science summary

Environment Agency

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Abandoned mines and the water environment

Science Summary SC030136/SS41

A new report by the Environment Agency, Scottish Environment Protection Agency (SEPA) and the Coal Authority outlines the current situation with tackling pollution from abandoned mines. Though we have made a lot of progress, many of these sites continue to release heavy metals into our rivers and aquifers.

Abandoned mines are one of the biggest pollution threats in Britain. Our legacy of mining for coal, metal ores and other minerals dates back to the Bronze Age. Many thousands of mines have been abandoned and now discharge minewater containing heavy metals and other pollutants into our rivers and aquifers. Other more recently closed mines are still filling up with groundwater and will start discharging in the future.

Nine percent of rivers in England and Wales, and two percent in Scotland are at risk of failing to meet their Water Framework Directive targets of good chemical and ecological status because of abandoned mines. These rivers carry some of the biggest discharges of metals such as cadmium, iron, copper and zinc to the seas around Britain. Seventy-two per cent of failures to achieve the cadmium quality standard in freshwater are in mined areas. In some areas, important drinking water supply aquifers are polluted or threatened by plumes of sulphate and chloride.

The legal position in the UK is such that no-one can be held liable for the pollution from the majority of mines. It is only since 1999 that the operator of a mine has had any obligation to deal with the consequences of abandonment.

The Environment Agency, SEPA and Coal Authority are leading efforts to deal with the problem. Between us we have made significant advances, mostly dealing with the problem from coal mines. We have built 54 minewater treatment plants, which prevent 2,500 tonnes of iron and other metals from entering our rivers every year, protecting over 200 km of rivers and drinking water aquifers. Most of these plants are owned and operated by the Coal Authority, which works with the environment agencies to prioritise the worst discharges from closed deep coal mines and identify future problems.

Priority non-coal mines are metal mines in the ore fields of Wales, the South West and northern England which continue to cause pollution despite being closed for over a hundred years. No single body has the responsibility for dealing with them and we do not yet have a national strategy to tackle them.

The Metal Mines Strategy for Wales has identified the most polluting sites in Wales and is working on sustainable treatment methods for them. In Cornwall, we have built the largest minewater treatment plant in the UK to deal with pollution from the Wheal Jane tin mine. This plant prevents 670 tonnes of iron and 150 tonnes of zinc from entering the Restronguet Creek each year.

Our approach to identifying and prioritising non-coal mine sites for treatment across England and Wales is set out in a joint project between the Department for Environment, Food and Rural Affairs (Defra) and the Environment Agency. This project, along with a similar assessment carried out in Scotland by SEPA, will identify the water bodies most affected by abandoned non-coal mines and the sites within them which are the source of pollution. The results of these projects will help to develop a national strategy.

Sustainable technology for treating coal minewater discharges is well developed, but cannot be used for most metal mine discharges. Some advances, including pilot-scale treatment plants, have been made but we need to develop passive treatment methods which do not rely on costly technology or substantial raw materials and power.

Abandoned metal mines are not only a source of pollution, they are a part of our national heritage and an important reserve of biodiversity. Many sites are designated as Sites of Special Scientific Interest or Scheduled Ancient Monuments. The tin and copper mining areas of Cornwall and West Devon have been declared a UNESCO World Heritage Site. This means

that some treatment methods cannot be employed; however, a collaborative approach may help to deal with the pollution threat.

The report outlines further work needed in many areas, including:

- sustainable treatment methods for metal mines;
- a national strategy for cleaning up pollution from abandoned non-coal mines;
- technology to recover energy and resources from minewater and treatment residues;
- monitoring of minewater flow and quality at the catchment scale;
- understanding the impacts of past discharges on sediment quality and ecosystem health;
- developing remedial methods which are sensitive to industrial heritage and other protected sites.

This summary relates to information from Science Project SC030136, reported in detail in the following output:

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