

APPG on Dark Skies Submission Nigel Jacklin September 2020

Reduce Light Pollution in Rural Areas.

The Government's 25 Year Environmental Plan set out a goal of leaving the environment in a better condition in 25 years. This can easily be achieved for light pollution; in some cases it's just a question of turning the lights off.

This document puts forward ideas to reduce light pollution, in particular in rural areas and areas in close proximity to Areas of Outstanding Natural Beauty. In such areas:

- small amounts of ill-considered lighting can have significant adverse effects on nocturnal pollinators and other wildlife, reducing biodiversity (we have summarised a recent scientific paper on this, attached)
- many residents and visitors enjoy starry dark skies. Light pollution reduces their ability to do so.

Unnecessary lighting adds to carbon emissions, through the needless consumption of electricity, and increased land-fill through the production of 'throw-away' products such as garden solar lights. *Addendum September 2022: In this respect garden solar lights may not be environmentally friendly, especially when they introduce lighting to outdoor spaces where it was previously dark. These lights will add to carbon emissions through their production, shipping and sale and have a negative impact on wildlife.*

Much light pollution is due to poor design or unconsidered use of lighting. Effective lighting tends to produce less 'overspill' or 'sky-glow.' Light overspill is simple to rectify by correct positioning and direction of lights. Lights which shine up into the sky serve little useful purpose and contribute significantly to sky-glow. Motion detector lights are a more effective means of deterring burglars than lights which are left permanently on at night. Factors such as intensity, brightness, reflective surfaces and light spectrum are also important. These areas are covered by existing guidance such as that provided by the Institution of Lighting Professionals (see Background Information). Guidance is routinely ignored.

My proposal is that we ask for two key steps to be taken:

- Increase awareness of lighting 'good practice' (and lighting 'harms') amongst the public and professionals such as electrical installers and retailers as well as those involved in planning and environmental health. This could be combined with more about the joys of dark skies and the biodiversity benefits.
- Agree a definition of areas in which enforcement of lighting guidance should be more diligently applied by local authorities, providing clear means of action. This should allow action to be taken regardless of whether any households are directly impacted by light pollution (i.e. nature can be protected). Light overspill from urban to rural areas also needs to be considered.

These could be implemented in combination with a review of lighting guidance and steps to limit the sales of harmful lighting or provision of relevant information where they are sold.

There is no need to be afraid of the dark. Our eyes developed before artificial lighting was available. We can see by starlight. We love dark skies. We can increase everybody's chances of enjoying the stars with well controlled, star-quality lighting.

Like many others interested in this subject I very much welcome the establishment of the All Party Parliamentary Group for Dark Skies. This would have particular impact in East Sussex where we live; I will join with others to ask our MP's to support your work.

Nigel Jacklin, East Sussex

Background Information

The countryside charity CPRE believes that darkness at night is one of the **key characteristics of rural areas** and that it represents a major difference between what is rural and what is urban. The CPRE and the British Astronomical Association's Commission for Dark Skies have worked with Highways England, DEFRA, the Institution of Lighting Professionals and others to achieve improvements in this area (such as downward street lighting and the establishment of lighting guidance). Despite major steps at the local authority level, private and small business lighting is of increasing concern in rural areas.

<https://www.nightblight.cpre.org.uk/>

<https://britastro.org/dark-skies/>

In 2016 the South Downs National Park became the world's newest **International Dark Sky Reserve** (IDSR). This is something we in Sussex are rightly proud of. However, when the Premier League gave grants to football teams to help improve their pitches in 2016 Brighton and Hove Albion and many other clubs installed lights which create "devastating and distressing light pollution" according to a campaign to fund a legal action to challenge the decision to grant permission for these lights. The lights help the grass grow at night and can be seen for miles around across the South Downs. This is one very significant example of light overspill into an International Dark Sky Reserve.

<https://www.change.org/p/brighton-and-hove-albion-fc-put-that-light-out>

Dark Skies Tourism is a small but growing industry. In the current circumstances one potential area of growth for the UK visitor economy will be rural staycations. Dark Skies can form an important part of this 'natural' attraction, with camping being an easily expandable form of 'socially distanced' accommodation and much-needed money flowing into local economies.

The insect charity Buglife produced a report in 2011 (A Review of the **Impact of Artificial Light on Invertebrates**) pointing to the effects on biodiversity. It stated "In particular, lighting should not be installed near ponds, lakes, rivers and the sea; areas of high conservation value; sites supporting particularly light-sensitive species of conservation significance (e.g. Glow worms and rare moths) and habitat used by protected species of invertebrate."

https://cdn.buglife.org.uk/2019/08/A-Review-of-the-Impact-of-Artificial-Light-on-Invertebrates-docx_0.pdf

More recent research published in the journal Biological Conservation (January 2020) concluded that "Artificial Light at Night (ALAN) is unique among anthropogenic habitat disturbances in that it is **fairly easy to ameliorate**, and leaves behind no residual effects."

<https://www.sciencedirect.com/science/article/pii/S0006320719307797?via%3Dihub>

The Institute of Lighting Practitioners defines three types of areas based on International Dark-Sky Association (IDA) SQM (**Sky Quality Measurements**).

E0 Protected Dark (SQM 20.5+)	Astronomical Observable dark skies, UNESCO starlight reserves, IDA dark sky places
E1 Natural Dark (SQM 20 to 20.5)	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones etc.
E2 Rural Low district brightness (SQM ~15 to 20)	Sparsely inhabited rural areas, village or relatively dark outer suburban locations

The ILP also provides lighting guidance.

<https://theilp.org.uk/publication/guidance-note-1-for-the-reduction-of-obtrusive-light-2020/>

'Light pollution is a driver of insect declines'
Biological Conservation – Owens et al (2020)

This note summarises an article published in the Journal Biological Conservation in November 2019. The article was brought to our attention by the charity Buglife.

Over the last two decades researchers and ecologists have observed the rapid decline internationally in insect diversity, naming it an “insect apocalypse.” Insects have an important role in our ecosystem, so their absence would have devastating consequences. Researchers have described habitat loss, chemical pollution, invasive species and climate change as key threats to insect diversity. But a bias towards studying daytime phenomena has meant the negative and crucial impact of artificial light at night (ALAN) has been explored less.

Artificial Light At Night (ALAN) has been observed to impact the physiology, behaviour and fitness of insects. Nocturnal insect species have declined at a steeper rate than diurnal species (active during the day) and disproportionate losses have been recorded at light polluted sites. For all of evolutionary time the daily cycle of light and dark has remained constant, so insects have not needed to evolve any relevant adaptations. And yet some estimates suggest that one third of insects attracted to artificial light sources die before morning either through exhaustion or predation.

ALAN disturbs the movement, foraging opportunities, reproduction, predation and development of a diverse range of insects;

- ALAN can **disorientate insects** from their natural patterns of movement, such as in their seasonal migration, or in their pursuit of food or habitat. Some insects use starlight or moonlight to help guide their movements, but this natural light can be obscured by ALAN.
- ALAN can disrupt insects' ability to obtain food. Researchers have observed nocturnal insects **postponing foraging activities** until their habitat is sufficiently dark, in order to reduce the risk of predation. This postponement can result in insects feeding less frequently and a subsequent decrease in nocturnal pollination.
- ALAN can **increase the risk of predation** to nocturnal insects and these insects do not seem able to defend against this increased pressure. Predators have been found feeding around artificial light, which gives them the advantage of improved visibility.
- ALAN can interfere with the window of time for night active insects to reproduce. For instance, some insects' **reproduction patterns** are sensitive to moonlight, which can be disturbed by ALAN. Artificial lighting can also impact insect development relevant to reproduction; overexposure can cause sterilisation in male insects and can suppress sex pheromones in female insects.
- Artificial light can interfere with the production of **endocrine hormones** in insects, which ultimately disturbs the processes that the hormones regulate, like circadian rhythms and metabolic function. Changes to circadian rhythms have been shown to impair immune function in insects and potentially shorten their lifespan.

A balance should be found between maintaining sufficient levels of night-time illumination for human safety and enjoyment, whilst showing consideration to the negative impact of ALAN on insect diversity. Reasonable adjustments could be made to lighting practices such as use of motion activators, timers or reducing the number of fixtures in areas of ecological vulnerability so light is not emitted when or where it is not needed. It would also be beneficial to carry out further research into the effects of specific wavelengths on insects. It may be possible to develop artificial lighting which emits a minimal output of the most harmful wavelengths.

Summary by Vanessa Gatward, Project Manager, Think.me.UK, July 2020