science summary

Environment Agency

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Making Information Available for Integrated Catchment Management

Science Summary SC060035/SS

A new report published by the Environment Agency looks at ways to improve data recording and sharing within the organisation, to help devise measures to protect and improve the quality of water in river basins.

Diffuse pollution from farmland is a major cause of deteriorating water quality, especially in the chalk streams of Southern England. Long-term trend analysis of nitrate in surface and groundwater has shown substantial increases since the 1940s. Phosphate levels have trebled since 1955 on the Hampshire Avon, mainly released from sewage treatment works and agriculture. Farm soil erosion is leading to greater loads of sediment entering rivers, which can have adverse impacts on invertebrate and fish communities.

The Water Framework Directive (WFD) requires an integrated approach to catchment management so that ecology, water quality and water quantity are considered together. Management actions that help us achieve the environmental objectives of the WFD are called measures and each river basin plan should include a programme of measures (PoMs).

This is one of several projects aiming to identify what approaches are useful for developing programmes of measures (PoMs) and to deal with the obstacles before the second cycle of the Water Framework Directive.

The aims of this project were to:

- Gather data and build a pilot Geographic Information System (GIS) and, working closely with Environment Agency Area staff, test its usefulness for the management of land use change and diffuse pollution in the Frome-Piddle catchment.
- Begin investigating the usefulness of spatial and time variant models for estimating the effects of land use change on nutrient concentrations in the Frome-Piddle.

The recommendations from this project will shape subsequent work.

The Environment Agency holds a large amount of data collected from its monitoring network, from third parties and derived by analysis. These data represent an enormous investment of time and money amounting to millions of pounds per year. This report concludes that it is our responsibility to extract the maximum benefit from this investment and makes the following recommendations.

Use of GIS

The GIS developed on this project brought together useful national and local datasets from several sectors and functions (fisheries, conservation, agriculture, water management, flood risk and so on).

Sharing data between local Environment Agency teams in river basin planning

In 2007, when the bulk of the data on this project was collected, nearly two-thirds of the 150 GIS layers collected were not accessible to staff working in the Frome-Piddle. Area teams working on PoMs for river basin planning need to know what data other teams hold and how to access it.

On this project, it cost about £25,000 to set up access to data related to the management of diffuse rural pollutants. If this is typical, there will be considerable costs to make the data that we already hold, available to the local teams across the country who are implementing the Water Framework Directive. And if the data is not made available, this is likely to lead to delays in decision-making.

The need to make data accessible is starting to be met for national and regional datasets, for example via the Environment Agency's central data store, planned regional data store, Easimap, and the objectives and measures database, which houses the most recent WFD data. But for local datasets and GIS layers, the need remains. The report recommends that teams such as area environment planning teams and the national data and information team find a way of satisfying this need

for a local repository of shared data. This could be done by expanding the Environment Agency's existing data management procedures. Three options are suggested in this report.

Metadata increases the value of our data

Good metadata (indicating the source of the dataset and other basic information) is essential to derive the maximum benefit from the data held. Few of the 150 datasets collected in 2007 had any metadata associated with them. This is likely to result in duplication of effort as several users collect the same metadata. Conversely, if metadata is recorded at the same time as collection of the original data, the effort is minimal compared to creating it later. The report recommends that metadata be collected routinely using standard operating procedures and that the data management structure described in the Environment Agency's guidance be put in place at all levels for river basin planning.

Intellectual property rights and licensing issues are obstacles to maximising our data investment

Some datasets are inaccessible because of licensing and intellectual property right (IPR) issues. Major changes in data protection legislation and the Environment Agency's data acquisition procedures are needed to resolve these issues but, to maximise the benefits from our data investment and ensure we can share data with our partners in the future, we should be prepared to tackle them.

Local Issues Tool

A GIS tool was developed in 2007 at the request of Area staff in the Frome-Piddle as a trial method for recording, mapping and making accessible local information that would otherwise not be recorded digitally, and might be lost when local staff moved on. Initial feedback has been very promising and we will continue to trial the tool, and provide feedback to the Data and Information Manager and the GIS Business Change Manager.

Access to GIS and modelling results

The majority of local users of GIS surveyed in this report said they did not want to spend time learning how to customise ArcGIS or use complicated tools. Users wanted easy access to GIS layers, for example via the Environment Agency's Easimap system, which could be expanded to include more local datasets. In addition, they wanted access to expertise for GIS analysis and modelling results related to their local issues. We recommend that Area managers consider whether their staff would benefit from access to the Environment Agency's own GIS and modelling experts.

Initial trialling of modelling tools

This study carried out some initial trialling of models and the report recommends which should be investigated further in the next phase of the work.

This summary relates to information from Science Project SC060035, reported in detail in the following output(s):

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