Tools enabling Ecosystem Based Management Plans and Operations (TEMPO)

Date: 29 January 2013

TEMPO is designed to provide the knowledge, understandings and mechanisms to allow the implementation of Ecosystem Based Fisheries Management (EBFM) in Europe. The focus of the project will be on the provision of the type of information needed by managers and advisors to achieve EBFM, and to deliver that in a form that is suitable to these stakeholders rather than to a scientific community. Thus, the central focus of TEMPO will be on the provision of Decision Support Tools to make advice for EBFM management salient, legitimate, understandable and credible.

The challenge taken on by the consortium in TEMPO is to translate scientific knowledge and the results of modelling into the information needed by the stakeholders actually implementing EBFM. To represent this emphasis on the stakeholders needs for information and Decision support, we have consciously reversed the order of the objectives outlined in the call, with the Stakeholder consultation and engagement being placed first. This process is expected to define the specifications and design of the Decision Support Framework (DSF, Objective 3 in the call). In turn the DSF will then define what the data and information needs are from the modelling (Objective 2 in the call), which will seek additional information and data from the innovative science components (Objective 1 in the call).

TEMPO research work will thus start with the design of a Decision Support Framework to provide what stakeholders want and need to make real decisions on the management of fisheries. These will be based on questions developed by stakeholders in consultation with the scientists. Such consultations carried out prior to submission yielded a central question of

> "How can Long term management plans be developed taking account of benefits from fisheries and the requirements of environmental objectives".

However, it is recognized that priorities may change between initial submission and the start of any subsequent project, and this, as well as subsidiary questions below the central question, will be revisited with stakeholders at the start of the work. A key component of the DSF will be to allow a clear understanding of the trade offs implicit in any changes to an EBFM management practice or approach. The trade offs will be considered in terms of the ecological, economic, and social implications as well as the more focused fishery issues, e.g. stock status. The type of DSF envisaged range from scenario based descriptions, risk based approaches or interactive tools where the impacts of a choice in management on other, selected parts of the ecological/social system will be detailed.

As part of the Decision Support process TEMPO will also provide advice on the management implications of the decisions, both in terms of the required changes in management practice and on the cost v. benefit of these changes. Possible management approaches to make decisions operational will be detailed, ranging from currently employed measures such as catch, effort, and capacity controls, as well as Technical Conservation Measures, through to innovative spatially explicit and incentive based approaches to management.

TEMPO will make use of a wide range of modelling and analytical approaches to provide the data and insights required to populate the DSF. These modelling/analytical approaches will be solidly based on the substantial suite of such methods currently available. It will focus on extraction of the key features and interactions of the fishery, the ecosystem and the social/economic context, rather than aiming for ever more complex and fully descriptive ecosystem/fishery modelling. In particular the development work in this field will emphasise the need for robust indicators of ecosystem impacts of fishing, the use of multiple models to provide a supportable interpretation of the most important changes (ecosystem, economic and social) on which to focus the DSF, and the approaches required to deal with spatially explicit and regionally appropriate advice.

TEMPO will utilise existing scientific data, wherever possible, and the models described above are based on such data. It is recognized in the call, and more widely, that there is also considerable scope for the inclusion of new understandings derived from the innovative application of fast developing technologies, such as inter alia genetics, otolith microchemistry and stable isotopes. These in turn can be used to improve the utility and accuracy of our models and hence the quality and appropriate design of our DSF. The innovative application of these tools will be used to develop better understandings of fishery impacts on key ecosystem components such as the food web and other inter species interactions, the spatial and temporal patterns in abundance and biology of key species (migrations, spawning and nursery areas, growth etc.), as well as habitat use potential implications of climate change. The scale of fishery impacts on top predators and threatened or vulnerable species and interactions between these species and the fishery will also be investigated and the conclusions incorporated in the DSF.

These topics will be realised in the context of a wide range of specific case studies focused on the specific EBFM questions raised by stakeholders at proposal stage and throughout the project. Most of the case studies will address a question using the core concepts of the project. This will entail developing new knowledge by the innovative application of appropriate technologies (genetics etc.). This knowledge will then be used in our existing suite of fishery and ecosystem models and then the ensemble modelling approaches developed for the project. Subsequently, the understandings and links delivered by the modelling step will be incorporated into the DSF to demonstrate options, trade-offs and appropriate management in the context of the original questions asked by the stakeholders. The concept includes the potential for feedback at all stages, with stakeholders developing their questions and needs based on the DSF, and that feeding back to the modelling and analytical work.