

> Coordinated biological studies in the Upper Rhine river 2011/12

Macroinvertebrates

*Summary of the publication «Koordinierte biologische Untersuchungen im Hochrhein 2011/12»
www.bafu.admin.ch/uz-1522-d*

> Summary

In 2011 and 2012 *Coordinated Biological Surveys* were carried out in the High Rhine for the fifth time since 1990. This report presents the results of the surveys on colonisation of the river bed by small invertebrate organisms, the macroinvertebrates.

Fifth survey campaign in 23 years

Samples were collected on the same nine river cross sections as in the previous campaigns, from the bank and from the river bed by divers. The organisms in the samples were immobilised and then identified in the laboratory. The identification level was based on the current requirements of the International Commission for the Protection of the Rhine (ICPR). It also depended on the size of the organisms collected and the associated detectability of identification characteristics.

Survey methods were retained

A particular focus was the further advance of invasive alien invertebrate species (neozoa). Neozoa keep increasing in number and biomass, and several indigenous species are endangered on some sections. Since 2007 the invasion of neozoa has reached most sections of the Rhine above its confluence with the Aare. The propagation of neozoa in this part of the High Rhine with long near-natural stretches also has its origin in their migration from Lake Constance. Four invasive species were also introduced there between 2003 and 2010 and have increased massively.

Unchanged focus: Impact of neozoa invasion

In the High Rhine below its confluence with the Aare, neozoa already account for over 50 % of individuals and well over 80% of the biomass. Colonisation at the first survey point above the Aare confluence is also close to these levels. Although the >98 % levels already detected in the Basel area have not yet been reached, the high levels of the population densities between Waldshut and Basel is quite alarming. For the first time clear indications have been found that one invasive species, *Dikerogammarus villosus* also known as “killer shrimp”, is able to displace indigenous species in the High Rhine. Nonetheless, it is hoped that typical High Rhine species can survive in morphologically near-natural stretches with habitat diversity.

The neozoa have spread to the upper High Rhine

To clarify the stepping stone potential of these near-natural sites, it is proposed to carry out detailed habitat surveys on near-natural stretches of the High Rhine. A further basis for an evaluation system for recording the biological status of large Swiss rivers could then be created. The environment of the High Rhine has survived river regulation, the construction of 11 hydropower plants, various chemical spillages and thirty years of substance pollution. The coming years will determine the extent to which the High Rhine can resist a biological invasion which will be assisted by the probable further rise in water temperatures in the future.

New problems demand new approaches