

Western Ecological Research Center

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Effects of Artificial Night Lighting on Amphibians and Reptiles in Urban Environments

Amphibians and reptiles have not evolved with artificial lighting at night. Thus, alteration of the natural variation in diurnal and nocturnal light intensities and spectral properties of lights has the potential to disrupt their physiology, behavior, and ecology. In a new review, USGS scientist Robert Fisher and colleagues at Texas Tech University, Utica College, and Florida Atlantic University provide an updated synthesis of information on what is known about the relationship between artificial lighting and urban herpetofauna and suggest areas that require further work. Their review is a chapter in a recently published book, "Urban Herpetology."

The authors paid special attention to taxa that appear to be at greatest risk of being affected: species that are found within or near human dwellings, feed at lights (or are simply attracted to lights), inhabit permanent and ephemeral ponds (parks, ditches), or are found in greenbelts or habitat reserves in or near city limits that are affected by skyglow or glare. Roads that connect urban areas, many of them illuminated by fixed lights in addition to vehicle headlights, may also have effects on species occurring nearby, although few papers addressed this problem. With the exception of negative consequences for sea turtles, data on the effects of night lighting on amphibians and reptiles were uncommon, and conclusive data were often lacking. In many studies that might be relevant, the illumination or irradiance at which experiments were conducted was not noted.

Emerging patterns: 1) species vary in their sensitivity to light pollution, which may have no effect, benefit, or negatively affect a particular taxon; 2) different aspects of a given species' biology can be affected differently

Management Implications:

- Although the most extensive work has been carried out on sea turtles at urban beaches, preliminary evidence indicates that many species of amphibians and reptiles are likely at risk from light pollution.
- Light pollution is a serious threat that should be considered as part of planning and management decisions in the maintenance or conservation of urban areas containing amphibians and reptiles.
- Returning habitats as closely as possible to their natural lighting conditions, primarily through the removal of unnecessary lighting and shielding of necessary lighting, is the best approach for the conservation of native amphibians and reptiles.
- The problems associated with artificial night lighting may impact not just a particular group of organisms but entire communities; thus, solutions may simultaneously benefit a broad range of taxa.

by different lighting conditions at different life history stages; 3) there is a paucity of research available on the negative effects of lighting on herpetofauna; 4) there is a dearth of studies of the positive effects of lighting on herpetofauna; 5) indirect effects are likely to be common; and 6) the ability of artificial light to enhance the invasive potential of some species should be a source of broad concern.

Perry, G., B. W. Buchanan, R. N., Fisher, M. Salmon, and S. E. Wise. 2008. Effects of artificial night lighting on amphibians and reptiles in urban environments. Pages 239–256 in J. C. Mitchell, R. E. Jung Brown, and B. Bartholomew, editors. Urban Herpetology. Society for the Study of Amphibians and Reptiles, Salt Lake City, UT. Herpetological Conservation Number Three.