Infrastructure indicator INF (project regions)

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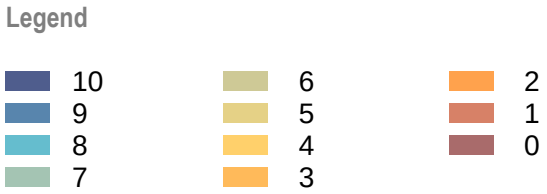
Summary Representation of the influence of infrastructure on ecological connectivity. The influence of infrastructure elements is determined by means of distance analyses. It is one of the indicators belonging to the continuum suitability indices CSI (consisting of LAN, POP, FRA, INF, TOP and ENV).



1 Introduction

Man-made infrastructure elements have a major disturbance effect on wildlife populations. These include vehicle killings of wildlife and habitat separation leading to isolated populations with limited access to resources (European Environmental Agency 2011). The aim of the infrastructure indicator is to consider a wide variety of infrastructure elements that may have a potential impact on wildlife. Depending on the infrastructure element, different distance classes were determined and weighted (Fu et. al. 2010).

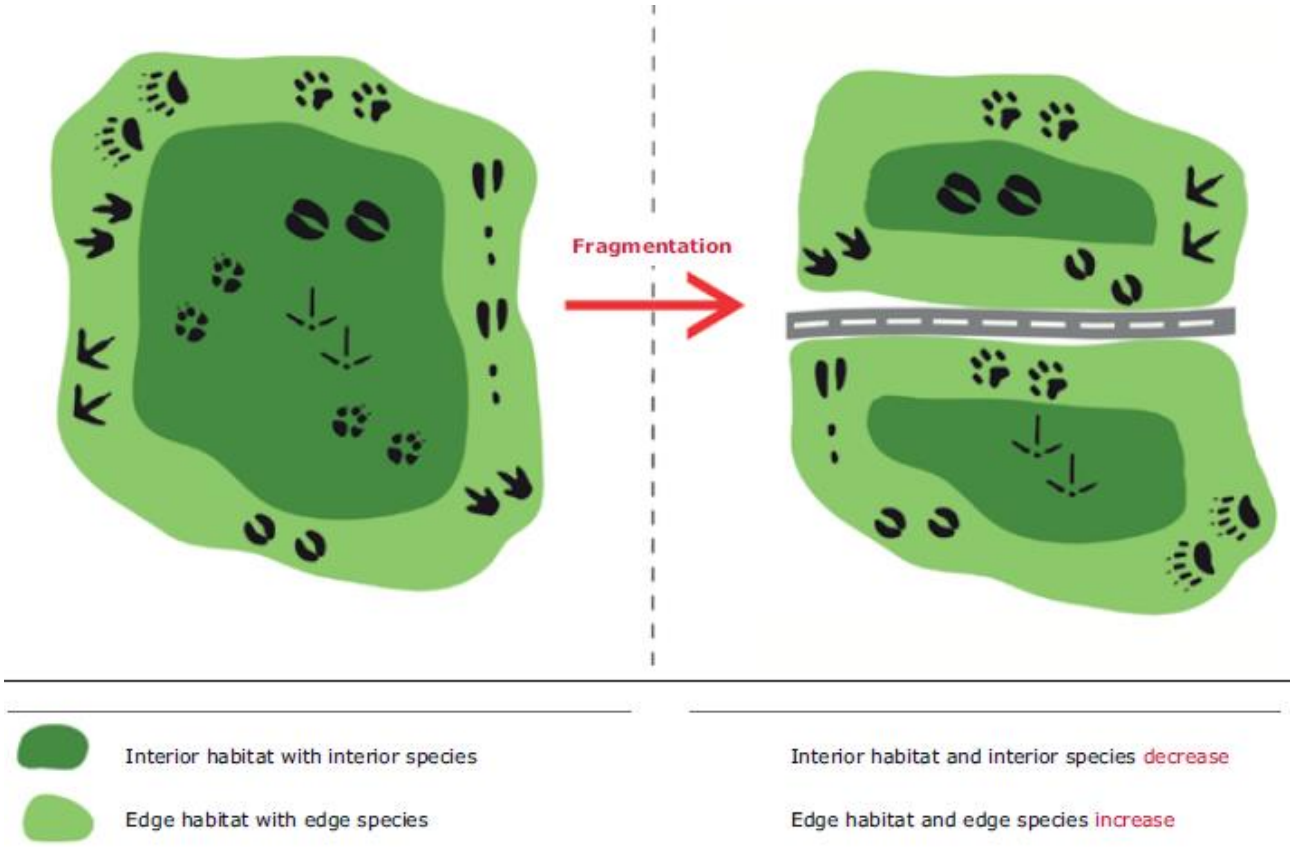


Figure 1: Influence of a street on the habitat, Source: European Environmental Agency (2011) -die Geographen schwick+spichtig

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2 Data

The infrastructure Indicator is produced using six different parameters (Road & Railway network, Ski regions, Aerial ways, High-voltage grid and Wind Power Stations)

2.1 Road network & Railway network

For the road and railway network analysis, regional datasets were used. Bad attribution of the data or lack of data were extended by OpenStreetMap (OpenStreetMap contributors 2018, Geofabrik GmbH 2018). Two homogeneous data set are required, one consisting of motorways, primary, secondary, tertiary streets and local connecting roads and the other of main railways and branch lines.

2.2 Ski regions & Aerial ways & High-voltage grid

For Ski regions including lifts, cable car and gondola, Aerial ways (only for goods) and High-voltage grid network the project partners database was used. Bad attribution of the data or lack of data were extended by OpenStreetMap (OpenStreetMap contributors 2018, Geofabrik GmbH 2018).

2.3 Wind Power

Only for the wind power station analysis the OpenStreetMap data were used (OpenStreetMap contributors 2018, Geofabrik GmbH 2018). No additional project partner dataset was available.

3 Processing and classification

Infrastructure indicator was calculated with the buffer distance analysis and weighted according to the distance of the infrastructure element.

3.1 Road network & Railway network

Streets and tracks were buffered like the distance in Figure 2 to reproduce the direct influence of the surface. Tunnels longer than one kilometre were deleted from the street network as the landscape can be considered as connected European Environmental Agency (2011).

TeleAtlas Multinet®	2009	Class 00 'Motorways' (buffer 2 × 15 m)
		Class 01 'Major roads' (buffer 2 × 10 m)
		Class 02 'Other major roads' (buffer 2 × 7.5 m)
		Class 03 'Secondary roads' (buffer 2 × 5 m)
		Class 04 'Local connecting roads' (buffer 2 × 2.5 m)
		Railroads (buffer 2 × 2 m)

Figure 2: Buffer around the street and railway elements, Source: TeleAtlas Multinet®, European Environmental Agency (2011)

The street dataset of all PWRs were classified into two groups. 1) Motorways and Primary streets 2) Secondary, Tertiary streets and local connecting roads. The same was done with the train network. These were divided into main railways and branch lines. Bothe were buffered and weighted according to the following Table 1 and Table 2.

Table 1: Motorways, Primary streets & Main Railways

Buffer distance	Indicator Value
0-10 m	0
10-20 m	1
20-30 m	2
30-40 m	3
40-60 m	4
60-80 m	5
80-100 m	6
100-130 m	7
130-160 m	8
160-200 m	9
> 200 m	10

Table 2: Secondary, Tertiary streets, local connecting roads & branch lines

Buffer distance	Indicator Value
0-5 m	0
5-10 m	1
10-15 m	2
15-20 m	3
20-30 m	4
30-40 m	5
40-50 m	6
50-65 m	7
65-80 m	8
80-100 m	9
> 100 m	10

Source: Pöpperl, Nitsch 2018

3.2 Ski regions, High-voltage grid, Aerial ways, Wind power stations

Ski regions

Ski lifts (line features) will be buffered with 100 Meter and will be weighted with 3. In addition, the Skiing areas (polygon features) will be weighted with 5.

High-voltage grid

Two different groups are also considered in the electricity grid. 1) Lines: Forming the transmission system and 2) Minor lines: Lines of the distribution system. The first group will be buffered with 50 meter and the second group with 25 meter and scored with 3.

Aerial ways

Aerial ways will be buffered with 10 meter and scored with 5.

Wind Power Station

Wind power station (point features) will be buffered according to Table 3.

Table 3: Buffer distance and Indicator value for wind power station, Source Sachlehner 1997, Pöpperl, Nitsch 2018

Buffer distance	Indicator Value
0-300 m	0
300-500 m	1
501-563 m	2
563-625 m	3
625-688 m	4
688-750 m	5
750-812 m	6
812-875 m	7
875-937 m	8
937-1000 m	9
> 1000 m	10

3.3 Combining the individual data sets

Finally, the individual data sets are combined and a 10x10 meter grid with the respective Indicator Value is created. If a pixel cell contains several Indicator Values from different source data sets, the lowest value is used.

4 References

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