

## Does turbulence affect the habitat choice of Atlantic salmon parr?

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### Abstract

Habitat preferences of Atlantic salmon parr are commonly described using mean flow velocity, water depth, and substrate as habitat variables, and a variety of habitat models have been developed using these variables to predict habitat quality. However, Atlantic salmon parr live in highly turbulent streams and rivers, in which intense fluctuations of flow velocity occur. Habitat preferences that consider the high variability of flow velocity have not been studied, and this although it has been shown in laboratory experiments that turbulence may affect the behavior and energetics of fish. Consequently, we studied the use of turbulent flow by Atlantic salmon parr in Patapédia River, Québec, Canada using radio-telemetry. We analyzed summer habitat preferences of individual parr in relation to several dynamic hydraulic variables such as standard deviation of flow velocity, turbulent kinetic energy, Froude number, and shear stress, and compared them with the habitat availability within the river reach. Our results revealed that in a natural flow environment, parr display a high individual variability in habitat preferences in relation to flow turbulence. Such heterogeneous habitat preferences suggest that individuals are not constrained to single habitat types and exhibit flexible habitat use. Furthermore, no differences were observed in habitat preferences between the four daily periods (dawn, day, dusk, and night) within individual parr.