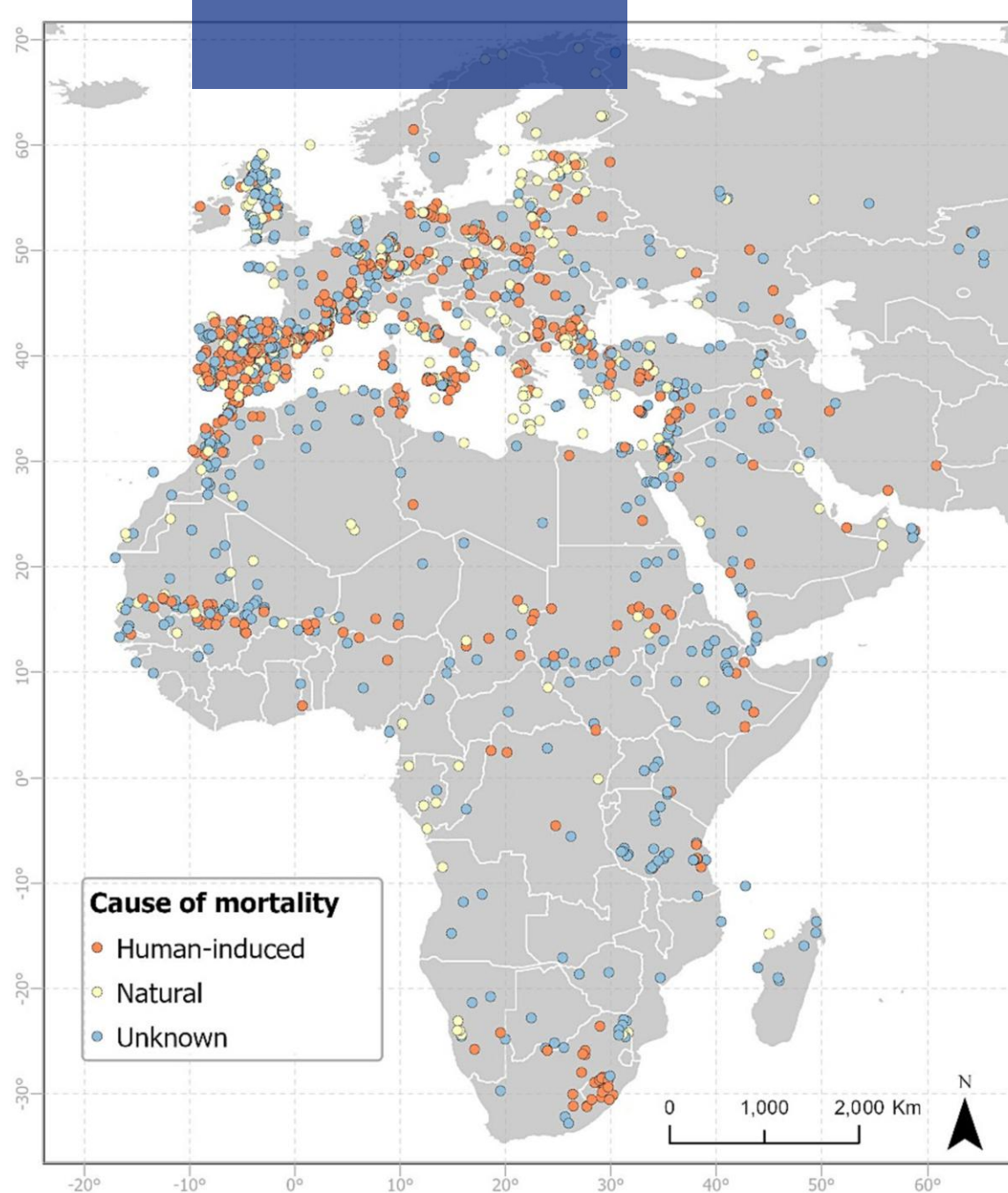
| Location | | | | | |
|---------------|--------------|---------------|------------------|------------------------------|----------------|
| X (longitude) | Y (latitude) | Date of death | Country of death | Mortality identified through | Cause of death |

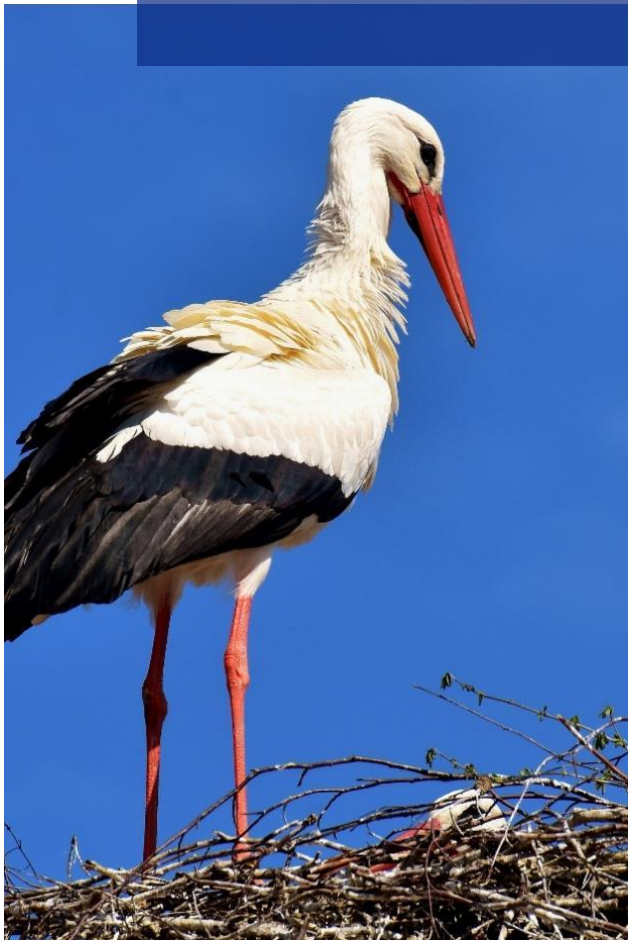
- Major collaboration led by BirdLife
- Involved researchers throughout flyway
- Tracking sp large migratory birds - storks, cranes, raptors
- More than 160 co-authors
- Filled out simple info for each event
- 1704 mortality events from 45 species 2003-2021

Serratosa *et al.* (2024) Tracking data highlight the importance of human-induced mortality for large migratory birds at a flyway scale. *Biological Conservation*. 293
<https://doi.org/10.1016/j.biocon.2024.110525>

Mortality in the flyway

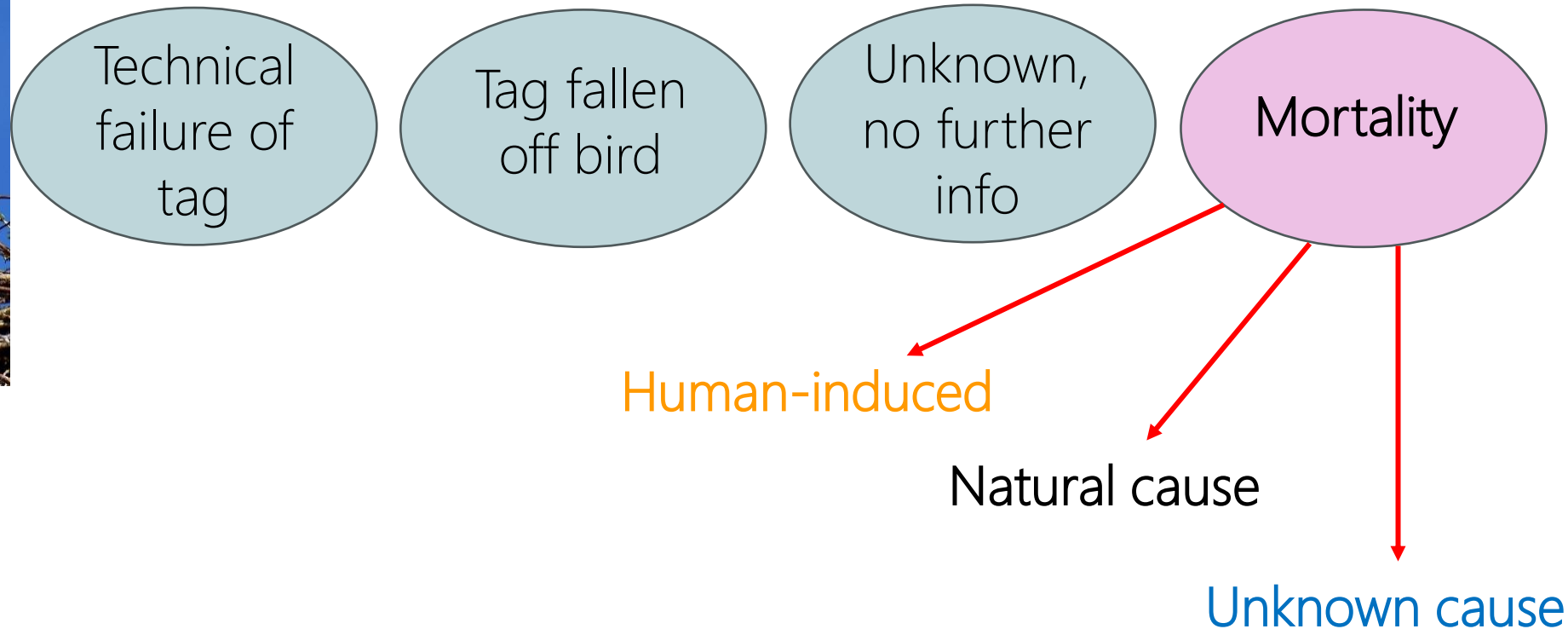
- Map shows distribution of mortality for tracked storks, cranes and raptors
- Birds were tagged in 48 countries
- Mortality events recorded in 91 countries



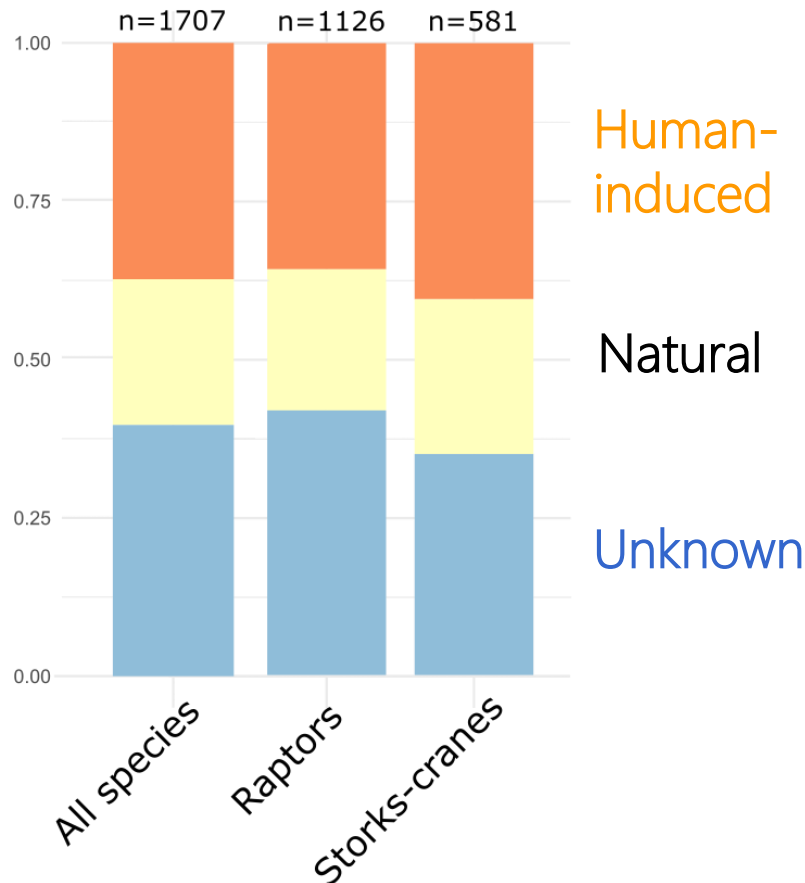


Tag issues or mortality?

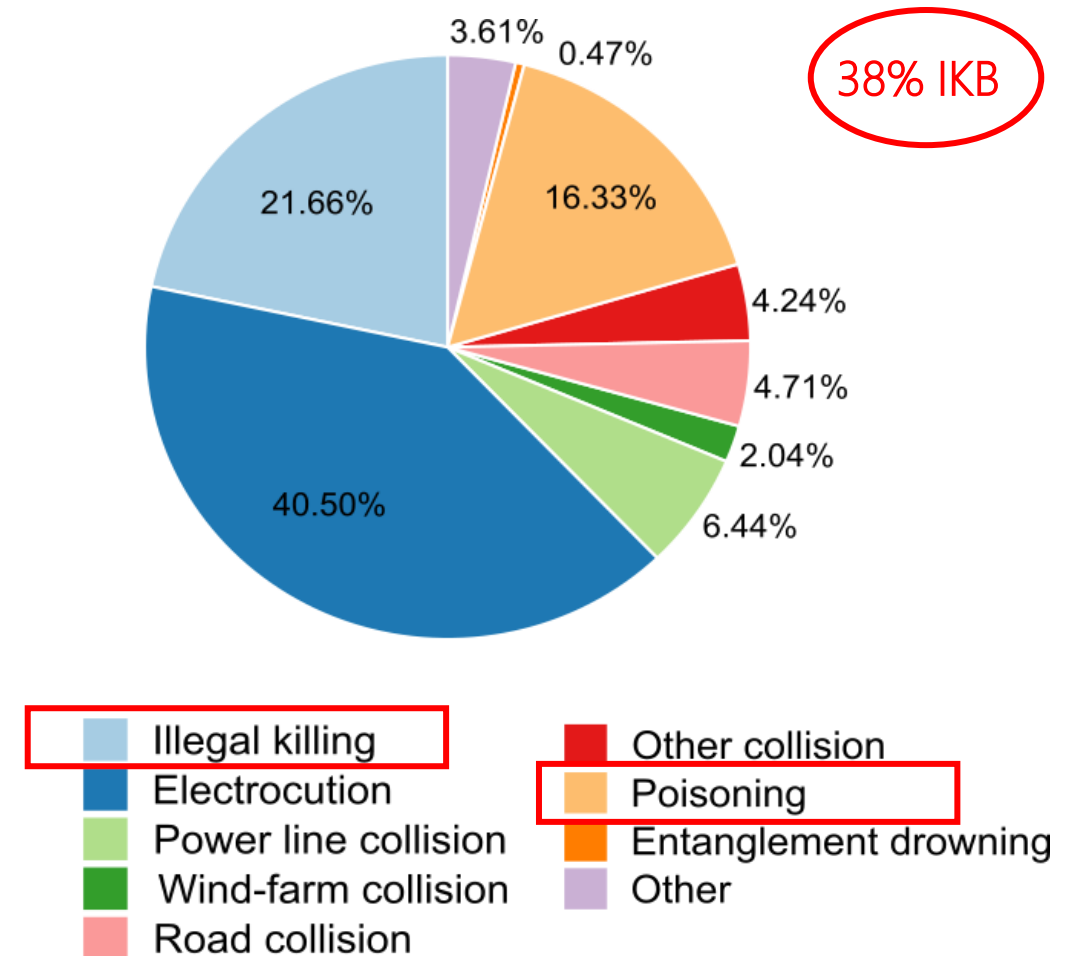
- Events where tag transmitting from static location or tag stops transmitting



Overall causes of mortality

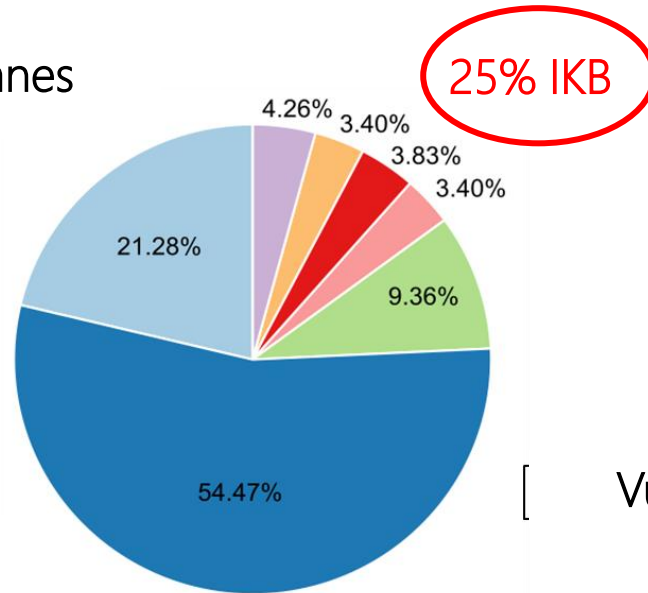


Human-induced mortality

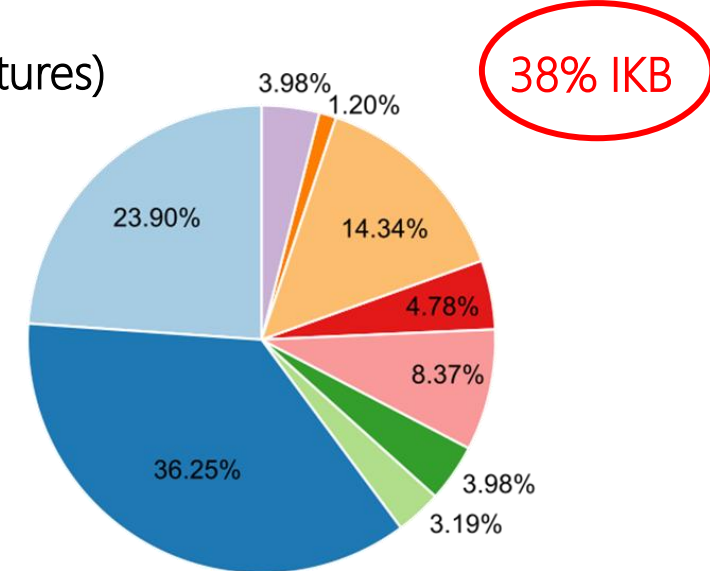


Causes of mortality by taxonomic groups

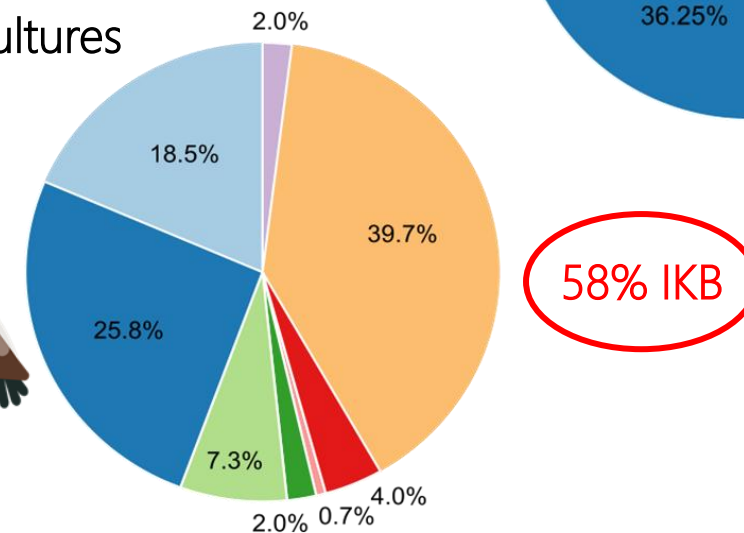
Storks & Cranes



Raptors (excl. vultures)

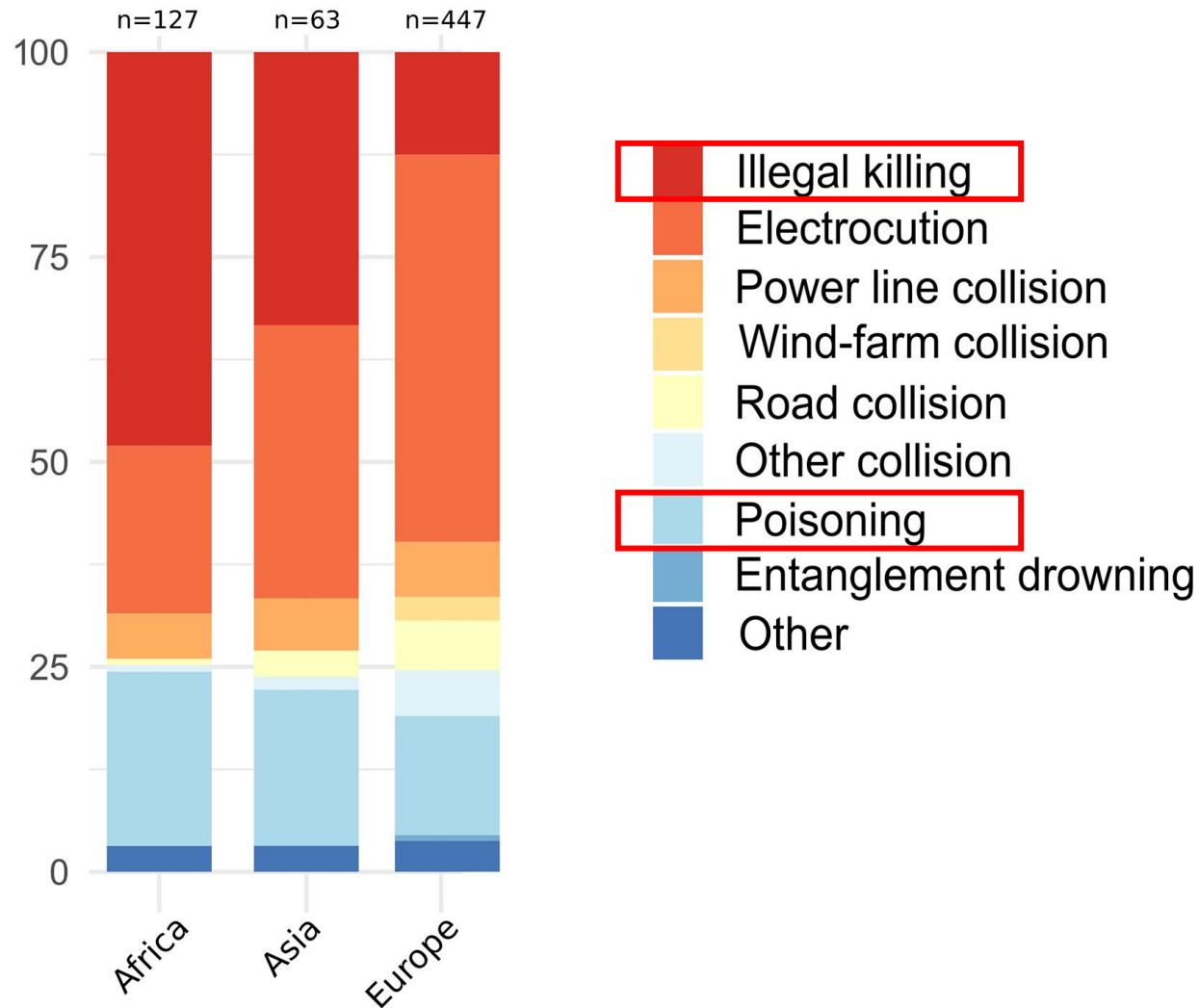


Vultures



- Illegal killing
- Electrocutation
- Power line collision
- Wind-farm collision
- Road collision
- Other collision
- Poisoning
- Entanglement drowning
- Other

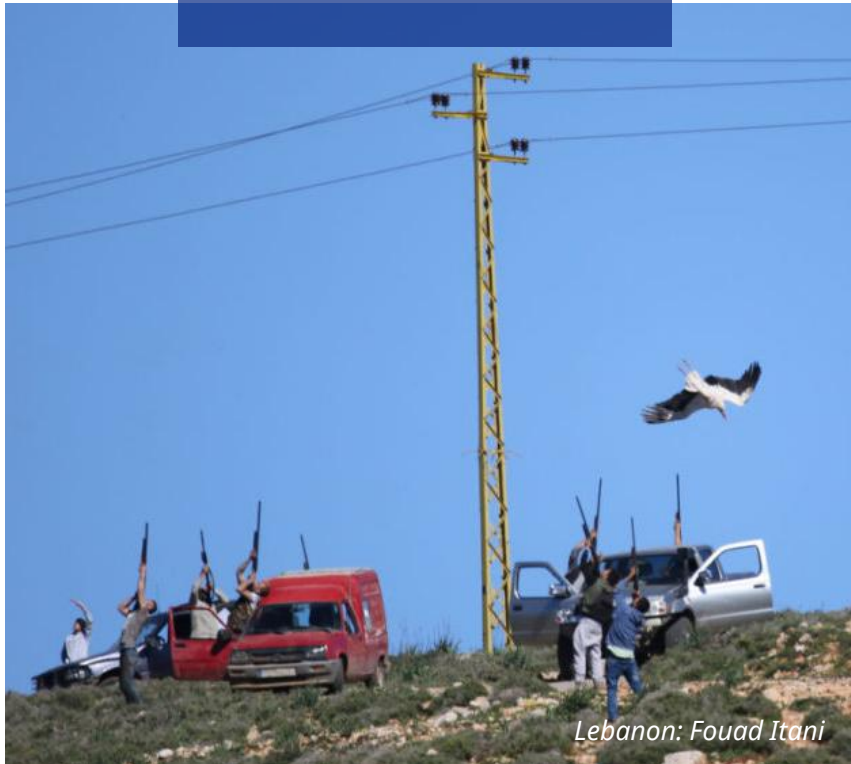
Overview human-induced mortality by region



- **69%** human-induced mortality events in Africa caused by IKB (incl. poisoning)
- **52%** in Asia (Middle East and C. Asia) caused by IKB (incl. poisoning)
- **27%** in Europe caused by IKB (incl. poisoning)

Conclusion

- From the deaths where cause could be established in the flyway IKB was responsible for 38%, second only to collision/ electrocution with energy infrastructure
- No evidence that human induced mortality was reducing relative to natural mortality over the time period 2003-2021
- Real world evidence that IKB is a significant cause of mortality in the flyway for large migratory birds, many of the species in study already threatened
- Very valuable to collect mortality info from tracking



Lebanon: Fouad Itani



Poisoned Imperial Eagle/ ©PannonEagle LIFE

Large-scale investment in conservation including threatened species

IKB can undermine species recovery investment elsewhere in flyway

EUROPEAN COMMISSION
LIFE Public Database

European Commission > CINEA > LIFE Programme > LIFE Public Database

LIFE for Falcons on LIFE Public Database

Securing the recovery of the Endangered Saker Falcon in Bulgaria and Southern Romania

Reference: LIFE20 NAT/BG/001162 | Acronym: LIFE for Falcons

PROJECT DESCRIPTION

BACKGROUND

The Saker falcon (*Falco cherrug*) was uplisted by the IUCN to globally 'Endangered' in 2012 due to an evaluated decline of around 50% in its global population within the last 20 years. In Europe, the species has declined markedly since 1945, its historical range becoming severely reduced and fragmented. In Bulgaria, the Saker falcon was widespread during the 20th century, but a considerable decline was recorded in the 1950s. Since 2010, only a few occupied territories have been reported and only one nest found (representing a

ADMINISTRATIVE DATA

- ★ Reference: LIFE20 NAT/BG/001162
- ★ Acronym: LIFE for Falcons
- 🕒 Start Date: 01/10/2021
- 🕒 End Date: 31/12/2026
- 💶 Total Eligible Budget: 2,448,489 €
- 🇪🇺 EU Contribution: 1,833,239 €



TOGETHER FOR AN IMPERIAL CAUSE!

"Conservation of the Iberian imperial eagle (*Aquila adalberti*) in Portugal"

LAYMAN'S REPORT
LIFE Imperial Project
LIFE13 NAT/PT/001300



LIFE Bonelli eastMed

Project title: Conservation & Management of the Bonelli's eagle population

Project code: LIFE17 NAT/GR/000514

Duration: 1/9/2018 – 28/2/2023

Coordinating beneficiary: University of Crete - Natural History Museum of Crete

Associated beneficiaries: Game and Fauna Service (Game Fund) - Cyprus, Ministry of Forests - Cyprus, NCC Environmental Studies Ltd - Greece

Project sites: 22 Natura 2000 sites (SPAs) in Greece (Crete, Peloponnese, Attica)

Funding: European Commission, Green Fund, A.G. Leventis Foundation

Total project budget: 4,235,584 €

EU financial contribution: 3,174,403 € (75% of total eligible budget)

EUROPEAN COMMISSION
LIFE Public Database

European Commission > CINEA > LIFE Programme > LIFE Public Database

LIFE22-NAT-PL-GSELIFEAboveBorders on LIFE Public Database

Above the borders: conservation of Greater Spotted Eagles at breeding and wintering areas, and on its flyway

Reference: LIFE22-NAT-PL-GSELIFEAboveBorders/101113849 | Acronym: LIFE22-NAT-PL-GSELIFEAboveBorders

PROJECT DESCRIPTION

BACKGROUND

The GSELIFEAboveBorders project is dedicated to protecting the rarest eagle in the Western Palearctic, the Greater Spotted Eagle (GSE), known by its scientific name as the *Clanga clanga* (former *Aquila clanga*). The GSE is classified worldwide as vulnerable, and its population is declining as noted in the International Union for Conservation of Nature's (IUCN) Red List of Threatened Species. It is described as critically endangered by the European Red List of Birds. The species is also listed in Annex 1 of the EU Birds Directive and the Community Species Action Plan (SAP) to protect biodiversity.

ADMINISTRATIVE DATA

- ★ Reference: LIFE22-NAT-PL-GSELIFEAboveBorders/101113849
- ★ Acronym: LIFE22-NAT-PL-GSELIFEAboveBorders
- 🕒 Start Date: 01/07/2023
- 🕒 End Date: 31/10/2027
- 💶 Total Eligible Budget: 5,491,825 €
- 🇪🇺 EU Contribution: 4,118,869 €

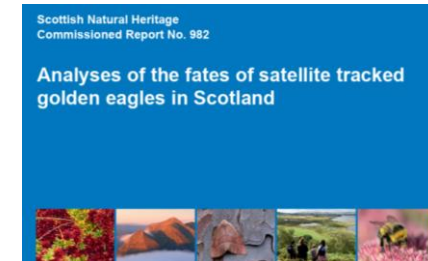
BALKAN DETOX LIFE

The BalkanDetox LIFE Project

Homepage > Pages > Project

Other uses of tracking info in IKB detection/prevention/response

- Previous example using multispecies tracking data to learn more about causes of mortality and when and where IKB happens at flyway scale
- Single sp -used in the UK to show that rates of Golden Eagle mortality are higher over managed grouse moors –pointing to perpetrators of IKB
- Rapid response eg/ [Balkan Detox Life](#) project-monitoring tracked Griffon Vultures. Body temp or not moving -get alert, do field check, save injured/ weak bird or retrieve carcass for postmortem/ info for prosecution





Other technologies
being used in
detecting/
addressing IKB



Drones/Aerial Surveys

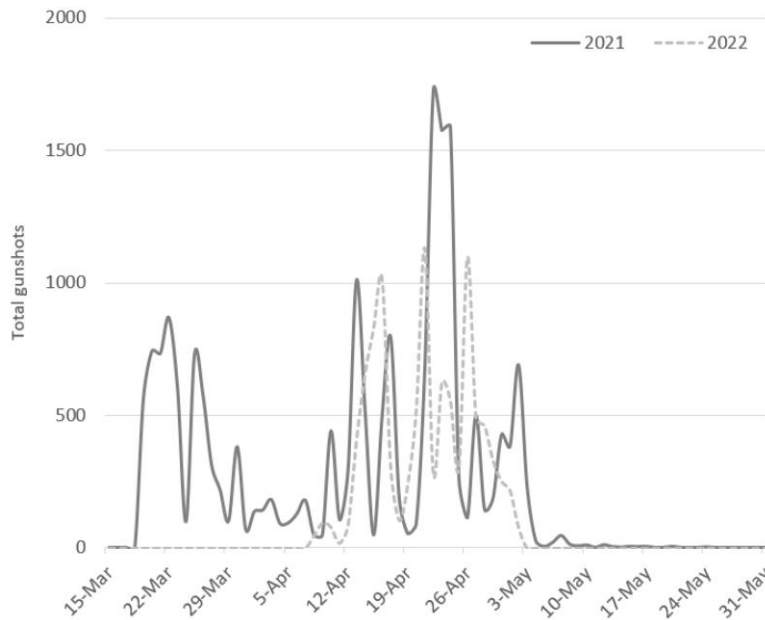
- Drones, or Unmanned Aerial Vehicles (UAVs), can provide quick, cheap and easy method of surveying large or hard to access areas (subject to legislation)
- Drones can be used to locate or count poachers or traps, track movements and record habitat modification/ structures associated with IKB
- Can combine with other tech such as thermal imaging, to record activity at night or with satellite tracking to help check on tagged birds in remote or inaccessible locations
- Top image-BIOM identifying illegally dug ponds in ornithological reserves in the Neretva delta, Croatia
- BirdLife Malta using drone to detect inaccessible finch trapping sites, reported to the police for investigation

DNA analysis

- DNA (blood, tissue, feather, faeces) can be used in identifying and evidencing IKB
- Eg/ DNA from feathers shed at nest sites revealed high turnover of adults at Eastern Imperial Eagle nests. Further investigation –high incidence poisoning (Helicon LIFE project)
- Dimitriou et al. (2017) DNA barcoded confiscated bird species in Cyprus, as reference so that prepared /cooked birds could be identified providing forensic evidence in cases where restaurants serving wild birds
- DNA can help in determining whether birds confiscated in trade are one species or another and whether they originate from the population claimed (eg/ captive bred or wild)



Acoustic Monitoring



- Passive Acoustic Monitoring (PAM) –put out a device for several weeks/ months (if battery replacement) and can detect and record gunshots; can be hidden (shoebox size)
- Useful where clear distinction in time or place where hunting allowed, data can be shared with stakeholders/ verified
- Can filter out background noise, needs some calibration to test how far shots can be detected in the landscape
- HOS & Forest Research Institute (Astaras *et al.* 2023) used on Ionian Islands, Greece. All spring hunting is banned, but Turtle Dove illegal spring hunting issue
- Patrols reported only isolated shots but the PAM detected >14,000 shots from just one of the monitoring locations in one spring migration period – across 6 locations 34,000-57,000 Turtle Doves estimated to be shot in one spring



Use of remote cameras for surveillance

- Remote cameras can be used for surveillance
- Small and discreet they can be hidden
- Can be used covertly to detect illegal activity and capture evidence without enforcement staff needing to be present
- Can capture images at intervals or be triggered by movement
- Pictures show their installation and use for poachers in Turkey
- Sovereign Base Area (SBA) Police worked with RSPB and BirdLife Cyprus using covert cameras at key illegal trapping hotspots to gather evidence and successfully prosecute perpetrators



A best practice guide for monitoring illegal killing and taking of birds

3rd edition



Illegal mist-netting of birds in Cyprus. © BirdLife Cyprus



Partnership for
nature and people

Best practice guide for monitoring IKB

Case studies

| | | |
|--|--|---|
| <ul style="list-style-type: none"> Mobilising volunteers for IKB monitoring in Lebanon (SPNL/BL Lebanon) Removing poaching infrastructure (Association for the Protection of Birds in Cyprus) Briefing hunters in Malta | <ul style="list-style-type: none"> Acoustic Recording Units to detect shooting in Greece (Hellenic Ornithological Society/BL Greece & FRI) Monitoring illegal take in hunting bags in Croatia (Croatian Society for Bird and Nature protection) | <ul style="list-style-type: none"> Collecting information from hunters/trappers in Egypt (NCE/BL Egypt) Protocol for recording incidental IKB observations in the UK (RSPB/BL UK) |
| <ul style="list-style-type: none"> Developing a volunteer network to monitor quail poaching in Croatia (Association Biom/BL Croatia) Monitoring illegal mist-nets in Cyprus (BirdLife Cyprus) Surveillance for illegal use of poison in Spain (SEO/BL Spain) | <ul style="list-style-type: none"> Monitoring illegal hunting in Hungary (MME/BL Hungary) Satellite transmitters, prevention of poisoning & DNA sampling of Eastern Imperial Eagles in Hungary. (MME) Monitoring a bird market in Jordan (RSCN/BirdLife Jordan & RMCSJ) Using monitoring results to change attitudes on IKB (LIPU/BL Italy) | <ul style="list-style-type: none"> trapping in Malta (BirdLife Malta) Drones for nest protection peregrine falcons in Northern Ireland DNA barcoding of bird species in Cyprus and Using covert surveillance (BirdLife Cyprus). Analysing magnitude of raptor shooting (Batumi/BL Georgia) |

<https://www.cms.int/en/page/monitoring-ikb>

REFERENCES

Serratosa *et al.* (2024) Tracking data highlight the importance of human-induced mortality for large migratory birds at a flyway scale. *Biological Conservation*. 293

<https://doi.org/10.1016/j.biocon.2024.110525>

Dimitrou A.C., Forcina G., Papazoglou C., *et al.* (2017) DNA barcoding of bird species in Cyprus: a tool for conservation purposes. *Bird Conservation International*. 227(4):483-494.

[doi:10.1017/S0959270916000472](https://doi.org/10.1017/S0959270916000472)

Astaras, C., Sideri-Manoka, Z.-A., Vougioukalou, M., Migli, D., Vasiliadis, I., Sidiropoulos, S., Barboutis, C., Manolopoulos, A., Vafeiadis, M., & Kazantzidis, S. (2023). Acoustic Monitoring Confirms Significant Poaching Pressure of European Turtle Doves (*Streptopelia turtur*) during Spring Migration across the Ionian Islands, Greece. *Animals*, 13(4), 687.

<https://doi.org/10.3390/ani13040687>

BirdLife International (2022) A best practice guide for monitoring illegal killing and taking of birds – 3rd Edition. Cambridge, UK: BirdLife International. Under 'Key Documents' at

<https://www.cms.int/en/page/monitoring-ikb>