Inventory of Emissions Reporting for Scotland and Solway Tweed river basin districts

The European Commission (EC)[1] requires that Member States establish an inventory of emissions, discharges and losses of priority substances for each river basin district alongside Water Framework Directive (WFD) characterisation analysis[2]. This inventory will be reported to the EC to inform WFD compliance checking.[1,3]

Our inventory was compiled using our environmental monitoring data and point source effluent and Scottish Pollutant Release Inventory (SPRI) data[4]. The inventory is intended as a baseline study in the first instance.

The technical guidance[2] states that if a substance meets particular relevance criteria then an "in-depth" inventory of emissions, discharges and losses from point and diffuse sources as well as loads transported in rivers should be provided. We used five relevance criteria based on compliance with environmental quality standards (EQS), levels of emissions, trends, and expert knowledge. We elected to include the data collated for all priority substances, with an indication of which relevance criteria had been met. The summary outputs for the Scotland river basin district and the Scottish part of the Solway Tweed river basin district[5] can be observed in tables 1 and 2, with the criteria included as table notes.

The following points should be noted:

- Though this inventory provides a baseline, it should be recognised that as we collect more data the baseline may change.

- In some cases environmental monitoring data was limited and therefore we were unable to estimate diffuse loads. Furthermore, environmental monitoring data contains inherent variability, which will have a direct input on the diffuse source calculations.

- Comparison with other areas of the UK and Member States may be difficult where there are variations in the methodology adopted.

- River flow data used to calculate diffuse riverine loadings provides a further source of variation with potential wide ranging differences in flow depending on the data source.

- Many substances have a tendency to partition into sediment and biota. We have not taken this into account in our load estimates.

[1] Directive 2008/105/EC

[2] CIS for WFD. Draft technical guidance on the preparation of an inventory of emissions, discharges and losses of priority and priority hazardous substances.

[3] Compliance checking regarding reduction of emissions, discharges and losses for priority substances and cessation or phasing out of discharges, losses and emissions for priority hazardous substances

[4] 2009-11 environmental monitoring data, 2009-11 river flow data (modelled dry mean flow or gauged), 2010 Scottish Pollutant Release Inventory data, and 2010 effluent monitoring data.

[5] Scottish locations only. English Solway Tweed emissions not included in this assessment.

Table 1: Inventory of emissions to Scotland river basin district 2010 (Kg/year)*						
Substance	**Riverine point source load**	**Riverine diffuse source load**	**Marine direct discharge load**	**Total point source load**	**Total load**	**Relevance criteria met?**
1,2 Dichloroethane	0.0	164.5	0.0	0.0	164.5	
4-Nonyl-Phenol	44.9	1001.2	105.2	150.0	1151.2	1,2,5
Nonylphenol ethoxylates	1140.1	0.0	2074.8	3214.9	3214.9	5
Anthracene	4.0	37.7	31.6	35.6	73.4	5
Atrazine	0.0	35.7	0.0	0.0	35.7	
Benzene	0.0	0.0	12412.0	12412.0	12412.0	
Benzo(a)pyrene	0.0	40.1	5.1	5.1	45.2	5
Benzo(b)fluoranthene	0.0	4.5	3.9	3.9	8.4	5
Benzo(ghi)perylene	0.2	2.5	5.5	5.8	8.2	1,2,5
Benzo(k)fluoranthene	0.0	6.2	1.7	1.7	7.9	5
Brominated diphenylethers	2.4	0.0	6.0	8.4	8.4	5
Cadmium	35.4	572.5	155.5	190.8	763.3	1,2,3,4
Chloroform	195.4	324.9	5427.6	5622.9	5947.8	
Diethyl Hexyl Phthalate	666.3	5946.5	1924.1	2590.4	8536.9	2,4
Dichloromethane	0.0	4422.5	0.0	0.0	4422.5	
Fluoranthene	3.1	43.1	84.4	87.4	130.5	5
Hexachlorobenzene	0.0	11.4	0.1	0.1	11.5	
Hexachlorocyclohexane	0.3	0.0	5.1	5.4	5.4	
Indeno(123cd)pyrene	0.0	1.4	1.9	1.9	3.2	5
Lead	478.5	24091.2	3517.1	3995.6	28086.9	1
Mercury	23.9	83.1	69.2	93.1	176.1	1,5
Naphthalene	3.0	250.5	532.6	535.6	786.1	5
Nickel	1861.5	45639.9	9564.1	11425.7	57065.6	4
Octylphenol	113.6	58.4	469.5	583.0	641.5	4
Pentachlorobenzene	0.0	2.3	0.0	0.0	2.3	1
Pentachlorophenol	0.8	3.6	8.9	9.7	13.2	1,5
Simazine	0.0	3.5	0.0	0.0	3.5	5
Tributyltin compounds	0.7	0.0	1.4	2.1	2.1	4
Trichlorobenzene	0.1	2.2	12.4	12.5	14.7	5
Trifluralin	0.0	5.1	0.0	0.0	5.1	4

1. It causes a failure of good chemical status in at least one water body;
2. The concentration of the substance is above half of the EQS in more than one water body;
3. Monitoring shows an increasing trend in concentrations which may cause problems for future river basin management planning cycles;
4. SPRI data show releases which might lead to concentrations matching the above criteria (carried out for rivers only);
5. Known sources and activities causing inputs in the river basin district exist which might lead to concentrations matching the above criteria.

* For Priority Substances not listed, the data assessed showed no evidence of emission.

Table 2: Inventory of emissions to the Scottish part of the Solway Tweed river basin district 2010 (kg/year)*						
Substance	**Riverine point source load**	**Riverine diffuse source load**	**Marine direct discharge load**	**Total point source load**	**Total load**	**Relevance criteria met?**
Cadmium	0.2	26.9	0.0	0.2	27.2	1,2
Hexachlorobenzene	0.0	1.4	0.0	0.0	1.4	
Lead	21.0	575.9	0.0	21.0	596.9	
Nickel	10.6	2392.7	0.0	10.6	2403.3	
Octylphenol	0.0	7.8	0.0	0.0	7.8	
Pentachlorobenzene	0.0	0.5	0.0	0.0	0.5	
Trifluralin	0.0	0.1	0.0	0.0	0.1	

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4. SPRI data show releases which might lead to concentrations matching the above criteria (carried out for rivers only);
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