Artificial night lighting has widespread impacts on nature

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Artificial night-time lighting has a diverse range of effects across the natural world and should be limited where possible, researchers say.

A team led by the University of Exeter brought together more than 100 studies and found "widespread" impacts on animals and plants.

Changes to animals' bodies and behavior—especially hormone levels and patterns of waking and sleeping—were consistently found.

The study shows that levels of melatonin (a hormone regulating sleep cycles) were reduced by exposure to artificial lighting at night in all animal species studied.

"Lots of studies have examined the impacts of artificial night-time lighting on particular species or communities of species," said Professor Kevin Gaston, of the Environment and Sustainability Institute on Exeter's Penryn Campus in Cornwall.

"Our research brings those studies together—and we find the effects are very diverse and very pervasive.

"Particularly strong responses are seen in hormone levels, the timing of daily activity in diurnal (daytime) species, and 'life-history' traits such as number of offspring.

"People may imagine this is all about powerful light, but in fact we are seeing a lot of responses at quite low levels of artificial light."

Dr. Dirk Sanders added: "We see differences in nocturnal and diurnal species.

"For rodents, which are mostly nocturnal, the duration of activity tended to be reduced by night-time lighting.

"In contrast, for birds—with all of those included strictly diurnal—artificial light led to an extension of the duration of their

activity, with singing and foraging starting earlier."

Previous studies have shown night-time lighting has wide-ranging impacts—from reducing pollination by insects to trees budding earlier in spring.

Like climate change, night-time lighting appears to benefit certain species in certain locations, but Professor Gaston said the clear message of the study was to reduce lighting where possible.

"Both climate change and night-time lighting are human-driven and enormously disruptive to the natural world," he said.

"Historically, we have not really worried about the impact of night-time lighting.

"Only now are we discovering its wide-ranging effects.

"Our study shows that we should, as a matter of principle, only use night-time lighting where we need it and no further, and at intensities that we need and no more.

"In effect, we need to view light like any other pollutant.

"Obviously it would be ridiculous to say 'switch the world's lights off' - but we could reduce our use of light immensely with absolutely no impact on ourselves."

Professor Gaston is the scientific advisor on a forthcoming landmark natural history series about the night-time, called "Earth at Night in Colour". The series is released on Apple TV+ on December 4th.

The paper, published in the journal *Nature Ecology and Evolution*, is

entitled: "A meta-analysis of biological impacts of artificial light at night."

More information: A meta-analysis of biological impacts of artificial light at night, *Nature Ecology and Evolution* (2020). DOI: 10.1038/s41559-020-01322-x , www.nature.com/articles/s41559-020-01322-x

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