
Type 3: Streams in the Pleistocene sediments of the alpine foothills

(Sub types 3.1 and 3.2)

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

Pleistocene moraine landscapes (ground and terminal moraines), folding molasses of Alpine piedmont

Picture:



Würm (Bavaria). Photograph: Bavarian Water Management Agency (LFW)

Short description of morphology:

This stream type exhibits meandering to straight channel forms, running through v-shaped valleys, troughs or u-shaped valleys. The predominantly single channels, are generally shallow and wide. Some anabranching or sections with islands occur. Dominant channel substrates are boulders, cobbles and gravel. Streams running through end moraines are more dynamic in flow than those on the base moraine. Stream type 3 comprises both small and mid-sized rivers in the Pleistocene moraines of the Alpine piedmont. Mid-sized rivers (sub type 3.2) are often the middle and lower reaches of lake outflows (Type 21).

Abiotic profile:

Size class: 10 - 1.000 km² catchment area
(sub type 3.1 small rivers: 10 - 100 km² catchment area)
(sub type 3.2 mid-sized rivers: 100 - 1.000 km² catchment area)

Slope of the valley floor: 10 - 40 ‰

Flow category: turbulent

Channel substrates: boulders, cobbles and gravel dominate

Physico-chemical water conditions:

Predominantly calcareous

Conductivity [µS/cm]: 250 - 440
pH-value: 7,8 - 8,5
Alkalinity [°dH]:
Total hardness [°dH]:

Flow regime & hydrology:

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Characterisation of the macroinvertebrate community:

Functional groups: The macroinvertebrate community is very species rich: demanding species in respect to abiotic parameters (current velocity, oxygen supply and water temperature) dominate the coenosis. Rheophile, stone-dwelling species are most abundant, while species inhabiting smaller patches with finer sediments are less common. Epirhithral species are particularly frequent in sub type 3.1.

Selection of type-specific species in small rivers (sub type 3.1):

Ephemeroptera: *Baetis muticus*, *B. niger*, *Electrogena ujhelyii*, *Habrophlebia lauta*. Odonata: *Calopteryx virgo*, *Cordulegaster boltonii*. Plecoptera: *Perla marginata*, *Siphonoperla torrentium*, *Brachyptera risi*, *Leuctra albida*, *Leuctra hippopus*. Neuroptera: *Osmylus fulvicephalus*. Coleoptera: *Brychius elevatus*, *Oreodytes sanmarkii*, *Deronectes platynotus*, *Helophorus arvernensis*, *Hydraena gracilis*, *H. polita*, *H. truncata*, *Elmis aenea*, *Elmis maugetii*, *Esolus parallelepipedus*, *Limnius volckmari*, *Riolus subviolaceus*. Trichoptera: *Rhyacophila fasciata*, *R. vulgaris*, *Philopotamus ludificatus*, *Hydropsyche instabilis*, *H. saxonica*, *Silo nigricornis*, *S. pallipes*, *Drusus annulatus*, *Potamophylax cingulatus*.

Selection of type-specific species in mid-sized rivers (sub type 3.2):

Ephemeroptera: *Baetis fuscatus*, *B. lutheri*, *Oligoneuriella rhenana*, *Rhithrogena beskidensis*, *R. germanica*, *Ecydonurus insignis*, *Heptagenia flava*, *H. sulphurea*, *Ephemerella notata*, *Potamanthus luteus*, *Caenis macrura*. Odonata: *Calopteryx splendens*, *Onychogomphus forcipatus*. Plecoptera: *Perlodes microcephalus*, *P. dispar*, *Perla burmeisteriana*, *Taeniopteryx schoenemundi*, *Brachyptera monilicornis*, *Amphinemura borealis*, *Leuctra fusca*, *L. geniculata*. Heteroptera: *Aphelocheirus aestivalis*, *Aquarius najas*. Coleoptera: *Orectochilus villosus*, *Hydraena minutissima*, *Elmis maugetii*, *E. rioloides*, *Oulimnius tuberculatus*, *Limnius opacus*, *L. volckmari*. Trichoptera: *Rhyacophila dorsalis*, *Glossosoma boltoni*, *Agapetus laniger*, *Brachycentrus maculatus*, *B. subnubilus*, *Micrasema setiferum*, *Hydropsyche instabilis*, *Hydropsyche siltalai*, *Silo piceus*, *Lasiocephala basalis*, *Lepidostoma hirtum*.

Characterisation of macrophyte and phyto-benthos communities:

Selection of type-specific macrophyte species: *Callitriche obtusangula*, *Hygroamblystegium fluviatile*, *Brachythecium rivulare*, *Bryum argenteum*, *Cratoneuron filicinum*, *Callitriche hamulata*.

Selection of type-specific diatom species: *Achnanthes biasoletiana*, *Amphora pediculus*, *Gomphonema pumilum*, *Gomphonema tergestinum*, *Navicula cryptotenella*, *Nitzschia fonticola*.

Characterisation of the fish fauna:

Small rivers offer suitable habitat for brook trout, bullhead, minnow and stone loach. Mid-sized rivers generally represent the grayling region. They typically support gravel spawning species like grayling and nase and more indifferent species like gudgeon or chub. In the temporary variant of the stream type, the fish fauna can be reduced or absent depending on the extent and length of dry periods.

Comments:

Stream type 3 „Rivers in the Pleistocene sediments of the alpine foothills“ comprises two longitudinal sub types: small rivers (sub type 3.1) and mid-sized rivers (sub type 3.2). Longitudinal, biotic differentiation and local particularities should be considered in stream assessment.

Examples of typical streams

Macroinvertebrates: Hardtbach, Rott, Thalkirchner Ache (Bavaria)
Macrophytes and phyto-benthos: Schlittbach (Bavaria), Obere Argen (Baden-Württemberg)

Comparative literature (selection):