

**T**he European Nitrates Directive aims to protect water bodies against nitrate pollution that comes from agricultural sources. The member states of the European Union must identify water bodies which are, or could become, polluted by nitrates and designate all land draining to those water bodies, and that contribute to the pollution, as Nitrate Vulnerable Zones (NVZs). The directive sets out the broad criteria to be used and reviews are required every four years.

In England and Wales, the Environment Agency is responsible for carrying out the reviews and the respective governments for England and Wales determine which areas of land to designate. The area of land currently designated is approximately 60 per cent of England and 2 per cent of Wales. The area of land designated has increased after each review.

After the last NVZ review in 2008, ministers asked for a full and transparent review of the NVZ designation methodology. This followed challenges from the European Commission and the National Farmers' Union (NFU). Both parties challenged the designation process, but from different perspectives. The Commission was concerned about reductions in the area of land designated following an appeals process. The NFU was concerned that designations should be made only where strictly necessary and it challenged some of the evidence used at that time.

WRc was commissioned by the Environment Agency to carry out an independent review and to propose a revised methodology that should try to satisfy the concerns of all parties. Any proposed changes will need approval by the Department for Environment, Food and Rural Affairs (Defra) and the Welsh Government before they are applied.

The methodology uses a "weight of evidence" approach. It combines observed data from monitoring with evidence on agricultural land use from a national-scale nitrate leaching model.

The proposed methodology builds on this approach. First, the waters for analysis should be identified and water quality monitoring data statistically analysed to identify failing waters. This evidence should be combined with land use modelling of nitrate pollution in surface and groundwaters to assess the strength of evidence for nitrate pollution in each water body.

A further test was then developed to identify if surface water monitoring points were unduly influenced by point source discharges. In many



parts of England and Wales, substantial population concentrations result in the point source discharge of sewage effluent into surface waters. A set of exclusion criteria was developed to exclude any monitoring point where nitrate pollution has an unacceptably large non-agricultural contribution.

The next stage was to identify the land draining to each polluted surface water body or delineate the area of polluted groundwaters. For surface waters, this was achieved by testing whether the failing monitoring point was on the main stem of the river or on a tributary stream that did not extend into upstream water bodies, and whether or not the model prediction was based on land use in the water body or on land use in the upstream catchment. For groundwater, a number of hydrogeological boundaries were applied, notably: solid and drift geology; surface water outflow features (such as rivers and lakes); urban areas; and groundwater flow lines.

The final stage in the process involved running a series of local quality assurance workshops in each Environment Agency region to allow local agency staff to comment on the results. The workshops focused on getting the best information for catchments where there was less certainty overall in the results. The workshops were open to invited observers from external stakeholder groups, such as the National Farmers' Union, who attended all of such meetings.

A consultation on the implementation of the Nitrates Directive in England is expected later this year by Defra using indicative boundaries. The full outcome of the designation process will be included as recommendations from the Environment Agency to Defra next spring. ●

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Rob Moore details the work being done to improve how Nitrate Vulnerable Zones are designated

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