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Can we predict the fate of Atlantic salmon populations in the face of climate change?

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Abstract: Atlantic salmon *Salmo salar* is the subject of many management actions aiming at their conservation. There is a strong demand, expressed by a diversity of local to international bodies for assessing the consequences of climate change for this species relative to the conflicting objectives of both conservation and exploitation. However, our predictive ability is still limited by the complexity and uncertainty of current and future environments, complexity of the life cycle and especially by the challenges of teasing apart evolutionary change from more ‘plastic’ responses to environmental perturbation. I discuss the importance and complementarity of experimental research, long-term monitoring *in natura* and modeling approaches. Importantly, life cycle models provide a powerful tool for disentangling eco-evolutionary processes and investigating interactive, synergistic effects among multiple factors in order to better understand the eco-evolutionary responses of populations in the face of various scenarios of climate change. I will present a demo-genetic Individual-based model which is designed to investigate the demogenetic consequences of environmental change scenarios on an exploited population of Atlantic salmon. Without omitting its limits, I show how this approach allows to synthesize knowledge and to identify its gaps.