
Type 10:

Very large gravel-dominated rivers

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

Large floodplains (over 300 m wide), lower river terraces

Picture:



Elbe at Rathen (Saxony) Photograph: F. Schöll

Short description of morphology:

Sinuate to meandering river reaches in both narrow, in parts canyon-like, and wide valleys. In open valleys, wide floodplains prone to inundation are common. Locally, depending on the valley slope and river bedload, anabranching and braided sections may develop. The river type shows a shallow bed profile, where fords, islands or bars and side branches are characteristic. The dominant channel substrates are coarse gravel and cobbles; intermittent finer sediments, i.e. mixtures of sand and fine gravel, are found. Under natural conditions this river type carries lots of coarse woody debris. This usually consists of large logs or fallen trees, which remain stable despite the strong current. Large pieces of coarse woody debris in the main and side channels can lead to accumulated debris dams of smaller pieces of woody debris and other organic matter.

Abiotic profile:

Size class: > 10.000 km² catchment area
Slope of the valley floor: 2 - 0,2 ‰
Flow category: in narrow valleys quick, even current; in wide valleys and branching or braided sections currents are locally varied
Channel substrates: cobbles, coarse gravel and in small quantities, mixtures of sand and gravel

Physico-chemical water conditions:

calcareous
Conductivity [µS/cm]: 350 - 500
pH-value: 7,0 - 8,5
Alkalinity [°dH]: 4 - 10
Total hardness [°dH]:

Flow regime & hydrology:

Alpine influenced flow regime e.g. in the upper and middle Rhein sections; other rivers of this type show a pluvial flow regime, e.g. upper Donau or the upper Elbe.

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Characterisation of the macroinvertebrate community:	<p>Functional groups: Occurrence of epipotamal to rhithral species, which are in part transported into the main river from tributaries. Due to this effect and high habitat diversity, there is a very diverse community, especially in branching or braided sections. Grazers dominate the community, which also hosts many detritus and sediment feeders. Stone dwelling species are most abundant, few fine sediment inhabitants occur as well.</p> <p>Selection of type-specific species: Predominant are specifically potamal species. Noteworthy are large mussels (bivalves) like <i>Pseudanodonta complanata</i>, <i>Unio pictorum</i> and <i>Anodonta anatina</i>, the mayflies <i>Heptagenia flava</i>, <i>Ephoron virgo</i> and <i>Potamanthus luteus</i>, the dragonflies <i>Gomphus vulgatissimus</i> and <i>Onychogomphus forcipatus</i>, the stoneflies <i>Perla burmeisteriana</i> and <i>Isogenus nubecula</i>, the water bug <i>Aphelocheirus aestivalis</i> and a rich caddis fly fauna including e.g. <i>Polycentropus flavomaculatus</i>, <i>Cheumatopsyche lepida</i>, <i>Hydropsyche contubernalis</i>, <i>H. exocellata</i>, <i>H. incognita</i>, <i>Hydropsyche bulgaromanorum</i>, <i>Brachycentrus subnubilus</i>, <i>Ecnomus tenellus</i>, <i>Mystacides azurea</i>, <i>Oecetis testacea</i>.</p>
Characterisation of macrophyte and phyto-benthos communities:	<p>Selection of type-specific aquatic bryophytes: <i>Fontinalis antipyretica</i> and less common <i>Cinclidotus riparius</i> and <i>Leptodictyum riparium</i>.</p> <p>Selection of type-specific macrophyte species: <i>Potamogeton nodosus</i>, <i>P. perfoliatus</i>, <i>P. pectinatus</i>, <i>R. fluitans</i>, <i>Myriophyllum spicatum</i>, <i>M. verticillatum</i>, <i>Elodea canadensis</i>, <i>Hippuris vulgaris</i>, <i>Ceratophyllum demersum</i>.</p>
Characterisation of the fish fauna:	<p>Due to the high habitat diversity, the fish fauna is rich in both species and individuals, with typical representatives of the barbel and bream regions. Besides the typical species of the main channel, numerous species occur, which preferably inhabit the slow-flowing waters along shore or standing side arms and other floodplain water bodies. Characteristic are anadromous fish, e.g. Atlantic salmon and salmon trout in the Rhein. In the Danube catchment several typical species occur which do not inhabit the Rhine system (e.g. huchen, stripe ruffe, zingel und sandsmelt). In earlier times, the Black Sea sturgeon was common in the Danube.</p>
Comments:	<p>Previously the stream type was insect dominated, while today, species invasion has shifted community dominance toward other invertebrate groups.</p> <p>For the entire length of the Rhine and Danube systems, specific typologies for the various stream sections have been compiled (IKSR 2004, IICPDR 2003).</p>
Examples of typical streams	<p>Makroinvertebrates: upper Danube, upper Elbe Macrophytes and phyto-benthos: Danube (in Bavaria)</p>
Comparative literature (selection):	<p>IKSR (2004), ICPDR (2002, 2003)</p>