

Title

Identification, typology and type specific reference conditions of river water bodies in the Hellenic part of the Strymonas river basin, as a transboundary case study.

Topic

Technical

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Identification, typology and type specific reference conditions of river water bodies in the Hellenic part of the Strymonas river basin, as a transboundary case study.

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1. Introduction

Monitoring according to the Water Frame Directive (2000/60/E.C.) guidelines demands the identification of river water bodies, typology and investigation of reference conditions within each river basin. The Water Directorate of the Region of Central Macedonia in Greece is the first to fund an intergraded study in order to assess the quality and the pressures of the surface waters of the transboundary river basin of the Struma/Strymon river for the implementation of the WFD.

The identification of “**water bodies**” based on geographical and hydromorphological determinants, is to enable the status to be accurately described and compared to environmental objectives of the Directive. A surface water body has to be a discrete element of surface water, which is not to overlap with each other or to be composed of elements of surface water that are not contiguous.

Heavily modified water bodies may be identified and designated where good ecological status is not being achieved because of impacts on the hydromorphological characteristics of a surface water resulting from physical alterations. Related to this requirement, there are considerations regarding pressures and impacts. Furthermore, different uses (e.g. drinking waters) and existing or new protected areas (e.g. Natura 2000 sites) may be used in the refinement of the “water body” identification. (GD No.2).

Typology is the next step for the categorisation of water bodies, which is based on two systems, system A or System B (GD No.10). The most critical output of this step by step procedure is the selection of the monitoring sites.

Study Area

The Greek part of the Strymonas river basin is the downstream part of a 17.730 km² river basin. This is a transboundary river between Greece (34,6%) and Bulgaria (51.3%) and a small part (14,1%) belongs to F.Y.R.O.M. which flows directly to the Bulgarian part. According to the data of the Ministry of Agriculture and Food Affairs in Greece, the mean annual discharge of the river is 3.440 x 10⁶ m³. The length of the river is 118 km in the Greek territory. Three major side rivers, with constant flow in the river basin, were chosen: Aggistro/Bistritsa, Mpelitsa and Aggitis. Aggisto is coming from Bulgaria and its main flow originates from the Greek springs at village Aggistro. Mpelitsa consists of two units, one is Krousovitis crossing through the town of Sidirokastro and the other is Mpelitsa draining the central part of Serres plain. Aggitis consists of three major units. The smallest called Aggitis originates at the north of Drama and joins the stream of Agia Varvara and the Tafros Filloipon before entering the Strymon river.

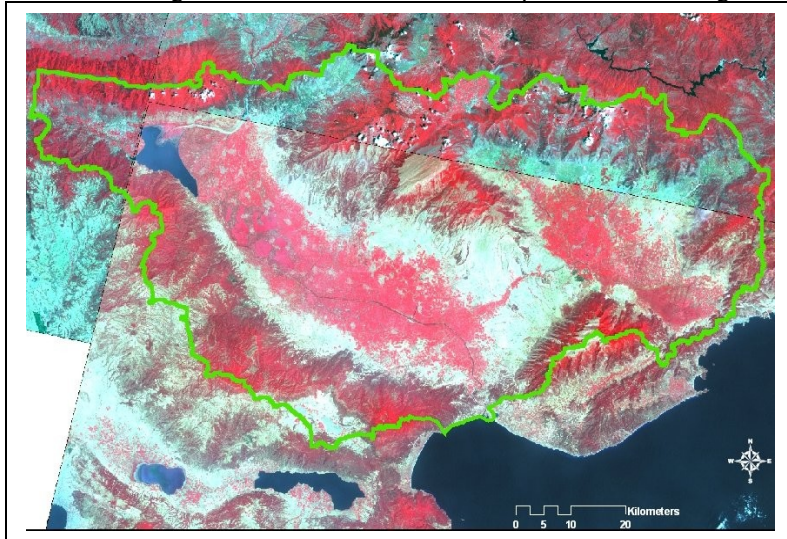


Figure 1. Hellenic part of Strymonas River Basin –Satelite image

2. Methodology

River water bodies in the basin were identified and recognized as coherent units, according to GD No.2, so that monitoring and the implementation of WFD can be fulfilled. Morphological elements and river confluences were examined thoroughly so as to achieve the best division grade among the river water bodies.

For the typology and the type specific conditions, system B was chosen in order to treat the mosaic differences of the Hellenic nature. For its implementation four factors from System B were selected: three obligatory factors (catchment size, geology, altitude) and one optional (slope) as the most representative. All factors were categorized in three classes either after a statistical analysis or according to the existing bibliography, achieving the same degree of differentiation as in the System A. Although data for the upstream Bulgarian part of the river were not available, catchment size was calculated taking into consideration the whole transboundary river basin for the parts of the main river. For the obligatory factor of geology, the class of organic was replaced by alluvial. A four digit numerical system was adapted to present the types, each digit representing one of the three classes of each factor.

In the different types type specific reference conditions were searched.

3. Results

In the Hellenic river basin, seventeen water bodies were recognized, seven of which in the Strymon river. The upper parts of the river after the Greek-Bulgarian borders and the downstream parts before the estuary were recognized as natural water bodies. The central parts of the Strymon river together with Mpelitsa were recognized as heavily modified because of the creation of the lake Kerkini in 1932, the diversion of the main river course and the alteration of the river banks. Aggistro and the major flow of Aggitis were also recognized as natural water bodies. The above procedure resulted in the 17 monitoring sites.

Five types in those seventeen river water bodies were recognized differing as their catchment size, geology or slope. The seven water bodies of the main flow of the Strymon river belong to the same type except for one due to geological differences. No type specific reference conditions were found in the river basin. It was also examined if there are similar types with specific reference conditions in central and northern Greece to the existing types in the Strymon river and there were found none.

4. Conclusions

Type specific reference conditions were not found because of the severe human interventions in the Strymon river basin. So for the assessment of the river water of the proposed monitoring sites the multimetric indices will be used where the intercalibration group (Buffagni et al. 2005) gives reference conditions (RM1, RM2) (Van de Bund et al. 2004) or/and the Hellenic Evaluation System (Artemiadou & Lazaridou 2005) for the ones that reference conditions do not exist (RM3).

5. References

- EC (2003), Common Implementation Strategy for the Water Framework Directive (2000/60/EC). Guidance document No.10 'River and lakes – Typology, reference conditions and classification systems'.
- EC (2003), Common Implementation Strategy for the Water Framework Directive (2000/60/EC). Guidance document No.4 'Identification of Heavily Modified Water Bodies'.
- EC (2003), Common Implementation Strategy for the Water Framework Directive (2000/60/EC). Guidance document No.2 'Identification of water bodies'.
- Artemiadou V. and Lazaridou M. 2005. Evaluation Score and Interpretation Index of the ecological quality of running waters in Central and Northern Hellas. *Environmental Monitoring and Assessment* 110: 1–40
- Buffagni, A., S. Erba, S. Birk, M. Cazzola, C. Feld, T. Ofenbock, J. Murray-Bligh, M. T. Furse, R. Clarke, D. Herring, H. Soszka & W. Van de Bund, 2005. Towards European Inter-Calibration for the Water Framework Directive: Procedures and Examples for Different River Types from the E.C. Project STAR. Instituto di Ricerca Sulle Acque, Rome.
- Van de Bund W., Cardoso A.C., Heiskanen A.S. & Noges P. (2004): Common Implementation Strategy for the Water Framework Directive (2000/60/EC). Overview of Common Intercalibration types. Final version 5.1. Ecological status Working Group 2.A; Available at <http://wfd-reporting.jrc.it/>

