American eel (Anguilla rostrata) have been identified as a species of special concern by COSEWIC after experiencing drastic population reductions in the Great Lakes and St. Lawrence regions of Canada. The purpose of this study was to examine eel physical and behavioral characteristics, and habitat usage in a model watershed to gain insight regarding the health of eel populations within the Atlantic region. East River located in East River, Nova Scotia was chosen as the study site for its range of representative Nova Scotia habitat conditions. Three eel pots were set in the East River, one in its tributary Barry’s Book, and three in Labrador Lake, the headwater to Barry’s Brook. Traps were relocated every 2-3 weeks to examine various habitat conditions within these sites and to randomize sampling both spatially and temporally. Selected eel were tagged with Passive Integrated Transponder (PIT) tags to monitor movement and catch activity for the duration of the study. A total of 295 eel were captured between 10 June and 26 August 2011 during 25 days of fishing with 93 recaptures from 65 tagged individuals. Eel density was highest within the East River, while lower densities within Barry’s Brook and Labrador Lake were observed. Eel captured in Labrador Lake were longer and heavier than those in other regions of the watershed. Recapture data suggested that eel establish a home range of approximately 200 metres and that eel movements are impeded by natural obstructions. Capture activity suggested that eel are influenced by both lunar cycles and precipitation, as eel are were most active during full and new moons, and after periods of heavy rainfall.

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