

## FLOWS OF MAJOR WATER COURSES

## WATER 2

Fluctuations in flows affect the ecological and chemical status of water courses (e.g., pollutant concentrations and low oxygenation of water during low water periods). Measuring flows is necessary, not only in the context of managing floods and low water levels, but also in relation to the quality objectives set by the Water Framework Directive 2000/60/EC.

### Flow monitoring networks in Wallonia

Two complementary measurement networks coexist on the Walloon rivers: (i) the AQUALIM<sup>1</sup> network, on non-navigable natural water courses, (ii) the WACONDAH<sup>2</sup> network, on navigable water courses, canals, reservoirs, water courses influenced by control structures and certain large natural rivers.

### Highly contrasted flows with no apparent trend

In 2015, the median flows<sup>3</sup> of the major Walloon water courses ranged from 1.4 m<sup>3</sup>/s on the Senne to 140.7 m<sup>3</sup>/s on the Low Meuse. The characteristic low-water flows<sup>4</sup> ranged from 0.4 m<sup>3</sup>/s on the Our to 44.8 m<sup>3</sup>/s on the Mid-Meuse. They were 1.4 to 5.7 times lower than the median flows. The characteristic high-water flows<sup>5</sup> ranged from 7.1 m<sup>3</sup>/s on the Dyle and 732.3 m<sup>3</sup>/s on the Low Meuse. They were between 2.5 and 11 times higher than the median flows. Three types of factors account for the interannual variability of river flows: climatic variations (duration and intensity of rainfall, etc.), the characteristics of rivers and their catchment areas (topography, types of soil and subsoil, shape, etc.) and certain human activities (soil sealing, navigation, water abstractions, dams, etc.). The predominant factor is the rainfall pattern.

### Prevent and manage crisis periods

Wallonia is keen to maintain a minimum ecological flow in its water courses, in particular through the authorisations

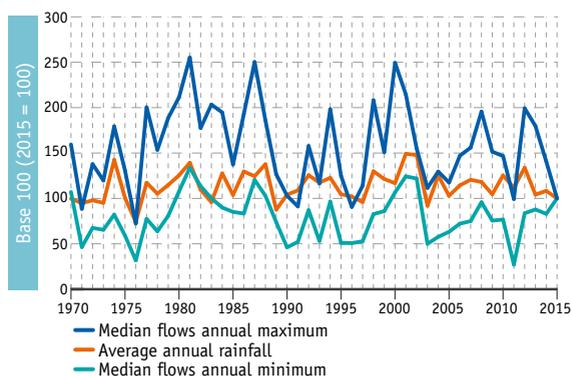
for water intakes and environmental permits it issues. The second River Basin Management Plans<sup>6</sup> envisage the use of additional measures if the water courses fail to achieve good ecological status due to excessive abstractions. In this case, Wallonia plans to set a maximum daily volume of abstractions, review permits and authorisations or tighten controls. The Flood Risk Management Plans<sup>7</sup> include operational objectives aiming in particular to limit the negative impact of floods due to high-water levels, improve knowledge of flows and manage crises. During high-water or low-water periods, the department responsible for integrated hydrological management<sup>2</sup> disseminates the hydrological alarms and forecasts throughout the Walloon territory to the Regional Crisis Centre, which transmits them to the competent authorities<sup>8</sup>. The hydrological forecasts are based on observations from measurement networks<sup>1,2</sup> in Wallonia and border regions, and from forecasting models.

[<sup>1</sup>] <http://aqualim.environnement.wallonie.be>, managed by DG03 | [<sup>2</sup>] <http://voies-hydrauliques.wallonie.be>, managed by DG02 | [<sup>3</sup>] Daily flow which is exceeded 6 months per year. It characterises the annual change. | [<sup>4</sup>] Daily flow which is not achieved 10 days per year | [<sup>5</sup>] Daily flow which is exceeded 10 days per year | [<sup>6</sup>] → WATER 21 | [<sup>7</sup>] → TRANSV 1 | [<sup>8</sup>] Municipalities, Provinces, the Walloon Government, FPS Interior – Governmental Coordination and Crisis Centre (*Centre gouvernemental de coordination et de crise*)

**Tab. WATER 2-1** Annual median flow (MF), characteristic low-water flow (CLWF) and characteristic high-water flow (CHWF) of the main water courses in Wallonia (2015)

Water courses	Surface of the catchment area (km <sup>2</sup> )	MF (m <sup>3</sup> /s)	CLWF (m <sup>3</sup> /s)	CHWF (m <sup>3</sup> /s)
Low Meuse	20,440	140.7	34.4	732.3
Mid-Meuse	15,644	134.5	44.8	626.3
High Meuse	10,374	95.2	25.7	405.6
Ourthe	3,613	30.5	10.0	173.1
Scheldt (outflow)	5,423	27.9	14.5	77.2
Scheldt (inflow)	4,652	23.9	12.4	66.3
Sambre (outflow)	2,847	16.5	6.7	105.4
Semois	1,270	10.7	1.9	91.0
Amblève	1,076	10.1	2.4	66.6
Chiers	965	8.7	3.5	31.8
Lesse	1,339	7.5	1.8	59.1
Vesdre	699	6.7	3.1	34.2
Sambre (inflow)	1,179	6.2	2.4	67.5
Haine	833	5.9	3.3	21.9
Dendre	856	3.8	1.7	23.7
Dyle	435	2.9	2.0	7.1
Our	406	2.4	0.4	25.0
Senne	361	1.4	0.6	14.3

**Fig. WATER 2-1** Changes in the annual median flows of the main water courses\* in Wallonia



\* Flows calculated from stations representative of the 14 river basins of Wallonia (Amblève, Dendre, Dyle-Gette, Scheldt, Haine, Lesse, Meuse upstream, Meuse downstream, Our, Ourthe, Sambre, Semois-Chiers, Senne, Vesdre)

SOERW 2017 – Sources: SPW - DG02 - DEAG; SPW - DG03 - DRCE