

Developing a preliminary River Basin Management Plan for the Evrotas River, Southern Greece

Vardakas L.¹, Tzoraki O.², Skoulikidis N.¹, Economou A.N.¹ & Nikolaidis N.²

¹Hellenic Centre of Marine Research, Institute of Inland Waters

²Department of Environmental Engineering, Technical University of Crete

The Water Framework Directive 2000/60/EC (WFD) has set tasks to overcome water related problems (socio-economical & environmental) in all Member States. The Directive requires water management plans, programmes of measures and environmental quality objectives to be pursued on the scale of entire river basins. In Greece, there is a slow progress in implementing the Directive, due to structural constraints, lack in environmental information, specifically for biota, due to the inadequate funding for background research. In 2005, a European Life Environment project entitled “Environmental Friendly Technologies for Rural Development” took off in the river basin of Evrotas, southern Greece, which was nominated as Pilot River Basin for Agricultural Development. The main objective was to assist the implementation of the WFD by providing a management plan for the Evrotas River Basin which includes among others a toolbox of environmental friendly technologies for the minimization of pollution sources. This communication presents a preliminary design of the management plan which focuses on the following six axes: *1. Agricultural development, 2. Pollution Control, 3. Irrigation, 4. Drinking Water Supply, 5. Joint action against floods and droughts, 6. Protection of the biodiversity and restoration actions for the riverine ecosystem.*

The dominant pressures in Evrotas River Basin derive mainly from agricultural activities and include overexploitation of water resources for irrigation, disposal of agro-industrial wastes (mainly from olive oil presses and orange juice factories) and agrochemical pollution. Based on the European and national legislation regarding drinking water quality criteria, the chemical status of groundwater bodies was in general in good condition. The surface water ecological status was assessed based on the hydromorphological, physicochemical and biological quality elements (fish fauna and macroinvertebrates). The hydro-morphological status ranged from high to good in the upper parts of Evrotas tributaries and from poor to bad in the middle and lower part of the Evrotas main course. The physico-chemical status ranged between high and moderate, with the majority of samplings sites (74%) classified as good. The ecological status based on macroinvertebrate communities showed high spatial and temporal variability depending on the distribution of point pollution sources. Assessments based on fish fauna showed a generally poorer biological status, with more than half (52%) of the sampling sites classified as bad. This situation was largely the consequence of an unusual drought event which occurred in summer 2007 and, combined with overexploitation of the water resources, resulted to the complete drying of almost all tributaries and about 80% of the main river course. In the remaining part of the river, where summer flow was maintained, the biological status of fish fauna ranged between high and moderate.

The surface and groundwater bodies that form distinct management and functional administrative units were determined. Overall, 41 surface water bodies (seven in the main course and 34 in its tributaries) and 14 groundwater bodies were identified.

Subsequently, specific measures were proposed for each water body in order to achieve and/or maintain the good chemical and ecological status of groundwater and surface water bodies, respectively. The main environmental measures proposed in Evrotas river basin are presented in Table 1. The effectiveness of measures will be assessed in future research projects.

Currently, the Evtotas River Basin Management Plan presents the most integrated research study concerning the implementation of the WFD in Greece.

Table 1. Main environmental measures proposed in Evrotas River basin.

MEASURES		
Axis 1	Modify Farming System	Mixed farming systems ³ , Biological farming system ¹ Integrated farming systems ³
Axis 2	Fertilizer Control & Reduction	Establish organised pasture areas ¹
		Phytoremediation ¹ , Drainage canals management ¹ . Vegetation management on river banks ³ Use of Fertiliser recommendation system ²
Axis 3	Drip Irrigation and Drainage system	Estimation of the real irrigation needs, Switching irrigation methods, Change Charges for water abstraction ³ , Water re-use (municipal and industrial treated wastewater) ³
Axis 4	Alternative choices for water supply	Inter-municipalities companies of drinking water supply ³ , Wise Cost estimate ³ .
Axis 5	Estimation zones vulnerable to flooding	Riparian zone stabilazation ¹ , Measures to prevent forest fires ² , Natural hazards procasting ² , Management plans for drought and flood protection ² .
Axis 6	Biodiversity & Riparian forest protection	River bed protection, Remediation /Protection of flooded areas ¹ , Ecological effective discharge quantification (during dry period) ³ , Extension of protection areas to ensure the integrity of hot spots of biodiversity ³

¹ active

² has studied and actions are ongoing

³ under discussion.