

Evidence

Prioritisation of abandoned non-coal mine impacts on the environment Project Summary SC030136/S14

A new report commissioned by Defra, the Welsh Assembly Government and the Environment Agency evaluates the impacts of abandoned non-coal mines on the environment of England and Wales, and summarises the information collected in a series of 13 reports. Although most of these mines were abandoned many decades ago they are still causing pollution, principally since the waters draining from the mines often contain high concentrations of metals, particularly cadmium, zinc, lead, copper and iron. The report prioritises the rivers and streams where these mines are having the highest impact and so pose the greatest risk of failing to meet the aims of the Water Framework Directive. It identifies the water bodies (river stretches) that should be the focus of attention in River Basin Management Plans (RBMPs) due to mining pollution. The report estimates that it would cost roughly £370 million over the next decade to deal with water-related pollution from these sites.

River stretches were assessed using impacts on water quality, and impacts on ecology, fish, groundwater and other receptors, and ranked them as 'impacted' or 'probably impacted'. The report focused on the impacts of polluted water discharges from abandoned non-coal mines to surface waters. Additional information collated in a database indicated other issues at these sites such as safety, risk of sudden outbreak of water, and local concerns. Taken together, this provides a valuable resource for long-term planning of the clean-up of such sites.

The reports' conclusions and recommendations for the future management of abandoned non-coal mines are outlined below.

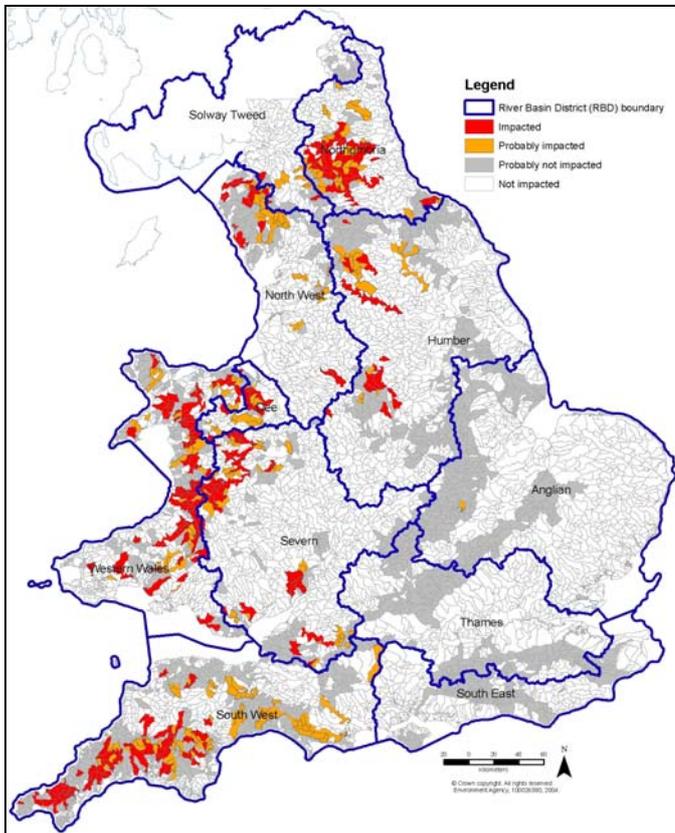
A clear understanding of the sources of pollution is essential to carry out an effective remediation (clean-up) programme. In some instances a single point source of non-coal mine water is causing the pollution, but at many sites there are multiple sources. Diffuse sources of mine water pollution are a major contributor to overall metal flux (the amount of metal released) in abandoned non-coal mine catchments. In very few water bodies do we have a clear understanding of how individual sources of pollution from abandoned non-coal mines contribute to the overall metal flux in that water body. More detailed studies of affected water bodies, including monitoring of water quality and flow rate, are therefore recommended. If remedial measures are implemented without understanding the dynamics of mining pollution in specific catchments, we may not achieve the environmental goals set out in RBMPs despite significant expenditure on engineering works and treatment systems.

Additional monitoring programmes will be necessary at most water bodies in which non-coal mine drainage is an issue. This is because data collection programmes to date have either not been systematic enough to characterise metal fluxes in these waters, or have not been targeted well enough to design a treatment system.

Passive mine water treatment that has successfully cleaned up coal mine drainage (principally by removing iron) will not work to the same degree for metals in non-coal mine drainage (such as zinc and cadmium).

The scale of environmental problems and risks associated with abandoned non-coal mines are summarised in the following table and figure:

Environmental problem	Number
Water bodies <i>Impacted</i> by non-coal mine water pollution	226
Water bodies <i>Probably Impacted</i> by non-coal mine water pollution	243
Confirmed mine water discharges	257
Suspected mine water discharges	81
Documented evidence of discharge outbreak risk	19
Mine sites at which there is evidence of diffuse non-coal mine water pollution	112
Definite concerns of airborne pollution, stability, safety, and / or public & animal health	425
Suspected concerns of airborne pollution, stability, safety, and / or public & animal health	275



Finding the best passive treatment options for non-coal mine drainage to meet environmental quality standards (EQS), within a practical land area, is the subject of ongoing research. Existing active treatment technologies could clean up non-coal mine drainage to the levels required to meet EQSs, but would be costly, resource intensive and may be unacceptable at the many sites in upland rural areas.

Irrespective of the type of technology, management of metal-rich sludge from the treatment of non-coal mine drainage remains a problem. Recovery of metals during treatment for recycling is desirable but at the moment it is not economically viable in England and Wales, even from active treatment systems. Re-use options may be available for metal-rich media recovered from passive mine water treatment systems, but these need further investigation.

Other problems associated with former non-coal mining districts include ground stability, safety, airborne pollution, and other human and animal health risks. The level of information on these issues is varied, so a systematic national approach to assess such problems is recommended. As well as identifying the most important problems to address, this will directly serve the requirements of the Mining Waste Directive.

Problems at abandoned non-coal mines are many and complex. A timetable of environmental management activities to tackle the problems is therefore proposed. It is likely to take at least five years to complete an individual remediation scheme, from starting a scoping study to installing a full-scale treatment system.

Conducting thorough investigations to understand clearly the environmental problems in abandoned non-coal mining districts can be costly. This cost is minor, however, compared with that of designing, installing and operating systems to treat such pollution. To deal with all

the water-related environmental problems identified in this project would cost an estimated £370 million over an initial 10 year period, followed by continuing operating costs. Of this cost, around 90 per cent would cover mine water treatment, and 10 per cent the mitigation of outbreak risk and diffuse pollution problems. Treatment systems are likely to be required to operate indefinitely.

This study is reported in detail in the following outputs:

Report: SC030136/R14

Title: Prioritisation of abandoned non-coal mine impacts on the environment

1. *A methodology for identification and prioritisation of abandoned non-coal mines in England and Wales*
2. *Prioritisation of abandoned non-coal mine impacts on the environment: The national picture*
- 3-11. *Prioritisation of abandoned non-coal mine impacts on the environment in the Dee, Northumbria, South West, Western Wales, Humber, North West, Severn, Solway-Tweed, Anglian, Thames and South East River Basin Districts*
12. *Future management of abandoned non-coal mine water discharges*
13. *Hazards and risk management at abandoned non-coal mine sites*

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