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APPLICATION OF LIGHT TO GUIDE DOWNSTREAM-MIGRATING LAMPREY TRANSFORMERS INTO TRAPS

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ABSTRACT:

The potential for light to be used as a guidance cue for trapping downstream migrant juvenile Sea Lamprey (*Petromyzon marinus*), also known as transformers, into traps as a means of control of this invasive species in the Great Lakes has been demonstrated in recent studies. A field study was conducted to evaluate the application and performance of a light guidance system for transformers and characterize their emigration timing and movement rates in a small, shallow stream. Behaviors and rates of downstream movement were monitored using passive integrated transponder (PIT) telemetry. Downstream movement appeared to be cued by precipitation-induced flow events when water temperatures ranged between 4 and 8 C. Once initiated, emigration was rapid and fish moved downstream at rates at least as great as stream velocity, and movements consistently occurred soon after sunset. Transformers expressed lateral attraction to a short bank-mounted linear light array, but the guidance effect was not strong or consistent between bank light locations. Downstream movement rates decreased slightly when transformers were exposed to the light cue. Laboratory tests of vertical guidance of transformers by strong visible light suggested that strong light elicited avoidance behaviors, and reduction of downstream movement rate, but a significant vertical guiding effect was not observed, likely because nearly all transformers moved on the bottom regardless of treatment. The experimental raceway for vertical guidance tests may have been of insufficient size, fish behaviors too variable, and sample sizes too low to measure a significant response. The results demonstrate that light can be used to guide transformers across small shallow streams, but further refinements in light array design and understanding of other behavioral responses to light are required to develop effective light guidance trapping technologies for transformers.

