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Source: Van Ael, E., Belpaire, C., Breine, J., *et al.* (2013). Are persistent organic pollutants and metals in eel muscle predictive for the ecological water quality? *Environmental Pollution*, *186C*, 165–171. DOI:10.1016/j.envpol.2013.12.006.

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***Further information**: It should be noted that the CIS Technical Guidance Document No 25 on Chemical Monitoring of Sediment and Biota under the WFD states on page 40 that "Because of the protected status eels should only be used for existing trend monitoring (to continue old monitoring programmes) and for this species the principle of conservation has to be respected." It should also be noted that the setting of EQS under the WFD needs to take account of risks to and via the aquatic environment, and that human health rather than aquatic wildlife might be the most critical determinant of the EQS.*

1.http://www.ncbi.nlm.nih.gov/pubmed/21374055

European Commission

Science for Environment Policy

Eels can be used to help monitor water's ecological quality

The European eel could act as an indicator of the ecological quality of aquatic environments, according to a new study. The research suggests that new pollution limits could be developed based on levels of pollutants in eel muscle, with the aim of improving the ecological quality of water under the Water Framework Directive (WFD).

The EU's WFD aims to protect Europe's water resources, by ensuring good ecological status in both freshwater and coastal ecosystems. It sets Environmental Quality Standards (EQSs) in water, sediments or wildlife for a number of pollutants, and the list of these has recently been updated.

Throughout Europe, the ecological quality of water bodies is assessed using the Ecological Quality Ratio (EQR). The EQR can be affected by a wide range of factors, including human pressures, such as climate change and pollution.

Pollutants in these ecosystems are typically monitored through tests on water samples. However, they are are also increasingly being measured in aquatic wildlife. This approach offers the possibility of quantifying certain pollutants at levels below critical limits (EQS) even though reliable techniques for measuring levels in water are lacking. It also better reflects the 'bioavailability' of a pollutant, i.e. the amount of a pollutant which may be taken up by wildlife.

Previous research has shown that the European eel *(Anguilla anguilla)* is, for most of its freshwater stage, a good indicator of a water body's chemical status. Contaminants found in their tissues provide an accurate reflection of the contaminants within their habitat. Information on bioaccumulation – the build-up of chemicals in plants and animals – in eels from a number of European countries has been collected in an eel monitoring database[1].

The researchers made use of these data to investigate how pollutant concentrations in the European eel can affect EQR scores. They used data from water bodies in Flanders, Belgium, and considered a number of pollutants, including 10 different polychlorinated biphenyl compounds (PCBs), eight pesticides and nine metals.

The database showed that a wide range of concentrations for each pollutant were found in eel muscle. The concentrations were compared with ecological quality as represented by the EQR score. From this comparison, threshold concentrations for each pollutant were determined, above which ecological quality was never rated good. For example, when lead levels were above 65 nanograms per gram of eel muscle, water bodies were never of good ecological quality.

For most pollutants, EQR scores were better when bioaccumulated concentrations were lower. In some instances, however, EQR values were poor even when pollutant levels were low. This suggests that other factors were also influencing EQR scores. Additionally, the researchers note that levels of pollutants, and therefore threshold concentrations, vary depending on the type of tissue analysed. For example, some pollutants accumulate more in organs than in muscle.

Overall, the study suggests that monitoring accumulation in eels could help refine WFD EQS for a number of waterborne pollutants to help protect aquatic ecosystems. The results also highlight the particular relevance of higher chlorinated PCBs to EQR scores.