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# A definition of the thermal niche of spawning for a French metapopulation of Allis shad in a global warming context.

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## Abstract

All around the world, diadromous fish are facing multiple anthropogenic pressures resulting in a global decline of these migratory species. In Europe, the allis shad (*Alosa alosa* L.), is no exception and has dramatically declined since 2000. Although the decline of this species in Europe is documented, the potential disruptive force of global warming is sparsely studied. To estimate the consequences of these perturbations, we explored ways in which individuals from the population in the Gironde watershed, sheltering the most abundant population in Europe, can adapt the reproduction to thermal heterogeneity. We used 14 years of daily reproductive surveys associated with river temperatures to define the thermal niche of reproduction for allis shad in the Gironde watershed. The low variability of realized thermal niches, despite fluctuations in thermal habitat, demonstrates that allis shad is a thermal generalist. Therefore, the allis shad can reproduce in a wide range of temperatures and is assumed to be weakly affected by the present thermal heterogeneity in river. Nevertheless, electivity index demonstrated a thermal preference for reproduction, slighted shifting to lower bound of the thermal tolerance of early stages. In a context of rapid warming of river temperature, the adaptability of this generalist strategy will be tested using an individual based model.

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