River Basin Management Plans 2015 – 2021

Inventory of Emissions, Discharges and Losses of Substances and Chemical Analysis Information

October 2015

An Agency within the Department of the Environment
www.doeni.gov.uk

INVESTORS IN PEOPLE

NIEA Northern Ireland Environment Agency
www.doeni.gov.uk/niea

Contents

1.0 Introduction to this document

The Environmental Quality Standards Directive (2008/105/EC), (as amended by Directive 2013/39/EU), is a daughter directive of WFD that specifies the assessment, reporting and objectives required for Chemical Status. Collation and reporting of the inventory of emissions, discharges and losses of priority substances is a requirement under Directive 2008/105/EC. This inventory must include diffuse and direct discharges in each River Basin District (RBD) for each substance for which data is available. The inventory will be used to verify that emissions, discharges and losses are making progress towards reduction or cessation objectives for the chemicals listed under the Directive.

The chemical analysis information is required by the Priority Substances Directive (2013/39/EU) to present the limits of quantification of the methods of analysis applied.

2.0 Methodology used to derive the inventory of emissions, discharges and losses of priority substances

Where available data was reported for each priority substance listed in Schedule 1, Part 2, Table 38 of the Water Framework Directive (Priority Substances and Classification) Regulations (NI) 2011. As much of the data used to compile the Inventory was generated by the WFD Surveillance Monitoring Programme and the associated OSPAR WWTWs Priority Substances Monitoring Programme it was not possible to use a single baseline year. Monitoring under both programmes spanned much of the duration of the first planning cycle, 2010 - 2014, with several substances/groups of substances monitored each year for a period of 12 months consecutively. This Inventory therefore used data generated during that period and is not directly comparable to the Inventory compiled in 2013 that used 2010 as the baseline year and was restricted to a much smaller data set.

Annual loads were estimated using the method described in 6.10 of the OSPAR[1] Commission document ref 1998-5, Principle of the Comprehensive Study of Riverine Inputs and Direct Discharges. The flow data employed in the calculation of annual loads was specific to the location of the sample point used. Where no flow data was available and a Water Order Consent was in place, half of the maximum permitted flow was used. For sites for which flow data was not available an estimated flow was modelled.

Total Emissions - The level of total emissions were calculated using data collected at 10 OSPAR monitoring sites and a site on the Erne River at Rosscor Viaduct which has been traditionally monitored as part of the OSPAR programme. These sites represent the lowest monitoring points in the catchments concerned. The OSPAR sites were monitored as part of the WFD Surveillance Programme with 12 months of monitoring data generated for each substance/group of substances during the first cycle.

Riverine Point Source - Loadings were extracted from the Industrial Pollution Prevention and Control (IPPC) database and also calculated from data held in the Industrial Discharge Consents database and by the Water Utility Regulation Group. Data from a number of the larger Waste Water treatment Works is reported to the

[1] Oslo/Paris convention (for the Protection of the Marine Environment of the North-East Atlantic)

Water Utility Regulation Group and included in the IPPC database, therefore the data was checked to eliminate double counting.

Riverine Diffuse - An estimate of riverine diffuse load was calculated by subtracting point source emissions from the total emissions load. Where the total emissions load is less than riverine point source load, resulting in a negative value for riverine diffuse load, it is assumed that the difference is lost to the ecosystem before reaching the OSPAR monitoring station.

Marine Discharge - Point source data for discharges downstream of an associated OSPAR monitoring site were used to calculate marine discharge loading. Much of this data was generated by the OSPAR WWTWs Priority Substances Monitoring Programme which ran in parallel with the WFD Surveillance Programme and spanned the duration of the first planning cycle.

Less than Limit of Quantification (LOQ) values - When calculating the estimated annual load for any data values which were less than the LOQ, half the LOQ was used. Using this approach means that loadings derived for substances where the method LOQ values are relatively high will be correspondingly high even if the substance in question was not positively detected during the period of monitoring.

Method LOQs are listed in the Chemical Analysis Information section of this document for analyses carried out by the NIEA labs. LOQs have also been included for the assessment of Marine Direct Discharges; much of this work was performed by a sub-contracting lab, the National Laboratory Service of the Environment Agency of England.

Whilst every effort was made to provide as accurate an Inventory as possible the following considerations should be acknowledged when using this data:

(a) Although this inventory provides a baseline for the period spanning the first planning cycle it is important to stress that as more data is collected the baseline may change.
(b) In some cases monitoring data was limited and so it was not possible to estimate loadings.

(c) Environmental monitoring data, both flow and chemical analysis, contain inherent variability, which will have a direct impact on riverine diffuse source calculations.

(d) Many substances have a tendency to partition into sediments and biota. This was not taken into account when calculating load estimates.

(e) Methods for collecting and reporting data for some chemicals have differed between the pollution inventory and environmental monitoring. Direct comparisons cannot always be made between these data sets which can limit reporting.

3.1 Pollution Inventory Neagh Bann RBD

Neagh Bann RBD	WFD Cycle 1 (2009 to 2014)			
Priority Substance	Total Emissions kg/year	Riverine Point Source Load kg/year	Riverine Diffuse Load kg/year	Marine Direct Discharge Load kg/year
Alachlor	3.688	No Data	3.688	No Data
Anthracene	2.178	0.150	2.028	No Data
Atrazine	1.761	0.031	1.730	No Data
Benzene	2530.348	No Data	2530.348	No Data
Brominated Diphenylether (sum of 6)	0.923	0.110	0.813	No Data
Carbon-tetrachloride	185.614	No Data	185.614	No Data
Cadmium and its compounds	102.699	1.165	101.534	No Data
C10-C13 Chloroalkanes (SCCPs)	50302.850	No Data	50302.850	No Data
Chlorfenvinphos	13.526	0.242	13.284	No Data
Chlorpyrifos (Chlorpyrifos-ethyl)	6.763	No Data	6.763	No Data
Cyclodiene Pesticide: Aldrin	0.922	No Data	0.922	No Data
Cyclodiene Pesticide: Dieldrin	0.922	No Data	0.922	No Data
Cyclodiene Pesticide: Endrin	0.922	No Data	0.922	No Data
Cyclodiene Pesticide: Isodrin	0.922	No Data	0.922	No Data
DDT total	3.963	No Data	3.963	No Data
para-para-DDT	0.922	No Data	0.922	No Data
1,2-Dichloroethane	185.614	No Data	185.614	No Data
Dichloromethane	920.311	No Data	920.311	No Data
Di(2-ethylhexyl)phthalate	1445.351	75.563	1369.788	No Data
Diuron	50.781	0.640	50.141	No Data
Endosulphan	2.054	No Data	2.054	No Data
Fluoranthene	7.270	0.240	7.030	No Data
Hexachlorobenzene	0.769	No Data	0.769	No Data
Hexachlorobutadiene	618.190	No Data	618.190	No Data
Total Hexachlorocyclohexane	6.184	0.214	5.970	No Data
Isoproturon	50.781	No Data	50.781	No Data
Lead and its compounds	1278.154	75.430	1202.724	No Data
Mercury and its compounds	10.668	0.010	10.658	No Data
Naphthalene	26.203	9.880	16.323	No Data

Nickel and its compounds	9822.969	296.490	9526.479	No Data
4-Nonylphenol	172.735	77.729	95.006	No Data
4-Octylphenol	82.829	No Data	82.829	No Data
Pentachlorobenzene	0.643	No Data	0.643	No Data
Pentachlorophenol	670.705	No Data	670.705	No Data
PAH - Benzo(a)pyrene	3.473	1.070	2.403	No Data
PAH - Benzo(b)fluoranthene	1.807	No Data	1.807	No Data
PAH - Benzo(k)fluoranthene	1.736	No Data	1.736	No Data
PAH - Benzo(g,h,i)perylene	0.848	0.380	0.468	No Data
PAH - Indeno(1,2,3-cd)pyrene	0.642	No Data	0.642	No Data
Simazine	8.454	0.154	8.299	No Data
Tetrachloroethylene	184.062	No Data	184.062	No Data
Trichloroethylene	184.062	No Data	184.062	No Data
(Tributyltin-cation)	0.997	0.020	0.977	No Data
Trichlorobenzenes (all isomers)	1854.569	No Data	1854.569	No Data
Trichloromethane (Chloroform)	186.200	11.113	175.087	No Data
Trifluralin	3.688	No Data	3.688	No Data

3.2 Pollution Inventory North East RBD

North East RBD	WFD Cycle 1 (2009 to 2014)			
Priority Substance	Total Emissions kg/year	Riverine Point Source Load kg/year	Riverine Diffuse Load kg/year	Marine Direct Discharge Load kg/year
Alachlor	0.700	No Data	0.700	No Data
Anthracene	0.553	2.600	-2.047	0.643
Atrazine	0.431	No Data	0.431	0.453
Benzene	514.737	No Data	514.737	130.071
Brominated Diphenylether (sum of 6)	0.192	No Data	0.192	0.112
Carbon-tetrachloride	35.000	No Data	35.000	6.504
Cadmium and its compounds	18.053	No Data	18.053	656.084
C10-C13 Chloroalkanes (SCCPs)	9605.044	No Data	9605.044	1788.482
Chlorfenvinphos	3.448	No Data	3.448	1.285
Chlorpyrifos (Chlorpyrifos-ethyl)	2.363	No Data	2.363	0.276
Cyclodiene Pesticide: Aldrin	0.175	0.021	0.154	0.323
Cyclodiene Pesticide: Dieldrin	0.175	0.021	0.154	0.323
Cyclodiene Pesticide: Endrin	0.175	0.021	0.154	1.292
Cyclodiene Pesticide: Isodrin	0.175	0.021	0.154	0.323
DDT total	0.700	No Data	0.700	2.260
para-para-DDT	0.175	No Data	0.175	0.323
1,2-Dichloroethane	57.456	No Data	57.456	6.610
Dichloromethane	175.000	No Data	175.000	32.518
Di(2-ethylhexyl)phthalate	274.563	197.734	76.828	52.362
Diuron	12.401	0.790	11.611	6.199
Endosulphan	0.422	0.021	0.401	0.646
Fluoranthene	1.611	2.630	-1.019	0.643
Hexachlorobenzene	0.148	No Data	0.148	0.323
Hexachlorobutadiene	95.610	No Data	95.610	1.292
Total Hexachlorocyclohexane	2.420	0.079	2.341	4.293
Isoproturon	12.069	0.050	12.019	0.654
Lead and its compounds	491.176	No Data	491.176	1505.246
Mercury and its compounds	5.539	No Data	5.539	843.377
Naphthalene	10.854	No Data	10.854	3.389

Nickel and its compounds	2236.193	18.140	2218.054	1677.893
4-Nonylphenol	25.752	1.280	24.472	13.349
4-Octylphenol	14.314	0.492	13.822	6.096
Pentachlorobenzene	0.630	No Data	0.630	No Data
Pentachlorophenol	129.536	2.630	126.906	27.634
PAH - Benzo(a)pyrene	0.610	No Data	0.610	0.643
PAH - Benzo(b)fluoranthene	0.834	No Data	0.834	0.643
PAH - Benzo(k)fluoranthene	0.305	No Data	0.305	0.643
PAH - Benzo(g,h,i)perylene	0.142	2.630	-2.488	0.643
PAH - Indeno(1,2,3-cd)pyrene	0.345	No Data	0.345	0.646
Simazine	2.155	No Data	2.155	0.701
Tetrachloroethylene	35.000	No Data	35.000	13.721
Trichloroethylene	35.000	No Data	35.000	7.727
(Tributyltin-cation)	0.191	No Data	0.191	0.033
Trichlorobenzenes (all isomers)	286.831	0.526	286.305	9.687
Trichloromethane (Chloroform)	35.382	No Data	35.382	100.477
Trifluralin	1.009	0.158	0.851	6.458

3.3 Pollution Inventory North West RBD

North West RBD	WFD Cycle 1 (2009 to 2014)			
Priority Substance	Total Emissions kg/year	Riverine Point Source Load kg/year	Riverine Diffuse Load kg/year	Marine Direct Discharge Load kg/year
Alachlor	6.218	No Data	6.218	No Data
Anthracene	3.896	No Data	3.896	0.080
Atrazine	4.086	No Data	4.086	0.048
Benzene	4876.438	No Data	4876.438	16.082
Brominated Diphenylether (sum of 6)	1.365	No Data	1.365	0.015
Carbon-tetrachloride	304.711	No Data	304.711	0.804
Cadmium and its compounds	172.003	No Data	172.003	80.411
C10-C13 Chloroalkanes (SCCPs)	90279.236	No Data	90279.236	221.131
Chlorfenvinphos	32.468	No Data	32.468	0.161
Chlorpyrifos (Chlorpyrifos-ethyl)	23.756	No Data	23.756	0.044
Cyclodiene Pesticide: Aldrin	1.554	No Data	1.554	0.040
Cyclodiene Pesticide: Dieldrin	1.554	No Data	1.554	0.040
Cyclodiene Pesticide: Endrin	1.554	No Data	1.554	0.161
Cyclodiene Pesticide: Isodrin	1.554	No Data	1.554	0.040
DDT total	7.524	No Data	7.524	0.281
para-para-DDT	1.563	No Data	1.563	0.040
1,2-Dichloroethane	306.033	No Data	306.033	0.804
Dichloromethane	1520.901	No Data	1520.901	4.021
Di(2-ethylhexyl)phthalate	2956.339	No Data	2956.339	7.355
Diuron	104.198	No Data	104.198	0.835
Endosulphan	3.236	No Data	3.236	0.080
Fluoranthene	24.267	No Data	24.267	0.080
Hexachlorobenzene	1.399	No Data	1.399	0.040
Hexachlorobutadiene	976.590	No Data	976.590	0.161
Total Hexachlorocyclohexane	10.531	No Data	10.531	0.523
Isoproturon	104.198	No Data	104.198	0.080
Lead and its compounds	2189.606	No Data	2189.606	184.276
Mercury and its compounds	28.723	No Data	28.723	225.500
Naphthalene	52.924	No Data	52.924	0.080

Nickel and its compounds	10102.204	No Data	10102.204	201.028
4-Nonylphenol	245.849	No Data	245.849	1.603
4-Octylphenol	125.005	No Data	125.005	0.570
Pentachlorobenzene	1.781	No Data	1.781	No Data
Pentachlorophenol	1220.633	No Data	1220.633	2.948
PAH - Benzo(a)pyrene	6.883	No Data	6.883	0.080
PAH - Benzo(b)fluoranthene	5.493	No Data	5.493	0.080
PAH - Benzo(k)fluoranthene	3.485	No Data	3.485	0.080
PAH - Benzo(g,h,i)perylene	1.531	No Data	1.531	0.080
PAH - Indeno(1,2,3-cd)pyrene	1.779	No Data	1.779	0.080
Simazine	20.292	No Data	20.292	0.070
Tetrachloroethylene	304.180	No Data	304.180	1.023
Trichloroethylene	304.180	No Data	304.180	0.804
(Tributyltin-cation)	1.646	No Data	1.646	0.004
Trichlorobenzenes (all isomers)	2969.977	No Data	2969.977	1.206
Trichloromethane (Chloroform)	562.349	No Data	562.349	9.527
Trifluralin	6.498	No Data	6.498	0.804

4 Chemical Analysis Information

Substance	LoQ (Freshwater)	LOQ Marine Direct Discharge	Units
Alachlor	0.001	NA	μgl^{-1}
1,2-dichloroethane	5	0.1	μgl^{-1}
Aldrin	0.0015	0.005	μgl^{-1}
Anthracene	0.001	0.01	μgl^{-1}
Atrazine	0.001	0.006	μgl^{-1}
Benzene	1.5	1.5	μgl^{-1}
Benzo(a)pyrene	0.002	0.01	μgl^{-1}
Benzo(b)fluoranthene	0.001	0.01	μgl^{-1}
Benzo(g,h,i)perylene	0.0005	0.01	μgl^{-1}
Benzo(k)fluoranthene	0.001	0.01	μgl^{-1}
Cadmium	0.05	10	μgl^{-1}
C10-C13 Chloroalkanes (SCCPs)	0.03	0.03	μgl^{-1}
Carbon Tetrachloride (Tetrachloromethane)	1	0.1	μgl^{-1}
Chlorfenvinphos	0.004	0.02	μgl^{-1}
Chlorpyrifos (Chlorpyrifos-ethyl)	0.004	0.004	μgl^{-1}
DDT ‘pp	0.0015	0.005	μgl^{-1}
DDT (Total)	0.0045	0.035	μgl^{-1}
DEHP (Di(2-ethylhexyl)phthalate)	0.8	0.2	μgl^{-1}
Dichloromethane	0.5	0.5	μgl^{-1}
Dieldrin	0.001	0.005	μgl^{-1}
Diuron	0.025	0.01	μgl^{-1}
Endosulfan	0.018	0.01	μgl^{-1}
Endrin	0.0015	0.02	μgl^{-1}
Fluoranthene	0.001	0.01	μgl^{-1}
Hexachlorobenzene (HCB)	0.002	0.005	μgl^{-1}
Hexachlorocyclohexane (HCH) - alpha	0.001	0.02	μgl^{-1}
Hexachlorocyclohexane (HCH) – beta	0.001	0.02	μgl^{-1}
Hexachlorocyclohexane (HCH) – delta	0.001	0.005	μgl^{-1}
Hexachlorocyclohexane (HCH) - gamma	0.0005	0.02	μgl^{-1}
Isodrin	0.0025	0.005	μgl^{-1}
Isoproturon	0.025	0.01	μgl^{-1}
Indeno(123-cd)pyrene	0.0005	0.01	μgl^{-1}
Lead	0.25	25	μgl^{-1}
Mercury	0.005	5	μgl^{-1}
Naphthalene	0.015	0.01	μgl^{-1}
Nonylphenol 4-Nonylphenol Branched	0.025	0.125	μgl^{-1}
Octylphenol p-tert-Octylphenol	0.025	0.05	μgl^{-1}

Nickel	1.2	25	μgl^{-1}
PBDE 28	0.000002	0.00006	μgl^{-1}
PBDE 47	0.000006	0.00006	μgl^{-1}
PBDE 99	0.000009	0.00006	μgl^{-1}
PBDE 100	0.000013	0.00006	μgl^{-1}
PBDE 153	0.000071	0.00006	μgl^{-1}
PBDE 154	0.000078	0.00006	μgl^{-1}
Pentachlorobenzene	0.001	NA	μgl^{-1}
Pentachlorophenol	0.13	0.4	μgl^{-1}
Simazine	0.005	0.006	μgl^{-1}
Tetrachloroethylene	0.2	0.1	μgl^{-1}
Trichlorobenzenes – 123	0.2	0.05	μgl^{-1}
Trichlorobenzenes – 124	0.3	0.05	μgl^{-1}
Trichlorobenzenes - 135	0.1	0.05	μgl^{-1}
Trichloroethylene	1	0.1	μgl^{-1}
Trichloromethane (chloroform)	2	0.1	μgl^{-1}
Trifluralin	0.001	0.1	μgl^{-1}

NA – Not analysed by the sub-contracting lab.