

Title: Application of size-moment based approaches for population modeling to long-term catch data of Great arctic char in Lake Vättern, Sweden.

Purpose of the visit

To visit John Pope at NRC (Europe) Ltd and CEFAS to learn of, discuss and apply size-moment based interpretations of long term time series for key species components of a freshwater ecosystem using Bayesian estimation procedures. The ultimate, applied goal of this is to develop an understanding of the causes for the decline of Great arctic char in Lake Vättern, Sweden.

Description of the work carried out during the visit

We used a proto-moment approach to focus on the decline of Great arctic char in Lake Vättern. We interpreted long term catch data records for Arctic char to begin with (can be extended to several species) and recent survey results to give probabilistic estimates of their populations and size distributions through time. This was the main goal of the initial collaboration. We also had a day at CEFAS in Lowestoft where we presented our ongoing work for interested staff at CEFAS and other early researchers involved in SIZEMIC. Other early career researchers presented their projects and lots of valuable discussion were raised that day.

Description of the main results obtained

The main results are estimation of Arctic chars populations and size distribution. The main results alone might not totally explain different causes for the decline of Arctic char in Lake Vättern but they can be combined with other ongoing and planned analyses. According to results coming from this visit the recruitment of Arctic char seems to be decreasing the last 10-20 years and this can be combined with other results from other ongoing studies to explain causes of this trend. For example is the climate change effect on Arctic chars recruitment investigated and a field study is conducted investigating the crayfish predation of roe from Arctic char. These might be linked together in future work. My project consists partly of integrating size-structure into food web modelling and the main results are important for that part of my work. Among else to be able to parameterise the model and have a basic understanding of the population and size distribution. The outcoming of this visit and work will lead to important guidelines when it comes to management the stock of Arctic char in Lake Vättern.

Projected publications/articles resulting or to result from your grant

Two articles were projected during my visit. We did manage to come up with a basic structure for these two and with distant communication they will be worked with and finished in nearest future. The titles of these two articles are:

1. A Bayesian interpretation of four years of Gill Net Surveys of Lake Vättern.
2. Simulacra of the population structure of Arctic char (*Salvelinus umbla*) in Lake Vättern from 1914 to 2006.