
Type 21:

Lake outflows

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

Ecoregion independent stream type. Ground and terminal moraines of the young moraine landscapes

Picture:



Unterer Schierenseebach (Schleswig-Holstein), Photograph: M. Brunke

Short description of morphology:

Stream reaches below lakes are typical elements of the waterway networks of young moraine landscapes. These are small and mid-sized rivers, which only occur below lake outflows. The stretches are usually quite wide and often connect a series of lakes (interlacustrine stretches). The channel bed usually has gravel with high shares of sand in the main flow line. The channel bed is poorly structured with little coarse woody debris, large shoreline bays often contain pure mud. If eroding banks are developed, the substrates here are usually loam or sand. Based on macroinvertebrate coenoses, lenitic and lotic lake outflows can be differentiated.

The stretches are often relatively open and have a reed margin, in the slowly flowing reaches, floating leaf plants occur.

Abiotic profile:

Size class: 10 - 1.000 km² catchment area

Slope of the valley floor:

Flow category: with slow (lenitic outflows) or quick (lotic outflows) currents; directly below the outflow currents are stronger than further downstream

Channel substrates: dependent on the regional and local geological and pedological situation; tendency to high levels of detritus and fine sediments

Physico-chemical water conditions:

Dependent on the water chemistry and nutrient conditions of the lake; tendency to eutrophic and calcareous situations (except in peat or bog rivers).

Conductivity [µS/cm]: 500 - 600

pH-value: 7,0 - 8,2

Alkalinity [°dH]: 10 - 20

Total hardness [°dH]: 12 - 28

Flow regime & hydrology:

Regulated discharge regime, with little fluctuation

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Characterisation of the macroinvertebrate community:

Functional groups: Because of specific water conditions (nutrient load and temperature regime are regulated by the lake), species adapted to higher temperatures, fluctuating oxygen concentrations and a higher nutrient load are promoted in the outflow fauna. Distinct is the high abundance of filter feeders (large mussels, filter-feeding caddis flies, black flies) and detritus feeders. There is a high share of potamal and litoral species.

Selection of type-specific species: Among the species typical for lake outflows are the caddis flies *Neureclipsis bimaculata*, *Athripsodes cinereus*, *A. bilineatus* and *Anabolia* spec., the mayfly *Centroptilum luteolum* and various mussels like *Anodonta anatina* and *Unio pictorum*. Characteristic for lotic outflows are the water bug *Aphelocheirus aestivalis* and the caddis fly *Hydropsyche angustipennis*. The alder fly *Sialis lutaria* and the caddis flies *Athripsodes aterrimus* and *Molanna angustata* are typical species of lenitic outflows.

Characterisation of macrophyte and pyhtobenthos communities:

Macrophytes are largely absent from narrow, shaded outflows. Otherwise macrophytes are well developed along river margins or over wide expanses. *Nymphaeion albae*, myriophyllid and pondweed communities occur. Often species of the frog-bit and *Lemnetea minoris* communities are present. Amphibious zones are usually colonised by various reed and sedge communities.

Characterisation of the fish fauna:

The fish fauna is highly variable and shows the transitional position between lake and river. Outflows are used differently and locally as a microhabitat by a variety of lake species. A generally valid description of the fish fauna is not possible. In contrast to optically similar streams of other stream types, in lake outflows the high summer temperatures and the presence of plancton as a food source are very important.

Comments:

The stream type is limited to the young moraine landscapes of the northern highlands and alpine foothills. The type cannot be confused with any of the others. Lake outflows can show very different morphological characteristics. The influence of the lake on nutrient and material cycling and thermal regime are significant for the biocoenosis. A description of the many different variants is not feasible.

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

Examples of typical streams

Macroinvertebrates: Lower and Upper Schierenseebach (Schleswig-Holstein)

Comparative literature (selection):