



# Ecological corridors in urban landscapes

## The impact of artificial light on the movements of bats

Julie Pauwels<sup>1,2</sup>, Laforge A.<sup>3</sup>, Le Viol I.<sup>1</sup>, Coulon A.<sup>1</sup>, Julien J.-F.<sup>1</sup>, Azam C.<sup>1</sup>, Bas Y.<sup>1</sup>, Besnard A.<sup>3</sup>, Fonderflick J.<sup>3</sup>, Faure B.<sup>4</sup>, Haquart A.<sup>4</sup>, Valet N.<sup>2</sup>, Kerbiriou C.<sup>1</sup>

Contact  
jpauwels@edu.mnhn.fr

<sup>1</sup> Centre d'Ecologie et des Sciences de la Conservation (CESCO), Muséum national d'Histoire naturelle de Paris, France ; <sup>2</sup> Département Biodiversité, Airele, Roost-Warendin, France ; <sup>3</sup> Centre d'Ecologie Fonctionnelle et Evolutive (CEFE), Montpellier, France ; <sup>4</sup> Service Recherche et Développement, Biotope, Mèze, France



Fast and massive development of cities is accompanied with the implantation of numerous artificial lights. Light pollution has become a major issue for biodiversity conservation (Hölker et al. 2010) especially for nocturnal species such as bats (Azam et al. 2015).

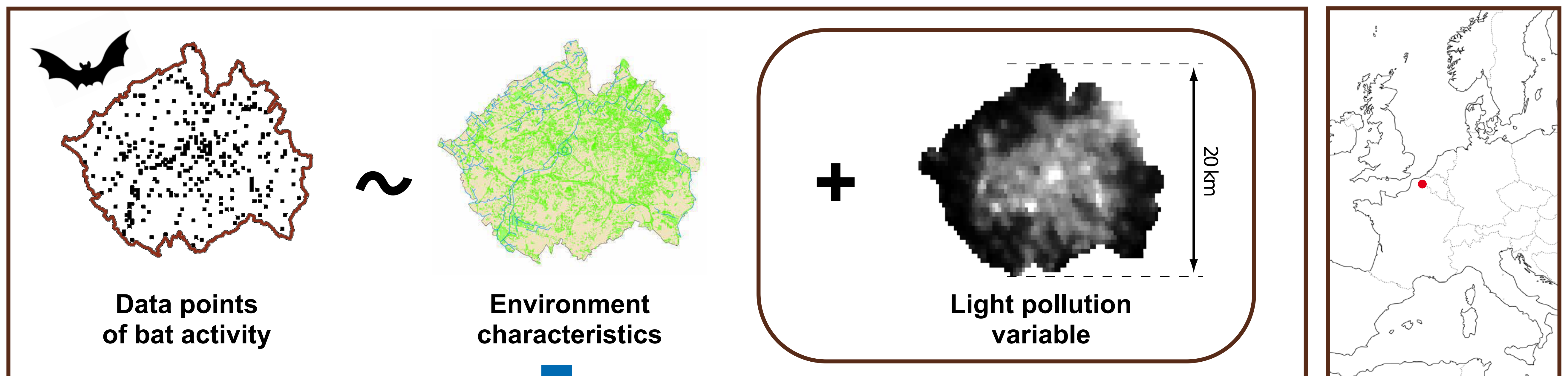
Artificial lights can affect the ability of bats to travel through a landscape and reduce the number of commuting routes they can use, i.e. landscape connectivity.

Hence it is of great importance to consider « dark » corridors and account for light pollution while modeling the landscape connectivity.



How to account for light pollution while modeling nocturnal connectivity ?

How to predict the impact of a change in the spatial distribution of light on ecological corridors ?



### Step 1

Predict bat activity over the territory from punctual activity data and environmental characteristics

Predicted intensity of bat activity over the territory

### Step 2

Model nocturnal connectivity using the Least-Cost Path algorithm

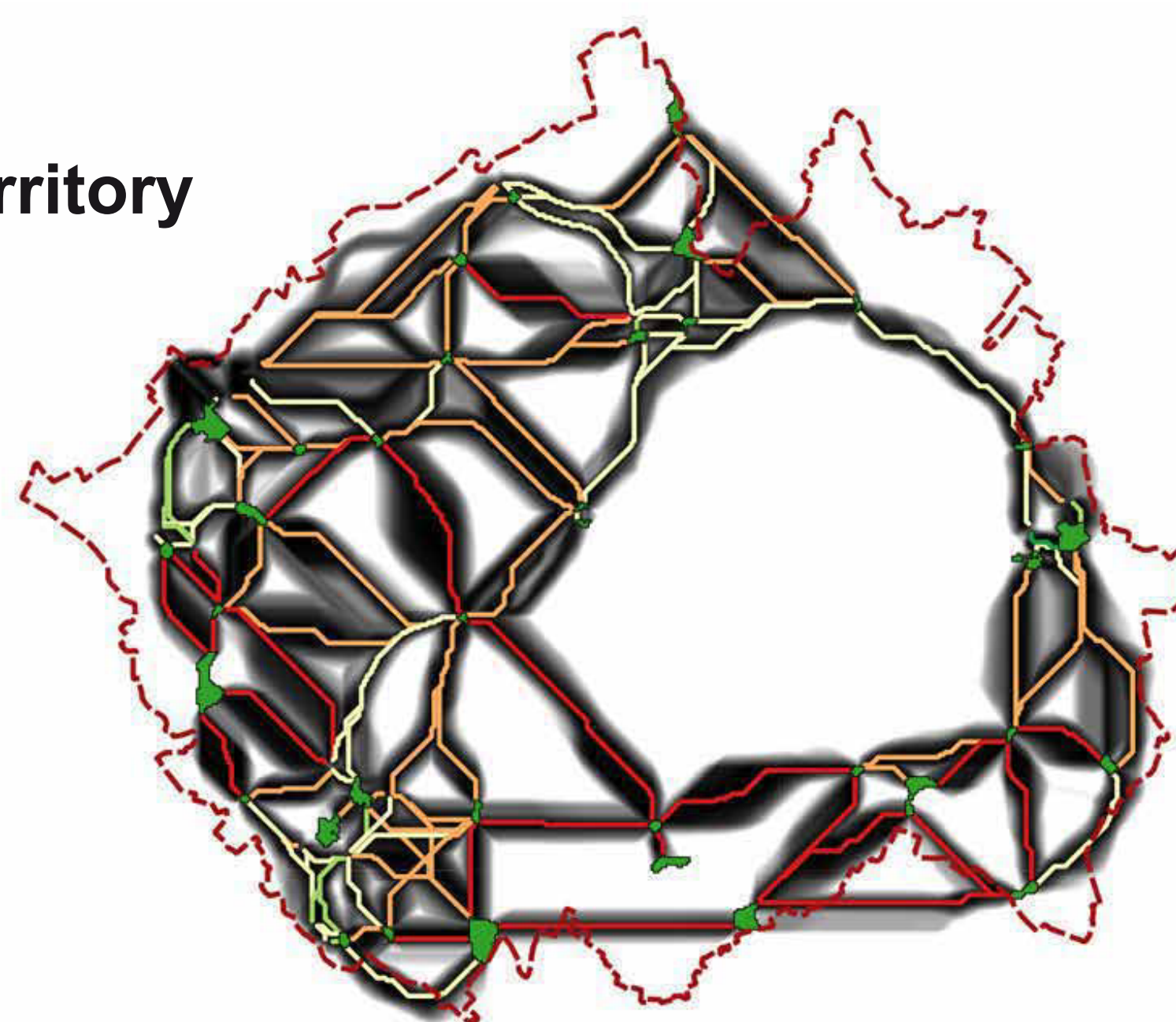
Actual nocturnal connectivity on the territory

Cost of a given least cost path

low High

Cost of movement in a corridor

low High



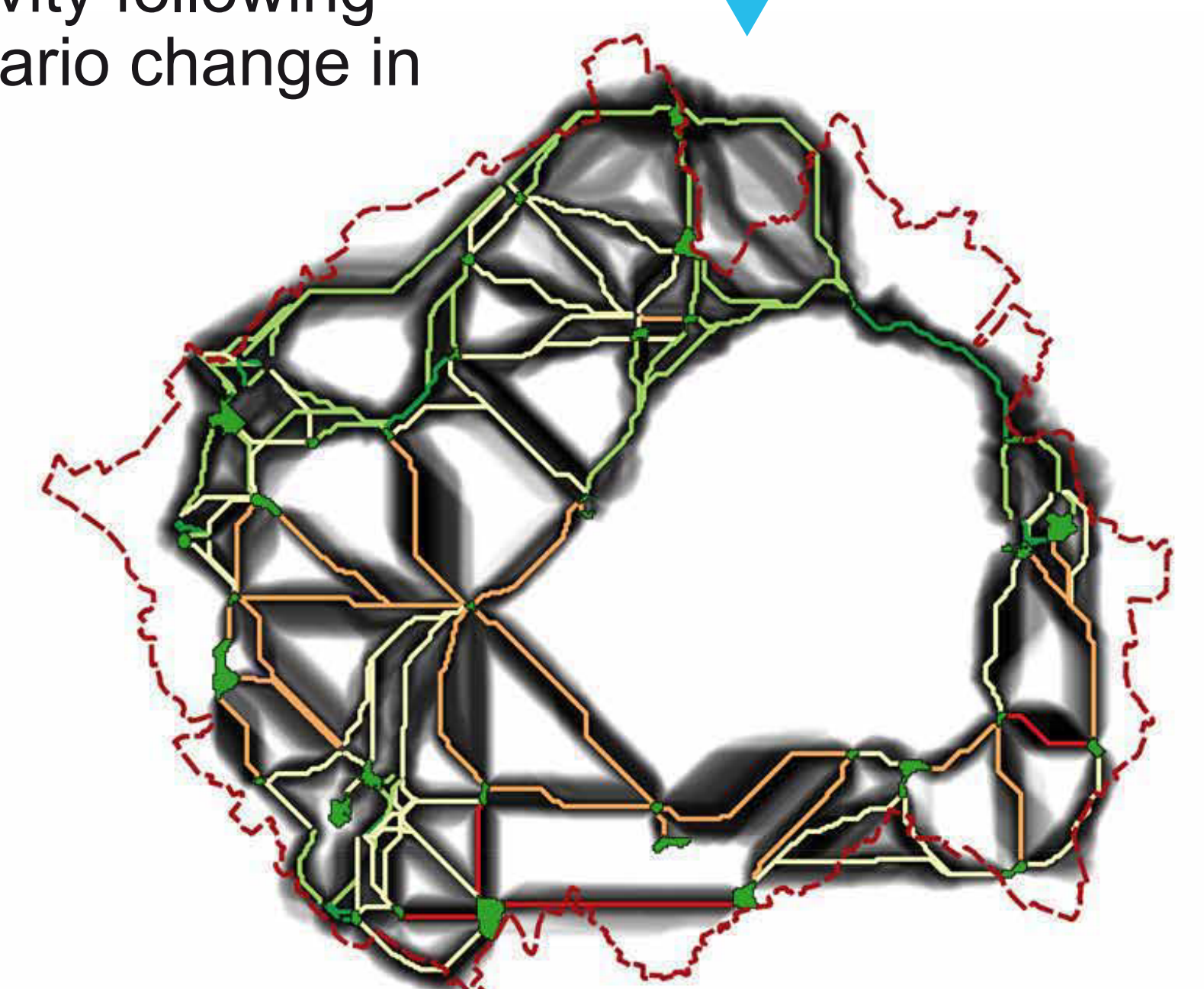
### LIGHTING SCENARIO

Extinction of public parks lights

Modified light pollution picture

Original light pollution picture

Potential nocturnal connectivity following the scenario change in lighting



### Conclusion & perspective

The extinction of public parks has an important positive effect on the nocturnal connectivity for bats on the territory : even seemingly small changes in public lighting can be of importance for bats conservation.

Overlaying ecological corridors based only on environmental characteristics with light pollution information might allow to point at critical areas which protection and management could benefit both diurnal and nocturnal species.

### References

Hölker F., Wolter C., Perkin E.K. and Tockner K. (2010) Trends in Ecology & Evolution, 25, 681–682  
Azam C., Kerbiriou C., Vernet A., Julien J.F., Bas Y., Plichard L., Maratrat J., and Le Viol I. (2015) Global Change Biology, 21(12), 4333-4341

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