Iberian Carnivores on the Road:

Just a RISKY Crossing or an Extinction RISK?

©Jacinto Román

Clara Grilo, Tomé Neves, Filipa Coutinho Soares

OSCARS Open Science Clusters' Action for Research & Society
Funded by the European Union
BIOPOLIS cibio
fct Fundação para a Ciência e a Tecnologia

Iberian Carnivores on the Road

RISKY

Our project

Building knowledge and open data for wildlife-friendly energy and transport infrastructure

RISKY

www.risky.pt

OSCARS
Open Science Clusters' Action for Research & Society

Funded by the European Union

RISKY

Implemented by

BIOPOLIS cibio

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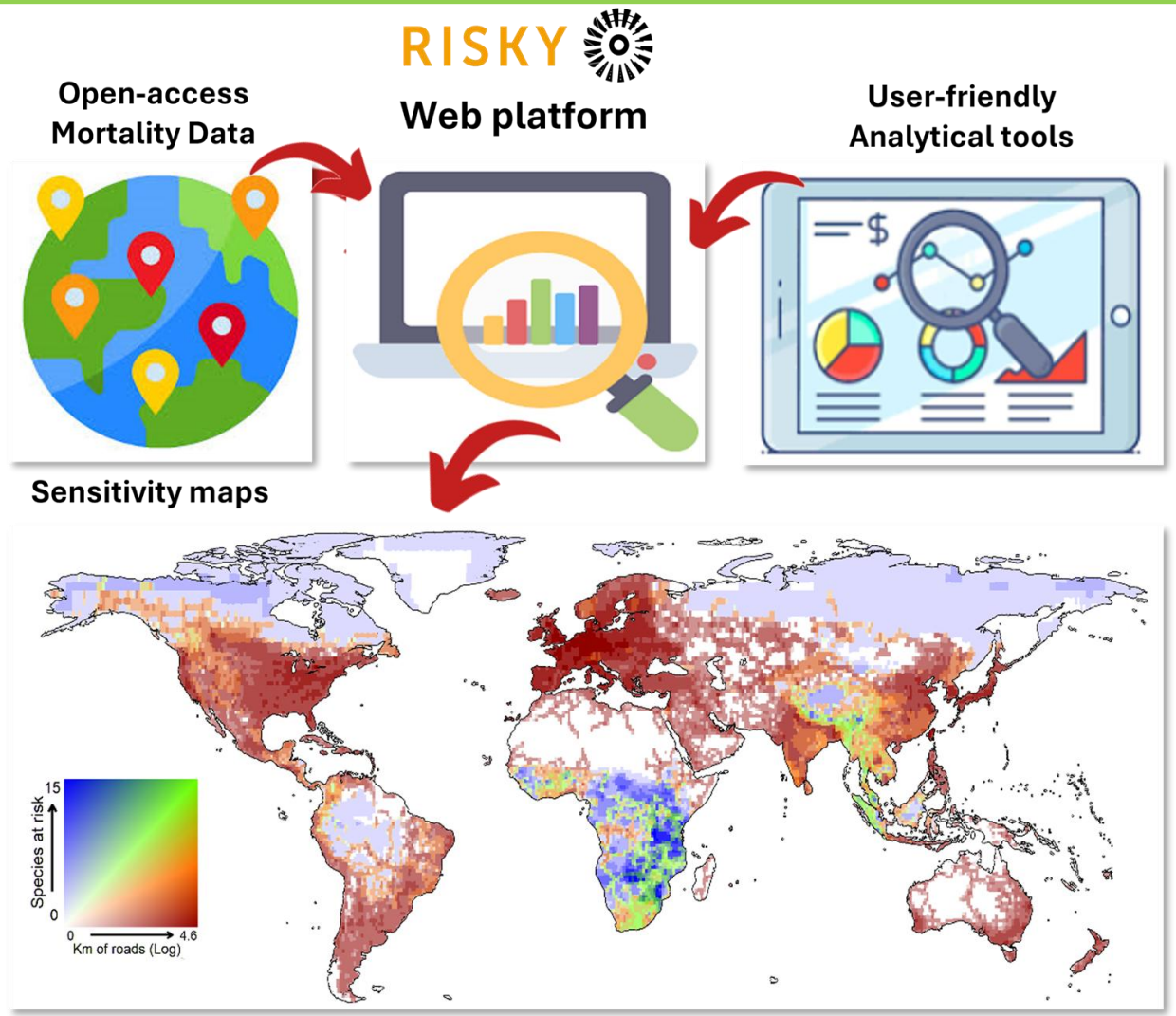
RISKY


RISKY
Open-access
Mortality Data
Web platform
User-friendly
Analytical tools
Sensitivity maps
Species at risk
15
0
0
4.6
Km of roads (Log)

RISKY

Objectives:

Open access mortality locations

Estimate mortality rates from systematic surveys

Run trait-based models to identify species vulnerable to collision

Run spatially explicit models to assess the impact on populations

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Our approach

1. Literature review

- ✓ 2000 and 2024
- ✓ only systematic surveys (>2km of road, > 6 months, <15 days survey interval)
- ✓ peer-reviewed and grey literature
- ✓ Boolean string: *(road OR highway OR freeway*) AND (mortality OR roadkill OR kill OR animal-vehicle OR wildlife-vehicle) AND (mammal* OR wildlife) NOT building NOT "power lines" NOT "wind farms"*
- ✓ We excluded Chiroptera

2. Estimate mortality rates (ind./km/year)

3. Corrected mortality rates for carcass persistence

(Santos et al. 2011)

RISKY

Spatially explicit model

MORTALITY RISK

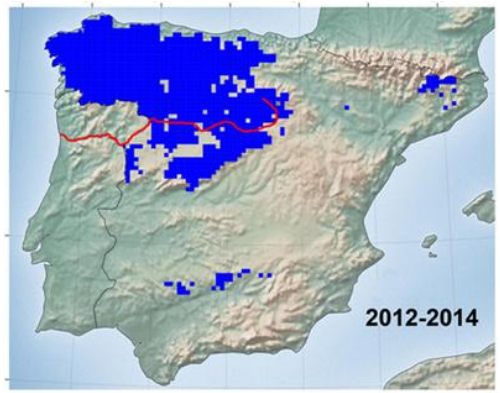
Mortality rates

+

Demographic parameters

+

Species range



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Road network

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Roadkill data

IBERIA 49 roadkill rates for carnivore species

0.13 ind/km/year

Species	N rates	Average	Min	Max
Vulpes vulpes	**8**	0.166	0.026	0.344
Ursus arctos	1	0.0000000007	0.0000000007	0.0000000007
Mustela nivalis	5	0.029	0.012	0.066
Mustela putorius	4	0.029	0.012	0.066
Martes foina	6	0.239	0.041	**0.600**
Meles meles	7	0.084	0.012	0.242
Lutra lutra	5	0.045	0.017	0.080
Genetta genetta	6	0.142	0.049	0.295
Herpestes ichneumon	5	0.127	0.023	0.500

Roadkill data

Iberian lynx

DOI: 10.1093/beheco/arg097

Proximate and ultimate causes of dispersal in the Iberian lynx *Lynx pardinus*

Pablo Ferreras,[a,b] Miguel Delibes,[a] Francisco Palomares,[a] José M. Fedriani,[a] Javier Calzada,[a] and Eloy Revilla[a]
[a]Department of Applied Biology, Estación Biológica de Doñana, CSIC, Avda. María Luisa s/n, 41013 Sevilla, Spain, [b]Instituto de Investigación en Recursos Cinegéticos (IREC)—CSIC-UCLM-JCCM, Ronda de Toledo s/n, 13005 Ciudad Real, Spain

Radio collared individuals (1983-1992): 0.16 ± 0.05 (0.19 ± 0.09 in Sierra Morena and 0.12 ± 0.07 in Doñana)

	No. ind. roadkilled	Population	% of pop roadkilled
2024	162	2401	6.7%
2023	144	2021	7.1%

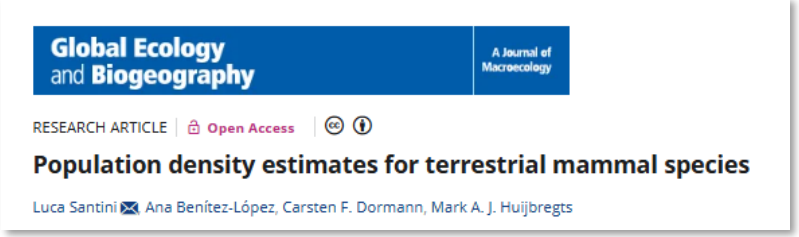
75.7%-76.19% of all mortality detected

Biological parameters

Species	Litter Size	Litters Per Year	Age First Birth (days)	Interval Birth (days)	Max Longevity (months)	Survival Rate Adult	Pop Density (ind/km2)	Home Range (km2)
Vulpes vulpes	4.6	1.0	356	365	180	0.640	0.74	3.5
Ursus arctos	2.2	0.4	1460	913	600	0.830	0.06	310.8
Mustela nivalis	5.0	1.0	202	274	120	0.473	3.63	0.1
Mustela putorius	5.0	1.0	224	253	168	0.320	4.11	0.5
Martes foina	3.8	1.1	365	365	217	0.553	4.90	2.2
Meles meles	3.1	1.0	365	365	194	0.730	2.17	1.2
Lutra lutra	2	1.0	1095	365	264	0.750	0.31	21.3
Genetta genetta	2.3	2.0	1557	183	408	0.912	0.92	10.9
Herpestes ichneumon	3	1.5	400	365	240	0.805	0.81	2.2
Lynx pardinus	3	1.0	1095	365	156	0.974;0.954	*2401	11.18; 9.87

*total population

Sources:

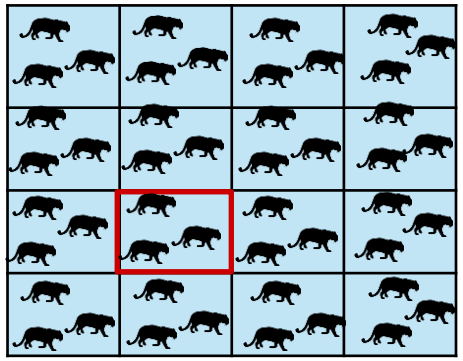


Spatially explicit model

MORTALITY RISK

Model: 25 years + 100 replicates

10x10km



Population density

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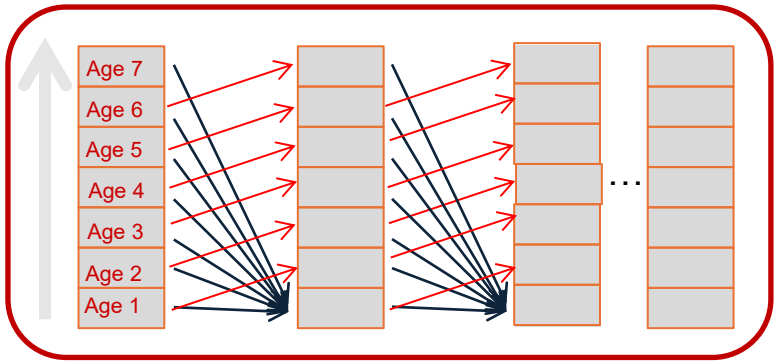
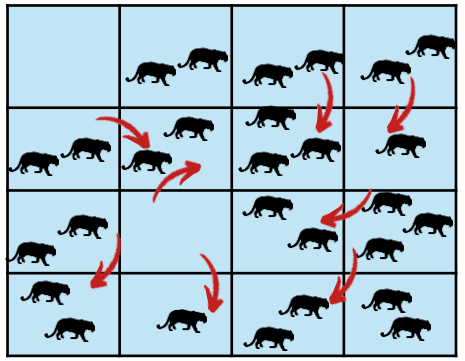


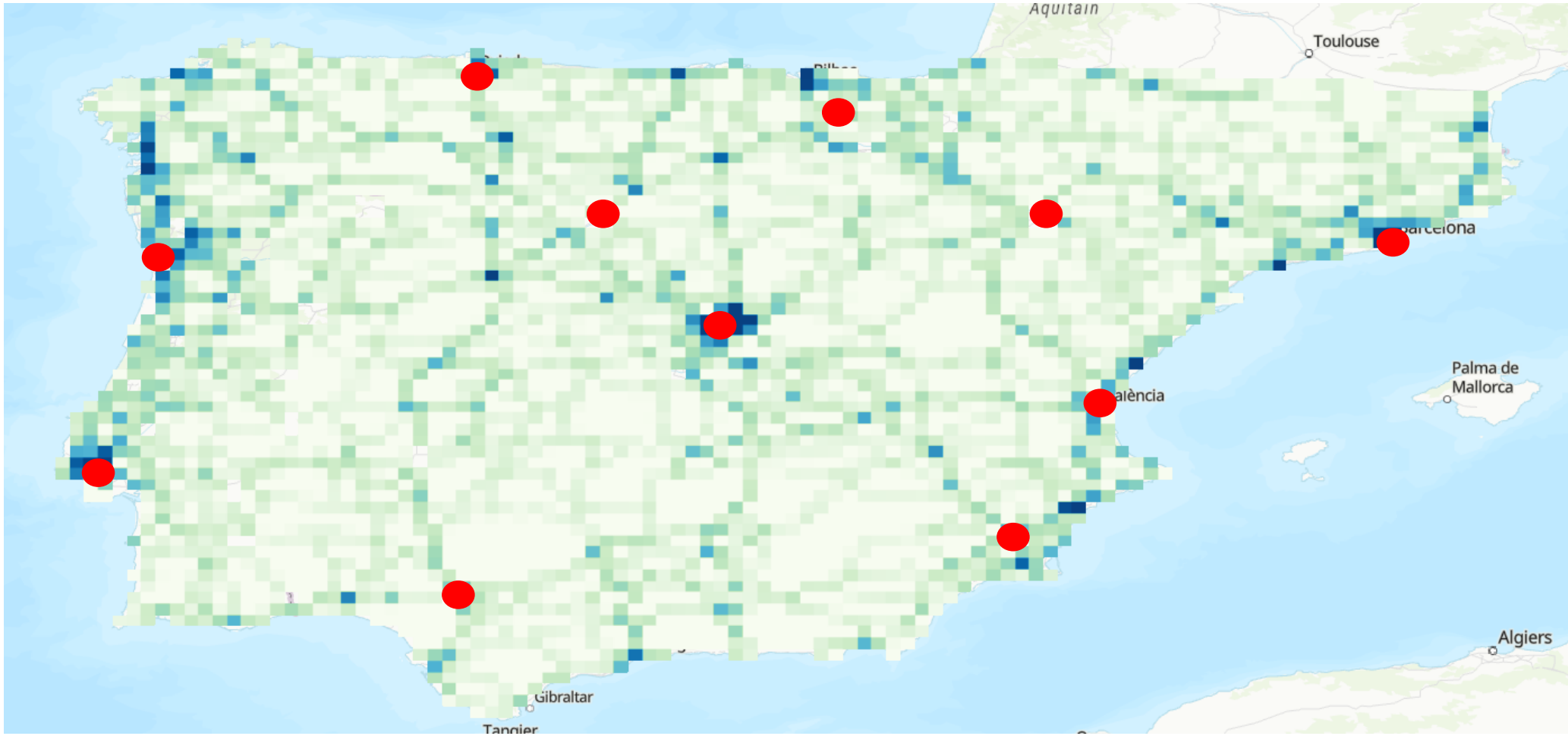
Demographic parameters over time



Random (movements + births + deaths)

Results Spatially explicit model

Maximum Annual % of Population Roadkilled in 10x10km

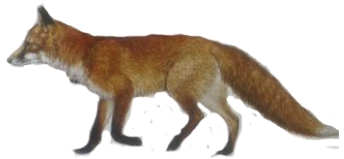


RISKY

Results Spatially explicit model

Maximum Annual % of Population Roadkilled in 10x10km

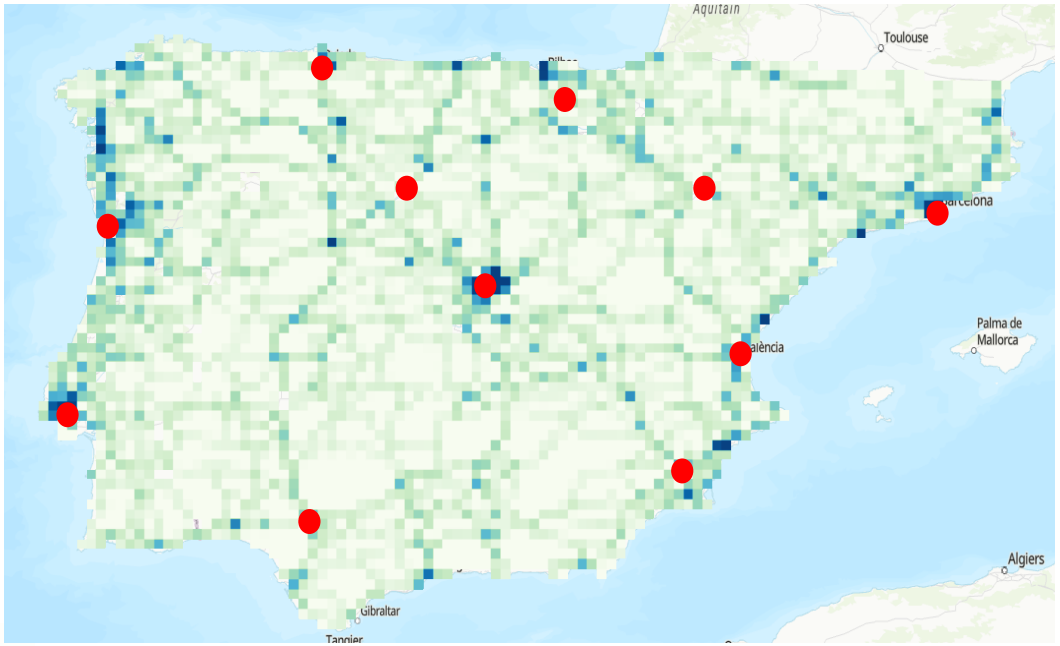
34%



4.7%

4.7%

9.2%



8.2%

12.7%

21.5%

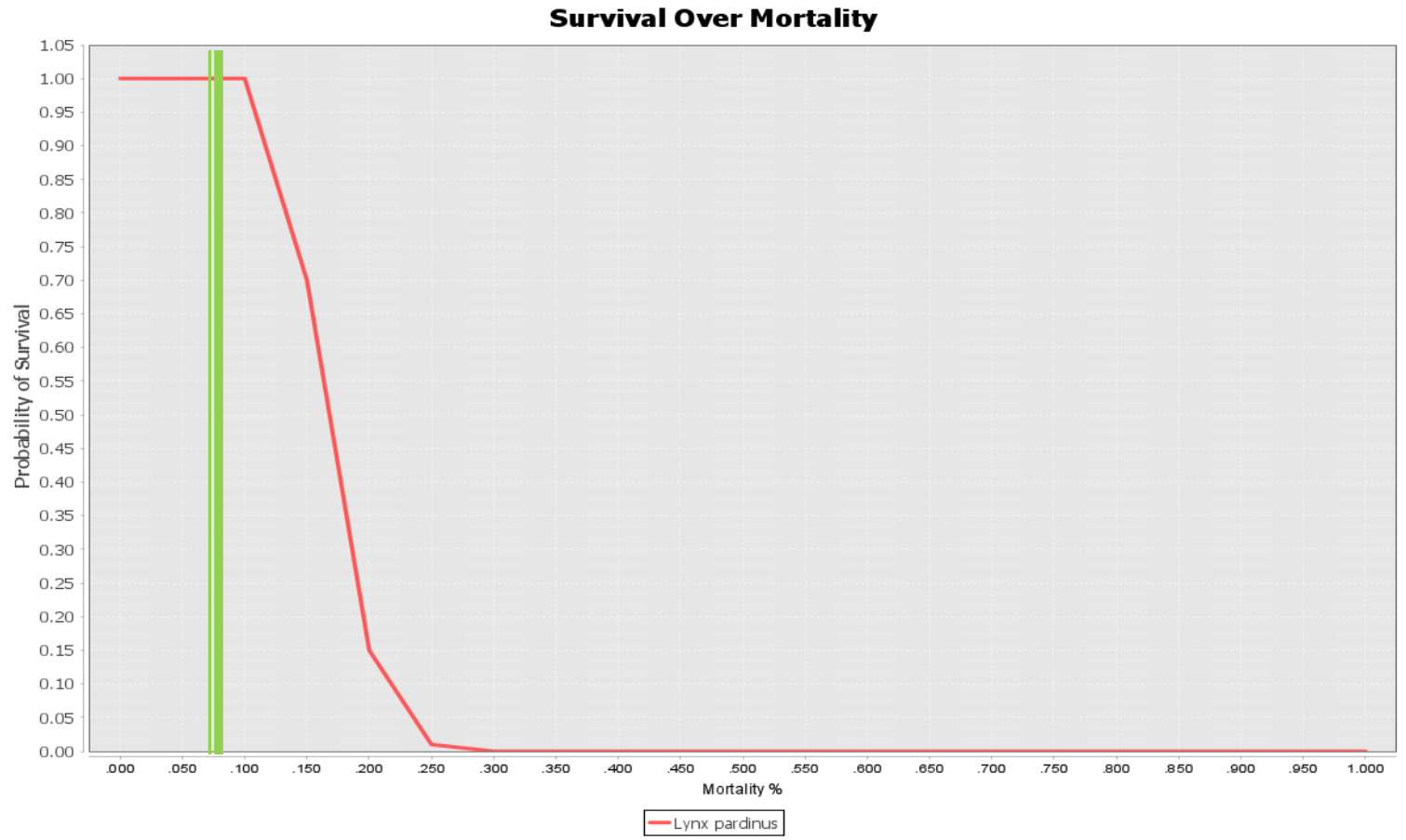
0.0059%

18%

RISKY

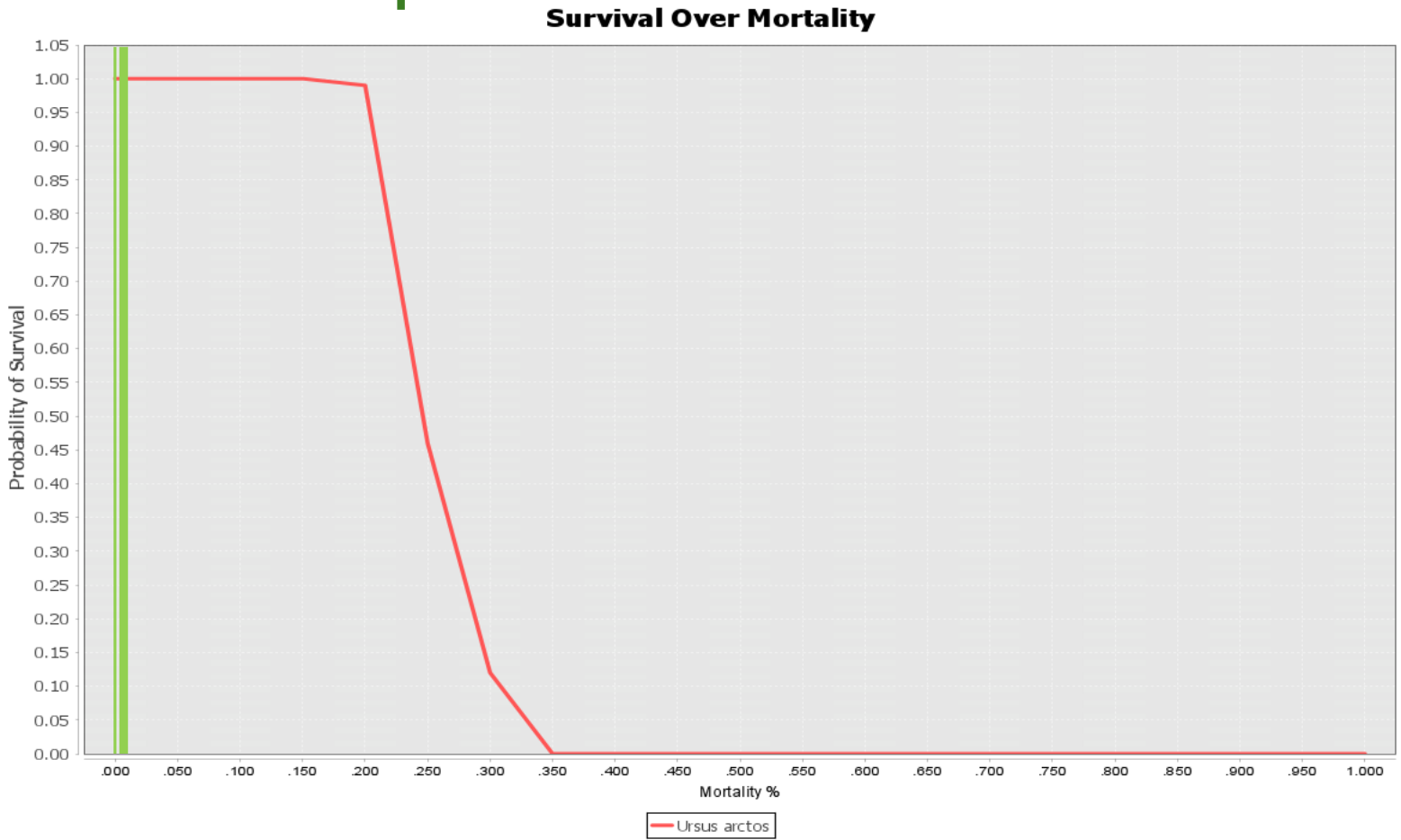
Results Spatially implicit model

Model: 25 years + 100 replicates

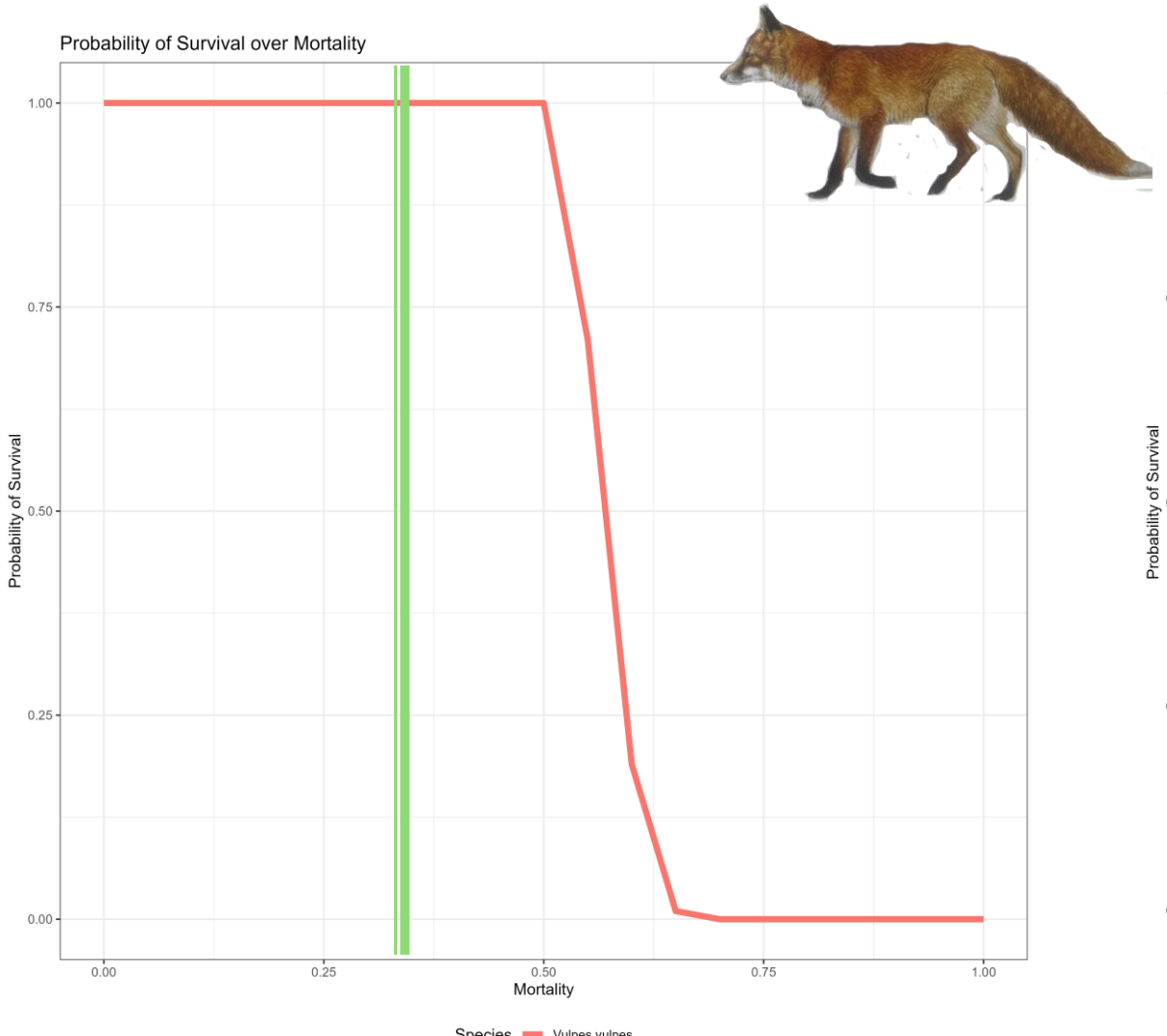


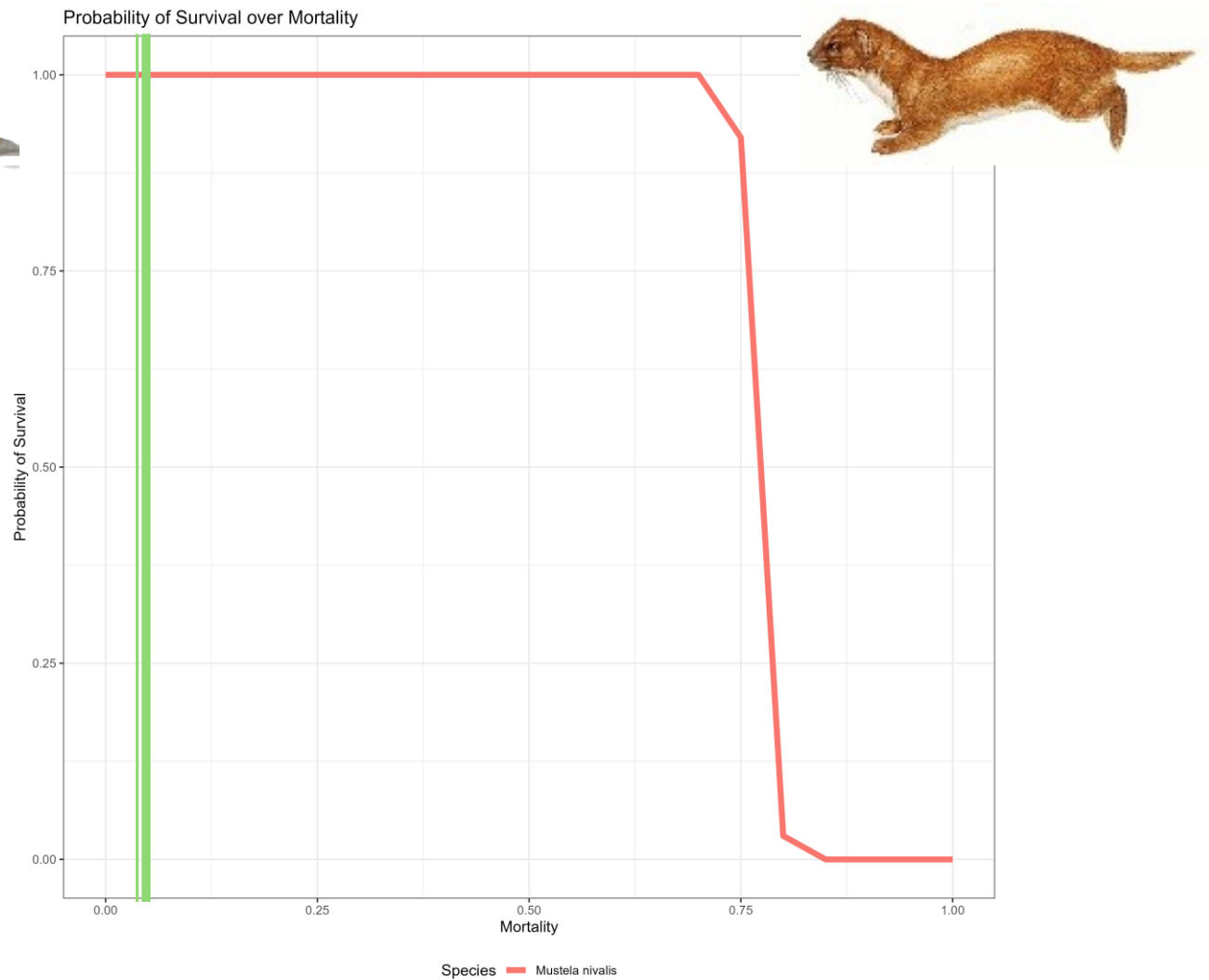
Results - Spatially implicit model

Model: 25 years + 100 replicates

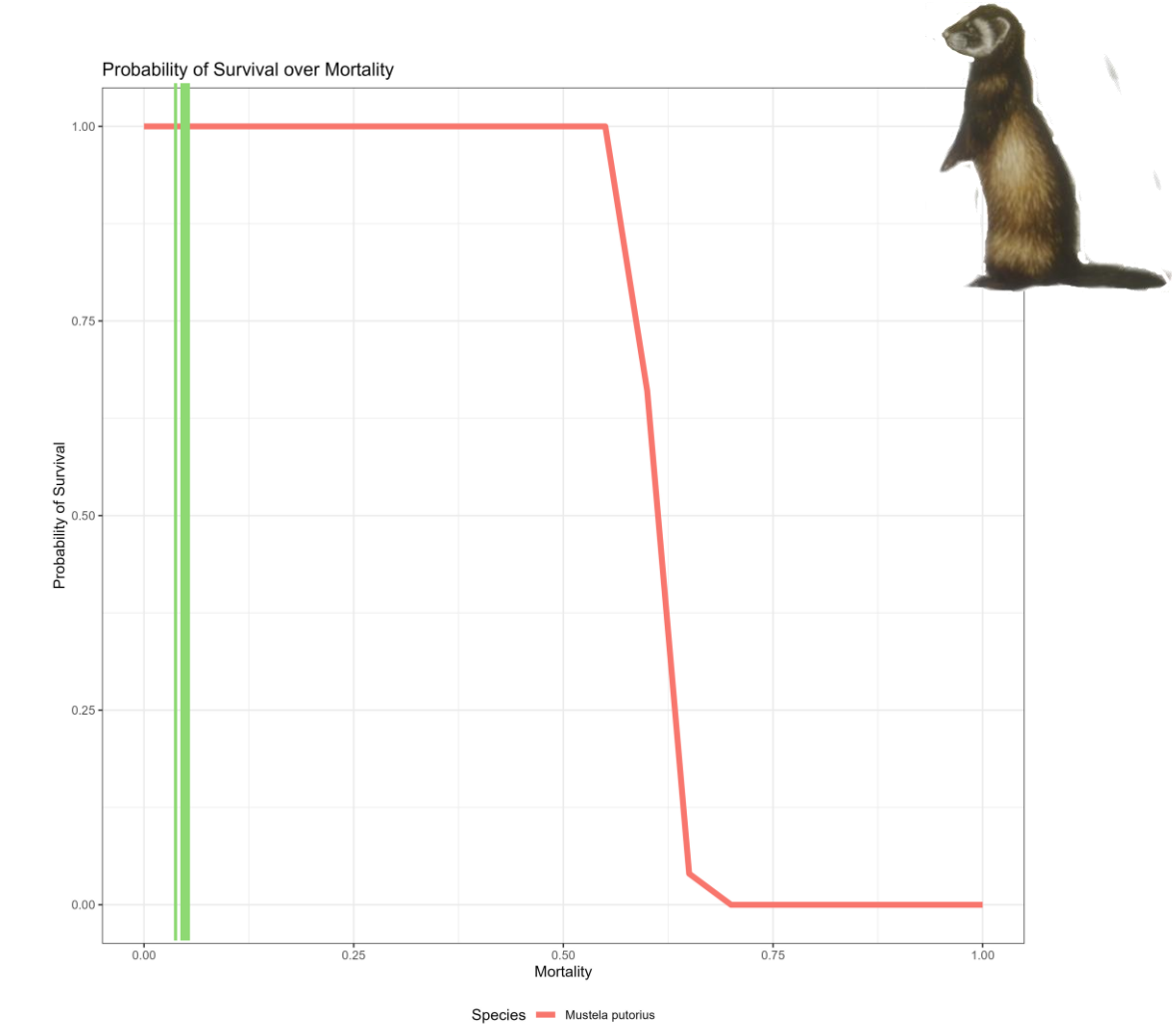


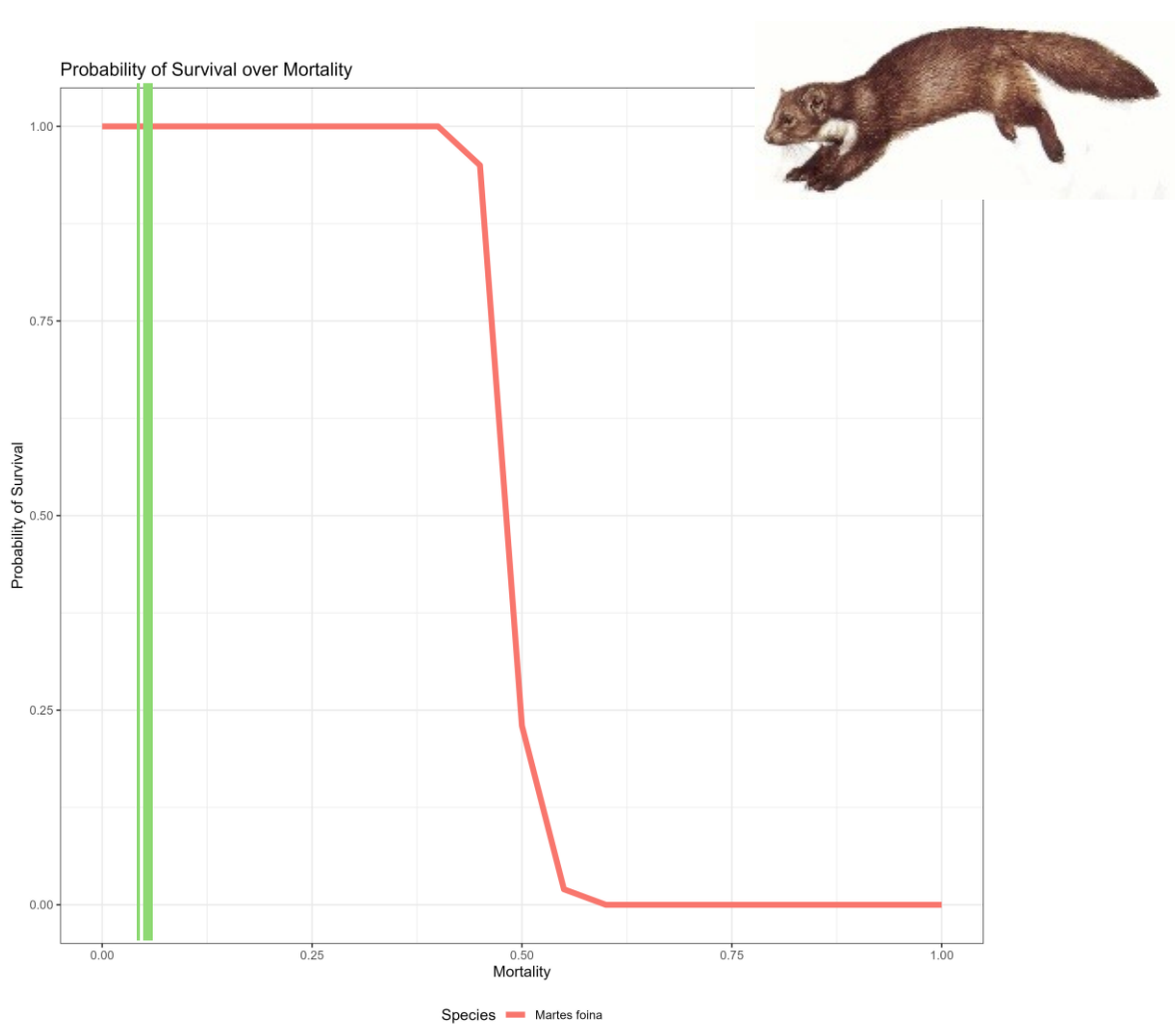
Results Spatially implicit model



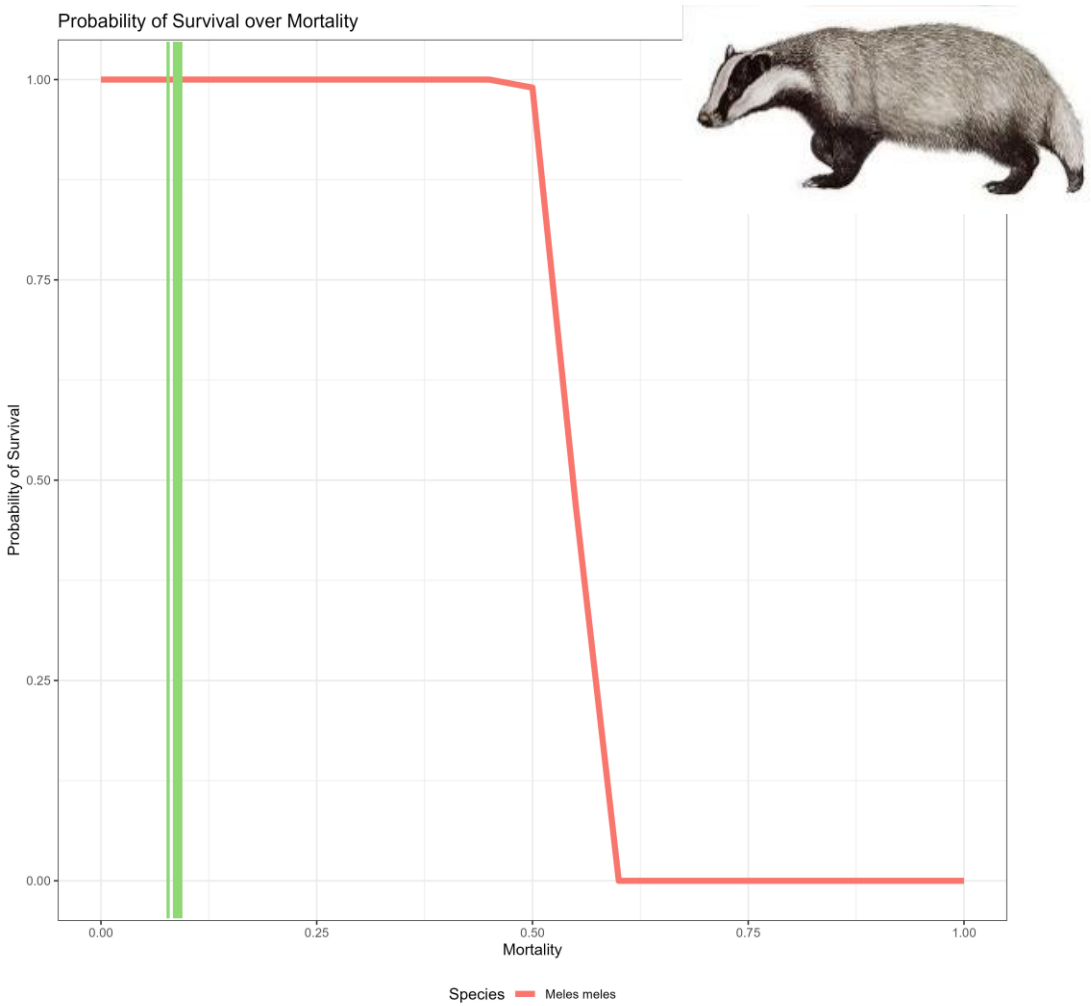


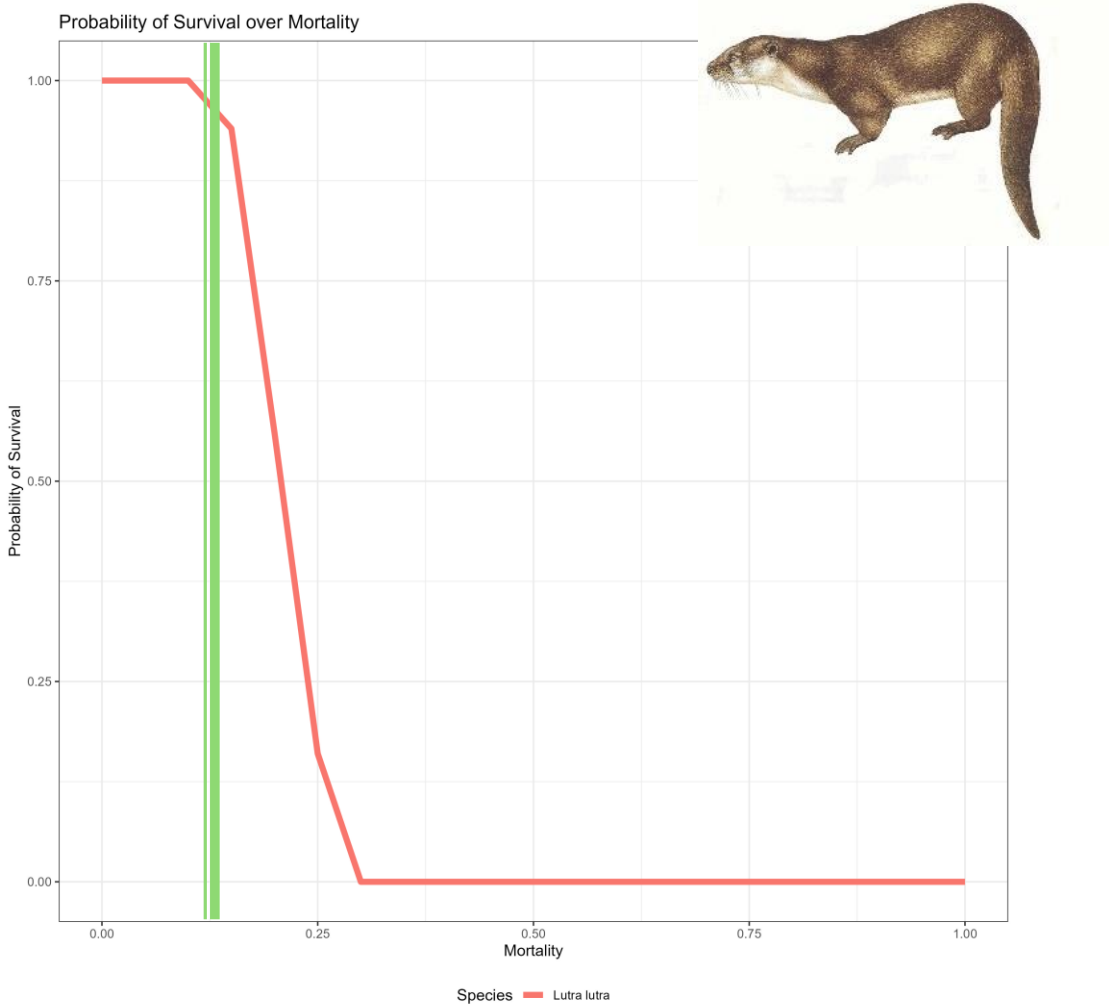
Results Spatially implicit model



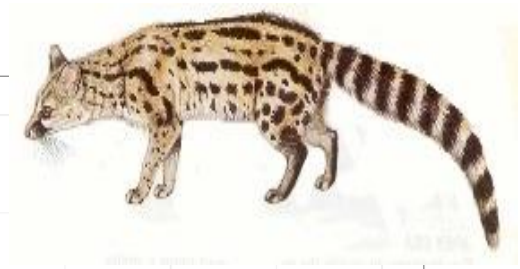


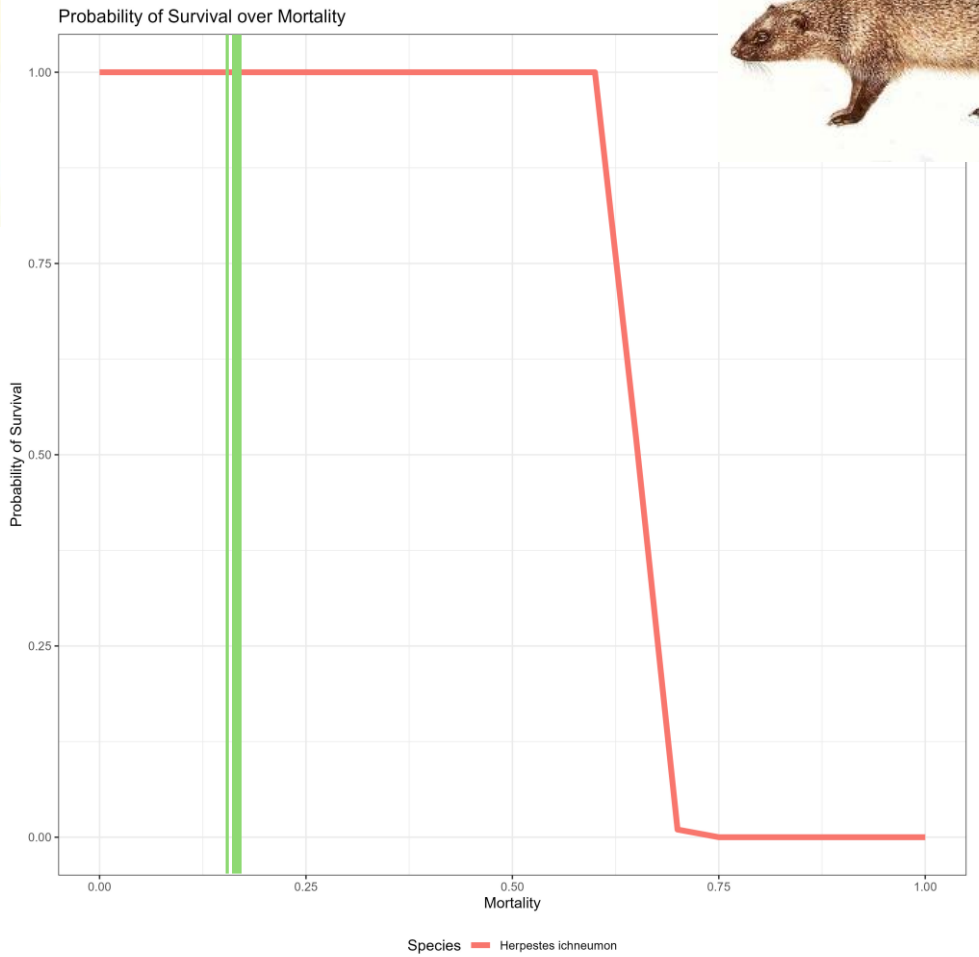
Results Spatially implicit model





Results Spatially implicit model





Anthropogenic mortality

SWiPE Successful Wildlife Crime Prosecution in Europe.

Wildlife crime | Databases | News
Legal framework | Useful links | Media
Resources | Training materials | About

Poaching is the second leading cause of non-natural death for the Iberian lynx, following roadkills

August 28, 2023

Every week, at least one Iberian lynx is shot, poisoned or killed in illegal snares, a steady trickle that threatens to undermine efforts to recover this strictly protected species. According to an analysis carried out by WWF Spain as part of the LIFE SWiPE project, an estimated 68 lynx died in 2021 as a result of poaching, 5% of the total population.

For two decades, a colossal collaborative effort has been made to recover the iberian lynx, which was the world's most threatened cat – the species now numbers 1,668 individuals between Spain and Portugal. But, in parallel to this encouraging increase, **WWF denounces the resurgence of poaching**, one of the main factors that brought the lynx to the brink of extinction. It is the second biggest cause of unnatural mortality of the species (5%), very close to roadkill (6%).

WWF's analysis reveals that 233 lynx were illegaly killed from 2000 to 2021, the latest year for which data is available. **Some of these crimes are caused by non-selective, cruel and illegal hunting methods, such as poisoned bait or leghold traps**. Other times, the killing is intentional: this year, a hunter was sentenced to two years and one day in prison for shooting an Iberian lynx at point-blank range in Don Benito (Badajoz).

SWiPE Successful Wildlife Crime Prosecution in Europe.

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The SWiPE project has received funding from the LIFE Programme of the European Union.

PARTNERS

	TOTAL DE EXEMPLARES MORTOS, REGISTADO EM 2024	EXEMPLARES MORTOS POR ATROPELAMENTO EM ESTRADAS/VIAS	EXEMPLARES MORTOS POR PATOLOGIAS	EXEMPLARES MORTOS POR OUTRAS CAUSAS
PORTUGAL	12	10	0	2
ANDALUZIA	95	78	6	11
CASTELLA-LA MANCHA	75	50	9	16
EXTREMADURA	29	22	2	5
REGIÃO DE MÚRCIA	3	2	0	1
TOTAL	**214**	**162**	**17**	**35**
%		75,7	7,9	16,3

RISKY

Take-home messages

Local demographic parameters

Systematic surveys

Regional scale

Cooperation

THANK YOU FOR YOUR INTEREST!

RISKY

www.risky.pt

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