



# MSc Project

## - Effects of warming on fish growth and body size

Thesis work in Biology or Environmental Science at the Department of aquatic resources SLU, 15-60 cp

**Research questions:** The world is getting warmer and ectothermic species such as fish are predicted to spawn earlier<sup>1</sup>, grow faster, and reach smaller adult body sizes<sup>2, 3</sup>. Numerous studies have found empirical support for faster growth rates in natural systems<sup>4, 5</sup> (inferred from larger size-at-age). However, it remains to be seen whether increases in size-at-age are purely due to faster growth rates, or because earlier spawning times give fish a head start in the race to be larger.

**In other words:** what are the relative contributions of temperature-dependent growth and earlier spawning times (and longer growing seasons) for explaining patterns in fish growth and size in relation to climate change?

**Tasks:** In this project, you will work with an exceptionally unique [Biotest system](#) (which contains long time series of fish growth taken from lakes with large differences in temperature). You will parameterise an existing R-based Individual Based Growth Model (IBM) for perch (*Perca fluviatilis*) and use it as a basis to quantify how changes in spawning times and temperature dependent growth describe empirical patterns.

**What you will learn:** Key skills for ecologists, including R-programming for performing data-analysis, data visualisation, and simulations following good practices for reproducible science.

**Prerequisites:** Familiarity with R and statistical/quantitative concepts for applied ecology is a merit. However, we offer a supportive environment with dedicated supervisors and firmly believe that any motivated student can take on this project and succeed.

**Location:** SLU Aqua in Lysekil, or work can be conducted remotely.

*Please do not hesitate to reach out for more information!*

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