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**Type 5:**  
(incl. Sub type 5.2)

**Small coarse substrate dominated siliceous high-land rivers**

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

Schists, gneiss, granites and similar rocks, volcanic regions

**Picture:**



*Kleine Schmalenau (North Rhine-Westphalia). Photograph: T. Ehlert*

**Short description of morphology:**

Streams of this type run in different valley forms depending on distance to source and the local conditions. Depending on the valley shape – v-shaped valleys, troughs, u-shaped valleys – the stream channel is either straight, sinuous or (slightly) meandering. Beside single channel forms, rivers with numerous secondary channels occur. The channel substrates are dominated by cobbles and boulders, which form numerous and large cobble bars. Locally large boulders and bedrock are found as substrates. The interstitial is well developed. In pools with slow current flow and in slip-off slope regions, finer substrates are found. The channel profile is usually very flat. Characteristic is a regular sequence of riffle and pool sections. Below perpendicular structures (debris dams, alder root bales) deep scour pools form. Specific variants of this type are found in volcanic regions (ub type 5.2), which are best differentiated by the diatom community.

**Abiotic profile:**

**Size class:** 10 - 100 km<sup>2</sup> catchment area  
**Slope of the valley floor:** 10 - 50 ‰  
**Flow category:** turbulent and fast flowing current, characteristic sequence of shallow turbulent riffles and deeper pools with calmer flow  
**Channel substrate:** cobbles, rocks and gravel dominate; locally large boulders can dominate, while finer substrates are subordinate

**Physico-chemical water conditions:**

siliceous  
**Conductivity [µS/cm]:** 50 - 300  
**pH-value:** 6,5 - 8,0  
**Alkalinity [°dH]:** <1 - 6  
**Total hardness [°dH]:** 1 – 10

**Flow regime & hydrology:**

High fluctuations in discharge over the year, with very pronounced extreme discharge events.

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### Characterisation of the macroinvertebrate community:

**Functional groups:** The macroinvertebrate community is generally species rich. With respect to abiotic parameters (current velocity, oxygen supply and water temperature) demanding species are prevalent. Inhabitants of the coarse cobble substrates dominate, to a lesser extent, fine sediment inhabitants are found. In terms of feeding types, abundance of grazers and a smaller share of shredders are typical. Biocoenotically, species of the epirhithral and metarhithral regions dominate.

**Selection of type-specific species:** Besides species which predominantly inhabit smaller streams like the stonefly *Perla marginata* and the caddis fly *Philopotamus* spec., typically metarhithral species abound. These include the mayflies *Baetis scambus*, *Ecdyonurus torrentis* and *Epeorus assimilis*, the stoneflies *Perlodes microcephalus* and *Protonemura* spec. as well as various species from the family Chloroperlidae. Typical caddis flies are *Micrasema longulum* und *Sericostoma* spec.. Because the interstitial is well developed, typical inhabitants of this microhabitat like stoneflies of the genus *Leuctra* and beetles from the genus *Esolus* occur.

### Characterisation of macrophyte and phytobenthos communities:

Higher aquatic plants are generally absent. On stable substrates aquatic moss can develop, like *Scapania undulata*, *Rynchosstegium riparioides* or *Fontinalis anipyretica* as well as freshwater red algae of the genus *Lemanea*.

### Characterisation of the fish fauna:

Streams of this type usually belong to the upper trout regions and are inhabited by gravel-spawning species like the brook trout and species, which depend on sandy substrates as juveniles like the brook lamprey. The bullhead also occurs. In parts migratory fish like the salmon complement the fauna.

### Comments:

This stream type corresponds to the "classic" cobble dominated highland stream. Streams of this type are vulnerable to acidification.

Specific variants of this stream type occur in volcanic regions (Sub type 5.2), which are especially different with respect to the diatom community.

### Examples of typical streams

**Macroinvertebrates:** Kleine Schmalenau, Heve, Weiße Wehe (North Rhine-Westphalia), Elbrighäuser Bach (Hesse), Wilde Gutach (Baden-Württemberg)

**Macrophytes and phytobenthos:** Wilde Rodach (Bavaria), Olef, Lörmecke (North Rhine-Westphalia), Sub type 5.2: Lüder, Kerkenbach (Hesse)

### Comparative literature (selection):

LUA NRW (1999) „Kleiner Talauebach im Grundgebirge“, „Großer Talauebach im Grundgebirge“