BInd05: Mean duration of low pulses within each year

Quality element: Hydromorphology

Water category and water body types: Rivers; all types

Selection rationale: Indicator of extreme hydrological events related to environmental flows and water supply

Indicator type (DPSIR): Pressure, State, Impact

Description: Streamflow is the 'master factor' in stream ecosystems, establishing the physical mosaic of habitats and influencing the water quality conditions (e.g., temperature, dissolved oxygen, and nutrient concentration). The hydrological river regime is characterised by five general features: flow magnitude, frequency, duration, timing and rate of change usually addressed within the 'range of variability approach' (Richter et al. 1997). Thus, a broad range of relevant streamflow indicators have been established (e.g. 32 Indicators of Hydrologic Alteration; Richter et al. 1996).

The 'mean duration of low pulses within each year' characterises the annual extreme streamflow conditions. Low pulses are defined as periods during which the daily mean flow falls below the 10^{th} percentile of the mean annual discharge.

The natural flow regime including low pulse magnitude, frequency, duration and timing represents an intrinsic hydrological feature of a river. Drivers influencing this feature include river regulation (e.g. damming, water abstraction and diversion), groundwater pumping, climate change (e.g. precipitation, evapotranspiration), catchment land use (e.g. impervious surface, deforestation) and river structure (e.g. straightening, embankment).

Low pulses lead to the loss of aquatic habitat availability and connectivity that generates a loss of biodiversity and biomass, poor water quality and riparian canopy die-back. Low pulse magnitude and duration are related to the concept of environmental flows and water supply.

Spatio-temporal scale: Gauging station, representing upstream sub-catchment

Unit: Number of days per year

Standardisation: To be standardised against natural hydrograph (e.g. % deviation from natural hydrograph)

Data requirements: Field data, modelled data (e.g. JRC LISFLOOD model)

Other: none

MARS spatial scale: River-basin and European scale

References

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