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Causes of ecological degradation in waterways



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Human activities can have a multitude of different effects on rivers and streams, and it is difficult to identify those that have the biggest impact on aquatic populations. A newly developed method for assessing ecological degradation in waterways helps deal with this problem and could provide crucial information for water managers charged with tackling the root causes of degradation.

In the EU, the Water Framework Directive aims to achieve Good Ecological Status of all European [water](#) bodies. Part of assessing ecological status is monitoring the presence and diversity of aquatic species. However, species or diversity loss might have more than one possible cause.

This study suggests that commonly used measurements for assessing ecological degradation cannot distinguish between the effects of [chemical](#) pollution, for example, due to run-off or spray drift of pesticides from arable lands, and the effects of habitat degradation caused by changes in the water course, current velocity, riverbed sediment composition or other factors. Habitat degradation can be caused by maintenance activities, such as dredging or removal of weeds and trees.

To better assess the individual contributions that different environmental stressors make to ecological degradation, the authors of the study developed metrics based on a concept called Species at Risk (SPEAR). The SPEAR approach aims to produce data about the level of risk posed by specific stressors, which could be pesticides (SPEAR_{pesticides}) or habitat degradation (SPEAR_{habitat}). The researchers focused on measuring the risks faced by a group of animals collectively known as macroinvertebrates – animals without a backbone, such as larval insects, crayfish, clams and snails.

They tested the SPEAR approach by collecting water samples and analysing populations of different macroinvertebrates at 100 streams in the central plains of Sweden. Compared to other commonly used metrics, SPEAR_{habitat} acted as a more specific indicator of habitat changes causing degradation. By contrast, other approaches were only able to provide a more general picture of ecological degradation, incorporating the effects of pesticides. The results given by the two SPEAR metrics were quite different from each other, reinforcing the idea that the approach is able to separate out the effects of chemicals, including pesticides, from those of habitat changes.

The researchers claim that their two new SPEAR metrics will help water managers to distinguish the effects of habitat degradation and pesticides, which are often stressors that occur – or are assumed to occur – simultaneously within the same environment. According to the researchers, there may often be cases where one stressor is much more important and could be tackled by water managers more readily if an ecological assessment showed this to be the case. Their study provides a way to assess the effects of both stressors separately, but using the same approach.

