



Fish inventory in 35 lakes completed

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Topics: Biodiversity | Ecosystems

In the "Projet Lac" research project, 35 lakes in the Alpine region were systematically examined for their fish populations for the first time: In Switzerland alone, 106 fish species were detected. With almost 20 percent of all known fish species in Europe, Switzerland is one of the hotspots for fish species diversity. The results are now the basis for measures for sustainable fishing and the protection of this still preserved diversity.

Original report



Alexander T., Seehausen O. (2021). Diversity, distribution and community composition of fish in perialpine lakes - "Projet Lac" synthesis report. Eawag: Swiss Federal Institute of Aquatic Science and Technology. 282 pages. ISBN 978-3-906484-76-1

[List of the project and funding partners](#)

Alexander, T.; Seehausen, O. (2021) Diversity, distribution and community composition of fish in perialpine lakes. "Projet Lac" synthesis report, 284 p, [doi:10.55408/eawag:24051](https://doi.org/10.55408/eawag:24051), [Institutional Repository](#)

Between 2010 and 2020, it was time to take stock of the fish in many lakes on the edge of the Alps. As part of the "Projet Lac", a team of scientists from the Swiss Federal Institute of Aquatic Science and Technology (Eawag) and the University of Bern carried out the first comprehensive and standardised surveys of fish populations in 35 large lakes on the edge of the Alps. The work was carried out together with the Bern Museum of Natural History, cantonal agencies and numerous other partners, and with the support of the Federal Office for the Environment (FOEN). A huge amount of data on the species, their distribution and their distribution within the lakes was evaluated. The project has now been completed with the publication of the synthesis report.



Projet Lac uncovered some surprises from the depths of our lakes. This blenny cagnetta from Lake Maggiore has not yet been clearly identified.

New and rediscovered diversity

Of a total of about 550 fish species now known in Europe, 106 were identified in the "Projet Lac". Although Switzerland accounts for only 0.4% of Europe's land area, it is home to almost 20% of the species. This makes it one of the regions in Europe with the highest diversity of fish species in freshwater. 15 (endemic) fish species, most of which are found only here, were identified and documented for the first time. In addition, five species were caught whose occurrence in Switzerland was previously unknown. Two species were found north of the Alps that were previously thought to occur only south of the Alps. And four fish species were rediscovered that were thought to be extinct, for example a char that lives at great depths in Lake Uri.

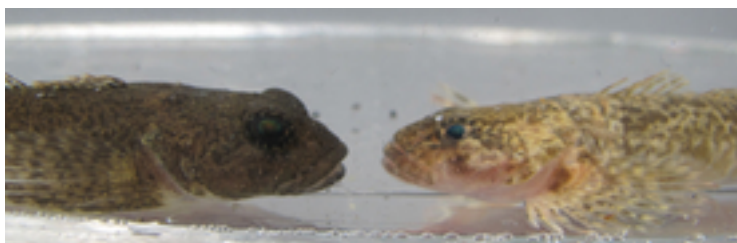


A shoal of minnows (*Phoxinus phoxinus*) in Lake Poschiavo.

From the shallow shore to the greatest depths

Most of the fish species found exclusively in the respective lake (endemic) were detected in open water and in very deep habitats of nutrient-poor lakes, for example the unique whitefish species in Lakes Brienz and Thun or a special bullhead that apparently still lives at depths of

over 200 m in Lake Uri. In many nutrient-rich lakes, on the other hand, practically no fish were caught above 30 m depth - there is a lack of oxygen there in summer. In absolute terms, the researchers found the largest number of species in shallower shore areas and near river mouths, but these are mostly widespread species. For the fish evolution scientist Ole Seehausen, who led the project, this shows how enormously important diverse, near-natural habitats are for fish diversity in addition to high water quality - from the lakeshores to the greatest depths.



Two bullheads (*Cottus gobio*) from Lake Thun. One (left) lives close to the shore, in shallow water; the other (right) was found in Projet Lac still at a depth of over 200 m.

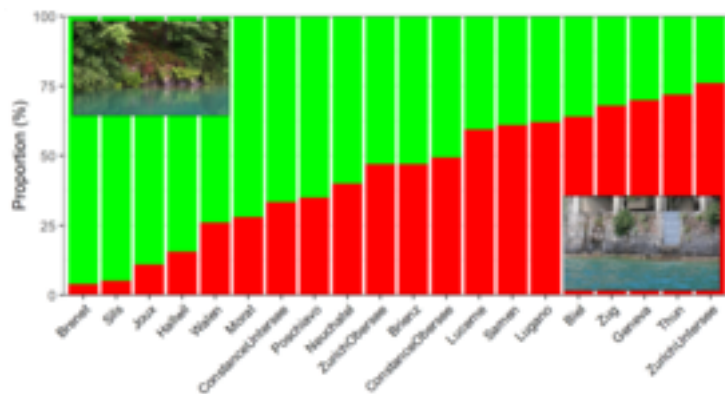
Whitefish and perch dominate

Whereas in the large Alpine lakes such as Lake Lucerne, Lake Brienz or Lake Thun the various whitefish species dominate in terms of number of fish and their biomass, at higher levels of the nutrient phosphorus it is rather the perch that dominate, together with roach, chub and common or southern rudd. An exception is Lake Maggiore, where the agone, a freshwater herring, dominates in open water, and the alpine lakes of Sils and Poschiavo, where non-native Arctic char and native and introduced, also non-native trout predominate.

Advice for fisheries and protection measures

The present synthesis report on the project provides an overview of the state of fish species diversity and fish stocks in all the larger lakes of the western Alpine region. It brings together the results from individual lakes, and since they were collected using the same methodology everywhere, the work provides a basis for comparisons between lakes and for analysing larger contexts. "Above all, recommendations can now be derived for the preservation of the still preserved fish species diversity in the lakes and for sustainable lake fishing," says project leader Ole Seehausen. Also important for continuous monitoring and later comparisons is the scientific reference collection of all fish species from all lakes built up at the Natural History Museum in Bern. It is also accessible to the public in the new permanent exhibition "[Wunderkammer](#)".

Cover picture: Eawag, Ole Seehausen



Proportion of shores in near-natural (green) and in unnatural condition (red). Shoreline habitats with a diverse structure and as natural a habitat as possible are particularly important for aquatic species diversity. (Graphic: Eawag)



None too small for the large inventory: every fish from the systematic fisheries was measured, weighed and photographed. (Photo: Eawag, Stefan Kubli)



Such natural steep banks, here on Lake Brienz, provide habitats and refuges for numerous fish species. In Projet Lac, targeted fishing was also carried out here. (Photo: Eawag, Stefan Kubli)



Researcher Carmela Dönz at work as part of the "Projet Lac".

Related Links

Project page Projet Lac

"Wunderkammer" / Cabinet of Curiosities, Natural History Museum Bern

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<https://www.eawag.ch/en/info/portal/news/news-archive/archive-detail/fish-inventory-in-35-lakes-completed>