



THE WATER FRAMEWORK DIRECTIVE - Stage of the implementation in Romania -

National Administration *Apele Romane / Romanian Waters*



IMPLICATIONS OF THE WFD IMPLEMENTATION :

- legislative;
- organizational;
- scientific;
- technical.





➤ **From a legislative point of view:**

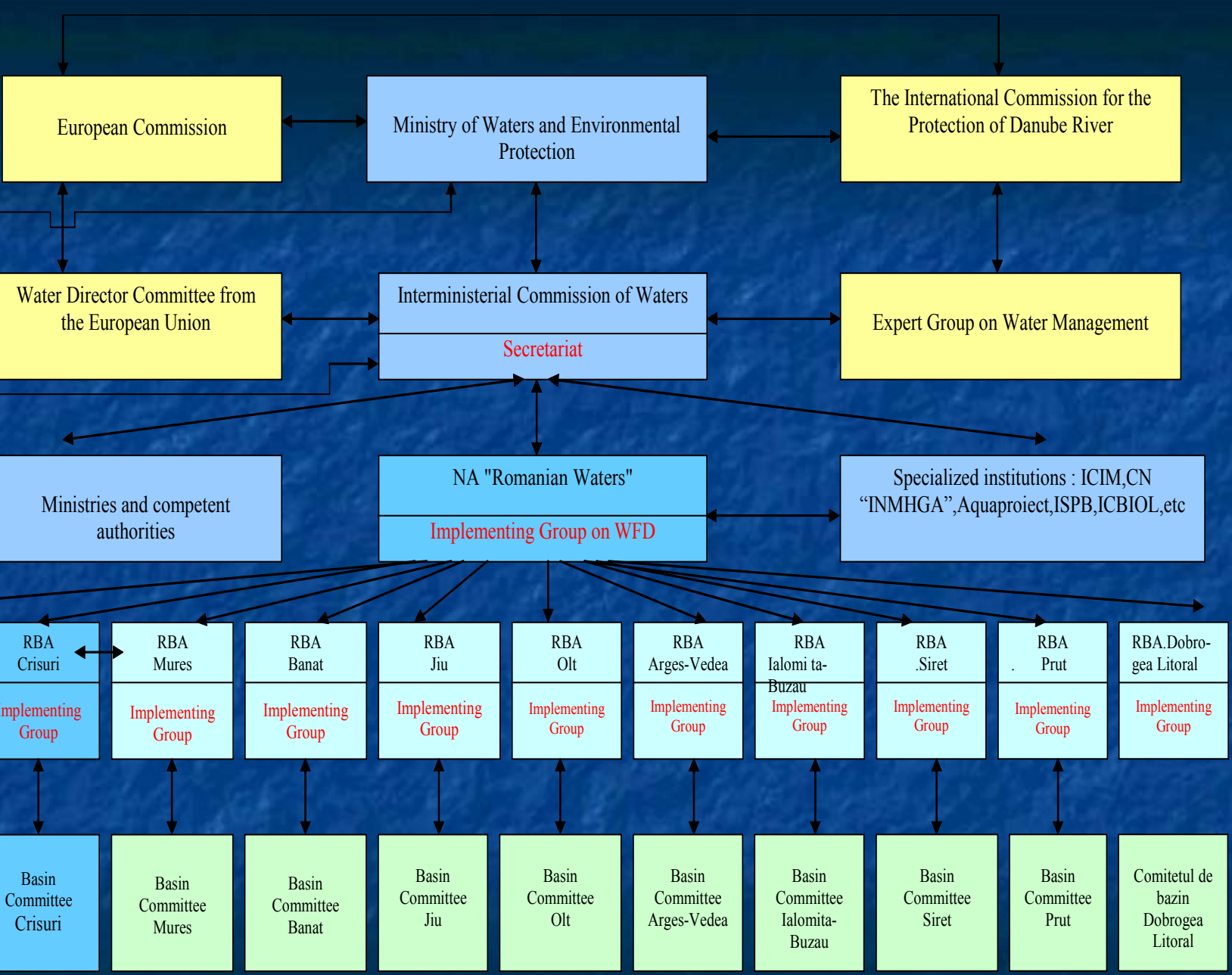
- to harmonise the Water Law 107/1996 with the 2000/60/EEC (end of 2003).

➤ **From an organizational point of view:**

- the *Apele Romane* N.A. activity is carried out through 11 Directorates, one for every main River Basin in the country ;
- creation of the Inter-ministerial Water Council ;
- reorganization of the National Administration *Apele Romane* into the competent authority for WFD implementation;
- establish the WFD implementation teams at central and river basin level.

APELE ROMANE'S WATER DIRECTORATES





Organizing structure for elaboration and implementation of the River Basin Management Plan



➤ **From a scientific point of view :**

- **Harmonise the *guidelines* elaborated within the EU working groups and the ICPDR at the specific conditions of Romania :**
 - definition of streams and lakes abiotic and biotic typology;
 - definition of coastal and transitional waters typology;
 - SWB delineation;
 - HMWB provisionally designation;
 - evaluation of pressures and impact in the pilot river basins;
 - the development of monitoring integrated water system.
- ***Projects***
 - *Mures* pilot project - Dutch Government funds;
 - *Arges* and *Somes* pilot project - PHARE funds;
 - *Dobrogea – Littoral* pilot project – MATRA funds, etc;
 - participation in the PRB exercise - *Somes* river basin.
- **Active participation in working groups at Danube river basin (ICPDR) and European level.**

Typological stream classification in Romania

Principle: parameters which define the natural or near-natural conditions



Top-down

- ◆ abiotic approach
- ◆ cause -effect



Bottom-up

- ◆ biotic approach
- ◆ effect-cause



Analysis and superposition

- ◆ top-down typology
- ◆ bottom-up typology



ABIOTIC STREAM TYPOLOGY IN ROMANIA

System B

■ 4 Obligatory factors:

- ➔ **ecoregions** : 10-The Carpathians, 11-Hungarian Lowlands, 12- Pontic province, 16- Eastern plains
- ➔ **altitude** : plains <200m, hills & plateau area 200-500m, high plateau & pied-mont area 500-800m, mountains- >800m;
- ➔ **catchment size** : small :10-100 km² ,medium : >100-1000 km² , large: >1000-10000 km² , very large :>10000 km²
- ➔ **geology** : calcareous, siliceous, organic

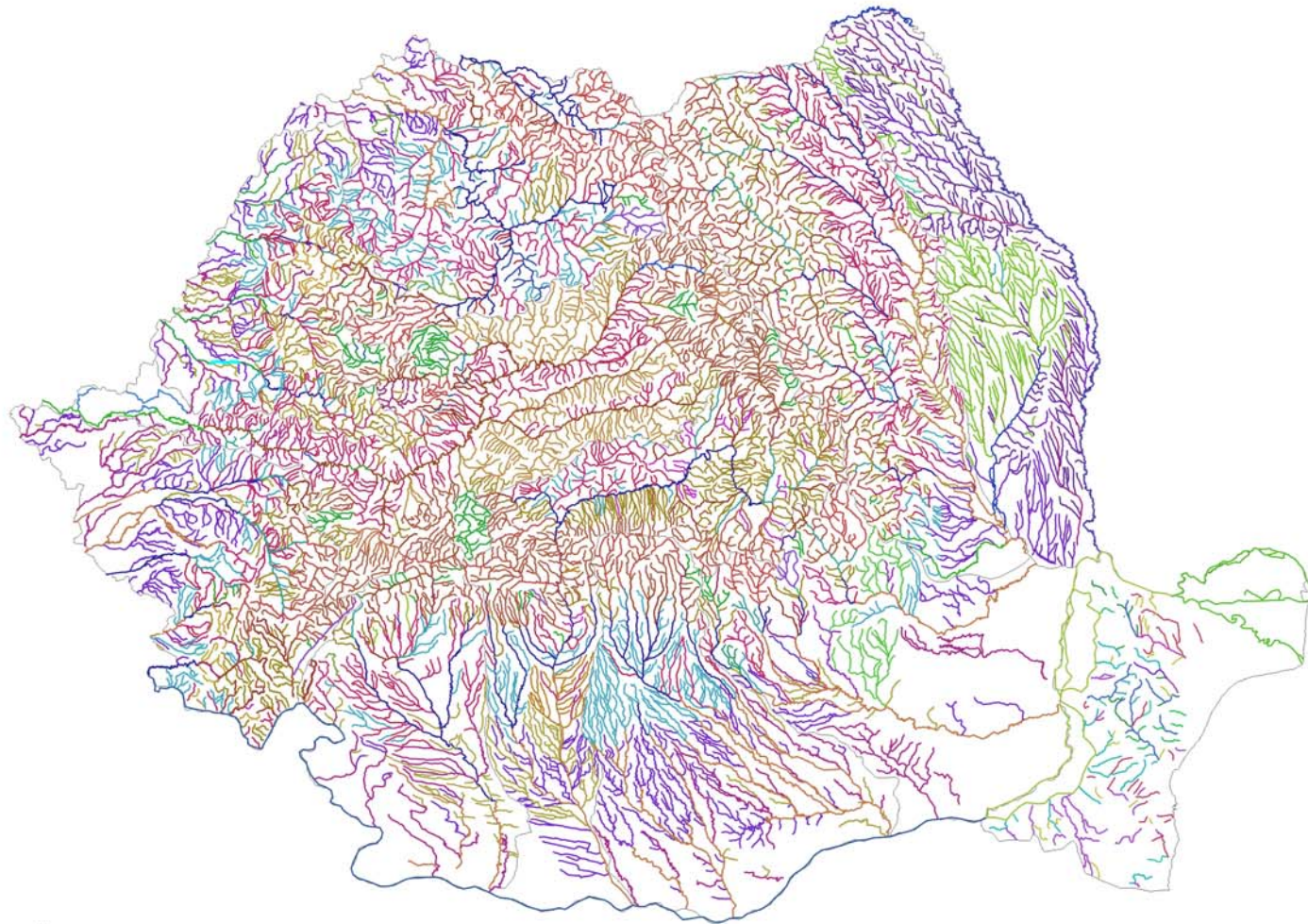
■ 6 Optional factors:

- ➔ **lithological bed structure (Fin, Ger, Swe, RO)**
- ➔ **slope (Bel,Fin, Nor, UK,RO)**
- ➔ **multiannual mean specific flow (NL,Nor,Swe,RO)**
- ➔ **specific yearly minimum monthly flow 95% (RO)**
- ➔ **multiannual mean precipitation (RO)**
- ➔ **multiannual mean temperature (RO)**



- The abiotic types have been correlated with the fish zoning defined by Banarescu (1964) as follows:
 - ➔ zone of *Salmo trutta fario* (trout);
 - ➔ zone of *Thymallus thymallus* (grayling);
 - ➔ zone of *Chondrostoma nasus* (shout);
 - ➔ zone of *Barbus barbus* (barbel);
 - ➔ zone of *Cyprinus carpio* (carp).
- 23 preliminary river types and 23 sub-types at national-level have been added;

THE PRELIMINARY ABIOTIC STREAM TYPOLOGY



Legend

TYPE	
— LCaP	— RO12b
— RO01a	— RO13
— RO01b	— RO13a
— RO02a	— RO13b
— RO02b	— RO14a
— RO03a	— RO14b
— RO03b	— RO15
— RO04a	— RO15a
— RO04b	— RO15c
— RO05a	— RO16
— RO05b	— RO16a
— RO05c	— RO17a
— RO06a	— RO17b
— RO06a*	— RO17b*
— RO06ac	— RO17c
— RO06b	— RO18a
— RO06c	— RO18a*
— RO07a	— RO18b
— RO07ac	— RO19
— RO07c	— RO19a
— RO08a	— RO19b
— RO08a*	— RO19s
— RO08b	— RO20
— RO09a	
— RO09b	
— RO10a	
— RO10a*	
— RO10b	
— RO10c	
— RO11a	
— RO11a*	
— RO11b	
— RO11c	
— RO12	
— RO12a	



A photograph of a small stream flowing over rocks in a forest. The water is white and turbulent as it cascades over the rocks. The surrounding area is lush with green trees and foliage. The text is overlaid on the right side of the image.

TIP RO03
SMALL STREAM IN PIED-MONT
OR HIGH PLATEAU AREA

Slope stream – 30-50 ‰

Altitude – 500 - 800 mdMN

Precipitation – 600-800mm/year

Temperature – 7-9°C

Specific mean flow = 10-20 l/s/ km²

Specific yearly minimum monthly flow
95% = 0,8 – 2 l/s/ km²

Bed lithology – boulders, gravel

Fish fauna – grayling, slout, chub



TIP RO10
STREAM SECTOR IN HILLY OR
PLATEAU AREA

Slope stream – 0.5-5 ‰

Altitude – 200 - 500 m dMN

Precipitation – 500-700 mm/year

Temperature – 8 - 10°C

Specific mean flow = 3-15 l/s/ km²

Specific yearly minimum monthly
flow 95% = 0.4-2 l/s/ km²

Bed lithology – sand, gravel

Fish fauna – slout, barbel

CRITERIA FOR TYPOLOGICAL LAKES CLASSIFICATION

▪ Altitude

- High : > 800 m;
- Mid-altitude : 200 - 800 m;
- Lowland : < 200 m.

▪ Geology

- Calcareous
- Siliceous
- Organic

▪ Depth

- Very shallow (mean depth < 3 m)
- Shallow (mean depth 3-15 m)
- Deep (mean depth >15 m)

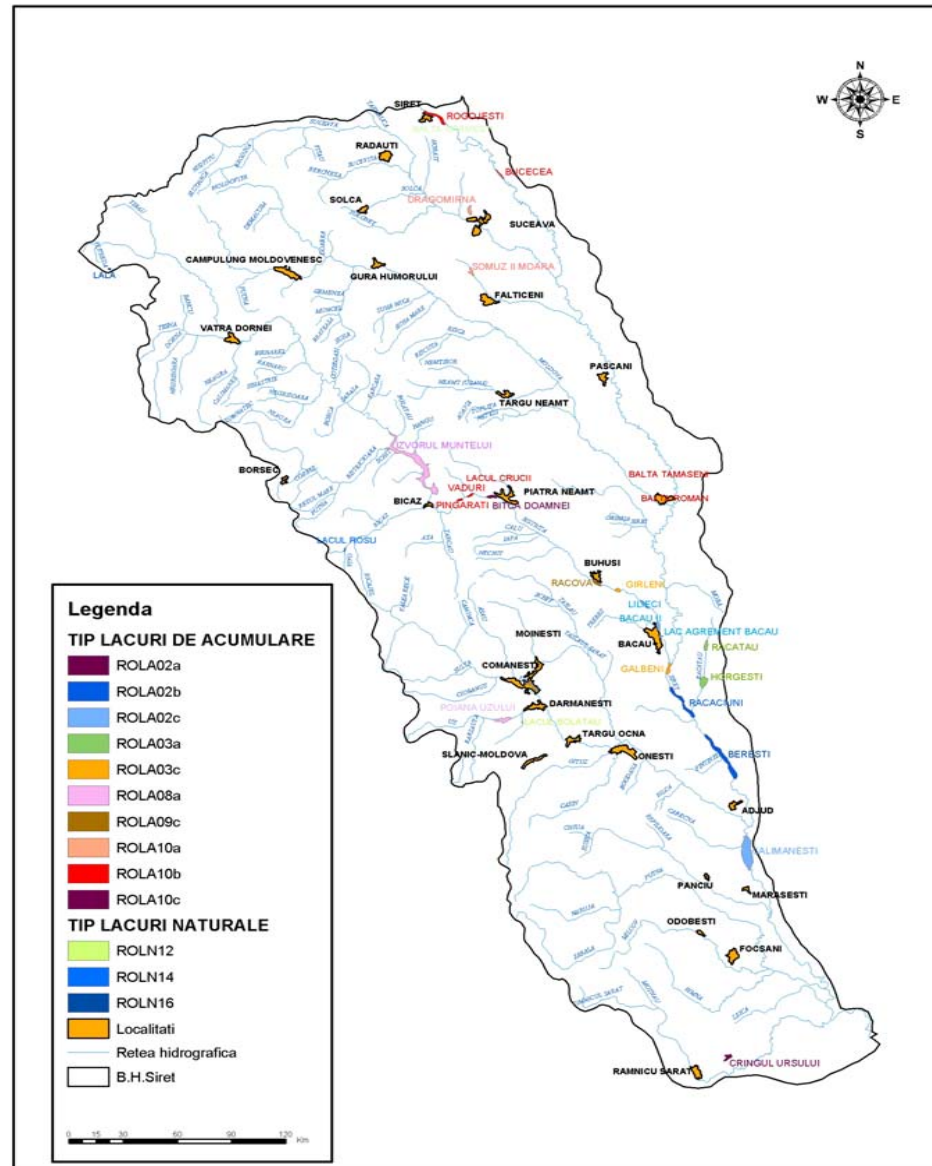
▪ Time residence (only for reservoirs)

- Small: < 3 days;
- Medium : 3 - 30 days;
- High : > 30 days.



- ✓ 13 types for natural lakes ; 14 types and 14 sub-types for reservoirs.
- ✓ The abiotic typology will be further checked through the biotic typology for the quality elements indicated by the WFD.

The typology for natural lakes and reservoirs - Siret River Basin -



Number of Romanian sites proposed for intercalibration exercises

∞ 15 for rivers : { - 6 for H/G ecological status
- 9 for G/M ecological status

∞ 17 for lakes : { - 4 natural lakes : { 3 for H/G ecological status
1 for G/M ecological status
- 13 reservoirs : { 8 for H/G ecological status
6 for G/M ecological status

Ecoregions according to WFD Annex X (Illies ecoregions for inland waters)

- ✧ 10 ~ The Carpathians:
 - 9 for rivers
 - 2 for lakes
 - 6 for reservoirs

- ✧ 11 ~ Hungarian Lowlands: 2 for reservoirs

- ✧ 12 ~ Pontic Province:
 - 1 for rivers
 - 2 for lakes
 - 3 for reservoirs

- ✧ 16 ~ Eastern Plains:
 - 3 for rivers
 - 1 for lakes

Romanian site proposed for intercalibration exercises

Legend

TIP

- LAKE
- RESERVOIR
- RIVER

NAME

- 10 - The Carpathians
- 11 - Hungarian lowlands
- 12 - Pontic province
- 16 - Eastern plains



Provisionally identification of HMWB, based on *hydromorphological changes*

Physical alterations :

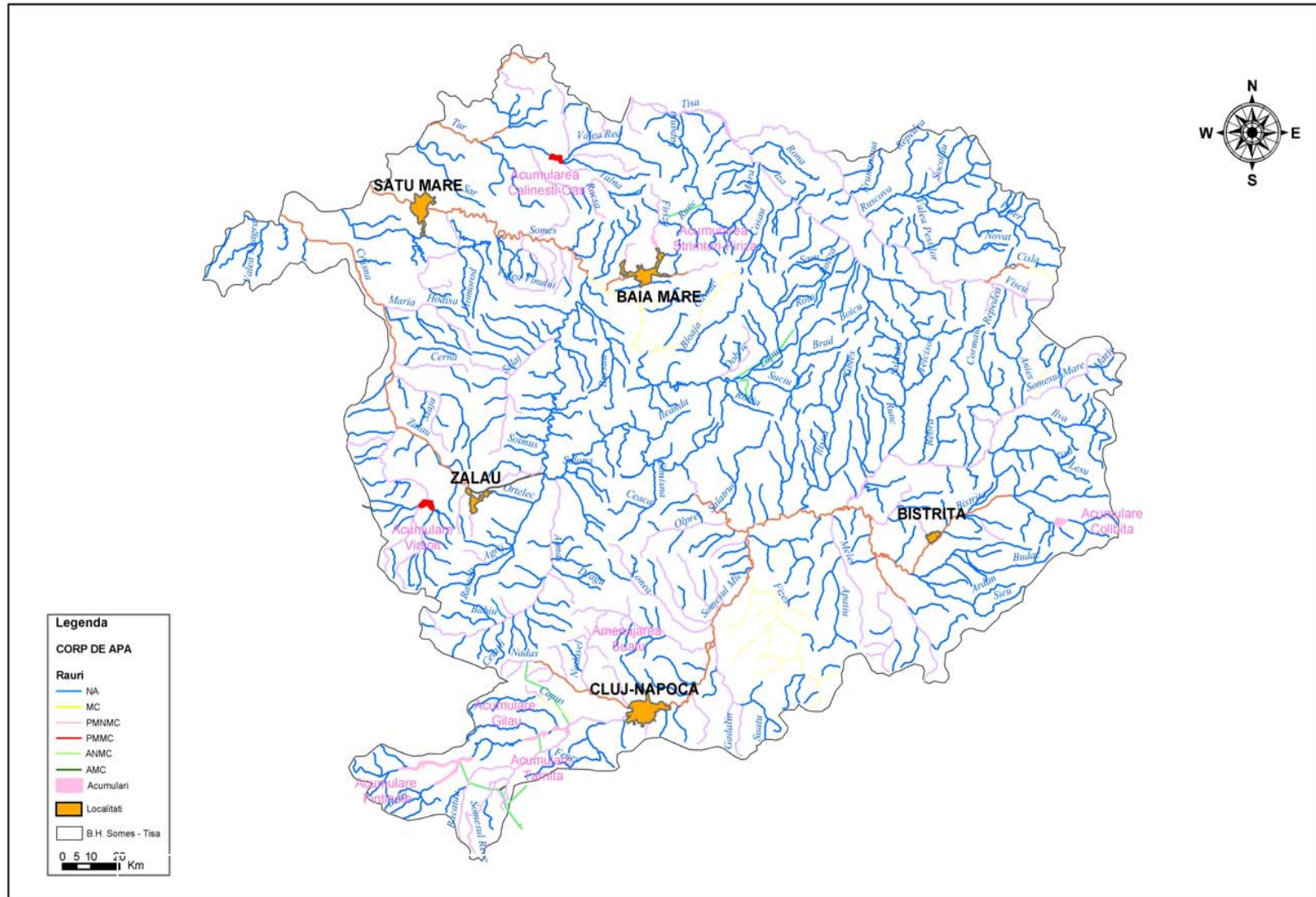
- ✓ *Disruptions of the longitudinal river continuity by weirs / barrages / sills*
- ✓ *Disruptions of the lateral river continuity by river engineering – connectivity to flood plains (dikes, agricultural works, fish farming works, etc)*
- ✓ *River engineering - banks regulation/consolidation*
- ✓ *Navigation channel*
- ✓ *Water abstraction, residual water flow, flow deviation*
- ✓ *Hydropeaking*

- *Quantitative criteria for hydro-morphological pressures and impacts assessment, as first stage of the HMWB designation (see table).*

Physical alterations	Effects	Parameter considered	Pressure significance degree		
			Low	Moderate	High
Disruptions of the Longitudinal river continuity by weirs / barrages / sills	Affect the migration of biota ¹ and the transport of sediments	Sills density (no. / km) or	≤ 1	2	≥ 3
		Height of the structure (cm)	< 20	20 – 50	> 50
Disruptions of the lateral river continuity by river engineering works	Affect the riverine vegetation	Length of dikes / Length of water body (%)	< 30	30 - 70	> 70
	Affect the lateral connectivity and floodplain vegetation	Affected surface / Floodplain surface (%)	< 30	30 - 70	> 70
River engineering - banks regulation / consolidation	Affect the river cross section, substrate structure and biota	Length of bank / Length of water body (%)	< 30	30 - 70	> 70
Navigation channel	Affect biota and the river bed	Width of navigation channel / Width of river bed (%)	< 30	30 - 70	> 70
Water abstraction, residual water flow, flow deviation	Affect biota and bed stability	Intake or residual flow / Multiannual mean flow	< 10	10 - 50	> 50
	Affect biota	Low flow in river bed / $Q_{95\%}^{2+ 0,1}$ (m ³ /s)	> 100	100 - 50	< 50
Hydropeaking	Affects biota (low flow)	Low flow in river bed / $Q_{95\%}^{2+ 0,1}$ (m ³ /s)	>100	100-50	< 50
	Affects flora and banks Stability	Water level gradient (cm) / hour	< 50	50-100	> 100

Surface water bodies delineation

- Somes-Tisa river basin -

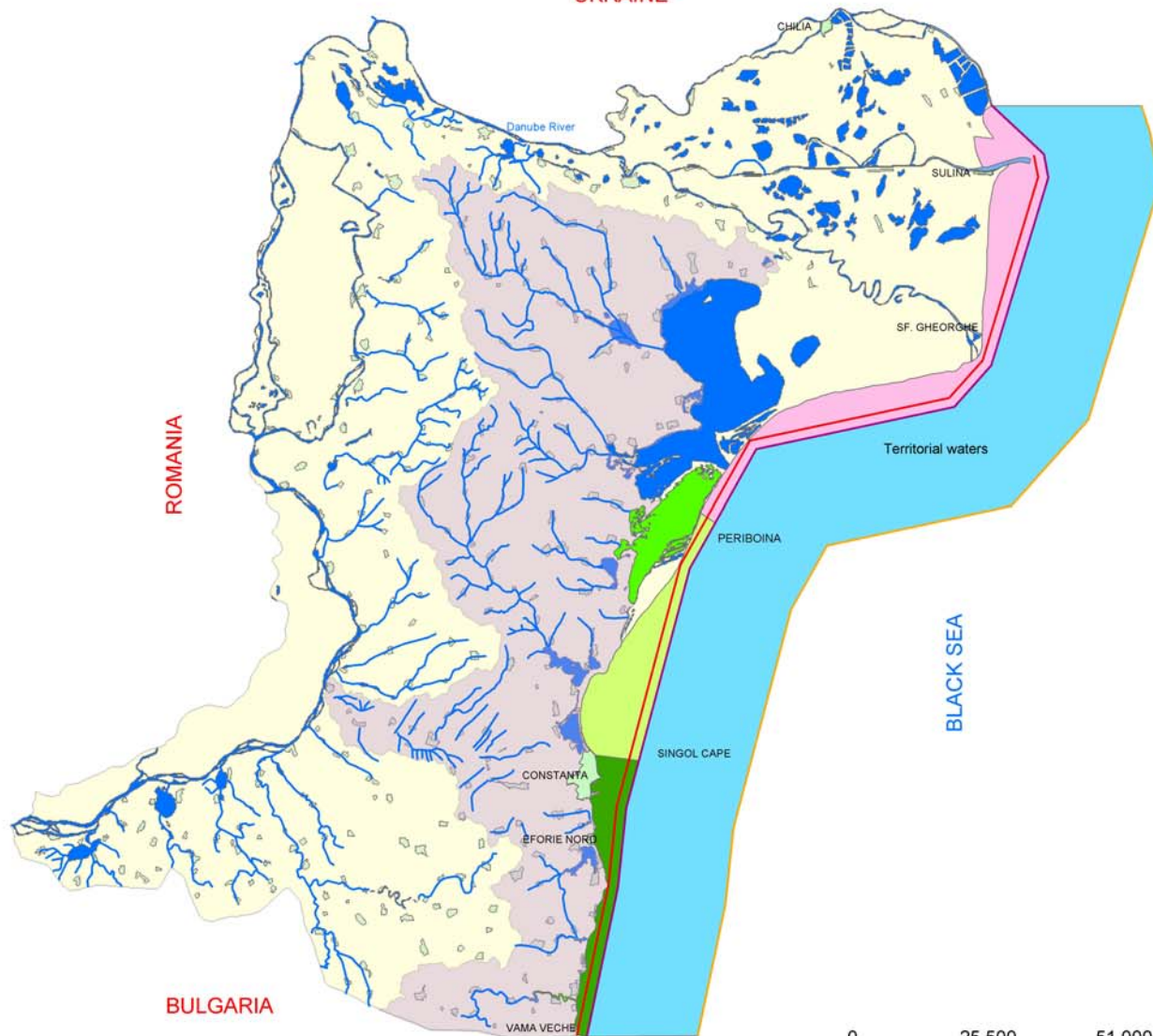


TRANSITIONAL AND COASTAL WATERS. ROMANIAN BLACK SEA

- **Transitional waters**
 - Marine type – Northern Sector from Chilia mouth to Periboina (1 WB);
 - Fluvial type – Danube River : Chilia, Sulina and Sf. Gheorghe arms (3 WB);
 - Lacustrine type – Sinoe and Mangalia Lakes (2 WB).
- **Coastal waters** (Central and Southern Sectors from Periboina to Vama Veche)
 - Sandy shallow type – from Periboina to Singol Cape (1 WB);
 - Mixed (sandy and rocky) shallow type – from Singol Cape to Vama Veche (2 WB).

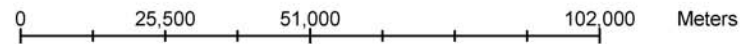
The coastal waters are defined according to the WFD, respectively of 1 nautical mile measured from the baseline, within territorial Sea of Romania.

Black Sea - ROMANIA
Typology of Transitional and Coastal Waters
UKRAINE



Legend

- Base line
- 1 Mm line
- 12 Mm line
- Marine transitional waters
- Fluvial transitional waters
- Lacustrine transitional water bodies
- Sandy shallow coastal waters
- Mixed shallow coastal waters
- LITORAL_BASIN
- DANUBE BASIN



Only together we can succeed !

