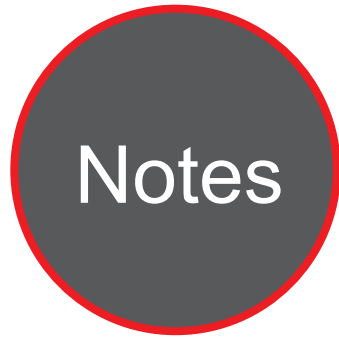




Research



APRIL 2023

Project Title:
Effects of LED Lighting on Terrestrial
Wildlife

Task Number: 3696

Start Date: January 2, 2020

Completion Date: December 31,
2022

Task Manager:
Simon Bisrat
Senior Environmental Planner
simon.bisrat@dot.ca.gov

Effects of LED Lighting on Terrestrial Wildlife

Develop knowledge that will allow for the design of effective and safe roadway lighting systems with LEDs (light emitting diodes) that minimize impacts to wildlife.

WHAT IS THE NEED?

Roadway lighting sources that have been in use for the better part of a century or more are rapidly being phased out in favor of light emitting diodes (LEDs). This transformation has been driven by energy efficiency and total replacement of legacy technologies such as low-pressure sodium and high-pressure sodium lamps.

Because the first available LED produced light appearing blue and bright, their replacement of the yellow-orange hues of sodium vapor lighting raised significant concerns among biologists, who recognized adverse consequences of this change in spectral composition to sensitive wildlife.

California Department of Transportation (Caltrans) is increasingly being asked to evaluate these adverse impacts to wildlife when consulting with federal and state regulatory agencies. However, Caltrans' practitioners lack the knowledge on how to evaluate the potential adverse effects and the means on how to minimize any adverse effects.

WHAT ARE WE DOING?

This research will involve synthesis of existing research and new laboratory and field investigations that fill crucial knowledge gaps, development of novel ways to integrate assessment of wildlife impacts into lighting engineering, and development of suggested design practices that can be deployed by Caltrans.



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WHAT IS OUR GOAL?

The goal of this research is to expand knowledge that will allow for the design of effective and safe roadway lighting systems with LEDs that minimize impacts to wildlife. Guidance materials for evaluation and mitigation of the potential impacts to wildlife will be developed for use by Caltrans personnel.

WHAT IS THE BENEFIT?

The benefits of the research would be the protection of sensitive biological resources through the adoption of best management practices for roadway lighting during the conversion to LEDs; and when new lighting is added to unlit areas for safety reasons.

Costs to Caltrans could be reduced through a streamlined regulatory process that reduces uncertainty surrounding impacts to sensitive species based on the best available science. Within this context the results of the proposed research could be used to:

1. Establish significance impact thresholds by intensity and spectrum for species or groups of species;
2. Use generalized impact maps to extrapolate species-specific impact zones from different lighting technologies and configurations;
3. Set procedural triggers for further consultation based on species presence and known lighting impacts; and
4. Establish system-wide lighting design standards as a “no regrets” policy for biological resources impacts.

WHAT IS THE PROGRESS TO DATE?

A contract for the research was developed and a University of California Los Angeles (UCLA) research group led by Dr. Travis Longcore was selected. The research project has progressed well with the first phase of literature review and all laboratory experiments successfully conducted. The project was completed on December 2022 and the project manager is currently in the process of closing out this project.