science summary

Environment Agency

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SCHO0508BOEY-E-P

Predicting bathing water quality

Science Summary SC060029

The Environment Agency has developed a way to forecast bathing water quality, to help make sure that the public are protected from any disease-causing microbes that could be in the water.

A new Bathing Waters Directive was adopted by the European community in 2006, to be fully implemented by 2015. The new directive aims to protect public health, improve management practices at bathing waters, and provide more information to the public so they can choose when and where to bathe.

The new directive allows the option of putting in place methods of predicting bathing water quality and to advise the public against bathing during short-term pollution events. For sites where prediction procedures are in place and the public are advised against bathing, the new directive allows for up to 15% of samples to be discounted when determining overall bathing water classification, since bathers are unlikely to be bathing (if they follow the advice).

For warnings of poor water quality to be issued in time, forecasts need to be generated one to two days in advance.

Forecasts will be made at each site on a daily basis during the five months of the bathing season, which means the predictive model selected had to be simple and quick to run. Decision trees were found to have significant advantages over other model types and were adopted as part of the solution.

The forecast models are driven by commonly available environmental data, including rainfall, wind, tidal state and sunshine hours. Past performance data are then used to build up the models, which can be easily updated to reflect evolutionary changes in inputs or infrastructure.

To ease the adoption of prediction and forecasting into routine operations, many of the processes used (including data capture and verification and model building) have been automated.

The software used is commercially available and will run on a standard PC. The task of interfacing the new systems to Environment Agency networks has been explored and recommendations made.

Adoption of these modelling techniques will:

- Allow the UK to implement discounting provisions in bathing water classification procedures.
- Allow beach managers to provide timely warnings to the public whenever sub-optimal microbial water quality is expected and hence protect bathers from exposure to faecal pathogens.
- Prove a valuable tool in predicting the microbial quality of water.

This summary relates to information from Science Project SC060029, reported in detail in the following output(s):

Science Report: SC060029
Title: Developing and testing of predictive models to allow sample discounting

Project manager: Andrew Wither, Science Department

This project was funded by the Environment Agency's Science Department, which provides scientific knowledge, tools and techniques to enable us to protect and manage the environment as effectively as possible.

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