Reducing bird collision with power line: Sensitivity mapping in Belgium

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Connecting Biodiversity – reconciling nature and the electricity grid
Workshop RGI 8-9 November 2023 - Berlin

Elia, Belgium's electricity Transmission System Operator

high-voltage (30 kV to 380 kV) electricity transmission system

5,000 km of high voltage overhead lines in Belgium
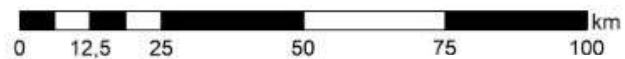

Powering a world in progress

1000's ornithologists in the field
Long-term biodiversity monitoring schemes
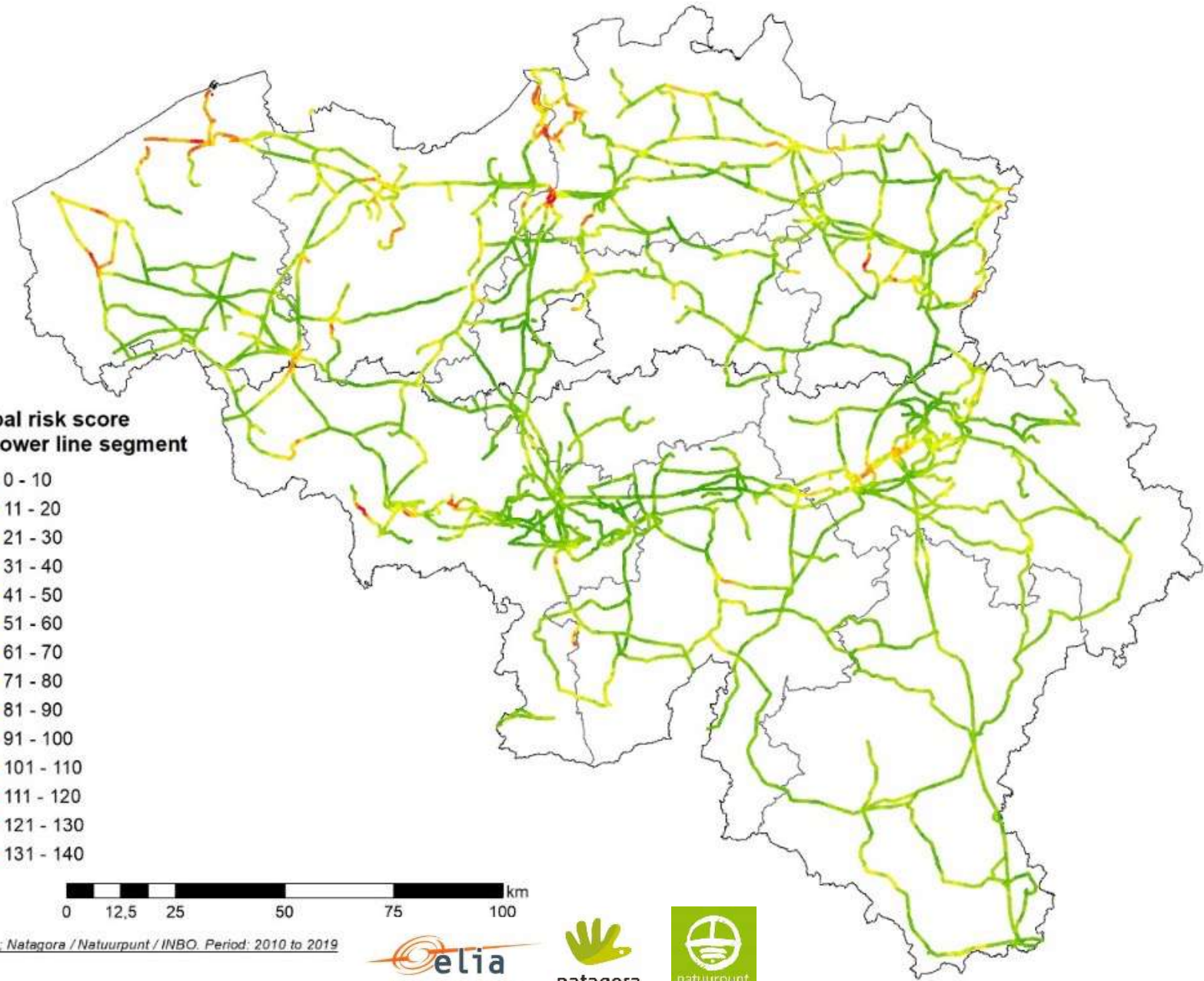about 4 millions bird records every year

Global risk score by power line segment

- 0 - 10
- 11 - 20
- 21 - 30
- 31 - 40
- 41 - 50
- 51 - 60
- 61 - 70
- 71 - 80
- 81 - 90
- 91 - 100
- 101 - 110
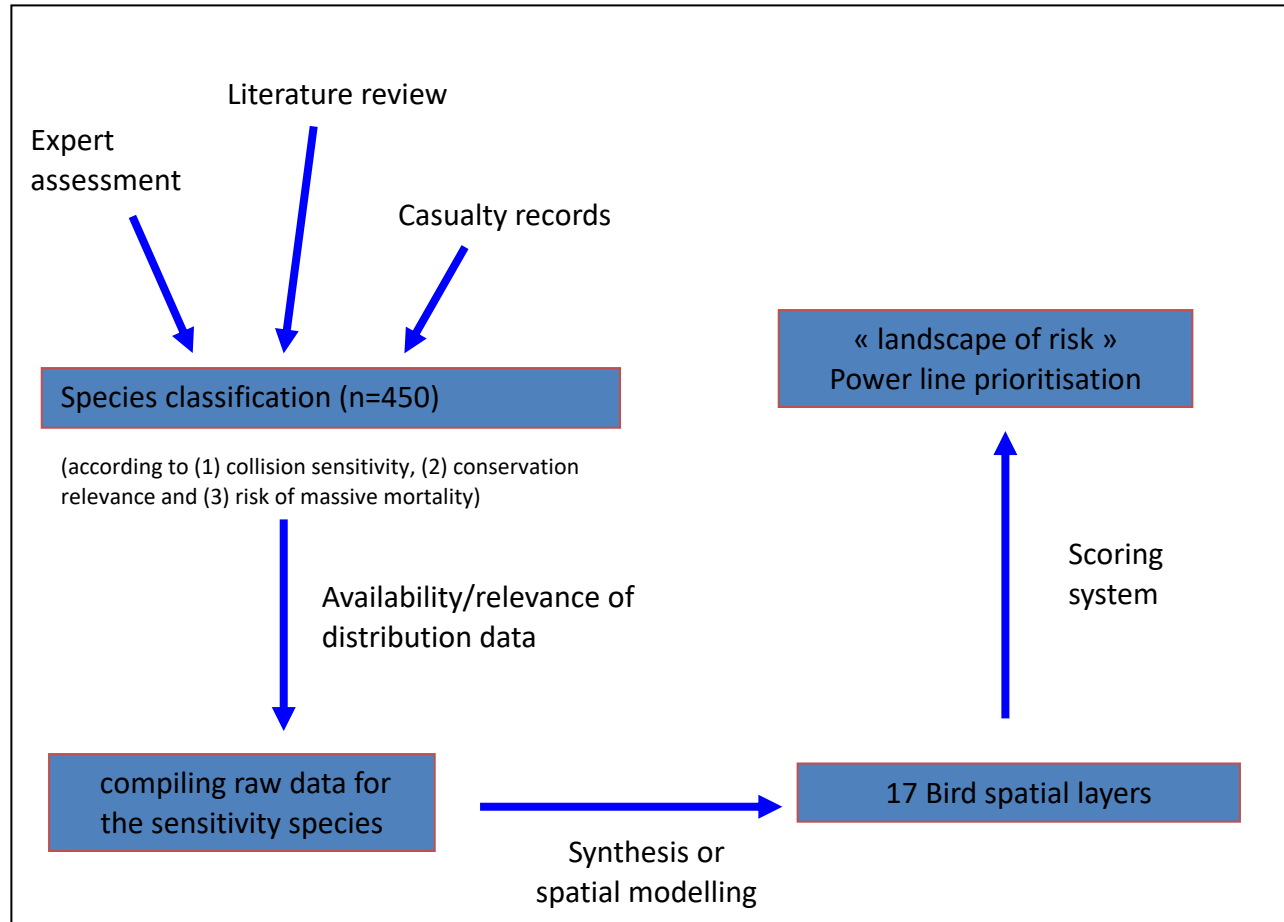- 111 - 120
- 121 - 130
- 131 - 140

km

0   12,5   25   50   75   100

Source; Natagora / Natuurpunt / INBO. Period: 2010 to 2019

elia
Powering a world in progress

natagora

natuurpunt

How did we proceed ?

Method applied in 2012 and 2019 (revision)

*More details: Paquet et al. (2022) Nature Conservation 47
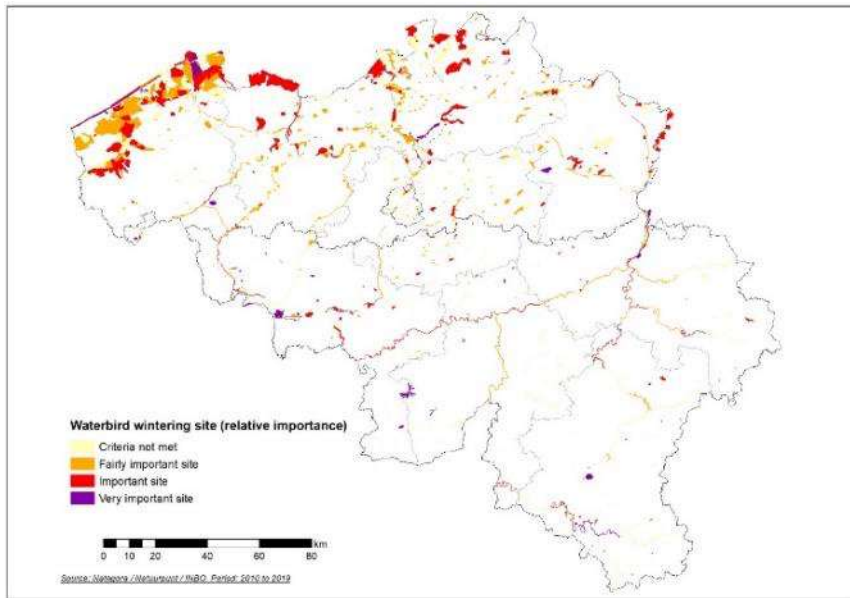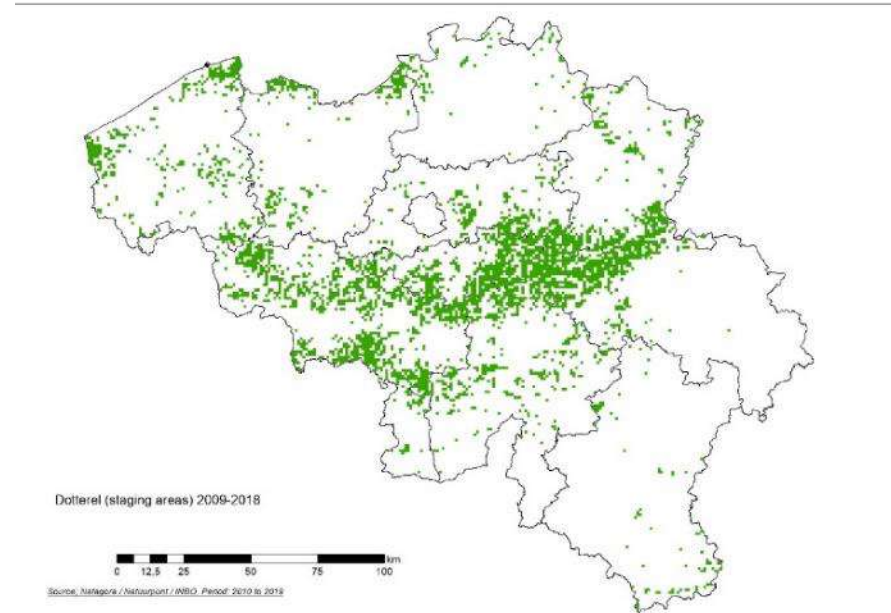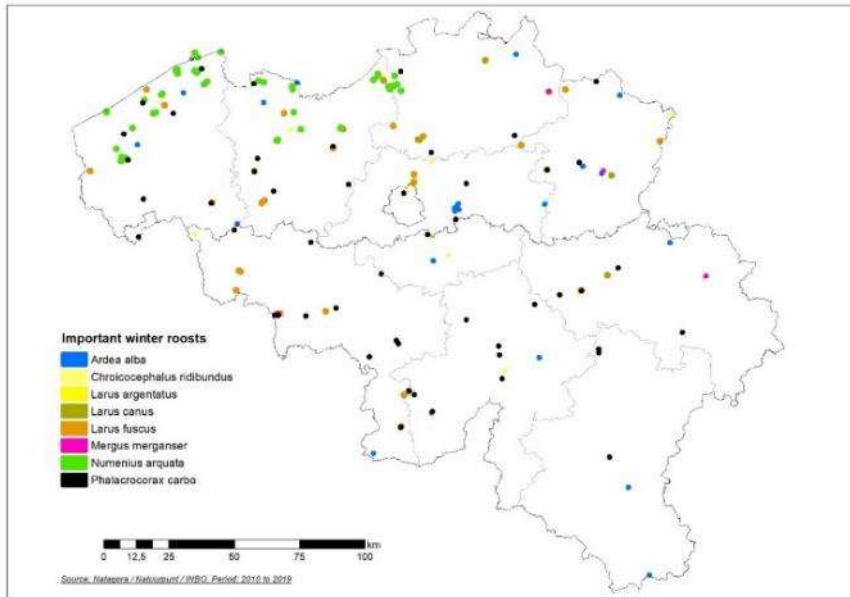doi: 10.3897/natureconservation.47.73710*

How did we proceed ?

The 17 « bird spatial layers » compiled from raw data

Bird layer type	spatial information type	Explanation	Number of layers	Species concerned
Important waterbird sites	Distance buffer around sites	based on International Waterbird Counts. Relative risk associated with the sites depends on the total number of individuals + regional importance of the site for each species	1	48 species of wintering waterbirds
Important roosts / colonies	Buffers around a point location	based on the distance to a colony or a roost of a sensitive species	2	10 sensitive species regularly forming roosts / 11 forming colonies
Foraging geese areas	Presence / absence at a 1x1 km spatial resolution	Spatial model from observation data and from environmental variables	3	Goose species wintering in large numbers: Greylag, Pink-footed and Greater White-fronted Goose
Widespread breeding birds	Presence / absence at a 1x1 km spatial resolution	Spatial model from observation data and from environmental variables	5	5 species of widespread breeding birds (Grey Partridge, Green Woodpecker, Black Woodpecker, Middle Spotted Woodpecker, European Turtle Dove)
Woodcock areas	Presence / absence at a 1x1 km spatial resolution	Spatial model from observation data and from environmental variables	1	Areas where displaying Eurasian Woodcock are present
Plover group areas	Presence / absence at a 1x1 km spatial resolution	Spatial model from observation data and from environmental variables	3	Charadriidae species with a tendency to form large groups in very open countryside: Eurasian Dotterel, Golden Plover, Northern Lapwing
Rare bird areas	Number of rare breeding species	Maps at 1-km² resolution with a count of the number of rare species breeding in in that cell.	1	22 species of susceptible rare bird with high conservation value
Migration corridors	Low resolution	Very low-resolution maps of the main 'corridors' for large numbers of migrant birds in transit	1	Migration corridors for general migrants (coastline) and two very abundant migrants: Woodpigeon and Common Crane

How did we proceed ?

The 17 « bird spatial layers » compiled from raw data

Important winter roosts
- Ardea alba
- Chroicocephalus ridibundus
- Larus argentatus
- Larus canus
- Larus fuscus
- Mergus merganser
- Numenius arquata
- Phalacrocorax carbo

Source: Natagora / Natuurpunt / INBO. Period: 2010 to 2019

Dotterel (staging areas) 2009-2018

Source: Natagora / Natuurpunt / INBO. Period: 2010 to 2019

Waterbird wintering site (relative importance)
- Criteria not met
- Fairly important site
- Important site
- Very important site

Source: Natagora / Natuurpunt / INBO. Period: 2010 to 2019

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9

How did we proceed ?

The scoring table

Spatial layer considered (Table 1)	Distance buffer from the site				
	Inside the site	Less than 1 km	Between 1 and 3 km	Between 3 and 5 km	Over 5 km
Important waterbird site	If very important, 30; if important, 25; if fairly important, 20	14	9	4	0
Important roosts	If very important, 25; if important, 20	14	9	4	0
Important colonies	If very important, 25; if important, 20	14	9	4	0
	(no buffer considered below)				
Rare-bird area	10 points for an area with one rare species, 20 for an area with two or three rare species, 25 for an area with four or five rare species, and 30 for an area with more than five species				
Migration corridor	8 points if inside, 12 if it is the coastal corridor				
Plover staging area	5 points for each of the three species, when presence cut-off is reached				
Widespread breeding bird	4 points for each species, when presence cut-off is reached				
Woodcock area	4 points if Woodcock presence cut-off is reached				
Geese foraging area	5 points in the areas of occurrence defined by the spatial models				

10

The « landscape of collision risks »

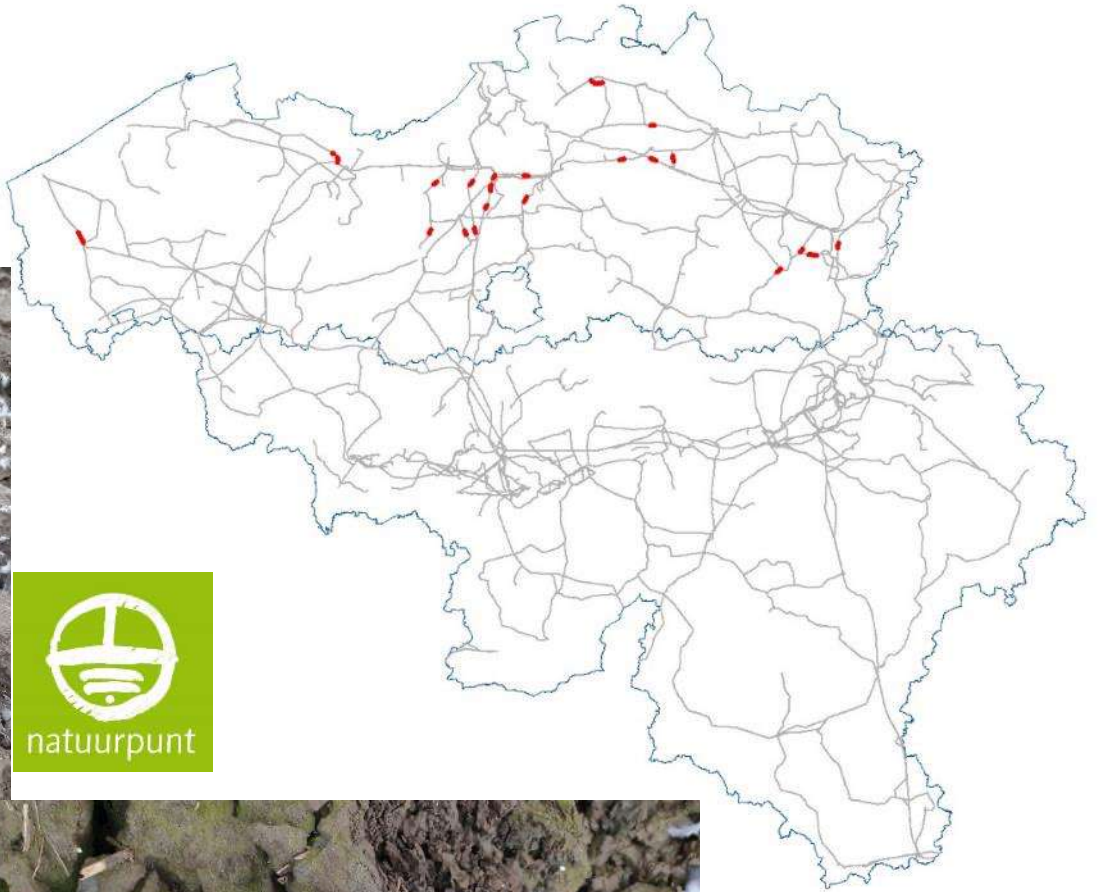The Polders: internationally important numbers of overwintering "Arctic" Geese

The Harbour of Antwerp: nature restoration works

The Yser Valley: large numbers of waterfowl, important staging area

Collision risk landscape (overall risk score)
- 4 - 20
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100
- 101 - 120
- 121 - 140
- 141 - 160

Major river valleys

km
0   12,5   25   50   75   100

Source; Natagora / Natuurpunt / INBO. Period: 2008-2009 to 2017-2018
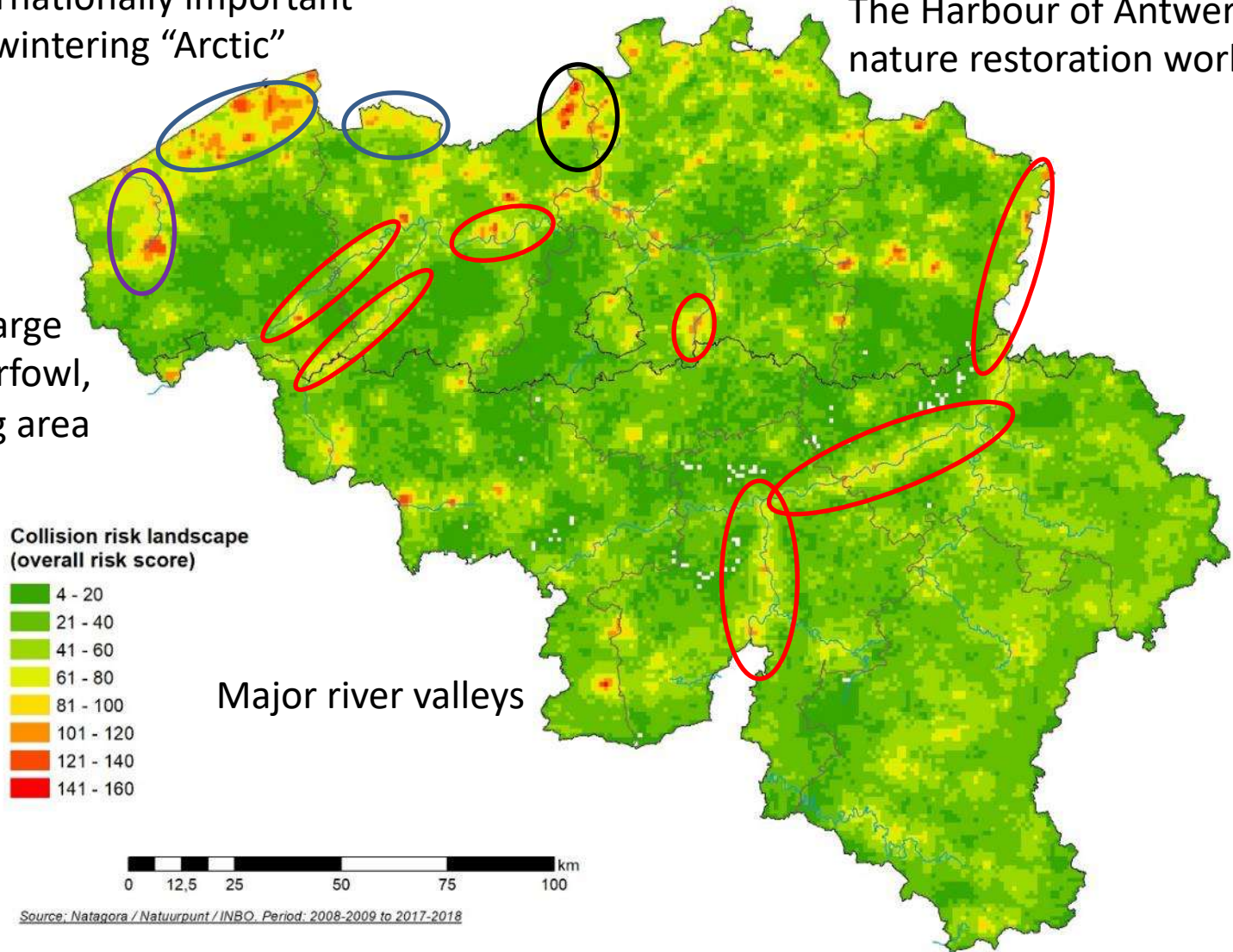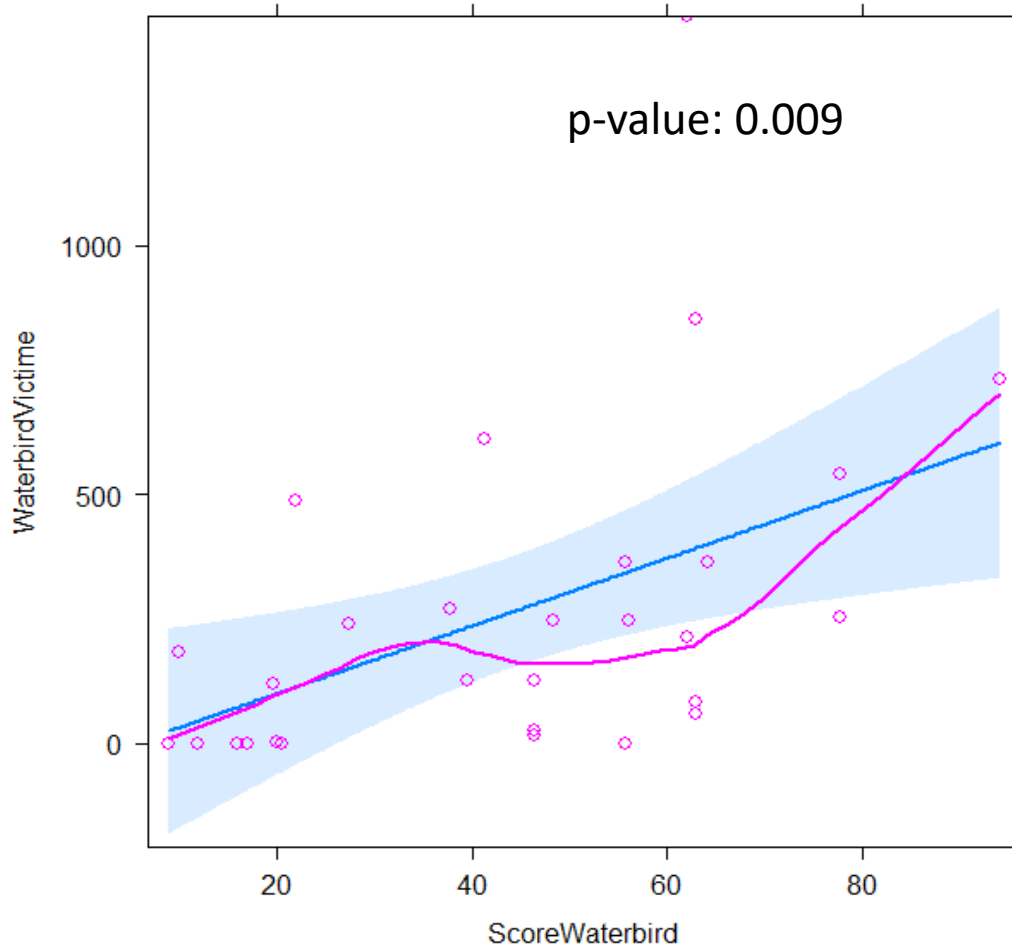
Is this just theoritical ?

Carcass searches at 29 sites

12

Is this just theoritical ?

Positive correlation between waterbird risk score and waterbird victim founds

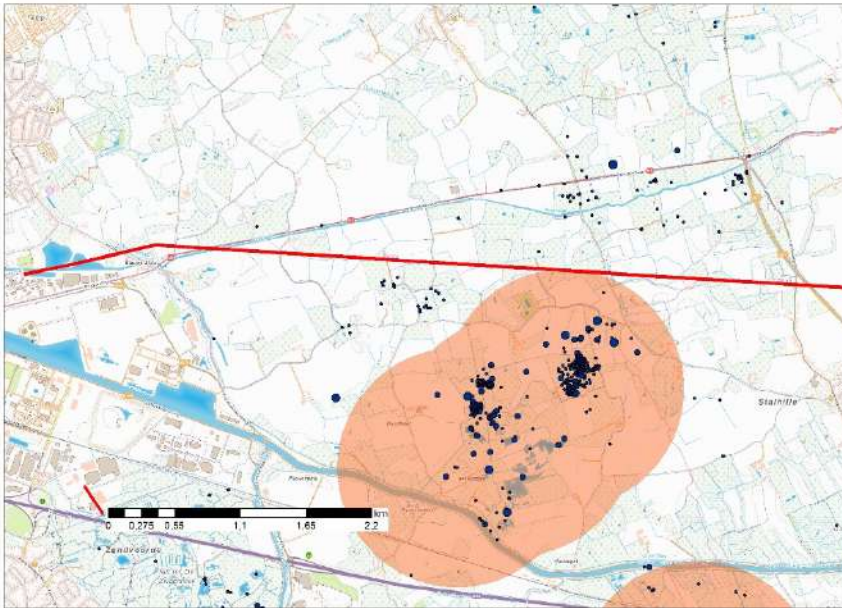**ScoreWaterbird effect plot**

p-value: 0.009

Extrapolation:
600,000 waterbirds killed each year (large confidence interval)

Installing deterrent devices on 4.5 % worst lines could reduce mortality by 9-14 %

13

LIFE SafeLines4Birds

https://www.safelines4birds.eu/

Update the risk map for target species
- Black Stork
- Eurasian Curlew
- Northern Lapwing
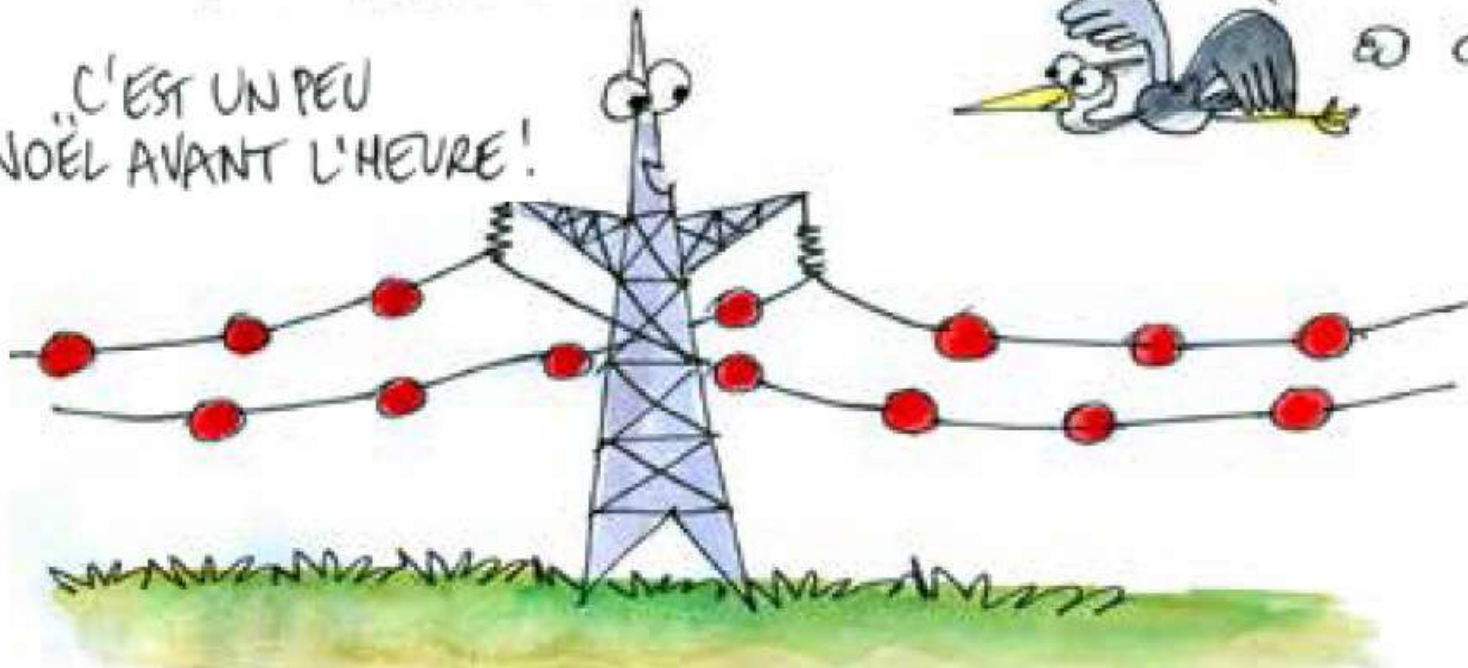- Woodcock

- (and Black Tailed Godwit)

14

(It's Christmas time before the time)