



Low flow hydrology in the context of the EU Water Framework directive

Alan Gustard

Research Fellow, Centre for Ecology and Hydrology, Wallingford, UK

Operational applications of low flow research are most frequently carried out within the framework of national and international law and policy Directives. In Europe the most important of these is the Water Framework Directive (WFD), which was adopted by the European Parliament and the Council of the European Union in September 2000. This has established a strategic framework for the sustainable management of both surface and groundwater resources. Each country must set up a competent authority to implement the Directive and log every significant piece of water above ground and below it, inland and on the coast. Implementation of the Directive will require each River Basin District to develop a River Basin Management plan. A key element of this plan will be to develop a consistent and structured approach to local water resource management. This will need to recognize the traditional needs of abstractors but also the water requirements to maintain a sustainable ecosystem.

In order to implement the Directive it will be necessary to estimate the frequency and time series of river flows for every river reach in Europe in a consistent and transparent manner. This provides the hydrological research community in Europe with three key challenges. First, to develop procedures for estimating the frequency of low flows at gauged and ungauged locations throughout Europe. Second, to develop methodologies for estimating the time series of river flows at gauged and ungauged locations. Thirdly to enable the operational community to use the results of this research in a rapid and user friendly way. This paper outlines the key research and operational issues which need to be resolved. These include the development of statistical and continuous simulation models which can be applied on every European river system, with hydrological regimes ranging from the mountainous regions of northern Europe to the semi arid conditions of the Mediterranean. A second issue is the need to integrate observational data with predictive models and finally to estimate river flows in

catchments which are heavily influenced by man's activity. The paper concludes with case studies where some progress has been achieved in meeting these objectives.