

## Fish hybridise themselves extinct in Alpine lakes

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When the going gets tough, species start merging. Lake-dwelling fish species that once lived separately began interbreeding when pollution forced them together. Ultimately most of the lakes' remarkable diversity has been lost – and the same could be happening in threatened habitats around the world.

After the last ice age, whitefish (*Coregonus*) in Europe's Alpine lakes split into several species, each with a specialised appearance and lifestyle. They first separated because they spawned in different places, some favouring the lake bottom and others the surface layers.

That all changed when the lakes became polluted in the mid-20th century, says [Ole Seehausen](#) of Eawag: Swiss Federal Institute of Aquatic Science and Technology in Kastanienbaum and the University of Bern, Switzerland. Fertiliser ran off farmland into the lakes, leaving them over-rich in nutrients – a phenomenon called [eutrophication](#). This caused algal blooms in the lakes, which in turn caused oxygen levels to crash deep in the lakes.

Seehausen and colleagues now think that this oxygen crash forced species to merge. They studied the whitefish populations in 17 lakes, each of which was also studied in the 1920s, before the eutrophication began. Back then, the deeper lakes had more species.

### Fishy goings-on

The number of species in the lakes has fallen 38 per cent since the 1920s, and the remaining species have become more similar in shape. What's more, lakes that have experienced more eutrophication have fewer species. Seehausen found that the remaining species sometimes carry genetic markers previously found only in extinct species, suggesting that those species have hybridised themselves out of existence.

The European lakes are [far from the only example](#) of the dangers of hybridisation. Seehausen has previously shown that eutrophication of Lake Victoria in east Africa caused a crash in the diversity of cichlid fish. The different species used to be distinguished by bright colours, but these became useless in the murky water, and [many hybridised](#). Some iconic North American animals, such as wolves and coyotes, are also [intermixing as they are forced together](#).

Seehausen says hybridisation is dangerous because it can go unnoticed for a long time, and species can vanish before action can be taken to save them. Most assessments of endangered species focus on population size, but if species are interbreeding the population could hold steady even as species diversity collapses.

### Who's at risk?

Only species that split relatively recently can hybridise, because evolution ultimately makes them too dissimilar to mate. However, some fish species can still interbreed 20 million years after splitting, Seehausen says.

We don't know how many species are at risk. Based solely on how evolutionarily different they are, 88 per cent of fish species could still hybridise with at least one other, as could 55 per cent of mammals ([Molecular Ecology](#), DOI: [10.1111/j.1365-294X.2007.03529.x](#)).

Admittedly, those figures overestimate the real risk, because only neighbouring species can breed. "Things that live on different continents don't hybridise," Seehausen points out. He says ecosystems where many species have recently diversified, such as large lakes and rivers, are most at risk.

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