



# Prioritisation of abandoned non-coal mine impacts on the environment

**SC030136/R5 The South West River Basin District**

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The Environment Agency's National Customer Contact Centre by emailing:  
[enquiries@environment-agency.gov.uk](mailto:enquiries@environment-agency.gov.uk)  
or by telephoning 08708 506506.

**Main Authors:**

Mayes, W.M.,<sup>1</sup> and Jarvis, A.P.<sup>1</sup>

**Contributing Authors:**

Coulon, P.,<sup>2</sup> Fox, A.,<sup>2</sup> Hill, S.,<sup>3</sup> Johnston, D.,<sup>4</sup> Potter, H.A.B.,<sup>4</sup> Thorn, P.,<sup>2</sup> Watson, I.A.<sup>3</sup>

<sup>1</sup>Newcastle University, <sup>2</sup>Atkins Ltd, <sup>3</sup>Coal Authority,  
<sup>4</sup>Environment Agency

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**Research Contractor:**

Atkins Ltd., Coal Authority, Newcastle University.  
Contact: Dr. Adam Jarvis, Newcastle University  
Email: [adam.jarvis@ncl.ac.uk](mailto:adam.jarvis@ncl.ac.uk)

**Environment Agency's Project Manager:**

Dr Hugh Potter, Operations Directorate

**Collaborators:**

Department for Environment, Food and Rural Affairs  
Welsh Government  
Department for Communities and Local Government

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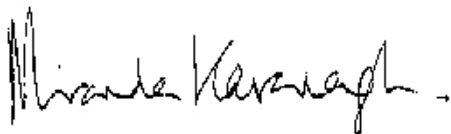
# Evidence at the Environment Agency

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Miranda Kavanagh  
**Director of Evidence**

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# 1. Introduction

The *Prioritisation of abandoned non-coal mine impacts on the environment* project has generated the most definitive evaluation to date of the impacts on the water environment from abandoned non-coal mines across England and Wales. For the first time, an objective assessment has been carried out to prioritise the rivers in England and Wales where pollution from these mines has the highest impact, and where there is the greatest risk that water bodies (river stretches) will fail to meet the objectives of the Water Framework Directive (European Community, 2000) due to abandoned non-coal mines. The specific water bodies which should be the focus of immediate attention in River Basin Management Plans (RBMPs) have been identified, and the work needed to address mining pollution through both research into passive treatment technologies and catchment monitoring investigations is outlined.

This is one of 13 reports that detail the final results of the implementation of the methodology across England and Wales. This particular report presents the finalisation of the categorisation of surface water bodies for the South West River Basin District, and also details of mine sites and mine waters, to be used as a basis for directing future remediation planning and / or further data collection.

In every report the 13 reports that comprise the outputs of the project are listed, so that the reader may cross-reference between them at need. They are:

- I. *A methodology for identification and prioritisation of abandoned non-coal mines in England and Wales*
- II. *Prioritisation of abandoned non-coal mine impacts on the environment: The national picture*
- III. *Prioritisation of abandoned non-coal mine impacts on the environment in the Dee River Basin District*
- IV. *Prioritisation of abandoned non-coal mine impacts on the environment in the Northumbria River Basin District*
- V. *Prioritisation of abandoned non-coal mine impacts on the environment in the South West River Basin District*
- VI. *Prioritisation of abandoned non-coal mine impacts on the environment in the Western Wales River Basin District*
- VII. *Prioritisation of abandoned non-coal mine impacts on the environment in the Humber River Basin District*
- VIII. *Prioritisation of abandoned non-coal mine impacts on the environment in the North West River Basin District*
- IX. *Prioritisation of abandoned non-coal mine impacts on the environment in the Severn River Basin District*
- X. *Prioritisation of abandoned non-coal mine impacts on the environment in the Anglian, Thames and South East River Basin Districts*
- XI. *Prioritisation of abandoned non-coal mine impacts on the environment in the Solway-Tweed River Basin District*
- XII. *Future management of abandoned non-coal mine water discharges*
- XIII. *Hazards and risk management at abandoned non-coal mine sites*

Much of the text in the individual River Basin District (RBD) reports (reports III-XI) are common to all 9 reports, though the information in the tables is different. A detailed description of the methodology used to produce these results is provided in Report I, while Report II provides a national overview of the findings. Implications of the results for future management of abandoned non-coal mine sites is dealt with at length in Report XII, while specific detail of the outputs of the data collated on mine hazards and risk management is provided in Report XIII. It is recommended that the individual RBD reports are read in conjunction with these other national-level reports.

## 2. Water body impact categories

The initial stage of the prioritisation exercise comprised use of existing data, from various sources, to categorise surface water bodies as *Impacted*, *Probably Impacted*, *Probably Not Impacted* and *Not Impacted*. This exercise was based on the spatial relationship between Environmental Quality Standard (EQS<sup>1</sup>) failures in mining areas, or EQS failures immediately downstream of a mining area as described in detail in the Methodology report. The impact categories grade from *Impacted* where water quality failures are coincident in a water body with former mine sites, to catchments where the quality failures are either not associated with any former mining areas, or there are no reported water quality issues (*Not Impacted* water bodies). The risk categories prefixed “probably” are there to indicate uncertainty in the nature and extent of the link between mining and pollution. *Probably Impacted* describes a water body where there is a pollution problem but uncertainty persists as to whether the mining activity and downstream pollution issue are explicitly connected, either due to distance between source and receptor, or where there are no recorded mine sites in a polluted former mining area. *Probably Not Impacted* water bodies are those in mining areas where there is no water quality concern either in the host or downstream water body. The final numbers of water bodies in each of the impact categories are detailed by RBD in Table 1.

**Table 1. Summary statistics showing final categorisation of water bodies across England and Wales (Stage 4, March 2009)**

River Basin District (RBD)	Impacted	Probably Impacted	Probably Not Impacted	Not Impacted	Total
Anglian	0	1	181	831	<b>1013</b>
Dee	9	10	10	71	<b>100</b>
Humber	13	18	151	734	<b>916</b>
North West	15	27	63	427	<b>532</b>
Northumbria	28	39	38	262	<b>367</b>
Severn	31	32	89	599	<b>751</b>
Solway-Tweed	3	6	29	149	<b>187</b>
South East	0	0	88	308	<b>396</b>
South West	57	73	325	680	<b>1135</b>
Thames	0	0	154	490	<b>644</b>
Western Wales	70	37	143	619	<b>869</b>
<b>Grand Total</b>	<b>226</b>	<b>243</b>	<b>1271</b>	<b>5170</b>	<b>6910</b>

<sup>1</sup> The EQS values used for this project are detailed in the methodology report – see reference list. The metals / metalloids assessed were cadmium, lead, nickel, zinc, copper, iron, manganese, and arsenic.

### 3. Water body validation and prioritisation

After the initial categorisation of water bodies an online questionnaire was used to collate data from local experts at the Environment Agency. This process served to clarify whether the categorisations were valid (e.g. were area staff aware that the pollution in the mining area was due to something other than abandoned non-coal mines?) and to gather information on the extent of impact of non-coal mine pollution on other receptors (ecology, groundwater and water resources). Figure 1 shows the categorisation of water bodies in the South West RBD. This information was used to allocate an individual score to each of the *Impacted* and *Probably Impacted* water bodies to describe the extent of the impacts of abandoned non-coal mine drainage, shown in Figure 2 (for details of the scoring system refer to the Methodology report).

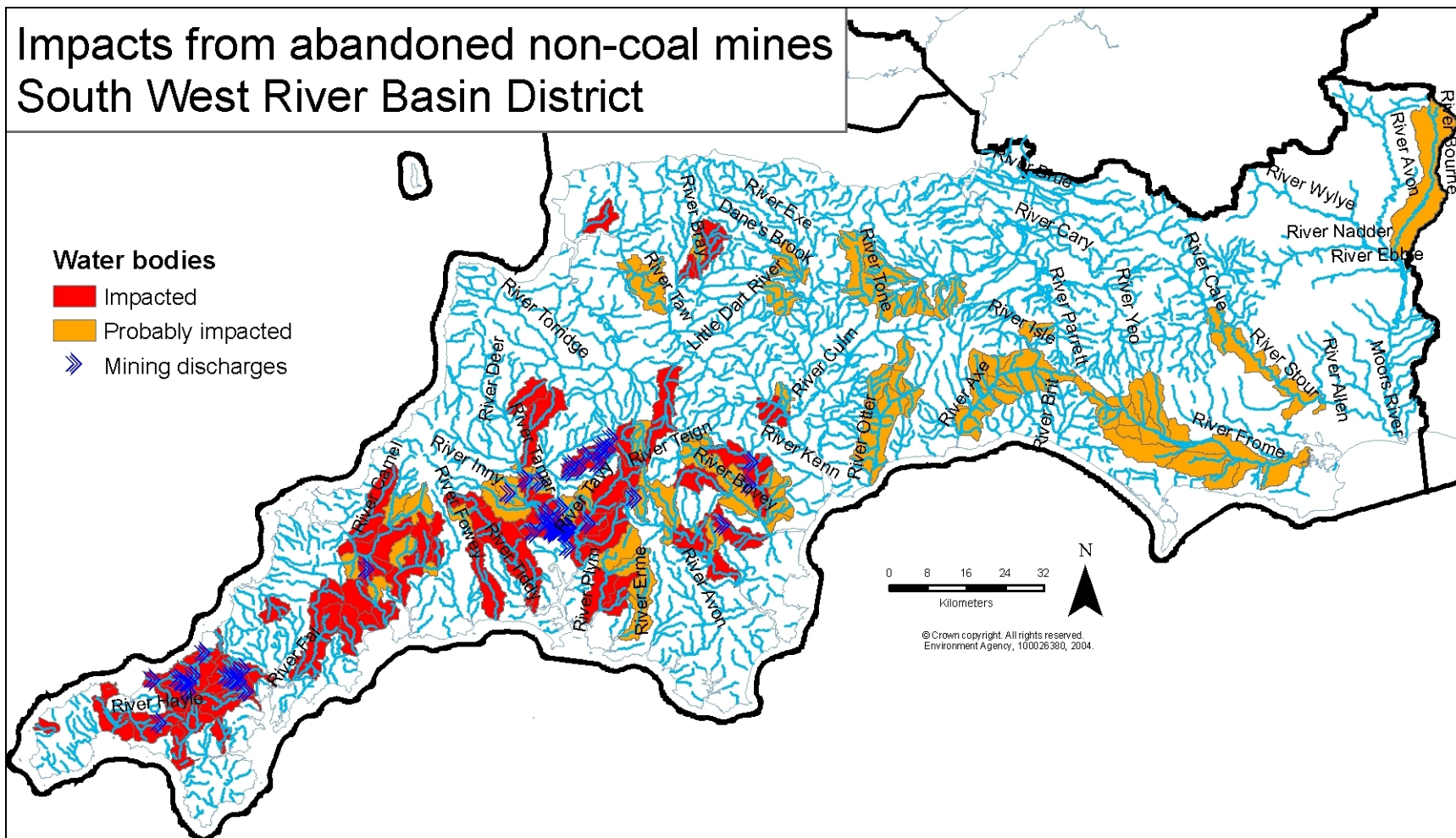
Tables 4 and 5 (located at the end of the report) show the respective impact scores for the *Impacted* and *Probably Impacted* water bodies in the South West RBD. By reading this report in conjunction with Report II (*The National Picture*), it is possible to see how the results fit into the national prioritisation. These tables contain only a selection of the results with the full details available as a database or a series of GIS (Geographical Information System) layers.

### 4. Mine site and discharge identification

The online questionnaire also collated data specific to mine sites themselves within the priority water bodies. A range of information was collected (Table 2) covering known polluting sites, the presence of point and diffuse pollution, water quality, flow rates, stakeholder concerns and risks and hazards at abandoned sites. This stage provides the crucial link between prioritising impacted water bodies (Tables 4 and 5) and identifying the polluting mine sites within them that could be the focus for future catchment scoping studies (see Section 5).

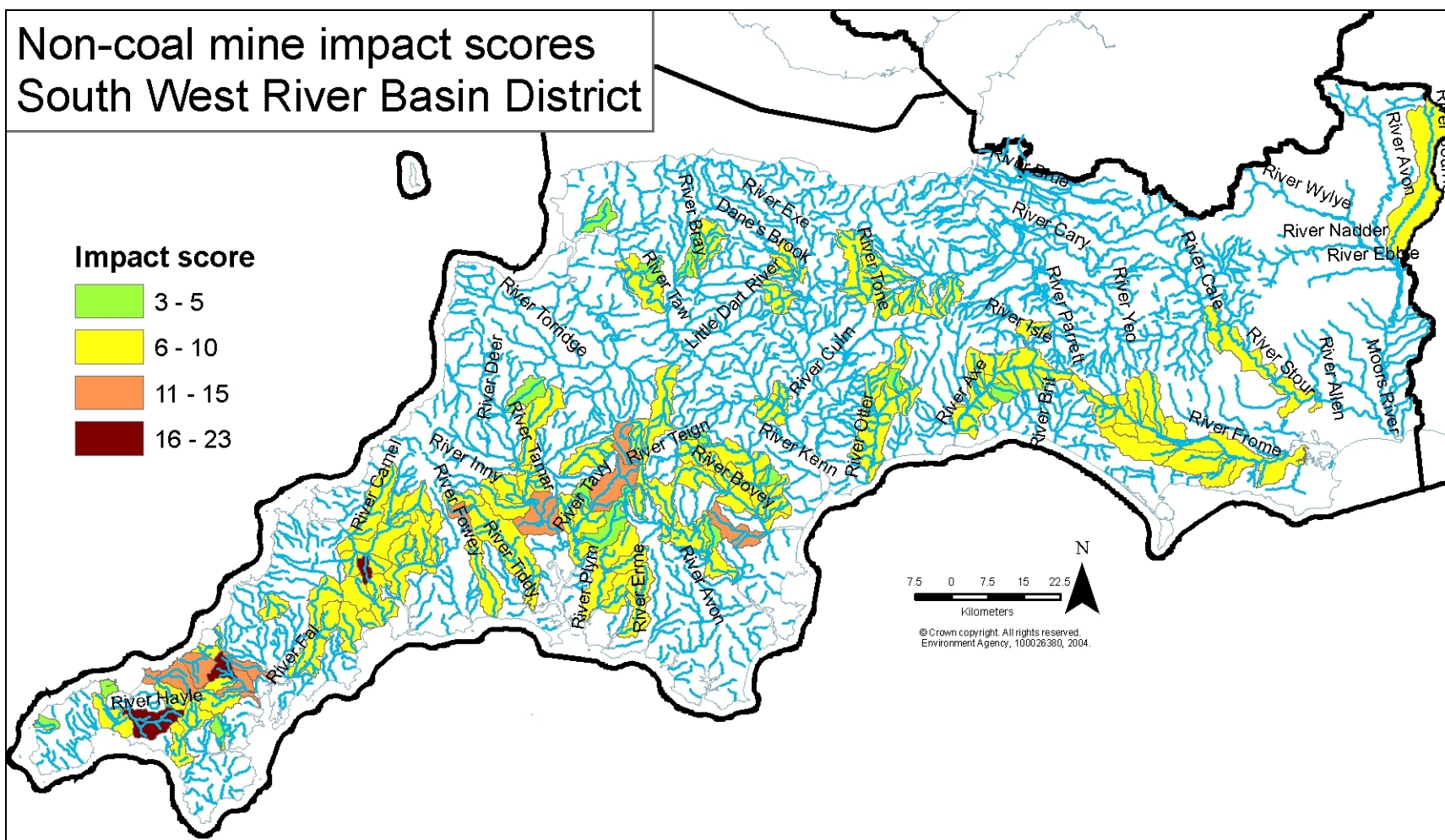
Summary details of all mining discharges identified in the South West RBD are presented in Table 6 while Table 7 shows all sites identified where outbreak risk received either a 'Suspected' or 'Yes' response. It is important to note that not all of the data gathered during the project is shown in the tables. This is simply because it is not possible to present all of this information in a written report such as this. The main items that have been omitted are:

- Water quality and flow-rate data for discharges where it is available
- Text comments relating to evidence of impacts and risks, and whether stakeholder issues are converging or diverging
- Detailed geographical references, such as grid references and water body identifier codes.
- Stability, airborne pollution, safety issues, public / animal health concern information which is summarised nationally in the *Hazards and Risk Management* report and presented in their entirety in the database.



**Figure 1. Water bodies *Impacted* or *Probably Impacted* by abandoned non-coal mines in the South West RBD**





**Figure 2. Non-coal mine impact scores for *Impacted* and *Probably Impacted* water bodies in the South West RBD**

**Table 2. Key information requested in Environment Agency questionnaire**

<b>Question / information requested</b>	<b>Comment</b>
Water Body ID and Name	Information provided by Consortium
EQS failure co-ordinates and score	Information provided by Consortium
Categorisation (e.g. <i>Impacted</i> etc.)	Information provided by Consortium
Locations of point mine water discharges within water bodies with EQS failures, or in water bodies immediately upstream of water body with EQS failure	Required to characterise <i>Impacted</i> and <i>Probably Impacted</i> water bodies
If there is a mine water discharge (either point or diffuse) known or suspected then further information on the discharge is required	Including receiving watercourse name, groundwater, ecological and higher impacts, stakeholder information, and water quality
Knowledge of historical mines, irrespective of water pollution issues	Including mine location and name (if known), airborne pollution risk, safety concerns, stability concerns and outbreak risk

## 5. Preparing for remediation: further investigations and monitoring (Programmes of Measures)

This project has identified the surface water bodies which show the greatest impacts from abandoned non-coal mines, and so should be prioritised for action in the first cycle of River Basin Planning (RBP).

### 5.1 *Probably Impacted* water bodies

Many water bodies in mining areas are in the *Probably Impacted* category since we do not have water quality data from within the water body itself. We know that abandoned non-coal mines are present but not if they are the specific cause of the downstream pollution. Collecting new data on metal concentrations in these rivers would allow these water bodies to be moved either to *Probably Not Impacted* (if no EQS failures are identified) or to *Impacted* (if EQS are exceeded). All the data tables within the database are editable beyond the timescale of the project to allow such re-categorisation as new information comes to light.

Monitoring would need to be carried out over a 12 month period (ideally at monthly frequency) to ensure variation due to seasonal and flow effects is evaluated. It is recommended that collection of these data is prioritised in the first RBP cycle for the *Probably Impacted* water bodies with the highest impact scores (see Table 5).

## 5.2 Catchment investigations – *Impacted and Probably Impacted* water bodies

Unfortunately, with very few exceptions, we do not have sufficient monitoring data in any water bodies to allow remediation measures to be designed and implemented. This is the case even in the *Impacted* water bodies where we are confident that the pollution is due to abandoned mines, and have been able to identify significant point sources. This is a function of the type of monitoring data that need to be collected to characterise mine water pollution for remediation. Concentrations of metals in rivers or mine water discharges alone are not adequate, the flow must also be measured so that the loading (flux) can be calculated. Such data are rarely available from the Environment Agency's routine monitoring.

As a result, the first stage of implementing Programmes of Measures (POMs) for abandoned non-coal mine pollution is to carry out detailed synchronous monitoring of water quality and flow over at least a 12 month period in affected catchments. These further investigations will allow management and remediation schemes to be implemented in the second and third RBP cycle. If these data are not collected during the first RBP cycle, then it will not be possible to address the threat that pollution from abandoned mines poses to good ecological and chemical status.

The design and execution of such catchment monitoring programmes is described in the accompanying *Future Management of Abandoned Non-Coal Mine Discharges* report, and a comprehensive example of such a study is provided by Mayes *et al.* (2008). In general terms a phased approach is recommended:

1. Scoping study of the catchment (water body scale) to identify main sources of pollution using existing water quality data and other information sources. The data reported in Tables 4, 5 and 6 will inform these studies.
2. Design and implementation of detailed monitoring programmes to collect synchronous measurements of water quality and flow, as well as investigation of the river ecology over a period of at least 12 months.
3. Subject to the results of the monitoring programme, carry out feasibility study for the design and implementation of appropriate management and remediation measures, including pilot-scale treatment trials where appropriate. The suitability of various passive approaches to treatment is provided in the *Future Management of Abandoned Non-Coal Mine Discharges* report, and also by PIRAMID Consortium (2003).
4. Construct and operate management and remediation measures.

Examples of sites at which this phased approach is being implemented by the Environment Agency are shown in Table 3.

**Table 3. Example sites at which a phased approach to catchment monitoring is being undertaken by the Environment Agency**

RBD	Mine site / catchment
Western Wales	Parys Mountain, Cwm Rheidol, Dylife, Frongoch, Cwmystwyth, Conwy (Nant Gwydyr/Afon Crafnant)
Dee	Clywedog
Northumbria	Saltburn Gill, Rookhope Burn
North West	Coledale Beck

## 6. Conclusions

By assessing mine waters using water quality, ecological, groundwater and higher impact metrics it has proved possible to objectively prioritise *Impacted* and *Probably Impacted* water bodies into ranked lists. Furthermore, additional data stored in the database enables environmental managers to assess what the other issues are at these sites, such as safety issues, outbreak risk and stakeholder concerns. This information can be used to inform future management of pollution from abandoned non-coal mine sites.

## References

- European Community (2000). Council Directive 2000/60/EC establishing a framework for Community action in the field of water policy. The Official Journal of the European Communities.
- Mayes, W.M., Gozzard, E., Potter, H.A.B. and Jarvis, A.P. (2008) Quantifying the importance of diffuse minewater pollution in a historically heavily coal mined catchment, *Environmental Pollution*, **151**, 165-175.
- PIRAMID Consortium (2003) *Engineering guidelines for the passive remediation of acidic and/or metalliferous mine drainage and similar wastewaters*. Passive In-situ Remediation of Acidic Mine / Industrial Drainage (PIRAMID) report, European Commission Fifth Framework Programme. Newcastle University.

**Table 4. Prioritisation of *Impacted* water bodies in the South West RBD (all water bodies shown)**

RBD priority rank <sup>2</sup>	Water body name	Water Body ID	EQS Score	Ranked EQS Score	Ecological Impact score	Higher Impact score	Groundwater Impact score	Overall Impact score <sup>1</sup>
1	Upper Carnon River	GB108048001160	17	8	2	5	3	<b>18</b>
2	HAYLE	GB108049000380	6	4	5	5	3	<b>17</b>
3	LANIVET STREAM	GB108049000030	4	4	5	5	3	<b>17</b>
4	Lower River Carnon and Perranwell Stream	GB108048001230	17	8	2	5	0	<b>15</b>
5	Calenick Stream	GB108048001250	3	3	5	5	2	<b>15</b>
6	Red River (Upper)	GB108049000600	15	7	2	5	0	<b>14</b>
7	West Okement	GB108050008080	18	8	0	5	0	<b>13</b>
8	Red River (Lower)	GB108049000570	11	6	2	5	0	<b>13</b>
9	PORTREATH STREAM	GB108049000620	9	5	2	5	0	<b>12</b>
10	Lower River Tamar	GB108047007860	7	5	2	5	0	<b>12</b>
11	Upper River Tavy	GB108047007950	3	3	2	5	2	<b>12</b>
12	River Lemon	GB108046008450	3	3	2	5	1	<b>11</b>
13	River Lynher	GB108047007670	7	5	0	5	0	<b>10</b>
14	ST. AUSTELL RIVER	GB108048002280	3	3	2	5	0	<b>10</b>
=	ST. LAWRENCE STREAM	GB108049000040	3	3	2	5	0	<b>10</b>
=	BENNY STREAM	GB108049000210	3	3	2	5	0	<b>10</b>
=	HICKS MILL STREAM	GB108048001150	3	3	2	5	0	<b>10</b>
=	CRINNIS RIVER	GB108048001330	3	3	2	5	0	<b>10</b>
=	ROSEWORTHY STREAM	GB108049000560	3	3	2	5	0	<b>10</b>
=	TREVELLAS STREAM	GB108049000670	3	3	2	5	0	<b>10</b>
21	Tory Brook	GB108047003640	2	3	2	5	0	<b>10</b>
=	River Kennal	GB108048001140	2	3	2	5	0	<b>10</b>
23	LEW (TAMAR)	GB108047007770	1	3	2	5	0	<b>10</b>
=	TEIGN	GB108046008540	1	3	2	5	0	<b>10</b>
25	PORTHTOWAN STREAM	GB108049000630	10	6	2	1	0	<b>9</b>
26	Lower River Fal	GB108048001270	5	4	0	5	0	<b>9</b>
27	Par River (Upper)	GB108048002310	4	4	0	5	0	<b>9</b>

=	MOLE	GB108050014130	4	4	0	5	0	9
=	Lower River Camel	GB108049000190	4	4	0	5	0	9
=	GWINDRA STREAM	GB108048001350	4	4	0	5	0	9
31	River Tamar below River Lyd	GB108047007910	2	3	1	5	0	9
=	Lower River Tavy	GB108047007840	2	3	1	5	0	9
33	MARAZION RIVER	GB108048002110	3	3	0	5	0	8
=	Par River (Lower)	GB108048002290	3	3	0	5	0	8
=	TAW	GB108050008250	3	3	0	5	0	8
=	River Seaton	GB108048002320	3	3	0	5	0	8
=	River Cober US Lowrtown Bridge	GB108048001171	3	3	0	5	0	8
=	River Cober DS Lowrtown Bridge	GB108048001172	3	3	0	5	0	8
=	Upper River Fal	GB108048001390	3	3	0	5	0	8
=	River Allen	GB108049007050	3	3	0	5	0	8
41	Upper River Lynher	GB108047007690	2	3	0	5	0	8
=	BOVEY	GB108046008320	2	3	0	5	0	8
=	WARLEGGAN RIVER	GB108048007630	2	3	0	5	0	8
=	ST. NEOT RIVER	GB108048007640	2	3	0	5	0	8
=	MOLE	GB108050019970	2	3	0	5	0	8
=	Lower River Fowey	GB108048001420	2	3	0	5	0	8
47	Lower River Plym	GB108047004040	1	3	0	5	0	8
=	CREEDY	GB108045009070	1	3	0	5	0	8
=	DART	GB108046008350	1	3	0	5	0	8
=	CAREY	GB108047008040	1	3	0	5	0	8
51	TREGSEAL STREAM	GB108049000350	3	3	2	0	0	5
52	CLAW	GB108047008060	4	4	0	0	0	4
=	LESTRAINES RIVER	GB108048001870	4	4	0	0	0	4
54	NADRID WATER	GB108050013950	3	3	1	0	0	4
55	HayleTidal,Lands End,St.Ives	GB108049000530	1	3	1	0	0	4
56	KNOWL WATER	GB108050020020	3	3	0	0	0	3
57	WALKHAM	GB108047007870	1	3	0	0	0	3

**Note:** 1. Overall impact score = Ranked EQS + Ecological Impact + Higher Impact + Groundwater Impact. 2. EQS Score used to determine Overall priority rank where Overall impact scores are equal

**Table 5. Prioritisation of *Probably Impacted* water bodies in the South West RBD (all water bodies shown)**

RBD priority rank <sup>2</sup>	Water body name	Water Body ID	EQS Score	Ranked EQS Score	Ecological Impact score	Higher Impact score	Groundwater Impact score	Overall Impact score <sup>1</sup>
1	Withey Brook	GB108047007680	7	5	1	5	0	11
2	BOURNE	GB108043022390	8	5	0	5	0	10
3	Lower River Inny	GB108047007890	7	5	0	5	0	10
4	Lower River Ruthern	GB108049000050	4	4	1	5	0	10
4	LOPEN BK	GB108052015330	4	4	1	5	0	10
6	HAYWARDS WTR	GB108052015390	3	3	2	5	0	10
7	STOUR (Middle)	GB108043016050	2	3	2	5	0	10
7	LUMBURN	GB108047007850	2	3	2	5	0	10
9	Upper River Plym	GB108047003650	1	3	2	5	0	10
9	BEADON BROOK	GB108046008500	1	3	2	5	0	10
11	BOVEY	GB108046008300	5	4	0	5	0	9
11	WRAY BROOK	GB108046008330	5	4	0	5	0	9
11	BOVEY	GB108046008470	5	4	0	5	0	9
11	UGBROOKE STREAM	GB108046008460	5	4	0	5	0	9
11	River Teign	GB108046008430	5	4	0	5	0	9
16	River Camel (De Lank to Stannon)	GB108049006980	4	4	0	5	0	9
16	DE LANK RIVER	GB108049007030	4	4	0	5	0	9
18	BROCKEY RIVER	GB108045015080	3	3	1	5	0	9
18	EXE	GB108045015060	3	3	1	5	0	9
18	IRON MILL STREAM	GB108045015040	3	3	1	5	0	9
18	BOKIDDICKSTREAM	GB108048002300	3	3	1	5	0	9
18	HELE BK	GB108052015400	3	3	1	5	0	9
18	SHERFORD STR	GB108052015410	3	3	1	5	0	9
24	Lowley Brook	GB108047007920	2	3	1	5	0	9
24	Tamar (Kelly Brook)	GB108047007900	2	3	1	5	0	9
26	Frome Dorset Trib (Compton Valence Stream)	GB108044009680	1	3	1	5	0	9
26	Frome Dorset Trib (River Win)	GB108044009650	1	3	1	5	0	9
26	TEIGN	GB108046008550	1	3	1	5	0	9

26	DART	GB108046008340	1	3	1	5	0	9
26	KATE BROOK	GB108046008480	1	3	1	5	0	9
31	BARLE	GB108045015100	3	3	0	5	0	8
31	MADFORD RIVER	GB108045014920	3	3	0	5	0	8
31	HILLFARRANCE BK	GB108052015510	3	3	0	5	0	8
31	TONE, upper	GB108052021370	3	3	0	5	0	8
31	WESTFORD STR	GB108052015380	3	3	0	5	0	8
31	Broughton Brook	GB108052015420	3	3	0	5	0	8
37	AXE	GB108045014840	2	3	0	5	0	8
37	KIT BROOK	GB108045014830	2	3	0	5	0	8
37	FORTON BROOK	GB108045014820	2	3	0	5	0	8
37	Upper River Yealm	GB108047004050	2	3	0	5	0	8
37	PIALL	GB108047004020	2	3	0	5	0	8
37	AXE	GB108045008870	2	3	0	5	0	8
37	YARTY	GB108045008820	2	3	0	5	0	8
37	River Tamar (Launceston)	GB108047007940	2	3	0	5	0	8
37	QUITHER STREAM	GB108047007930	2	3	0	5	0	8
37	River Fowey (Warleggan to St Neot)	GB108048001410	2	3	0	5	0	8
37	CARDINHAM WATER	GB108048001450	2	3	0	5	0	8
48	HOOKE	GB108044009800	1	3	0	5	0	8
48	FROME Dorset (Upper)	GB108044009780	1	3	0	5	0	8
48	Frome Dorset (Lower) & Furzebrook Stream	GB108044009690	1	3	0	5	0	8
48	Tadnoll Brook (including Empool Bottom)	GB108044009660	1	3	0	5	0	8
48	CERNE	GB108044009710	1	3	0	5	0	8
48	SYDLING WATER	GB108044009700	1	3	0	5	0	8
48	TALE	GB108045009200	1	3	0	5	0	8
48	OTTER	GB108045009180	1	3	0	5	0	8
48	Lower River Yealm	GB108047004010	1	3	0	5	0	8
48	River Otter	GB108045009170	1	3	0	5	0	8
48	JACKMOOR BROOK	GB108045009080	1	3	0	5	0	8
48	MEAVY	GB108047003660	1	3	0	5	0	8
48	WEBBURN	GB108046005250	1	3	0	5	0	8



48	EAST DART RIVER	GB108046008420	1	3	0	5	0	8
48	WEST DART RIVER	GB108046008400	1	3	0	5	0	8
48	SOUTH WINTERBOURNE	GB108044010060	1	3	0	5	0	8
48	TAW	GB108050014530	1	3	0	5	0	8
48	EAST OKEMENT RIVER	GB108050008100	1	3	0	5	0	8
66	BURCOMBE STREAM	GB108050014150	4	4	1	0	0	5
67	BURN (TAVY)	GB108047007880	2	3	1	0	0	4
67	WOLF (OTTER)	GB108045009190	1	3	1	0	0	4
67	ASHBURN	GB108046005270	1	3	1	0	0	4
67	BRAMBLE BROOK	GB108046008490	1	3	1	0	0	4
71	BLACKWATER RIVER	GB108045008850	2	3	0	0	0	3
71	FINGLE BROOK	GB108046008570	1	3	0	0	0	3
71	HAWKRIDGE BROOK	GB108050014520	1	3	0	0	0	3

Note: 1. Overall impact score = Ranked EQS + Ecological Impact + Higher Impact + Groundwater Impact. 2. EQS Score used to determine Overall priority rank where Overall impact scores are equal

**Table 6. Mining discharge responses for the South West RBD (all sites for which data provided by Environment Agency)<sup>2</sup>**

Water Body	Discharge name	Associated mine(s)	Receiving watercourse	Diffuse Pollution	Eco. Impact	G/W Impact	Higher Impact	Visual Impact	Stakeholder Issues	Complaints
GB108046008450		Brothers/Union and Stormsdown mines, (Owllacombe mine)	Tributary of R Lemon	Unknown	Suspected	Unknown	Unknown	Yes	Unknown	Yes
GB108046008540	Bridford mine adit	Bridford	Rookery Brook	Yes	Suspected	No	Suspected	Yes	Unknown	Yes
GB108046008540		Great Rock Mine	Beadon Brook	Yes	Suspected	No	Suspected	Unknown	Unknown	Unknown
GB108047007770	LEWTRENCH ARD	LEWTRENCHARD	LEW	Suspected	Suspected	No	Yes	Unknown	Yes	Yes
GB108047007770	CORYTON	CORYTON	LEW	Suspected	Suspected	No	Yes	Unknown	Yes	Suspected
GB108047007770	SOURTON QUARRY	SOURTON QUARRY	LEW	Suspected	Suspected	No	Yes	Unknown	Yes	Suspected
GB108047007770	HAMLIN	HAMLIN	LEW	Suspected	Suspected	No	Yes	Unknown	Yes	Suspected
GB108047007770	FANNY	FANNY	LEW	Suspected	Suspected	No	Yes	Unknown	Yes	Suspected
GB108047007770	TORWOOD	TORWOOD	LEW	Yes	Suspected	No	Yes	Unknown	Yes	Suspected
GB108047007770	SOURTON DOWN CONSOLS	SOURTON DOWN CONSOLS	LEW	Yes	Suspected	No	Yes	Unknown	Yes	Suspected
GB108047007770	FURZE PARK	FURZE PARK	LEW	Yes	Suspected	No	Yes	Unknown	Yes	Suspected
GB108047007770	BATTISHILL DOWN	BATTISHILL DOWN	LEW	Yes	Suspected	No	Yes	Unknown	Yes	Suspected
GB108047007840			Tavy	Suspected	Unknown	No	Suspected	Unknown	Suspected	Unknown
GB108047007850	CREBOR	CREBOR	Lumburn	Suspected	Suspected	No	Suspected	Unknown	Yes	Suspected
GB108047007850	EAST COLLACOMBE	EAST COLLACOMBE	Lumburn	Unknown	Suspected	No	Yes	Yes	Suspected	Yes
GB108047007850	CLOCHARTON	COLCHARTON	Lumburn	Suspected	Suspected	No	Suspected	Unknown	Suspected	Suspected
GB108047007850	WEST WHEAL CREBOR	WEST WHEAL CREBOR	Lumburn	Suspected	Suspected	No	Suspected	Suspected	Suspected	Suspected
GB108047007850	NORTH	NORTH	Lumburn	Suspected	Suspected	No	Suspected	Suspected	Yes	Yes

<sup>2</sup> Note that not all information gathered is included in this table; limited data included only due to difficulties of presentation of all data in printed format. The complete dataset is available with the GIS files associated with these reports.

	CREBOR	CREBOR								
GB108047007860	Sydenham Damerel Stream		Tamar	Yes	Suspected	No	Yes	No	Suspected	Unknown
GB108047007860		various	Tamar	Yes	Suspected	No	Yes	Unknown	Suspected	Unknown
GB108047007860			Tamar	Yes	Suspected	No	Yes	Yes	Yes	Yes
GB108047007860	all mines in this catchment	various	Tamar	Yes	Suspected	No	Yes	Suspected	Yes	Yes
GB108047007860	all mines in this area	various	Tamar	Yes	Suspected	No	Yes	Suspected	Yes	Yes
GB108047007860	all mines in this area	various	Tamar	Yes	Suspected	No	Yes	Unknown	Suspected	Suspected
GB108047007860	DEVON GREAT CONSOLS	DEVON GREAT CONSOLS	Tamar	Yes	Suspected	No	Yes	Suspected	Yes	Yes
GB108047007860	Gawton	Gawton	Tamar	Yes	Suspected	No	Yes	Suspected	Suspected	Suspected
GB108047007860	Portontown Stream	DEVON GREAT UNITED	Portontown Stream/Tamar	Yes	Suspected	No	Yes	Suspected	Suspected	Suspected
GB108047007860	Bedford United	Bedford United	Tamar	Yes	Suspected	No	Yes	Unknown	Suspected	Suspected
GB108047007860	Clitters Adit	Gunnislake Clitters	TAMAR	Yes	Suspected	No	Yes	Suspected	Suspected	Suspected
GB108047007860	Clitters Spoil Heap	Gunnislake Clitters	Tamar - above SWW intake	Yes	Suspected	No	Yes	No	Yes	Unknown
GB108047007860	Luckett - Spoil Heap	New Great Consols	Luckett Stream	Yes	Suspected	No	Suspected	Unknown	Suspected	Suspected
GB108047007900			Tamar (Lower)	Suspected	Unknown	No	Unknown	Unknown	Unknown	Unknown
GB108047007910			Tamar	Suspected	Unknown	No	Unknown	Unknown	Unknown	Unknown
GB108047007910		Lawhitton Consols & Gatherley	Tamar	Suspected	Unknown	No	Suspected	Unknown	Unknown	Unknown
GB108047007920		Greystone Wood, Greystone Silver Lead, South Petherwin, Trenute, Trebullet Hill	Lowley Stream/ Tamar	Suspected	Unknown	No	Yes	Unknown	Suspected	Unknown
GB108047007950	various	Betsy, Union, South Friendship, South Devon United, Jewell,	Charwell Brook/Tavy	Yes	Suspected	Suspected	Yes	Suspected	Yes	Unknown

		Hillbridge Consols, Rattlebrook, North Friendship, North Devon United, Central Devon United, Bennetts, Friendship, Gibbet Hill.								
GB108048001160	County Adit	various	Carnon River	Yes	Suspected	No	Yes	Yes	Suspected	Yes
GB108048001160	Wheal Jane	Wheal Jane	Baldhu Bridge	Suspected	Suspected	No	Yes	Suspected	Suspected	Yes
GB108048001160		various	Carnon River	Suspected	Suspected	No	Yes	Suspected	Suspected	Yes
GB108048001160		various	Carnon River	Suspected	Suspected	No	Yes	Suspected	Suspected	Yes
GB108048001160		various	Baldhu Stream	Suspected	Suspected	No	Yes	Suspected	Suspected	Suspected
GB108048001160	Wheal Maid Tailings Dam	Mount Wellington	St Day Stream	Yes	Suspected	No	Yes	Yes	Yes	Yes
GB108048001250	East Wheal jane	east wheal jane	Tinney	Yes	Yes	Suspected	Unknown	Yes	Unknown	Yes
GB108049000030			Lanivet Stream	Yes	Yes	Yes	Yes	Yes	Yes	Yes
GB108049000380			R Hayle	Suspected	Yes	Yes	Unknown	Suspected	Unknown	Unknown
GB108049000570			Red River	Suspected	Suspected	No	Yes	Yes	Suspected	Suspected
GB108049000600	Brae Tin	Carn Brea	Red River	Suspected	Suspected	No	Yes	Unknown	Suspected	Unknown
GB108049000600	Treslillard Adit		Red River	Suspected	Suspected	No	Yes	Yes	Suspected	Unknown
GB108049000600	Dolcoath Adit	South Crofty Ltd, Pool, Redruth	Red River	Suspected	Suspected	No	Yes	Yes	Yes	Yes
GB108049000600	South Crofty Ltd, Pool, Redruth	South Crofty Ltd, Pool, Redruth	Red River	Suspected	Unknown	No	Suspected	Suspected	Suspected	Yes
GB108049000620	Barncoose adit	South Crofty Limited, Pool, Redruth	Portreath Stream	Suspected	Unknown	No	Suspected	Yes	Suspected	Suspected
GB108049000630	Tywarnhayle	Tywarnhayle	Porthtowan Stream	Yes	Unknown	No	Unknown	Unknown	Unknown	No

**Table 7. Mine sites in the South West RBD where risk of sudden outbreak is confirmed or suspected to exist**

<b>Water Body</b>	<b>Mine</b>	<b>Outbreak Risk</b>	<b>Receiving watercourse</b>	<b>Details</b>
GB108046008450	STORMSDOWN	Yes	River Lemon	Pollution incident logged in 2004
GB108046008450	UNION	Yes	River Lemon	Pollution incident logged in 2004
GB108046008450	BROTHERS	Yes	River Lemon	Pollution incident logged in 2004
GB108047007860	DEVON GREAT UNITED	Suspected	Lower River Tamar	Being monitored for movement
GB108047007860	GUNNISLAKE CLITTERS	Suspected	Lower River Tamar	No details
GB108048001160	MOUNT WELLINGTON	Suspected	Carnon River	No details

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