THE OHIO STATE UNIVERSITY
SCHOOL OF
Environment and Natural Resources
Impact Statement

Ecological Light Pollution

SUMMARY

Understanding and quantifying the impacts of ecological light pollution on the biodiversity and function of urban stream-riparian ecosystems.

SITUATION

Around 70% of the world's population is projected to be urban by the year 2050. Understanding the ecological consequences of a rapidly urbanizing planet is critical if we are to protect urban streams and rivers and the critical ecosystem services they provision (e.g., potable water, biodiversity, aesthetics and recreation, cycling and movement of nutrients). Thus, this work is relevant to both conservation and management of urban water resources and is of interest to multiple stakeholders, including the scientific community, city planners and watershed groups, conservation organizations, and the sector of the general public that recreate in or along urban streams and rivers.

RESPONSE

To-date, scientists in the OSU Stream and River Ecology Lab have completed both observational and experimental work at a suite of urban streams in the Columbus, OH Metropolitan Area. Specifically, we have quantified the influences of light pollution on two endpoints:

1. Biodiversity: community diversity of both aquatic and riparian invertebrates.
2. Ecosystem Function: bi-directional fluxes of invertebrates (i.e., aquatic insects that emerge from the stream as adults and disperse into the riparian zone and conversely, riparian invertebrates that fall into the stream).

IMPACT

Results to-date suggest that artificial lighting may fundamentally alter invertebrate biodiversity and lead to changes in both the magnitude and directionality of cross-ecosystem fluxes of invertebrates and organic carbon. Potential impacts include contributions to both basic science as well as applications towards stream conservation and management. At the basic level, this research contributes to an improved conceptual understanding of the suite of urban stressors that collectively alter stream-riparian ecosystems, and as such, will have a significant impact on the research community. At an applied level, potential impacts include learning how to manage urban environments to maximize biodiversity conservation and identifying best practices for restoring functional and healthy stream ecosystems in urban landscapes.


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