+Annex 2.5.3. EC GIG - harmonised quality class boundary setting

Introduction

Within the intercalibration exercise the definition of reference conditions is of major importance for the comparison of national quality assessment methods. In this regard, two problems are obvious in the EC GIG: Either existing reference site are not available (esp. lowland types) or reference criteria to screen for existing reference sites differ among countries. In the EC GIG we agreed to follow an alternative approach to resolve these issues by defining IC type specific, harmonised quality criteria. In general, we set common high-good resp. good-moderate quality class boundaries for the national biological assessment methods using existing data assembled within the EC GIG intercalibration exercise. The main idea is to overcome the difficulties of lacking (near-natural) references by defining an alternative reference, i.e. common agreement on a certain level of impairment.

Outline of the approach

A. Harmonised definition of quality criteria/thresholds for the high and good ecological status

Based on criteria for saprobiological quality commonly agreed for monitoring purposes in the Danube River Basin, biological threshold values are derived using the common metric ASPT (Average Score Per Taxon). Sites with samples showing ASPT values above these thresholds are screened by additional chemical, morphological and land-use parameters. The set of sites complying with all criteria/thresholds are regarded as of being in a commonly agreed, ecologically high resp. high and good status.

B. Class boundary setting based on 25^{th} percentile value of common metrics using all sampling sites meeting the criteria defined in section A (high status sites → high-good boundary, high and good status sites → good-moderate boundary)

The ecological quality class boundaries are expressed in ICMi-EC scale to comply with the normative definitions of the WFD. These boundaries are derived by selecting the 25^{th} percentile values of each common metric from the set of sites in high resp. high and good status. By means of regression analysis the boundary values are translated into values of the national assessment method.

A. Harmonised definition of quality criteria/thresholds for the high and good ecological status

Step 1: Setting biological screening thresholds using TNMN quality criteria for the saprobiolobical status → Table 1

Table 1: Proposal for classification of Austrian Saprobic Index in two types of natural rivers in the Danube basin according to Knoben et al. (1999): Water Quality Enhancement in the Danube River Basin; subaction 2A: Waterquality classification/characterisation.
a= fast flowing/mountainous rivers
b= slow flowing/lowland rivers

Class	I	II	III	IV	V
ecological status	high	good	moderate	Poor	bad
Saprobic Index (a)	< 1.8	1.81-2.3	2.31-2.7	2.71-3.2	>3.2
Saprobic Index (b)	< 2.2	2.21-2.5	2.51-2.9	2.91-3.5	> 3.5

Step 2: Translation of the Austrian Saprobic Index SI (AT) into ASPT values based on regression analyses using Austrian, Czech, Hungarian and Slovak data of R-E1, R-E2, R-E3 and R-E4 → Figure 1 and Table 2

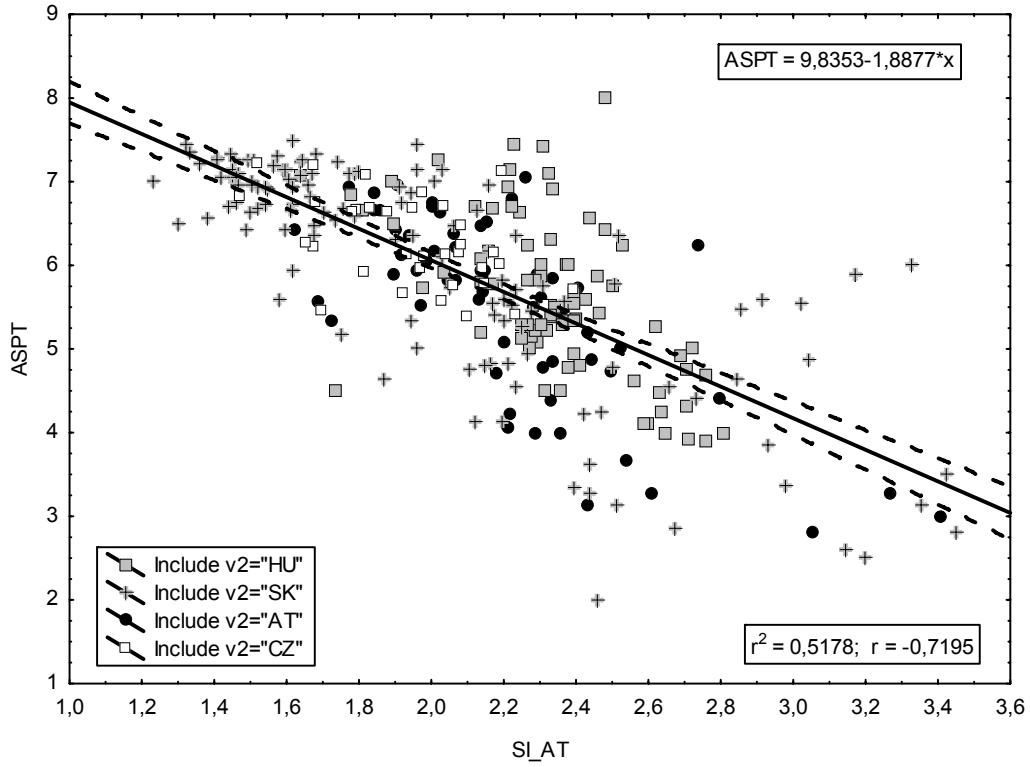

Figure 1: Regression of Austrian Saprobic Index against ASPT using samples derived from multi-habitat sampling technique of Austria, Czech Republic, Hungary (Ecosurv project data) and Slovak Republic (n=302)

Table 2: ASPT values corresponding to SI (AT) quality class boundaries.

	high-good		**good-moderate**	
	SI (AT)	**ASPT**	**SI (AT)**	**ASPT**
fast flowing/mountainous rivers	1.8	6.4	2.3	5.5
slow flowing, lowland rivers	2.2	5.7	2.5	5.1

Step 3: Site screening using ASPT thresholds and additional criteria according to Table 3

Table 3: Criteria used for the definition of sampling sites showing high and/or good quality status

	R-E1	**R-E2**	**R-E3**	**R-E4**
defined quality range	high status	high and good status	high and good status	high and good status
quality criteria and	ASPT>= 6.4	ASPT >= 5.1	ASPT >= 5.1	ASPT >= 5.1

thresholds	additional criteria • no hazardous substances • unaltered hydromorphology • mean BOD <=2.5mg/l • if no BOD data available: agriculture <=20%	additional criteria • no hazardous substances • unaltered or moderately altered hydromorphology • mean BOD <=5mg/l • mean conductivity <1000µS/cm • cropland <=50% • urban area <10%	additional criteria • no hazardous substances • unaltered or moderately altered hydromorphology • mean BOD <=5mg/l • mean conductivity <1000µS/cm • cropland <=50% • urban area <10%	additional criteria • no hazardous substances • unaltered or moderately altered hydromorphology • mean BOD <=5mg/l • mean conductivity <1000µS/cm • cropland <=50% • urban area <10%

Results of sampling site screening

Note: Sampling sites without additional abiotic data have been excluded from analysis.

R-E1 – sites in high quality status

country	site_code	stream_name	site_name
CZ	402	Juhyne	Rajnochovice nad
CZ	82	Vsetínská Becva	Halenkov pod
RO	353	Aita	upstream Aita Medie
RO	193	Bradesti	Satu Mare
RO	50	Crisul Alb	Dragu Brad
RO	350	Galben	upstream Baia de Fier
RO	245	Homorodul Mare	upstream Baile Homorod
RO	251	Iza	upstream Sacel
RO	239	Jiu de Est	upstream Cimpa
RO	339	Mara	upstream Mara
RO	347	Mnierea	upstream Calaseni
RO	356	Otasau	upstream Barbatesti
RO	345	Ribita	Uibaresti
RO	338	Sapanta	upstream Sapanta
RO	351	Susita	upstream Vaidei
RO	335	Valea Rea	Negresti-Oas
SK	163	Bystrica1	pod Ve¾kou skalou
SK	167	Bystrica2	pri lyžiarskom vleku
SK	87	Bystrica3	Horná domovina
SK	30	Bystrica4	Bystrièany
SK	168	Hostiansky potok1	pri Pod Javorom
SK	161	Hostiansky potok2	pod Obecným vrchom
SK	220	nad Majdanovom	Lutinka
SK	378	nad Rajeckou Lesnou	Lesnianka
SK	380	nad VN Nova Bystrica	Riečnica
SK	164	Pokútsky potok1	pod Za Žliabkom
SK	162	Pokútsky potok2	pod Ostrým Grúòom
SK	376	Vitanová nad	Oravica
SK	170	Žitava1	pri Živánskej veži
SK	121	Žitava2	Machulince
SK	169	Žitavica	pri Pred Žitavou

R-E2 – sites in high and good quality status

country	site_code	site_name	stream_name
BG	43	Djuljunitza	Djuljunitza
HU	ADO_266	Rácalmás alatt	Adonyi-Dunaág
HU	ADO_264	Szentendre alatt	Adonyi-Dunaág
HU	BAN_012	Vadna	Bán-patak
HU	BOD_120	Bodrogkeresztúr	Bodrog
HU	BOD_119	Felsőberecki	Bodrog
HU	BOD_031	Borsodszirák	Bódva

HU	319	Borsodszirák	Bódva
HU	320	Szendrőlád	Bódva
HU	BOD_217	Szendrőlád alatt	Bódva
HU	BOZ_226	Mikóháza-Széphalom között	Bózsva-patak
HU	EGE_202	Monostorapáti fölött	Eger-víz
HU	GYO_209	Tanakajd	Gyöngyös-műcsatorna
HU	GYO_385	Adács	Gyöngyös-patak
HU	IPO_060	Balassagyarmat	Ipoly
HU	KER_211	Kerkaszentkirály	Kerka
HU	KER_210	Lentikápolna	Kerka
HU	122	Magyarföld	Kerka
HU	LET_250	Hoázúpályi-Létavértes	Létai-ér
HU	65	Felsőcsatár	Pinka
HU	140	Nagygeresd	Répce
HU	SAJ_037	Sajókaza	Sajó
HU	TAR_313	Nagyatád-Berzence	Taranyi-Rinya
HU	TAR_428	Tarnadob	Tarna
HU	TAR_029	Verpelét	Tarna
HU	TOL_225	Vámosújfalu-Tolcsva között	Tolcsva-patak
HU	ZAG_409	Hatvan	Zagyva
HU	ZAL_030	Alibánfa-Pethőhenye között	Zala
HU	ZAL_351	Zalalővő	Zala
RO	222	Tulburea	Gilort
RO	63	Fata Motrului	Motru
RO	264	upstream confluence Timis	Nadrag
RO	147	Nedelea	Prahova

R-E3 - sites in high and good quality status

country	site_code	site_name	stream_name
BG	101	Kobilyak	Ogosta
BG	91	Iasen	Vit
BG	187	Sadovetz	Vit
CZ	397	Dyjákovice	Dyje
CZ	398	Hevlín	Dyje
CZ	88	Hrádek	Dyje
CZ	396	Jevišovka nad	Dyje
CZ	276	Valtrovice	Dyje
CZ	399	Znojmo pod	Dyje
CZ	44	Dolní Kounice pod	Jihlava
CZ	93	Iváň	Jihlava
CZ	165	Pohořelice nad	Jihlava
CZ	166	Pohořelice pod	Jihlava
CZ	171	Přibice	Jihlava
HU	317	Bodrogkeresztúr	Bodrog
HU	318	Felsőberecki	Bodrog

country	site_code	site_name	stream_name
HU	DRA_234	Bélavár	Dráva
HU	DRA_039	Zákány (Ňrtilos-OT)	Dráva
HU	324	Magyartés	Hármas-Körös
HU	325	Gesztely	Hernád
HU	326	Gibárt	Hernád
HU	327	Hidasnémeti	Hernád
HU	IPO_059	Letkés	Ipoly
HU	MAR_123	Makó-Kiszombor között	Maros
HU	MUR_040	Letenye	Mura
HU	MUR_219	Murakeresztúr	Mura
HU	SAJ_081	Kesznyéten	Sajó
HU	SAJ_080	Miskolc	Sajó
HU	190	Sajópüspöki	Sajó
HU	SAJ_038	Sajószentpéter	Sajó
HU	TAR_106	Jászdózsa felett	Tarna
HU	12	Aranyosapáti	Tisza
HU	331	Mindszent	Tisza
HU	316	Szeged Tápé	Tisza
HU	332	Szolnok	Tisza
HU	218	Tiszabecs	Tisza

R-E4 – sites in high and good quality status

country	site_code	site_name	stream_name
AT	5	Altenmarkt-Fürstenfeld	Lafnitz
AT	23	bei Wolfau	Lafnitz
AT	141	near Burg	Pinka
AT	143	near Lutzmannburg	Rabnitz
AT	234	uh. Piringsdorf, EU 1	Rabnitz
AT	142	near Heiligenbrunn	Strem
HU	CUH_322	Bakonyszentmihály-Bakonyszentl. között	Cuha (Bakony-ér)
HU	GER_203	Bakonybél alatt	Gerence-patak
HU	315	Gyöngyös	Gyöngyös-patak
HU	113	Lajosháza	Gyönyös Creek
HU	100	Királyháza	Kemence Creek
HU	328	Bárszentmihály	Kerka
HU	RAB_035	Rábagyarmat-Rátót között	Rába
HU	329	Sajókaza	Sajó
HU	330	Sajószentpéter	Sajó
HU	4	Alsótelekes	Telekes Creek
RO	346	Sacalasau	Corbeni
RO	266	upstream Moreni	Cricovul Dulce
RO	253	upstream Cazanesti	Cungrisoara
RO	223	Turceni	Jilt
RO	132	Mureni	Scroafa
SK	388	Medovarce nad	Krupinica
SK	112	Kuty	Myjava

SK	390	nad ústím	Stará rieka
SK	389	Senné nad	Tisovník

B. Class boundary setting based on 25th percentile value of common metrics using all sampling sites meeting common criteria

Step 4: Calculation of 25th percentile values of common metrics for each country/IC type combination to set common high-good (R-E1) or good-moderate boundary (R-E2, R-E3,
R-E4) → Table 4

Table 4: 25th percentile common metric values per IC type and country

IC type	country	quality status	#_fam	ASPT	Struct-Index_fam	%_EPT_fam
R-E1	CZ	high	26	6,68	75,3	17,83
R-E1	RO	high	10	6,75	30,5	57,57
R-E1	SK	high	26	6,95	72,5	21,46
R-E2	HU	high+good	12	6,04	7,0	21,63
R-E2	RO	high+good	4	5,43	10,0	31,25
R-E3	BG	high+good	17	5,29	0,0	33,06
R-E3	CZ	high+good	21	5,63	19,0	11,91
R-E3	HU	high+good	11	6,00	-3,0	8,21
R-E4	AT	high+good	28	6,54	66,5	14,13
R-E4	HU	high+good	15	7,15	35,0	62,86
R-E4	RO	high+good	9	5,18	12,0	28,04
R-E4	SK	high+good	24	6,17	47,0	31,51

Step 5: Normalisation of common metrics using 25th percentile values, composition of ICMi EC (reflecting boundary value; see Table 4) and translation into national index values via correlation and regression analyses → Table 5

Table 5: Harmonised class boundary values of national assessment methods derived by applying common boundary setting criteria
italic – low correlation
n.s. – non significant correlation

	R-E1	R-E2	R-E3	R-E4
	high-good	good-moderate	good-moderate	good-moderate

worst-case_AT	**-**	**-**	**-**	**0,56**
R square	-	-	-	0,43
SI_SK	**1,67**	**-**	**-**	***2,10***
R square	0,43	-	-	*0,24*
SI_CZ	**1,40**	**-**	**n.s.**	**-**
R square	0,87	-	n.s.	-
ASPT_HU	**-**	**5,24**	***5,34***	**5,89**
R square	-	0,49	*0,21*	0,51
BI_BG	**-**	**-**	**3-4**	**-**
R square	-	-	0,72	-
SI_RO	**1,73**	**2,35**	**-**	***2,07***
R square	0,50	0,52	-	*0,21*