

Drought and water scarcity indicators

Magdalena Mrkvičková

Drought x water scarcity

Drought

- a temporary decrease of the average water availability due to rainfall deficiency
- a normal, recurrent feature of the all climates, its occurrence can be related to large-scale changes in atmospheric circulation patterns
- it can last from a few weeks to several years

Water scarcity

- long-term imbalance between available water resources and long-term average water demand
- man-made phenomenon due to (over)abstraction of water resources, or their pollution
- characterised by a permanent degradation/decline of water resources

Water scarcity assessment in the CZ

Surface water

- results of the surface water management balance assessment of the past year in balance profiles on the river system

Groundwater

- groundwater management balance assessment of the past year in hydrogeological units

Surface W. Balance Status

BS1 $Q_m > Q_{330d}$

BS2 $Q_{330d} > Q_m > Q_{355d}$

BS3 $Q_{355d} > Q_m > Q_{364d}$

BS4 $Q_{364d} > Q_m$

BS5 $Q_{MF} > Q_m$

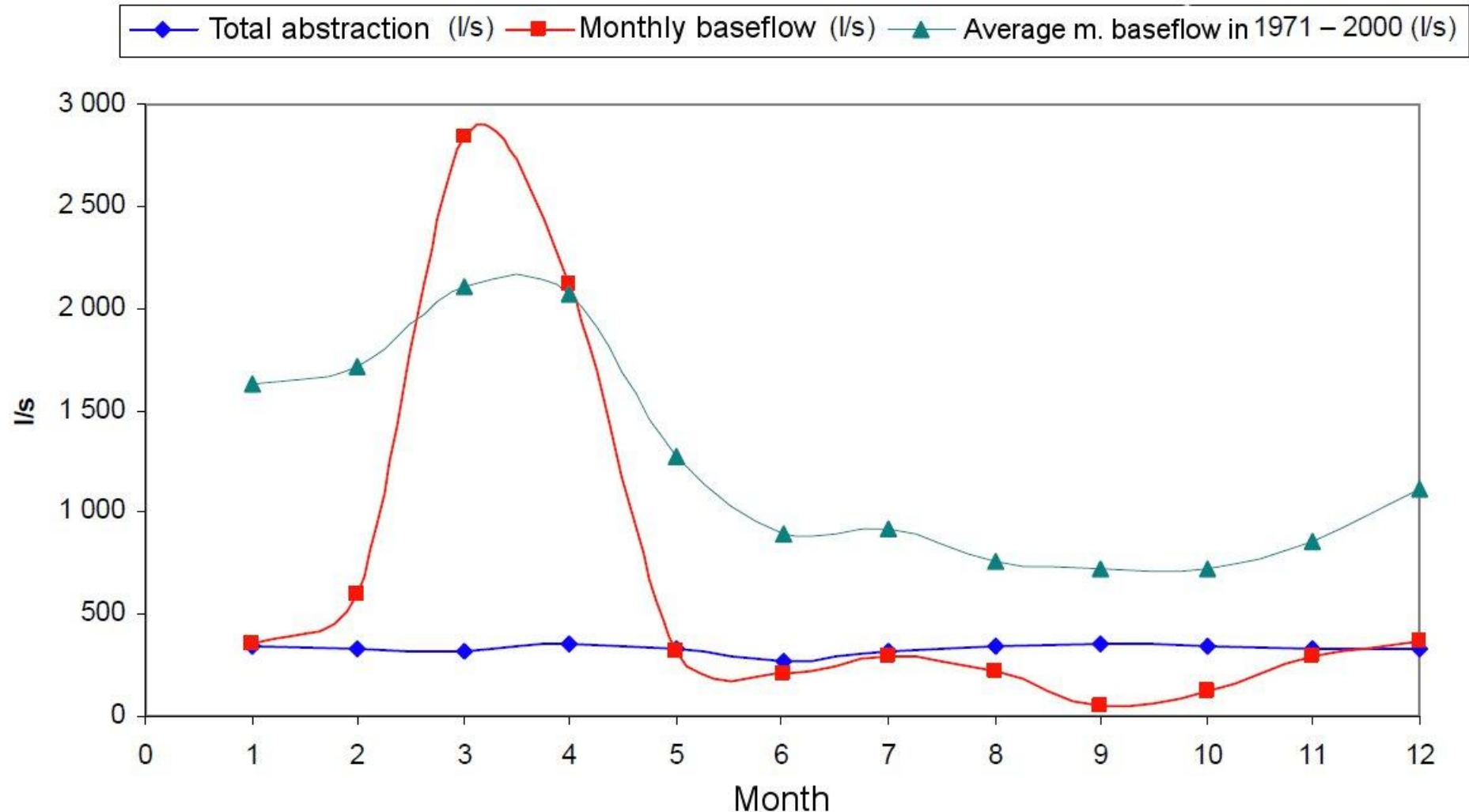
Groundw. Balance Status

$\text{Max_abs/Min_BF} < 0,5$

$\text{Max_abs/Min_BF} > 0,5$

Water balance assessment of a groundwater unit in the Orlice river basin

HGR 4222 Podorlická křída v povodí Orlice



Source: Report on groundwater quantity and quality assessment of the Elbe River Water Board, 2009

Drought and water scarcity assessment at EU level

CIS Expert Group on Water Scarcity and Drought

- proposal of pragmatic and simple drought and water scarcity indicators in order to provide a clear picture throughout the EU
- The indicators should help in the implementation of the WFD at river basin level
- The indicators should identify the extent and magnitude of the socio-economic and environmental problems caused by WS&D

Drought indicators

- Snowpack Storage Indicator
- Standardized Precipitation Index
- Fraction of Absorbed Photosynthetically Active Radiation
- Standardized Runoff Index
- Groundwater level indicator

Water scarcity indicator

- Water Exploitation Index

Water Exploitation Index

$$WEI = \frac{A}{RWA}$$

$$RWA = IF + EF + R - WR$$

$$IF = P - ETA$$

A – total annual water abstraction [mil m³]

RWA – renewable water resources [mil m³]

IF – internal flow [mil m³]

P – precipitation, ETA – actual evapotranspiration [mil m³]

EF – external flow (e.g. Inflow from neighbouring country) [mil m³]

R – returned water (e.g. WWTP effluents...) [mil m³]

WR – water requirements (environmental flow + minimum outflow to the neighbouring country) [mil m³]

Thank you for your attention