

Type 15:

Mid-sized and large sand and loam-dominated low-land rivers

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

Large floodplains (over 300 m wide), outwash plains, sandy deposits, loess regions, ground moraines, also in sandy regions of river terraces.

Picture:



Lippe (North Rhine-Westphalia). Photograph: T. Ehlert

Short description of morphology:

Sinuate to meandering streams in shallow troughs or wide u-shaped valleys. Besides the dominant sand and loam fractions, gravel is an important substrate, which can form gravel banks; clay and marl are common and can aggregate into flat slabs. Important habitat structures include natural secondary substrates like woody debris, alder roots, macrophytes and fallen leaves.

The channel profile is flat with pronounced slip-offs and stable bank cliffs. In the floodplain numerous drainage channels, detached side arms and backwaters of varying age are common. Valley bogs and fens can form.

Streams with higher amounts of loam are naturally incised well below the floodplain level and have a trench-like profile. Disconnected side channels are rare.

Abiotic profile:

Size class: 100 - 10.000 km² catchment area

Slope of the valley floor: 0,2 - 2 ‰

Flow category: predominantly calm current flow

Channel substrates: dominated by sands of varying grain size, or loam; often supplemented by gravel, in parts by clay and marl.

Physico-chemical water conditions:

stream type occurs in more or less calcareous variants

Conductivity [µS/cm]: 400 - 850

pH-value: 7,0 - 8,5

Alkalinity [°dH]: 6 - 17

Total hardness [°dH]: 8 - 23

Flow regime & hydrology:

Medium to high fluctuation in discharge over the year, with pronounced extreme discharge events.

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Characterisation of the macroinvertebrate community:

Functional groups: The invertebrate community is relatively diverse, although only few specialised species colonise this stream type. These are predominantly inhabitants of lenitic areas with detritus-rich deposits and burrowing species (substrate specialists). The natural hard substrate, coarse woody debris and macrophytes host the most species-rich and abundant communities. Especially rheophile species occur here.

Selection of type-specific species: These include only few colonisers of the sandy substrates like the burrowing mayfly *Ephemera danica* or the stonefly *Isoptena serricornis*. Burrowed in the stable detritus rich shore regions, the mussel *Unio pictorum*, the dragonfly *Gomphus vulgatissimus* and the stonefly *Taeniopteryx nebulosa* occur. Coarse woody debris presents the most important hard substrates in this stream type: the mayfly *Heptagenia flava* and the caddis flies of the genus *Lype* are restricted to this habitat. Other typical mayflies are *Caenis pseudorivolorum*, *Paraleptophlebia cincta* and *Brachycercus harisella*. A number of species typical for large rivers like the mussel *Unio crassus*, the snail *Viviparus viviparus*, the true beetles *Haliphus fluviatilis* and *Brychius elevatus* and the dragonfly *Ophiogomphus Cecilia* occur.

Characterisation of macrophyte and pyhtobenthos communities:

Large pondweeds like *Potamogeton lucens*, *P. perfoliatus*, *P. alpinus* and *P. gramineus* are common macrophytes, which characterise the stream type together with the growth-form rich community of *Sparganium emersum*. More loam-dominated streams are characterised by *Callitriche platycarpa* and *Callitriche stagnalis*.

Young moraines: Here the macrophyte community is spatially highly structured: in erosion zones, macrophytes are missing; otherwise they form banks or meadow-like expanses. The species community is characterised by reeds, pondweed and stream weed community. In slower flowing regions, *Nymphaeion albae* and *Lemnetea minoris* communities occur; in amphibious regions marginal reed and sedge communities.

Characterisation of the fish fauna:

This stream type is characterised by a species rich fish fauna with many rheophile cyprinids like dace, chub, gudgeon. The typical species, especially of larger rivers is the burbot. Many species are dependent on the presence of larger quantities of coarse woody debris, like stone loach, which is more abundant in mid-sized rivers. Besides species of the main channel, many abandoned channels host a number of typical species, like spined loach, which occurs in muddy deposits of bank bays and floodplain channels. The more loam-dominated rivers are usually less specious: trout and other species dependent on high oxygen levels are absent, because suitable spawning habitats are missing and the fine particle load inhibits breathing. Due to the natural entrenchment, species from floodplain water bodies are subordinate.

Comments:

This stream type is the most common and widespread stream type in the northern German lowlands and comes closest to matching the typical perception of the "classic lowland river".

Examples of typical streams

Makrozoobenthos: Lippe (North Rhine-Westphalia), Schaale, Sude, Alte Elde (Mecklenburg-West Pomerania), Ems, Hunte, Örtze (Lower Saxony), Treene (Schleswig-Holstein), Rhin (Brandenburg)

Comparative literature (selection):

LUA NRW (2001) „Sandgeprägter Fluss des Tieflandes“