

ABC model for estimating sea lamprey local population size using a simple nest count during the spawning season



Population estimation implies considering the biology of the species, but also the constraints of logistic aspects such as cost. While common methods based on individual counts can provide precise estimates, they require an extensive sampling effort. An alternative to these methods is using cues linked to the species abundance. In that case, producing absolute estimates requires assessing the relationship between the individuals and these cues. In this paper, we propose a model based on data on spawning behaviour and Approximate Bayesian Computation to estimate the number of sea lamprey spawners using nest counts data. By counting the daily number of occupied nests and using parameters from a behavioural study, we set up a model simulating a spawning season and returning a population estimate by comparison with field data. Our model gives realistic estimates and we discuss the parameters on which to prioritize data collection with a sensitivity analysis, and show that halving the sample size provides a still satisfactory accuracy. We made an easily parametrizable application to run the model for any people interested in sea lamprey population estimation, and believe this framework to be a good way to increase data collection for both endangered and invasive sea lamprey.

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