

Criteria used in SR for identifying and designating HMWB

- *background - database of hydromorphologic data prepared on VUVH (SWE, g.e.)*
- *criteria used for pressures assessment:*

1. Tubed stretches:

Criteria of significance: - tubed stretch is longer than 100 m

- cumulative length of tubed stretches is 150 m (tubed and opened stretches alternate) and is more than 1/2 of total WB's length

2. Straightening of rivers:

Criteria of significance: - total cumulative length of straightened stretches is more than 10 % of total WB's length

3. Backwater level:

Criteria of significance: - length of backwater (by low discharge) is longer than 1 500 m for $B/H > 15$; 1000 m for $B/H < 15$; 600 m for $B/H < 8$; total length of lifted stretches by low discharge is more than 10% of total WB's length

4. Length and way of lining:

Criteria of significance: - total length of stretches with lining is more than 10 % of total WB's length

5. Flood defence:

Criteria of significance: - distance of embankment/dikes (B_i) from river bank is shorter than $3B$ on stretch length equal to $5B$ (B -river width)

6. Urbanization:

Criteria of significance: - distance of urbanized areas from river bank is not less than 5 m on length more than 15 % of total WB's length

7. Combined assessment:

- additional criteria which integrates criteria **4. Length and way of lining**, **5. Urbanization** and **6. Flood defence**

- includes 6 classes describing degree of channel regulations according to ecological status

Criteria of significance: - WB belongs to class 3 and more

(Note: it is additional criteria only, not given by the WFD)

8. Change of cross-section:

Criteria of significance:

a) **enlargement of channel:** - river width B is after regulation 20% bigger on stretch longer than 1 km

b) **reduction of channel:** - profile surface S is 25 % smaller

- **water-ways – criteria of cross-section surface change:** - present cross-section surface (to water level of channel discharge) is more than 25% smaller on stretch longer than 1 km

9. Weirs and drops:

Criteria of significance: - height of barrier is more than 0,5 m (if it is not a barrier for fish migration)

10. Demands:

Criteria of significance:

- a) individual demands with identifiable recirculation more than 50 l/s (150 l/s in case of demands without recirculation or with not identifiable recirculation)
- b) individual demands with identifiable recirculation more than 10% of average low discharge (30% in case of demands without recirculation or with not identifiable recirculation)
- total demand for WB more than 50 % of average low discharge

■ *following the significance of criteria was estimated degree of pressure:*

Significance of pressure: - pressures 1,2,3,7,8 a 9 were quantificated according to scale 1 to 10 (1 – lowest change, 10 – most strong change)

- to the pressures was bind weight factor

Final point assessment: - $V = \Sigma (\text{significance of pressure})^* (\text{point assessment})$

V – degree of pressure

Classification of WB: WB provisional classified into 3 categories:

V = (0-3) - Natural or moderate modified WB (low degree of total pressure)

V = (4-7) - Candidate as HMWB (medium degree of total pressure) (based on detailed testing possible assigned as natural or heavily modified WB)

V = (8-10) – Heavily modified WB (high degree of total pressure)

▪ *example of hydromorphological changes assessment:*

- point assessing of each pressure for each stretch

Pressure	Significance of pressures	Point assessment of pressures									
		1	2	3	4	5	6	7	8	9	10
1. <u>Tubed stretches</u>	0,06	x									
2. Straightening of rivers	0,20										x
3. Backwater level	0,15								x		
7. Combined assessment	0,17							x			
8. Change of cross-section	0,20								x		
9. Weirs and drops	0,22								x		
<u>L_{migr}</u>											

- final score

$$V = 1 (0,06) + 10 (0,2) + 8 (0,15) + 7 (0,17) + 8 (0,2) + 8 (0,22) = 0,06+2,0+1,2+1,19+1,6+1,76 = 7,81 \approx 8$$

=> **Heavily modified WB**