

## WHITE PAPER: LIGHTING FOR LIFE

# A PILOT STUDY ON WILDLIFE SENSITIVE LIGHTING AND ITS DUAL IMPACT ON PEOPLE AND NATURE

### **Executive summary**

Artificial light at night (ALAN) enhances the visual environment for humans but is increasingly recognised as an environmental pollutant that negatively impacts ecosystems. In response, wildlife sensitive lighting technologies have been developed, offering flexible control of timing, intensity and colour temperature to mitigate these effects. However, there remains a critical knowledge gap: few studies have provided real-world evidence that these approaches truly reduce ecological impact. Even fewer have explored their effectiveness for both wildlife and humans simultaneously.

To address this, WE-EF LIGHTING partnered with the University of Melbourne and the City of Salisbury, with the support also of Buckford Illumination Group SA, in a pilot study evaluating the ecological and social outcomes of wildlife sensitive PC Amber lighting. The findings offer encouraging validation of these lighting strategies, with clear benefits for both biodiversity and public amenity.

### **Addressing the knowledge gap**

While wildlife sensitive lighting technologies exist, including options for warmer colour temperatures and smart controls, very few studies have demonstrated their effectiveness in the field. Even fewer have assessed their impact on both humans and wildlife in tandem. This project addresses that critical knowledge gap.

By comparing three trail sites with varying lighting types (PC Amber, 3000 K LED and no lighting), the study evaluated the effect of nocturnal lighting on bird song, frog and insect activity, and anthropogenic noise using automated audio monitoring. It also tracked human movement via LIDAR to examine patterns of park use.

## Pilot Study partners

- WE-EF LIGHTING Australia - Provider of lighting solutions and PC Amber luminaires
- University of Melbourne, Urban Light Lab - Lead research and data analysis
- City of Salisbury (SA) - Project host, installer of lights and data contributor
- Buckford Illumination Group SA - WE-EF Sales Partner involved in several PC Amber Solutions deployed in SA



## Methodology snapshot

### Sites monitored:

- Little Para River Trail (PC Amber lighting)
- Mawson Lakes (3000 K LED)
- Dry Creek (unlit)

### Monitoring period:

- December 2023 - April 2024

### Tools Used:

- 13 Audiomoths (automated recording devices), LIDAR movement tracking, climate data extraction

### Ecological indices tracked:

- ACI (Acoustic Complexity Index) - a proxy for bird biodiversity
- M (Median Amplitude) - a proxy for frog and insect chorusing
- RMS (Root Mean Square) - a proxy for anthropogenic noise



## Key findings

1. PC Amber lighting preserved natural rhythms. Wildlife behaviour at Little Para River Trail was still responsive to moonlight cycles, suggesting minimal ecological disruption.
2. Biodiversity was highest at the PC Amber and unlit sites. Mawson Lakes (3000K LED) showed significantly lower acoustic complexity.
3. Insect and frog activity (M index) was highest at Mawson Lakes. This may be due to species tolerance of light or specific habitat conditions, not necessarily a positive biodiversity signal.
4. Human trail use increased fivefold at Little Para River Trail after lighting installation. PC Amber improved safety and usability without displacing wildlife.
5. Smart lighting strategies are essential. LIDAR showed negligible human movement between 10 pm and 4 am, supporting timed lighting curfews or adaptive dimming.

## Best practices for wildlife sensitive lighting

This pilot reinforces the need for context-aware, ecologically sensitive lighting designs. These recommendations align with the National Light Pollution Guidelines for Wildlife and the Wildlife Sensitive Tools Report (Lockett & Jones, 2022):

- Avoid lighting areas that do not require it for human safety.
- Reduce lighting intensity wherever possible. Illuminance should not exceed Australian Standards (AS/NZ 4282, AS/NZS 1158, AS/NZS 2560) by more than 50%.
- Direct and shield lights to avoid spill and sky glow. Install lights close to the ground and only where needed.
- Use adaptive light controls:
  - Timing - ensure lights are only on when required
  - Intensity - dim when not needed; allow for full switch-off
  - Colour temperature - <2700K is sufficient; <2500K preferred
- Adopt lighting curfews (e.g. sunset to 10 pm; 4 am to sunrise) to reduce ecological disruption.

- Apply the lowest practical specification in areas where pedestrian and vehicle interactions occur, while still complying with Australian Standards.

Tailor designs to site-specific biodiversity and patterns of human activity.

## Policy recommendations

- Encourage councils and developers to integrate ecological considerations into lighting decisions.
- Apply wildlife sensitive lighting principles to public open spaces, pathways and ecologically significant corridors.
- Fund more real-world research that combines ecological and human-centred lighting data.

## Conclusion

This study demonstrates that it is not only possible but essential, to consider both human and ecological needs when designing outdoor lighting. PC Amber lighting, combined with smart adaptive controls, enables safer, more liveable spaces while preserving biodiversity and natural rhythms.

**Download the Full Report:** For technical data and ecological index analysis  
Access Lighting for Life White Paper: share with councils, consultants and planners

**Contact WE-EF** - For expert advice on wildlife sensitive lighting and customised design solutions - [info.australia@we-ef.com](mailto:info.australia@we-ef.com)

Let's light the way - for people and for the planet.

*Disclaimer: This white paper is a collaboration led by WE-EF LIGHTING, based on findings from a pilot study conducted with the University of Melbourne and the City of Salisbury. The views expressed represent WE-EF's interpretation of the study outcomes and associated best practices. Reference to academic or policy documents does not imply endorsement. For full citations and data, please refer to the original technical report or consult [www.urbanlightlab.com/useful-resources](http://www.urbanlightlab.com/useful-resources).*