

Poor outlook for water quality in Germany

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Photo of the mouth of the river Saale into the Elbe. The study analyzed data from the four largest rivers in northern Germany - the Elbe, Weser, Aller and Ems - were analyzed over ten years. Credit: André Künzelmann, UFZ

The good chemical and ecological status of water bodies as defined by the EU Water Framework Directive is unlikely to be attained in Germany by 2015. This is the conclusion of a study in which data from the four largest rivers in northern Germany - the Elbe, Weser, Aller and Ems - were analysed over ten years. The study was carried out by the University of Koblenz-Landau, the Helmholtz Centre for Environmental Research - UFZ and Freiberg University of Mining and Technology, and published in the international scientific journal *Environmental Science & Technology*.

"This study is the biggest of its kind anywhere in the world," stated Ralf B. Schäfer, an assistant professor at the Institute for Environmental



Sciences at the University of Koblenz-Landau. River monitoring data spanning from 1994 until 2004 were analysed. The study was only recently made possible by a new technique enabling the prediction of the toxicity of previously untested substances. Explaining the cut-off date, Prof Schäfer added that data after 2004 weren't available to the extent required owing to the closure of Lower Saxony's Department of Environment. The occurence and possible toxic effects of 331 organic pollutants were examined in order to evaluate the quality of the rivers. A total of 257 of these compounds were detected in the rivers - sometimes in concentrations likely to have acute toxic effects on river organisms. Yet despite being potentially harmful to aquatic organisms, many of these compounds are not among the priority substances defined by the European Union and used to assess the chemical status of surface water under the Water Framework Directive. In fact just two of the 33 priority substances were found to exceed the recommended limits. Banned pesticides were also frequently detected in the river water raising the question of origin.

Even though the detection frequency for most compounds decreased significantly over the ten years, still the pollution caused by pesticides and industrial chemicals was found to be so high that flora and fauna will almost certainly suffer toxic impacts. "These results cast doubt on the assumption that rivers aren't significantly impaired because the chemicals in them are diluted," said Peter von der Ohe from the Helmholtz Centre for Environmental Research. The scientists agree that if this pollution in the major rivers remains unchanged, it will be difficult to meet the ecological objectives of the EU's Water Framework Directive.

To assess the concentrations of chemicals in river water, the scientists compared data from official monitoring with laboratory results from standard tests involving water fleas, fish and algae. "In some cases we found worrying concentrations of substances at levels which under



laboratory conditions would kill 50 per cent of water fleas and could lead to the significant decline of the algae population," explained Prof Schäfer. Dr von der Ohe pointed out that the monitoring data were collected using point water grab sampling, although pesticides occur episodically, meaning that pollution levels are likely to be even higher at times. He added that official river monitoring is currently only carried out at a few times a year and in order to cut costs the number of measured chemicals has been reduced focusing on the 33 priority substances - hardly any of which were found to play a role in water pollution in the <u>rivers</u> investigated. Instead, the greatest risks were caused by other substances, according to the researchers. They advocate that future water monitoring should pay more attention to these substances and identify their exact sources. In addition to point sampling, integrated and event-driven sampling methods should be used.

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