

MKOL – GW
November 11-12 2010
Point 8

Relationship between
groundwater bodies and
groundwater dependent aquatic
and terrestrial ecosystems

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Experiences from the Czech Republic

on:

- GW-dependent aquatic ecosystems
 - base-flow index analysis
 - establishment of threshold values

and/or

- GW-dependent terrestrial ecosystems

Solutions chosen

- Surface waters – analysis of base-flow index:
 - Identification of river profiles with greater ratio of base-flow index (> 0.5 – long-term value)
 - easier
 - useful only like an indicator of possible problems caused by groundwater body status
 - Identification of groundwater structures (bodies) related with above river profiles
 - more complicated
 - useful only for small catchments

Solutions chosen

- Surface waters – analysis of base-flow index:
 - River profiles with ratio of base-flow index over 50%

Main river of the catchment: tributary - tributary of tributary...		Count of profiles with BFI > 50 %	BFI max (%)
(Labe)			
(Tichá Orlice)	Třebovka	1	57
Loučná		3	57
(Cidlina)	Javorka	1	70
Jizera		1	50
	Žehrovka	1	73
	Mohelka	1	53
	Zábrdka	1	73
	Bělá	1	71
	Kněžmostka	1	59
Vltava	Lužnice	1	51
Ploučnice		3	71
	Ještědský potok	1	55
Morava		1	54
Třebůvka		2	60
Blata		1	53
(Dyje)	Svitava	2	61
	Litava	1	51

BFI determined in 1976

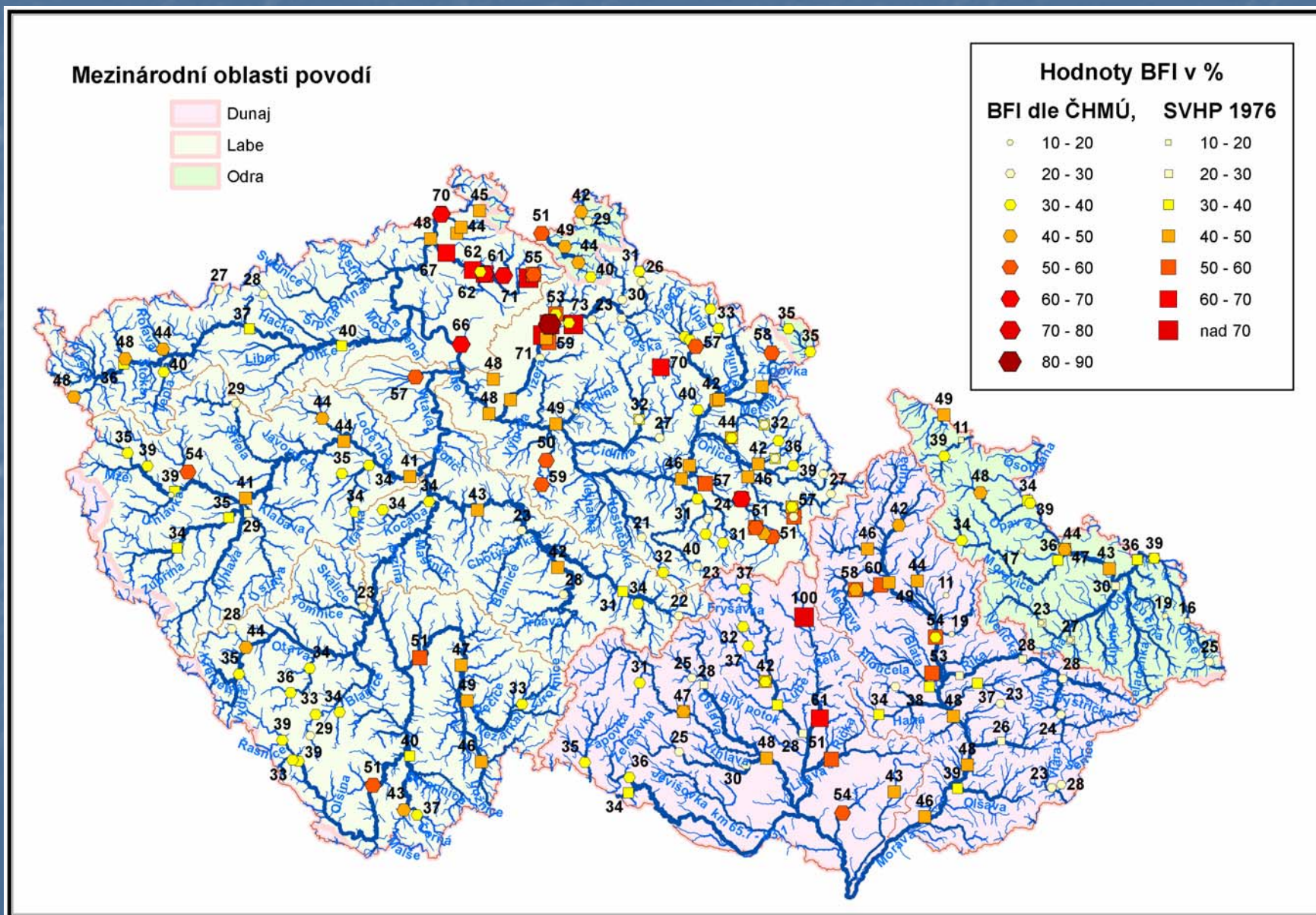
Solutions chosen

- Surface waters – analysis of base-flow index:
 - River profiles with ratio of base-flow index over 50%

Main river of the catchment: tributary - tributary of tributary...		Count of profiles with BFI > 50 %	BFI max (%)
(Labe)			
Pilníkovský potok		1	57
Metuje		1	58
Loučná		3	65
Výrovka		2	59
(Jizera)	Zábrdka	1	87
(Vltava)	Polečnice	1	51
	(Mže) - Úterský potok	1	54
	Bakovský potok	1	57
Liběchovka		1	66
Ploučnice	Ještědský potok	1	52
	Svitávka	1	66
		1	62
(Morava)			
Trkmanka		1	54
(Odra)			
Lužická Nisa		1	51

BFI determined by Czech Hydrometeorological Institute (CHMU)

Values of base-flow index in CR (%)



Solutions chosen

- Surface waters – analysis of base-flow index:
 - Identification of groundwater structures (bodies) related with above river profiles – example:

ID GW body	BFI ČHMÚ (%)	ČHMÚ profile representativeness	BFI 1976 (%)	1976 profile representativeness
21 100	48	1 PRJ		
32 302	54	most of the body plus 1 PRJ 32 301		
41 100	58	cca half of the body		
42 310	29	cca half of the body and minute part of 42 320	57	
42 320			100	entire body
42 700	65	most of the body	57	
44 100	39 87 -	minute parts of the body	53 73 71	minute parts of the body

PRJ = working unit (part of groundwater body)

Solutions chosen

- Surface waters – establishment of threshold values of GWB:
 - boundaries between good and moderate ecological status (or good and poor chemical status) for relevant determinands
 - only if stricter than „normal“ TVs – ready for chemical status
 - Identification of relevant monitoring sites – not yet
 - Comparison of concentrations with TVs – not yet
 - Identification of possible sources of pollution (GW and/or SW) – not yet
 - GW and SW -> Quantification of emission load from groundwater – not yet

Threshold values for groundwater and dependent surface waters

Groundwater determinands	Units	TV - GW	TW - SW
aldrin *	µg/l	0,03	Σ=0,01
dieldrin *	µg/l	0,03	
endrin *	µg/l	0,1	
isodrin *	µg/l	0,1	
benzo(b)fluoranthen **	µg/l	0,1	Σ=0,03
benzo(k)fluoranthen **	µg/l	0,1	
benzo(g,h,i)perylene **	µg/l	0,1	Σ=0,002
indeno(1,2,3-cd)pyrene **	µg/l	0,1	
hexachlorbenzen	µg/l	0,1	0,01
chlorpyrifos	µg/l	0,1	0,03
p,p-DDT	µg/l	0,1	0,01
pentachlorbenzen	µg/l	0,1	0,007
trifluralin	µg/l	0,1	0,03

Solutions chosen

- Surface waters:
 - Quantity issues – not general methodology
 - Surface water quantity balance – assessment surface and groundwater abstractions together
- Terrestrial ecosystems:
 - Quantity issues only – according to local conditions and terrestrial ecosystems demands

Difficulties encountered

- Surface water:
 - Reliability of base flow index data
 - Selection of relevant monitoring sites
 - Quantification of emission load from groundwater
- Terrestrial ecosystems:
 - Ecosystems quantity demands not known in „water management language“
 - No information about chemical dependency (relation between ecosystems and determinands and limits)

Thank you for your attention.