

Bee behaviour in dim light

Supervisory team:

Main supervisor: Dr Natalie Hempel de Ibarra (University of Exeter)

Non-academic supervisor: Roger English (AONB South Devon)

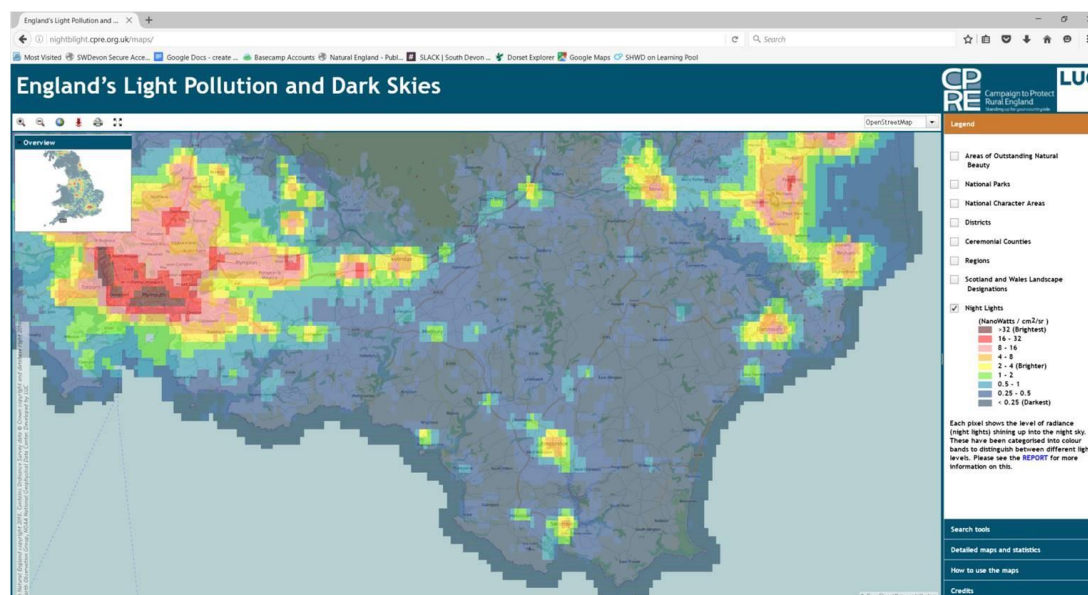
Prof Kevin Gaston (University of Exeter), Dr Heather Whitney (University of Bristol)

Collaborators: Dr Misha Vorobyev (University of Auckland, New Zealand)

Host institution: University of Exeter

Project description:

Expansion of artificial lighting changes the illumination conditions in many natural and agricultural habitats with many predicted impacts on plants and animals in ecosystems (Davies, Bennie, Inger, Hempel de Ibarra, Gaston 2013 Artificial light pollution: are shifting spectral signatures changing the balance of species interactions?. *Glob Chang Biol* 19, 1417-23). However, there is still a significant lack of empirical research and knowledge about physiological, neural and behavioural mechanisms of animals to critically evaluate and support these predictions. Here we aim to study the visual and cognitive capabilities of bees when they forage under dim light conditions. Bees have excellent colour vision and quickly learn to discriminate between flowers learning their colours and patterns (Hempel de Ibarra, Vorobyev, Menzel 2014 Mechanisms, functions and ecology of colour vision in the honeybee. *J Comp Physiol A* 200, 411-33). Their performance and decision-making under dim light, however, is still poorly understood. Using carefully designed behavioural experiments, quantitative data modelling and measurements in the field this project aims to study sensory and cognitive mechanisms underlying bee foraging behaviour to develop an understanding of the limitations imposed by dim illumination, natural and artificial. This research will help to develop more specific predictions about the potential consequences for pollination services and the nutritional and health status of bee populations.



A map of light-polluted and dark skies in South Devon (<http://nightblight.cpre.org.uk/maps/>)