

Research Plan Summer 2022: The effects of artificial light at night (ALAN) on invertebrate assemblages in the littoral and adjacent riparian zones

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Timeline: Late May through Late August, 2022

Desired Set-up Date: Thursday, May 26th

Methodology:

Experimental light treatments will be added to the littoral and riparian area of Waterfowl Pond located in Seven Ponds Nature Center (fig B). Light treatments will consist of 4 differing wavelengths; 630 nm (red), 530 nm (green), 410 nm (purple/nearUV) and 4000k (neutral white) and a dark control. Each treatment will be replicated 6 times, with 3 replicates in the shallow littoral zone of Waterfowl Pond and 3 replicates in the riparian zone. Replicates will be assigned randomly. Each treatment consists of a battery-powered 50.8 cm strip of 15 5050 SMD LEDs (AA-20-Flex, LEDsupply) mounted on the underside of a L-shaped wooden stake approximately 0.6m above the surface or the water/ground (fig A). Each wooden stake will be hammered into the center of a 2 m² plot, resulting in lights spaced at least 4m apart.

Three types of invertebrate traps will be installed and left overnight for one night on a bi-weekly basis from late May through late August at each plot. The lights will be turned on right before sunset and turned off right after sunrise. A pitfall trap will be installed at each terrestrial treatment plot and an aquatic trap will be installed at each littoral plot.

A pan trap to collect aquatic emergent invertebrates will be installed at all treatments, consisting of a white plastic pan (58.4 cm x 41.3 cm x 15.2 cm) with approximately 2 cm of soapy water covering the bottom of the pan. Terrestrial pan traps will be placed directly below light stakes and aquatic pan traps will be attached directly below light treatments to float in littoral zone.

After each night the lights are turned on, the contents from each of the 3 traps will be poured through a sieve to capture invertebrates, and stored in 70% ethanol. Invertebrates will be enumerated and identified to the lowest practicable taxonomic unit back in the Aquatic Ecology Lab at Oakland University.

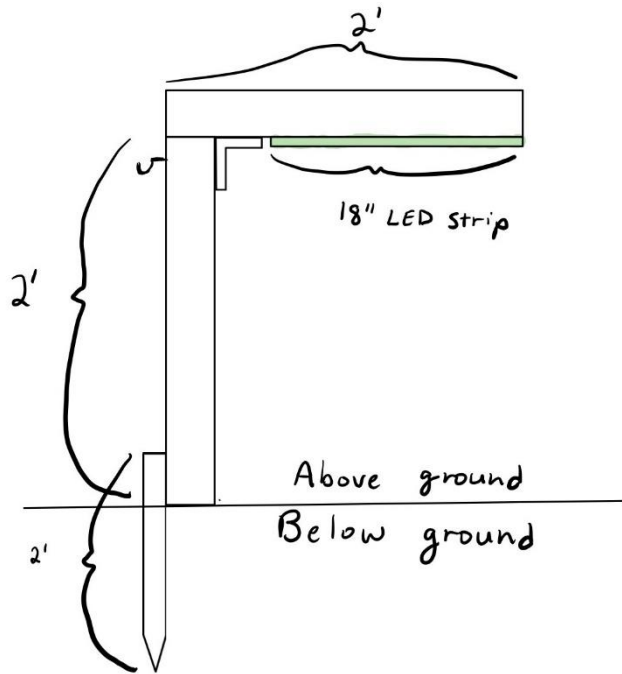


Figure A: Design of L-brace to be placed at each treatment site. The wooden L-brace is a treated wood 2"2"x2'. Underneath the horizontal part of the L-brace there will be an 18" LED strip (color based on treatment). L-brace is secured in the ground by a wooden stake.



Figure B: Planned sites for the 30 treatment sites indicated by a light symbol. Sites split up between the littoral and riparian zones (15 in each).