

**Annex 2.5.4 Intercalibration of biological assessment methods for the Danube River***Outline of general approach and presentation of preliminary results – June 2006***A. Introduction**

Biological assessment of the Danube River on the basis of the benthic macroinvertebrate community is limited to the application of Saprobic Systems or Biotic Indices to evaluate the degree of organic water pollution. Currently, no WFD compliant classification method to assess the ecological status of the Danube River using benthic macroinvertebrates is applied by the EC GIG countries. In general, two shortcomings impede completed WFD compliant ecological assessment for the Danube River: (1) lack of data derived from techniques to acquire representative samples of the macroinvertebrate community from the different river habitats; (2) lack of near-natural reference conditions.

Therefore, the intercalibration exercise performed for the Danube River (R-E6) focuses on the comparison of national assessment indices used in regular water quality monitoring of the Danube River. For the 5 countries participating in the EC GIG intercalibration exercise these indices are listed in Table 1.

Table 1: National bioassessment methods to evaluate the water quality of the Danube River

country	assessment method	abbreviation
Austria	Austrian Saprobic Index	SI (AT)
Slovakia	Slovak Saprobic Index	SI (SK)
Hungary	Hungarian ASPT	ASPT (HU)
Romania	Romanian Saprobic Index	SI (RO)
Bulgaria	Bulgarian Biotic Index	BI (BG)

**B. Methods**

Based on analyses of the JDS 1 dataset, Stubauer and Moog (2003) proposed a basic saprobic condition (=reference value) of SI (AT) = 2,00 for the Danube River below 200 m altitude, arguing against a section type specific differentiation of the basic saprobic condition of the Danube River. Knoben et al. (1999) suggested a harmonised saprobiological classification scheme for the Danube River (see class boundaries of the Austrian Saprobic Index in Table 3). These recommendations formed the basis for the intercalibration exercise of the Danube River.

Intercalibration of quality class boundaries was performed by direct comparison of national assessment indices. Data from samples taken at the Danube River covered a relatively short saprobiological gradient (difference between 25<sup>th</sup> and 75<sup>th</sup> percentile values of Austrian SI: 0,11). Thus, direct index comparison was carried out analysing data of all types included in the intercalibration exercise. In particular, the index comparison covered pair-wise analyses of x: SI (AT) against y: SI (SK), x: SI (AT) against y: ASPT (HU), x: ASPT (HU) against y: SI (RO) and x: ASPT (HU) against y:

BI (BG). Via modelling using linear regression the reference value and the saprobiological class boundary values were translated from the Austrian Saprobic Index and the Hungarian ASPT into the national index values, respectively.

### C. Results

Table 2 reveals the main descriptors of the correlation and regression analysis. In Table 3 the harmonised class boundary values for the national assessment methods are listed.

Table 2: Main statistics of the correlation and regression analyses

			x-axis	
			SI (AT)	ASPT (HU)
y-axis	SI (SK)	n	360	
		R square	0,91	
		regression equ.	$y=1,22 \cdot x - 0,56$	
	ASPT (HU)	n	360	
		R square	0,43	
		regression equ.	$y=-1,81 \cdot x + 9,55$	
	SI (RO)	n		179
		R square		0,53
		regression equ.		$y=-0,26 \cdot x + 3,38$
	BI (BG)	n		32
		R square		0,73
		regression equ.		$y=1,77 \cdot x - 2,80$

Table 3: Harmonised national class boundary values for biological water quality assessment of the Danube River

national index	Reference value	lower quality class boundary values			
		high-good	good-moderate	moderate-poor	poor-bad
SI (AT) <sup>1</sup>	2,00	2,20	2,50	2,90	3,50
SI (SK)	1,90	2,10	2,50	3,00	3,70
ASPT (HU)	5,95	5,60	5,00	4,30	3,20
BI (BG)	4 to 5	4	3 to 4	3	2
SI (RO)	1,80	1,90	2,10	2,30	2,65

### D. Literature

Stubauer, I. & O. Moog, 2003. Integration of the Saprobic System into the assessment approach of the WFD - a proposal for the Danube River. In Sommerhäuser, M., S. Robert, S. Birk, D. Hering, O. Moog, I. Stubauer & T. Ofenböck (eds), Final Report of the Activity 1.1.7 "Implementing ecological status assessment in line with requirements of the EU Water Framework Directive using specific bio-indicators". University of Duisburg-Essen, Essen and Vienna: 29-39.

<sup>1</sup> Reference value acc. to Stubauer and Moog (2003); class boundary values acc. to Knoben et al. (1999)

Knoben, R. A. E., L. Bijlmakers & P. van Meenen, 1999. Water Quality Enhancement in the Danube River Basin; subaction 2A: Waterquality classification/characterisation. IWACO, 's-Hertogenbosch: 105 pp.