**Movement responses of common noctule bats to the illuminated urban landscape**

Christian C. Voigt1,2,3, Julia M. Scholl1,4, Juliane Bauer1,5, Tobias Teige6, Yossi Yovel7, Stephanie Kramer-Schadt1,3,8, P. Gras1,3

1 Leibniz Institute for Zoo and Wildlife Research, Alfred-Kowalke- Str. 17, 10315 Berlin, Germany

2 Institute of Biology, Freie Universität Berlin, Takustr. 6, 14195 Berlin, Germany

3 Berlin-Brandenburg Institute of Advanced Biodiversity Research, Berlin, Germany

4 Institute of Biochemistry and Biology, University of Potsdam, Maulbeerallee 1, 14469 Potsdam, Germany

5 Faculty of Landscape Management and Nature Conversation, Eberswalde University for Sustainable Development, Schicklerstr. 5, 16225 Eberswalde, Germany

6 Büro für faunistisch-ökologische Fachgutachten, Germany

7 The George S. Wise Faculty of Life Sciences, Tel Aviv University, Israel

8 Department of Ecology, Technische Universität Berlin, Rothenburgstr. 12, 12165 Berlin, Germany

Corresponding author: voigt@izw-berlin.de

Cities are a challenging habitat for obligate nocturnal mammals because of the ubiquitous use of artificial light at night (ALAN). How nocturnal animals move in an urban landscape, particularly in response to ALAN is largely unknown. We studied the movement responses, foraging and commuting, of common noctules (*Nyctalus noctula*) to urban landscape features in general and ALAN in particular. We equipped 20 bats with miniaturized GPS loggers in the Berlin metropolitan area and related spatial positions of bats to anthropogenic and natural landscape features and levels of ALAN. Common noctules foraged close to ALAN only next to bodies of water or well vegetated areas, probably to exploit swarms of insects lured by street lights. In contrast, they avoided illuminated roads, irrespective of vegetation cover nearby. Predictive maps identified most of the metropolitan area as non-favoured by this species because of high levels of impervious surfaces and ALAN. Dark corridors were used by common noctules for commuting and thus likely improved the permeability of the city landscape. We conclude that the spatial use of common noctules, previously considered to be more tolerant to light than other bats, is largely constrained by ALAN. Our study is the first individual-based GPS tracking study to show sensitive responses of nocturnal wildlife to light pollution. Approaches to protect urban biodiversity need to include ALAN to safeguard the larger network of dark habitats for bats and other nocturnal species in cities.