

Supporting the Water Framework Directive

Water pollution has a significant negative impact on human health and the environment. Increasing demand from citizens and environmental organisations for cleaner rivers and lakes, groundwater and coastal beaches has led the European Commission to make water protection one of its priorities. The European Water Framework Directive (WFD) was established to protect and improve water quality and prevent further deterioration through legal limits on a wide range of known pollutants.

Europe's National Measurement Institutes working together

The European Metrology Research Programme (EMRP) brings together National Measurement Institutes in 23 countries to address key measurement challenges at a European level. It supports collaborative research to ensure that measurement science meets the future needs of industry and wider society.

Challenge

The Water Framework Directive specifies a list of 33 priority water pollutants which present a significant risk to or via the aquatic environment. The Environmental Quality Standards (EQS) Directive specifies maximum allowable concentrations of these pollutants in surface waters such as rivers, lakes and coastal waters. EU member states are required to implement monitoring programs to ensure their water bodies comply with the EQS.

Some of the priority pollutants identified by the Water Framework Directive are toxic, persistent and liable to accumulate within the food chain and can endanger a wide range of living organisms - the permitted levels specified by the EQS for such pollutants are consequently very low. As a result, implementation of the European Water Framework Directive requires the ability to measure and monitor a range of pollutants at very low concentration levels.

However, a review by the CEN Technical Committee on Water Analysis identified a lack of appropriate standardised measurement methods for five important pollutants and pollutant groups identified in the WFD as 'priority hazardous substances'. In 2008, the European Commission tasked CEN to develop and improve standards in support of the WFD.

Accurate measurement of priority pollutants at the concentrations specified by the EQS requires the development of primary analytical methods and traceable reference materials at National Measurement Institutes and Designated Institutes, as well as practical methods and well-characterised materials for use in test laboratories on a routine basis. These new methods also need to be valid for 'whole water' - real-world water samples, where pollutants are not only found in solution but also bound to other materials such as colloids and suspended particulate matter.

Solution

The EMRP project *Traceable measurements for monitoring critical pollutants under the European Water Framework Directive* focused on three pollutants and pollutant groups (Tributyltin (TBT), Polybrominated Diphenylether (PBDE) and Polycyclic Aromatic Hydrocarbons (PAH)), bringing together experts from 11 European metrology institutes to develop primary analysis methods and the first ever reference materials for these substances in whole water. In parallel, the CEN community developed practical methods for test laboratories.

Impact

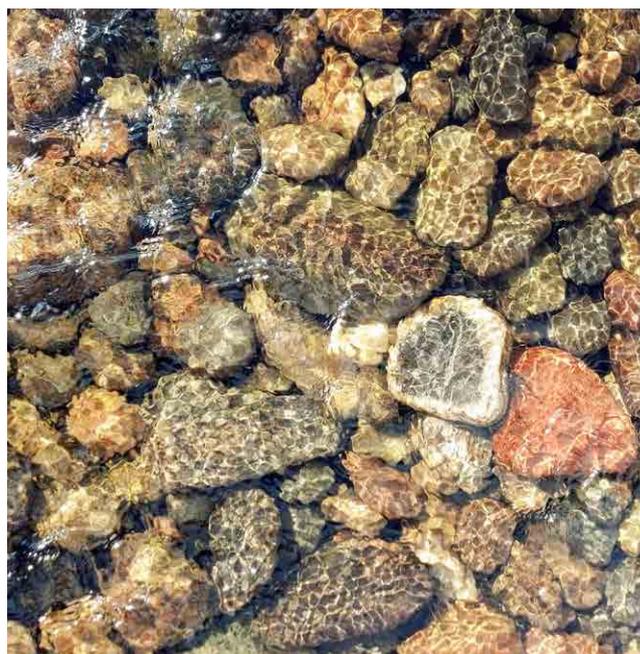
The project team provided well-characterised reference materials to enable CEN to undertake a validation intercomparison of test methods in support of the Water Framework Directive and provided method development advice to a working group of the CEN Technical Committee on Water Analysis. This work contributed to three draft standards developed by CEN for the analysis of the pollutants TBT, PBDE and PAH. These draft standards were published in 2015.

The project team also worked closely with end-users and quality assurance communities to ensure best practice and traceability to national standards will be adopted widely. An intercomparison of test laboratories based on the new reference materials was undertaken to allow them to assess their in-house methods against the requirements of the European Directives, and traceable reference values were provided for a Proficiency Testing scheme for field laboratories in France.

The adoption of the CEN standards and traceable measurements will improve pollutant testing processes across Europe and help keep priority hazardous substances in waters at a safe level. This will contribute to achieving the objective of the Water Framework Directive - high quality of surface, ground and coastal water in the EU and a reduction in the effects of pollution on the environment and human health.

Metrology in support of the Water Framework Directive

The EMRP project *Traceable measurements for monitoring critical pollutants under the European Water Framework Directive* was undertaken to support the implementation of the WFD and related directives, through improvements to the quality and comparability of data used to monitor the ecological status of Europe's inland water sources. The project developed primary reference methods for selected water pollutants, and produced new concepts for whole water reference materials and test materials that can meet the requirements of the legislation. The improvements will ensure long-term reliability and global comparability of water monitoring data obtained under the WFD and support better decision-making in the field of water management.



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