# Type 12: Mid-sized and large organic substrate-dominated rivers

**Distribution in river landscapes and regions according to Briem (2003):**

**Ecoregion independent stream type.** Large floodplains (over 300 m wide) with valley peat, bogs, mainly organic material; outwash plains and sandy deposits, lower river terraces, old river terraces

**Picture:**

*Stepenitz (Brandenburg). Photograph: C. Feld*

**Short description of morphology:**

Organic rivers typically meander or flow in anastomising channels in u-shapes valleys with many side channels. The transition to the floodplain is often gradual. The floodplain and river bed are dominated by organic substrates (peat, fallen leaves, macrophytes, etc.). Some mineral substrates can occur, particularly sand and gravel. Pure organic streams are rather rare. More common are partially organic forms with mineral riverbeds, which run through valley bogs or peat floodplains. The minimal entrenchment allows for a strong connectivity between river and floodplain. In the floodplain numerous drainage channels, detached side arms and backwaters of varying age are common.

**Abiotic profile:**

| | |
|---|---|
| **Size class:** | 100 - 10.000 km² catchment area |
| **Slope of the valley floor:** | < 0,5 - 1,5 ‰ |
| **Flow category:** | predominantly slow flowing current, partially turbulent |
| **Channel substrates:** | organic substrates dominate (peat, fallen leaves, macrophytes), while mineral substrates are subordinate (sand, gravel) |

**Physico-chemical water conditions:**

Organic streams; depending on catchment geology, physical and chemical characteristics exhibit different ranges for base-rich or base-poor variants.

| | **base-poor** | **base-rich** |
|---|---|---|
| **Conductivity [µS/cm]:** | 350 - 500 | 550 - 800 |
| **pH-value:** | 6,5 - 7,5 | 7,0 - 8,0 |
| **Alkalinity [°dH]:** | 3 - 6 | 8 - 14 |
| **Total hardness [°dH]:** | 6 - 11 | 11 - >20 |

**Flow regime & hydrology:**

Medium to high fluctuation in discharge over the year.

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**Characterisation of the macroinvertebrate community:**

**Functional groups:** The macroinvertebrate community is rich in both species and individuals. Dominant are lenitic species of slowly flowing reaches and standing waters. True running water species play a subordinate role and are restricted to shallow lotic regions. Besides species, which inhabit permanent water bodies, numerous species adapted to intermittent flow are also found and inhabit the periodically dry floodplain drainages and abandoned side arms.

**Selection of type-specific species:** These include the mayfly *Leptophlebia vespertina*, which colonised macrophytes, the mayfly *Caenis robusta*, the sponge inhabiting caddis fly *Ceraclea nigronervosa* as well as the caddis flies *Ceraclea senilis*, *Limnephilus nigriceps*, *L. stigma*, *Oligotricha striata* and *Phryganea grandis*.

**Characterisation of macrophyte and pyhtobenthos communities:**

The aquatic vegetation is characterised by occurrence of large pondweeds like *Potamogeton lucens*, *P. perfoliatus*, *P. alpinus* and *P. gramineus* and the growth-form rich community of *Sparganium emersum*, which includes *Sagittaria sagittifolia* and *Nuphar lutea*.

Young moraines: The macropyhte community is well developed: stream margins have flooded reeds, usually lined with plants of the Nymphaeion albae-community, duckweed and frog-bit communities. The central riverbed supports submerged species of the Myriophyllid and pondweed communities.

**Characterisation of the fish fauna:**

As a result of the strong connectivity between stream and floodplain, the fish fauna supports mainly macrophyte-spawning standing water body species, which are promoted by the numerous side arms and abandoned channels. Typical are species well adapted to conditions of valley bogs, like Crucian carp. Besides these, few rheophile fish species occur. Gravel-spawning species of lotic and summer-cool reaches, like salmonids, play a minor role and occur only locally.

**Comments:**

Typical for this stream type are humic substances, which colour the water brown.

**Possible confusion with other stream types:** Compared with streams of type 19 (Small streams of riverine floodplains), type 12 streams have a clearly discernible valley form and a steeper stream slope. They are also “independent” from the main stem, rivers into which they flow, and are not influenced by them hydrologically.
Biocoenotically, stream type 12 is characterised by running water and floodplain species, whereas stream type 19 supports large numbers of standing water body species.

**Notice:** The description of this stream type may be supplemented with results from currently running research projects.

**Examples of typical streams**

**Macroinvertebrates:** Schwalm (Lower Saxony)

**Comparative literature (selection):**

LUA NRW (2001) „Organisch geprägter Fluss des Tieflandes“