Researchers propose use of electrical blackouts to determine impact of artificial light on wildlife

May 23 2024

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New research proposes the use of electrical blackouts, such as those experienced during loadshedding in South Africa, to enhance our understanding of how artificial light in urban areas may be affecting wildlife behaviors.

Artificial light at night, known as ALAN among urban ecologists, has become ubiquitous worldwide, with a notable increase in recent years. For humans, this widespread illumination has prevented an estimated 2 billion people of seeing the night sky clearly, including the Milky Way. In addition, research indicates that ALAN can profoundly influence the

behaviors of urban-dwelling animals.

The latest study on ALAN is published in the journal *Trends in Ecology & Evolution* and led by researchers from the University of Cape Town's (UCT) FitzPatrick Institute of African Ornithology in collaboration with the University of Witwatersrand and the University of Glasgow.

The research brings attention to the unique research opportunity which currently exists in South Africa, where planned blackouts are being used to meet electricity demands.

While blackouts are often seen as disruptive to human activities, this new study suggests that they can also be used as natural experiments that provide researchers with a controlled environment to study the absence of artificial light and its implications for wildlife behaviors.

UCT's Associate Professor Arjun Amar, lead author of the article, underscores the importance of recognizing blackouts as a unique opportunity for global research collaboration. Professor Amar said, "We are keen to highlight this opportunity to the global research community and we hope to encourage international collaborators to come to South Africa and work with our researchers."

Within South Africa, Eskom, the parastatal in charge of supplying electricity, is increasingly unable to supply enough electricity to meet the demand and so has introduced load-shedding—scheduled blackouts—which usually last a couple of hours. The study shows that these blackouts are already visible from space in some South African cities.

The researchers say that blackouts significantly reduce ALAN, which can be quantified using remote satellite data. The study reports a decrease by as much as 13% in night-time radiance in some South

African cities during load-shedding periods, indicating a tangible impact on light pollution levels.

The article emphasizes that blackouts offer researchers a rare chance to compare animal behaviors in areas with and without artificial light within the same landscape and timeframe. By quantifying the reduction in ALAN during blackouts using remote sensing data, researchers can investigate short-term behavioral responses of wildlife, including movement patterns, foraging behaviors, and species interactions.

Dr. Davide Dominoni, co-author of the study from the University of Glasgow's School of Biodiversity, One Health & Veterinary Medicine, said, "Most studies on the impacts of ALAN on wildlife are either small-scale experiments or large-scale correlative analyses. This is an incredible opportunity to obtain large-scale experimental data, which is likely to reveal unappreciated consequences of light pollution."

Despite certain limitations, such as risk of crime when conducting research at night in South African cities, the article encourages researchers to explore the myriad research possibilities presented by blackouts.

The authors suggest international collaboration to capitalize on this unique research opportunity by combining the skills of researchers from the global north who have more experience studying ALAN, with researchers in South Africa who have intimate knowledge of the animal species that occupy their urban habitats.

More information: Arjun Amar et al, Investigating the impacts of artificial light via blackouts, *Trends in Ecology & Evolution* (2024). DOI: 10.1016/j.tree.2024.04.006

Provided by University of Glasgow