2024

WINGSPAN

Partnerships for a bird-friendly energy transition

Renewables Grid Initiative

TB Raab
Technisches Büro für Biologie

elia group

SafeLines4Birds

EUROKITE

LIFE GREAT BUSTARD

Life
Co-funded by the European Union

NATURA 2000

2024 WINGSPAN

Programme & More

2024 WINGSPAN

Side Activities

15 October

- Vendor Fair – Foyer 1
- Tattoo table – Share your photo on SoMe using #Wingspan 2024

16 October

- Poster Session – Foyer 1
- Workshop for Grid Operators, NGOs and Authorities – Foyer 3
- Tattoo table

17 October – Field excursion

- Departure: 7:45 at Place Flagey 24
- Return to Brussels: 15:30

Sylvia Barova

Advisor to EU

LIFE Programme

CINEA

Dr. Rainer Raab

CEO

TB Raab

Liam Innis

Senior Manager – Energy Ecosystems

Renewables Grid Initiative

Olivier Feix

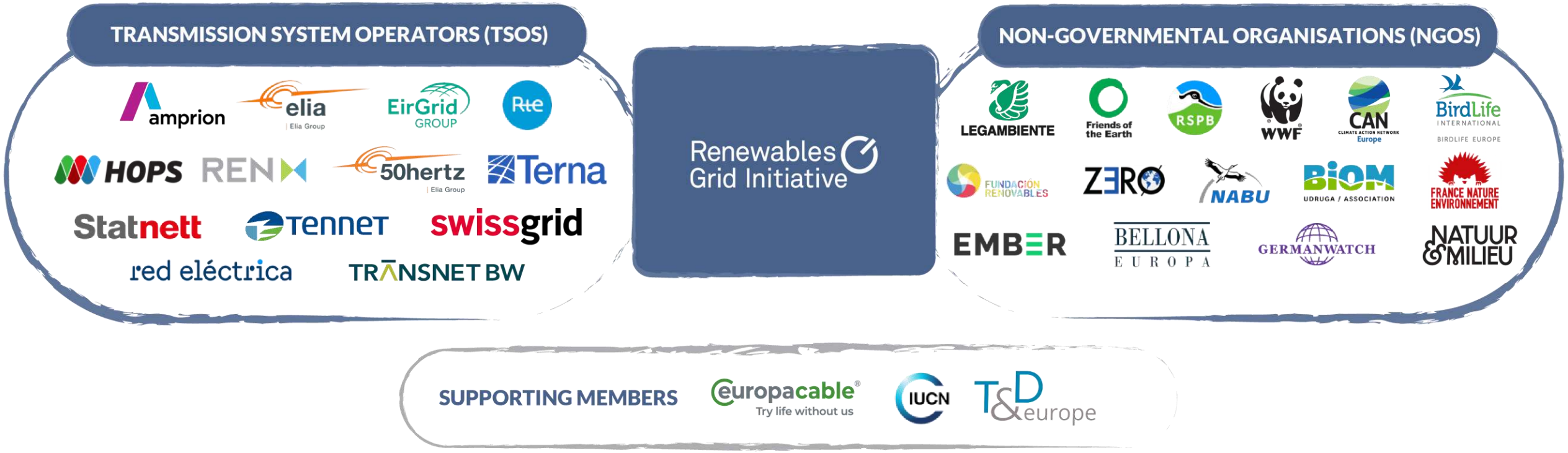
Head of Strategy

Elia Group

Opening Words

2024 WINGSPAN

Who is the Renewables Grid Initiative?



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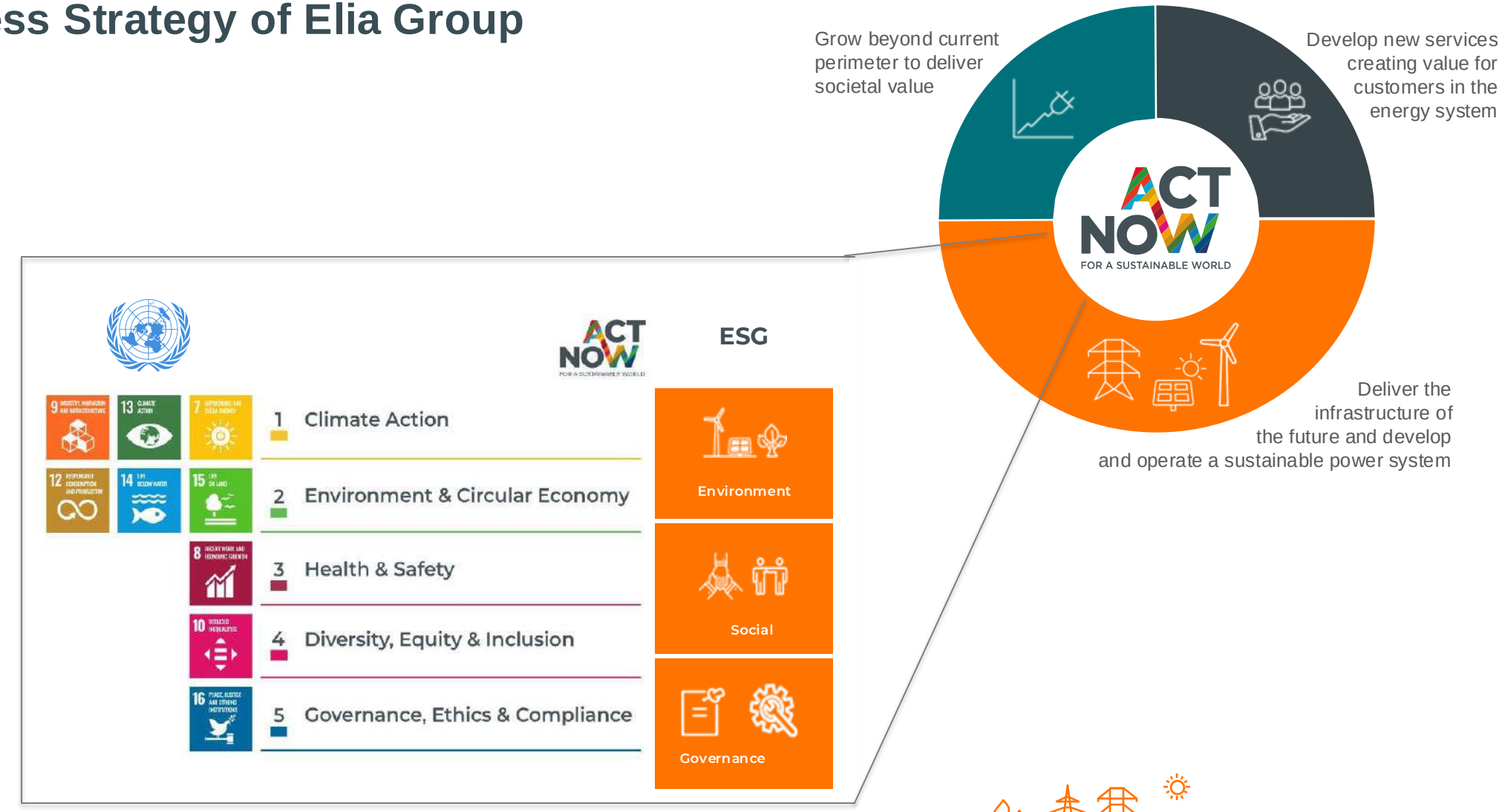
Opening Words

2024 WINGSPAN

Taking the journey together – Grid development & Nature

15th October 2024 I Olivier Feix, Strategy Elia Group

Sustainability embedded at the core of the Business Strategy of Elia Group



Elia Group‘s corporate business strategy building on sustainability

With our „ActNow“ programme we integrate sustainability in all of our activities and operations

- From system planning and grid design to procurement, grid construction and operations
- Transversal: Green Financing, Diversity, Governance, Health & Safety

Our large infrastructure projects on land and at sea are becoming lighthouses

- Green substations onshore: going the extra mile in biodiversity and climate action
- Princess Elisabeth Island: co-creation for nature-inclusive design
- Bornholm Energy Island: holistic integration of sustainability from the start

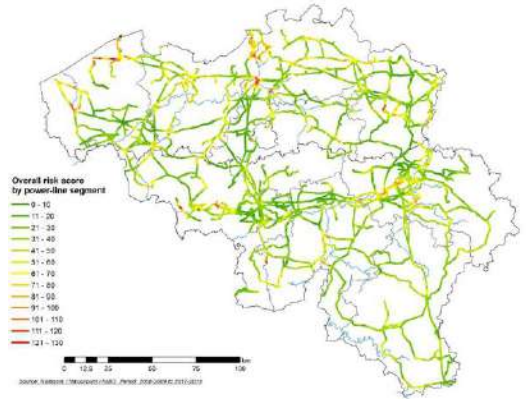
Having sustainability inherent to our strategy is essential to its business success

Biodiversity (as one element of sustainability) has become integral part of our grid projects

Onshore

Bird diverters

Ecological corridors

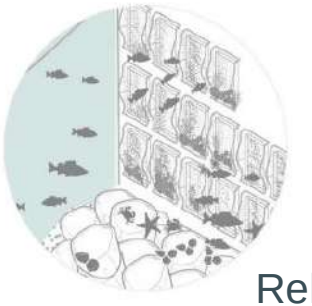


Bird collision risk map

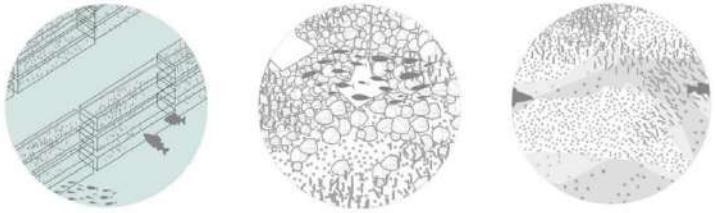
Nesting aid

Offshore

Ledges for cliff-nesting birds



Relief panels



Further habitats for forage, shelter and/or rest

Thank you!

Andrea Vettori

Head of Unit - Nature Conservation

DG Environment

Keynote

2024 WINGSPAN

Paula Rey

Deputy Head of Unit – Renewables & Energy System Integration Policy

DG Energy

Keynote

2024 WINGSPAN

Tris Allinson

Senior Scientist

BirdLife International

Keynote

Potential impacts of grids and renewables infrastructure on birds

2024 WINGSPAN

WINGSPAN

Brussels 15 – 17 October 2024

Potential impacts of grid and renewables infrastructure on birds

Tris Allinson

Senior Conservation Scientist, BirdLife International

BirdLife INTERNATIONAL

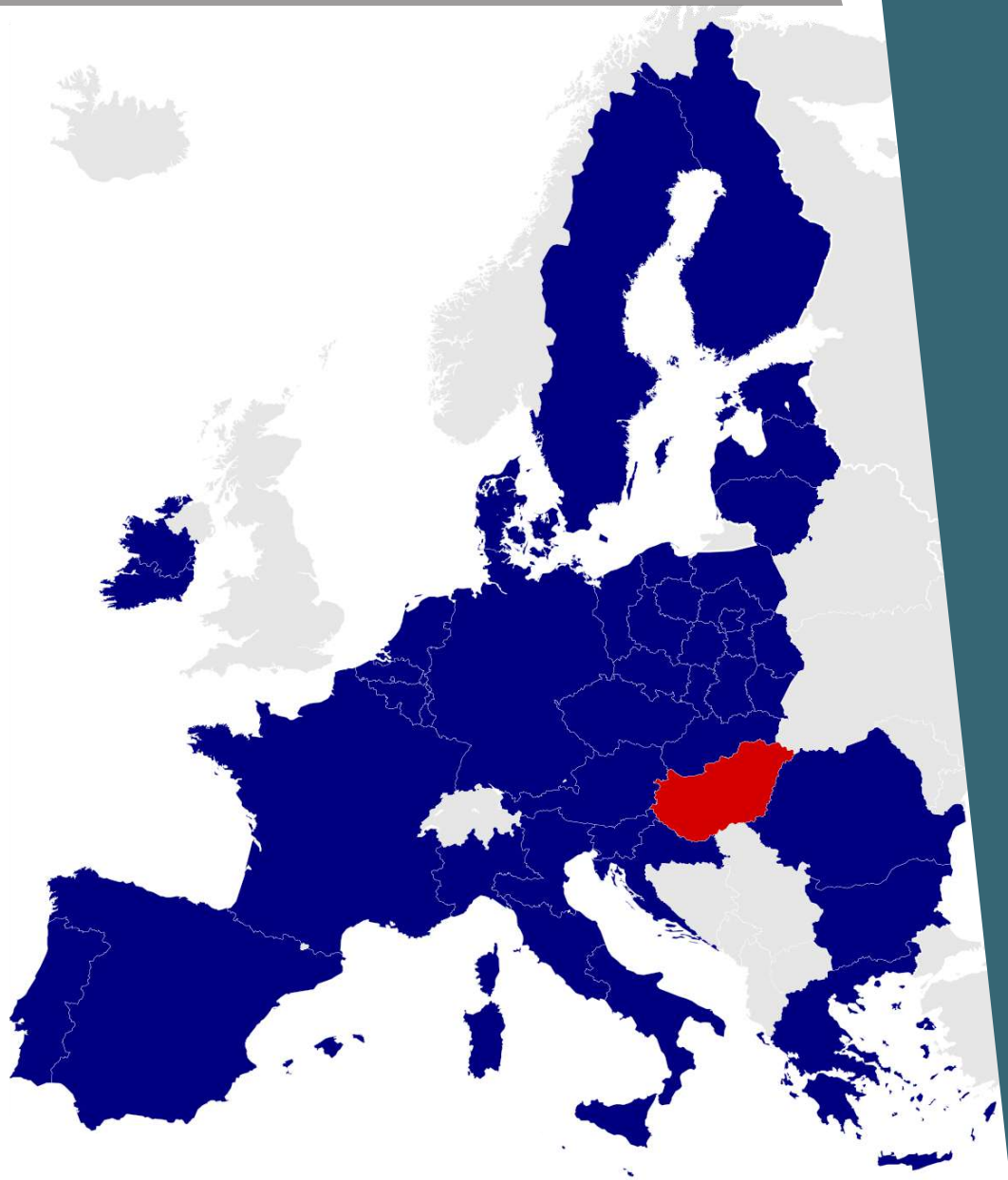
Partnership for nature and people


We must end our reliance on fossil fuels and rapidly transition to renewable sources of energy

- The coming decades will see millions of square kilometres across the globe set aside for renewable energy, primarily windfarms and solar facilities.

- Utility-scale solar and wind farms require at least ten times as much space per unit of power as coal or gas fired power plants.

- For instance, it is estimated that generating the Europe Union's electricity using only onshore wind and utility-scale photovoltaics (PV) would require 97,000 km^2, equivalent to an area roughly the size of Hungary (Tröndle 2020).

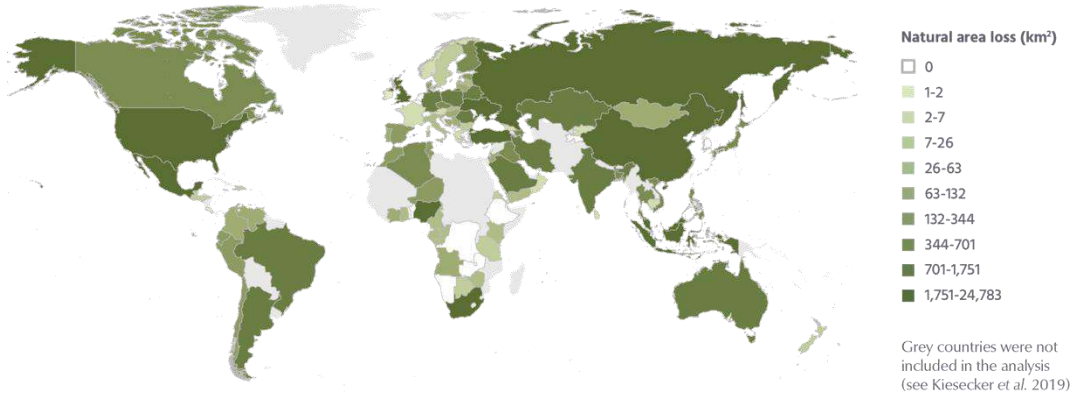


SOURCE Tröndle, T. (2020) Supply-side options to reduce land requirements of fully renewable electricity in Europe. *PLoS One 15*, e0236958. https://doi.org/10.1371/journal.pone.0236958

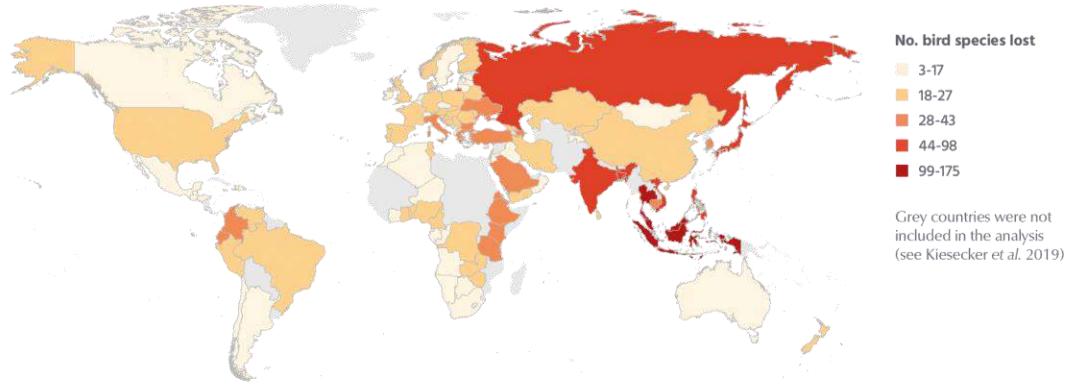
- It is calculated that if renewable energy developments were sited solely to maximise energy production, 11 million hectares of natural habitat could be lost globally, including over 3 million hectares in Key Biodiversity Areas (KBAs).

- Perversely, this loss of natural habitat would result in the release of almost 415 million tonnes of stored carbon, undermining the climate change benefits associated with a transition to renewable energy.

Predicted natural area loss per country if wind and solar energy were sited solely to maximise production



Potential losses of globally threatened bird species per country if wind and solar energy were sited solely to maximise production



SOURCE Kiesecker et al. (2019) Hitting the Target but Missing the Mark: Unintended Environmental Consequences of the Paris Climate A greement. *Front. Environ. Sci.* 7:151.doi: 10.3389/fenvs.2019.00151

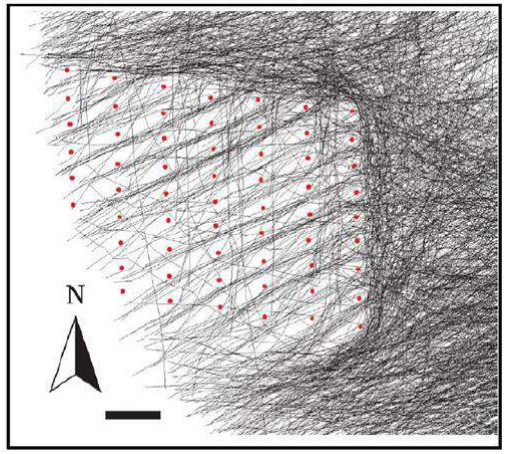
Griffon Vulture *Gyps fulvus* Crete

White-tailed Sea-eagle *Haliaeetus albicilla* Hokkaido, Japan, © MoEJ

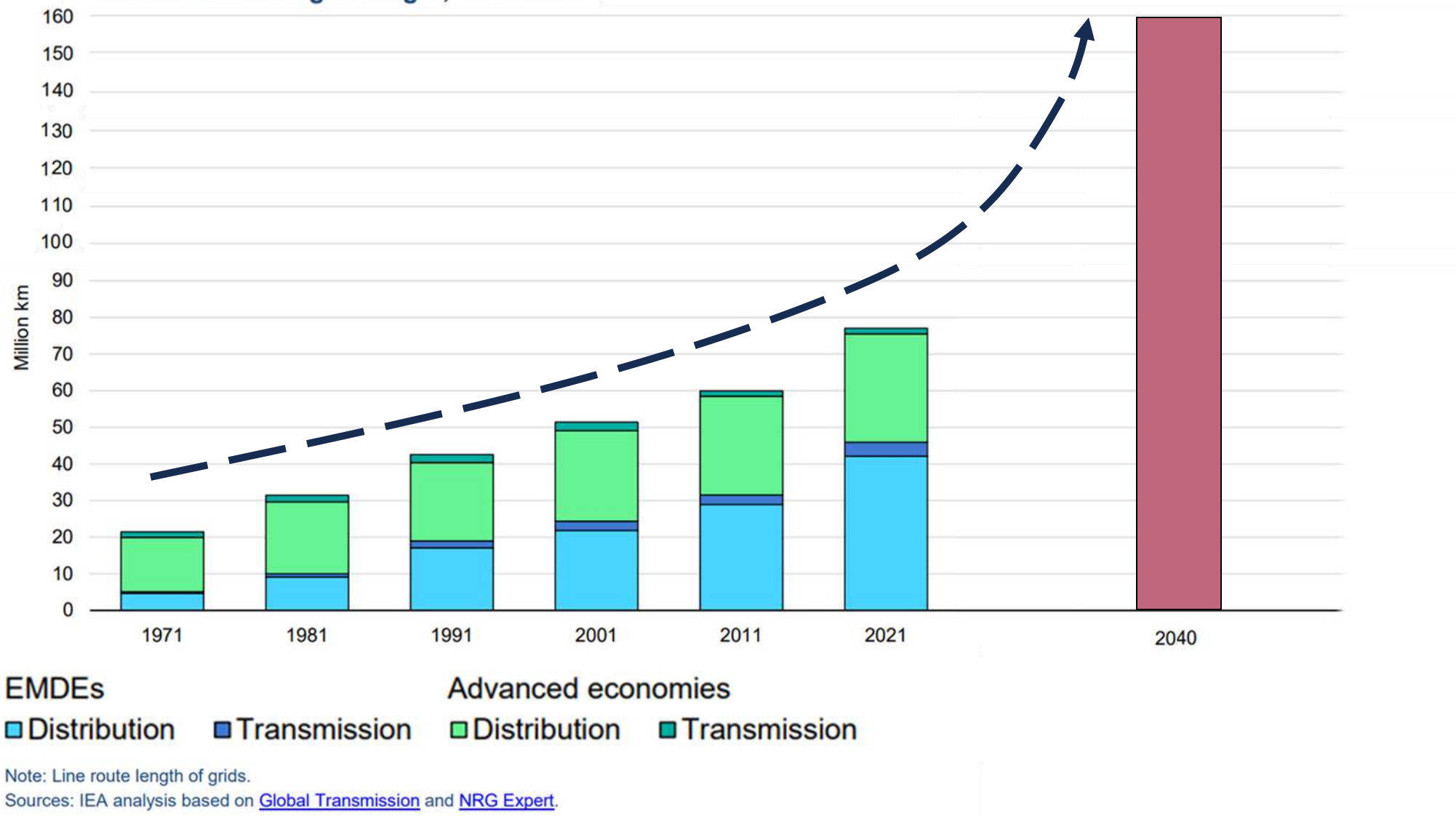
Avoidance, displacement and barrier effects

- Another factor affecting collision risk is avoidance behaviour—some species show high wariness around turbines and avoid turbine arrays.

- However, this itself can have a negative impact if it results in displacement from a favoured habitat or creates a barrier to daily movements or migration.



Global historical grid length, 1971-2021



Note: Line route length of grids.

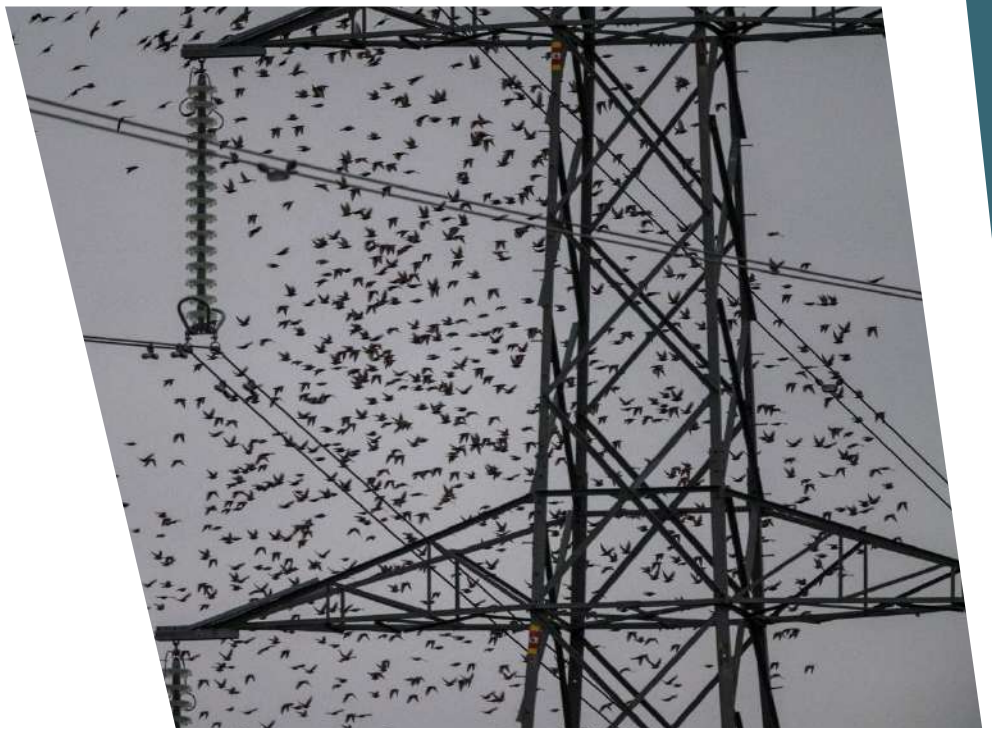
Sources: IEA analysis based on Global Transmission and NRG Expert.

- There are already 80 million kilometres of powerlines globally – enough to stretch to the moon and back 200 times – and this will need to more than double by 2040 to accommodate the transition to renewables.

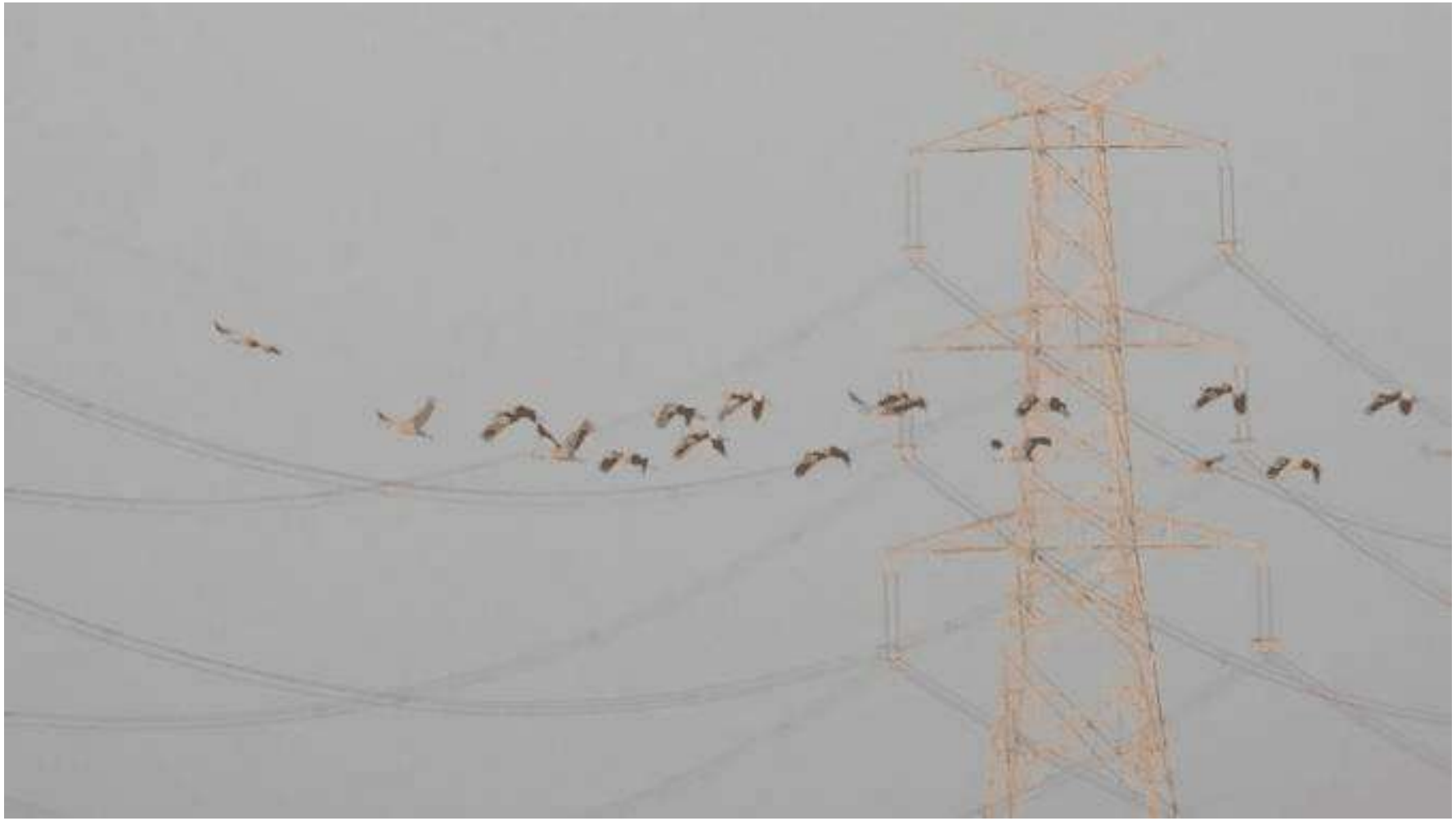
- Fatality rates range from less than one dead bird per kilometre of powerline per year to as many as 170 fatalities/km/yr.

- Even if we take a conservative estimate of five fatalities/km/yr the annual death toll by 2040 will be approaching one billion birds.

- This is equivalent to 1,000 Deepwater Horizon oil spills every year.

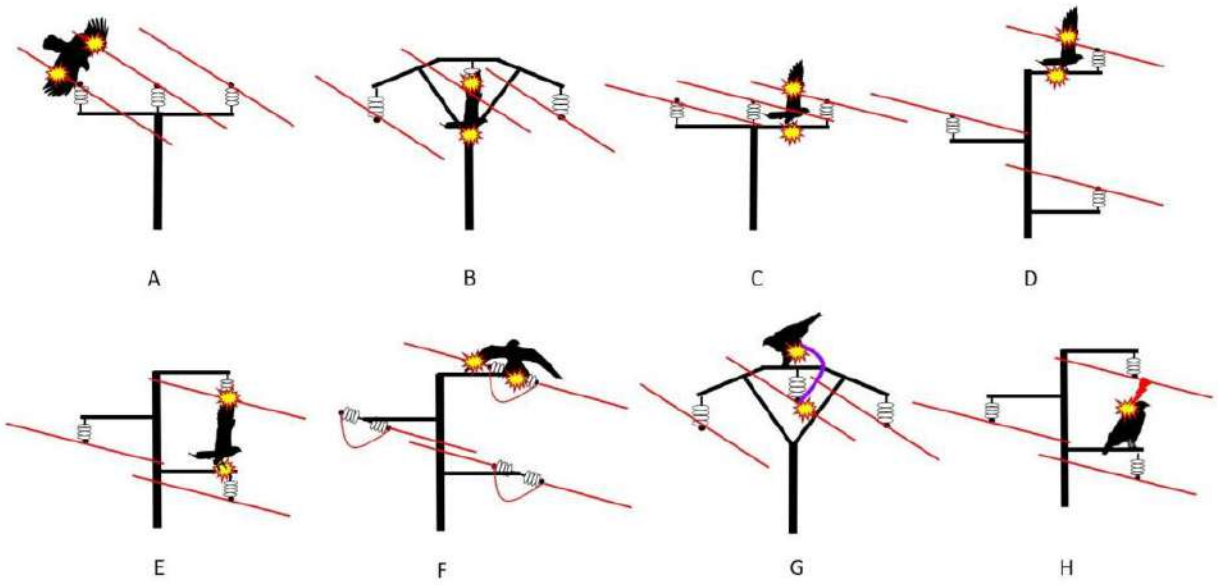


Mute Swan *Cygnus olor*, Slovakia, © LIFE Energia

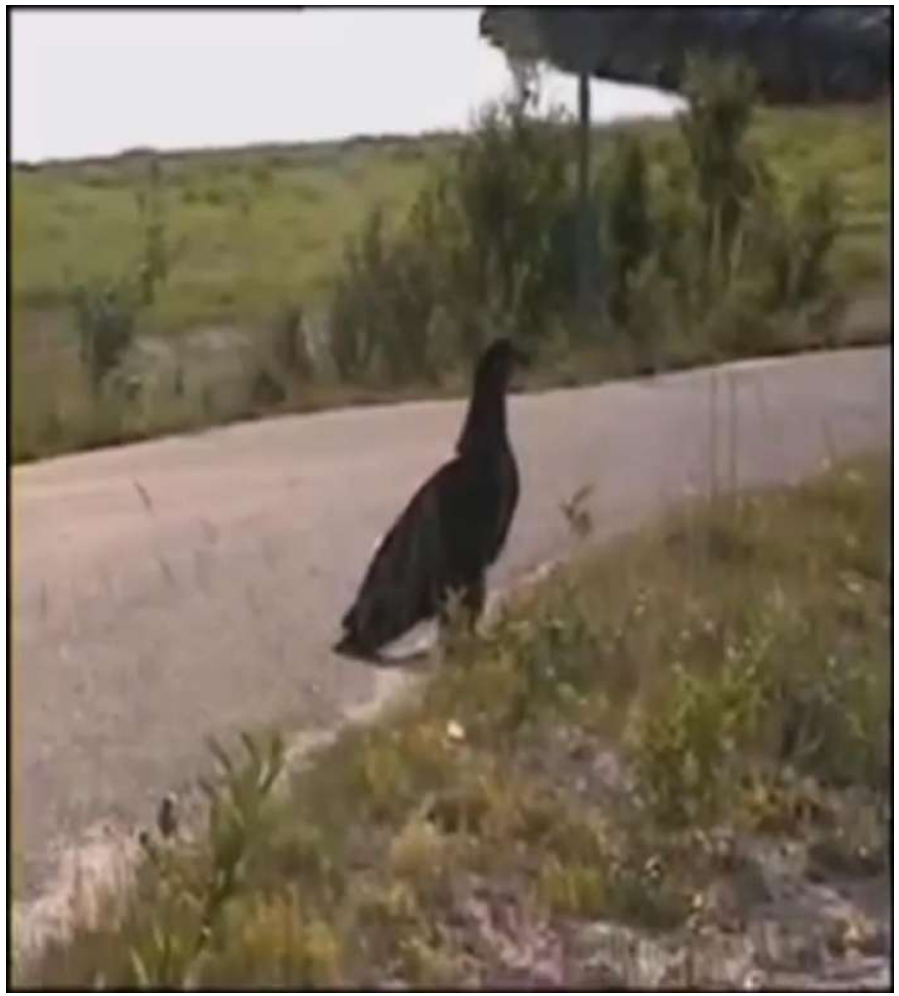


Common Crane *Grus grus* Rajasthan, India, © WII

Electrocution occurs when a bird makes simultaneous contact with two conductors, or with a conductor and a grounded structure (e.g. a metal crossarm).



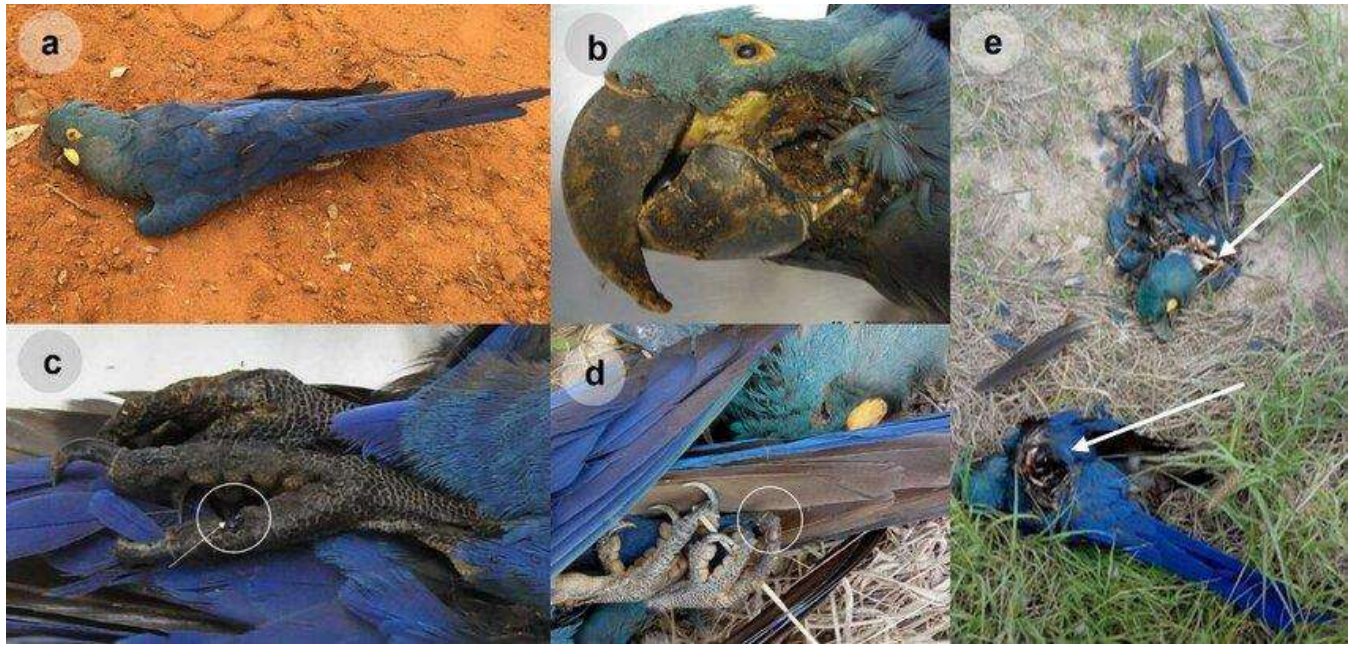
SOURCE Sielicki et al. (2020) IAF Quick Guidance for Preventing Electrocution Impacts on Birds



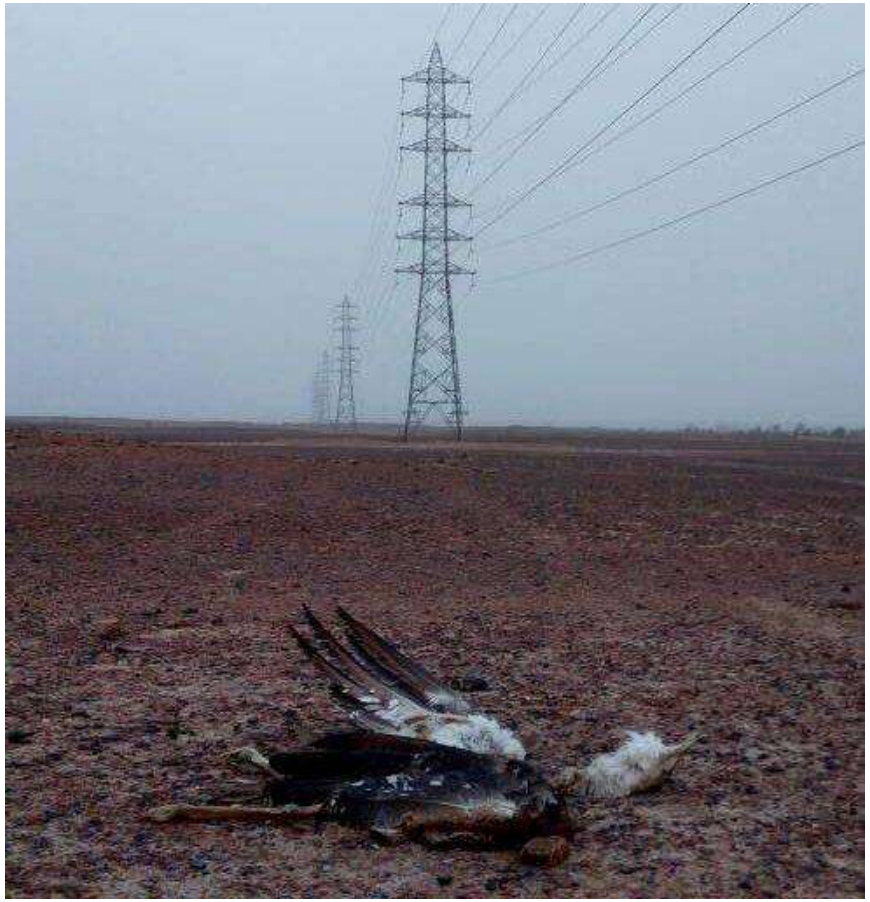

CGTN

In Mongolia, badly designed powerlines are responsible for the electrocution of 4,000 – 5,000 Endangered **Saker Falcon** each year.

In Brazil, powerlines and renewable energy development are a major threat to the Endangered **Lear's Macaw**.



The **Great Indian Bustard** is on course to go extinct due to badly planned renewable energy

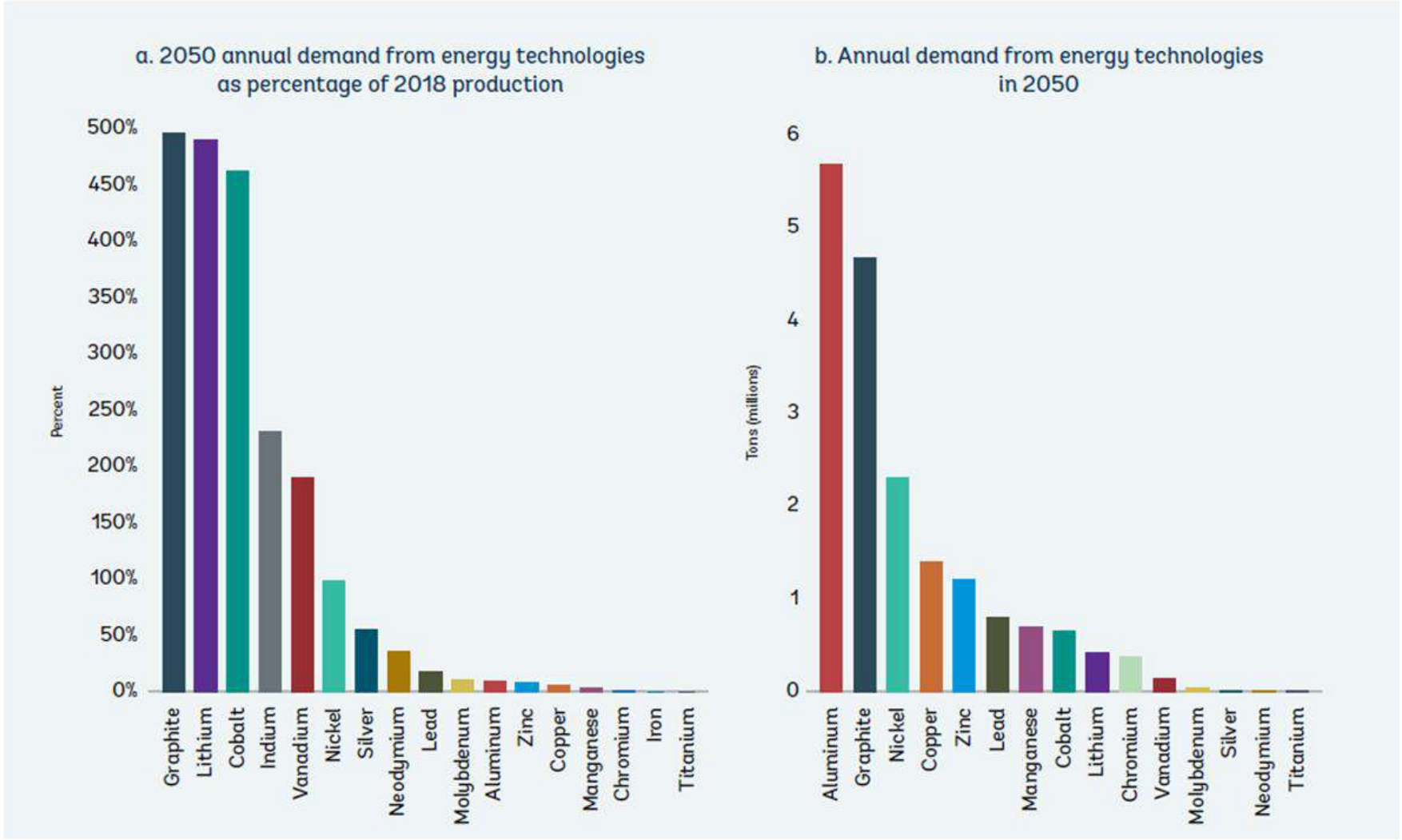


- The transition to clean energy will massively increase demand for metals and minerals.

- Renewable energy generation requires large amounts of steel, iron, aluminium, copper and zinc, as well as several rare earth metals. Whilst battery storage requires a lot of graphite, lithium and cobalt.

- New research has found that 4,642 species of vertebrate are threatened by mineral extraction around the world (Lamb *et al*. 2024). Some bird populations are already at risk from mining linked to the clean energy transition. For instance, Andean and James's Flamingos are at risk from lithium mining in Chile (Gutiérrez 2022).

SOURCE Lamb et al. (2024) Global threats of extractive industries to vertebrate biodiversity. *Current Biology* 34, 3673–3684. Gutiérrez et al. (2022) Climate change and lithium mining influence flamingo abundance in the Lithium Triangle. *Proc. R. Soc. B*.28920212388



Adapted from IBRD/The World Bank (2020).

CURB ENERGY DEMAND through better energy efficiency and energy sufficiency.

AVOID developing in areas of ecological importance by prioritising low risk locations, planning strategically and assessing impacts effectively.

MINIMISE impacts by utilising nature-safe designs and adopting nature-safe practices.

RESTORE damage incurred during project construction.

OFFSET any residual and irreversible operational damage through like-for-like compensation.

IMPROVE biodiversity more generally through support for supplementary conservation policy and action.


Thank you

Tris Allinson

Senior Scientist

BirdLife International

Keynote

Potential impacts of grids and renewables infrastructure on birds

2024 WINGSPAN

Panel

Unlocking the path to a bird-friendly energy transition

MODERATOR

Olivier Feix

Head of Strategy

Elia Group

Guillaume Marchais

Senior Environmental Specialist

EDP Renewables France

Lisa Garnier

Senior Expert Grid & Biodiversity R&D

RTE

José Tavares

Director

Vulture Conservation Foundation

Stefania Charisiadou

Nature Conservation Policy Officer

DG Environment

Coffee Break

2024 WINGSPAN

Klaus Maras

CEO

BE Energy GmbH

Keynote

Low and medium-voltage cable undergrounding in Austria

2024 WINGSPAN

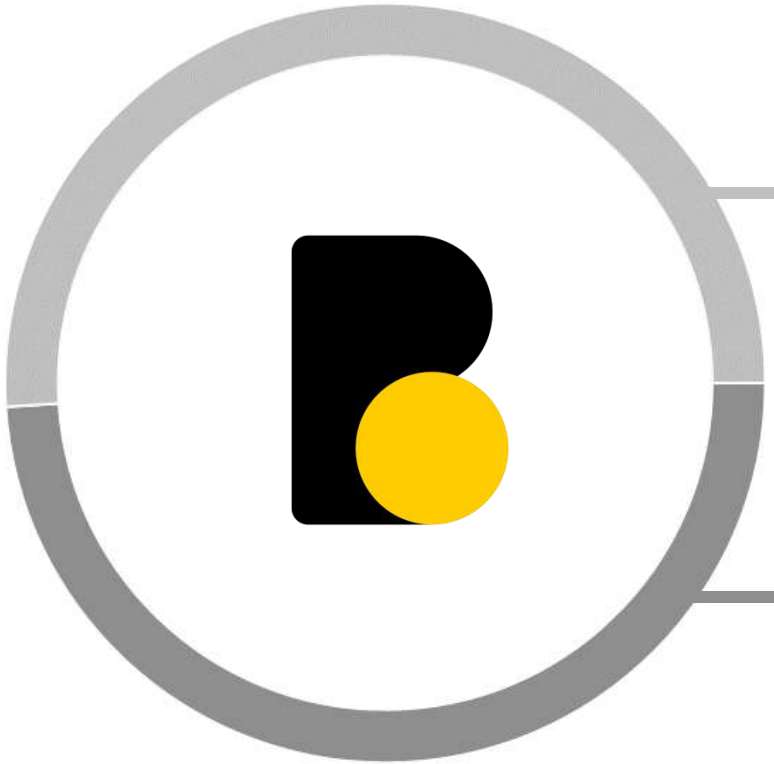
WINGSPAN 2024

Exploring one solution to protect bird species
Cable undergrounding – Case study on cable undergrounding of low and medium voltage power lines in Austria

Mag. Klaus Maras
Managing Director
BE Energy GmbH / Austria

Burgenland Energie

Shareholders



51 % Burgenländische Landesholding GmbH

(100% Province Burgenland)

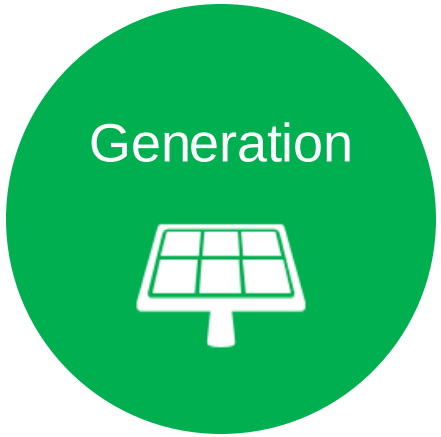
49 % Burgenland Holding AG

(73,63% EVN)

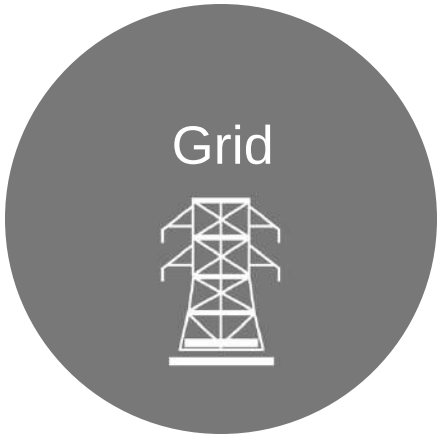
VISION

Burgenland as the first carbon-neutral region in the world by 2030.

Strategy Change 2025



Increase Renewables
No. 1 in Wind power
No. 1 in PV



Security of supply
System expansion
H2-system development

Opt. energy distribution
Robot-Trading, AI
Broadband expansion

Regional products
Participation Models
Forwardthinker.eu

GreenTech Company

Involvement in LIFE Projects

Success story of underground cabling

BE ENERGY GMBH

Involvement in LIFE Projects

- LIFE05 NAT/A/000077

  Cross-border Protection of the Great Bustard in Austria (2005-2010)

- LIFE09 NAT/AT/000255

  Cross-border Protection of the Great Bustard in Austria - Continuation (2010-2015)

- LIFE15 NAT/AT/000834

  LIFE Great Bustard - Cross-border protection of the Great Bustard in Central Europe (2016-2024)

- LIFE18 NAT/AT/000048

  LIFE EUROKITE - Cross-border protection of the red kite in Europe by reducing mortality caused by humans (2019-2027)

Involvement in LIFE Projects

- In the last 20 years (2005-2024), a total of 30.9 km of existing overhead medium voltage power lines were removed and placed into the ground in northern Burgenland as part of **LIFE projects.**

- In addition to the LIFE projects, 18.1 km of existing overhead medium voltage power lines were removed and placed into the ground in northern Burgenland.

- Furthermore, a newly constructed 110 kV power line (12 km) was installed directly as an underground cable for the first time in the great bustard area and additionally 1.9 km existing 110 kV overhead power line were placed into the ground.

© Franz Josef Kovacs

Underground cabling of a overhead power line in Burgenland 2006

Removal of a 20 kV overhead power line in Burgenland 2006

Newly build 110 kV overhead power line which was placed into the ground in the Great Bustard area in Burgenland.

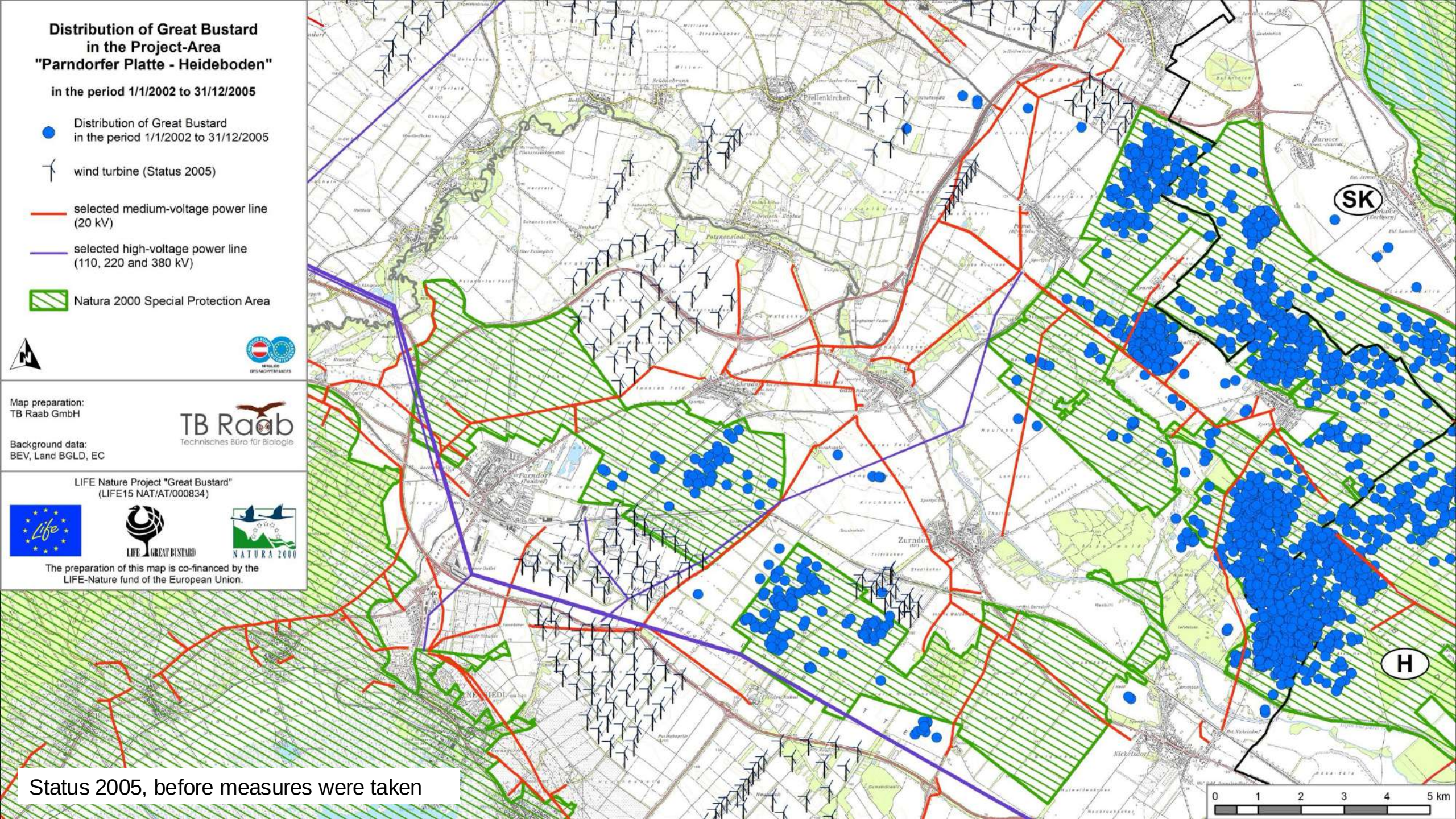
Involvement in LIFE Projects

- In northern Burgenland, in cooperation with **BirdLife Austria** and **TB Raab**, priority areas and no-go areas, especially for **Great Bustards** and Imperial Eagles, are taken into account during the planning phase. Large areas were selected for wind farms, but large areas were also selected for nature (no fragmentation of habitat).

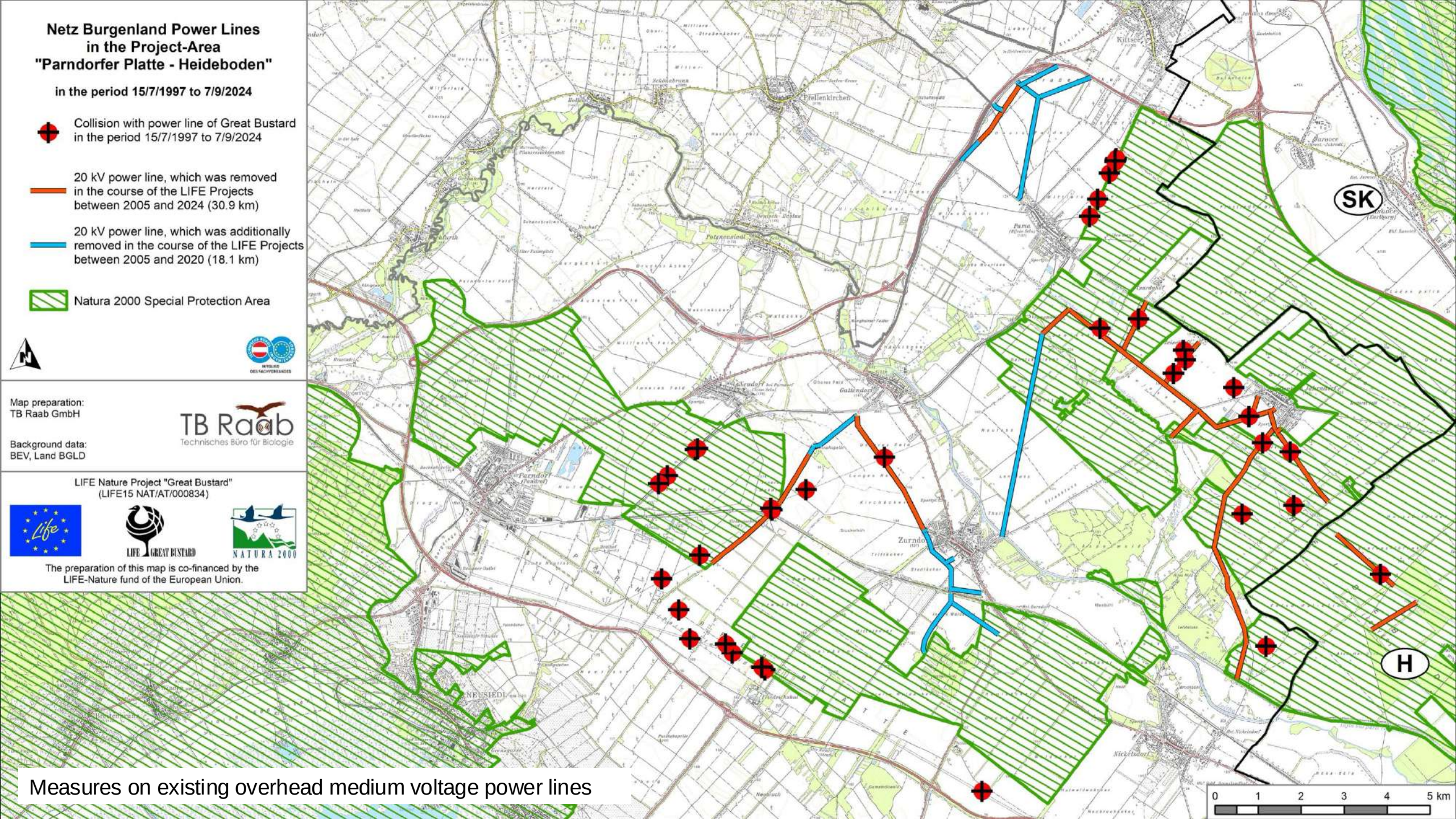
- In addition, 19.5 km of 110 kV overhead power lines were marked in the great bustard area.

→ This has been possible due to the good co-operation between the people involved in the fields of energy, NGOs and nature conservation

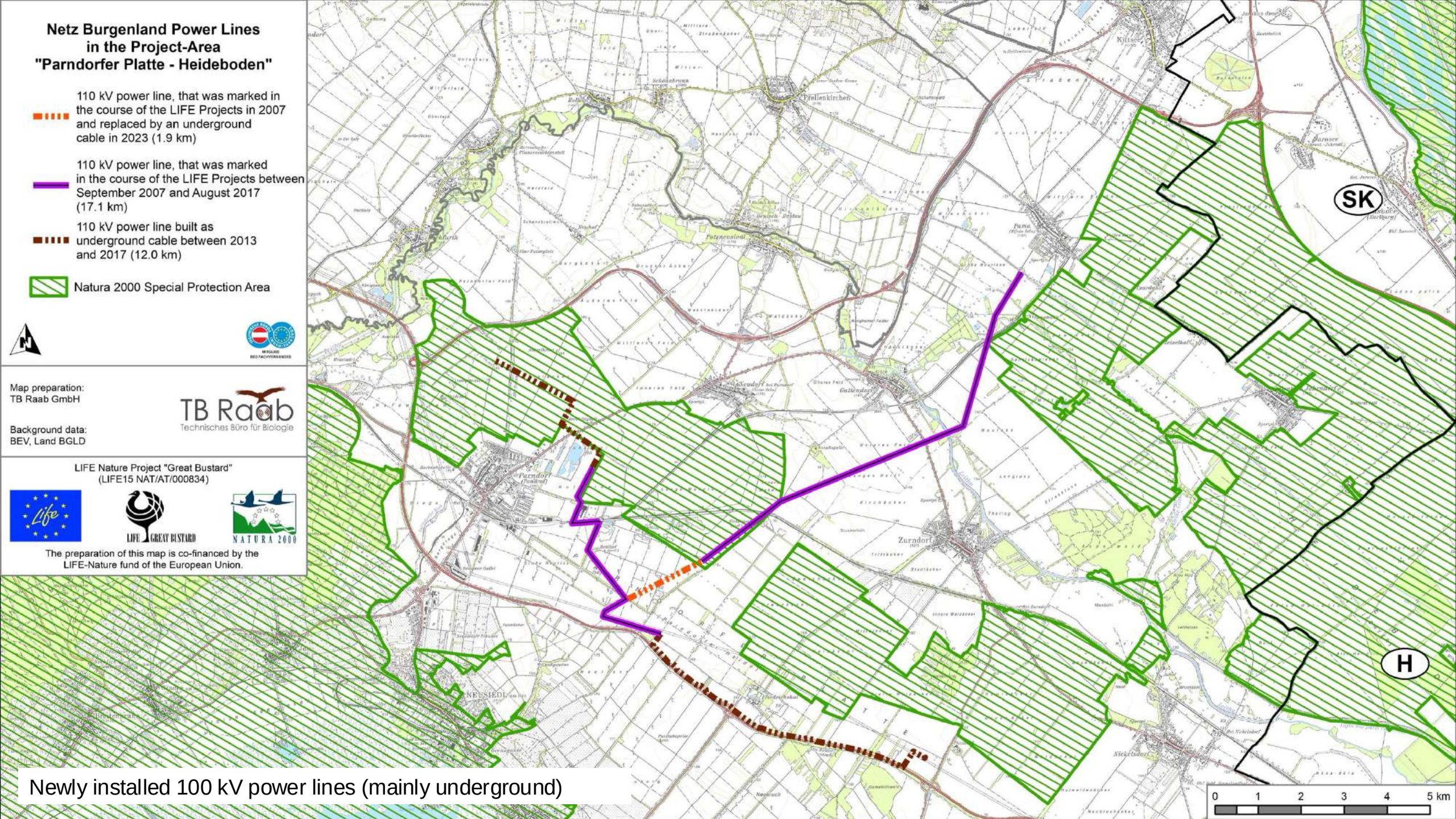
(provincial government, Dr. Andreas Ranner, former managing director of BirdLife Austria).



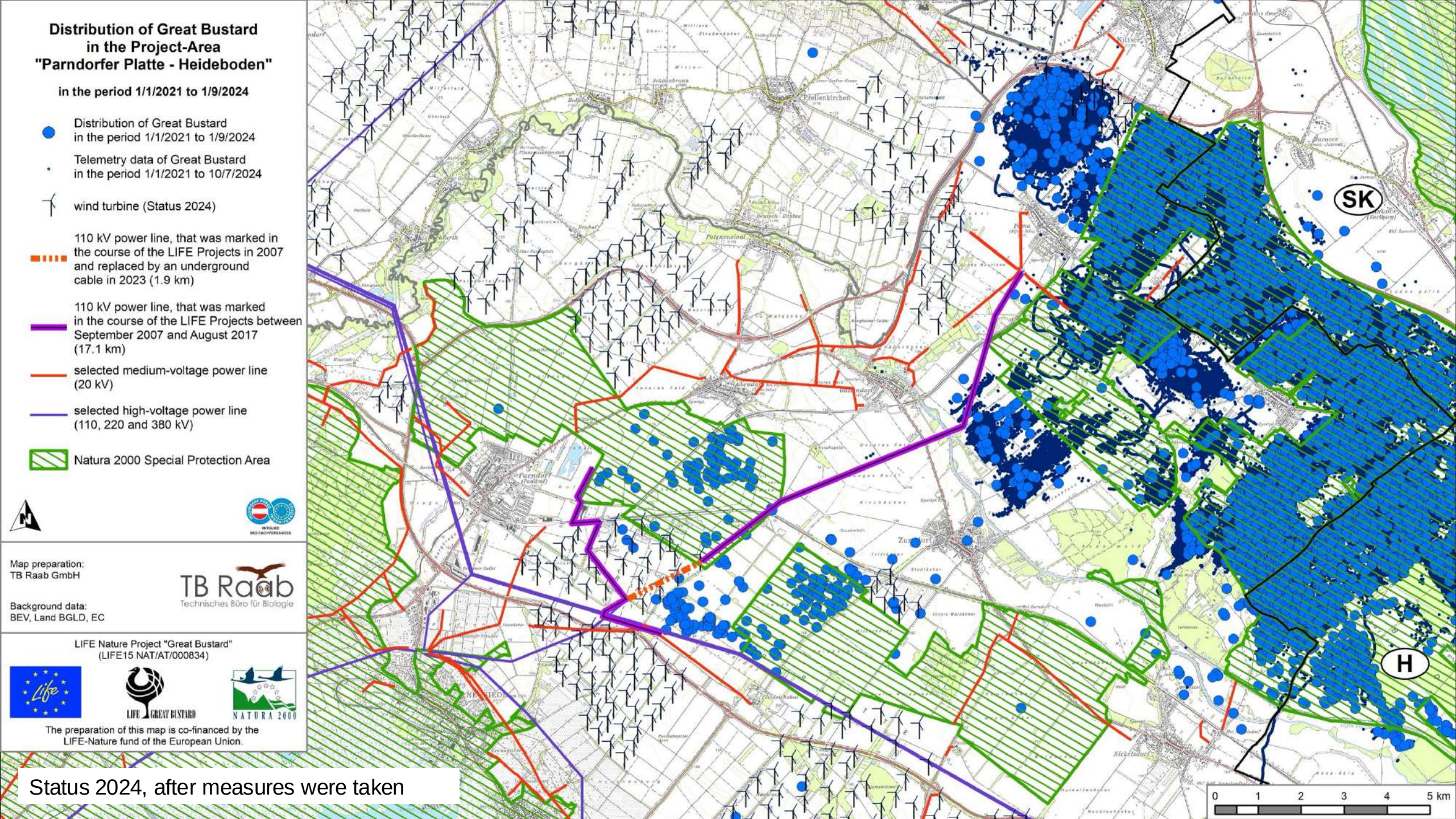
Status 2005, before measures were taken



Measures on existing overhead medium voltage power lines



Newly installed 100 kV power lines (mainly underground)



Status 2024, after measures were taken

Involvement in LIFE Projects

- In Burgenland, no new medium-voltage overhead lines have been erected in important bird protection areas since the implementation of the LIFE projects.
- Thanks to these measures on power lines and other habitat-improving measures, the number of Great Bustards in Burgenland has risen sharply and collisions with overhead power lines have been significantly reduced.

→ **Marking and underground cabling are the most effective measures to protect the Great Bustards**

Wind power in Burgenland

Model region for sustainable wind energy development

BE ENERGY GMBH

Burgenland & BE Energy a role model

Transition to energy autonomy

Once reliant on energy imports, Burgenland has become self-sufficient in electricity, producing 100% of its power from renewable sources since 2013.

Pioneering renewable energy

The region serves as a European leader in integrating renewable energy, particularly wind power, with environmental protection.

A strategic vision

The regional government set ambitious energy targets, supported by innovative policies and strong public backing.

Burgenland
Facts

213 wind turbines owned by BE Energy
(all operators 448 wind turbines),
618 MW (all operators 1.346 MW)

The Parndorf Plateau

- unique location (the Schotterterrasse lies ~ 40 to 50m above the Pannonian Plain) → one of the best inland locations for wind turbines in Europe & one of the most productive in Austria
- relatively steady winds generate an average wind speed of more than 6,5m/sec at a height of 70 meters
- of great ornithological importance and considerable potential for nature conservation
- conservation measures for the Great Bustard: were implanted from the mid 90s; rapid increase in the remaining populations of numerous steppe species (e.g. Great Bustard) & recolozination by locally extinct species (e.g. Imperial Eagle, White-tailed Eagle)
- **a priority concern: the search for zoning solutions for wind power expansion that are compatible with nature conservation → a corresponding commitment on the part of NGOs and official nature conservations bodies**

Energy flow from the wind farm

Cabling / Removal of energy

→ **The cabling for wind farms is generally placed underground.**

Construction of a wind turbine

Cable laying

Harmonizing Wind Energy & Nature Conservation

Compensation Measures

Example of the Imperial Eagle Action Plan, which protects the habitat of this endangered species through specific land management actions near wind farms.

Biodiversity Protection

Wind energy projects are designed to avoid or mitigate impacts on bird migration routes, sensitive species, and valuable ecosystems.

Environmental Integration

Careful planning and zoning allow for wind energy expansion while maintaining Burgenland's unique biodiversity hotspots.

BE Energy takes bird migration routes into account

Example photo of two Great Bustard males © Franz Josef Kovacs

Challenges and Solutions

Environmental Concerns

Wind turbines can pose risks to birds and bats and alter landscapes, making nature-friendly solutions crucial.

Zoning and Planning

The designation of "no-go zones" ensures that wind farms are located away from protected areas and biodiversity hotspots.

Public Acceptance

Transparent communication with local communities, along with early engagement of stakeholders, has resulted in strong public support and limited opposition.

Key factors for our success

Commitment from politicial decision-makers

There is a continuous and strong political commitment by local political players. Clear political targets are set and necessary measures and timetables have been defined.

Innovative planning tools

The use of regional zoning frameworks helped reduce conflicts, increase transparency, and ensure the sustainable development of wind energy.

Cooperation and exchange in workshops and working groups

Regular meetings between government officials, energy producers, and conservationists fostered a cooperative environment, allowing for the resolution of conflicts.

Key factors for our success

Positive attitude among population towards investments in energy supply and nature conservation

The general public in Burgenland has been supportive of wind energy projects due to clear communication strategies and the region's focus on environmental sustainability.

Opportunity EU accession and support mechanisms

Austria’s accession to the EU in 1995 and the designation of a relatively small region as a special objective 1 funding area were seen as a great chance.

Positioning of nature conservation

As a nature conservation organization or authority, play a constructive role in the development of spatial energy planning concepts and the corresponding processes.

Outlook and Recommendations

Further Expansion

Burgenland plans to continue expanding its wind energy capacity while ensuring that projects align with environmental goals.

Model for Other Regions

The success of Burgenland’s wind energy approach can serve as a blueprint for other regions aiming to balance renewable energy development with ecological preservation.

Burgenland plans to continue expanding renewable energies also with Photovoltaic capacity while ensuring that projects align with environmental goals.

Our focus on renewable energy.

A success story for 25 years.

BE ENERGY GMBH

Klaus Maras

CEO

BE Energy GmbH

Keynote

Low and medium-voltage cable undergrounding in Austria

2024 WINGSPAN

Presentations

Technologies and solutions to reduce bird mortality around energy infrastructure

Brian McGowan

Founder & Managing Director

Scientias Ireland Limited

Dr. Moritz Mercker

Managing Director

Bionum GmbH

Lyubka Vasileva

Team Leader Innovation & EU Projects

EVN Bulgaria

Rainhard Raab

Deputy CEO

TB Raab

15.10.2024

Preventing Wildlife Electrocution, Global best practices

Brian McGowan | Scientias-Energy

www.SCIENTIAS-ENERGY.com

Independent Consultancy | Driving Grid Reliability | Asset & Wildlife Protection | Building Global Connections.

Scientias-Energy

- Brian McGowan – Founder & Managing Director.
- Industry experience leading teams at innovators *Raychem* and TE Connectivity
- Technical membership: EI, IEEE, CIGRE
  - Convenor -CIGRE B2.24: Methods of reducing electrocution of birds from power lines.
  - Member - IEEE P1656, Guide for Testing the Electrical, Mechanical, and Durability Performance of Wildlife Protective Devices on Overhead Power Distribution Systems Rated up to 38 kV
  - Member - CIGRE WG B2.91: Long overhead line spans design practices

- Consulting focus:
  - Wildlife & Asset protection: Electrocution | OHL collisions | Turbine collisions | Fire mitigation
  - Polymeric materials testing, |, Insulation & product Standards development, | Training and Education.

Agenda: Preventing Wildlife Electrocution

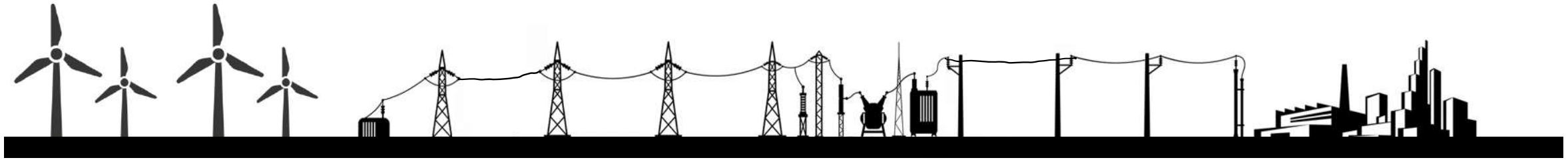
- The energised grid and common wildlife challenges and risks
- Introduce electrocution mitigation approaches
- Global experience and importance of product specifications

Questions at end of session

Send an e-mail unanswered questions

e-mail: brianmcgowan@scientias-energy.com; **Website:** www.Scientias-energy.com/

Introduction: A simple view of the network.



There are 100million km of overhead lines & hundreds of thousands of open MV/HV substations in the world today

It is impossible to separate wildlife from Energy infrastructure,
Birds perch, roost, nest, forage and fly around and commute past overhead lines daily






Introduction: Risks for avian wildlife.

Contact electrocution

Wildlife bridges phase to phase or phase to ground with body

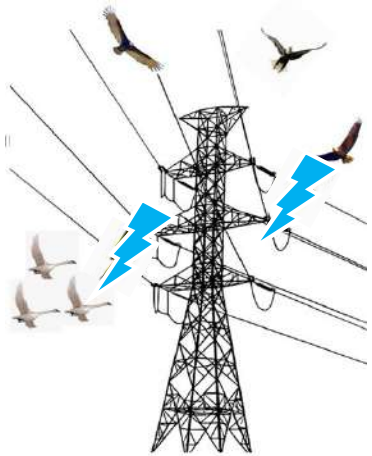
Number one risk!

Guano electrocution

Bird guano bridges phase/ground across insulation with guano

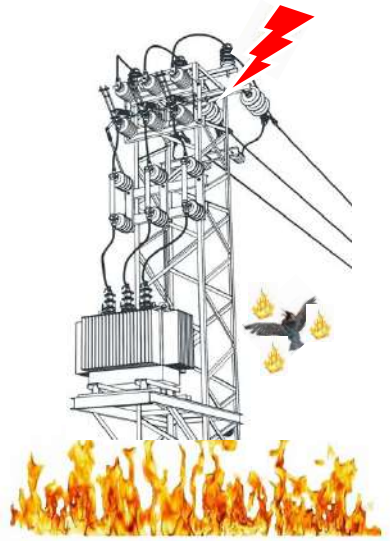
Collision

Birds collide with conductors or ground wires in between the towers.



Fire & Habitat destruction

Electrocution, initiated wild-fire



It is typical for utilities to report 20-35% of annual outages as being caused by wildlife. Not just birds….

What does wildlife vs Grid look like?

- Reporting
- Mortality
- Crippling injury
- Vested interests

Tens of millions of birds and animals are killed and maimed by electrocution and collision every year, causing hundreds of thousands of costly outages

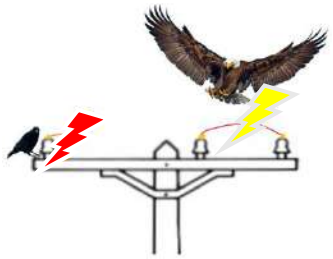
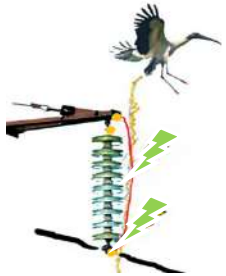
Wildlife Electrocution Mitigation strategy

Avoid & re-route	Pre-construction, decision to re-route to a less critical/sensitive area.
Avoid & Underground	Underground or bury the energised infrastructure.
Mitigate | Insulated system	Implementing a fully insulated overhead line design.
Mitigate | Safe line design	Design OHL structures with sufficient air space clearance to avoid electrocution of target species.
Mitigate | Retrofit	Use insulation and isolating barriers to make energy infrastructure safe for target species.
Mitigate | Divert	Use Nest diverters, and nesting platforms to redirect avian wildlife away from danger zone on structure.

Wildlife Electrocution Mitigation options

		Pre-construction	Upgrade / retrofit
Avoid & re-route	• Pre-construction, decision to re-route to a less critical/sensitive area. • Considerations; planning requirements, conservation impact, grid reliability.	✓	N/A
Avoid & Underground	• If routing though a critical wildlife or fire risk area is necessary – plan to bury or underground the energy infrastructure.	✓	✓
Mitigate | Insulated system	• If undergrounding is not possible, the line is passes through a wildlife sensitive or fire risk area, consider implementing a fully insulated OHL design.	✓	✓
Mitigate | Safe line design	• Design OHL structures with sufficient air space clearance to protect the largest endangered species under consideration.	✓	✓
Mitigate | Retrofit	• Use insulation and isolating barriers to make energy infrastructure wildlife safe for target species.	N/A	✓
Mitigate | Divert	• Use Nest diverters, and nesting platforms to redirect avian wildlife away from danger zone on structure. • Use of anticollision measures	✓	✓

Most common approaches?

	Contact electrocution	Guano electrocution	Collision	Fire & Habitat destruction
				
Avoid and & re-route	**			
Avoid & underground	Best approach **	Best approach **	Best approach **	Best approach **
Mitigate & insulate		**		Most common
Mitigate & redesign line	**	**		
Mitigate & retrofit	Most common	Most common	N/A	
Mitigate & divert			Most common	
Remove ground wire	N/A	N/A	**	N/A

Conflict in priorities are common, (Technical feasibility, cost and practicality(**))

Distribution grid Electrocution risk factors

Wildlife

- Size
- Behaviour (hunting, perching, roosting, flocking)
- Age (experience)
- Migratory routes

Structure

- Design & materials used
- Pole mounted equipment
- Earth arrangement
- Condition

Environment

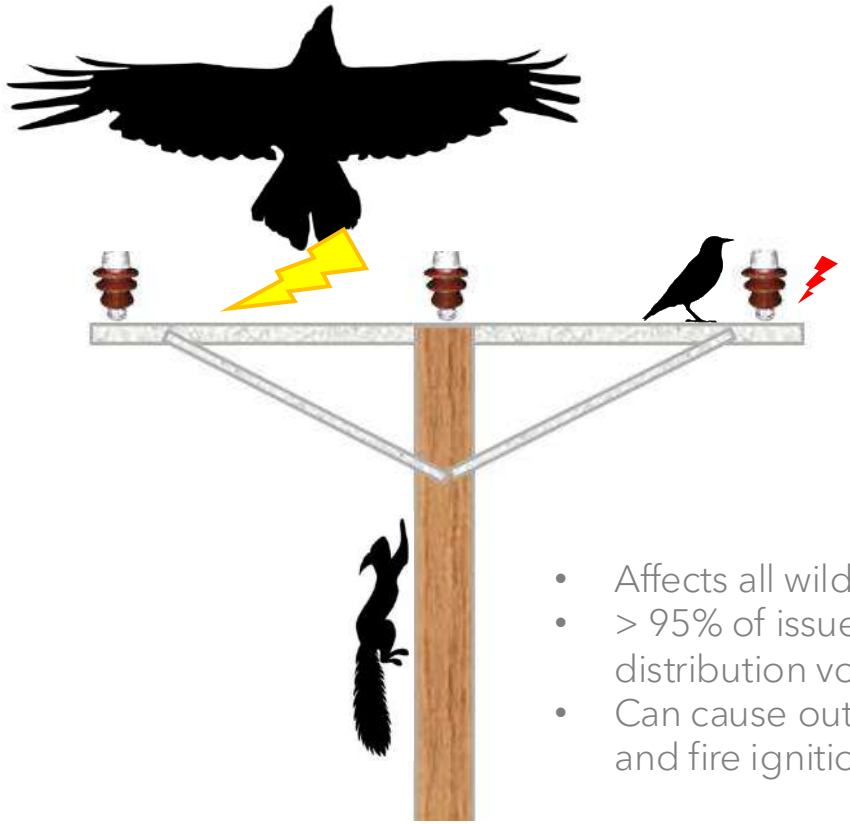
- Proximity to roosting, feeding, nesting locations
- Precipitation
- Wind
- Potential disturbance





Mature wildlife mitigation utilities, create spatial models to map risk over network footprint.

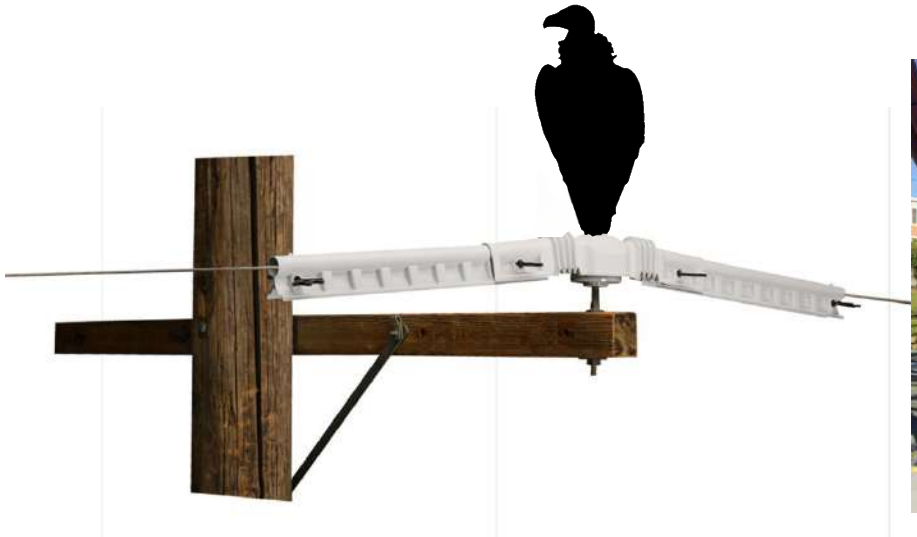
Contact electrocution risk



- Affects all wildlife
- > 95% of issues on distribution voltages
- Can cause outages and fire ignition.

Anything with a wingspan or body length > 20cm is at risk at distribution voltages.

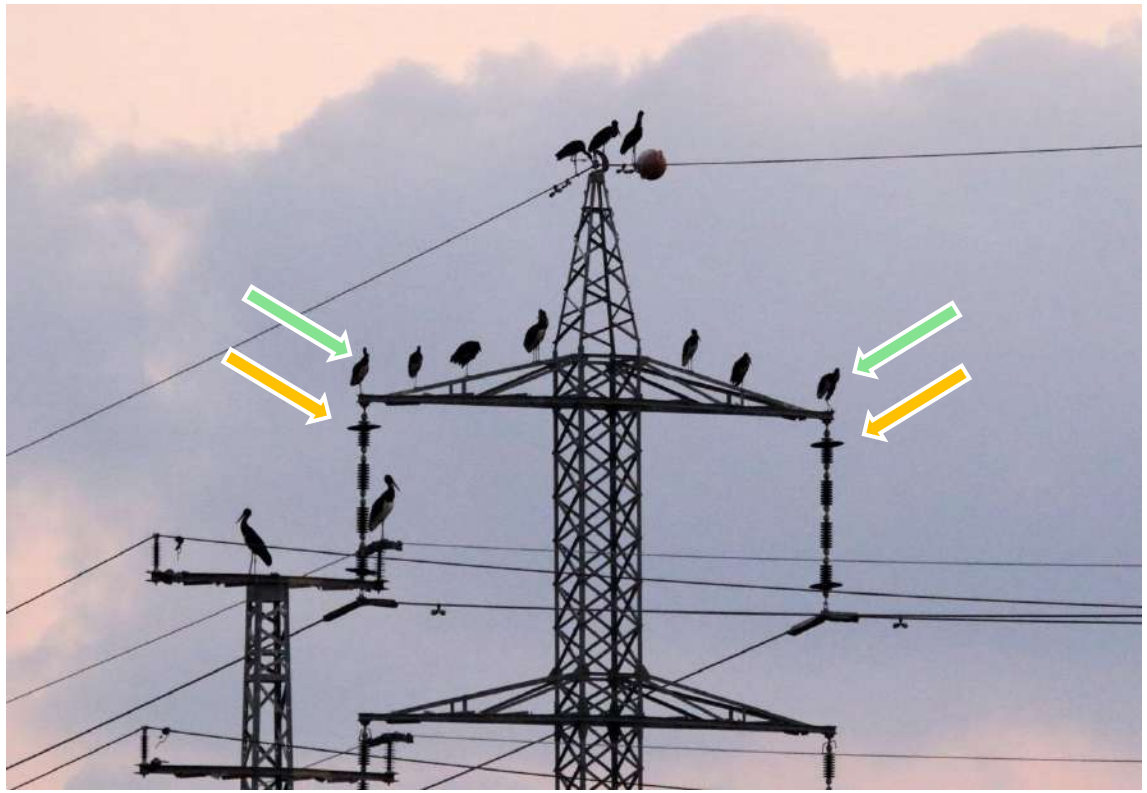
Contact electrocution - Mitigation

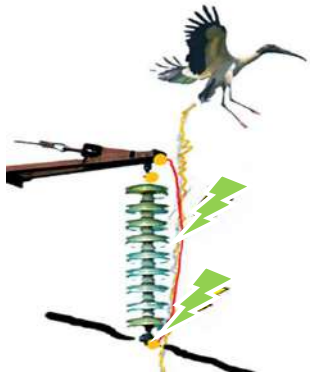


- Combine insulation and barriers to prevent bridging (contact)
- Use designs and materials that are durable (30+ years)
- Protection zone determined by the target species

>98% of all wildlife electrocution risks can be resolved (where used!), using retro-fitted insulation, barriers and deterrents

Guano electrocution





Features of a good guard!

- Big enough
- Resistance to uric acid, (bird poo)
- Wind resistant
- Durable (designed for 30+ years).

Occurrence: Transmission & Distribution structures and substations.

Use a barrier to prevent guano bridging of phase to ground elements.

A note on durability from grid operator perspective

- Durability design (fail safe)
- Durable materials (no deterioration)
- Suitable design(re-enterable)
- No weak links (cable ties, latches)
- Easy to installation, (live)
- Low / no maintenance.
- Should not influence other components negatively.

Solutions should have stable and predictable performance over its lifetime

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Is 30 years a reasonable lifetime expectation?

YES! - The design & material specifications for energised components should match the lifetime of the assets it is protecting.

To ensure 30+ years - for polymeric materials in the HV grid – a good specification is required including for example:

- UV evaluation per ASTM G-154
- Anti-tracking evaluation per ASTM D2303 or IEC 60587
- Thermal endurance per IEC 60216
- Flammability, self-extinguishing properties UL94 (only if relevant)

(Also critical: Commissioning inspection designed to detect common installer errors.)

30+year solutions are the norm in mature wildlife protection markets.

Summary

- It is impossible to separate avian wildlife from energy infrastructure.
- The overhead grid is expected to double by 2040 globally which will ensure billions of wildlife/grid interactions daily.
- Avoidance strategy is the most effective approach but is often not practically possible.
- Mitigation solutions are 98% effective in preventing electrocution and most fire risks.
- 30year + life time durability is a reasonable expectation.

A final note - approaches that build a collaboration (Utility / NgOs / application experts) have the best outcomes!

Pre-planning (avoidance) | Mortality reduction(retrofit efficacy) | Reliability (technical specification).

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Back up

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A note on deterrents for specific challenges

(a)

(b)

(b)

(c)

a) Snakes in substations – electric fences

b) Persistent roosting bird pressure, (nesting) – Multi-sensory optical gel.

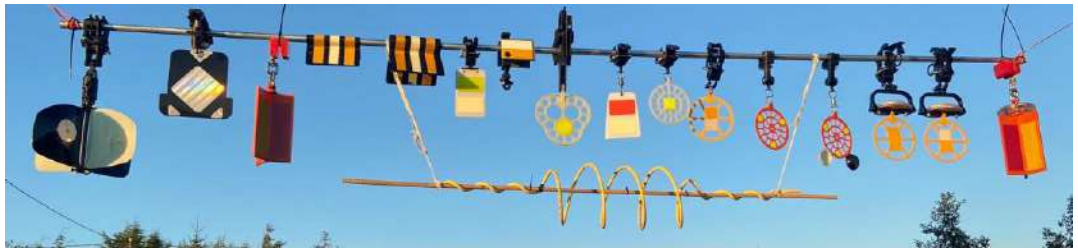
c) Laser beams

Buyers guide

Buyers guide: Global best practices to reduce risk of avian collisions with Energy, Rail and Telecom overhead lines and structures.

60 page technical guide for utility engineers covering all aspects of avian collision risk and mitigation.

- Collision risk scenarios
- Avian behaviour, biology and risk factors
- Technology available and sample use cases
- Recommended qualification testing for longevity
- Summary of solutions available in the market



Sign up to receive a free digital copy:

https://scientias-energy.com/knowledge/buyers-guides/

References & credits

- *Juan Serratosa, Steffen Oppel et al, (2024), Tracking data highlight the importance of human-induced mortality for large migratory birds at a flyway scale, Biological Conservation, Volume 293, 2024,110525, ISSN 0006-3207, https://doi.org/10.1016/j.biocon.2024.110525.*
- *Youtube channel @cgtn - Goose gets fried after hitting power line in Illinois (https://youtu.be/Mw7mR6Hjew4?si=sO9WmsFZMNI5GGg0)*
- *Youtube channel @PolarisHockey90– Cooked Goose (https://youtu.be/9mUD9brpa0g?si=FNibes_i5Ajj_GvK)*
- *Youtube channel @quebecavoldoiseau7729 - Goose Killed by Powerline !!! (https://youtu.be/316Zx_nrx6w?si=hy8XkEYtjra6pQMk)*
- *Youtube channel @EnvironmentalBro Marsh Owl Powerline Collision 2018 (https://youtu.be/kBWxhf91dps?si=kEa7zNWg6QngoE3V)*
- *Youtube channel, The discovery of life, Bird Electrocution - White Tailed Eagle in Hungary - Akkuyruklu Kartalın Çarpılması Macaristan, https://youtu.be/ql7JNlqn6GE?si=iGpXL-5mxOyWmRun*
- *Youtube channel, Free Power, Bird explosion, https://youtu.be/SFMiPtubk0Q?si=5OaF9xehtUkg5zdb*

Thanks to the following manufacturers for supplying images for use in today's session:

Bird Barrier America, Transgard USA, TE Connectivity, Kaddas

Thank –you for your participation.

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Presentations

Technologies and solutions to reduce bird mortality around energy infrastructure

Brian McGowan

Founder & Managing Director

Scientias Ireland Limited

Dr. Moritz Mercker

Managing Director

Bionum GmbH

Lyubka Vasileva

Team Leader Innovation & EU Projects

EVN Bulgaria

Rainhard Raab

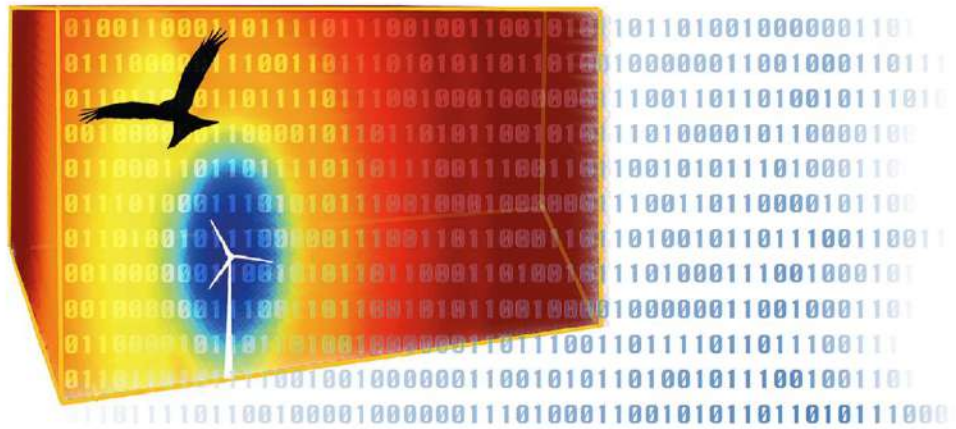
Deputy CEO

TB Raab

Probabilistic predictions of bird collisions at wind turbines and power lines

Moritz Mercker (Bionum)

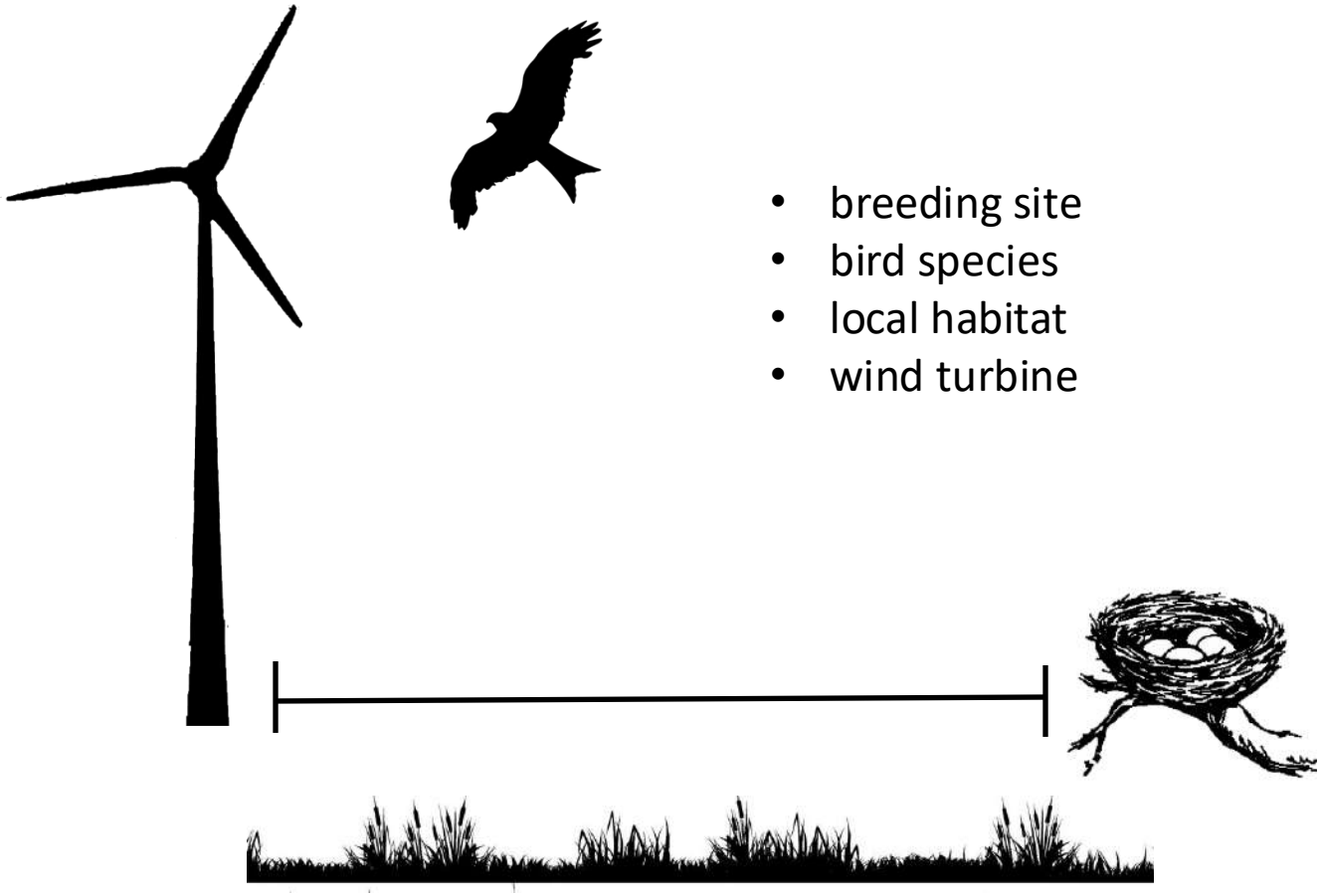
in collaboration with Jan Blew & Jannis Liedtke & Thilo Liesenjohann (BioConsult SH) as well as TB Raab



Wingspan Conference 2024

founded by
BfN and **HMUKLV**

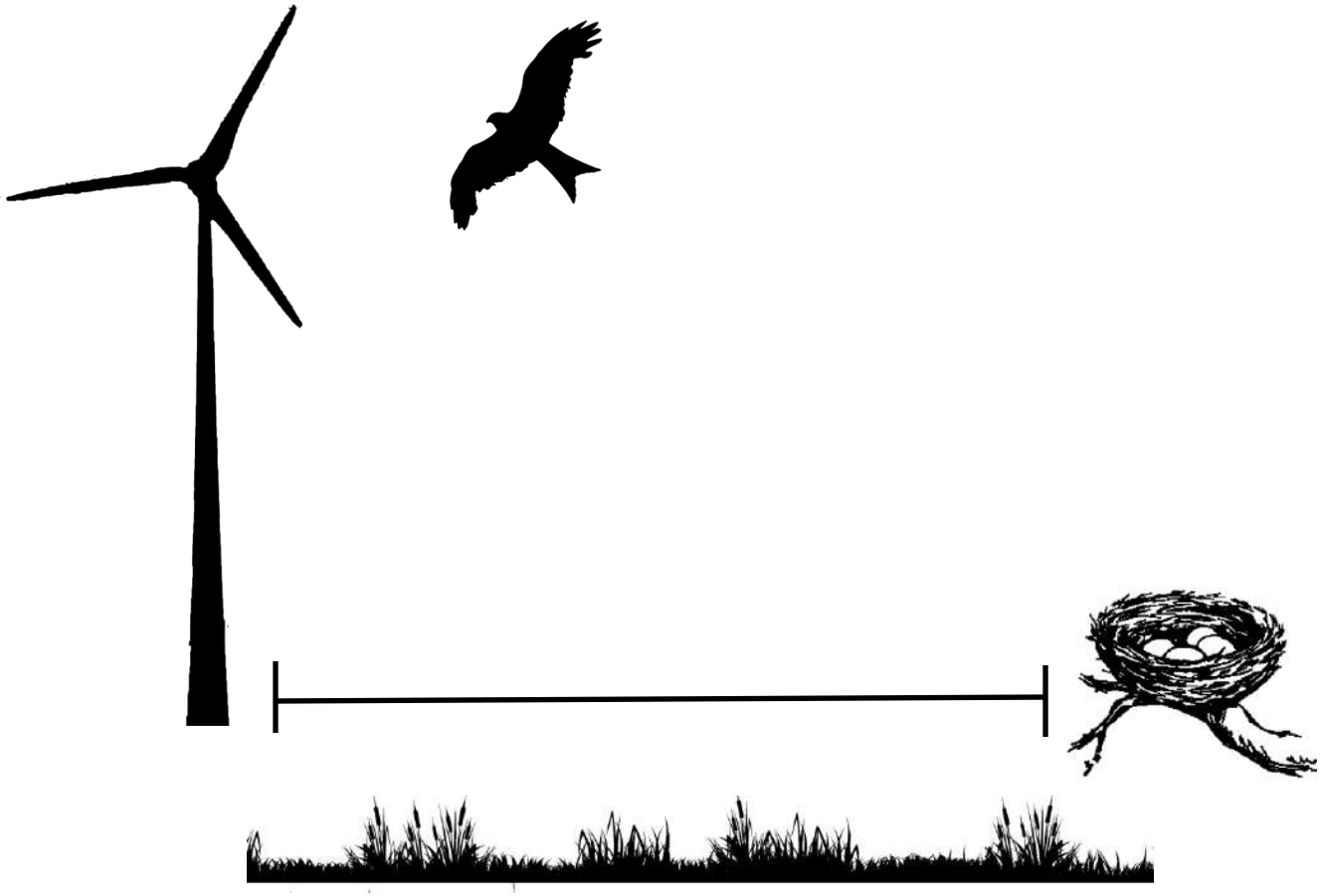
research question



- breeding site
- bird species
- local habitat
- wind turbine

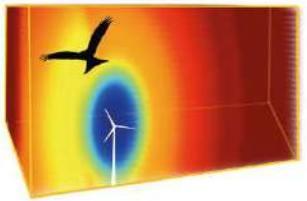
Can we predict/calculate the collision risk?

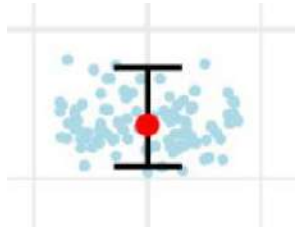
What are the advantages of the calculation?



previously:

Calculation



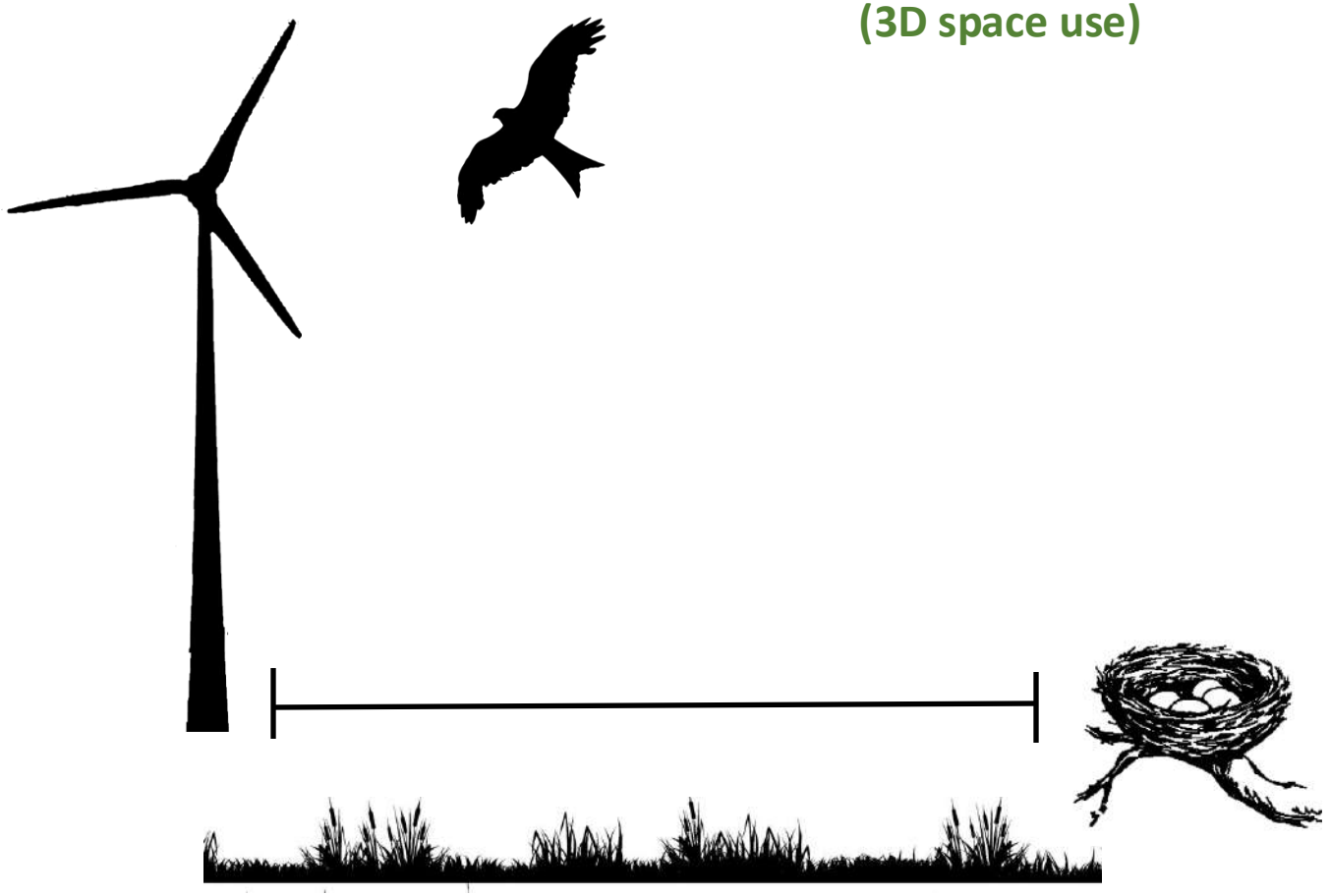


- fast
- standardized & empirically based
- simple (quantitative) result

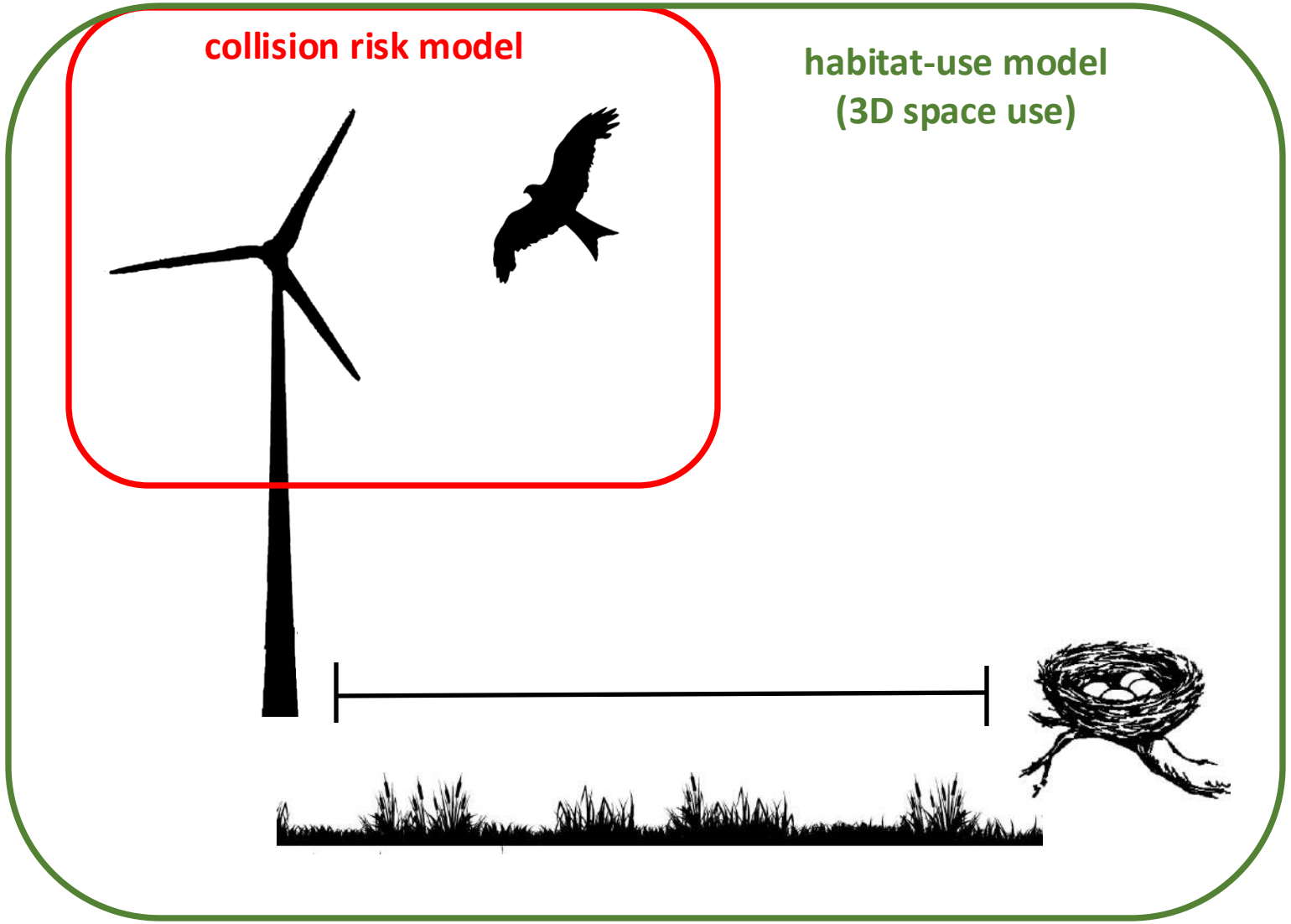
- 2 projects (pilot project & follow-up study)
- intensely validated by various experts

modelling concept

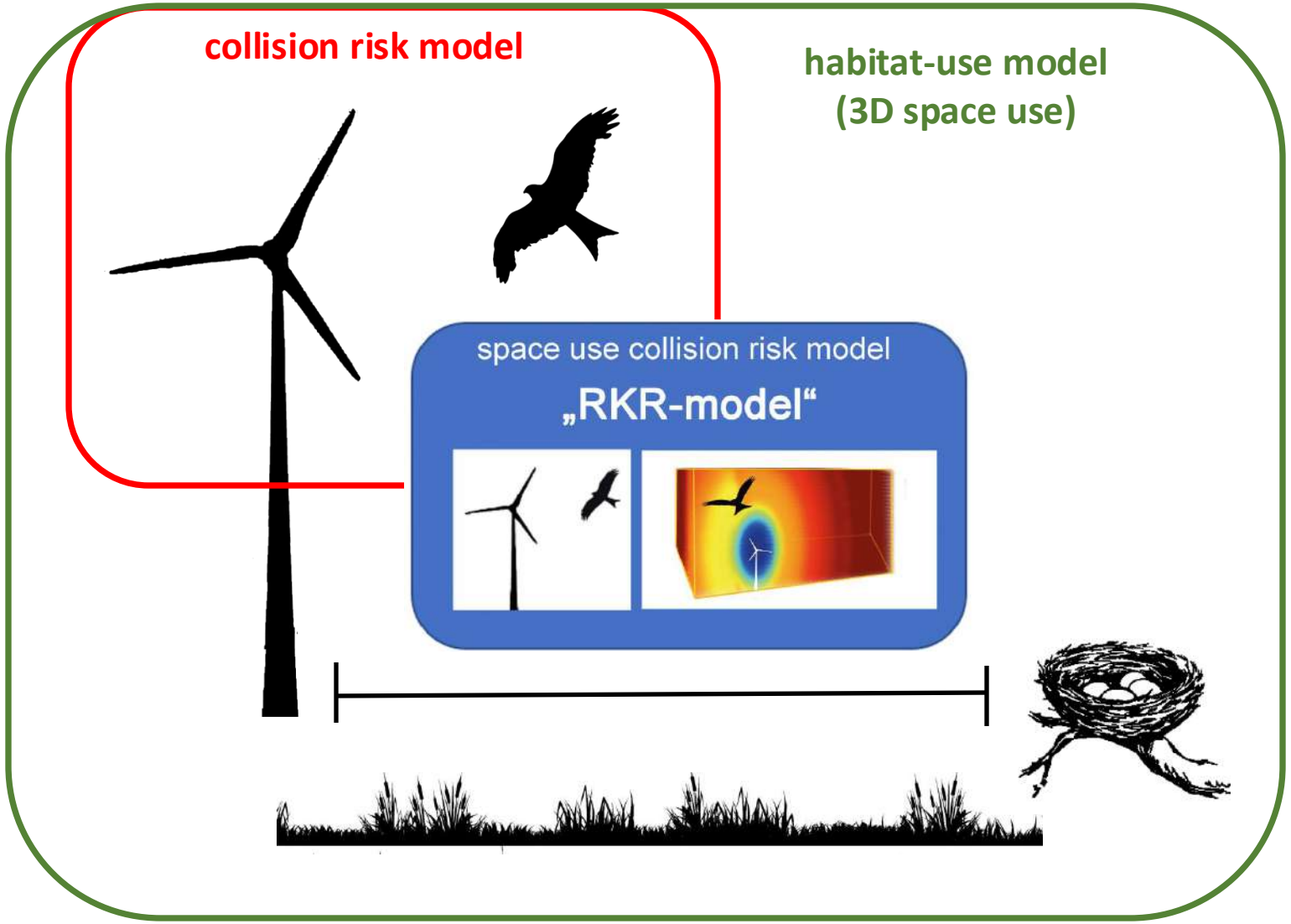
habitat-use model
(3D space use)



modelling concept



modelling concept

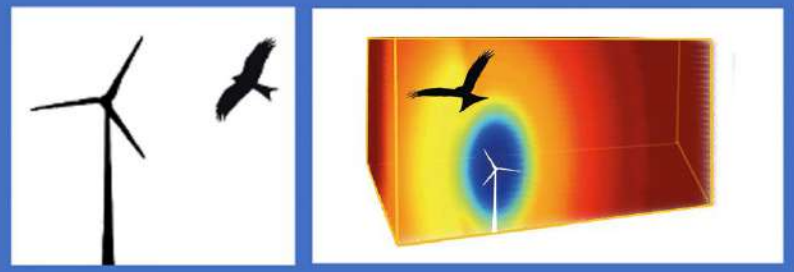


modelling concept

collision risk model

space use collision risk model

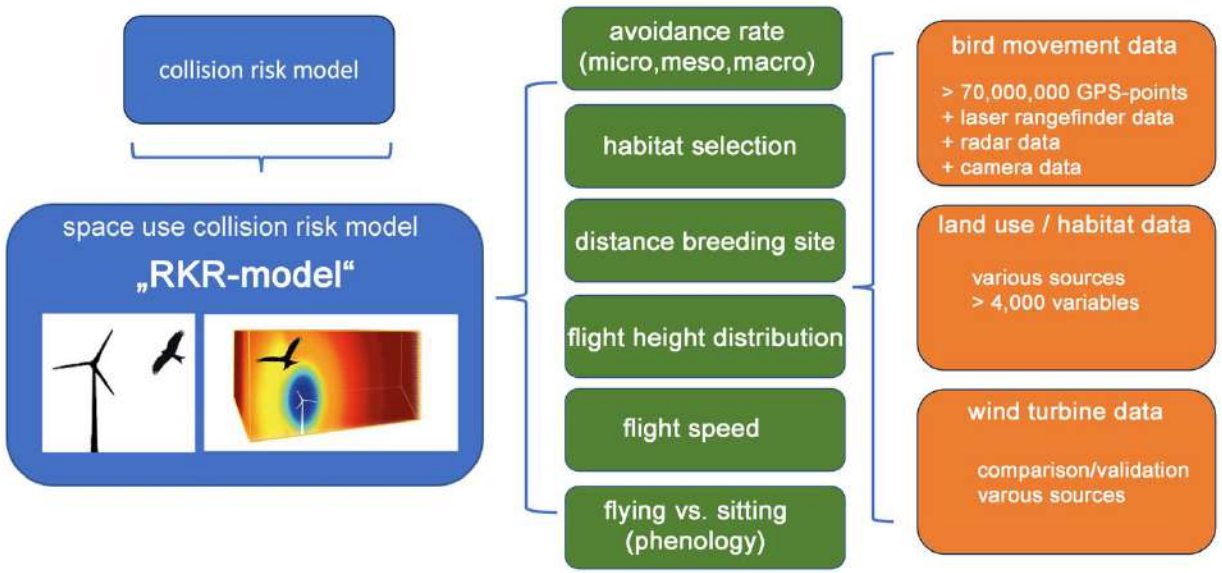
„RKR-model“

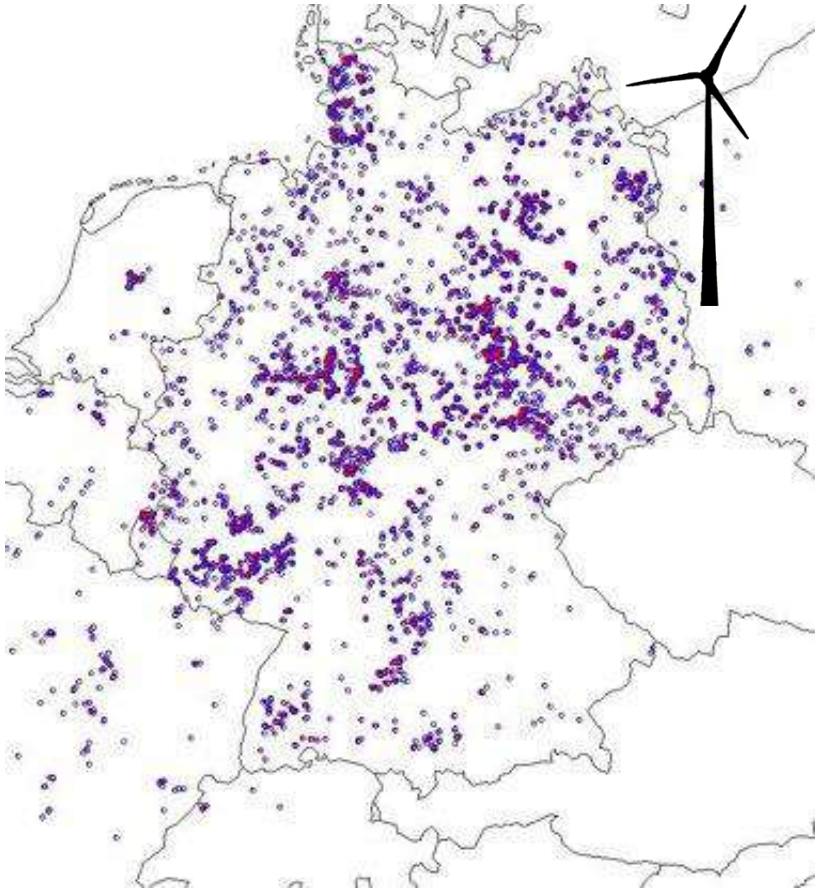


- avoidance rate (micro,meso,macro)
- habitat selection
- distance breeding site
- flight height distribution
- flight speed
- flying vs. sitting (phenology)

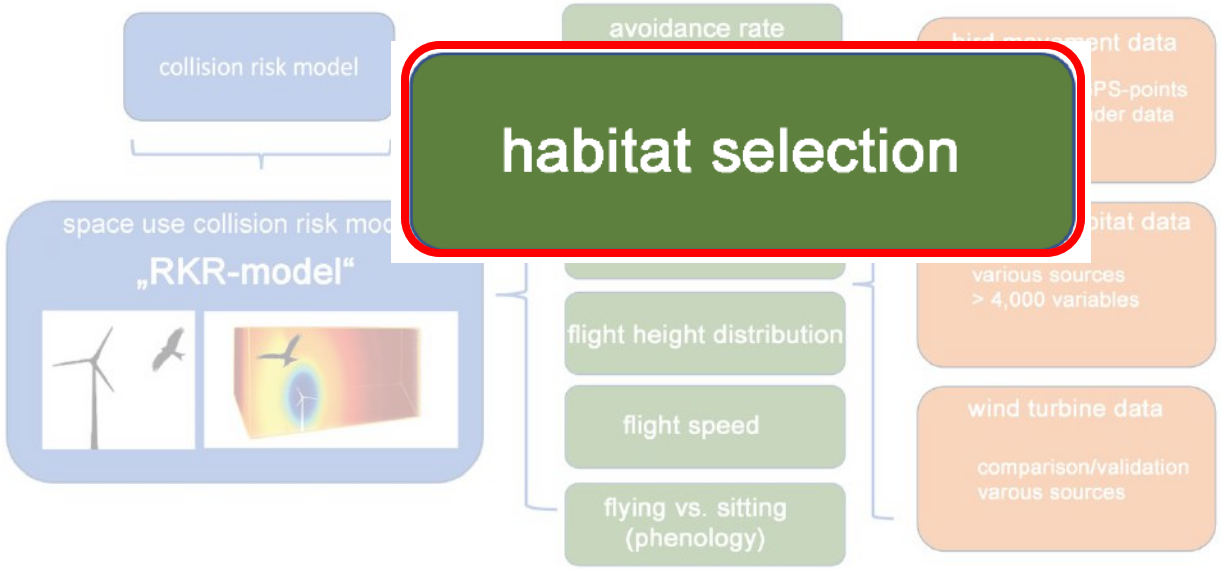
- **bird movement data**
  - > 70,000,000 GPS-points
  - + laser rangefinder data
  - + radar data
  - + camera data
- **land use / habitat data**
  - various sources
  - > 4,000 variables
- **wind turbine data**
  - comparison/validation
  - varous sources

modelling concept

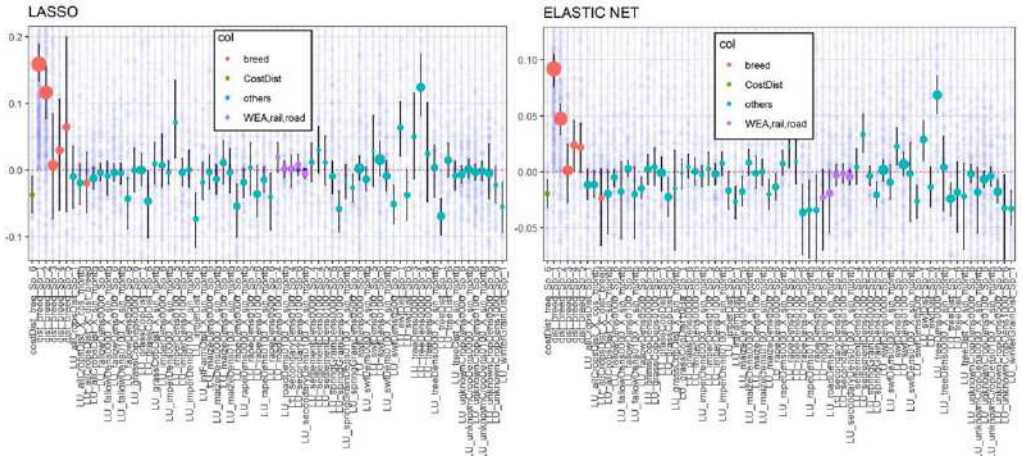


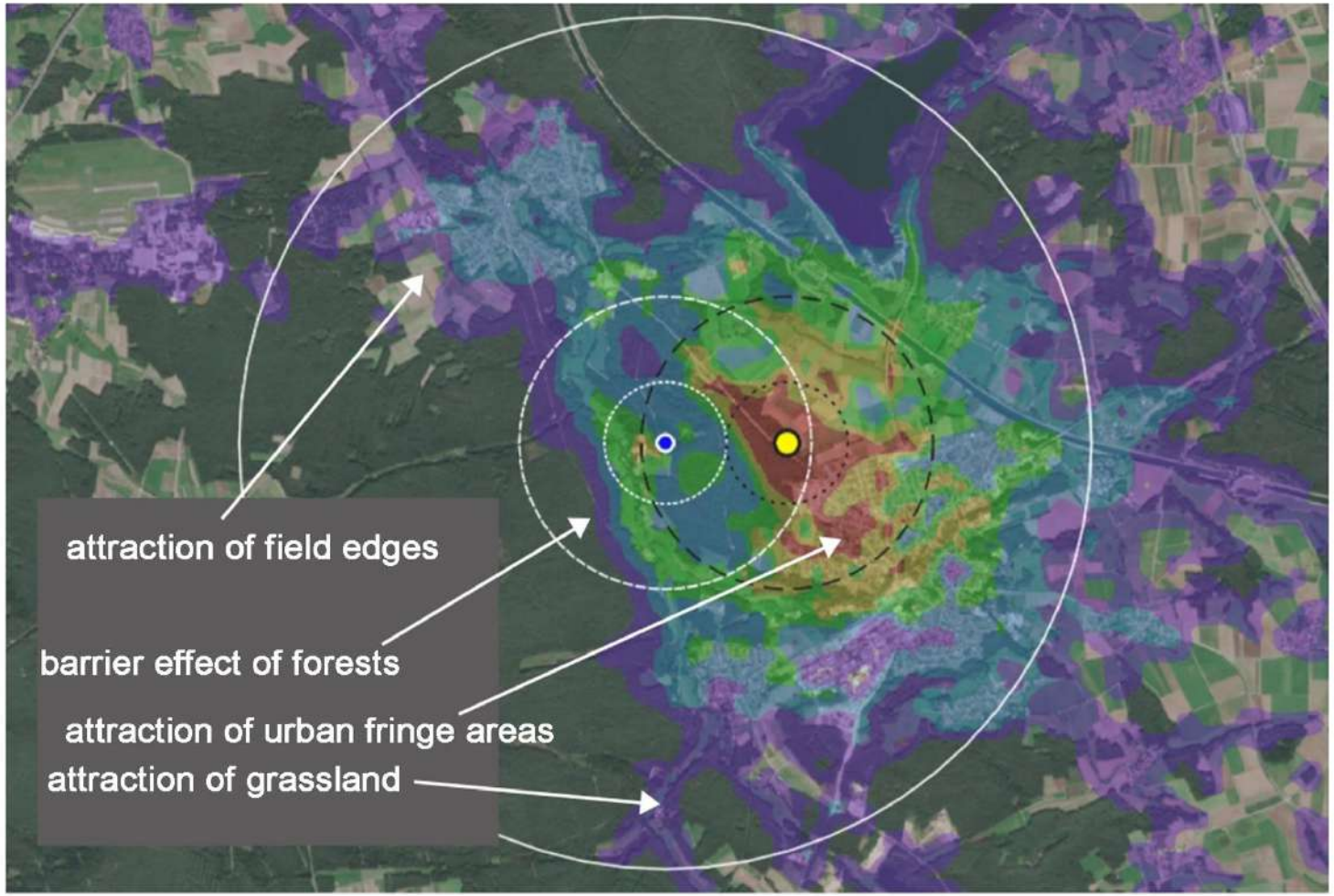


habitat selection



- > 4,000 variables tested
- modern variable selection methods
- → habitat use prediction model





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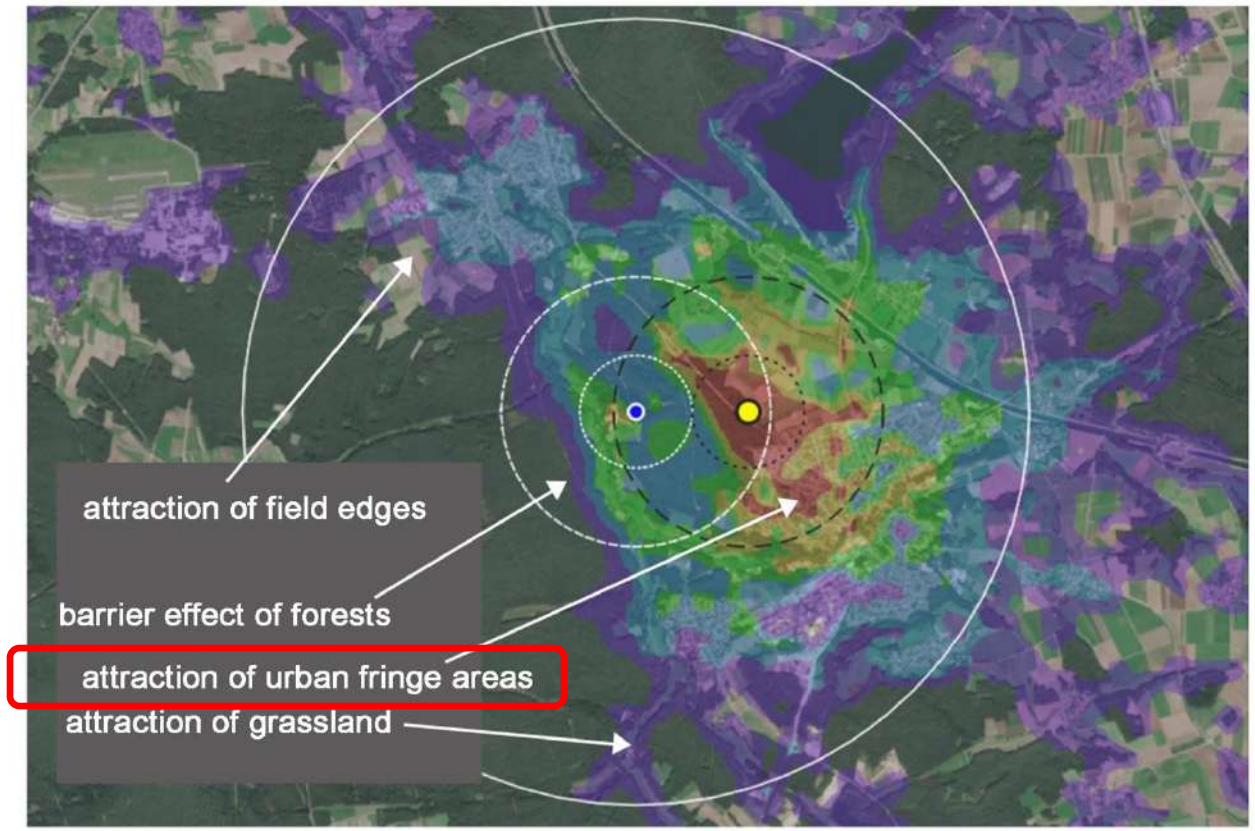

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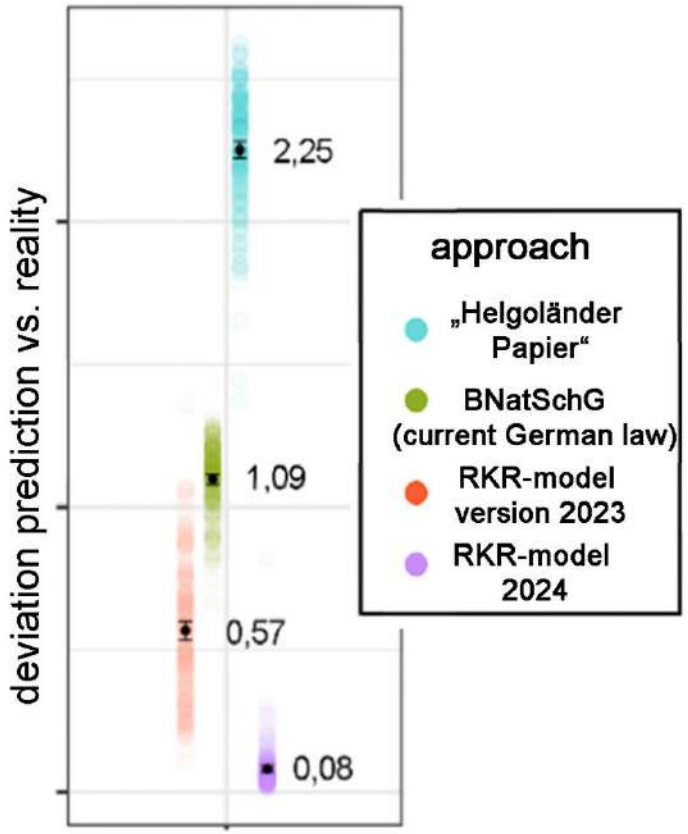

- avoidance rate (micro,meso,macro)
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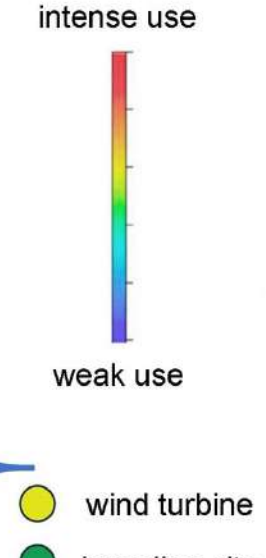
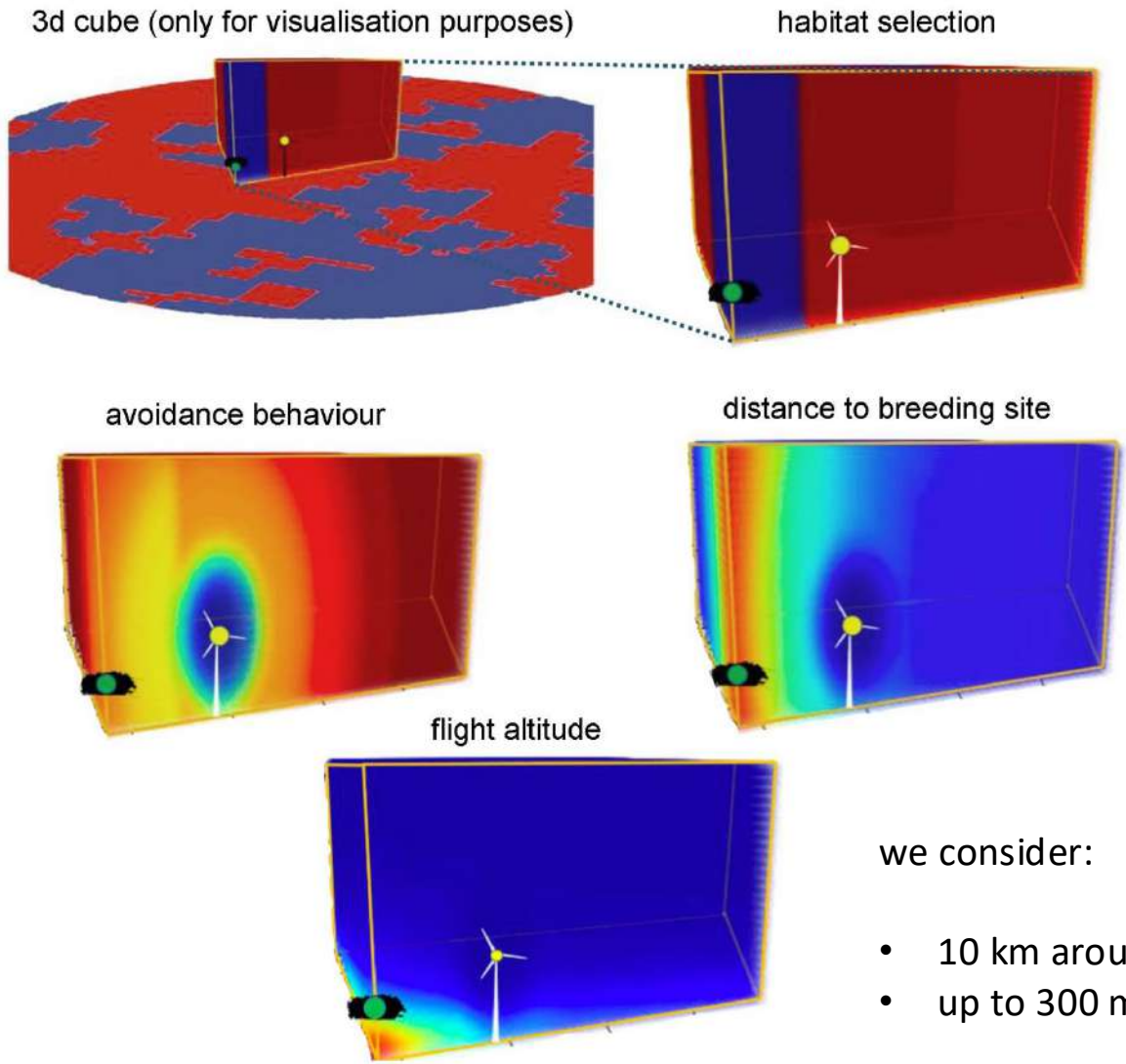
- flying vs. sitting (phenology)





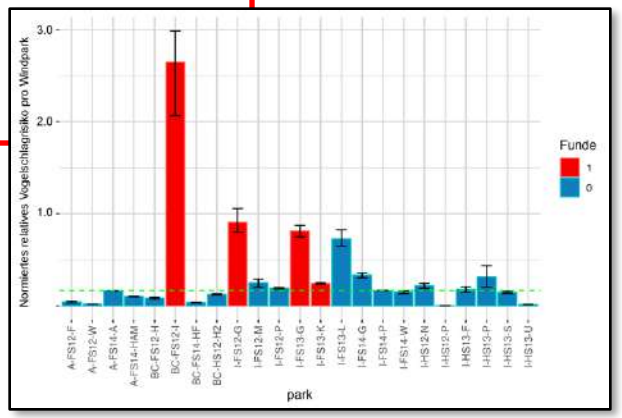
we consider:

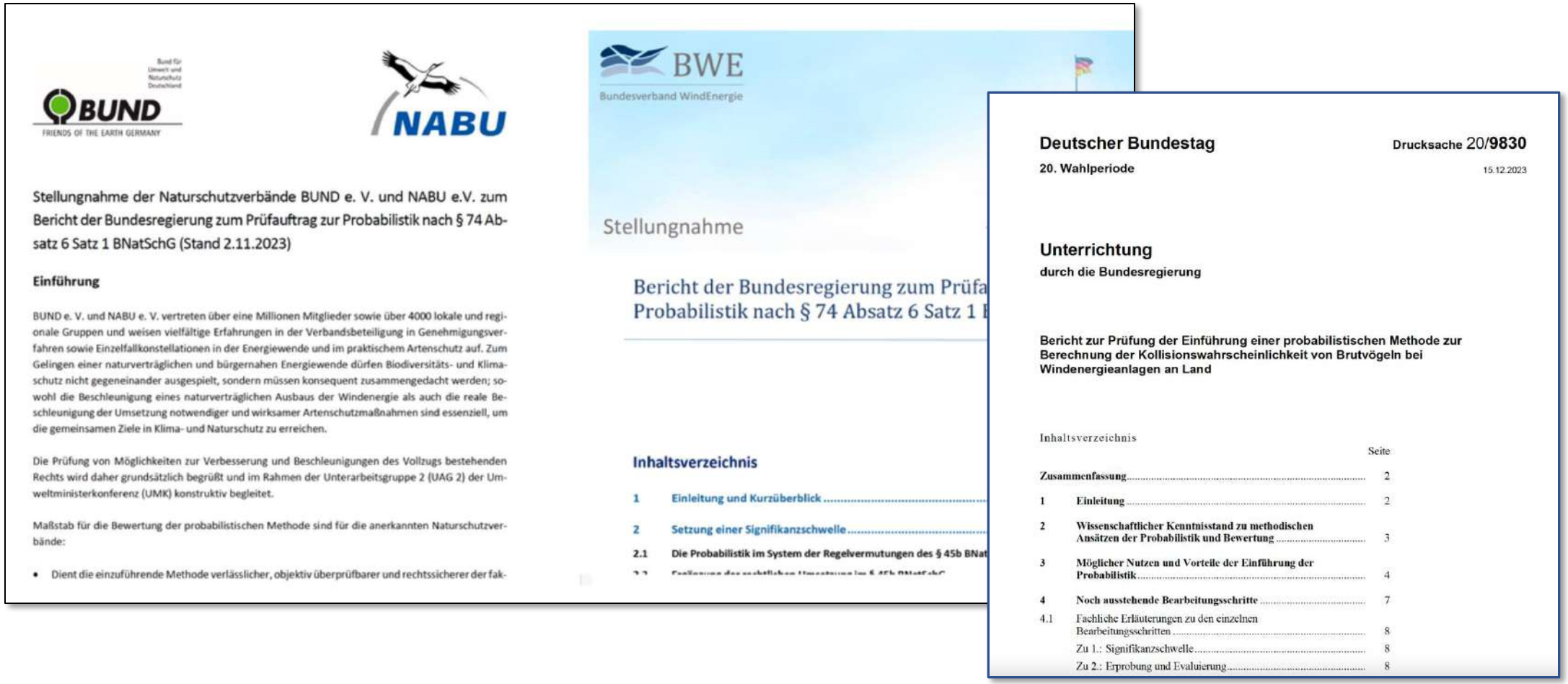
- 10 km around breeding site
- up to 300 m altitude

validation RKR-model

Empirical external studies e. g. on collision victims

- PROGRESS-study
- Bellebaum *et al* (2013)
- Reichenbach *et al* (2023)
- LIFE EUROKITE data (2024)





BUND
FRIENDS OF THE EARTH GERMANY

NABU

Stellungnahme der Naturschutzverbände BUND e. V. und NABU e.V. zum Bericht der Bundesregierung zum Prüfauftrag zur Probabilistik nach § 74 Absatz 6 Satz 1 BNatSchG (Stand 2.11.2023)

Einführung

BUND e. V. und NABU e. V. vertreten über eine Millionen Mitglieder sowie über 4000 lokale und regionale Gruppen und weisen vielfältige Erfahrungen in der Verbandsbeteiligung in Genehmigungsverfahren sowie Einzelfallkonstellationen in der Energiewende und im praktischem Artenschutz auf. Zum Gelingen einer naturverträglichen und bürgernahen Energiewende dürfen Biodiversitäts- und Klimaschutz nicht gegeneinander ausgespielt, sondern müssen konsequent zusammengedacht werden; sowohl die Beschleunigung eines naturverträglichen Ausbaus der Windenergie als auch die reale Beschleunigung der Umsetzung notwendiger und wirksamer Artenschutzmaßnahmen sind essenziell, um die gemeinsamen Ziele in Klima- und Naturschutz zu erreichen.

Die Prüfung von Möglichkeiten zur Verbesserung und Beschleunigungen des Vollzugs bestehenden Rechts wird daher grundsätzlich begrüßt und im Rahmen der Unterarbeitsgruppe 2 (UAG 2) der Umweltministerkonferenz (UMK) konstruktiv begleitet.

Maßstab für die Bewertung der probabilistischen Methode sind für die anerkannten Naturschutzverbände:

- Dient die einzuführende Methode verlässlicher, objektiv überprüfbarer und rechtssicherer der fak-

BWE
Bundesverband WindEnergie

Stellungnahme

Bericht der Bundesregierung zum Prüfa
Probabilistik nach § 74 Absatz 6 Satz 1 B

Inhaltsverzeichnis

1 Einleitung und Kurzüberblick
2 Setzung einer Signifikanzschwelle
2.1 Die Probabilistik im System der Regelvermutungen des § 45b BNat

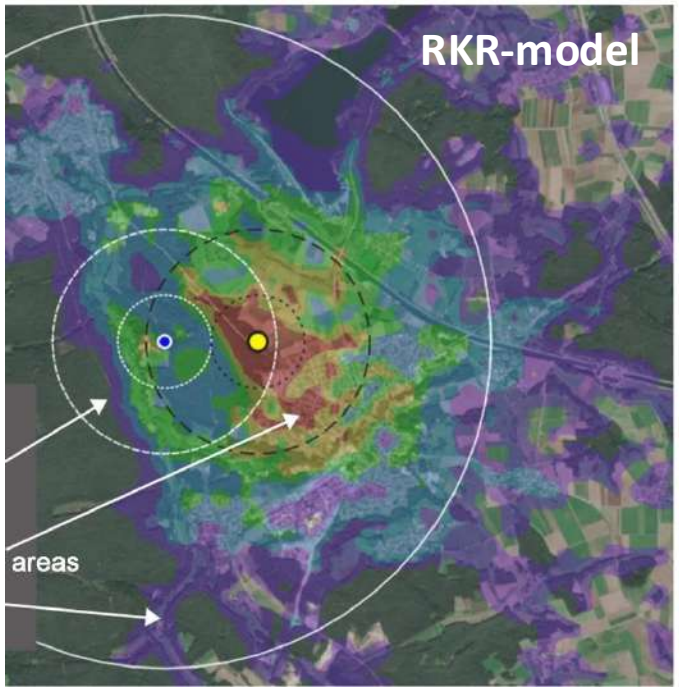
Deutscher Bundestag Drucksache 20/**9830**
20. Wahlperiode 15.12.2023

Unterrichtung
durch die Bundesregierung

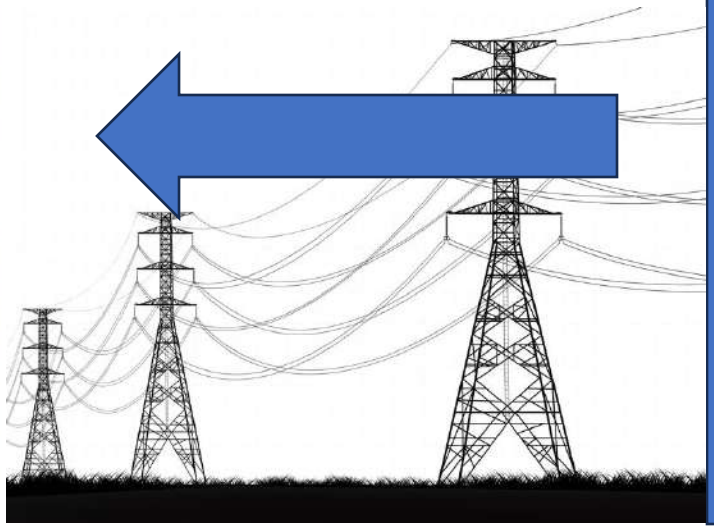
Bericht zur Prüfung der Einführung einer probabilistischen Methode zur Berechnung der Kollisionswahrscheinlichkeit von Brutvögeln bei Windenergieanlagen an Land

Inhaltsverzeichnis

in progress: collision risk at power lines

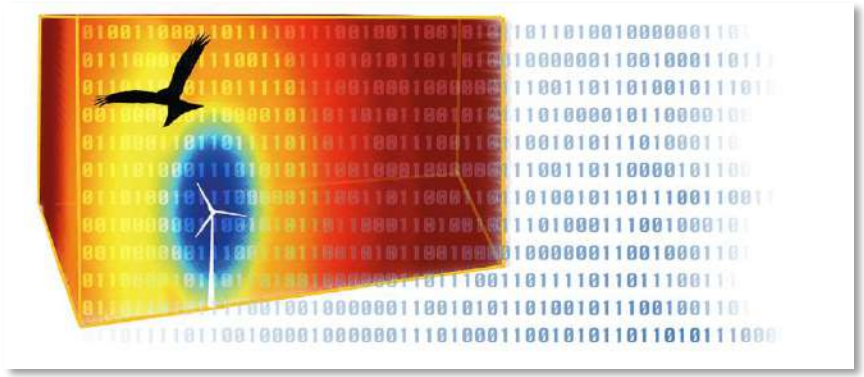


bird strike risk per unit time in the surrounding of power lines



LIFE EUROKITE data

Thank you for your attention and to:



Jan Blew, Thilo Liesenjohann, Jannis Liedtke

as well as

Rainhard Raab

Download pilot- and follow-up study :
https://www.naturschutz-energiewende.de/fachwissen/probabilistik-in-der-signifikanz-bewertung/

contact: **Moritz Mercker** www.bionum.de / mmercker@bionum.de

Presentations

Technologies and solutions to reduce bird mortality around energy infrastructure

Brian McGowan

Founder & Managing Director

Scientias Ireland Limited

Dr. Moritz Mercker

Managing Director

Bionum GmbH

Lyubka Vasileva

Team Leader Innovation & EU Projects

EVN Bulgaria

Rainhard Raab

Deputy CEO

TB Raab

Project LIFE Safe Grid for Burgas

Lyubka Vasileva
EVN Bulgaria

Project “LIFE20 NAT/BG/001234 LIFE Safe Grid for Burgas” is funded by the EC LIFE Program

Birds and overhead electricity distribution grid

Imperial eagle, picture: Svetoslav Spasov BSPB

Risks

- Birds use medium-voltage overhead power lines to sit and rest
- When spinning their wings, the birds can touch simultaneously a live conductor and a grounded part of the pole

EVN Bulgaria's concept for medium voltage grid (20 kV):

- When a new building a new grid, underground cable lines are designed (cable installation)
- In special occasions when replacing overhead lines are used insulated conductors

Long-standing cooperation between EVN Bulgaria and BSPB

Memorandum of Cooperation 2011

- Goal: preserving the protected bird species in Southeast Bulgaria

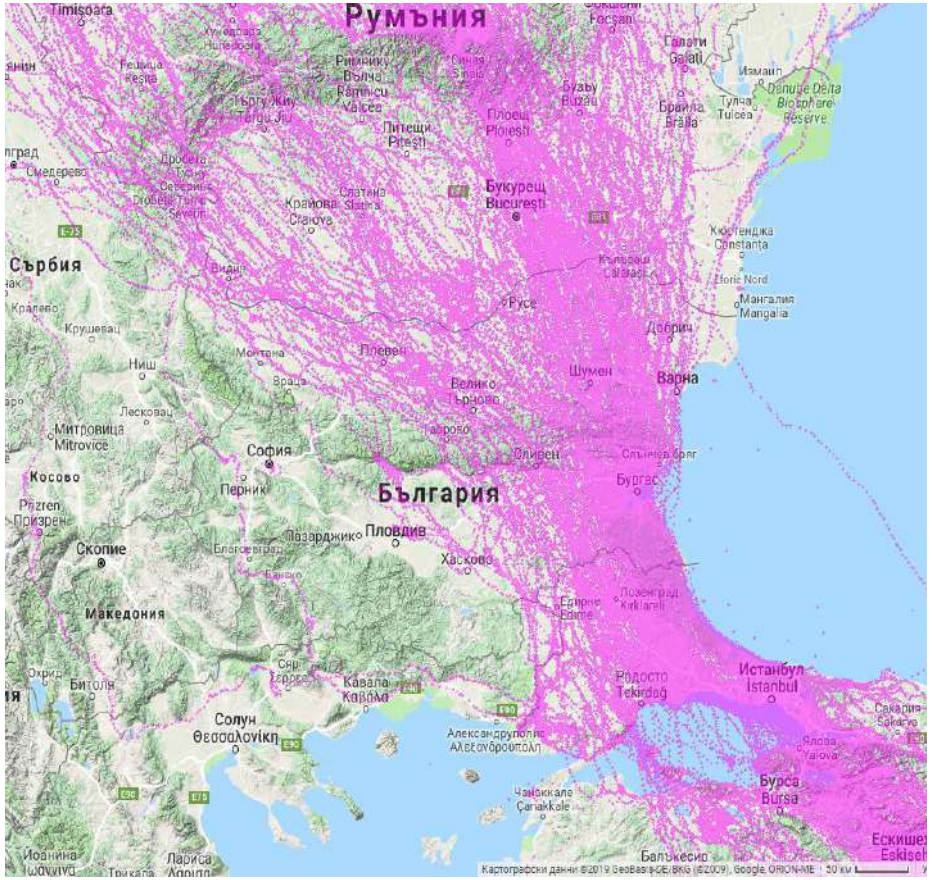
Project Save the Raptors 2009-2013

- Goal: conservation of the Imperial Eagle and Saker Falcon
- Secured more than 590 electric poles

Project "LIFE for the Burgas lakes"
2010-2013.

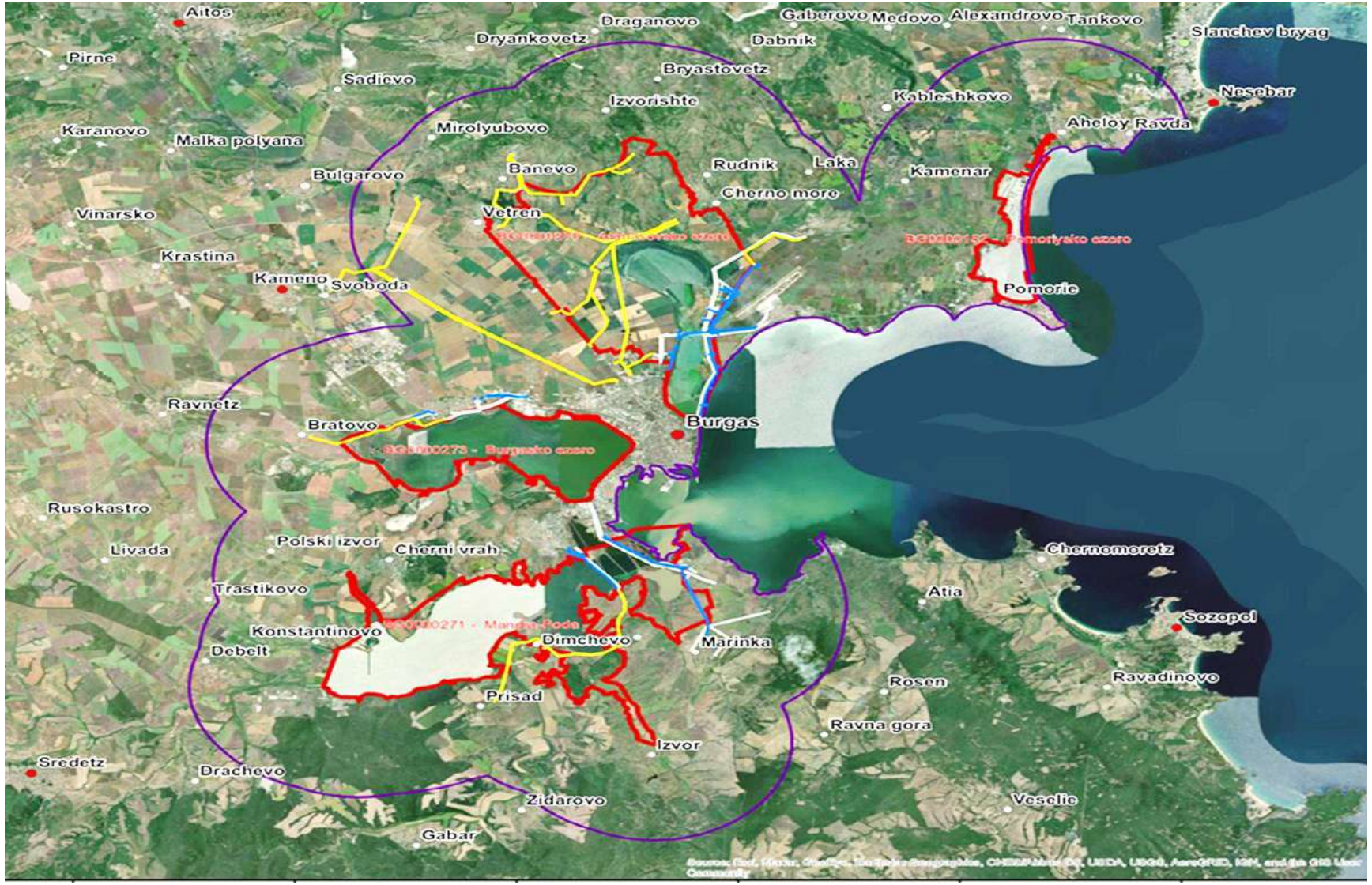
- 60 insulations and 760 light reflectors (electrical diverters) mounted along the grid - for the first time in Bulgaria

Via Pontica - migration route of the birds



- Via Pontica, the second most important migration route of wild birds in Europe
- The route connects Europe and Africa and passes through more than 20 countries
- Over 550 000 birds are passing during the spring migration from Africa to Europe
- Over 78% of the entire world population of the white stork passes through this migration route
- In the entire Bulgarian section of Via Pontica the largest gathering of birds is monitored in the area of Burgas Lakes

Birds and grid: a major challenge in the migratory and lake areas around Burgas



Project LIFE Safe Grid for Burgas

Photo: Internet

- Beneficiary: Elektrorazpredelenie Yug (part of EVN)
- Partner: BSPB
- Second major LIFE project of Elektrorazpredelenie Yug
- **NATURA 2000 areas (Burgas lakes)**
  - Atanasovsko Lake, Burgas Lake, Mandra - Poda, Pomorie lake
- Period: 2021 – 2026
- Budget: EUR 5.5 million
  - 75% EC funding
  - 25% Elektrorazpredelenie Yug funding

Operating activities in respect of Project LIFE Safe Grid for Burgas

Technical

52 km of overhead power lines will be installed underground

96 km of overhead power lines will be secured by protected by protective insulations

18 transformer stations and 1 switching station will be built

Over 2 000 light reflectors (electrical diverters) will be mounted

Ecological

Surveys for protected bird species

Prepare a Geographic Information System (GIS) with a database

Communication

Website, brochures, seminars, information to local organizations and media, etc.

Administrative

Administrative and financial management of the project

Reporting to the EC

Implementation of project activities 1/3

Since 2022 until now 1 678 dangerous poles have been secured

Implementation of project activities 2/3

400 light diverters have been installedFor the first time in Bulgaria, a drone installation was carried out

Implementation of project activities 2/3

Started cabling works on a total of 50 km of power lines

LIFE SAFE GRID FOR BURGAS

Thank you for your attention!

https://lifesafegridforburgas.bg/

Presentations

Technologies and solutions to reduce bird mortality around energy infrastructure

Brian McGowan

Founder & Managing Director

Scientias Ireland Limited

Dr. Moritz Mercker

Managing Director

Bionum GmbH

Lyubka Vasileva

Team Leader Innovation & EU Projects

EVN Bulgaria

Rainhard Raab

Deputy CEO

TB Raab

Video monitoring of power lines

RAINHARD RAAB, BSC, DEPUTY CEO,TB RAAB GMBH

15.10.2024

WINGSPAN CONFERENCE

BRUSSELS, BELGIUM

Outline

TB Raab
Technisches Büro für Biologie

Project areas

Materials and methods

Results and discussion

Bird collisions

Conclusions

Video monitoring in 5 project areas

Overview of projects since 2012

Project areas

50 Hertz (Germany)

- **Krajnik-Vierraden**: 12/2017 – 12/2018

APG (Austria)

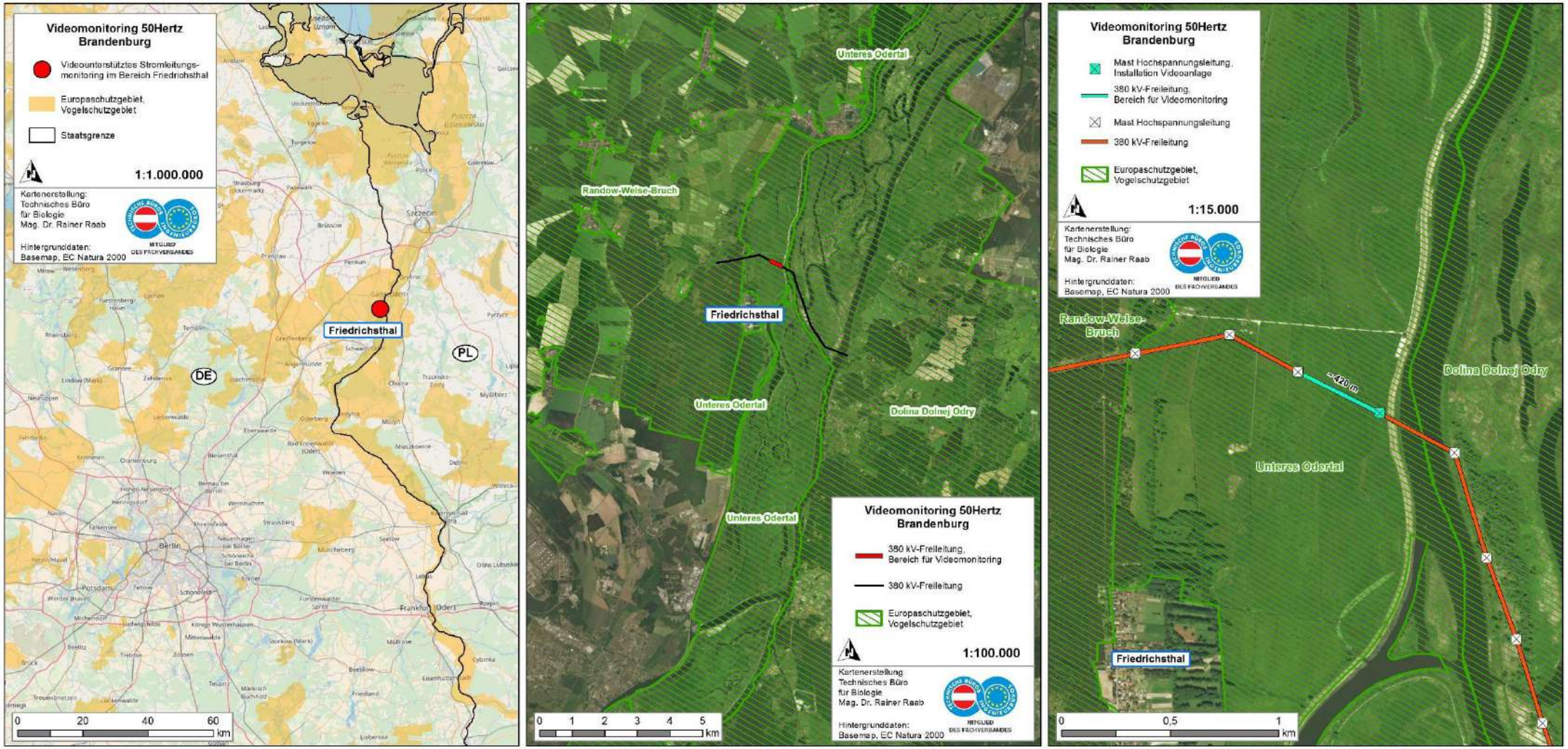
- **Danube floodplains**: 09/2020 – 01/2023
- Enns-Ernsthofen: 12/2012 – 12/2018 & 02/2023 – 03/2024
- Braunau am Inn: 08/2020 – 06/2023
- Gailitz: 06/2020 – 04/2021

Objectives

- ✓ How do **power line markings**, **time** of day, **season** and **flock size** influence the behaviour and collision risk of birds?
- ✓ Which **species** are particularly at **risk**

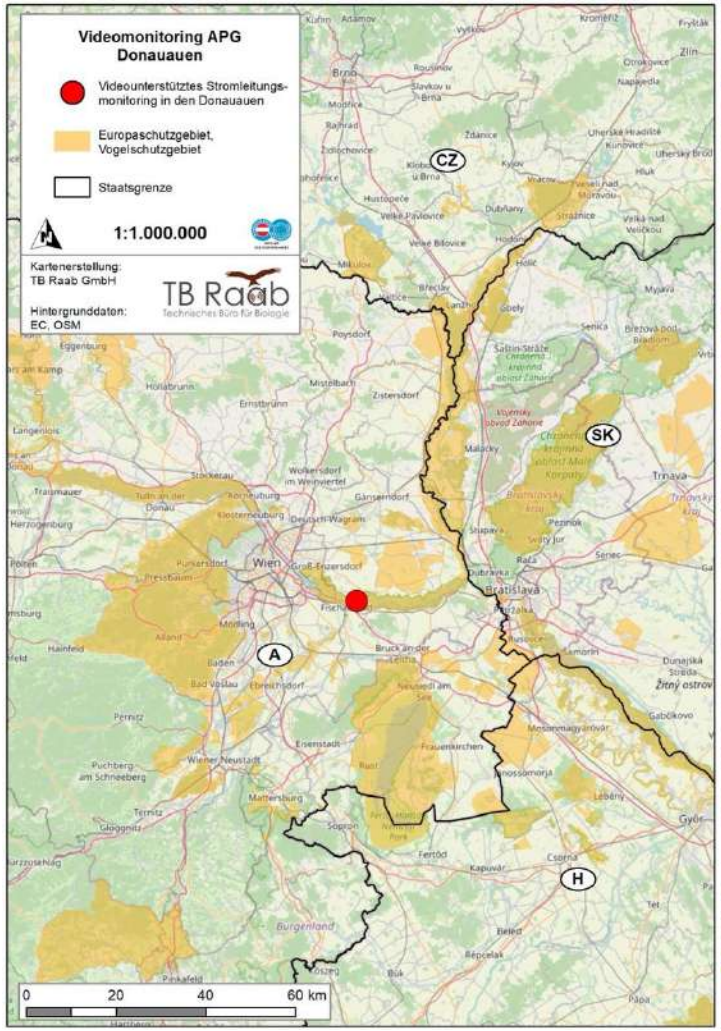
380 kV-power line Krajnik–Vierraden

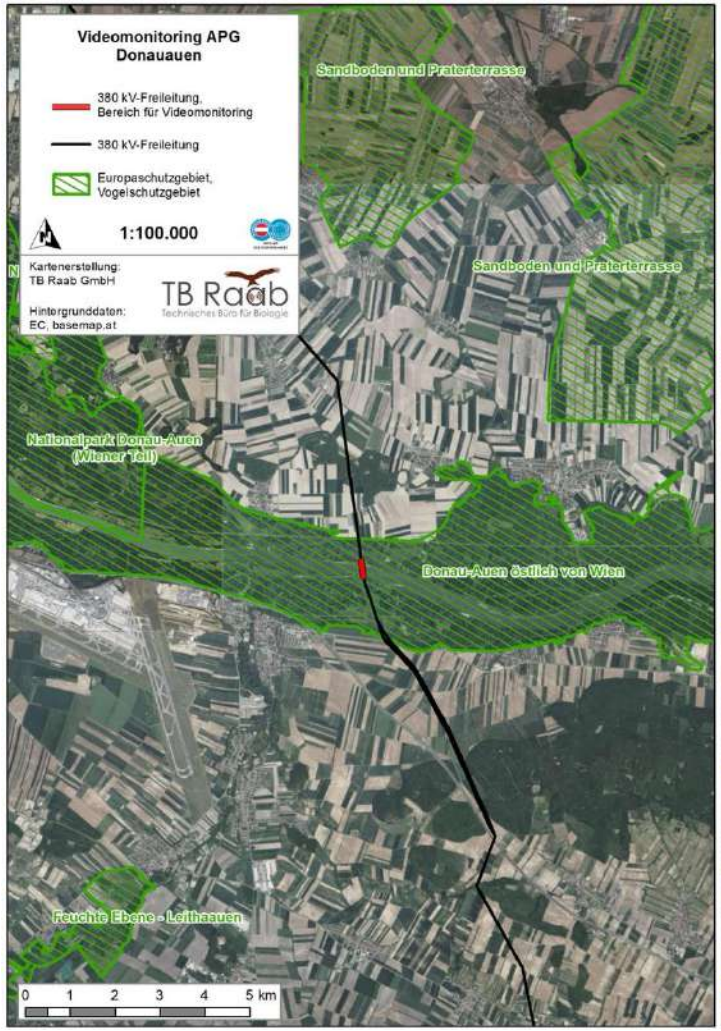
Overview of the study area at the river "Oder"

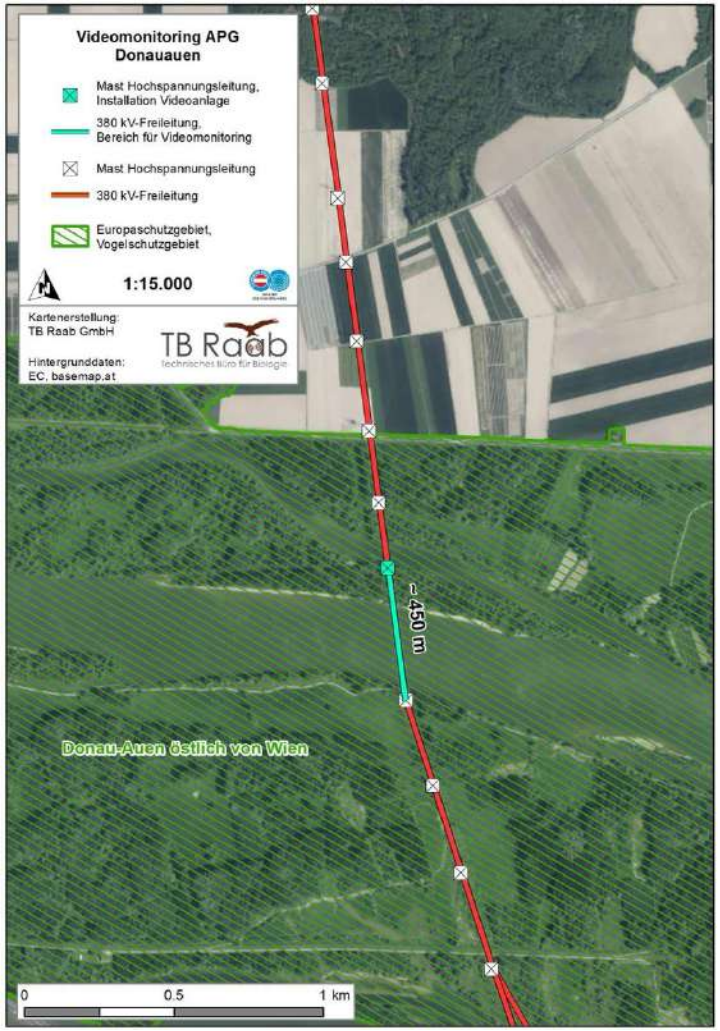


380 kV-power line Danube floodplains

Overview of the study area at the river “Danube”







Outline

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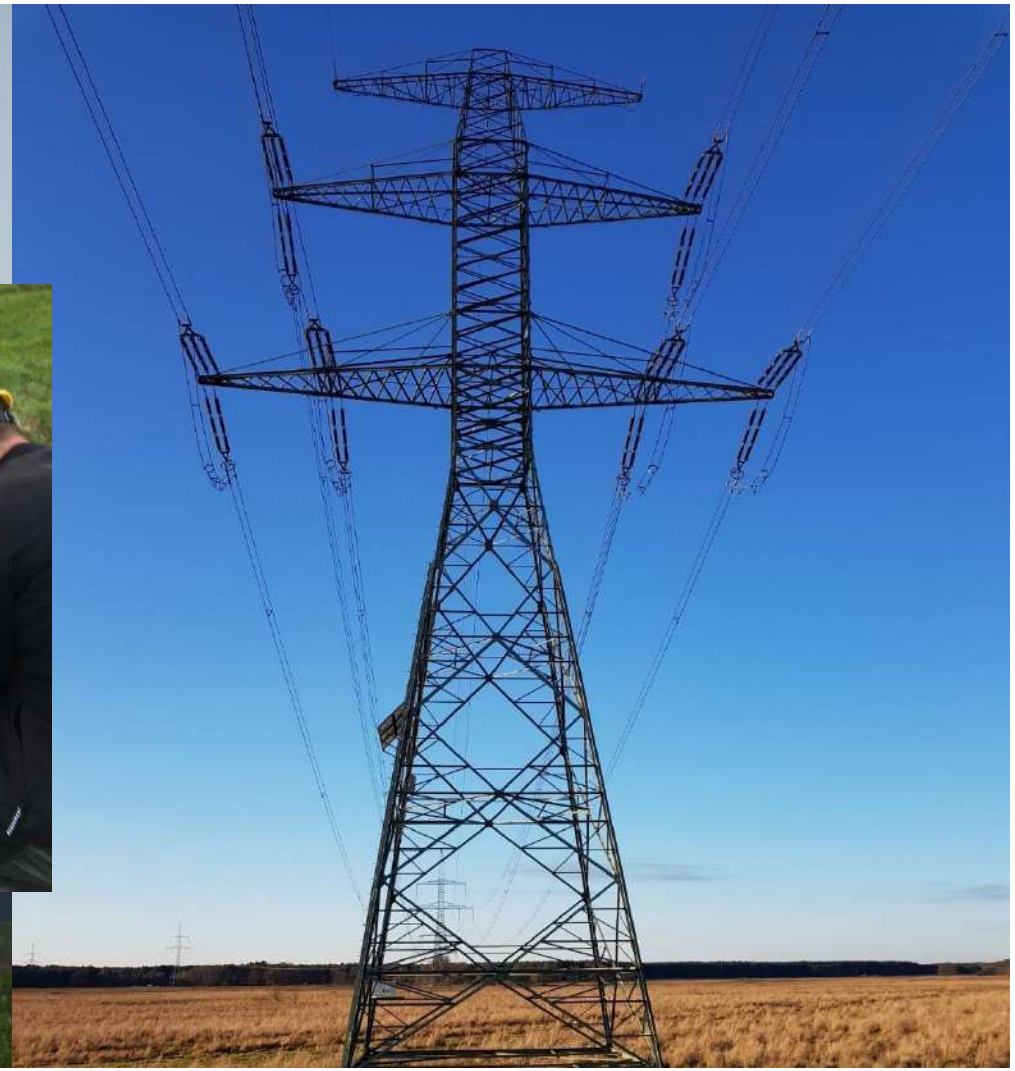
Conclusions

State-of-the-art video technology in use

Photos by Elektro Fladischer GmbH



Camera coverage in Krajnik-Vierraden

Simultaneous camera images

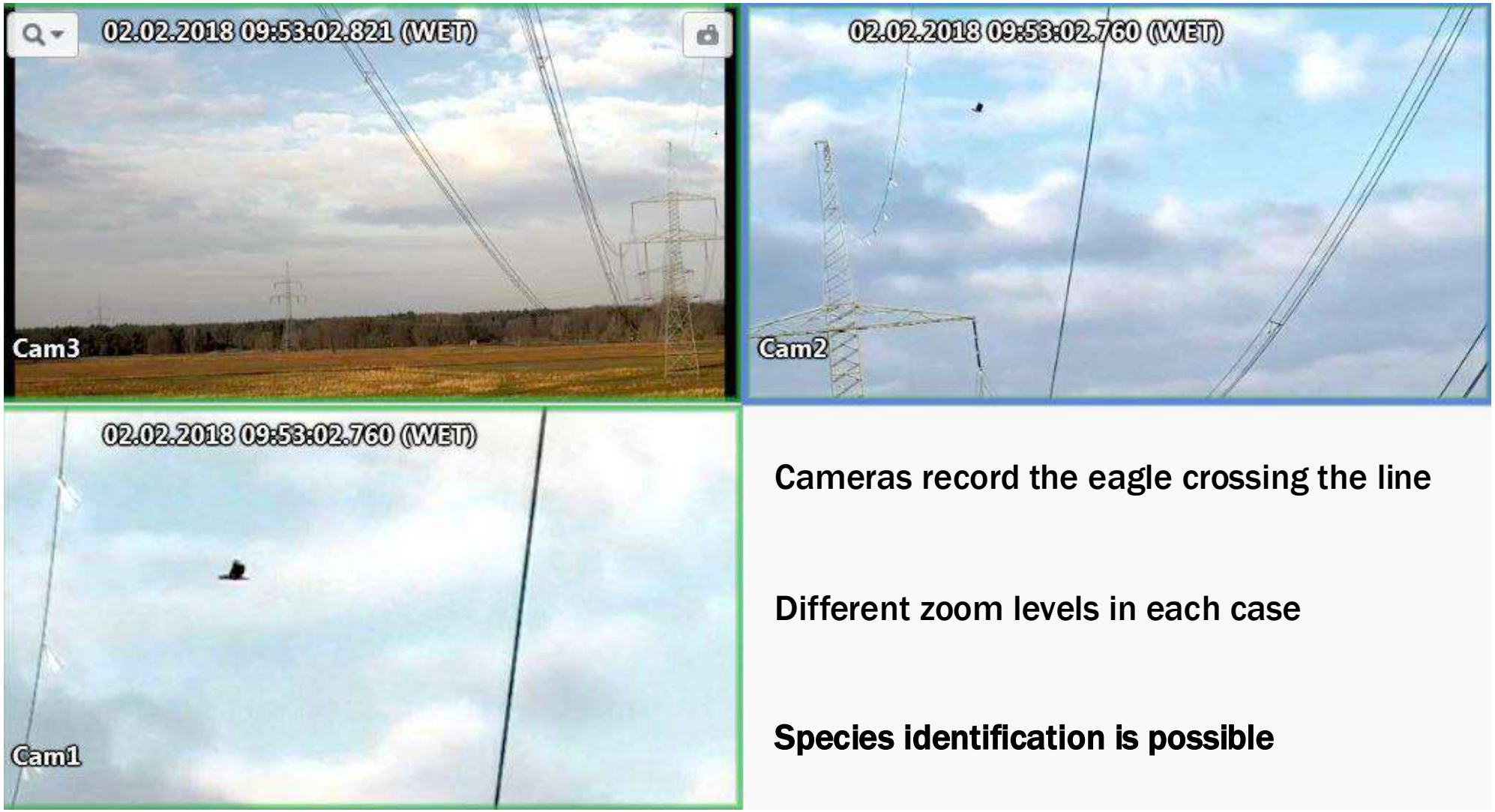
Limitations:

Maximum visibility 1 km

Good detection from crow size

Species identification is possible

Flight behaviour of a White-Tailed Eagle



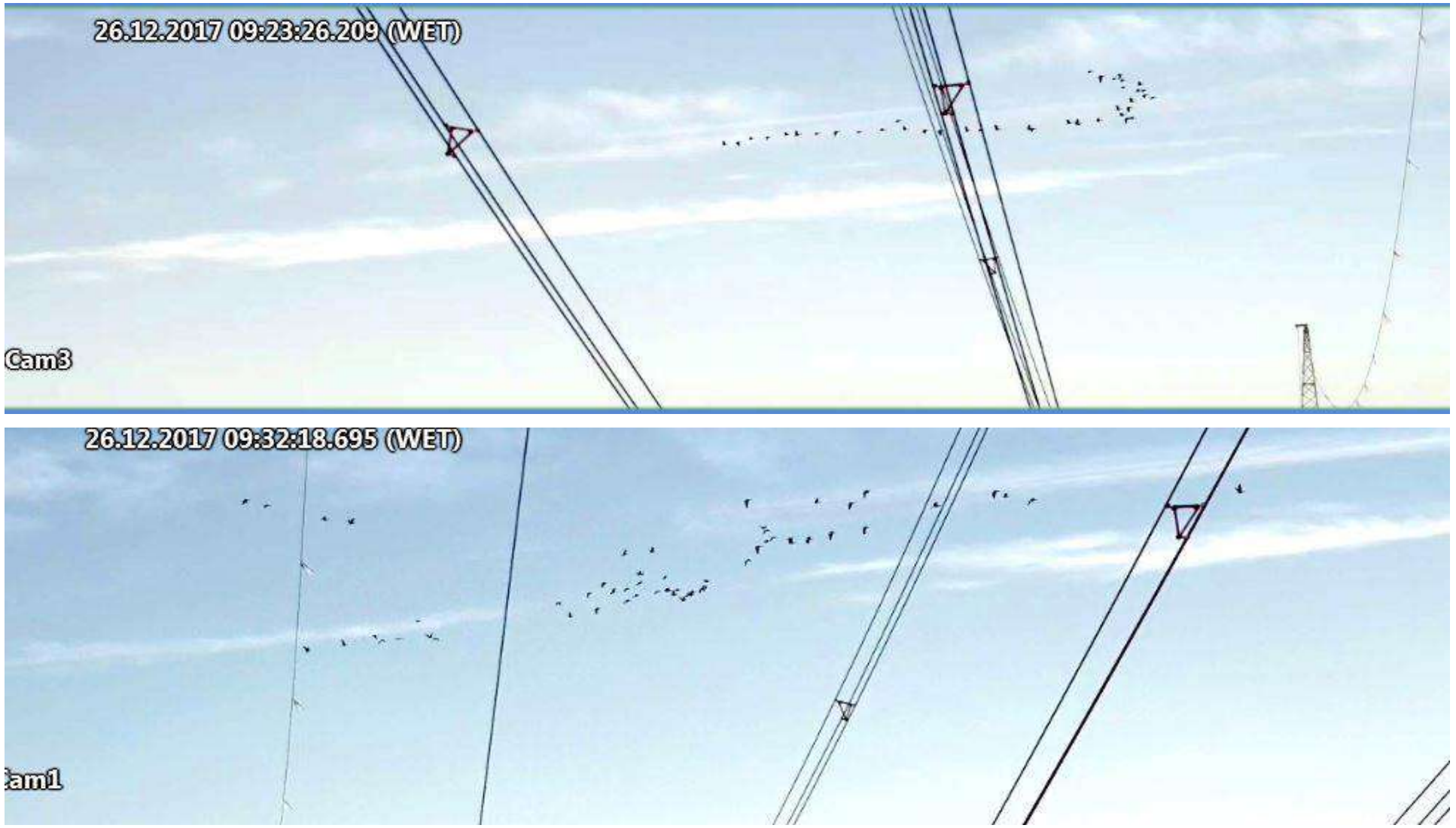
Cameras record the eagle crossing the line

Different zoom levels in each case

Species identification is possible

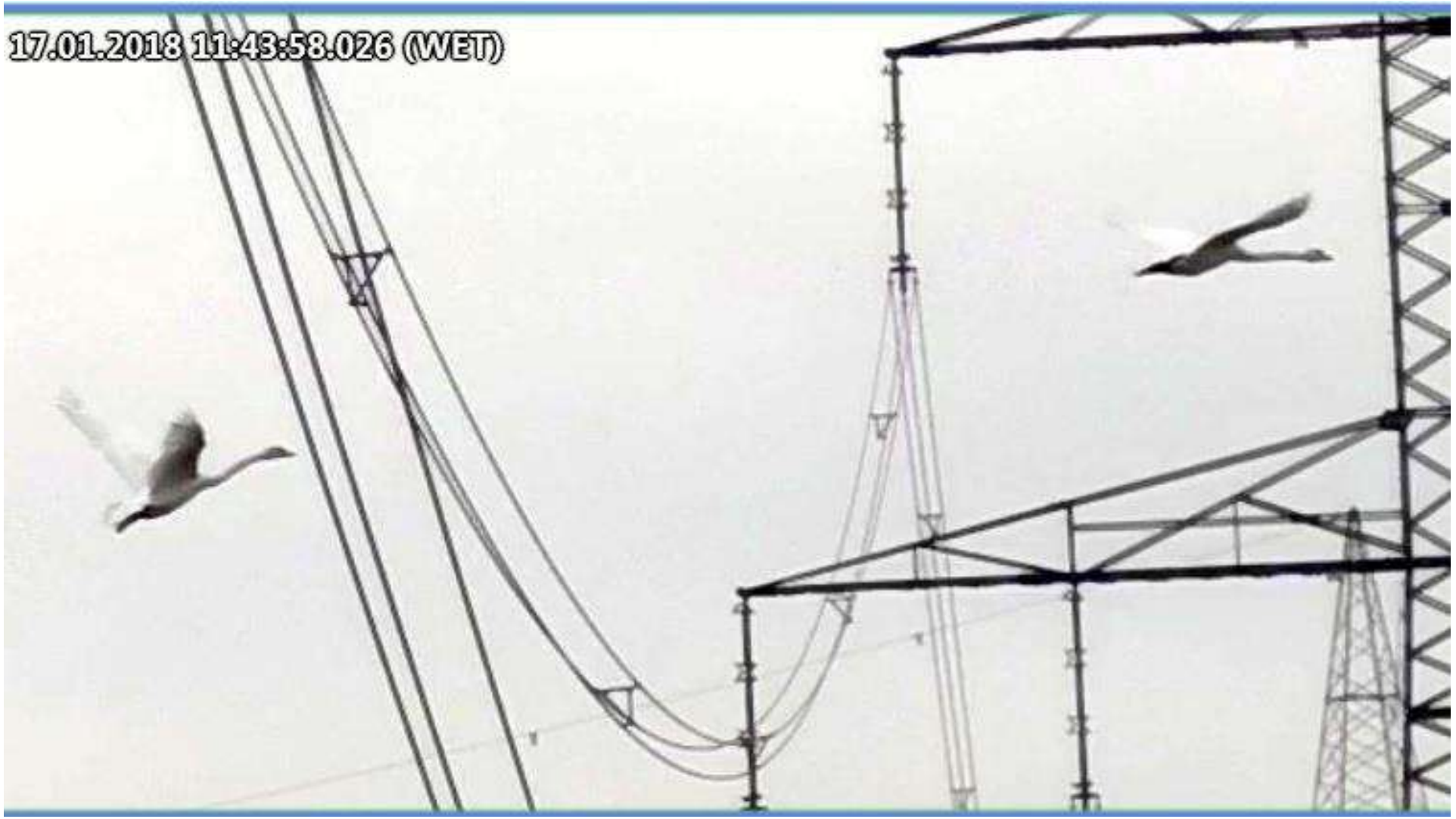
Good visibility of group size

Flight behaviour of Greylag Goose



Observation during line crossing

Flight behaviour of two Mute Swans



Camera coverage in Danube floodplains

Simultaneous camera images

Outline

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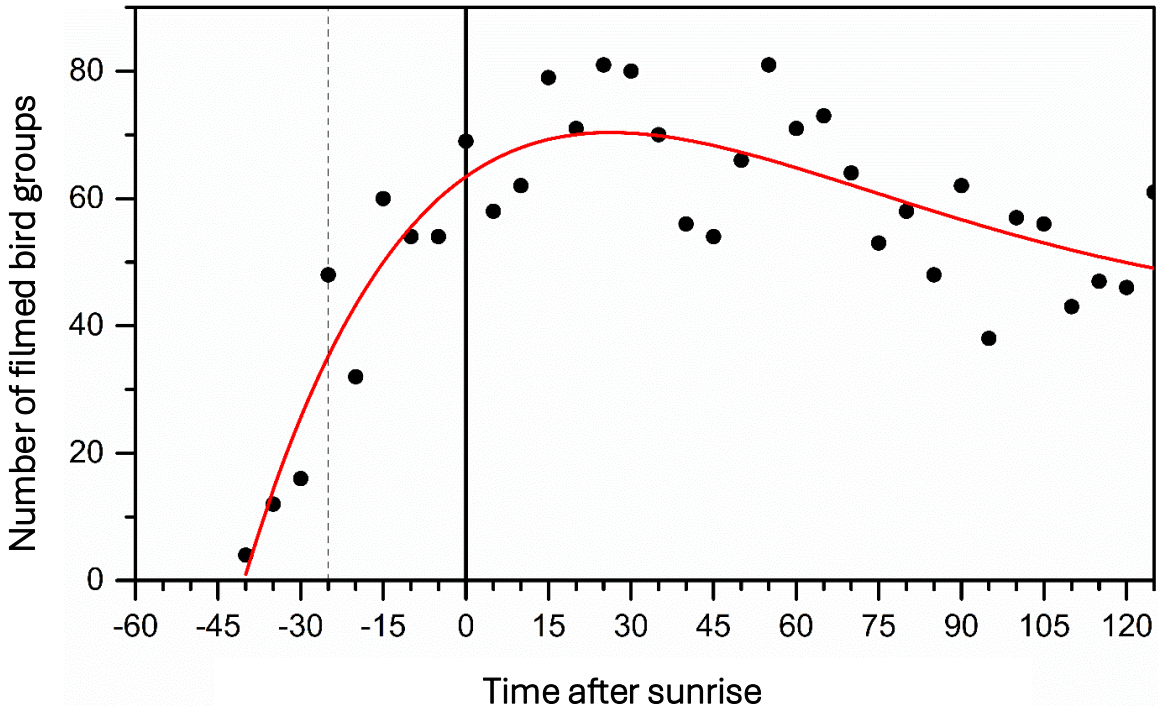
Recording is possible beyond twilight

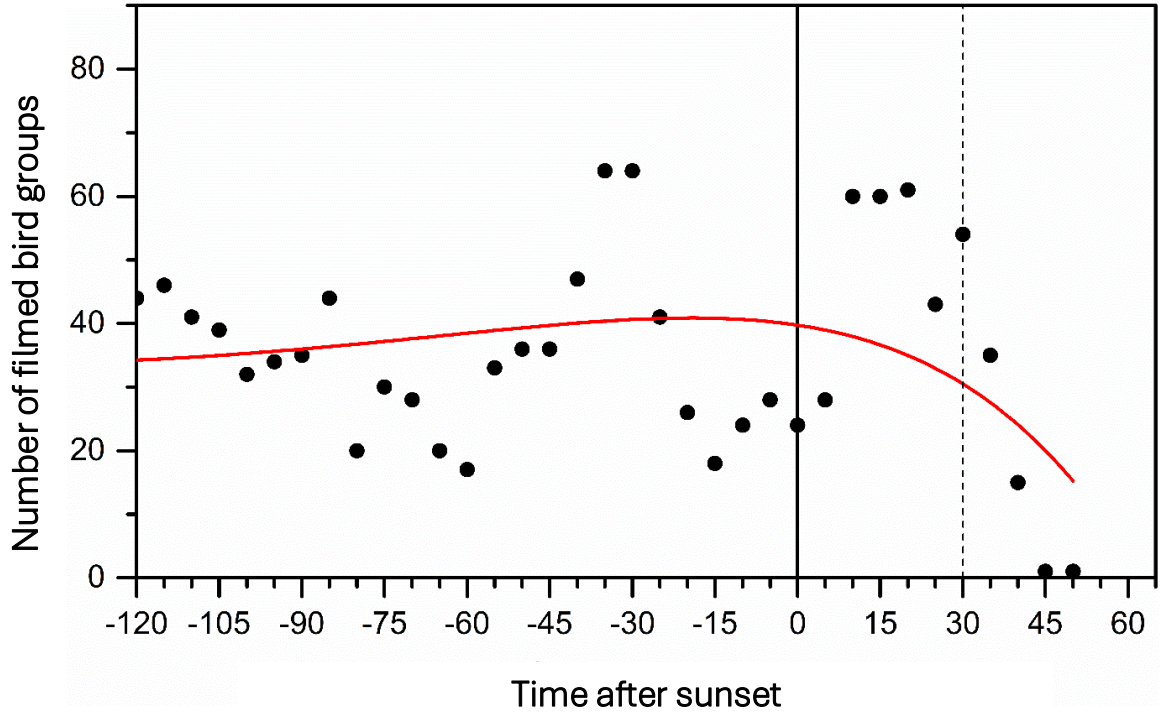
Bird flocks observed over time at Krajnik–Vierraden

TB Raab
Technisches Büro für Biologie

Sunrise



Sunset



Method suitable for a period from 25 minutes before sunrise to 30 minutes after sunset

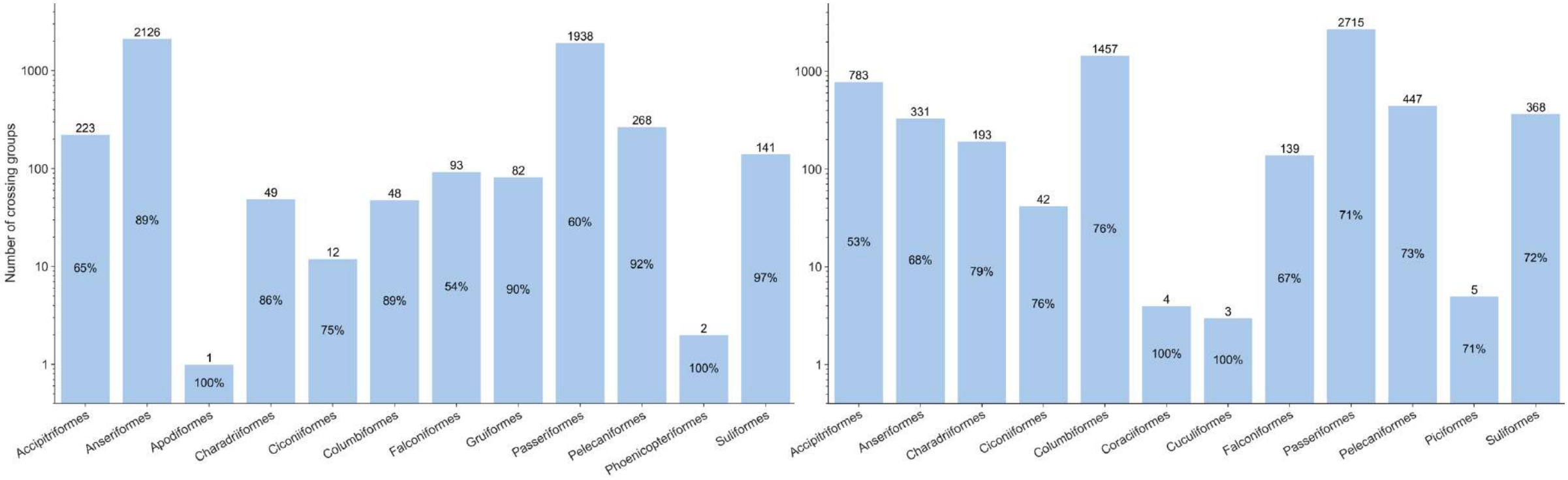
Numerous birds of various orders recorded

Bar chart of the number of power line crossings

TB Raab
Technisches Büro für Biologie

Krajnik–Vierraden: 380 kV

Danube floodplains: 380 kV



Percent value represents the share of observed groups that crossed the power line

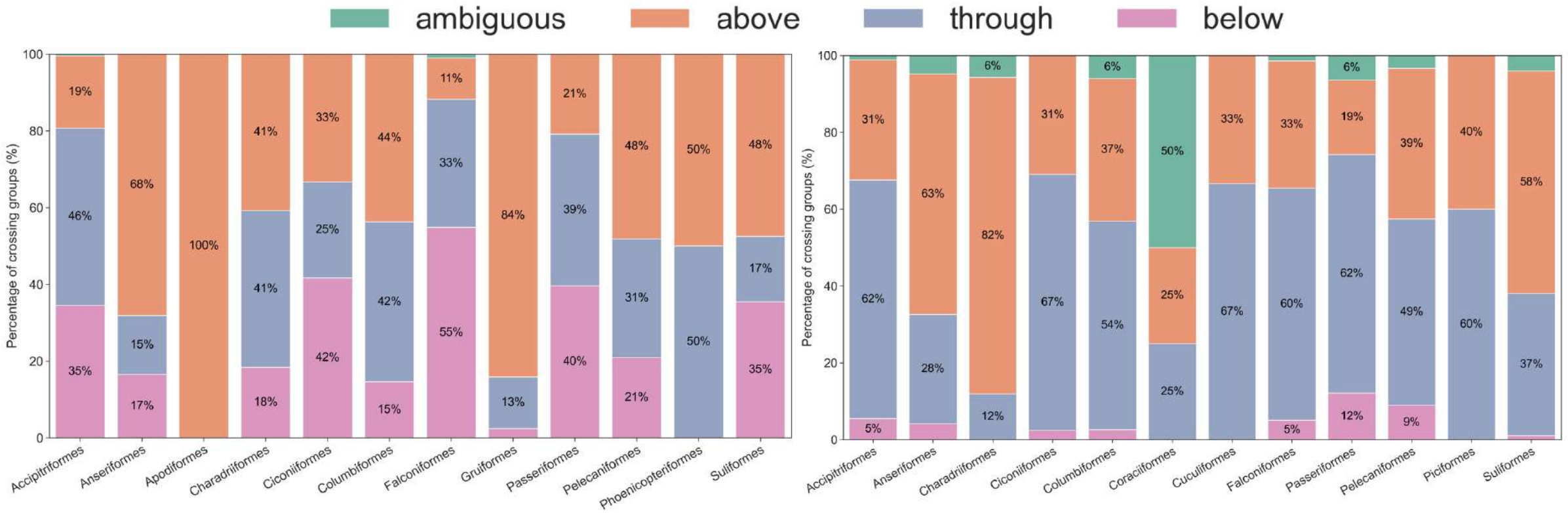
Crossing behaviour varies with location

Bar chart of the relative share of crossing type categories

TB Raab
Technisches Büro für Biologie

Krajnik–Vierraden: 380 kV

Danube floodplains: 380 kV



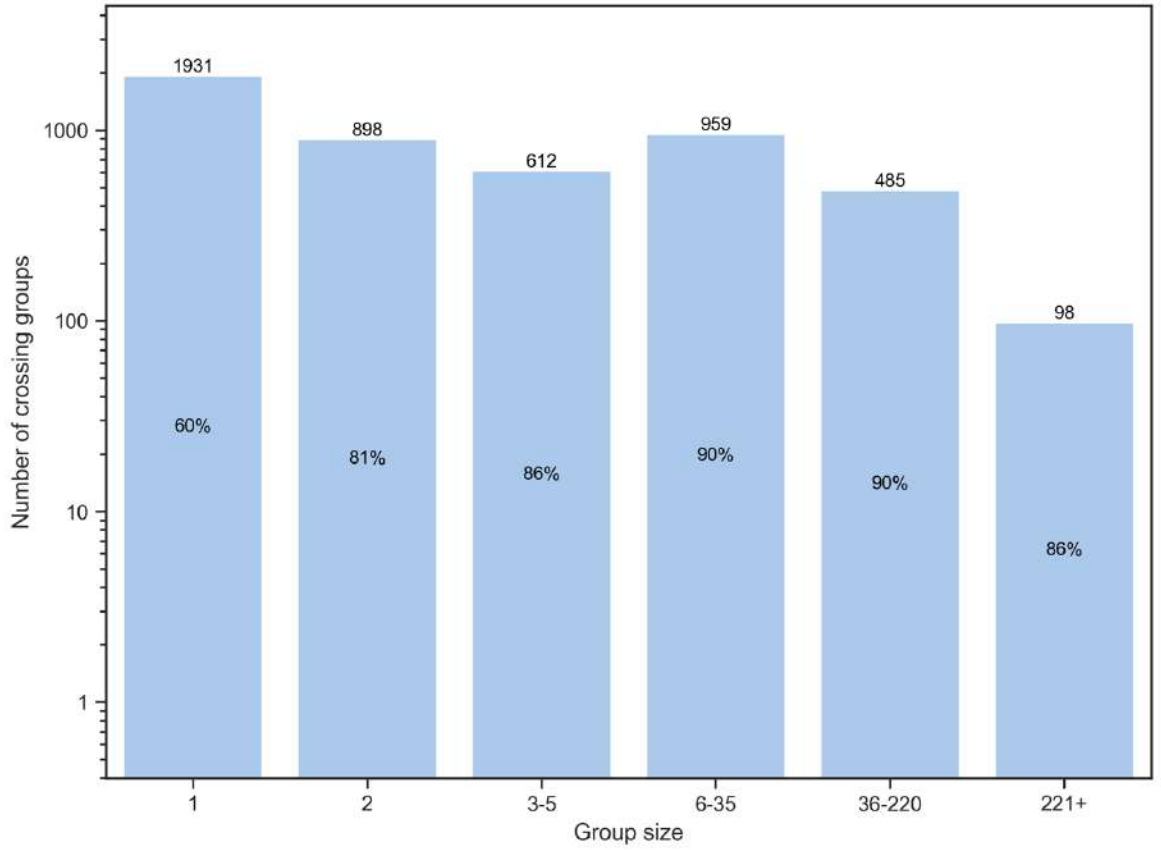
Percent value represents the share of crossing groups per height category

Group size varies with location

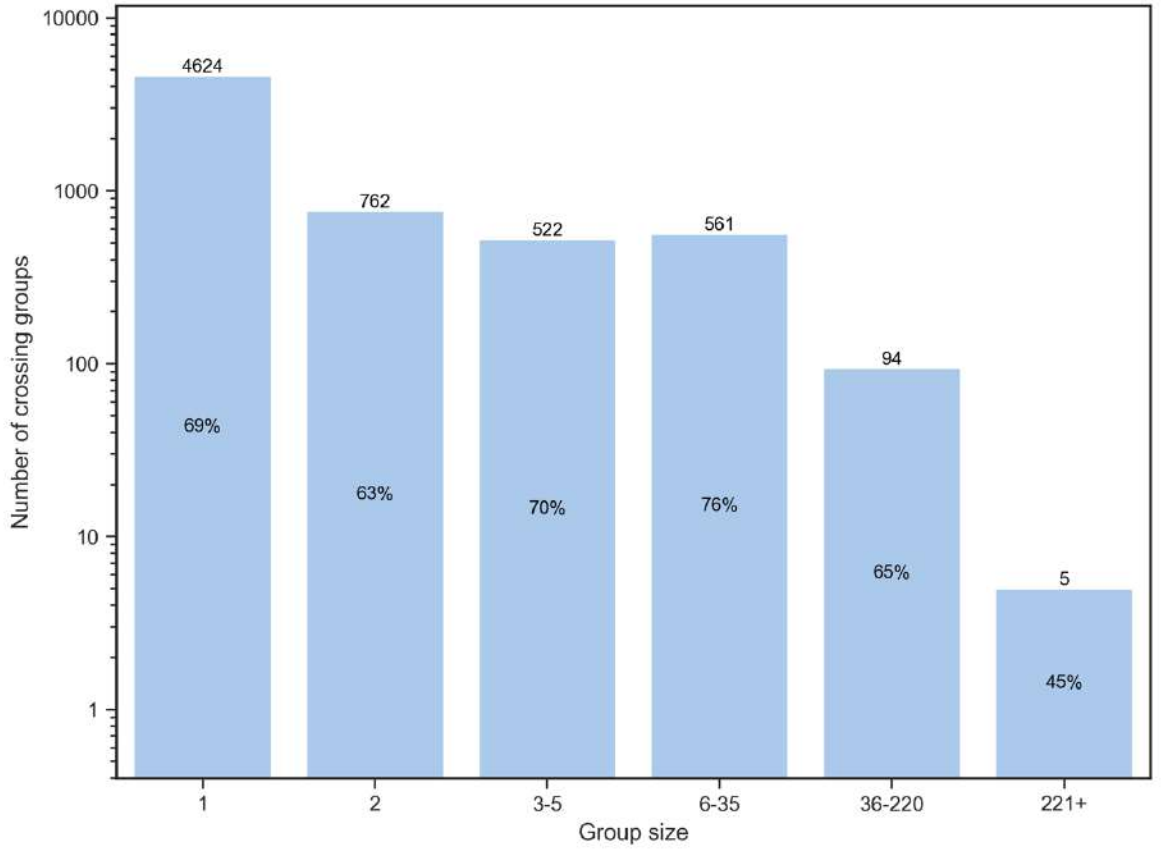
Observed flight behaviour per category of swarm size

TB Raab
Technisches Büro für Biologie

Krajnik–Vierraden: 380 kV



Danube floodplains: 380 kV



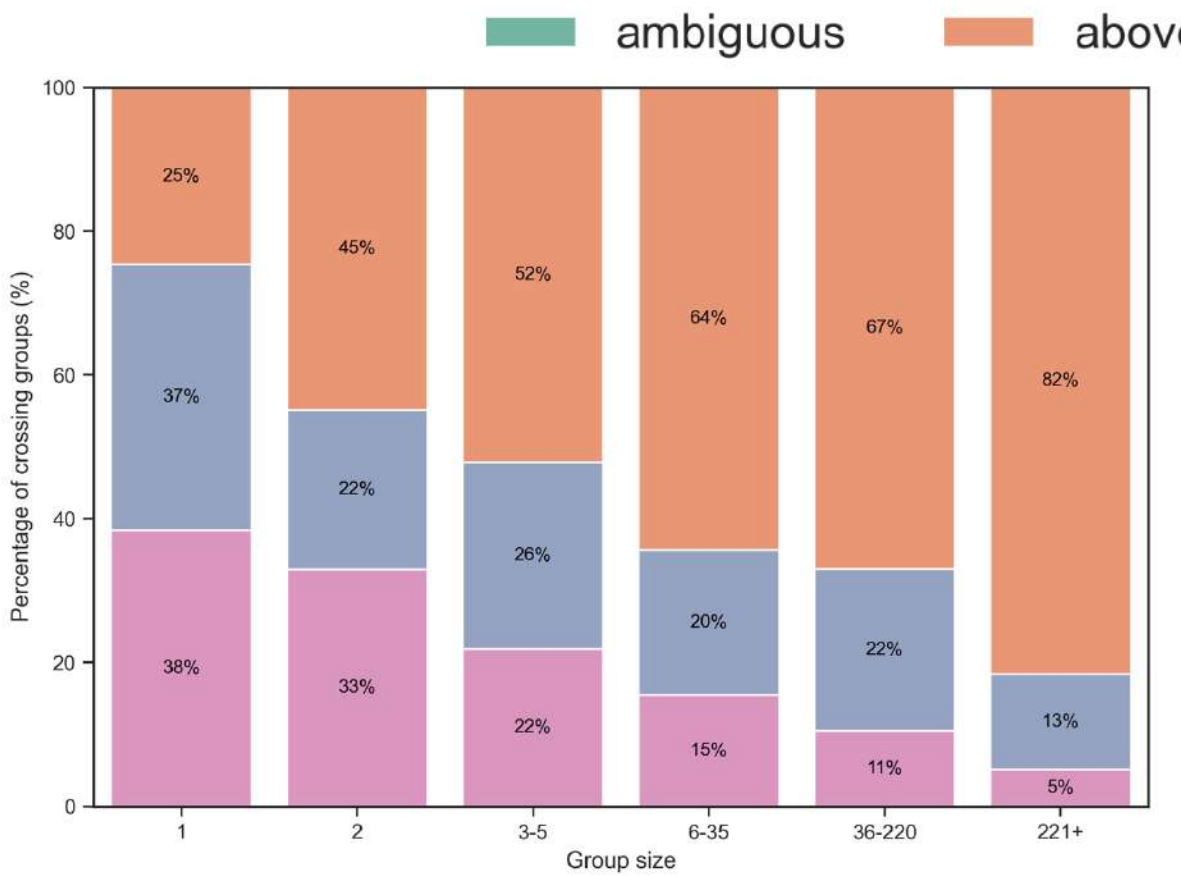
Percent value represents the share of observed groups that crossed the power line

Large flocks fly above more frequently

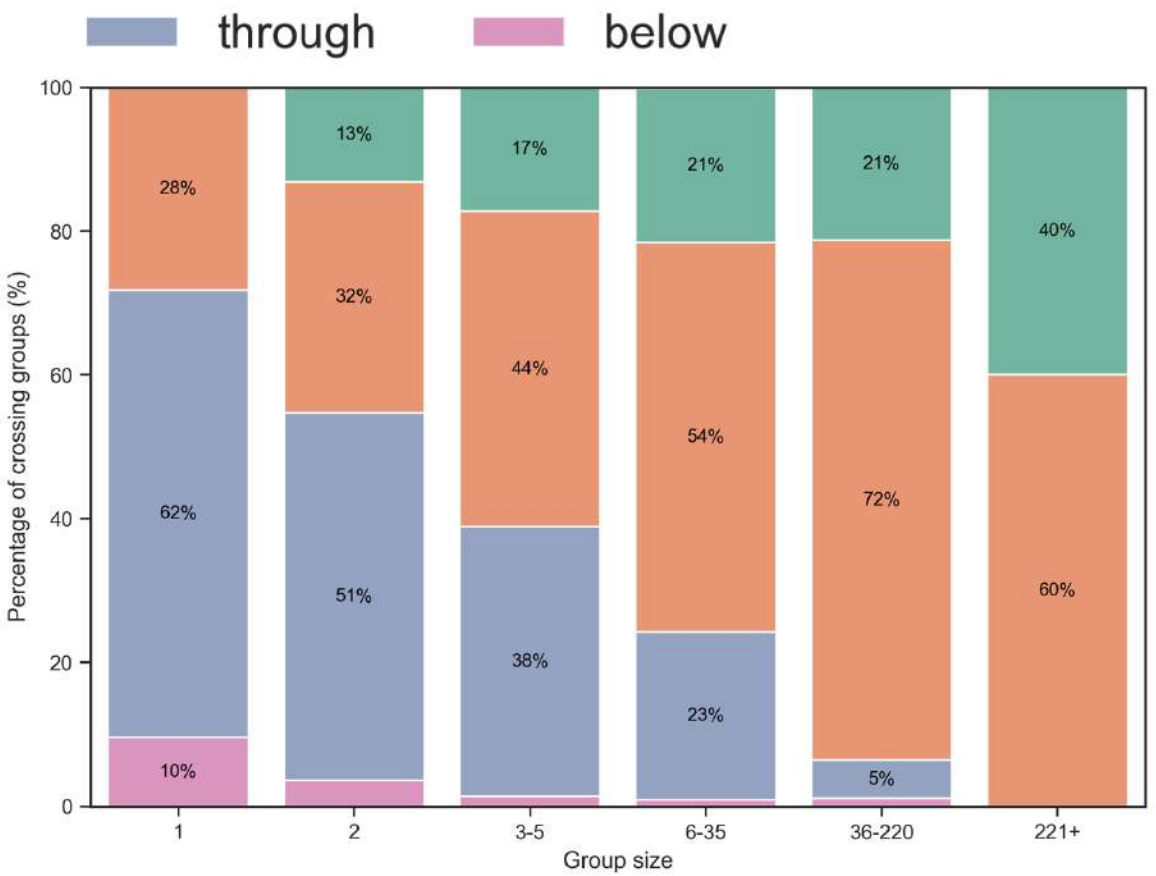
Observed flight behaviour per category of swarm size

TB Raab
Technisches Büro für Biologie

Krajnik–Vierraden: 380 kV



Danube floodplains: 380 kV



Percent value represents the share of crossing groups per height category

Outline

Project areas

Materials and methods

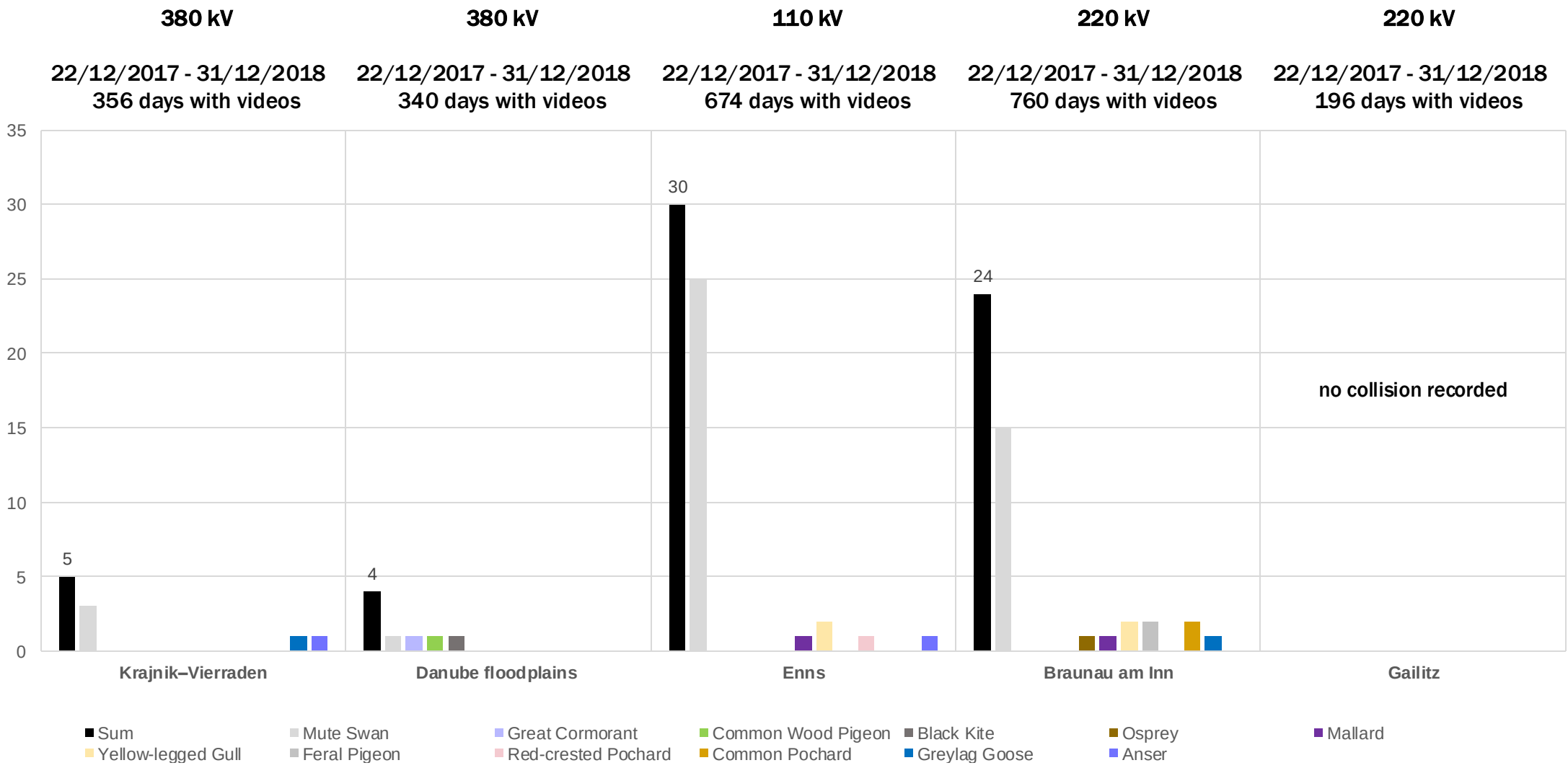
Results and discussion

Bird collisions

Conclusions

Mute Swan is the most affected species

Overview of collisions at video monitored rivers

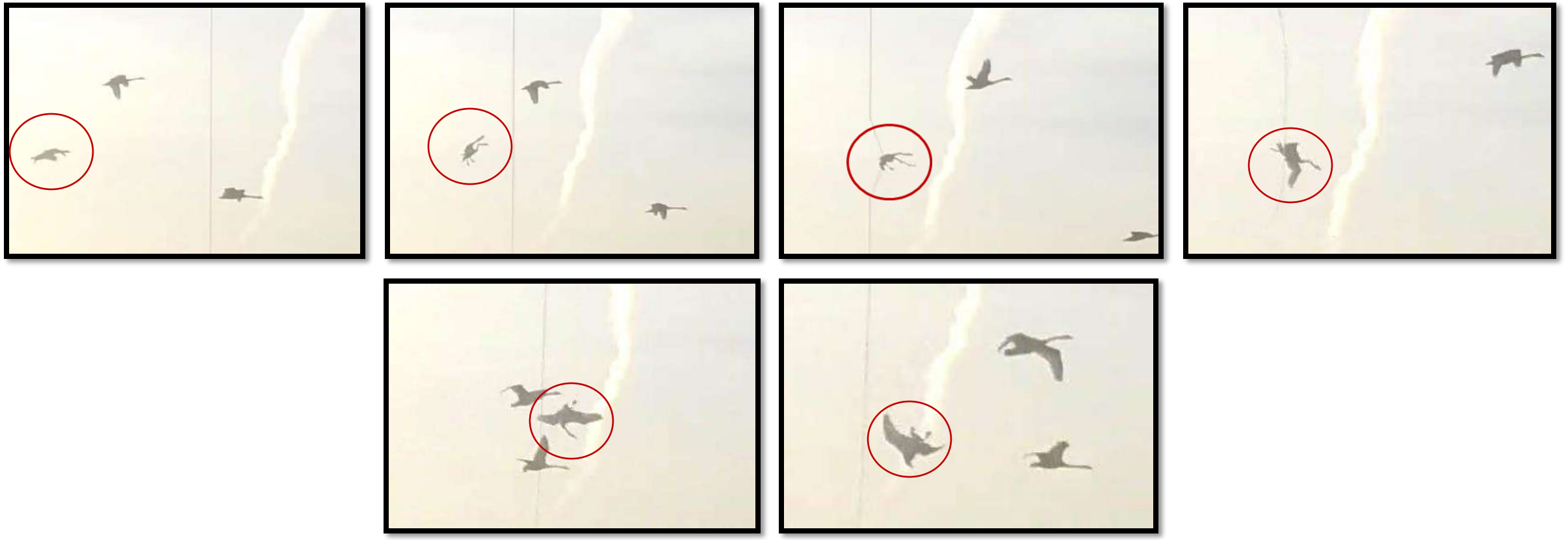


Mute swan collides with unmarked line

Video of the collision sequence

Mute swan collides with unmarked line

Photos of the collision sequence



Collisions mainly on unmarked cables

Ground and transmission cables pose a risk

TB Raab
Technisches Büro für Biologie

Krajnik-Vierraden: Upper ground cable marked (zebras)/ Lower ground cable not marked				
22/05/2018	07:31	Mute Swan	1	(Upper) ground cable (marked)
16/05/2018	11:31	Mute Swan	1	(Lower) ground cable **(not marked)**
12/04/2018	06:03	Anser	1	(Upper) ground cable (marked)
21/03/2018	09:56	Greylag Goose	1	transmission line **(not marked)**
14/03/2018	09:27	Mute Swan	1	(Lower) ground cable **(not marked)**

Danube floodplains: 1 of the ground cables marked (marker balls)				
06/12/2020	08:56	Great Cormorant	1	transmission line **(not marked)**
29/12/2020	09:53	Mute swan	1	transmission line **(not marked)**
30/07/2022	15:25	Black Kite	1	transmission line **(not marked)**
24/12/2022	08:28	Wood pigeon	1	transmission line **(not marked)**

Enns-Ernsthofen: Ground cable marked (marker balls & zebras)				
17/07/2014	13:45	Yellow-legged Gull	1	transmission line **(not marked)**
30/07/2018	15:55	Yellow-legged Gull	1	transmission line **(not marked)**
02/05/2023	07:38	Red-crested Pochard	1	transmission line **(not marked)**
22/06/2023	07:12	Mute swan	1	ground cable (marked)
14/07/2023	16:16	Mute Swan	6	transmission line **(not marked)**
15/07/2023	15:40	Mute Swan	4	transmission line **(not marked)**
16/07/2023	15:17	Mute Swan	1	ground cable (marked)
17/07/2023	06:02	Mute Swan	2	transmission line **(not marked)**
19/07/2023	06:25	Mute Swan	3	transmission line **(not marked)**
23/07/2023	07:49	Mute Swan	4	transmission line **(not marked)**
20/08/2023	07:01	Mute Swan	1	transmission line **(not marked)**
24/09/2023	08:38	Mute Swan	1	transmission line **(not marked)**
24/09/2023	11:12	Mute Swan	1	ground cable (marked)
14/11/2023	13:37	Mallard	1	transmission line **(not marked)**
17/11/2023	11:07	Mute Swan	1	transmission line **(not marked)**
04/12/2023	16:37	Anser	1	transmission line **(not marked)**

Braunau am Inn: not marked				
27/08/2020	06:46	Yellow-legged Gull	1	ground cable **(not marked)**
27/09/2020	08:40	Mute Swan	1	ground cable **(not marked)**
11/02/2021	11:26	Mute Swan	1	ground cable **(not marked)**
17/03/2021	17:43	Yellow-legged Gull	1	ground cable **(not marked)**
13/04/2021	10:13	Greylag Goose	1	ground cable **(not marked)**
14/04/2021	08:28	Mute Swan	1	ground cable **(not marked)**
02/05/2021	11:38	Osprey	1	ground cable **(not marked)**
15/05/2021	07:19	Mute Swan	1	ground cable **(not marked)**
14/07/2021	18:16	Mallard	1	ground cable **(not marked)**
07/01/2022	10:30	Mute Swan	1	ground cable **(not marked)**
08/08/2022	16:14	Feral pigeon	1	transmission line **(not marked)**
10/10/2022	08:08	Mute Swan	1	ground cable **(not marked)**
15/10/2022	13:59	Feral pigeon	1	ground cable **(not marked)**
26/10/2022	10:02	Mute Swan	1	ground cable **(not marked)**
28/10/2022	16:14	Mute Swan	1	ground cable **(not marked)**
21/11/2022	12:33	Common Pochard	1	ground cable **(not marked)**
24/11/2022	09:19	Mute Swan	1	ground cable **(not marked)**
15/12/2022	09:29	Mute Swan	1	ground cable **(not marked)**
23/12/2022	14:37	Mute Swan	2	ground cable **(not marked)**
06/01/2023	15:47	Mute Swan	1	ground cable **(not marked)**
18/02/2023	13:34	Mute Swan	1	ground cable **(not marked)**
17/04/2023	08:02	Mute Swan	1	ground cable **(not marked)**
22/04/2023	07:10	Mute Swan	1	ground cable **(not marked)**

Gailitz: Ground cable marked (marker balls)
no collisions

Outline

Project areas

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Bird collisions

Conclusions

Marking reduces the risk of collision

Schematic representation of the flight behaviour

Flight behaviour depends on power line visibility

<u>Recognise late:</u>

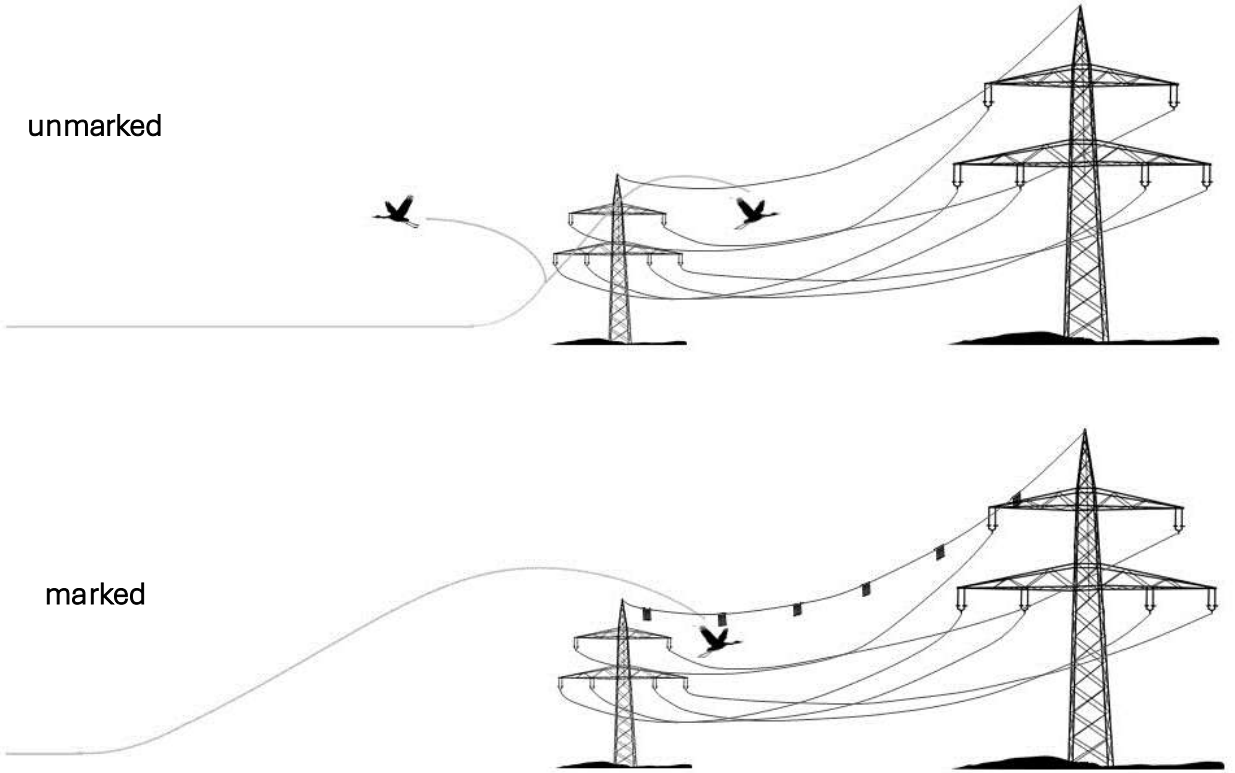
Bird forced to climb very steeply or turn away for a short time

<u>Recognise early:</u>

Continuously rising trajectory

<u>Reduce collision risk of affected species:</u>

Increase visibility through marking[1]



[1] e.g. Alonso et al., 1994

Let’s stay in touch

RAINHARD RAAB, BSC, 15.10.2024, WINGSPAN CONFERENCE, BRUSSELS

Presentations

Technologies and solutions to reduce bird mortality around energy infrastructure

Brian McGowan

Founder & Managing Director

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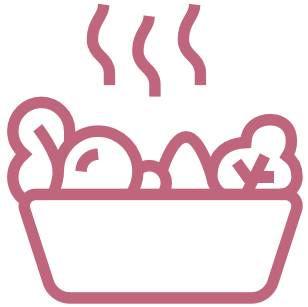


Lunch Break

2024 WINGSPAN

Panel

From Science to Practice: Translating scientific findings into legislation and effective implementation of measures

MODERATOR

Frank Vassen

Policy Officer

DG Environment

Dr. Constance Blary

Postdoctoral Researcher

CNRS

Anouk Puymartin

Policy Manager

BirdLife Europe & Central Asia

Liam Innis

Senior Manager – Energy Ecosystems

Renewables Grid Initiative

Dr Ricardo Martins

Researcher

BIOPOLIS/CIBIO

Coffee Break

2024 WINGSPAN

Presentations

Data and sensitivity mapping to understand and prevent mortality risks for birds

Dr. Joana Bernardino

Researcher

BIOPOLIS/CIBIO

Bruna Arbo-Meneses

Science Officer Bird & Energy

BirdLife International

Ingrid Marchand

Coordinator LIFE SafeLines4Birds

LPO France

Dr Soňa Svetlíková

Team Leader Modelling & Scientific Studies

TB Raab

Dr Rainer Raab

CEO

TB Raab

Mitigating bird-caused electrical faults in a transmission grid increasingly used by nesting white storks: the successful Portuguese case study

WINGSPAN 2024

Brussels, October 15 - 17, 2024

Ricardo Martins, **Joana Bernardino**, Rui Morgado, Francisco Aguilar & Francisco Moreira

António Canhoto, Gonçalo Pintado, José Moreira, António Meireles & Francisco Parada

Infrastructure Ecology

BIOPOLIS | CIBIO
Research Centre in Biodiversity and Genetic Resources

Background

- White stork use of pylons for nesting (and perching)
  - Common behaviour in many countries
  - Very significant (and increasing) in Portuguese transmission grid

REN pylons hold ~20% of the national breeding population

(2014 census)

Increased risk of electrical faults

Background

- **REN's nest management program** to minimize outage risk
  - Implemented by the TSO since the mid-1990s
  - Nest counts by helicopter to identify the ones in hazardous locations of pylons (above conductors)
  - TSO actions:
    - Removal/translocation of nests in hazardous locations
    - Installation of anti-nesting/perching devices
      (>95% "Anemometers")
    - Provision of nesting platforms (in safe locations of pylons)

Study aims

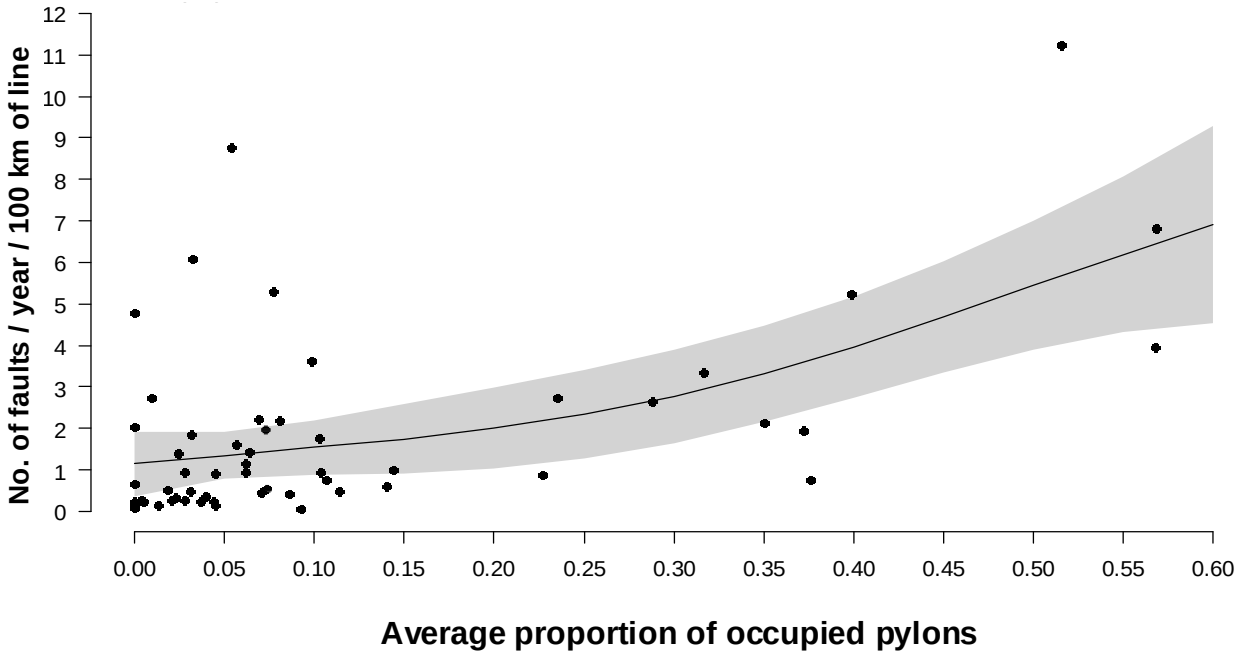
- To evaluate:
  - Spatio-temporal patterns of bird-caused electrical faults in the Portuguese transmission grid (150-400 kV)
  - Success of the (overall) TSO nest management program

DATASETS

18-year period (2001-2018)

1) Transmission electrical faults
2) White stork nests on transmission pylons
3) TSO actions: anti-perching devices + alternative nesting platforms

Spatial patterns of bird-related electrical faults

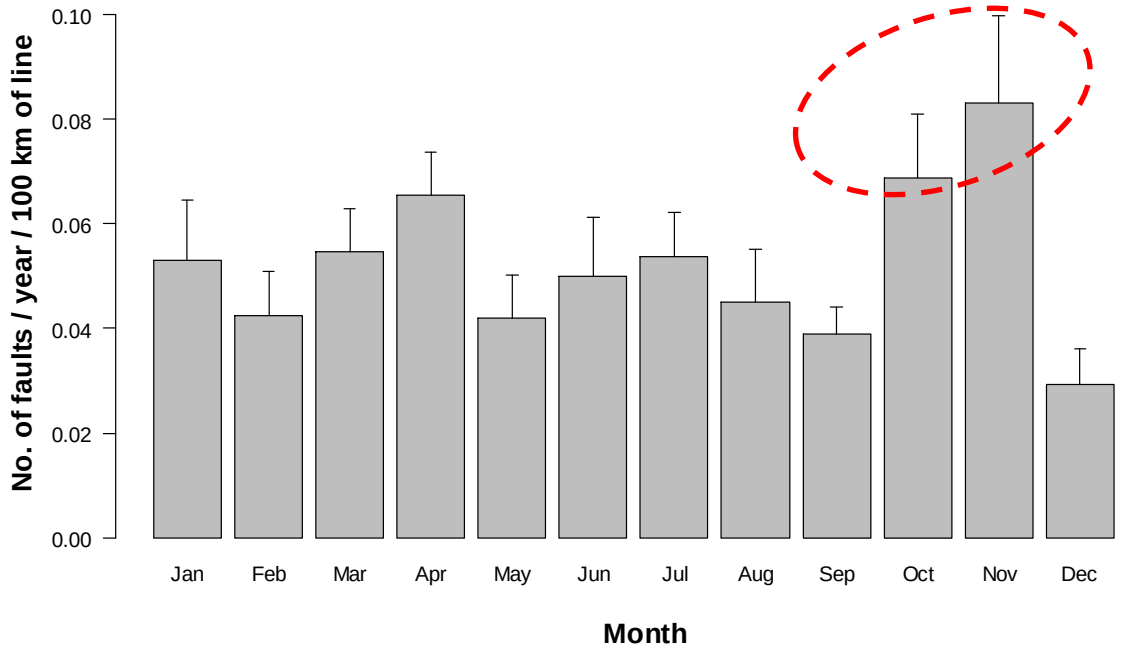


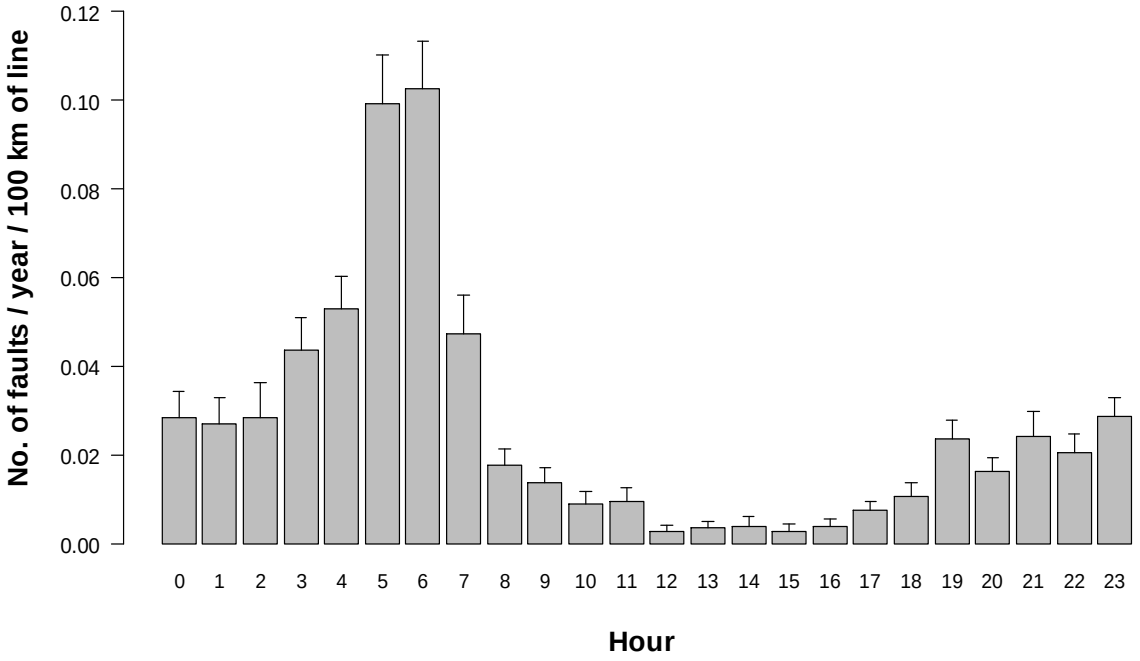
- Fault rates were positively associated with:
  - % of pylons with stork nests (in a circuit)
  - overall number of nests per 100 km of line

Temporal patterns of bird-related electrical faults

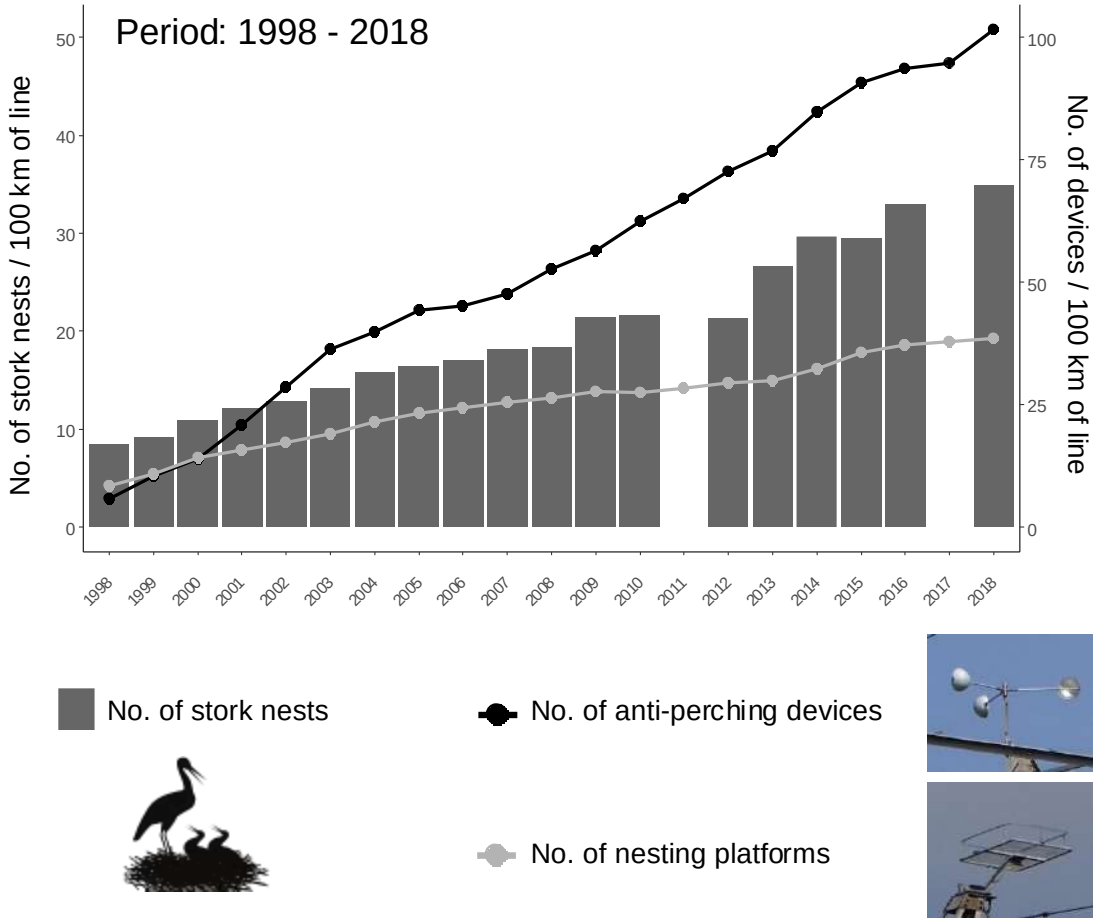
Breeding season

Non-breeding season

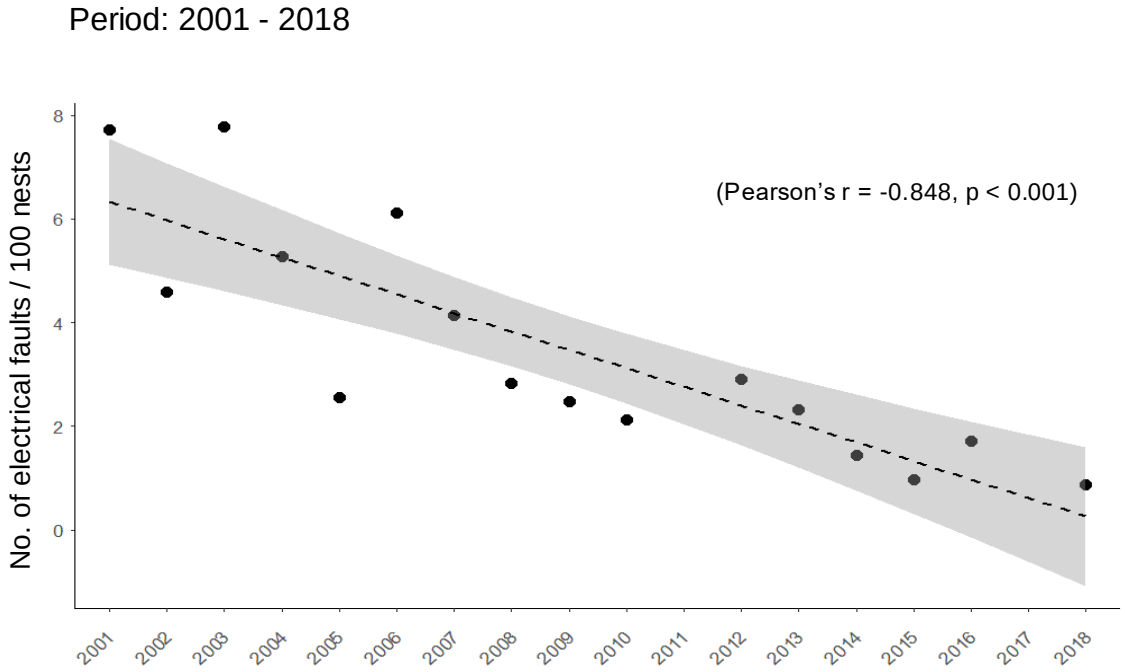




Overall effectiveness of REN's nest management actions



VARIATION IN BIRD-RELATED FAULTS / 100 NESTS



Despite a 3-fold increase in the no. of stork nests...

.... bird-related fault rates decreased significantly!

(ca. **95.9% reduction** in bird-related faults / 100 nests)

Effectiveness of “anemometers”

WINGSPAN 2024

- **Field experiment:**
  - matched pairs design (at pylon scale)

Before nest intervention

After nest intervention

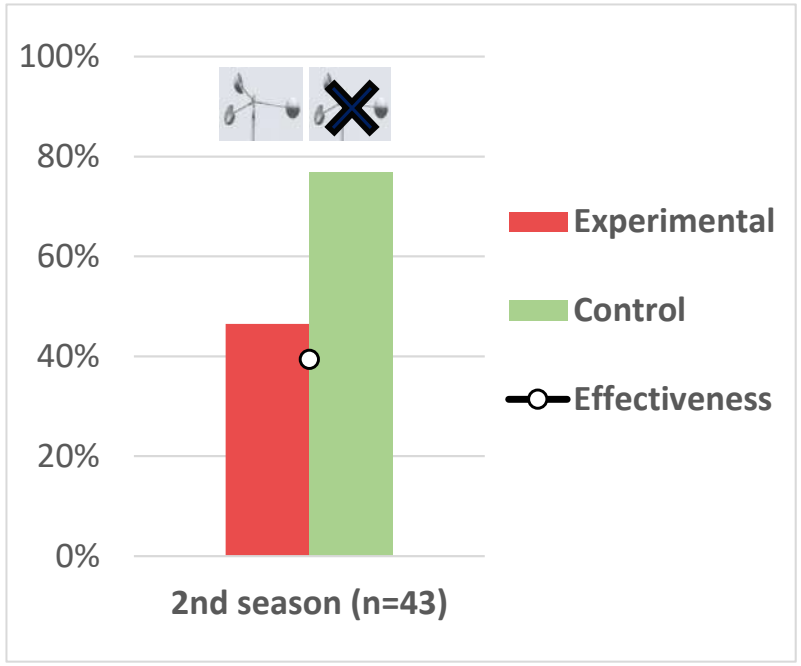
  - Total of 43 nest pairs on 36 pylons; interventions in 2020-2022 (before the breeding season)
  - Systematic observations to survey nest reconstruction (at least for two breeding seasons)

Effectiveness of “anemometers”

RESULTS

- Quick response from storks:
  - overall, 58% of nests were rebuilt after the 1st season and 62% after the 2nd season.

- Reconstruction rates on studied platforms (or slightly deviated but with nest material on it):

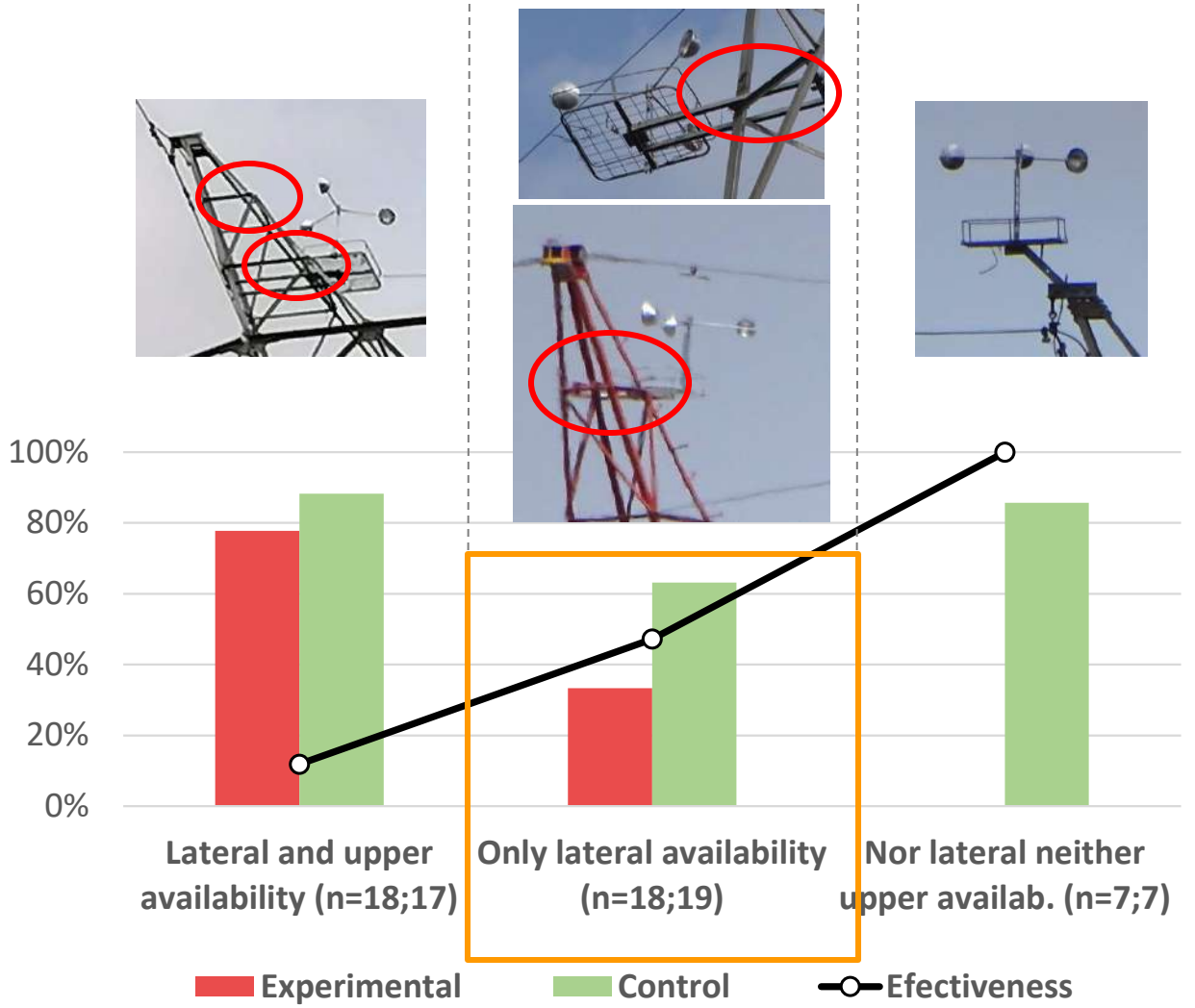


- Anemometers significantly reduced the likelihood of nest reconstruction (compared to controls)

Overall effectiveness:

~40% reduction in nest reconstruction

Effectiveness of “anemometers”



- Effectiveness (in the end of 2nd season) depended on pair location within pylon

Availability (of pylon support) for rebuilding nests in slightly deviated positions is a key factor

- Locations most similar to real context of anemometer installation

Overall effectiveness:

~47% reduction in nest reconstruction

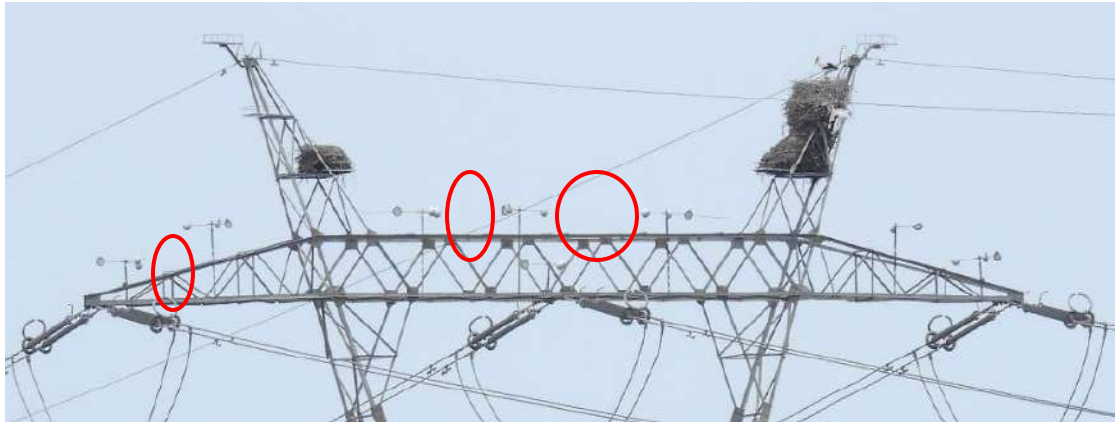
Take home messages

- **Advantages of Academia – TSO/DSO partnerships**:
  - Access to large datasets
  - Applied research to improve company practice / Knowledge Transfer

- **REN's nest management program has proven highly effective** in reducing bird-related electrical faults....

  ... while allowing white storks to continue nesting on transmission pylons.

- **Possible opportunities**:
  - Increase anemometer density in key locations (to reduce available space for lateral nest construction)
  - Develop and test other anti-perching devices, after deepening the knowledge on stork use of pylons (mainly outside breeding season and at night)



Mitigating bird-caused electrical faults in a transmission grid increasingly used by nesting white storks: the successful Portuguese case study

2024 WINGSPAN

RC Martins, J Bernardino, R Morgado, F Aguilar & F Moreira

BIOPOLIS cibio

A Canhoto, G Pintado J Moreira, A Meireles & F Parada

REN

jbernardino@cibio.up.pt

To know more...


Journal of Environmental Management

Research article

Long-term management practices successfully reduce bird-related electrical faults in a transmission grid increasingly used by white storks for nesting

Francisco Moreira, Ricardo C. Martins, Francisco F. Aguilar, António Canhoto, Jorge Martins, José Moreira, Joana Bernardino

https://doi.org/10.1016/j.jenvman.2022.116897

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NORTE2020 PROGRAMA OPERACIONAL REGIONAL DO NORTE PORTUGAL 2020 UNIÃO EUROPEIA Fundo Social Europeu

Project: NORTE-01-0246-FEDER-000063

Presentations

Data and sensitivity mapping to understand and prevent mortality risks for birds

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BirdLife International

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LPO France

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BirdLife INTERNATIONAL

AVISTEP: a sensitivity mapping tool to improve bird conservation in energy planning

Bruna Arbo-Meneses
Science officer (Birds and Energy)

October 2024

Ideas that fly.

Electrification and renewable energy expansion are essential but can pose a significant environmental risk if not planned in a nature-safe manner

- There are already over 80 million kilometers of powerline globally – enough to stretch to the moon and back 200 times
  - this will need to more than double to accommodate the transition to renewables until 2050

- Poorly sited, badly designed and insufficiently mitigated energy infrastructure can significantly impact biodiversity, especially birds.
  - Avoidance, displacement and barrier effects

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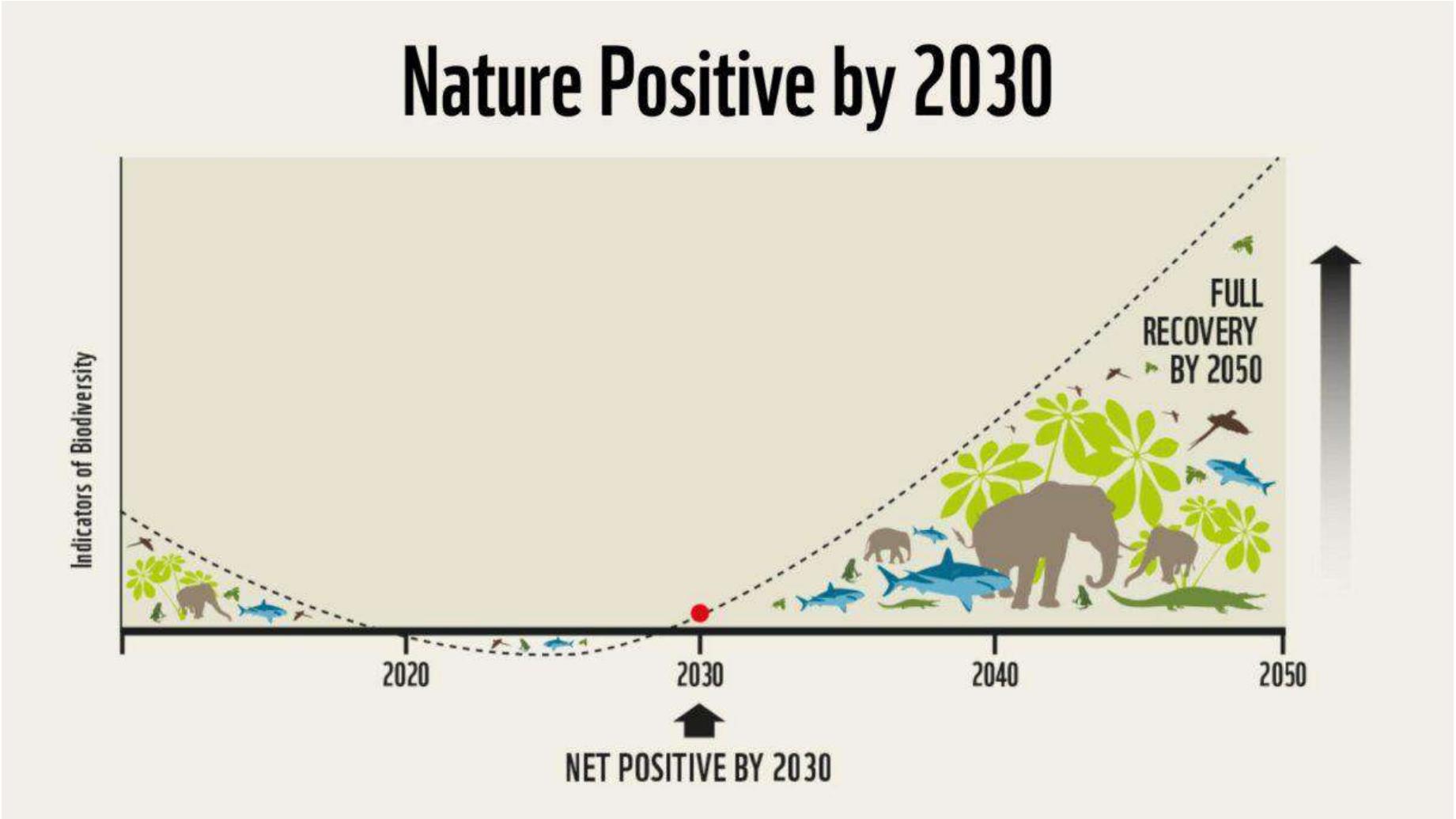
Ideas that fly.

NATURE POSITIVE INITIATIVE

Halt and reverse biodiversity loss by 2030 on a 2020 baseline and achieve full recovery by 2050.

Can we achieve a Nature Positive energy sector?



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Ideas that fly.

Mitigation Hierarchy		What this means for energy sector
STEP 1	**REFRAIN**	**REFRAIN** from building excessive, unnecessary or inappropriate infrastructure through better energy efficiency and energy sufficiency and smarter planning.
STEP 2	**AVOID**	**AVOID** developing in areas of ecological importance by prioritising low risk locations, planning strategically and assessing impacts effectively.
STEP 3	**MINIMISE**	**MINIMISE** impacts by utilising nature-safe designs (e.g. BFD) and adopting nature-safe practices (e.g SDOD).
STEP 4	**RESTORE**	**RESTORE** damage incurred during project construction.
STEP 5	**OFFSET**	**OFFSET** any residual and irreversible operational damage through like-for-like compensation.
STEP 6	**IMPROVE**	**IMPROVE** biodiversity more generally through support for supplementary conservation policy and action

AVISTEP

NATURE POSITIVE INITIATIVE

Ideas that fly.

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Need to consider biodiversity further ‘upstream’ in the planning process

- Typically, biodiversity is only considered once a site has already been identified.
- A site level assessment can only ever tell you if a site has sensitive wildlife. It cannot tell you how sensitive that site is relative to the wider landscape and indeed whether there are much more suitable locations elsewhere.

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Ideas that fly.

AVISTEP

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ONSHORE WIND

OFFSHORE WIND

PHOTOVOLTAIC (PV) SOLAR

OVERHEAD TRANSMISSION LINES
High voltage

OVERHEAD DISTRIBUTION LINES
Low — medium voltage

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- India
- Nepal
- Thailand
- Vietnam
- Kenya
- Lao PDR
- Uzbekistan
- Egypt

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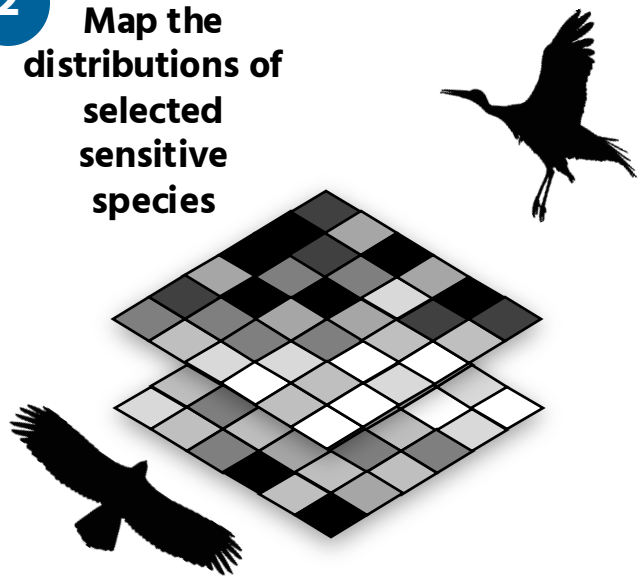
1

Calculate sensitivity scores for each species & identify sensitive species

- Collision
- Displacement
- Conservation status
- Life history

2

Map the distributions of selected sensitive species



Species occurrence probability =

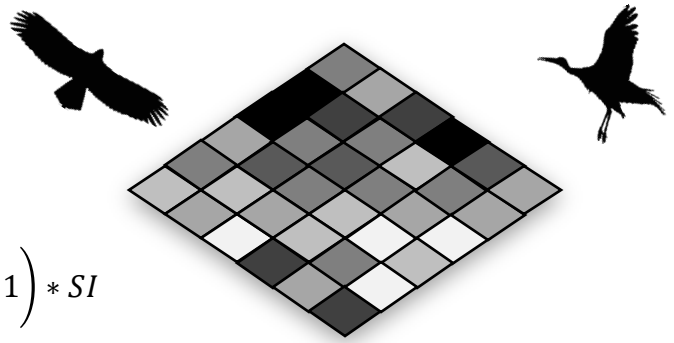
% area of habitat in each 5x5 km grid cell

+ species observations

3

Combine maps for sensitive species weighted by the sensitivity index

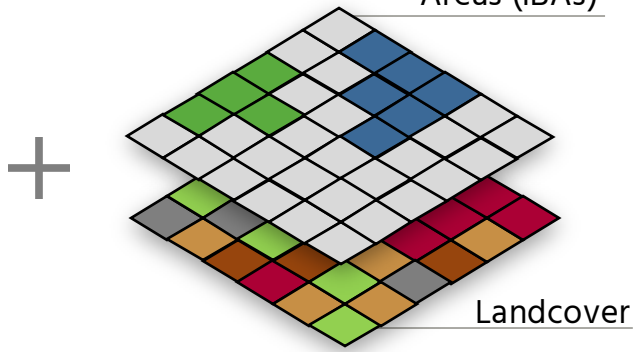
$$\sum_{species}^{n} ln\left(\frac{species\ occurence}{probability} + 1\right) * SI$$



4

Add other sensitive areas

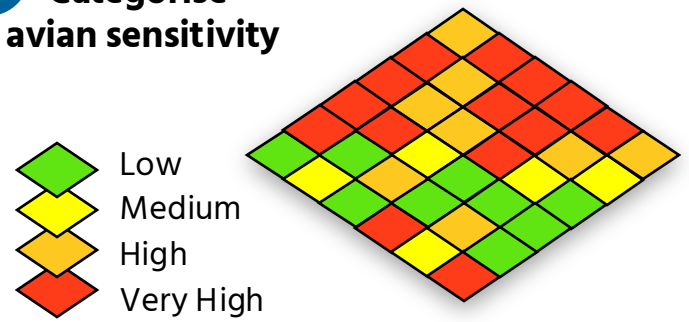
Important Bird & Biodiversity Areas (IBAs)



Landcover

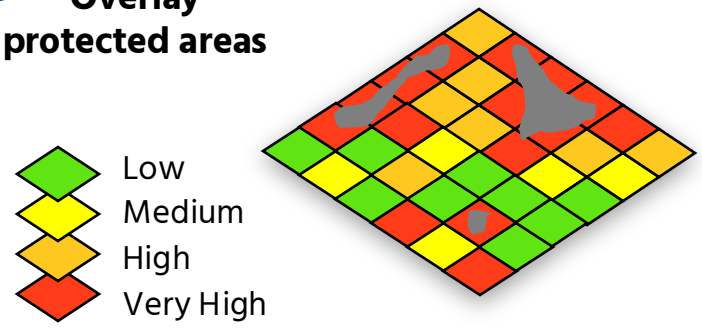
5

Categorise avian sensitivity



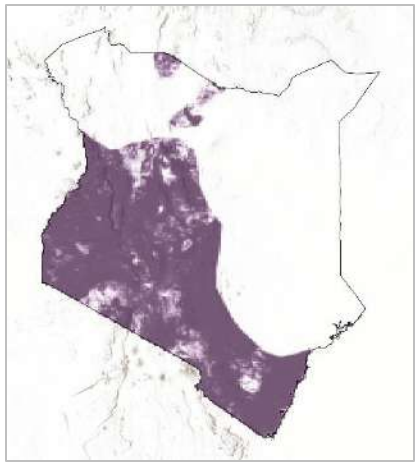
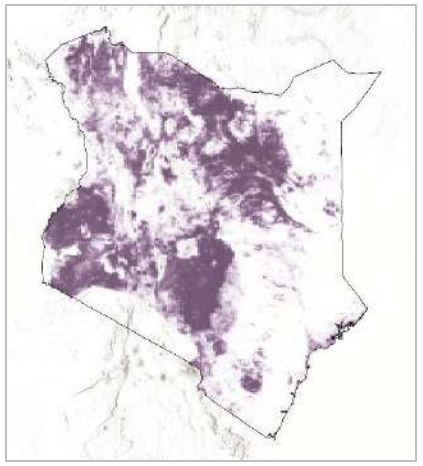
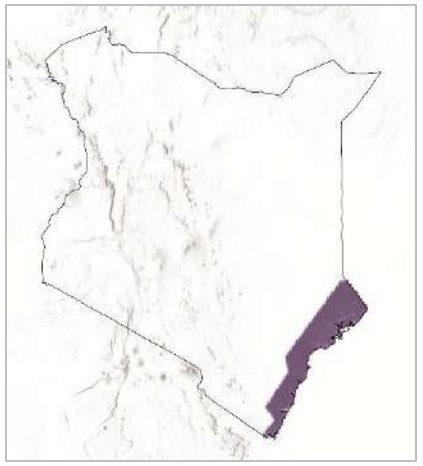
6

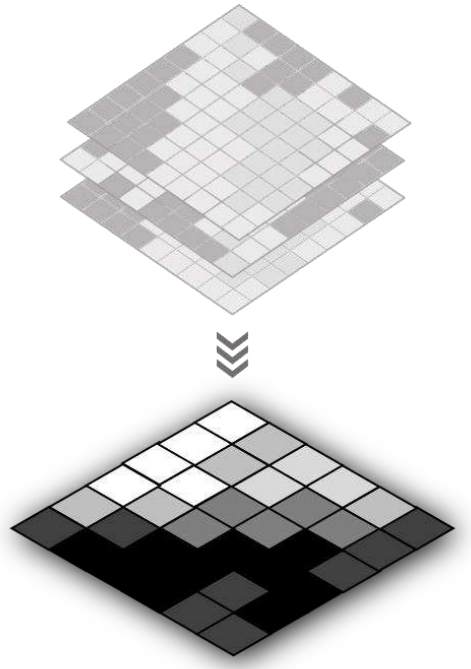
Overlay protected areas



Map the distribution of the sensitive species





Ideas that fly.

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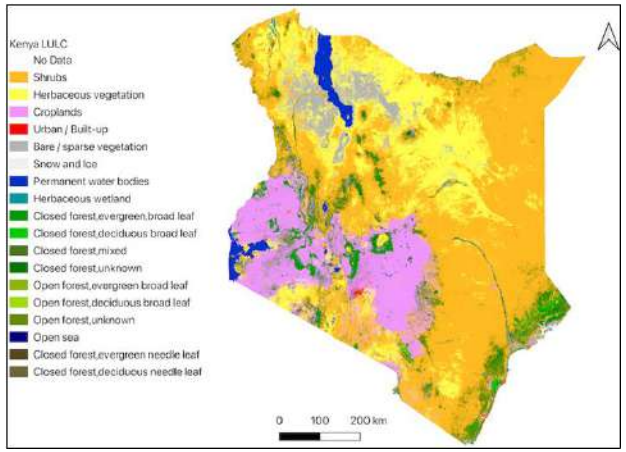
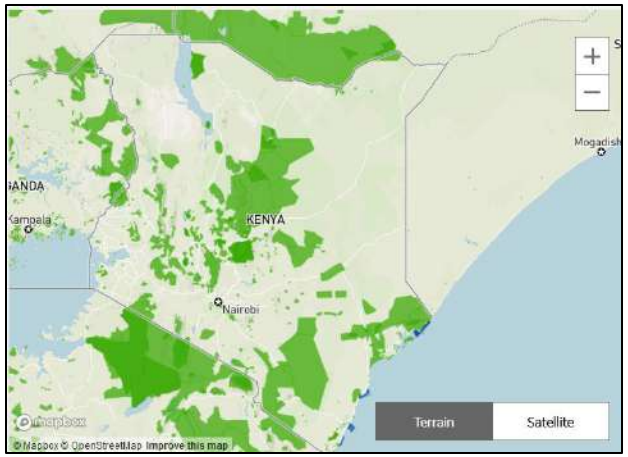
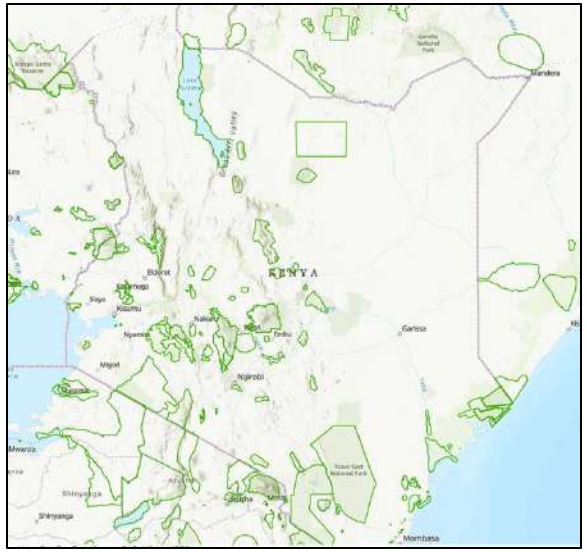
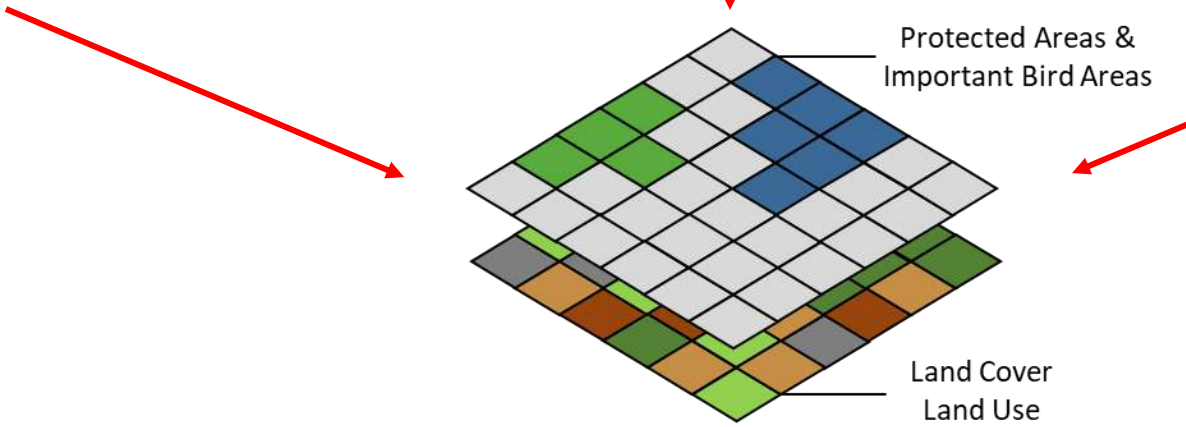
Map the distribution of the sensitive habitat









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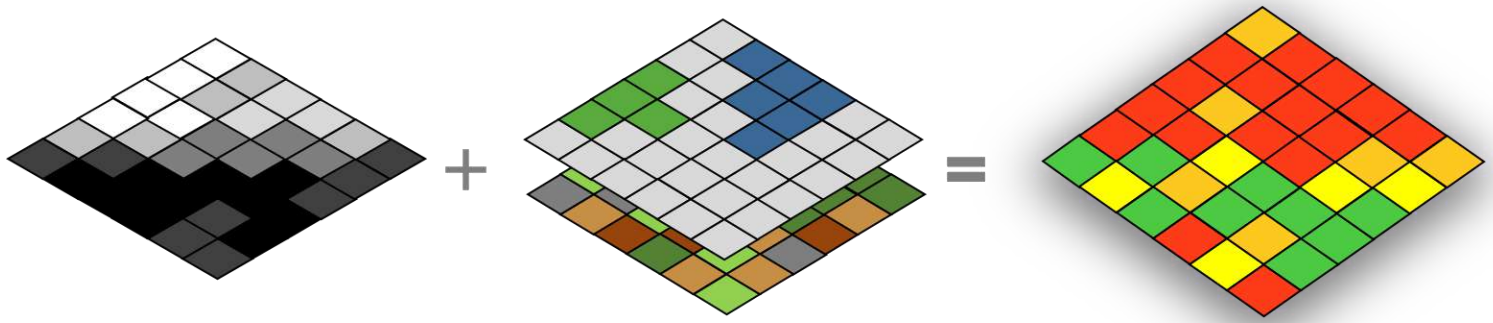
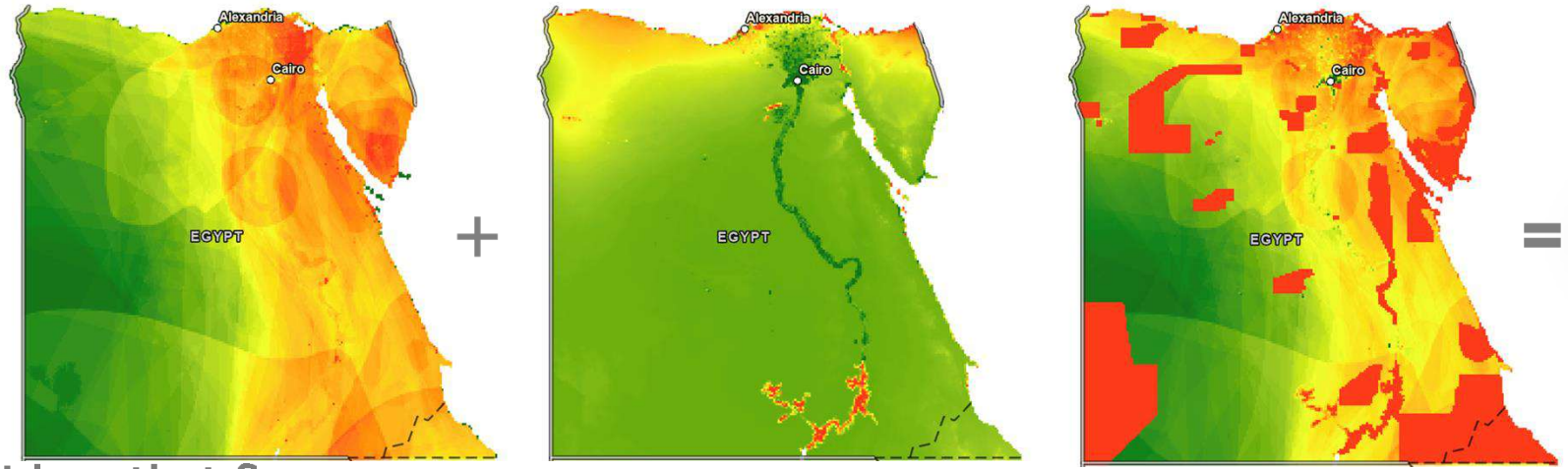
Combine the data and summarise the sensitivity into categories

Species sensitivity

Landscape sensitivity



Use **natural breaks** to identify four categories:



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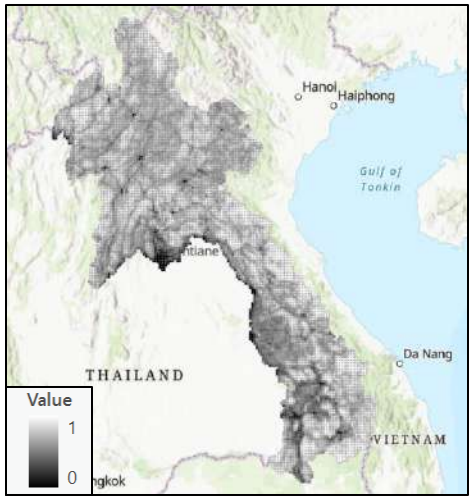
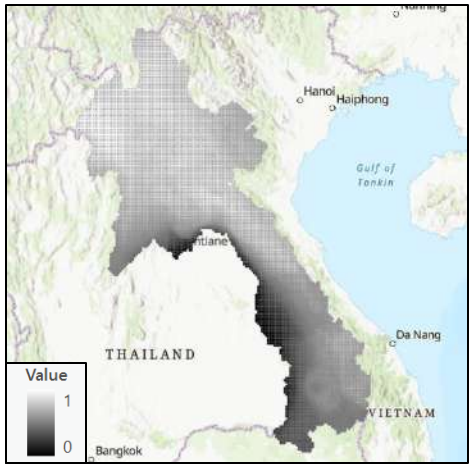
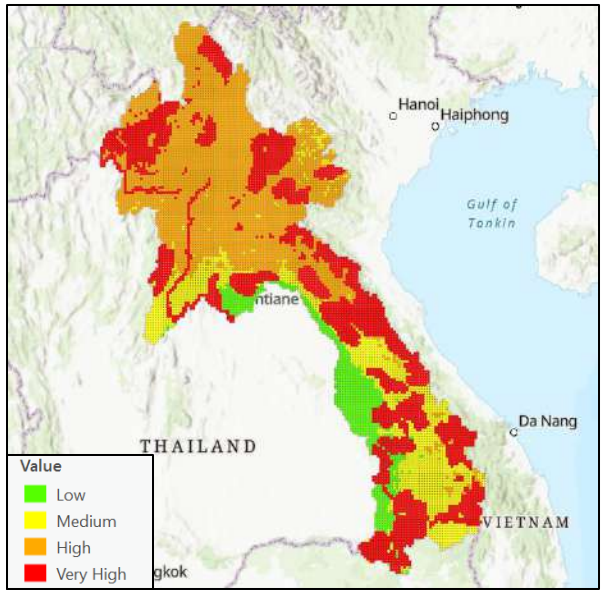
General framework - solar



Disturbance level



Bird richness with Cons Status



→ Integrating surfaces using **Multicriteria Analysis,** including **IBAs and PAs,** applying **Natural breaks**

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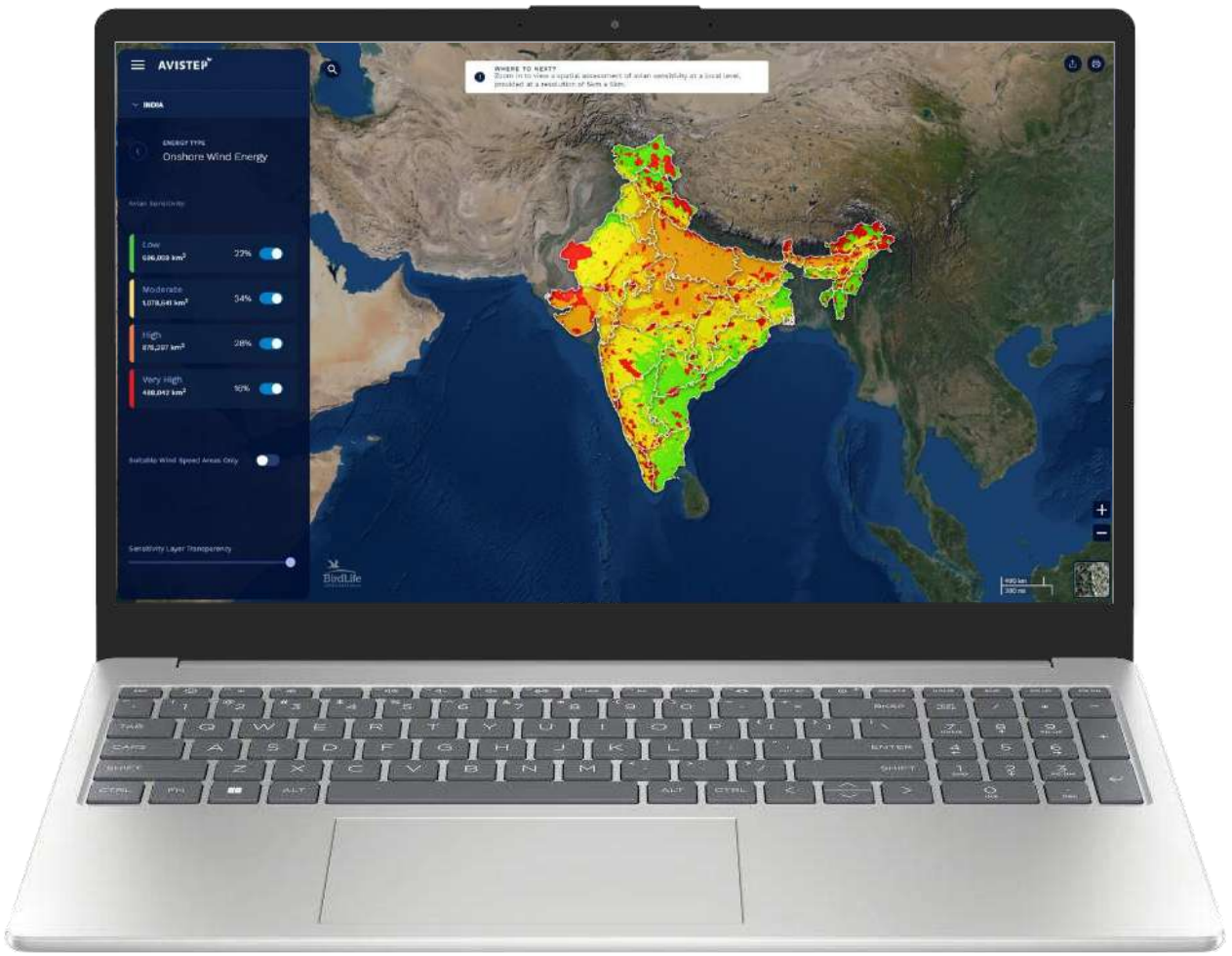
ONSHORE WIND

OFFSHORE WIND

PHOTOVOLTAIC (PV) SOLAR

OVERHEAD TRANSMISSION LINES
High voltage

OVERHEAD DISTRIBUTION LINES
Low — medium voltage



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Ideas that fly.

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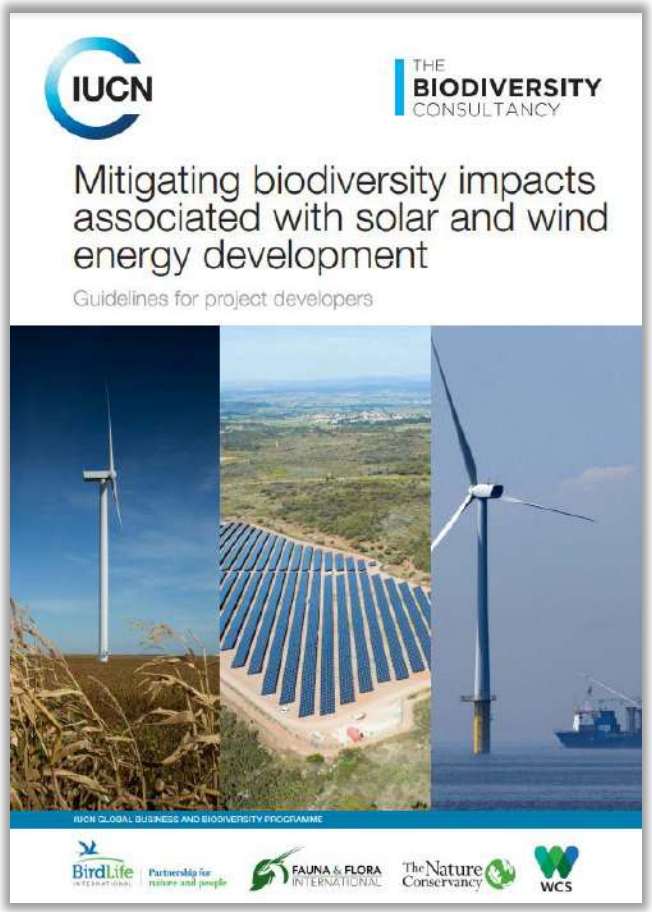
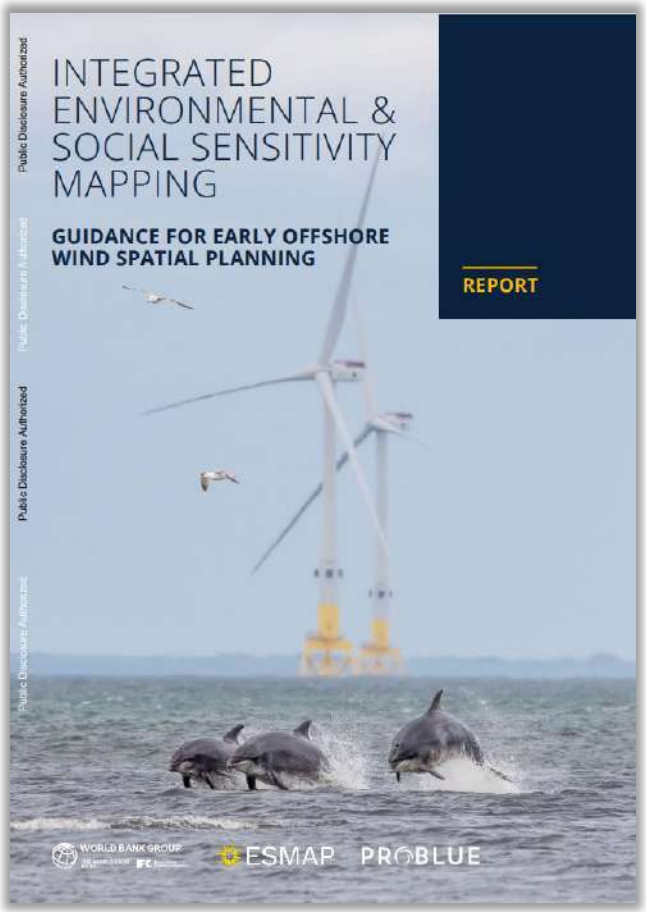
Sensitivity mapping is now globally established best practice

- Sensitivity mapping (and AVISTEP) widely recommended in best practice guidance.
- Increasingly energy investors expect the reassurance that development will not risk compromising their biodiversity standards.





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Ideas that fly.

Strategic planning informed by sensitivity mapping can help us to achieve renewable energy

- That is nature-safe;
- That is planned strategically and efficiently and optimizes available space;
- That is established more rapidly because the environmental impacts have been addressed from the outset;
- That is better inoculated against criticism and has greater public acceptance.

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Ideas that fly.

Benefits of using AVISTEP

- Provides biodiversity insight early in the planning cycle;
- Provides developers and financiers an upfront understanding of the biodiversity situation
  - They can factor suitable mitigation into the project design from the outset
- Helps speed up renewable energy growth whilst ensuring that this expansion is planned strategically and efficiently, optimizing available spaces.

Ideas that fly.

BirdLife INTERNATIONAL

Thank you!

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avistep.birdlife.org

Ideas that fly.

Presentations

Data and sensitivity mapping to understand and prevent mortality risks for birds

Dr. Joana Bernardino

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Science Officer Bird & Energy

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LPO France

Dr Soňa Svetlíková

Team Leader Modelling & Scientific Studies

TB Raab

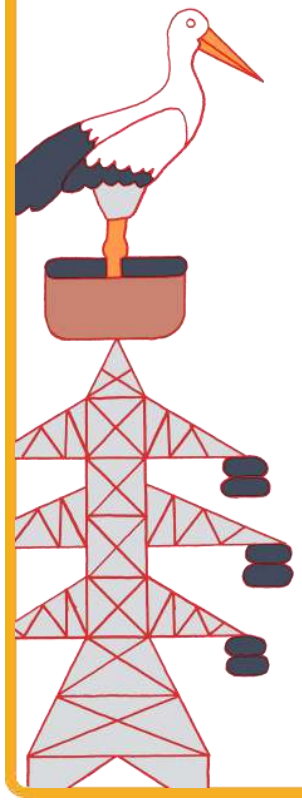
Dr Rainer Raab

CEO

TB Raab

Reducing bird mortality caused by power lines

Sensitivity mapping in France



Ingrid Marchand

LPO France

Wingspan 2024: Partnerships for a bird-friendly energy transition

15/10/2024

SafeLines4Birds

Context

- RTE: France's transmission system operator (mainland France)
- **100 000 km** of aerial high voltage

Le réseau de transport d'électricité

- Enedis: distribution system operator for much of France (mainland France)
- **More than 700 000 km** of aerial medium and low voltage

© Bruno Berthemy

Operational goals

- **Deliverables**

➢ Multi-species combination maps (resolution 1km2)

➢ One map per type of risk (collision/electrocution) and per operator (TSO/DSO)

➢ Usable at different scales

- **Uses**

➢ Secure the existing power lines for birds

➢ Planning new lines


© Dimitri Demande / ONF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Methodology: selection of the species and the data

- **Definition of the species list**

➢ Known cases of mortality / risk behaviour

➢ Types of issue (electrocution / collision)

➢ Type of data used

- **Sources of observation data**

➢ Faune-France database

➢ Other databases/data sources

FAUNE France


© Nicolas Gendre


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Methodology: selection of the species

- **List of species**

108 species impacted by the power lines

cd_nor	Nom vernaculaire	Nom latin	Période	Type de données
2651	Aigle botté	Hieraaetus pennatus	Reproduction	reproductions probable et certaine
2657	Aigle de Bonelli	Aquila fasciata	Hivernage	toutes les mailles avec 2 années
2657	Aigle de Bonelli	Aquila fasciata	Reproduction	reproduction certaine
2645	Aigle royal	Aquila chrysaetos	Reproduction	reproductions probable et certaine
2497	Aigrette garzette	Egretta garzetta	Reproduction	reproductions probable et certaine
2497	Aigrette garzette	Egretta garzetta	Toutes	toutes les mailles avec 2 années
2891	Autour des palombes	Accipiter gentilis	Reproduction	Toutes
3116	Avocette élégante	Recurvirostra avosetta	Reproduction	reproductions probable et certaine
2660	Balbuzard pêcheur	Pandion haliaetus	Internuptiale	toutes les mailles avec 2 années
2660	Balbuzard pêcheur	Pandion haliaetus	Reproduction	reproductions probable et certaine
2563	Barge à queue noire	Limosa limosa	Toutes	Effectif > 20
2563	Barge à queue noire	Limosa limosa	Reproduction	reproductions probable et certaine
2568	Barge rousse	Limosa lapponica	Toutes	Effectif > 20
2559	Bécasse des bois	Scolopax rusticola	Hivernage	toutes les mailles avec 2 années
2559	Bécasse des bois	Scolopax rusticola	Reproduction	reproductions possible, probable et ce
2901	Bécasseau cocorli	Calidris ferruginea	Toutes	Effectif > 20
3192	Bécasseau maubèche	Calidris canutus	Toutes	Effectif > 20
3206	Bécasseau minute	Calidris minuta	Toutes	Effectif > 20
2911	Bécasseau variable	Calidris alpina	Toutes	Effectif > 20
2543	Bécassine des marais	Gallinago gallinago	Toutes	Effectif > 20
2481	Bihoreau gris	Nycticorax nycticorax	Reproduction	reproductions probable et certaine
2481	Bihoreau gris	Nycticorax nycticorax	Toutes	toutes les mailles avec 2 années
2832	Bondrée apivore	Pernis apivorus	Reproduction	Toutes
2887	Busard cendré	Circus pygargus	Reproduction	reproductions probable et certaine
2878	Busard des roseaux	Circus aeruginosus	Reproduction	reproductions probable et certaine
2881	Busard Saint-Martin	Circus cyaneus	Reproduction	reproductions probable et certaine
2623	Buse variable	Buteo buteo	Toutes	Toutes
2473	Butor étoilé	Botaurus stellaris	Hivernage	Toutes
2473	Butor étoilé	Botaurus stellaris	Reproduction	reproductions probable et certaine

Methodology: species mapping

- **Observation filter**

➢ Breeding behaviour

➢ Phenology

➢ Recurrence

➢ Number

- **Mapping method according to level of knowledge**

➢ Almost complete knowledge of distribution (1 km² grid) -> Map of known data

➢ Poor knowledge of distribution (1 km² grid) -> Habitat model

➢ Buffer zones or protection perimeters added if necessary

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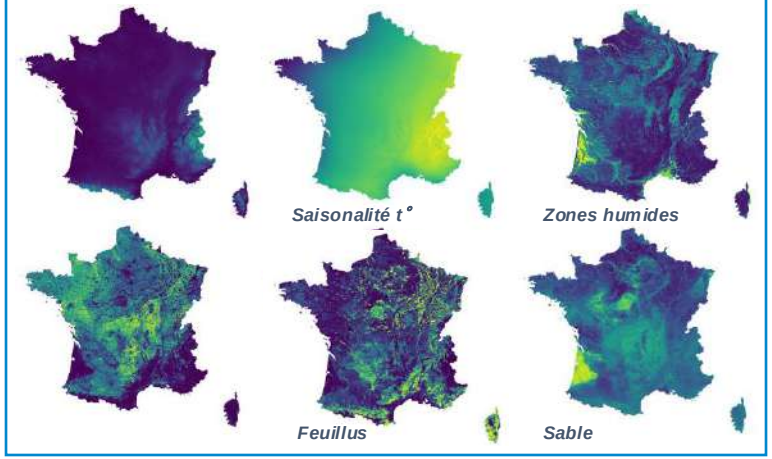
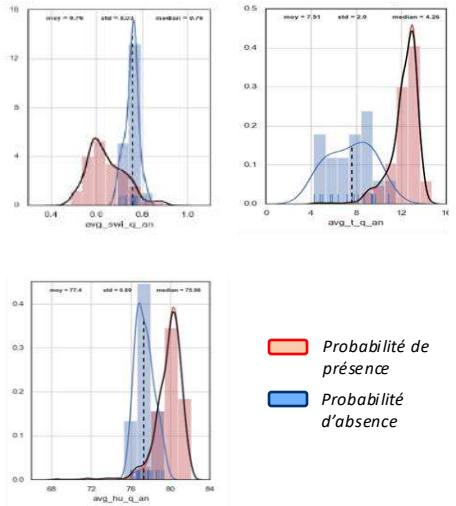
Methodology: species mapping

Occurrences
filtered

Environmental data



Habitat models

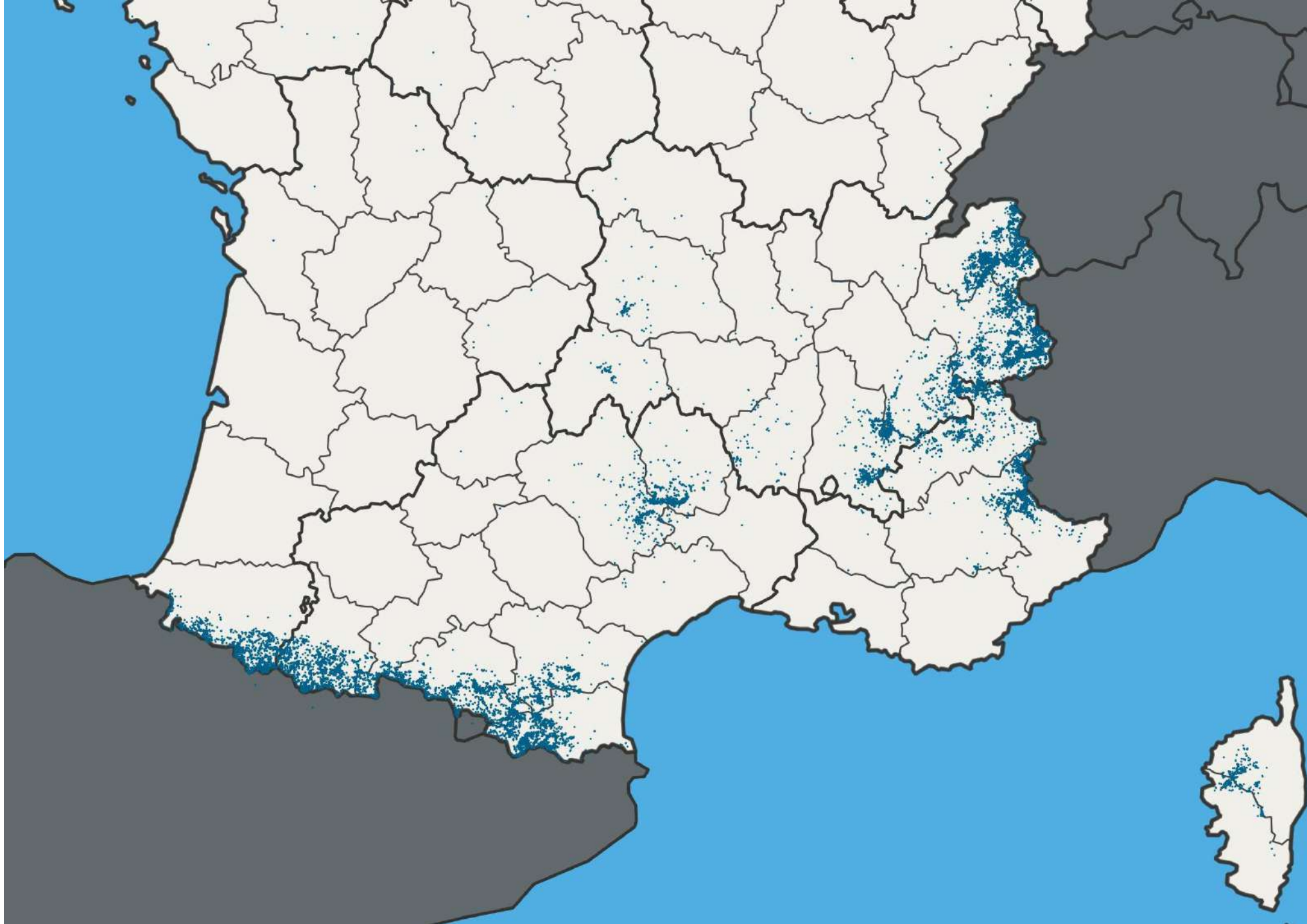


Ecological niche of the species
environmental parameters

Distribution model
Potential species distribution

Bearded vulture

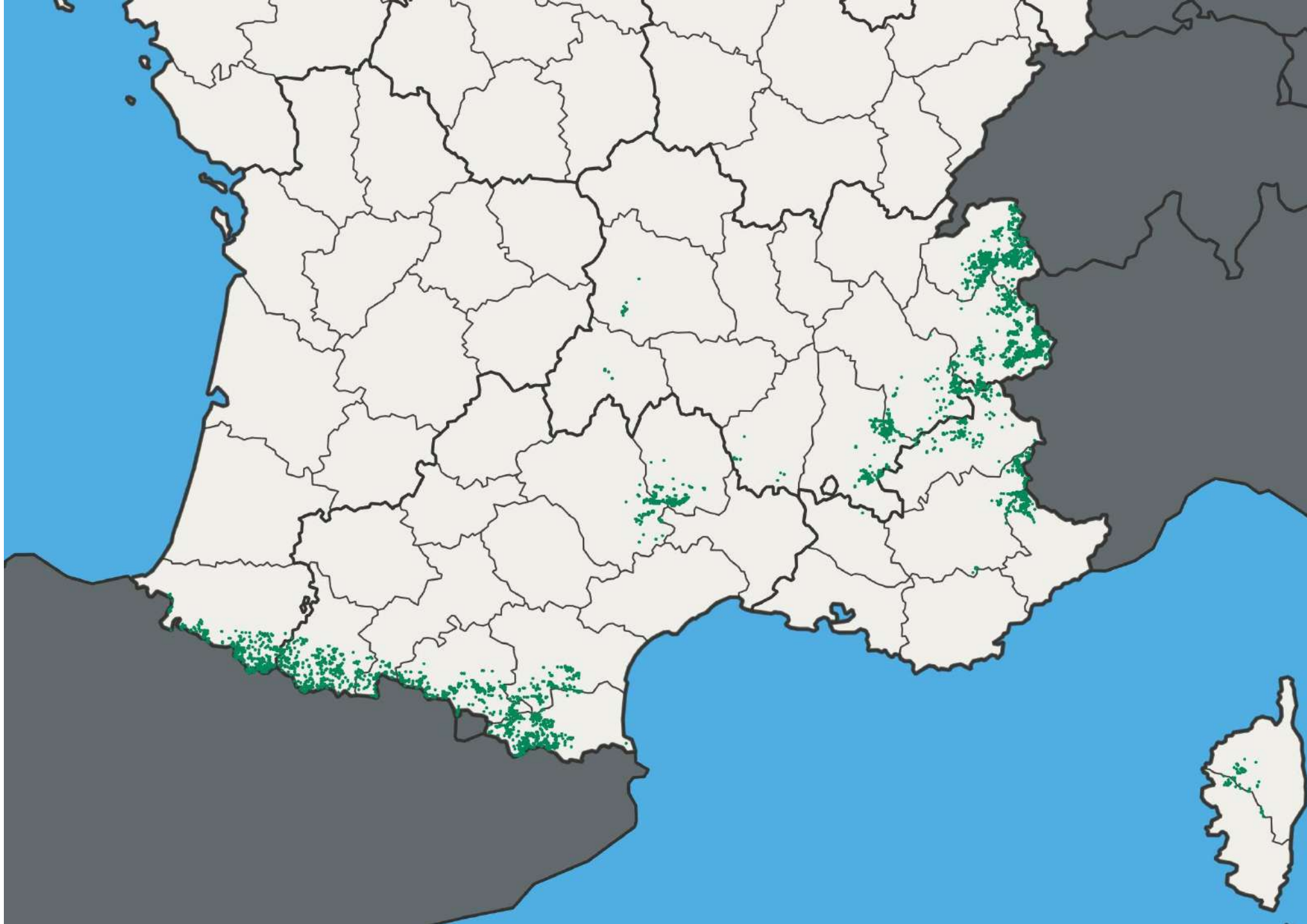
All row data



Bearded vulture

All row data

All data with 2 years of observation (in a radius of 1km)

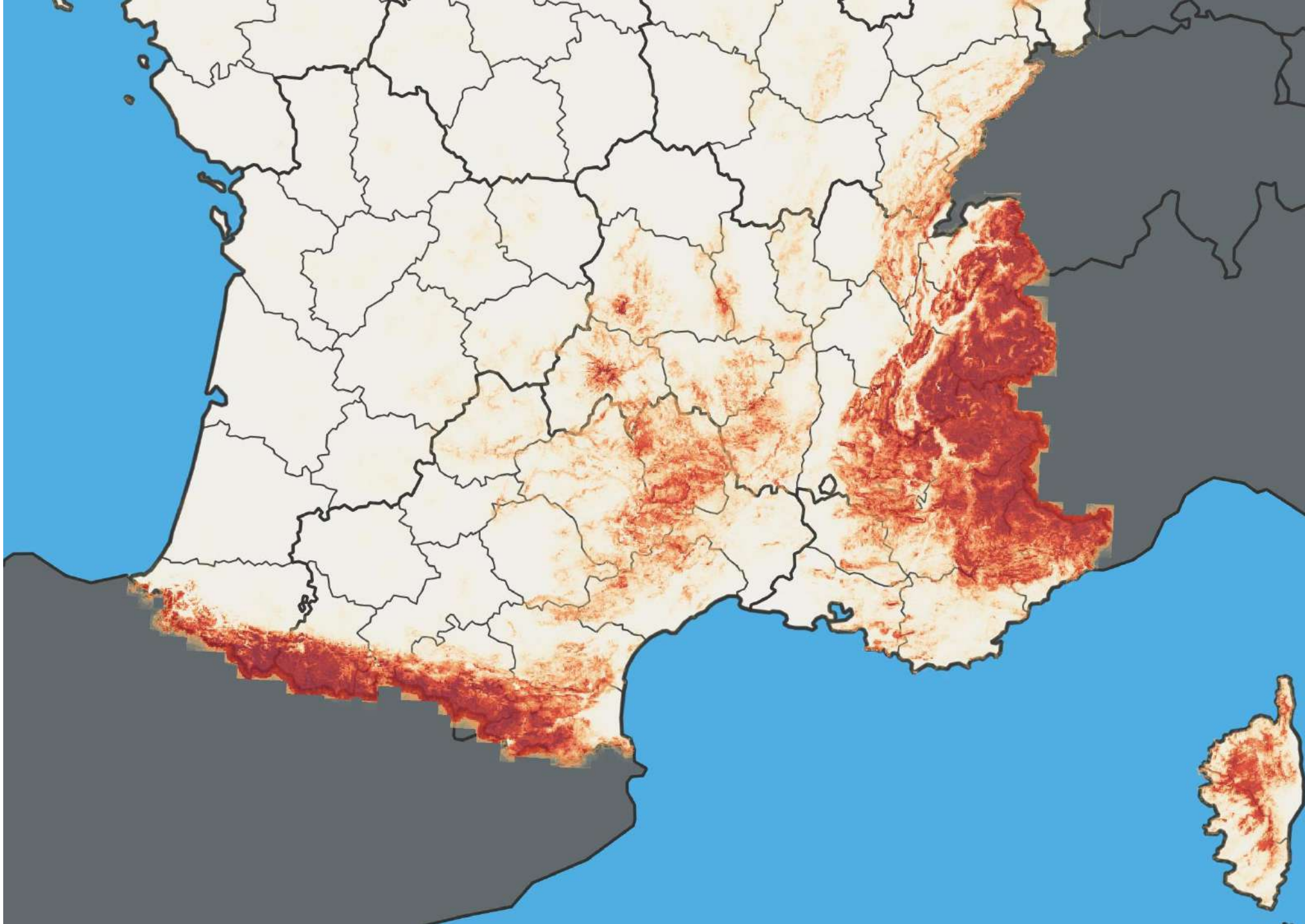


Bearded vulture

All row data

All data with 2 years of observation (in a radius of 1km)

Modelisation

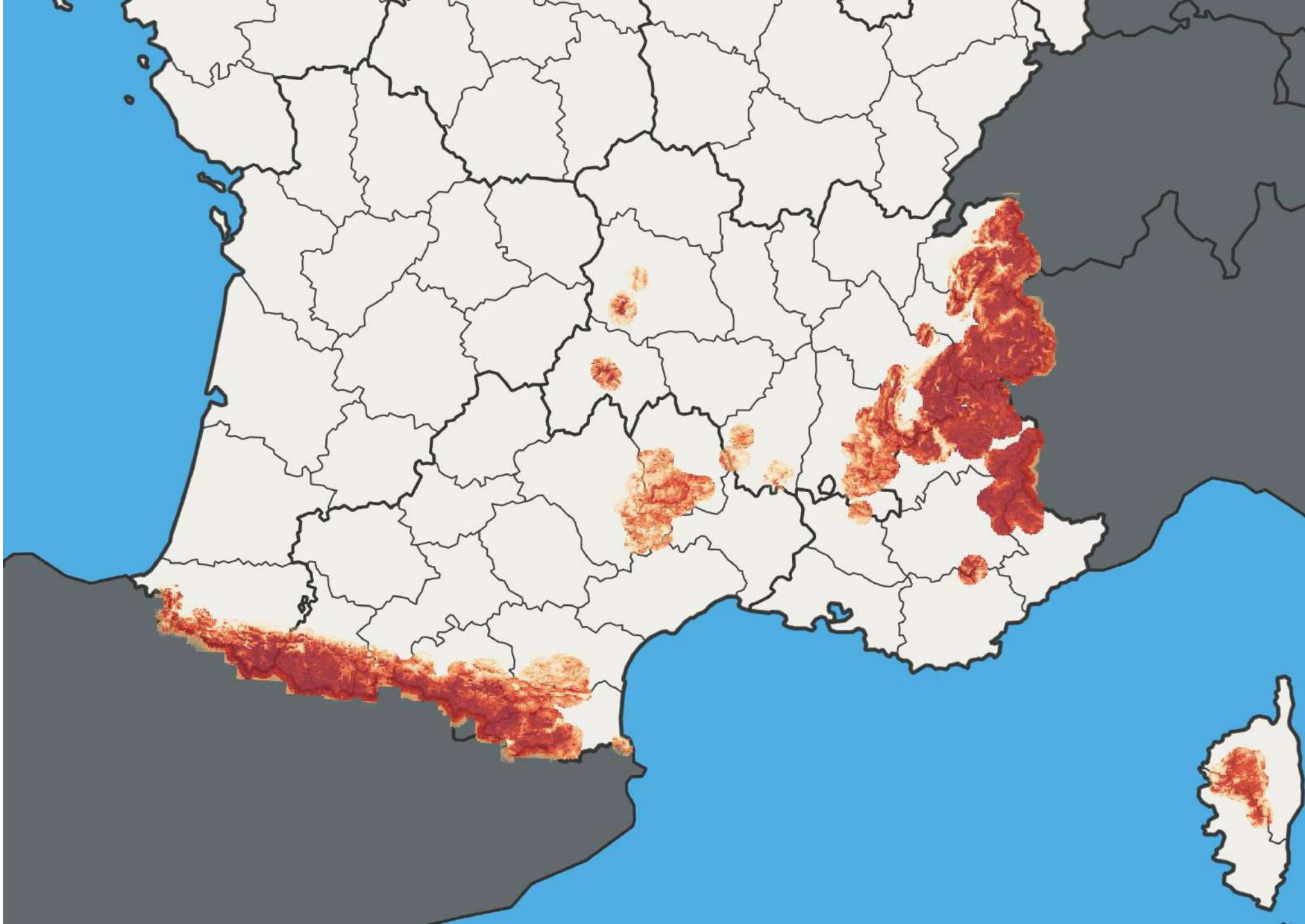


Bearded vulture

All row data

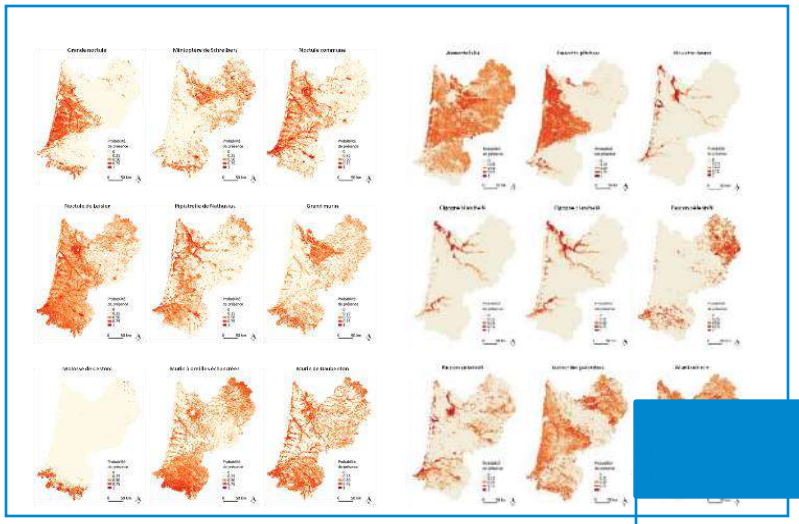
All data with 2 years of observation (in a radius of 1km)

Modelisation



Methodology: spatial synthesis

Distribution maps

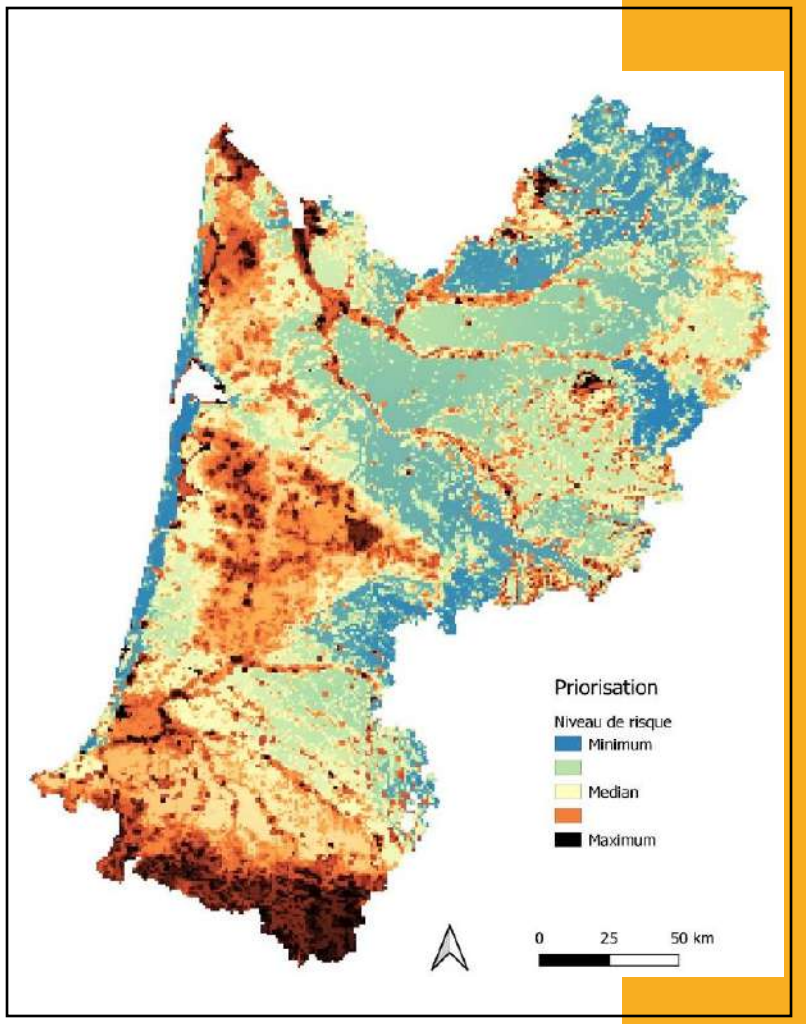


Species weighting
RL status x collision sensibility

Espèce à risque de collision	Filtre	Méthode	Statut LR	NoteA	Sensib. collision	NoteB	Note
Gypaète barbu	Tout	Modèle + ZSM	EN	0,8	max	1	0,8
Outarde canepetière	Reproduction	Modèle	EN	0,8	max	1	0,8
Vautour moine	Tout	Modèle + ZSM	EN	0,8	max	1	0,8
Vautour percnoptère	Tout	Modèle + ZSM	EN	0,8	max	1	0,8
Aigle royal	Reproduction	Modèle	VU	0,6	max	1	0,6
Cigogne noire	Reproduction	Avéré	VU	0,6	max	1	0,6
Grand tétras	Tout	Modèle	VU	0,6	max	1	0,6
Butor étoilé	Hivernage	Sites récurents	VU	0,6	max	1	0,6
Balbuzard pêcheur	Reproduction	Avéré	VU	0,6	moy	0,7	0,42
Balbuzard pêcheur	Hivernage	Modèle	VU	0,6	moy	0,7	0,42
Milan royal	Tout	Modèle + dortoirs	VU	0,6	moy	0,7	0,42
Courlis cendré	Reproduction	Modèle	VU	0,6	moy	0,7	0,42
Courlis cendré	Rassemblements	Sites récurents	VU	0,6	moy	0,7	0,42
Oie cendrée	Reproduction	Avéré	VU	0,6	moy	0,7	0,42

Spatial priorisation

Sensitivity map



What is next?

- Maps finalisation for December 2024
- Identification of the most dangerous sites by crossing both the species data and the dangerousness of structure characteristics

  - Inventory and analysis of potentially dangerous power lines
  - Ranking methodologies
  - Drafting of a technical guide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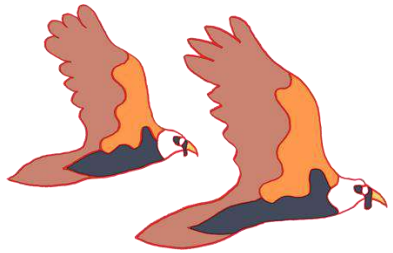

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Presentations

Data and sensitivity mapping to understand and prevent mortality risks for birds

Dr. Joana Bernardino

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Team Leader Modelling & Scientific Studies

TB Raab

Dr Rainer Raab

CEO

TB Raab

Habitat use and influence of the grid infrastructure on the West Pannonian Great Bustard population

Soňa Svetlíková

CONFERENCE WINGSPAN

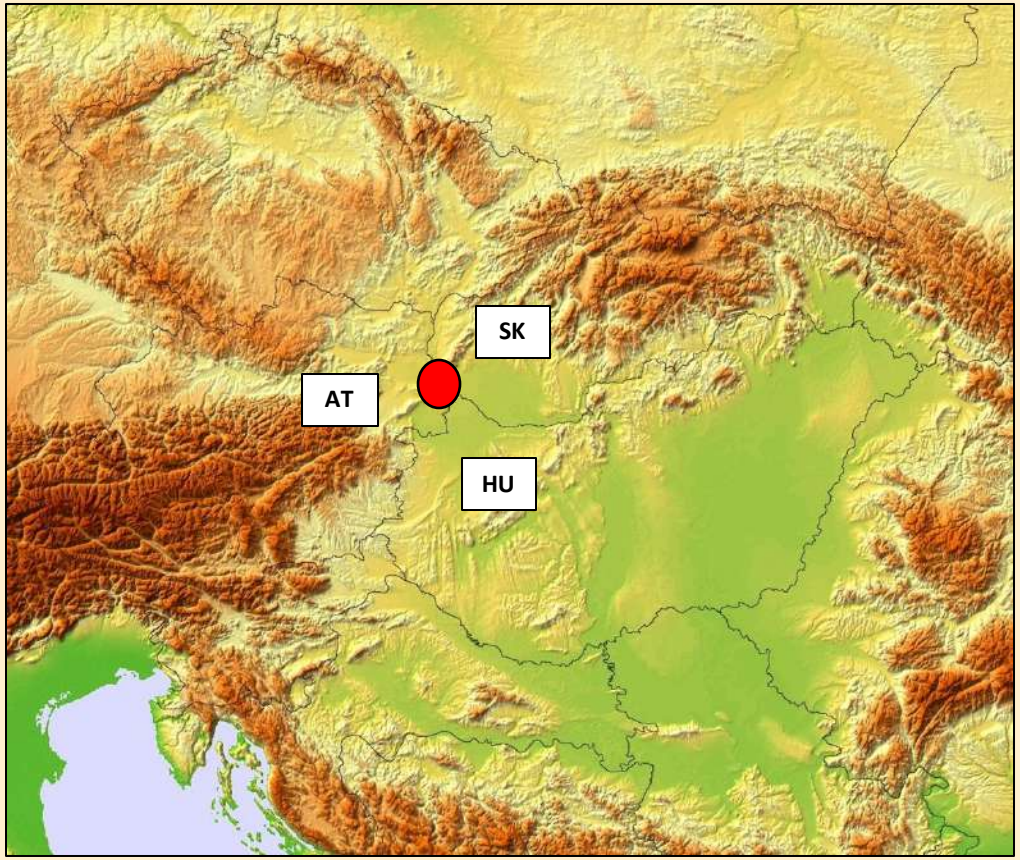
Wingspan 2024:
Partnerships for a bird-friendly energy transition
15 – 17 October 2024, Brussels

Model species

Great Bustard (*Otis tarda*)

- globally threatened species (EN)
- extinctions in many parts of Europe
- distribution restricted mostly to agricultural land
- survival dependent on conservation measures

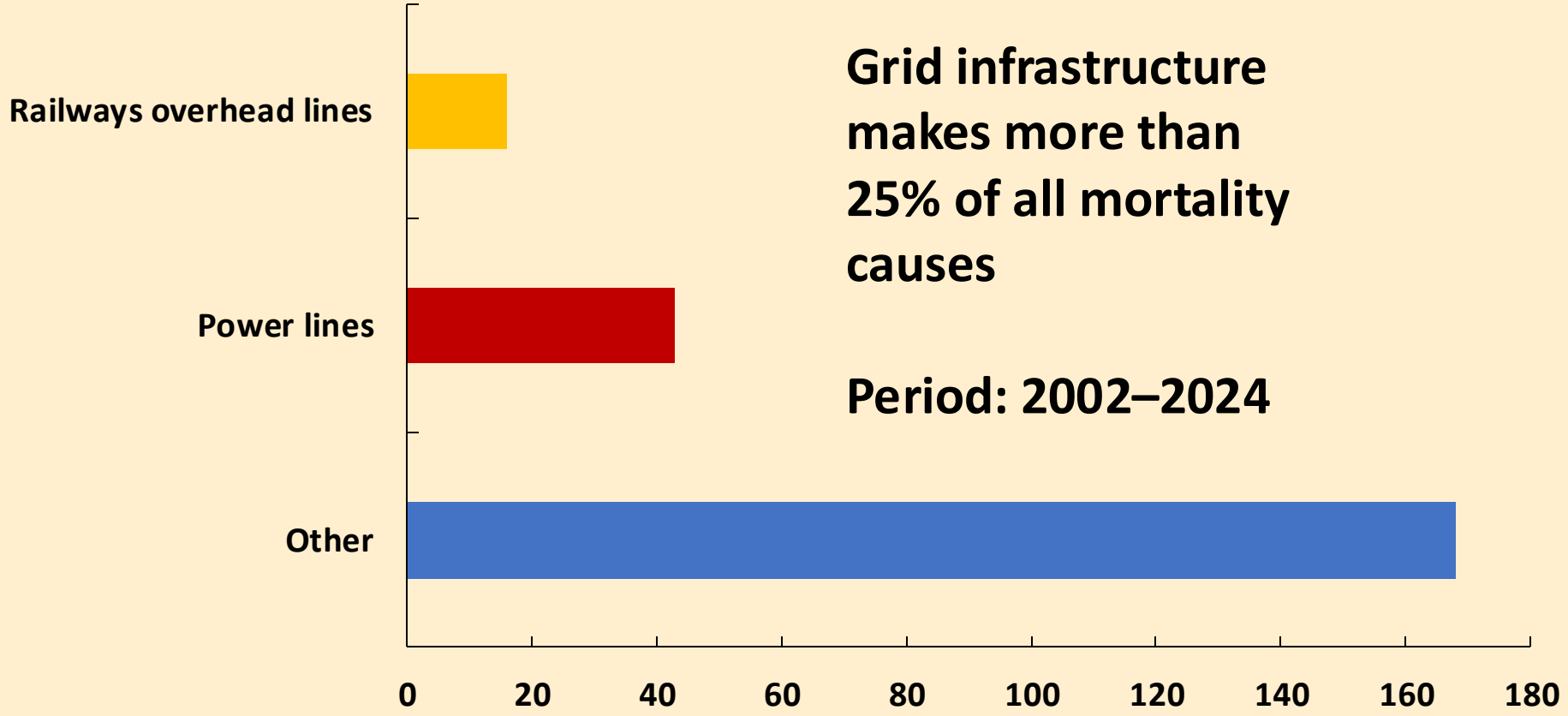
Model population



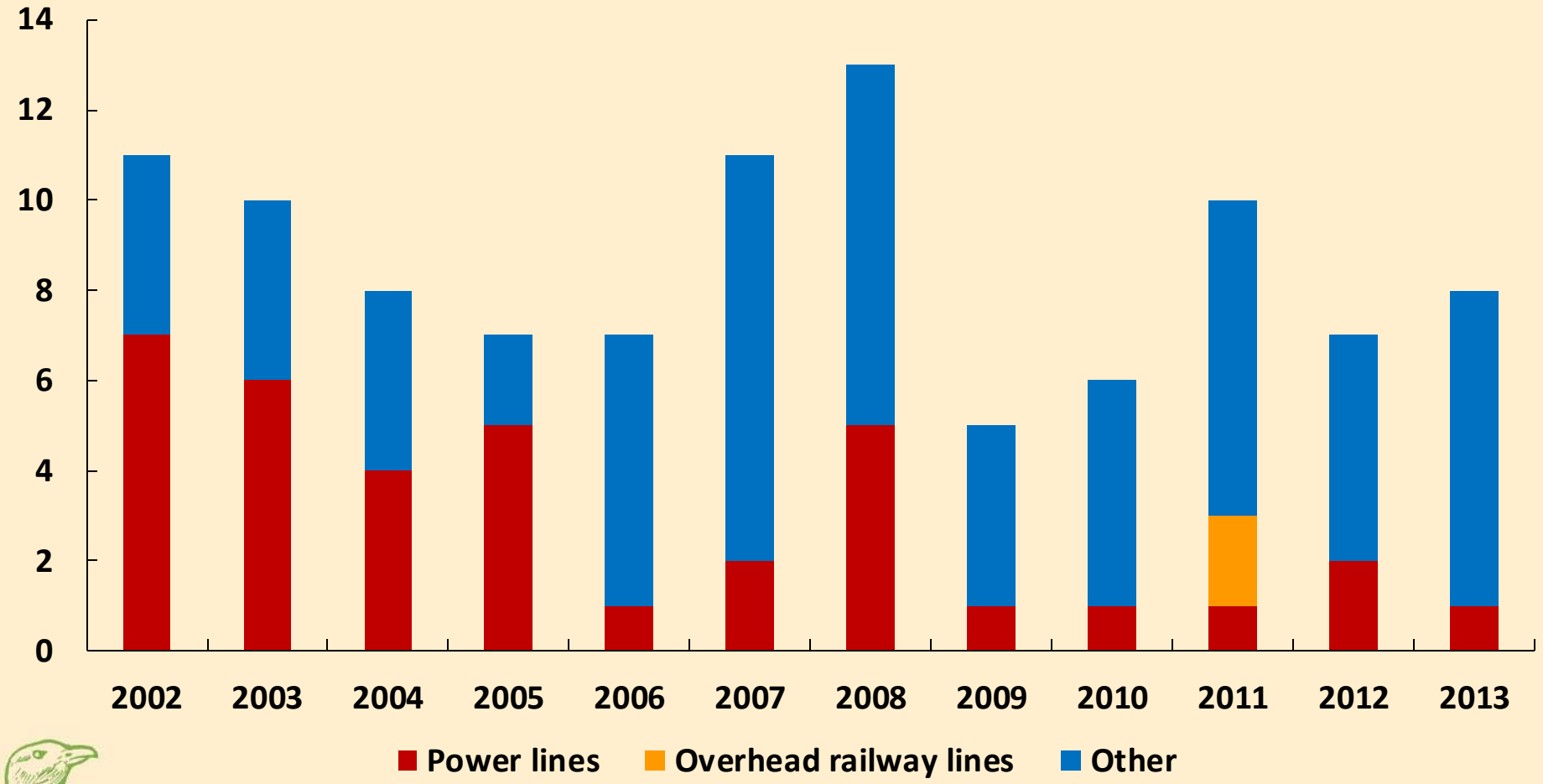
West-Pannonian Great Bustard population

- Central Europe
- Tri-border area
- Austria
- Slovakia
- Hungary

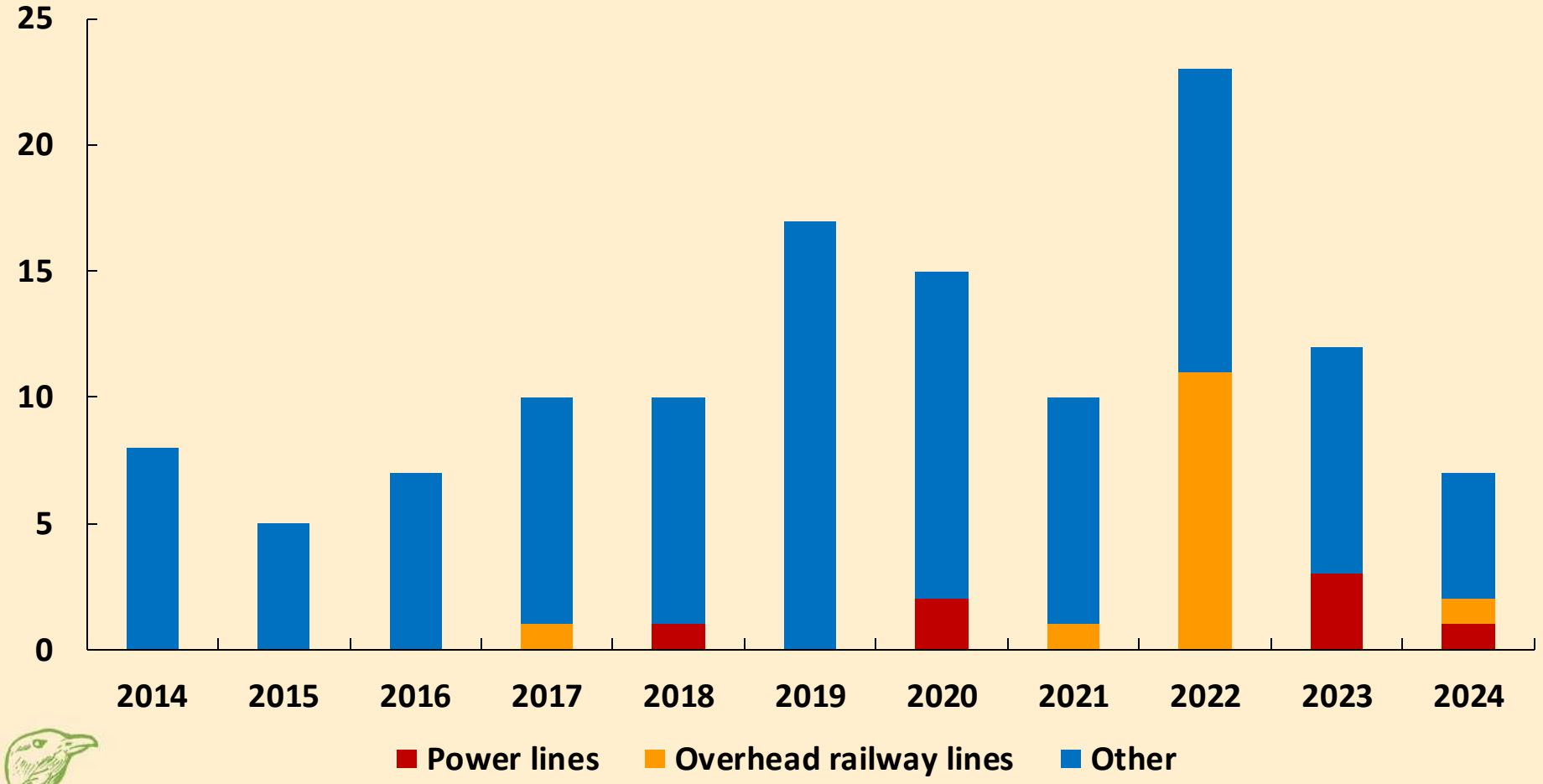
Major pressures and threats



Change of the major mortality causes between 2002 and 2013



Change of the major mortality causes between 2014 and 2024



Urgent need

To understand the spatial behaviour of Great Bustard in human altered world !

To set conservation measures on evidence-based data !

Major questions

Q1: What habitats are used by bustards?

- What is preferred?
- What is avoided?

Q2: Where bustards can move in human altered landscape?

- Which habitats are most important?
- Where are the major obstacles?

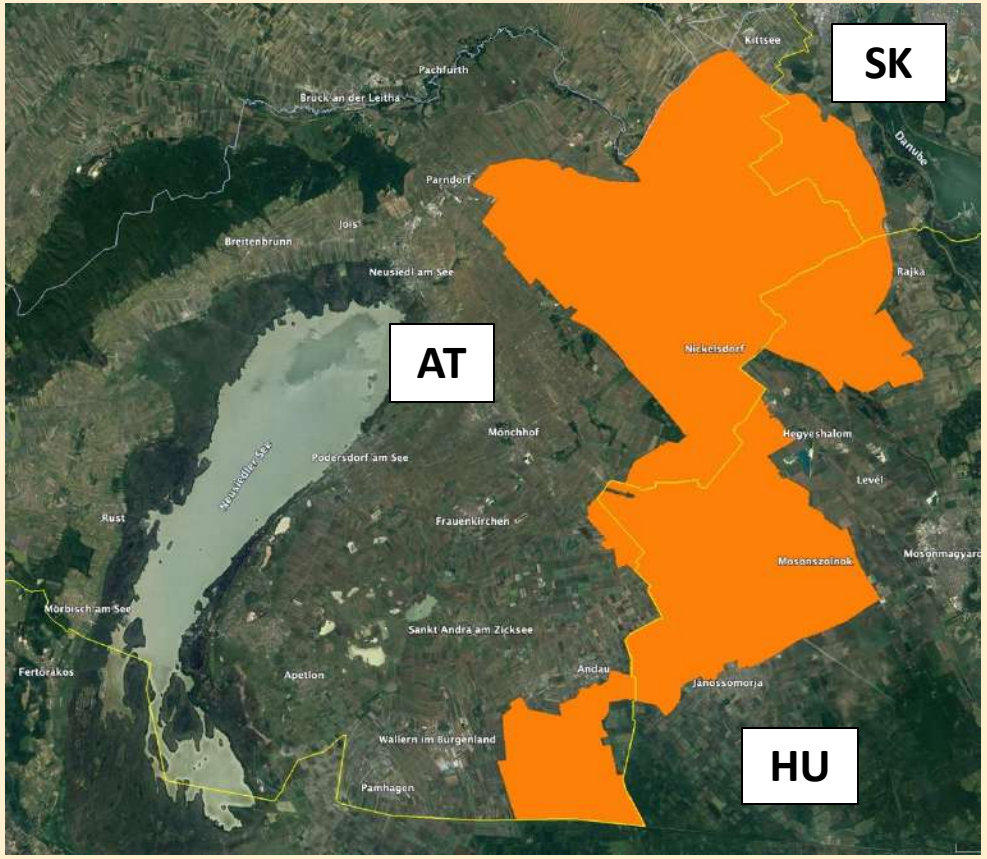
Study aims

A1: investigate which habitats bustards use and avoid

A2: identify the most important habitats for bustards

A3: create a framework to increase habitat connectivity for this threatened farmland bird

Study site



West-Pannonian Great Bustard population

4 study sites

- Heideboden
- Parndorfer Platte
- Mosonszolnok
- Hanság

Methods – major inputs (2016–2022)

76,656 observations of ind.

- Males
- Females
- Total

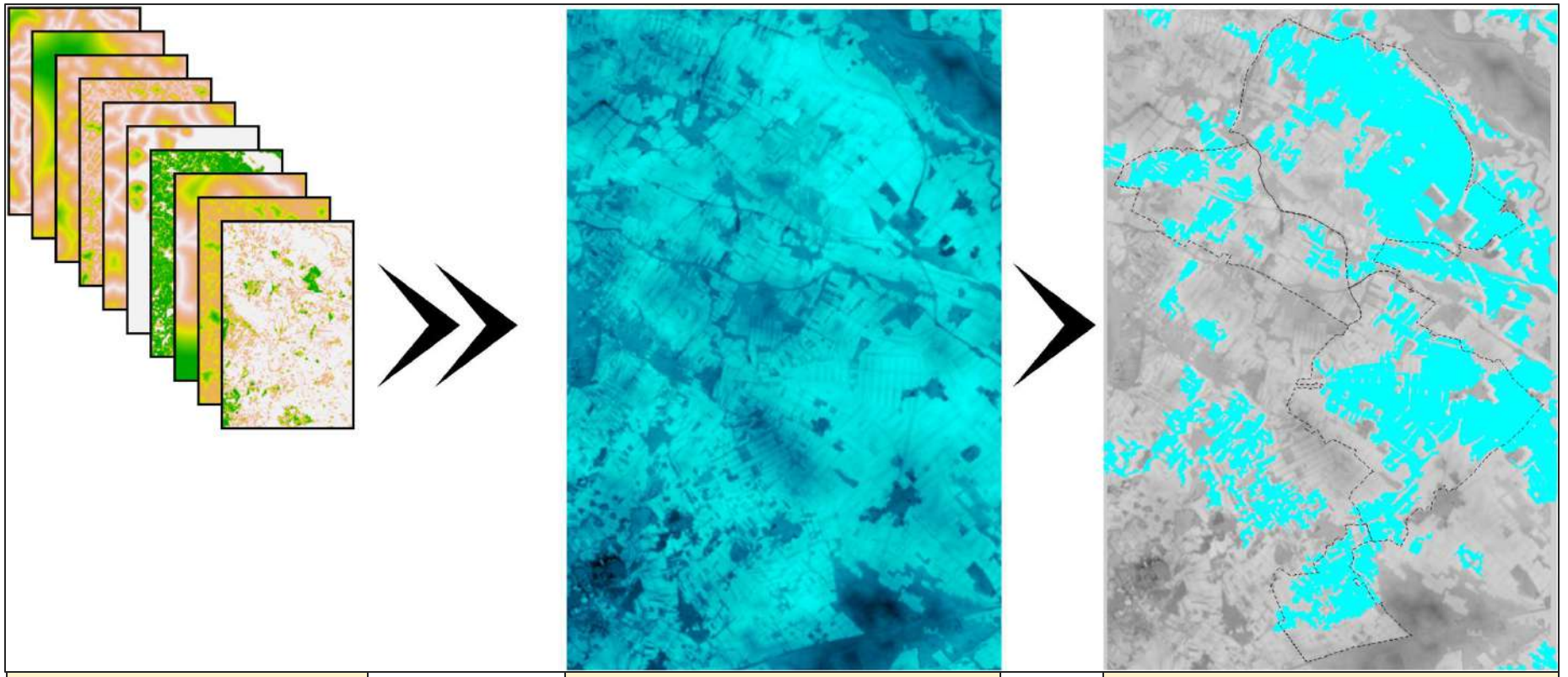
Three different periods:

- breeding
- non-breeding
- wintering

More than 20 different variables

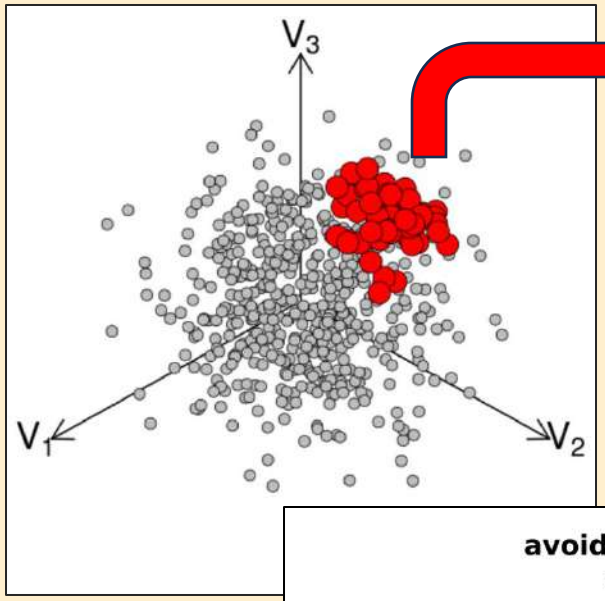
- natural habitats
- human-altered habitats
- grid infrastructure

Methods – major outputs

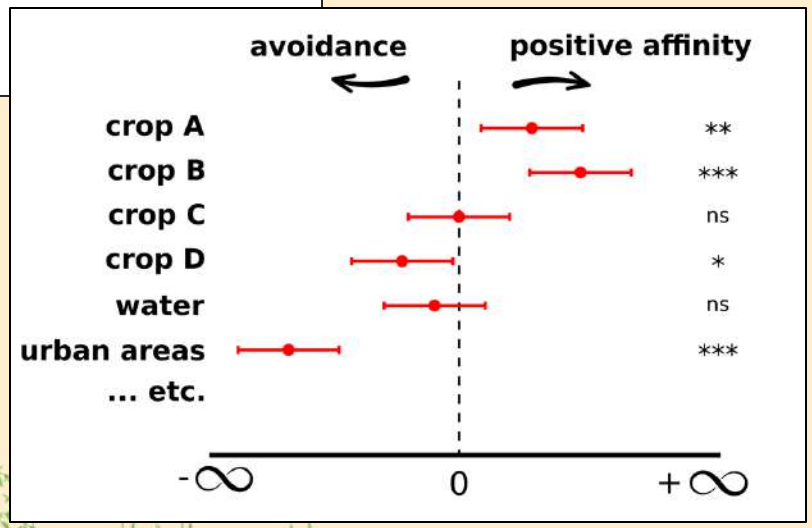


1) Environmental variable rasters	2) Analysis via ENFA + domain	3) Selection of high quality areas

Methods – analysis of habitat use



Ecological niche used by bustard



ENFA - **E**cological **N**iche **F**actor **A**nalysis

Calculations of marginalities

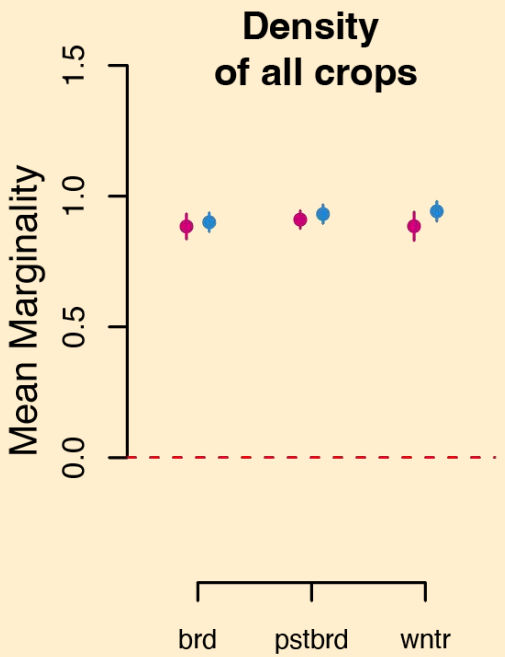
- marginality (+) = habitat use
- marginality (-) = habitat avoidance

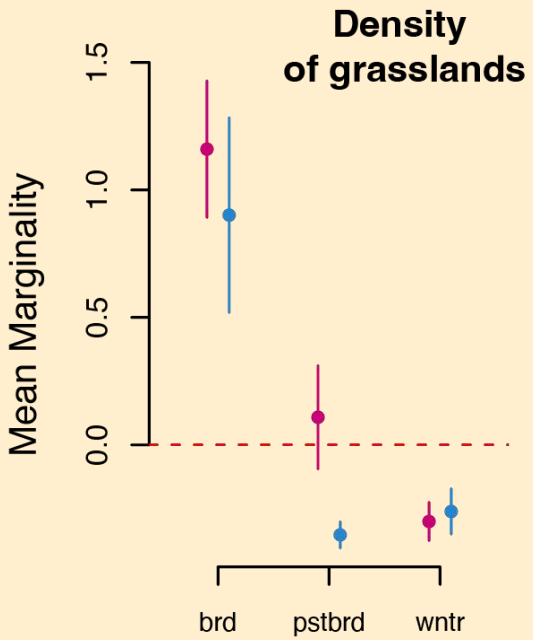
MPG - **Planar network modelling**

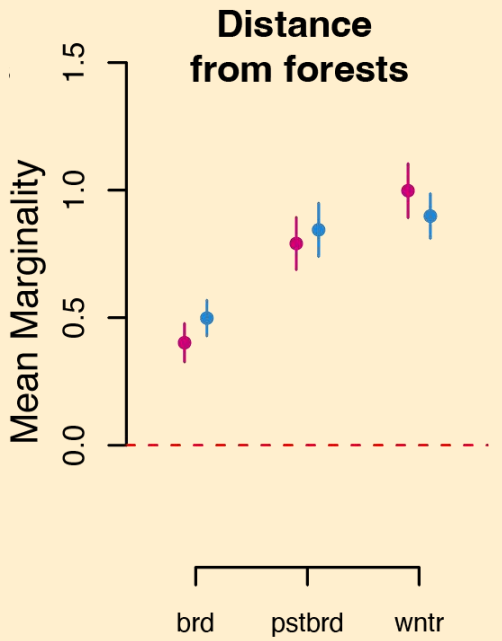
- Visualization in a map

Results – habitat use analysis

Results – nature-close environment

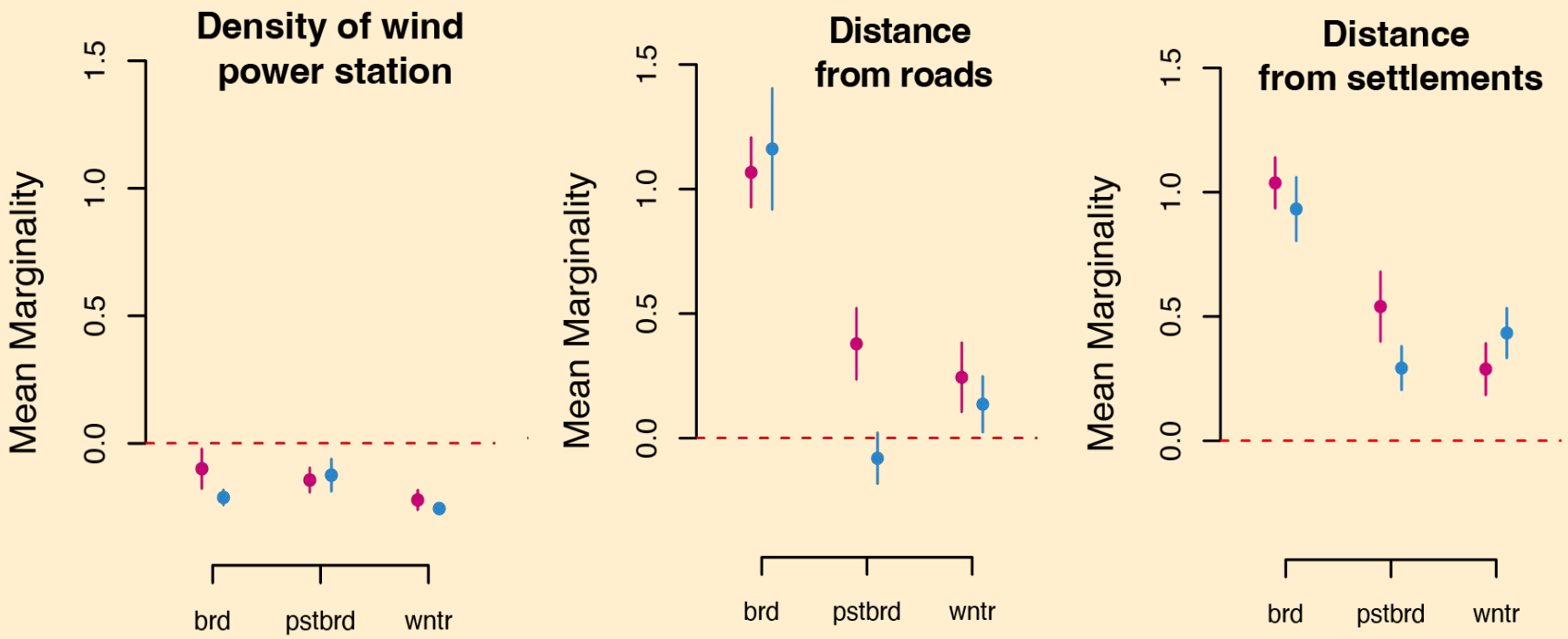






Positive marginality to density of crops, grasslands and distance from forests

Results – human-altered environment



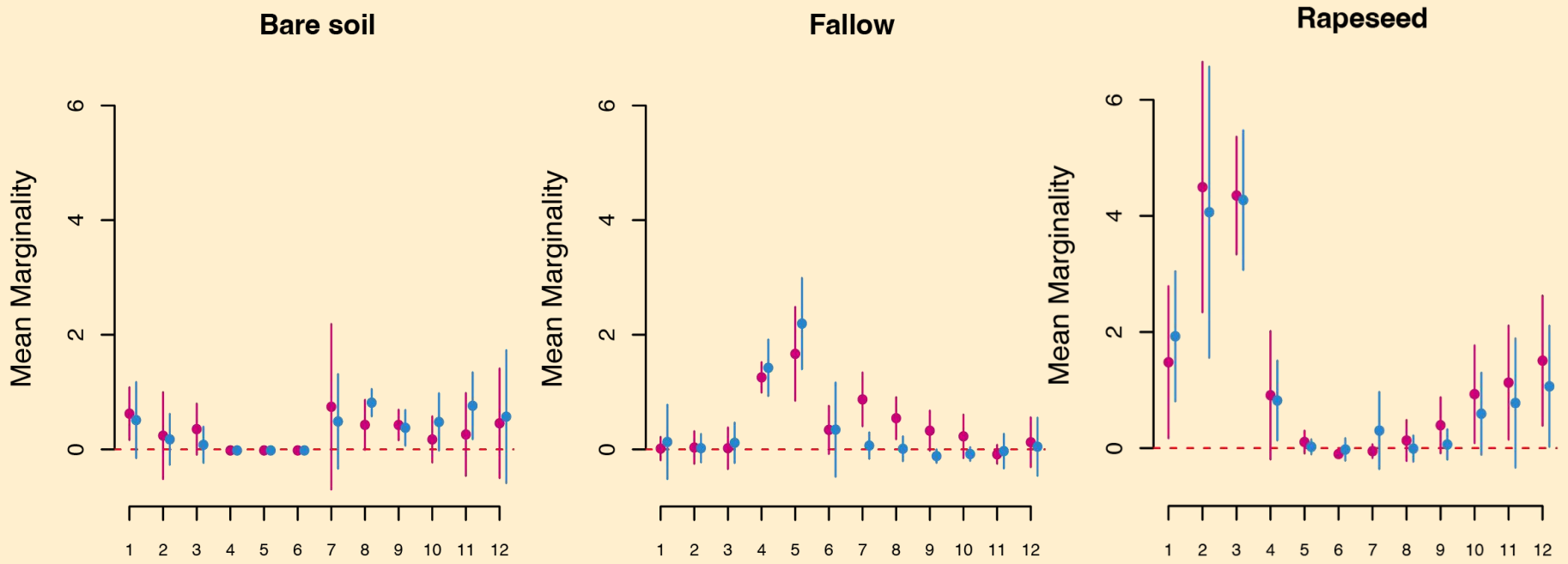
Negative marginality to density of wind power stations and positive marginality to distances from roads and settlements

Results – human-altered environment


© Franz Josef Kovacs


© Jozef Ridzoň

Results – use of crops

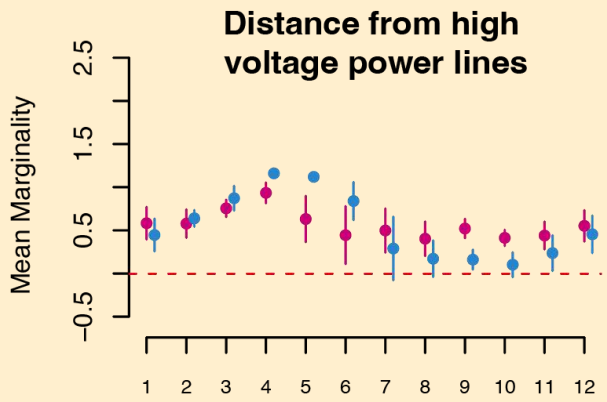


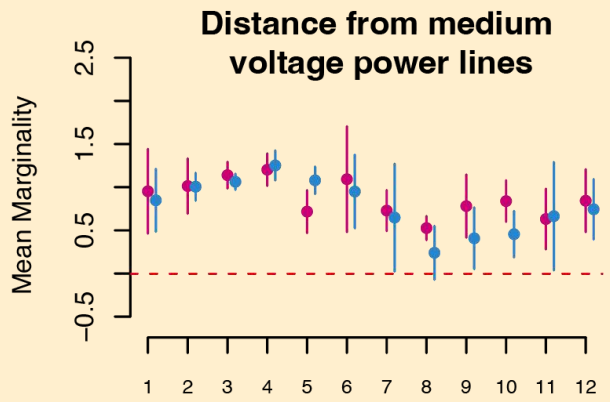
Positive marginality to bare soil, fallows and rapeseed

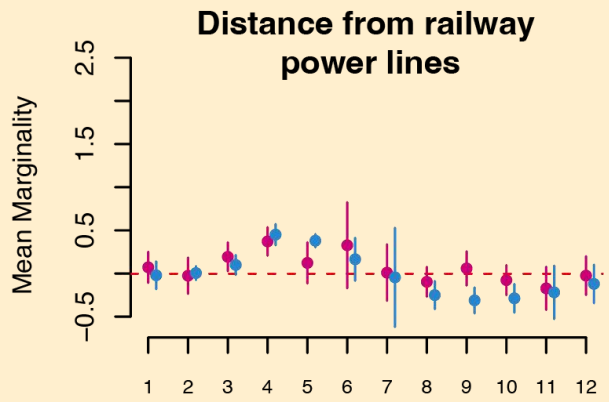
Results – importance of bare soil and fallows

Results – importance of rapeseed in winter

Results – use of habitats with grid infrastructure





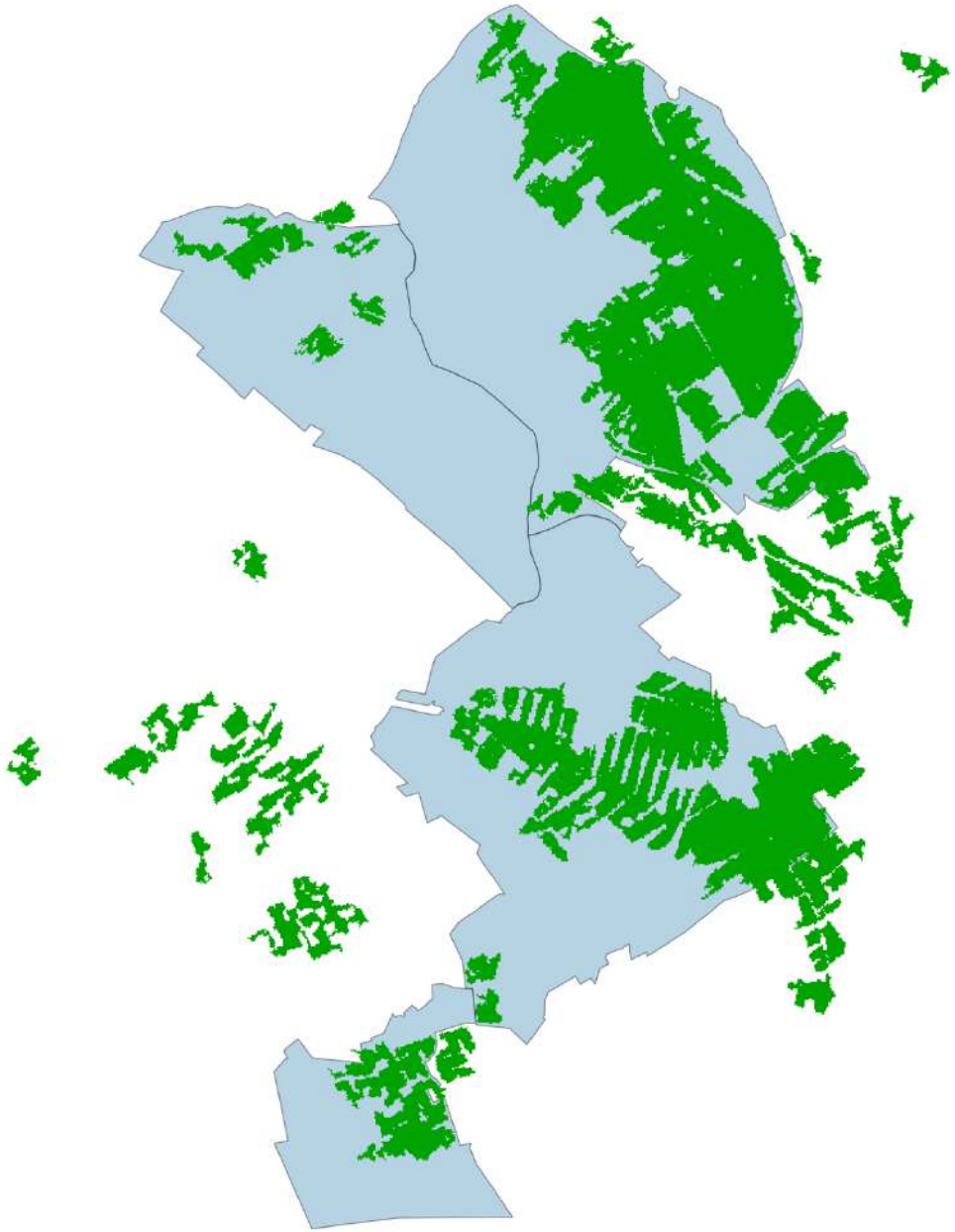


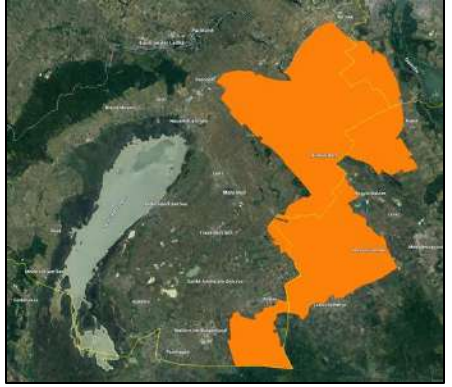
Both sexes show a weak positive or zero marginalities to distances from power lines.

Results – weak avoidance or zero marginality to distances from power lines

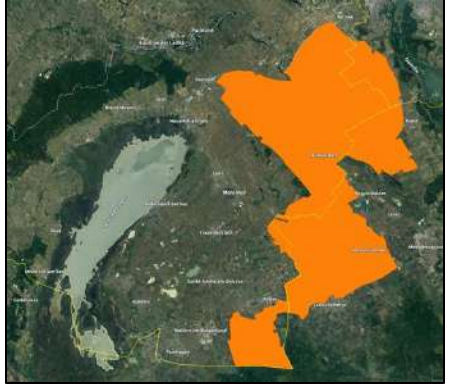
Indication of non-perception of these dangerous objects ???

Results – landscape connectivity modelling



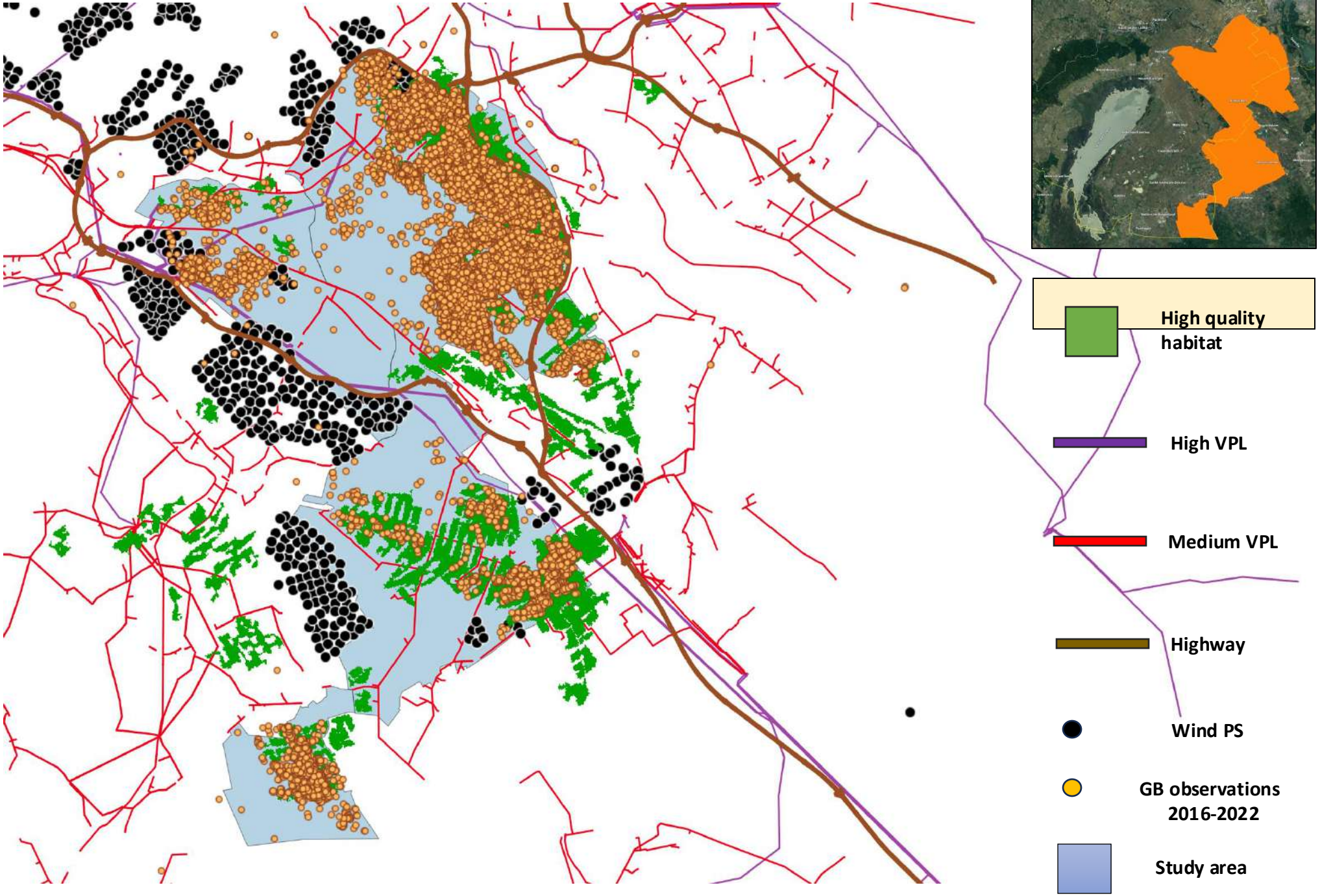


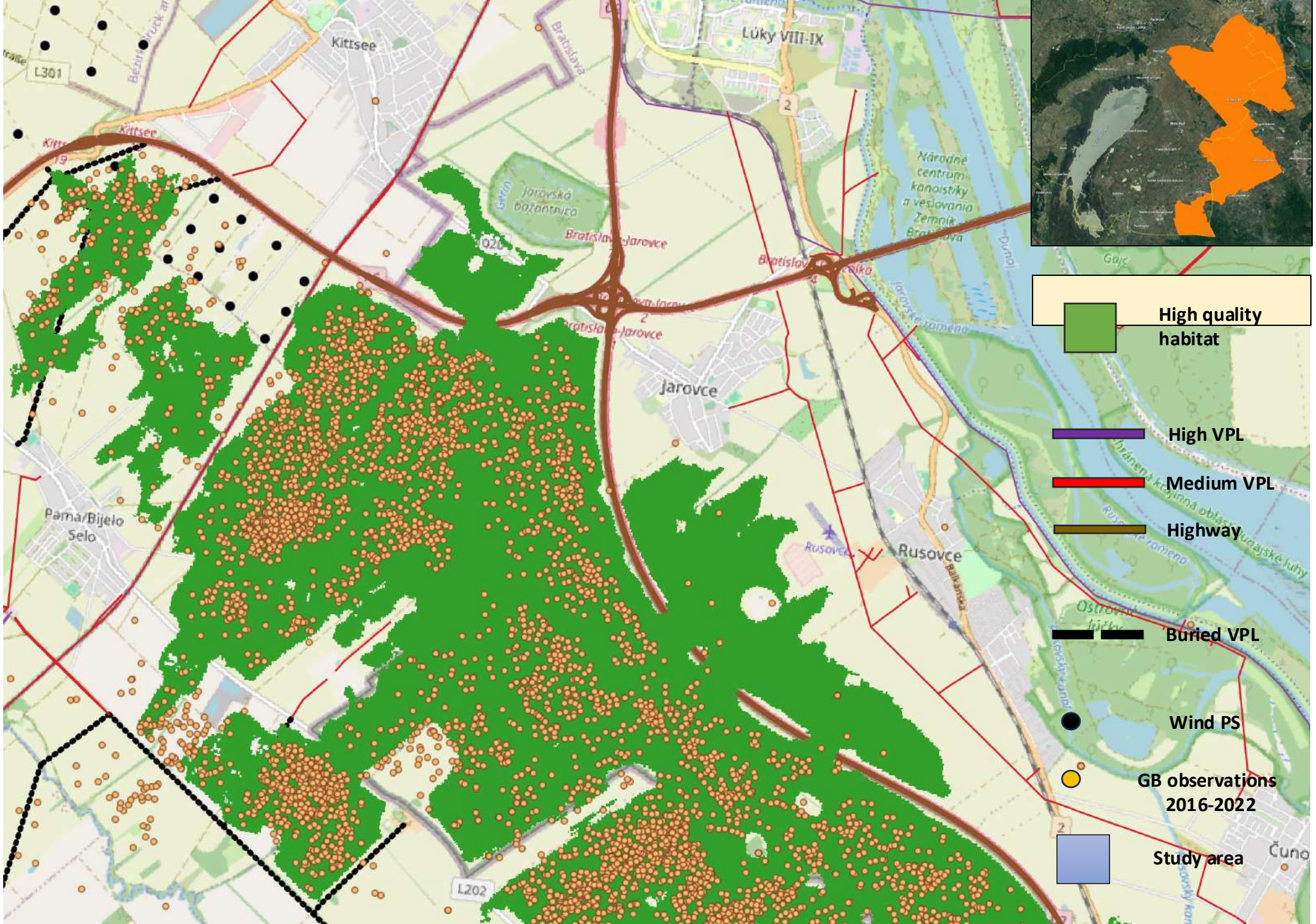
High quality habitat



High quality habitat

GB observations 2016-2022


High quality habitat
High VPL
Medium VPL
Highway
Wind PS
GB observations 2016-2022
Study area


Kittsee
Lúky VIII-IX
Jarovce
Rusovce
Pama/Bijelo Selo
Čunovo
L301
L202
High quality habitat
High VPL
Medium VPL
Highway
Buried VPL
Wind PS
GB observations 2016-2022
Study area

Major conclusions

x **No difference between sexes**

✓ **Most important crops: fallows, grasslands, rapeseed**

✓ **Power lines showing a weak negative marginality or around zero**

? **Indication of non-perception of these dangerous objects**

Major conclusions

- ✓ **Identification of habitats which are used and avoided**
- ✓ **Identification of habitats preferred by bustards**
- ✓ **Useful tool for conservation planning**

- Priority habitats
- Proposal of conservation measures
- Finding effective solutions for nature conservation and land use

Acknowledgment: our team









Coordinating beneficiary

ÖSTERREICHISCHE GESELLSCHAFT GROSSTRAPPENSCHUTZ

The TB Raab GmbH was commissioned to implement the LIFE Great Bustard project.

TB Raab
Technisches Büro für Biologie

Project partners (Associated beneficiaries)

Land Burgenland

NÖ Netz
EVN Gruppe

Kiskunsági Nemzeti Park

netz BURGENLAND

Bükki Nemzeti Park

Körös-Maros Nemzeti Park

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Bundesministerium
Klimaschutz, Umwelt,
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Innovation und Technologie

AGRÁRMINISZTÉRIUM

APG

Thank you for your attention!!!

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Mortality of the red kite in Europe

DR. RAINER RAAB, CEO, TB RAAB GMBH

15.10.2024

WINGSPAN CONFERENCE

BRUSSELS, BELGIUM

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Papers in preparation

A LEAP forward in wildlife conservation: a standardized framework to determine mortality causes in large GPS-tagged birds

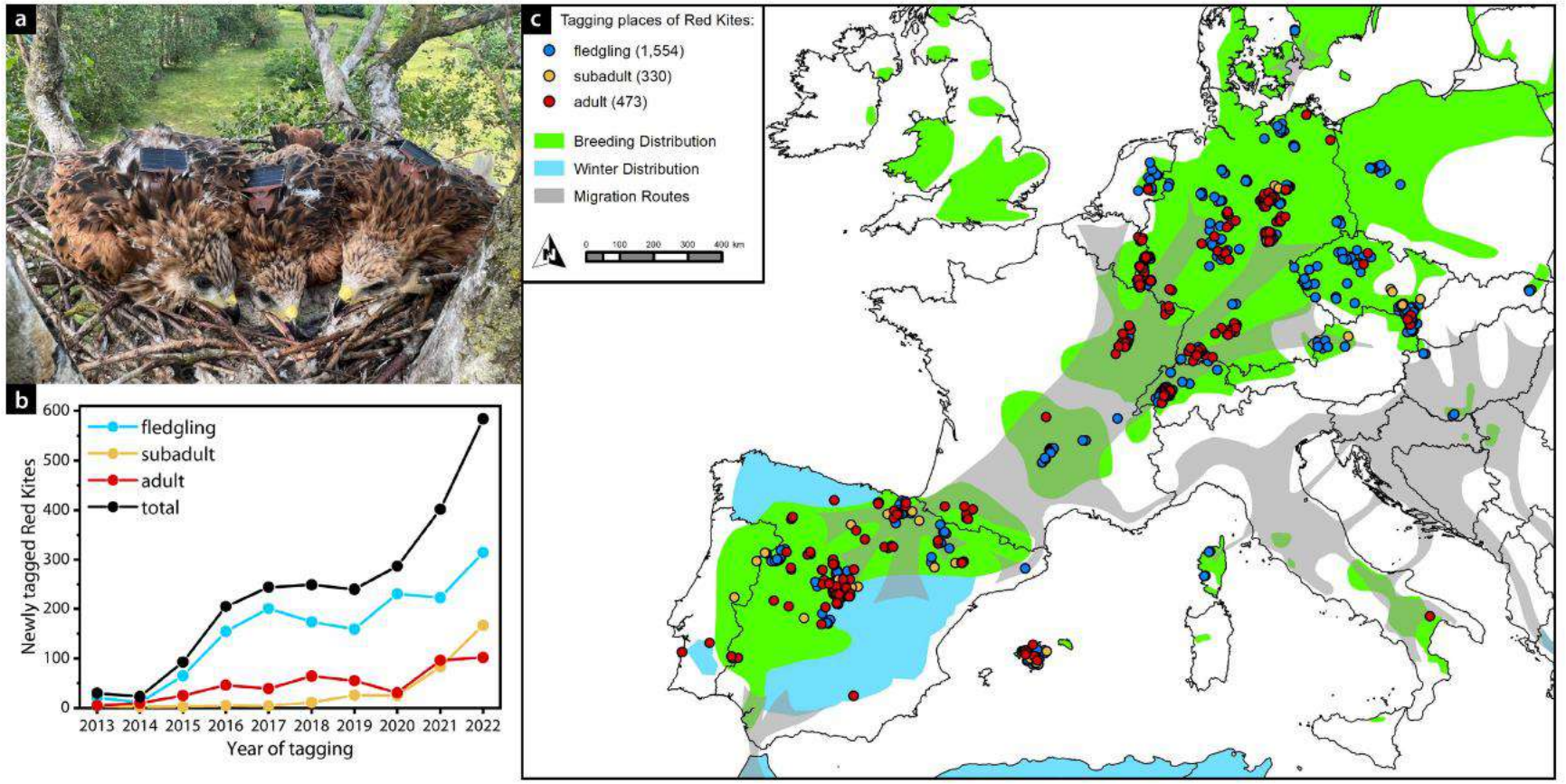
Authors: Connor T. Panter, Carina Nebel, Maximilian Raab, Verena Strauss, Clara Freytag, Manuel Wojta, Hannah Böing, Patrick Hacker, Rainhard Raab, Jendrik Windt, Annika Posautz, Anna Kuebber-Heiss, Patrick Scherler, Martin U. Grüebler, Urs G. Kormann, Martin Kolbe, Alexandre Millon, Javier De La Puente, Javier Viñuela, Duncan Orr-Ewing, Oliver Krone, Torsten Langgemach, Susanne Åkesson, Brady Mattsson, Petra Sumasgutner, Manuel Alcantara de la Fuente, Ernesto Alvarez, Juan Arizaga, Albert Bach Pagès, Ana Bermejo, Guido Ceccolini, Nayden Chakarov, Peter Derpmann-Hagenström, Marek Dostál, Gerd Fabian, Wolfgang Fiedler, Manuel Galán, Clément Ganier, Andreas Gärtner, Liza Glesener, Alfonso Godino, Zuzana Guziová, László Haraszthy, Caka Karlsson, Katharina Klein, Ivan Literák, Nicolas Lorenzini, Manuela Löwold, Christopher Lüning, Boris Maderič, Karel Makoň, Kerstin Mammen, Ubbo Mammen, Torsten Marczak, Hynek Matušík, Aymeric Mionnet, Sara Morollón, Jakub Mráz, Winfried Nachtigall, Bernd Nicolai, Marta Olalde Fernández, Meinolf Ottensmann, María Jesús Palacios González, Jean-Yves Paquet, Vladimír Pečeňák, Lubomír Peške, Thomas Pfeiffer, Robert Pudwill, Dušan Rak, Tim Maximilian Rapp, Alexander Resetaritz, Stef van Rijn, Romain Riols, Arturo Rodríguez, Luisa Scholze, Laura Schulte, Aurélie de Seynes, Jan Škrábal, Péter Spakovszky, Eike Steinborn, Ján Svetlík, Samuel Talhoet, Miklós Vaczi, Anne-Gaelle Verdier, Zdeněk Vermouzek, Diego Villanúa, Jörg Westphal & Rainer Raab

Papers in preparation

Anthropogenic mortality exceeds natural deaths in a European ecosystem sentinel species

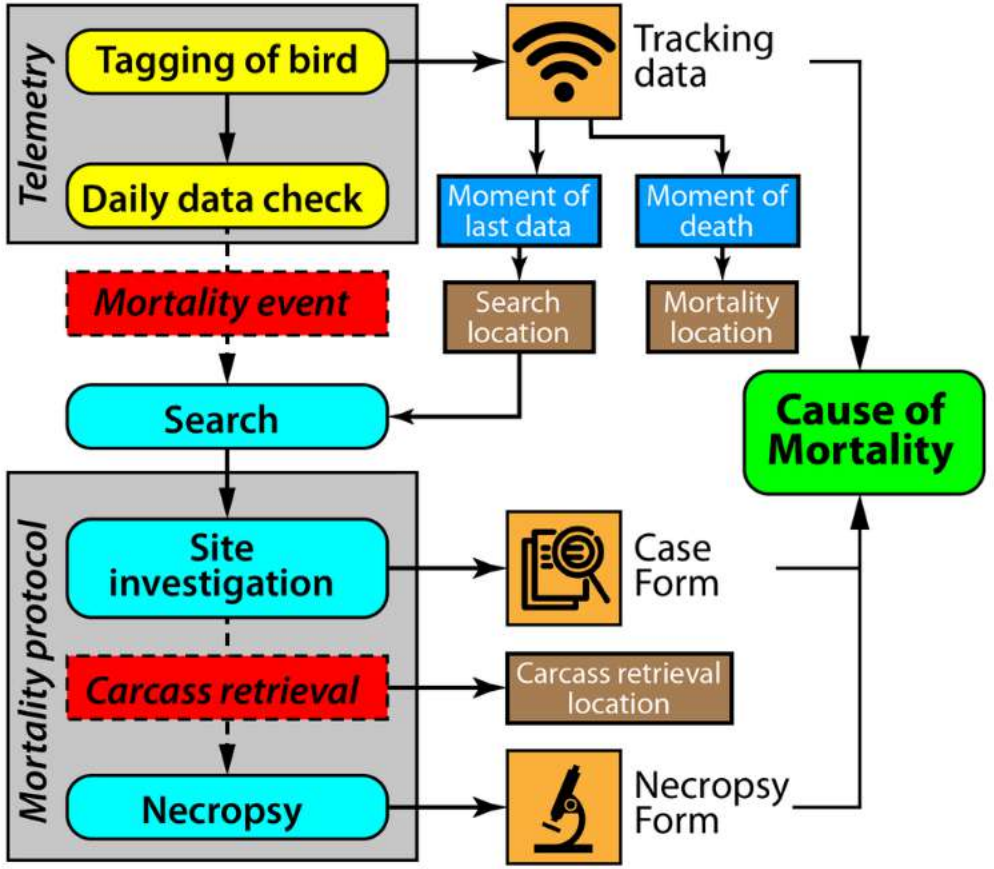
Authors: Connor T. Panter, Carina Nebel, Moritz Mercker, Maximilian Raab, Rainhard Raab, Hannah Böing, Manuel Wojta, Jochen Steindl, Eike Julius, Clara Freytag, Adrian Aebischer, Patrick Scherler, Martin Kolbe, Alexandre Millon, Javier De La Puente, Javier Viñuela, Piotr Zduniak, Duncan Orr-Ewing, Oliver Krone, Torsten Langgemach, Susanne Åkesson, Brady Mattsson, Jendrik Windt, Christian H. Schulze,Petra Sumasgutner, Sven Aberle, Manuel Alcantara de la Fuente, Ernesto Alvarez, Juan Arizaga, Carole Attie, Melvin Bach, Ana Bermejo, Elena Bravo-Chaparro, Guido Ceccolini, Nayden Chakarov, Peter Derpmann-Hagenström, Marek Dostál, Julia Ellersdorfer, Gerd Fabian, María Fernández-García, Wolfgang Fiedler, Cassandra Fröhlich, Manuel Galán, Clément Ganier, Andreas Gärtner, Liza Glesener, Alfonso Godino, Martin U. Grüebler, Iván Gutiérrez, Zuzana Guziová, Matthias Haase, László Haraszthy, Christof Herrmann, Stefanie Holm, Irene Hoppe, Caka Karlsson, Katharina Klein, Urs Kormann, Ivan Literák, José Vicente López-Bao, Nicolas Lorenzini, Manuela Löwold, Christopher Lüning, Grzegorz Maciorowski, Boris Maderič, Jesper Johannes Madsen, Karel Makoň, Kerstin Mammen, Ubbo Mammen, Torsten Marczak, Patricia Mateo-Tomás, Hynek Matušík, Bernd-Ulrich Meyburg, Aymeric Mionnet, Sara Morollón, Jakub Mráz, Antoni Muñoz, Winfried Nachtigall, Bernd Nicolai, Marta Olalde Fernández, Meinolf Ottensmann, María Jesús Palacios González, Jean-Yves Paquet, Vladimír Pečeňák, Eva Pejchalová, José Pereira, Lubomír Peške, Thomas Pfeiffer, Robert Pudwill, Dušan Rak, Tim Maximilian Rapp, Per Rasmussen, Alexander Resetaritz, Luís Ribeiro, Stef van Rijn, Romain Riols, Sascha Ritter, Arturo Rodríguez, Jorge Rodríguez-Pérez, Hans Rytter, João Pedro Valente e Santos, Tonio Schaub, Luisa Scholze, Laura Schulte, Aurélie de Seynes, Jan Škrábal, Péter Spakovszky, Martin Sprötge, Eike Steinborn, Verena Strauss, Ján Svetlík, Samuel Talhoet, Kasper Thorup, Anders P. Tøttrup, Miklós Vaczi, Stefan Vadura, Anne-Gaelle Verdier, Zdeněk Vermouzek, Diego Villanúa, Robin Walz, Jörg Westphal, Bettina Wilkening & Rainer Raab

Tagging of 2,346 red kites between 2013 and 2022

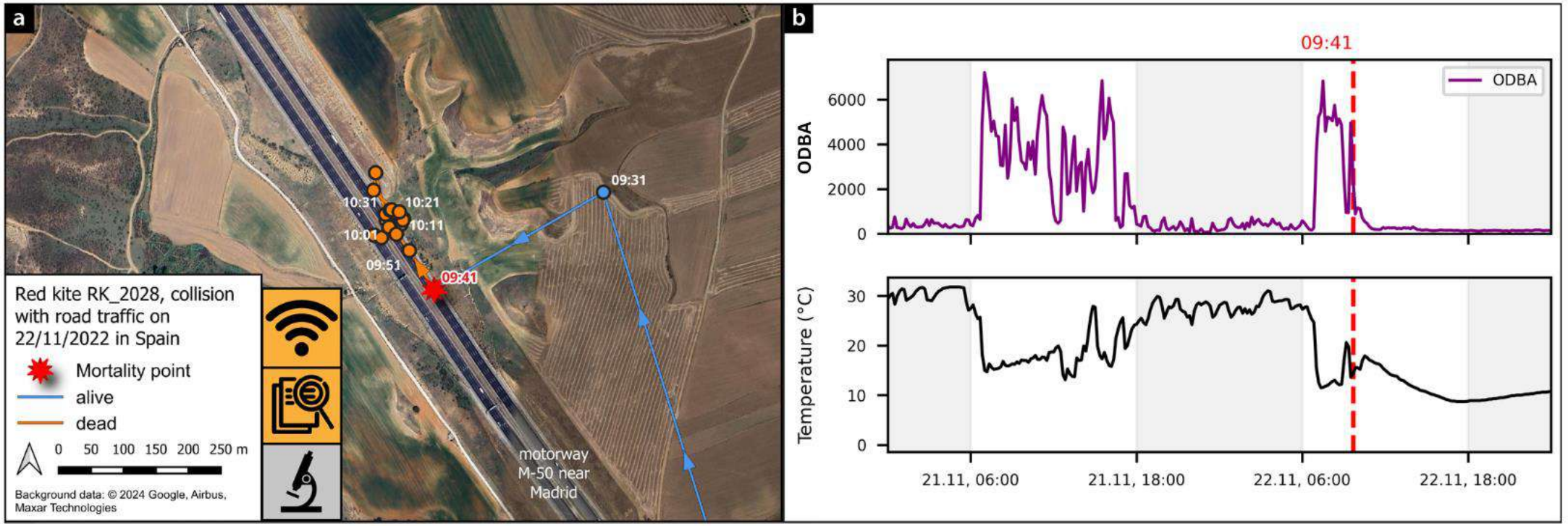


The LIFE EUROKITE assessment protocol (LEAP)

- The LEAP is a framework for determining timing, locations and causes of mortality in GPS-tagged birds
- Data collection starts with tagging the bird
- Followed by daily data checks for signs of mortality
- LEAP integrates:
  (1) GPS tracking data
  (2) evidence from the mortality location
  (site investigation)
  (3) necropsy results
  to derive the mortality cause and a corresponding certainty score



Exemplary case studies of mortality analyses from tracking data



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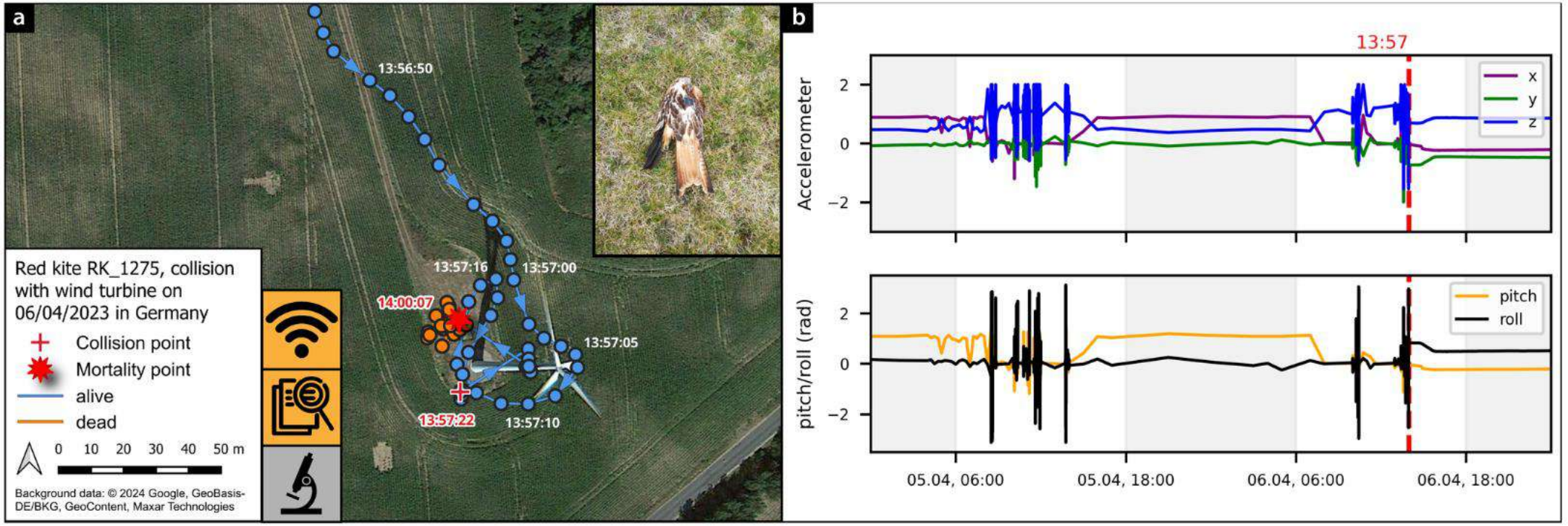
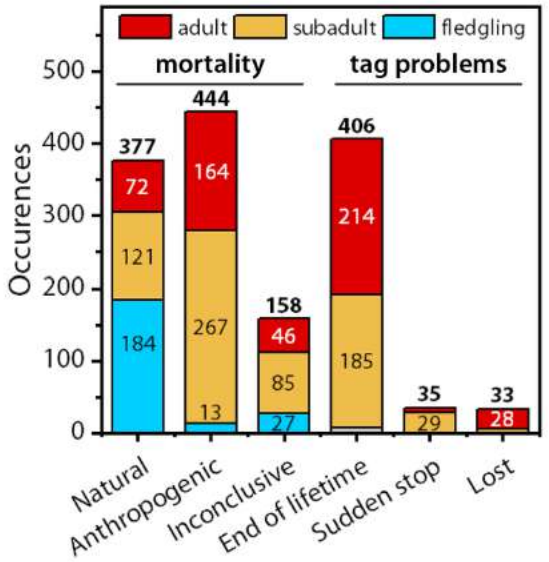
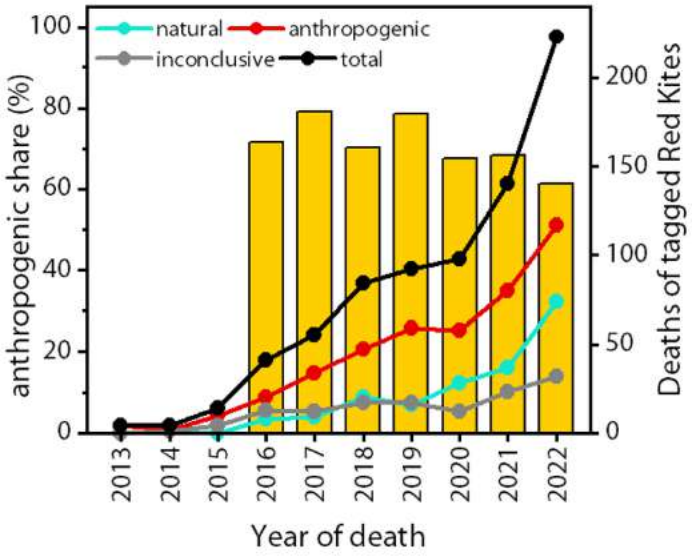
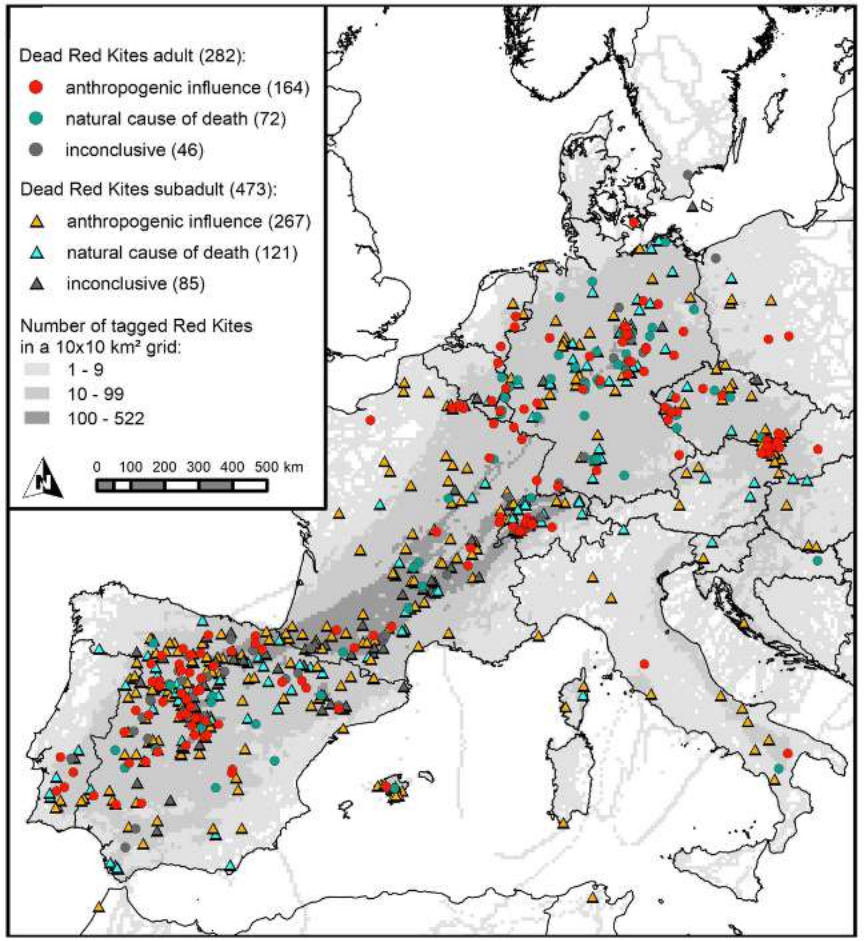


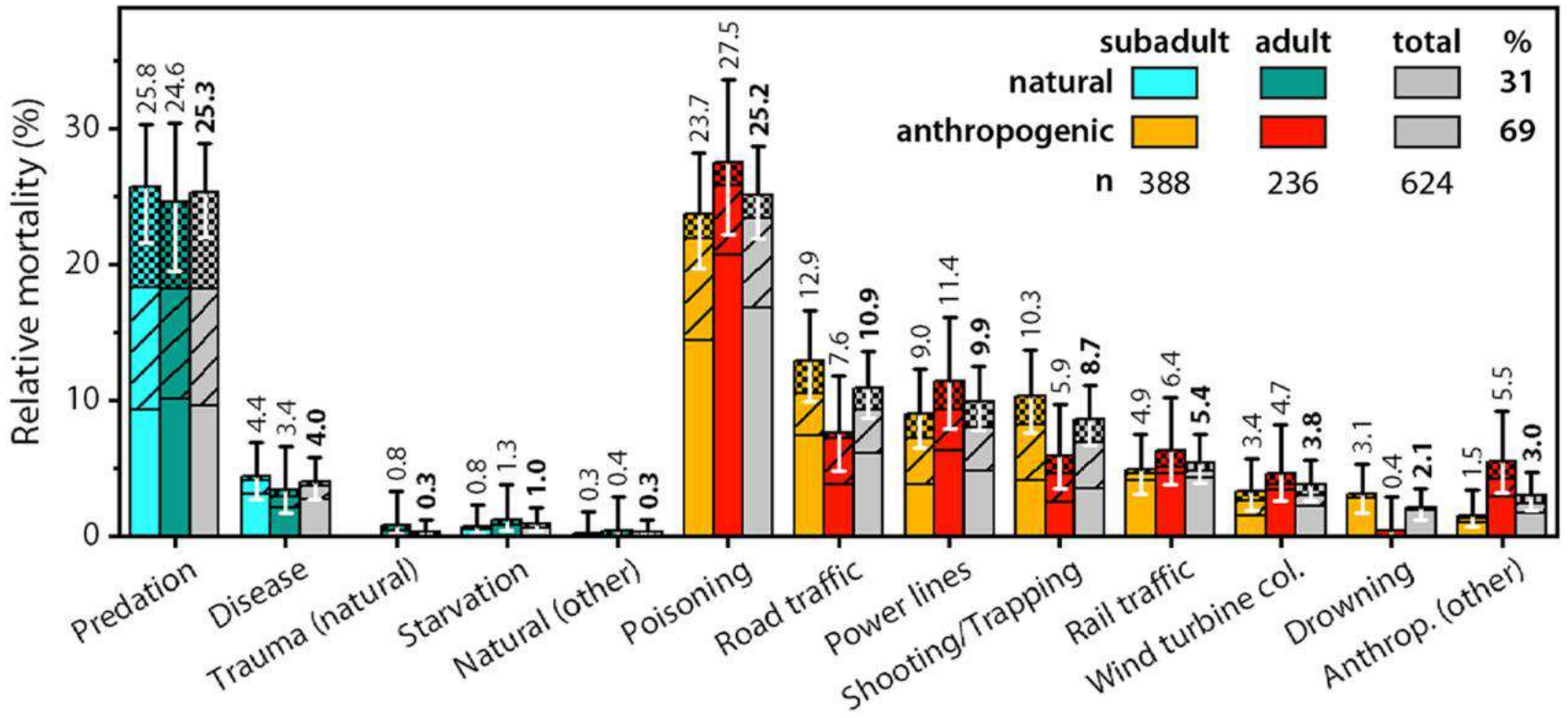
Mortality distribution of red kites between 2013 and 2022



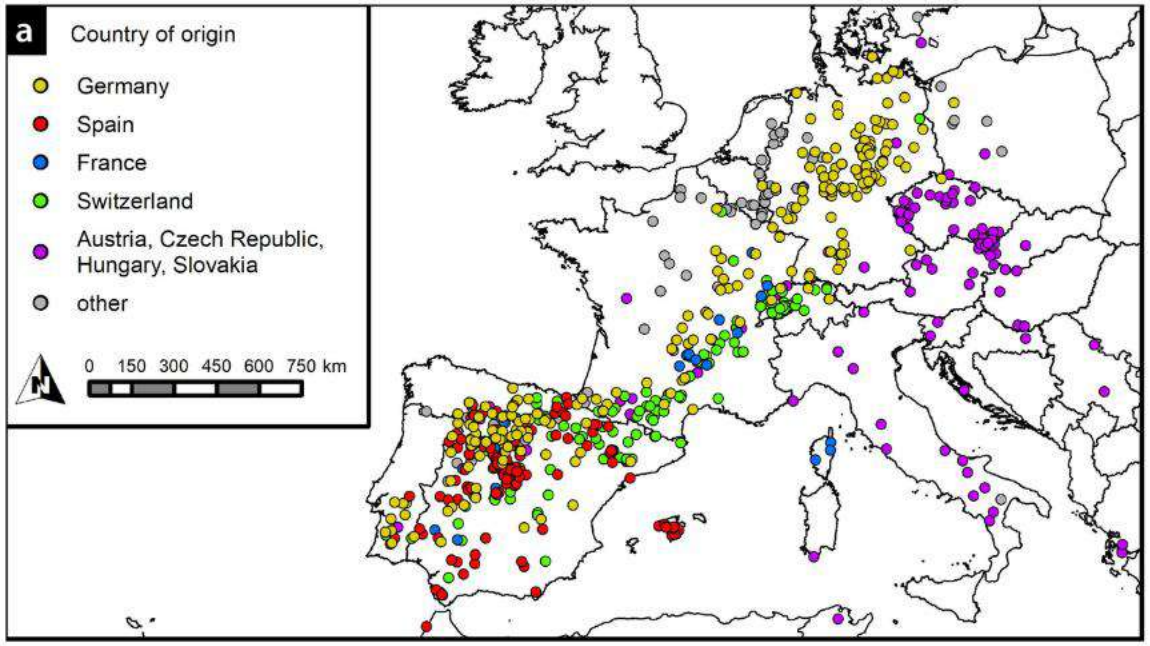


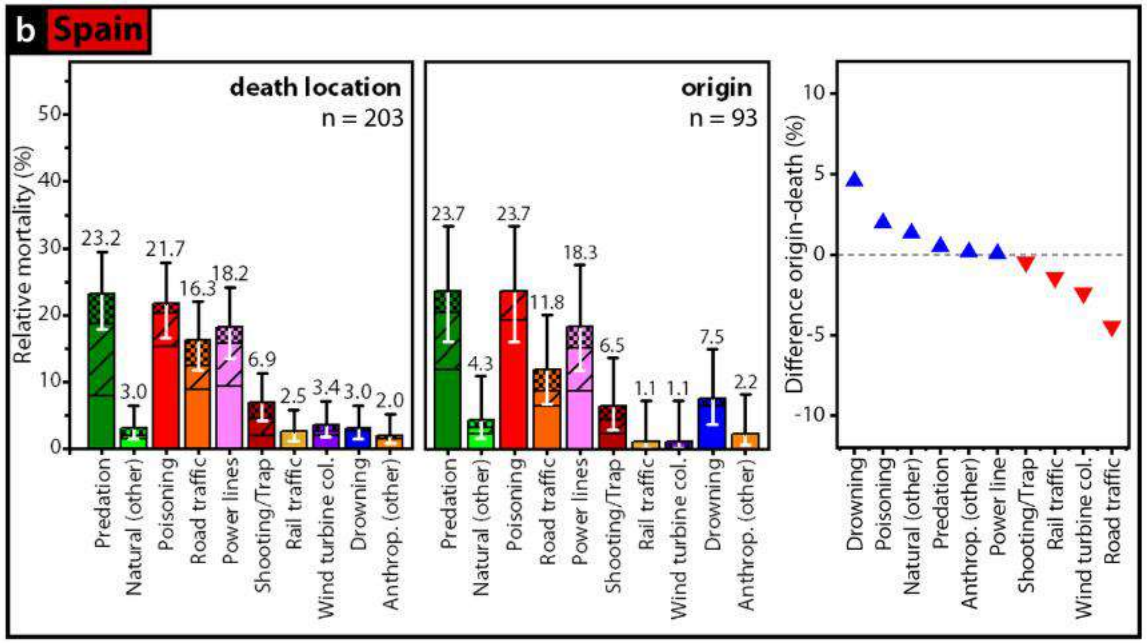


Proportion of causes of mortality for 13 different mortality categories and for different age classes

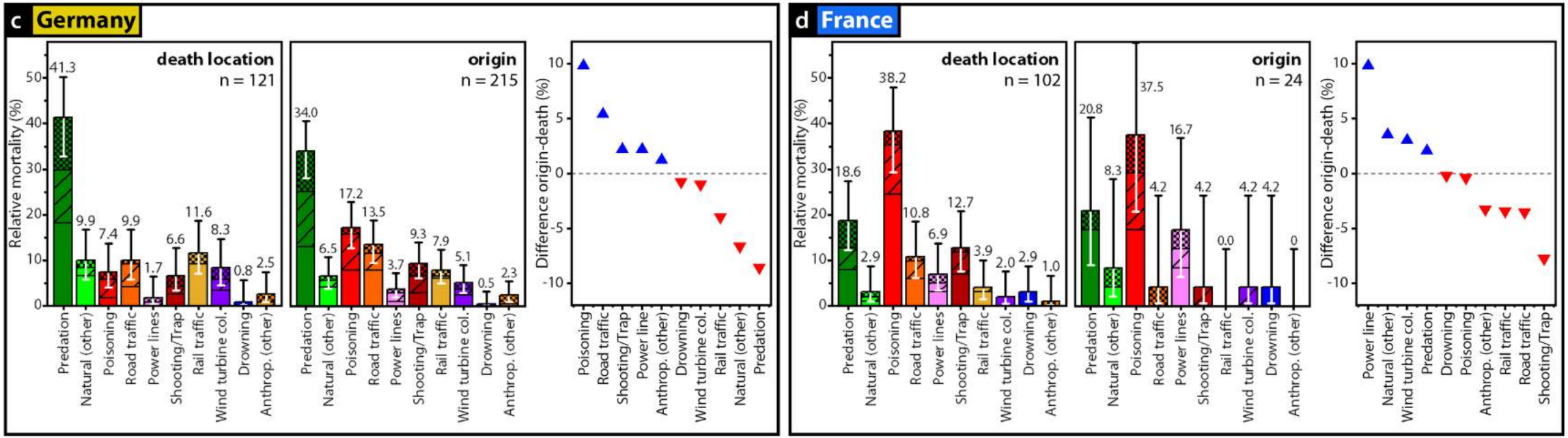


Mortality of adult and subadult red kites across Europe

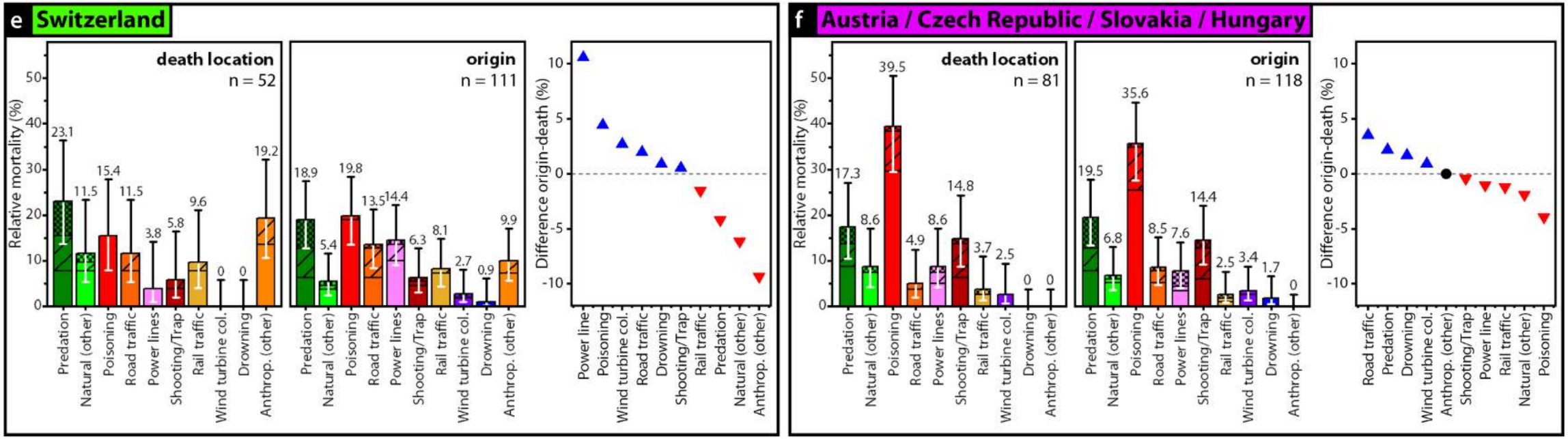




Mortality of adult and subadult red kites across Europe

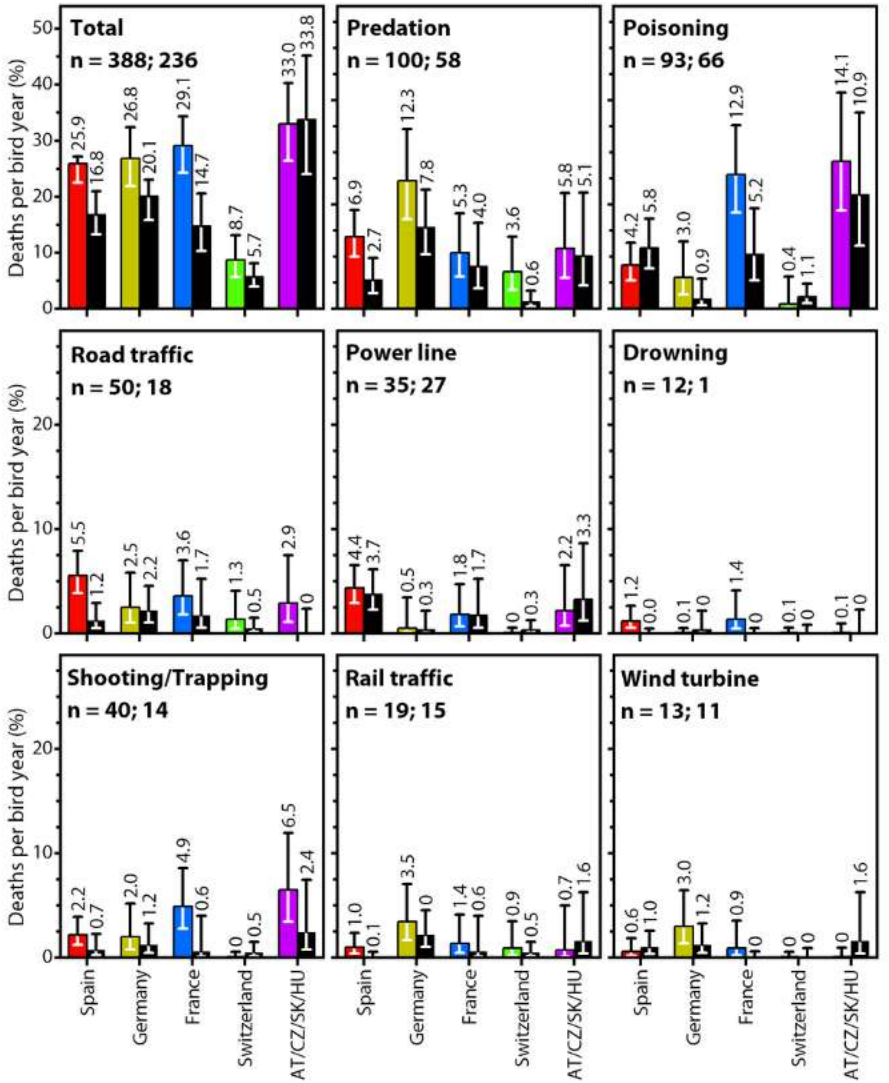


Mortality of adult and subadult red kites across Europe

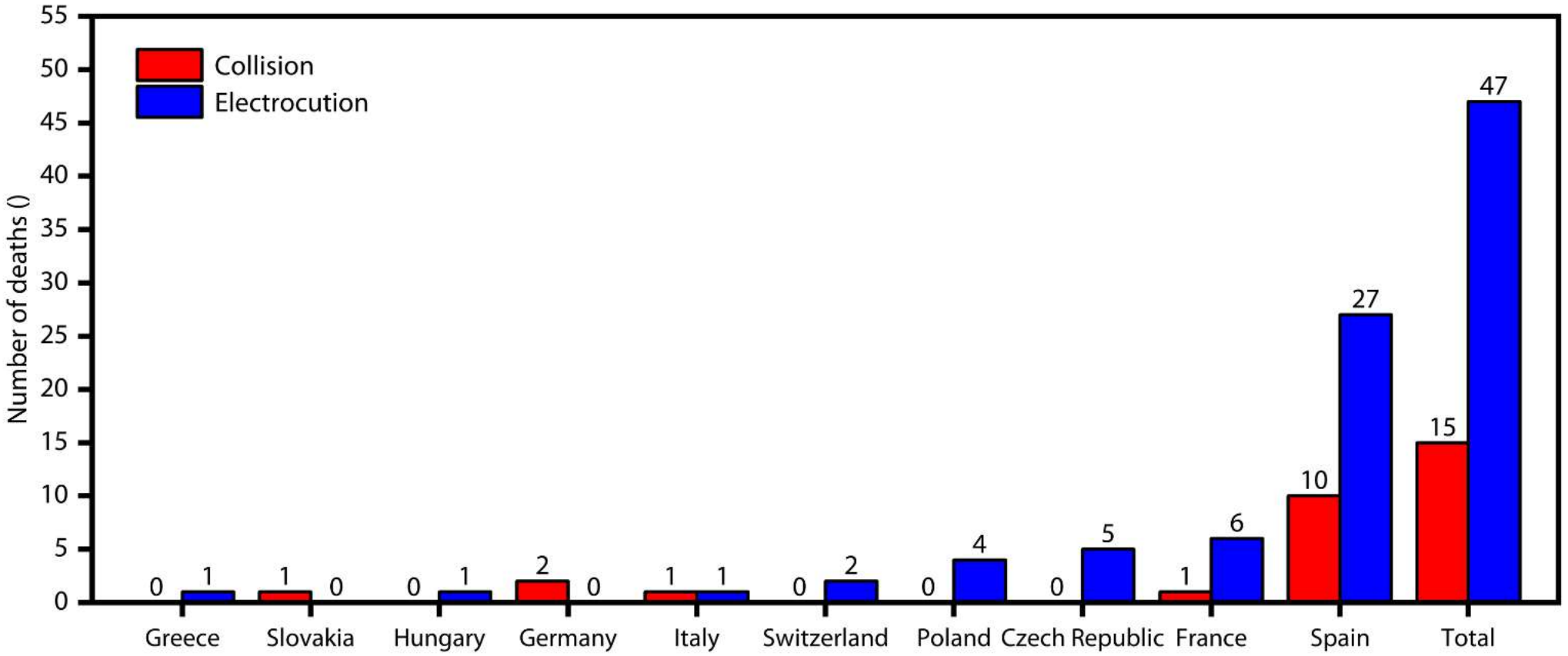


Standardized mortality rates (in %) for subadult (left) and adult (right) red kites

- The number of individuals that died to the given cause is given for each panel for subadult and adult birds
- Determined by night roosting sites from telemetry data

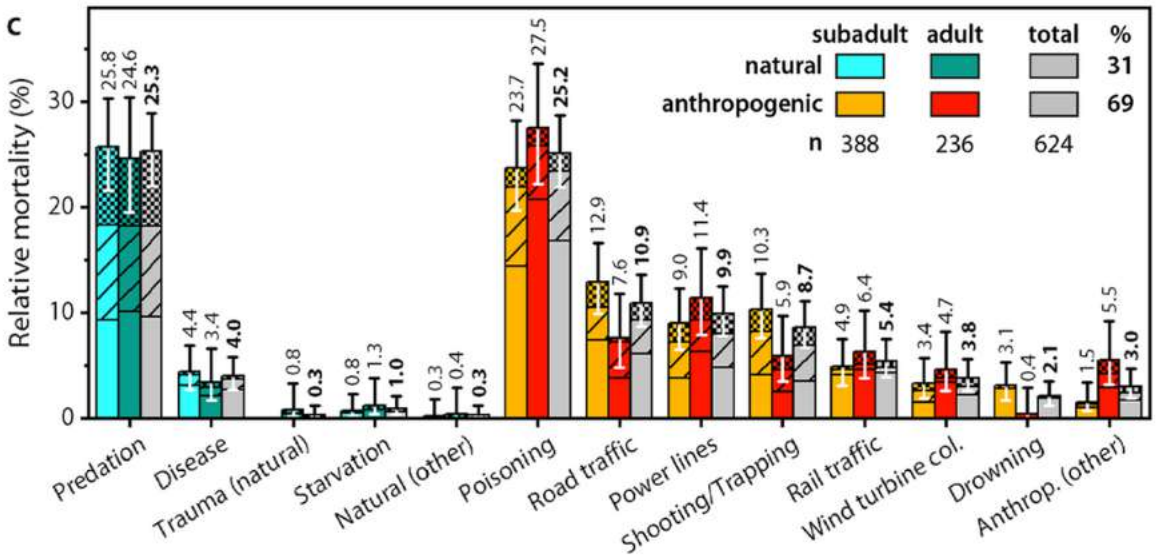


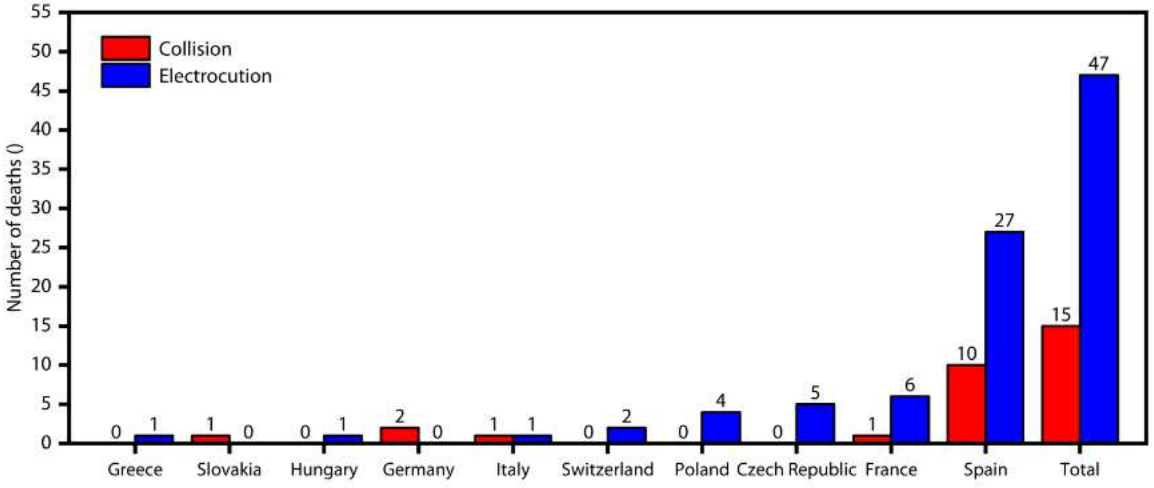
Power lines: Collision versus electrocution of tagged red kites between 2013 and 2022



Summary

- **Anthropogenic** mortality in total **69 %**
- **Poisoning and shooting** together responsible for more than **one third** of red kite mortality in Europe
- **Energy infrastructure** (without traffic) causes **14%** of red kite mortality
  - Power lines 9.9%
  - Wind turbines 3.8%
- Due to laws, **electrocution** on power lines is **not an issue in Germany**





Coordinating Beneficiary

MEGEG

The TB Raab was commissioned to implement the LIFE EUROKITE project after a pan-European public tender.

TB Raab
Technisches Büro für Biologie

Project partner (Associated Beneficiary)

AMUS (ACCIÓN POR EL MUNDO SALVAJE)

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Cooperation partner

Additional cooperation partners for specific research questions in the field of renewable energy

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

Presentations

Data and sensitivity mapping to understand and prevent mortality risks for birds

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Researcher

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