Biodiversity management in Sites of Community Importance in the A2 motorway

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Geographical and environmental context

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Sites of Community Importance (SIC)
(Natura Network)

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Geographical and environmental context

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Images of the different landscapes

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Geographical and environmental context

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More relevant species | Caldeirão Mountain range

Source: Google.pt

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Geographical and environmental context

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More relevant species | Barrocal

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Project and environmental impact assessment

Investigation and study of alternative routes, corridors and location of different road infrastructure such as interchanges, viaducts, etc., taking into account Ecologically Sensitive Areas (Natura Network, RAN, REN, ...), Urban Areas

Definition of technical solutions
that minimize identified impacts

Elaboration of Specific Impact Mitigation Plans

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Project and environmental impact assessment

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Compensation Measures - Collaboration Protocols / Research Projects

CCDR Algarve

Creation of an environmental interpretative route in the Paderne lowland and in the Quarteira riverside

Rehabilitation and valorization of local historical heritage

Develop a management model

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Distribution of Atmospheric Pollutant Concentrations in Motorway Surroundings

ICNF Instituto da Conservação da Natureza e das Florestas

To promote the maintenance and population recovery of the species included in the Red List of Threatened Species

Establish the basis for future management

Elaboration of Environmental Monitoring Plans

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Project Area and characteristics

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Viaduto sobre o Barranco da Vinha
PH 10.3
Viaduto sobre o Barranco do Corte Amarelo
210+0
211+0
PH 12.1
212+0
Viaduto 1 sobre o Barranco do Ribeiro
Viaduto sobre a Rib.ª de Odelouca
213+0
Viaduto 2 sobre o Barranco do Ribeiro
Viaduto 3 sobre o Barranco do Ribeiro
Viaduto 4 sobre o Barranco do Ribeiro
Viaduto 5 sobre o Barranco do Ribeiro
214+0
215+0
PH 15.1
Viaduto sobre o Barranco do Carvalhal
216+0
Viaduto sobre o Barranco da Água Velha

A2 crosses 6,8 km of the SIC Serra do Caldeirão

Along this length there are 8 viaducts

The average distance between viaducts in this SIC is approximately 790 m

E
N S
W

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Fauna monitoring (2002-2016)

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Two main objectives

1 Monitoring of recovery projects in hydraulic passages and viaducts

- Abundance of target groups in A2 surroundings
- Mortality of target groups in A2 platform (road kills)

2 Wildlife crossing rate (permeability)

- Crossing rates at Hydraulic, agricultural passages and viaducts
- Wildcat survey and crossing rate

Target groups – mammals, birds, amphibians, reptiles, bats

Methods used:

Abundance assessment	Direct observation, listening points, traces, vocalizations, ultra-sound recording
Mortality assessment	Road kills database (species, site, date)
Passages efficacy	Use of rock dust and identification of footprints; transects (traces)
Wildcat survey	Camera trapping in specific passages with suitable habitat and control areas

Campaigns in Spring, Summer and Autumn. Mortality assessed all year

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Monitoring of recovery projects

1

Abundance of target groups in the surroundings

36 hydraulic passes

12 viaducts

1underpass

3 agricultural passages

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Monitoring of recovery projects

1

Abundance of target groups in the surroundings

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Reptiles, birds, rabbits, foxes and mongooses **appear more frequently** in the surroundings

Livestock, micromammals, genetas and badgers are also quite frequent and **potential users** of these ecological corridors

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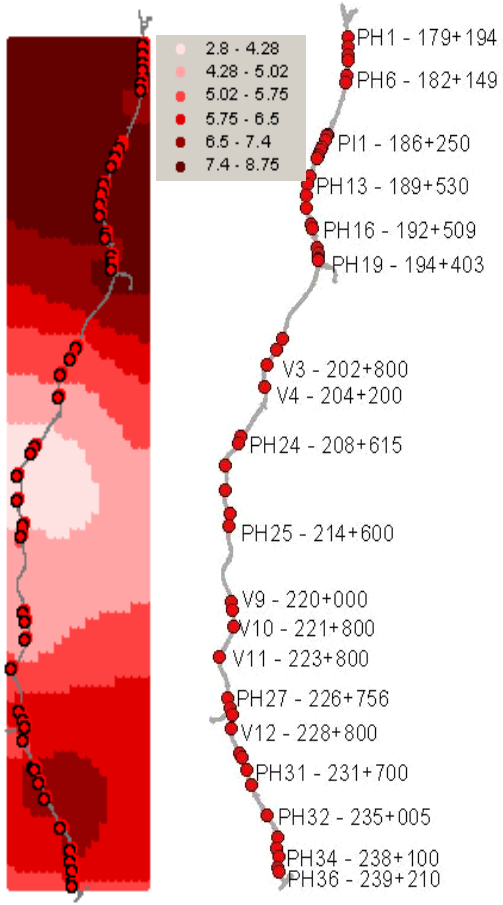
Monitoring of recovery projects

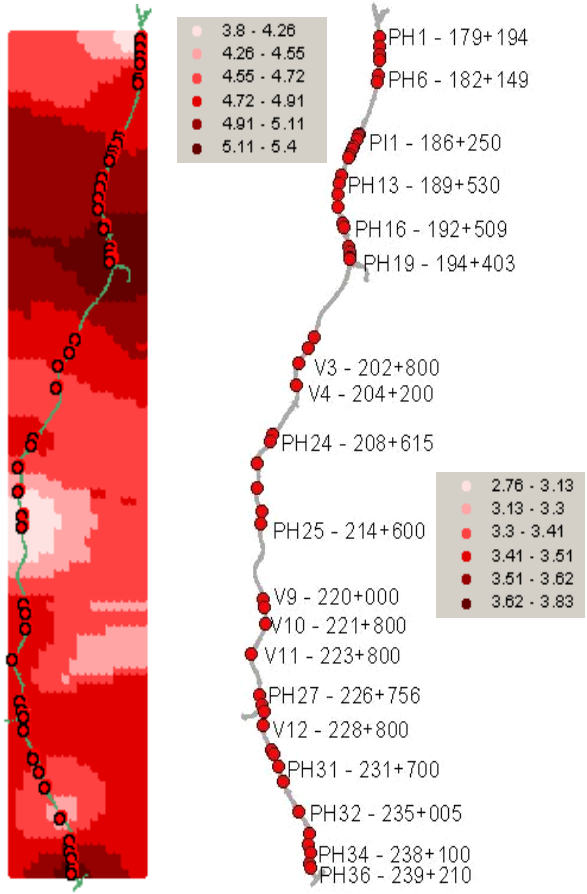
1

Mortality of target groups in A2 platform (road kills)

Road kills



Abundance



Species

The number of traces (abundance) and species in the surroundings are directly related to each other (statistically and spatially) and those are also related with the number of traces/species in the platform.

Higher prevalence of traces, species and road kills in the **northern** and **southern areas** of A2, and **lower in the central zone.**

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Monitoring of recovery projects

1

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Mortality of target groups in A2 platform (road kills)

In the period between 2002 and 2016

- **Mammal group is the group with the highest mortality rates** (67.6%) distributed by practically all kilometres
- Followed by **birds** (19.3%)
- **Domestic animals** (12.2%)
- **Reptiles** (0.8%)

The **mammals** dominant groups are the lagomorphs (rabbits and hares) and the carnivores. In this last one there are two species of greater conservation value (otter and wild cat). Regarding **birds**, the dominant groups are partridges and pigeons, followed by owls (with special concern for the eagle owl)

The periods of greatest activity/mortality of the various faunal groups correspond to the **months of the spring, summer and early autumn** seasons

The distribution of the road kills did not change significantly along the 10 years of monitoring

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Wildlife crossing rate

2

Hydraulic, agricultural passages and viaducts crossing rate

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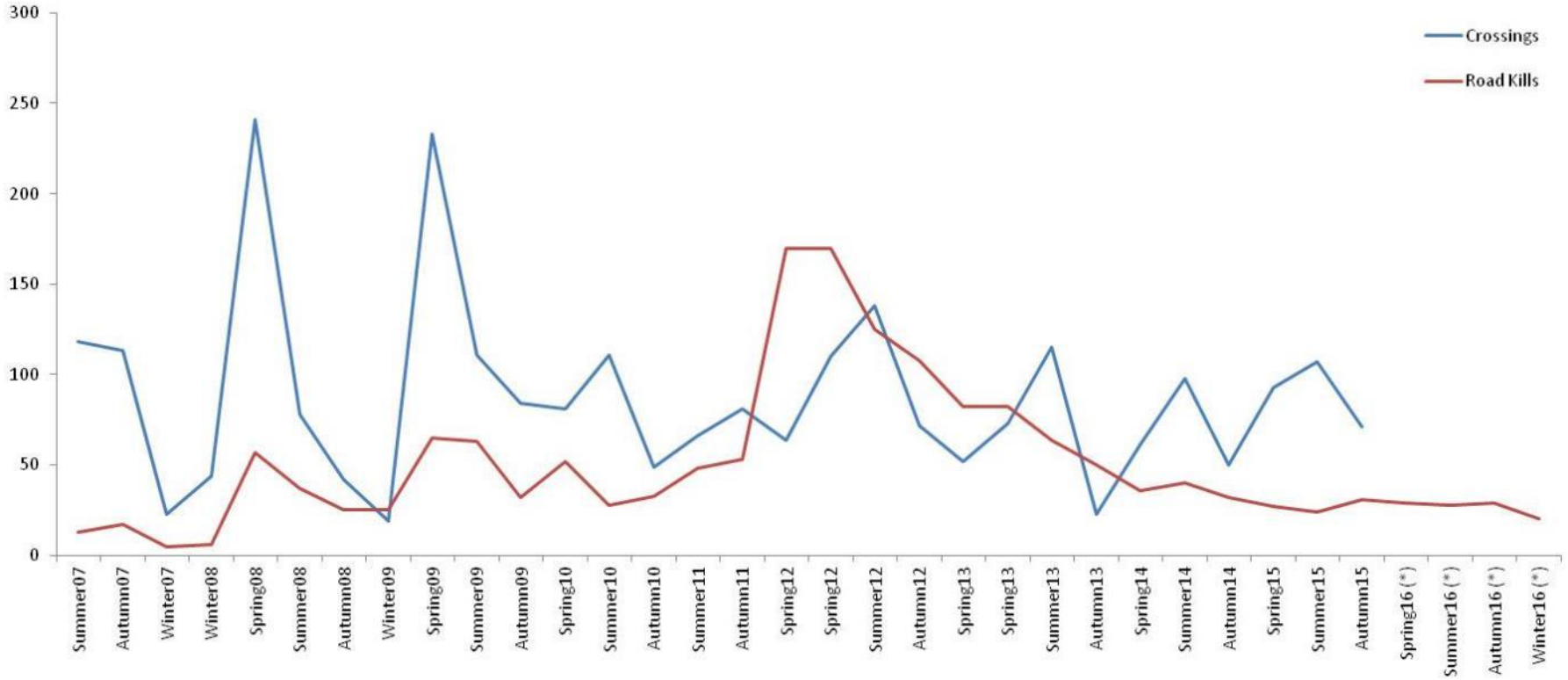

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Wildlife crossing rate

2

Hydraulic, agricultural passages and viaducts crossing rate

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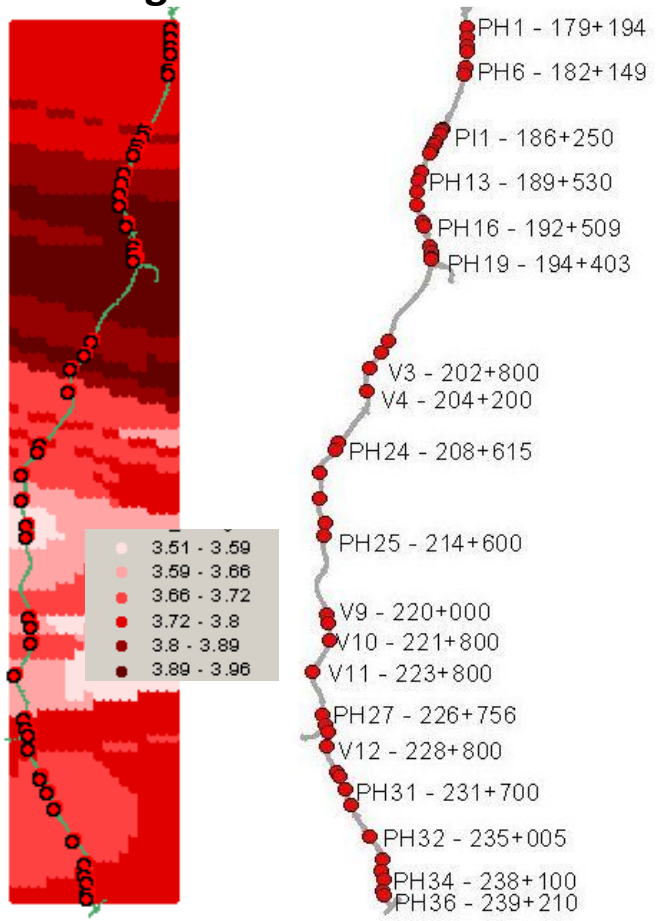
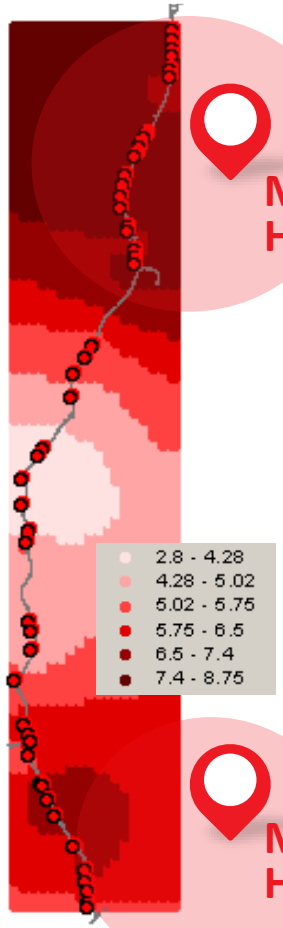
Crossings



Road kills



Mortality Hotspots

Mortality Hotspots

The number of crossings is also spatially correlated with the number of road kills on the A2 platform.

Higher - North and South

Lower - Central zone

Wildlife crossing rate

2

Hydraulic, agricultural passages and viaducts crossing rate

The periods of more activity in the passages correspond to the months of the **spring** and **summer**. The lower number of crossings in the autumn is related to the flooding of the passages because of the rains

The **cattle and micromammals** present the highest crossing rates, followed by rabbits, dogs and birds

There is a **direct positive correlation** between the number of species identified in the surroundings of the passages and the species that effectively cross the passages

The agricultural areas, the “montado” areas (oak trees), the pastures and streams are the areas where more species and more crossings occur

The seasonality of crossings and road kills is similar – Although the efficacy of passages is high, is not sufficient to reduce road kills level. But road kills are reducing along the years – **FAUNA IS ADAPTING!**

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Wildlife crossing rate

2

Wildcat survey and crossing rate

The campaign of camera trapping **did not detect any individuals of wildcat**, but confirmed the presence of some species that were identified in the highway surroundings, in the passages and in the road kills data.

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Wildcat survey and crossing rate

2

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Wildcat survey and crossing rate

Is assumed the non-presence of this species in the region of A2 highway, being the road kills identification a misjudge with domestic cat

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Fauna monitoring – Main conclusions

Recovery projects are successful for fauna communities

Permeability of highway is confirmed and high

But…

Road kills are still an issue

Are there BLACKSPOTS OF MORTALITY?

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Defining sensitive areas for mitigation measures

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Nature conservation "blackspot"

* Simulation of the application of Poisson distribution in different road fauna kills scenarios of a fictitious motorway

Highway	Section	Nr.of road kills	Poisson	Total	Road kills/km
A1000	500	1	3	106	10,6
	1000	3	23		
	1500	4	39		
	2000	12	100		
	2500	6	72		
	3000	4	39		
	3500	9	96		
	4000	7	83		
	4500	6	72		
	5000	5	56		
	5500	2	10		
	6000	8	91		
	6500	0	0		
	7000	2	10		
	7500	7	83		
	8000	11	99		
	8500	8	91		
	9000	4	39		
	9500	3	23		
	10000	4	39		

Nr.of road kills	Poisson	Total	Road kills/km
5	56	106	10,6
6	72		
5	56		
6	72		
5	56		
6	72		
6	72		
4	39		
5	56		
6	72		
4	39		
6	72		
5	56		
6	72		
5	56		
6	72		
5	56		
6	72		
6	72		
3	23		

Same nr. of road kills concentrated in some sections ⇒ **Blackspots**

The same nr. of road kills equally distributed ⇒ **No blackspots**

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Defining sensitive areas for mitigation measures

Highway	Section	Nr.of road kills	Poisson	Total	Road kills/km
A1000	500	9	30	228	22,8
	1000	10	41		
	1500	9	30		
	2000	11	53		
	2500	12	64		
	3000	12	64		
	3500	12	64		
	4000	10	41		
	4500	11	53		
	5000	12	64		
	5500	12	64		
	6000	12	64		
	6500	12	64		
	7000	12	64		
	7500	12	64		
	8000	12	64		
	8500	12	64		
	9000	12	64		
	9500	12	64		
	10000	12	64		

Nr.of road kills	Poisson	Total	Road kills/km
0	90	2	0,2
0	90		
0	90		
0	90		
0	90		
0	90		
1	100		
0	90		
0	90		
0	90		
1	100		
0	90		
0	90		
0	90		
0	90		
0	90		
0	90		
0	90		
0	90		
0	90		

This analysis it's not sensitive to the kind of species, their statute of preservation, abundance, habitat, existence of underpasses and also presents some constraints related to the impact magnitude determination.

Lots of road kills equally distributed ➡ **No blackspots**

Few road kills concentrated in some sections ➡ **Blackspots**

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Defining sensitive areas for mitigation measures

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In face of a lack of a definition for "blackspot" from the nature conservation perspective, it’s important to discuss this matter

Source: Google.pt

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Defining sensitive areas for mitigation measures

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Nature conservation "blackspot"

*** Our proposal**

Criteria 1

High number of road kills + Low number of crossings + Identification of species with conservation status

Criteria 2

Proximity or not of passages that allow crossing of fauna

Note: Criteria 1 based on descriptive statistics – normality of data, Median (2nd quartile), 1st and 3rd quartile - **high values of road kills above the 3rd quartile and low values of crossings below the 2nd quartile**

Based on the two criteria proposed above, it was possible to identify sections where mitigation measures might be needed

Thank you

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