Environment Agency

Evidence

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Developing Life Tables for English and Welsh Eel Stocks

Project summary SC060028/S

Eel populations have declined dramatically across Europe. Since 2000 eel stocks have been reported as outside safe biological limits and current fisheries as not sustainable. The European Commission has responded by introducing an Eel Recovery Plan.

The Environment Agency is responsible for managing eel stocks in England, and for keeping track of whether measures to boost eel stocks are working. This report supports this role by providing a new, more realistic approach for modelling the life cycle and population dynamics of eels in our rivers.

To measure compliance with the European regulations we need data about the populations of mature silver eels. Silver eels are not monitored directly, but younger yellow eels are routinely monitored by the Environment Agency, so researchers have developed a model that can use these data to generate information about silver eel populations and their movements.

The model also incorporates the effects on eel stocks of human activities such as fishing pressure and habitat quality. This will help us to assess the benefits of different fishery and habitat management options for eel populations.

The report reviews the other modelling options and builds on an earlier European project which tested various models against recommendations made by the European Commission. The new model, Scenario-based Model of Eel Populations (SMEP II), is a computer programme that models the dynamics of eel populations at the river basin level and has three main components:

- A model that simulates the biological characteristics of the eel population and a number of potential man-made influences on the population.
- A geographical information tool that helps the user work out the information that they want to use for their calculations and prepare data for the population model to run.
- A statistical model that is used to estimate some of the parameters of the population model.

The report also contains a user guide for the SMEP II model, showing how it can be used to address the needs of the Environment Agency in assessing and managing eels stocks.

The life cycle of eels is very complex and challenging to understand and model. The report authors therefore make recommendations to improve our knowledge to underpin the model. Topics for future research include natural mortality rates at different eel life stages; mechanisms by which eels become male or female; how eel density affects the biology and eel dynamics; and the best ways to survey yellow eel populations.

This summary relates to information from the following project:

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