

# science summary



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SCHO0705BJHW-E-P

## River fish habitat inventory phase 2: methodology development for juvenile salmonids

The Environment Agency's National Fisheries Technical Team have developed a new statistical modelling approach for assessing habitat quality and fish populations throughout a river catchment, using a geographic information system (GIS).

The habitat models were calibrated on pristine reference sites throughout England and Wales, and utilise contemporary modelling techniques and high-resolution GIS. The models operate at two levels of detail; one based on map-based (GIS) variables only, and the other based on a combination of map and field-based variables from habitat surveys. The models enable the quality and quantity of habitat to be mapped throughout a catchment, and provide an improved basis for the calculation of Conservation Limits for salmon.

The fish population models can be applied to quantitative and semi-quantitative data collected from the Agency's national monitoring programme. Data from survey sites are used to interpolate and extrapolate fish abundance estimates throughout a catchment. The resulting maps provide a way of assessing spatial patterns in fish populations, and allow the estimation of population size at any spatial scale.

A statistical comparison between the maps of fish abundance, and the maps of habitat quality, provides an assessment of where fish abundance is less than that expected from the habitat. This enables impacts affecting fish populations to be detected and quantified.

The science report, to which this summary relates, gives examples of the modelling outputs. Details of the modelling methods are provided in separate papers:

Wyatt, R.J. 2002. Estimating riverine fish population size from single- and multiple-pass removal sampling using a hierarchical model. *Can. J. Fish Aquat. Sci.* **59**: 695–706.

Wyatt, R.J. 2003. Mapping the abundance of riverine fish populations: integrating hierarchical Bayesian models with a geographic information system (GIS). *Can. J. Fish Aquat. Sci.* **60**: 997-1006

This Summary relates to information from Science Project SC980006 reported in detail in the following output:

### Science Report SC980006/SR

#### Title River Fish Habitat Inventory Phase 2: Methodology Development for Juvenile Salmonids

ISBN Number 1844324591

July 2005

**Internal Status:** Released to Regions

**External Status:** Public Domain

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This project was funded by our Science Group, which provides scientific knowledge, tools and techniques to enable us to protect and manage the environment as effectively as possible. Further copies of this and the above report are available from our National Customer Contact Centre by telephoning 08708 506506 Or by emailing:

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