Science Project: Flow and Level Criteria for Coarse Fish and Conservation Species

Summary SC020112/S

The overall objective of the project was to provide, for various river reach types, generic seasonal flow and water level regime requirements for key life stages of freshwater fish species to advise and influence the management of flow regimes. Phase I of the project identified potential tools to evaluate the potential impact of flow and water level criteria on selected fish species and populations in English and Welsh rivers to allow more scientifically robust and hence defensible assessments to be made. The tools will be developed in Phase II of the project.

The fish community types in rivers were modelled based on Environment Agency fisheries data and complementary environmental data. The models discriminated eight major fish community types that broadly followed the classical zonation theory with river gradient from upland salmonid to lowland cyprinid communities. It is was concluded that the influence of flow and the potential impacts of abstractions and releases should be considered within the context of each of these main fish assemblages, linking key species per community type to their functional ecology and flow requirements. The relationship between the rate of flow, the rate of change of flow, the duration of high/low flow events and their seasonal timing, and their influence over the functioning of fish populations (spawning, recruitment and growth) needs to be considered when evaluating anthropogenic changes to flow patterns.

Some biases in the dataset were identified, and it was considered important to remove these biases by filling the gaps in information, especially with respect to regions and river reaches poorly represented in the current dataset.

The preferred habitat characteristics of the predominant fish species found in UK fresh waters was Three potential approaches were proposed.

1) The integration of the various biotic components of RAM to produce a single integrated statistic.
2) The development of a RIVPACS (River InVertebrate Prediction And Classification System) type model for fish, e.g. River Fish Environmental Flow Assessment Matrix (RIFEFAM). This model can either be based on species presence or absence, relative species abundance or incorporate those parameters of the fish such as biomass, condition, and growth and survival rates that are needed to manage the fishery.
3) The development of population dynamics models that will assist in predicting the effects on the quality and quantity of the fish population of various alternative hydrological regimes. It was recommended that all three models are examined in detail and the most appropriate for meeting the objectives of the Agency selected for assessing the impact of water resources schemes on fisheries.

These aspects were developed into a project framework for consideration for future funding to meet the requirements for assessing the impact of water resources schemes on fish and fisheries.

This Summary relates to information from Science Project SC020112 reported in detail in the following output:-

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