



## Restoring our Freshwaters: pollution from land management

April 2018

### Summary of key points

- When the UK leaves the EU, if freshwater ecosystems are to be healthy, resilient and fully recover from damaging land management practices, the objectives of the Water Framework Directive, Nitrates Directive and other EU legislation affecting the freshwater environment must continue to be implemented and must be properly enforced.
- Much can be achieved with effective implementation and enforcement of existing legislation and regulation for the freshwater environment, but NRW must be enabled and resourced to enforce the law.
- We know what changes in land management practice are needed to improve water quality, but much of this practice is in guidance and can't be enforced, nor is it independently audited in the majority of cases: a new sustainable land management policy is the opportunity to change this.
- Voluntary measures are no substitute for a baseline of strong regulation.
- Area Statements should be used to identify water quality issues and drive local improvements in water quality, facilitating the work of the River Basin Management Plans.

### Introduction

In 2013 Wales Environment Link (WEL) published *Valuing our Freshwaters*, which identified actions to protect our freshwater environment. These actions are even more relevant today, as we call for the restoration of our freshwaters. WEL cares about the health of our freshwater ecosystems because they provide us with safe drinking water, habitats for our increasingly threatened species and opportunities for recreation and well-being. The health of our freshwaters also affects our coastal waters, with pollution impacting upon our bathing water quality and shellfish fisheries. Pollution of our freshwaters and coastal waters has large economic impacts affecting businesses and the public, as the costs of cleaning our water are passed on through our water bills. Pollution is increasingly affecting our freshwater biodiversity – from the invertebrates at the bottom of the food chain to iconic species such as the Atlantic salmon and freshwater pearl mussel.

The [EU Water Framework Directive](#) (WFD) is the main driver of improvements in water quality across Wales today. It aims to ensure “good status” by 2027, with interim dates for improvement in 2015 and 2021. It also contains a legal requirement for the status of water bodies not to be allowed to deteriorate. The WFD does not apply to freshwater ponds, however, which are vitally important for biodiversity. The top reason for failure of water bodies in Wales is agricultural pollution, followed by abandoned mines and contaminated land, acidification and forestry. **WFD assessments indicate**

**that 171 water bodies in Wales are failing due to agricultural pollution and 61 water bodies are failing due to acidification<sup>1</sup>.**

Under the WFD, River Basin Management Plans (developed by NRW in consultation with stakeholders) are the main vehicle for achieving improvements in freshwater quality. They identify regulatory, policy and practical actions that need to be taken by different actors, such as the Welsh Government, NRW, local authorities, private landowners, communities and NGOs. They represent the most comprehensive level of planning for the freshwater environment and identify links to existing legislation, regulation and Government strategy and policy. They are further broken down into catchment level plans. Article 14 requires legislators to include appropriate stakeholders in planning, but currently there are important stakeholder groups that do not include all relevant stakeholders, for example the NRW subgroup reporting back to the Welsh Government on managing farm pollution.

The main types of pollution affecting freshwaters in Wales are:

### **Diffuse**

- acidification (from air pollution, exacerbated by forestry location and design – particularly where there is conifer monoculture plantation on peatland)
- nitrate pollution (from inorganic fertilisers, farmyard slurry and poultry litter, car emissions and soil-water run-off from farmland)
- phosphate pollution (farmland soil-water run-off due to inorganic fertilisers, farmyard slurry and poultry litter)
- pesticide leaching

### **Point-source**

- agricultural waste mismanagement (including livestock defecating directly into streams and rivers)
- contaminated waters from mines (largely abandoned mines)
- silt and soil (from farming and forest harvesting)
- pesticide use (spills, runoff or over-spray)

There is a plethora of EU, UK and Welsh legislation, regulation, policy and guidance that provides both regulatory and practical land management solutions to the problems of freshwater pollution (see Annex 1), and many of our water bodies are slowly recovering from a degraded baseline. However, when the UK leaves the EU, we could lose much of the framework legislation that is currently driving all this positive action, including the Water Framework Directive and cross-compliance measures under the Common Agricultural Policy (CAP). WEL members are also concerned that if the environmental principles from the Treaty of the Functioning of the EU are not brought over along with the EU acquis, the polluter pays principle may carry less weight in the design and implementation of policy and legislation.

In this paper, we examine the ongoing barriers to a resilient, clean freshwater environment.

## **Agricultural Pollution**

Pollution from agriculture is widespread in Wales, and a major reason for waterbodies failing WFD good status. This includes nitrate and phosphate pollution, pesticides and soil erosion resulting in siltation of watercourses. There are both regulatory and voluntary measures (in the form of detailed land management guidance) that tackle agricultural diffuse pollution.

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<sup>1</sup> NRW - Diffuse Water Pollution in Wales Issues, solutions and engagement for action  
<https://naturalresources.wales/media/4059/diffuse-water-pollution-in-wales.pdf>

## Slurry, silage and manure

In recent years there have been some serious point source pollution events affecting rivers in Wales, such as the slurry [pollution incident on the River Teifi](#) in December 2016 that killed 1000 fish. WEL fears that such incidents will become more frequent and widespread in future if significant action is not taken. In part this is due to post-Brexit pressure on farmers to intensify production to make their business economically viable, as evidenced by dairy farmers' intentions to expand herd size and overall production<sup>2</sup> and the increased applications for intensive poultry units in mid-Wales.

We recognise the costs involved in maintaining and upgrading, or increasing the capacity of storage facilities for slurry and silage, and ensuring the safe application of manure, but this is essential if such incidents are to be prevented. In recent years, we have seen an increase in planning applications for intensive poultry, pig and dairy farms which have an increased waste output. 81% of ammonia emissions come from agriculture<sup>3</sup> and the current proliferation in the intensive poultry units are contributing to the continuing high levels of these emissions<sup>4</sup> as well as phosphate. Most proposals for new units are just under the limit requiring detailed regulatory approval, with the result that the substantive combined impacts are not being assessed or mitigated. Much of this ammonia is returned from the air into nearby water bodies.<sup>5</sup>

We are concerned that applications are being approved without giving sufficient attention to

- a) the need to upgrade the slurry and waste management capacity of these farms in line with increased numbers of livestock/poultry;
- b) the ability of farms to dispose of these waste products without causing environmental damage;
- c) adequate risk management, and clear acceptance of responsibility for the consequences of incidents; or
- d) the cumulative environmental impact of such enterprises, which may be making it more difficult for Wales to deliver on its statutory obligations in respect of freshwater quality and the favourable conservation status of designated sites.

## Soil erosion

Soil erosion, particularly from arable land and from clear-fell forestry directly causes additional sediment load in streams and rivers. Increased water run-off from badly trampled pasture and unprotected, eroding stream banks also contribute. The proliferation of invasive, non-native species (INNS) such as Himalayan balsam, is also an important cause of river bank erosion. This loss of soil has a negative impact on the resilience of ecosystems, not only by polluting the freshwater environment, but in terms of availability for food production. According to a 2010-11 Defra study, the total quantified costs of soil degradation in England and Wales are estimated at between £0.9 bn and £1.2 bn per year.<sup>6</sup> Across the EU, soil erosion affects over 12 million hectares of land – about 7.2% of the total agricultural land – and leads to €1.25 billion loss in crop productivity.<sup>7</sup>

Changes in recent decades such as increase in field size, loss of hedgerows and use of heavier machinery have increased the risk of soil erosion. Climate change and predicted increase in frequency of severe weather events is likely to magnify the impact of erosion (DEFRA, 2009).

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<sup>2</sup> <http://www.dairy.ahdb.org.uk/media/1670698/WelshEUConditionalAidScheme%20FULL%20WEB.pdf>

<sup>3</sup> [http://naei.beis.gov.uk/overview/pollutants?pollutant\\_id=21](http://naei.beis.gov.uk/overview/pollutants?pollutant_id=21)

<sup>4</sup> [https://uk-air.defra.gov.uk/assets/documents/reports/cat07/1710060932\\_DA\\_Air\\_Quality\\_Pollutant\\_Inventories\\_1990-2015\\_v01-01.pdf](https://uk-air.defra.gov.uk/assets/documents/reports/cat07/1710060932_DA_Air_Quality_Pollutant_Inventories_1990-2015_v01-01.pdf)

<sup>5</sup> <https://www.omicsonline.org/open-access/nitrogen-sources-and-cycling-in-the-ecosystem-and-its-role-in-air-water-and-soil-pollution-a-critical-review-2375-4397-1000136.php?aid=46511>

<sup>6</sup> Defra (2010-11) SID5 Costs of Soil Degradation

<sup>7</sup> <https://ec.europa.eu/jrc/en/news/soil-erosion-costs-european-farmers-125-billion-year>

In an assessment for the restoration plan for the lower Wye SSSI, high sediment loading was observed in the Lower Wye, particularly at the confluence with tributaries, such as the River Monnow at Monmouth. The report states that “This is likely to have been sourced from the adjacent agricultural land which has insufficient riparian buffer zone to trap sediment carried in hill slope runoff before it reaches the main channel. There were many locations along the Lower Wye where degraded riparian buffer zone was observed.”<sup>8</sup>

## Buffer strips

The value of riparian buffer strips in reducing diffuse pollution impacts and in aiding flood mitigation has been well documented<sup>9</sup> and recognised as an essential technique in catchment sensitive farming and have been adopted into agri-environment schemes in both England and Wales.

Well-designed green infrastructure, including the careful use of trees on farms, can do much to mitigate pollution impacts.<sup>10</sup> Woodland buffers on mid-slope and down slope field edges, can be effective in increasing water infiltration<sup>11</sup> reducing and slowing runoff and intercepting nutrient and sediment. Studies at Pontbren in mid-Wales found that water infiltration increased by 60 times within 5m of tree shelter belts after just 3 years of planting<sup>12</sup>. Wetland systems can also be used to buffer sensitive areas and tackle leaching of pollutants, whilst providing important habitats for wildlife.

## Pesticides

The use of pesticides in agriculture has been a hot topic of debate in recent years, with the EU planning to ban certain pesticides, in particular neonicotinoids, due to the harmful effects they have on pollinators. The impacts on our freshwater have received much less attention but are no less devastating. Buglife have produced a UK report<sup>13</sup> on the impacts of neonicotinoids on freshwaters across the UK showing that over half of freshwaters surveyed exceeded chronic levels of toxicity. This has impacts on freshwater invertebrates, fish and other freshwater species. It also threatens the safety of our drinking water.

The sample size from rivers in Wales was small, but it did find evidence of neonicotinoid pollution in one of the three rivers sampled. It also identified a lack of monitoring for pesticide pollution, which needs to be addressed so policymakers have a clear picture of the likely impacts for Wales.

## Forestry-derived pollution

The main pollution issues from forestry practices are:

- acidification
- pesticides

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<sup>8</sup> [http://www.therrc.co.uk/sites/default/files/files/Designated\\_Rivers/wyedrafttechnicalreport.pdf](http://www.therrc.co.uk/sites/default/files/files/Designated_Rivers/wyedrafttechnicalreport.pdf)  
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<sup>9</sup> [http://evidence.environment-agency.gov.uk/FCERM/Libraries/FCERM\\_Project\\_Documents/Working\\_with\\_natural\\_processes\\_evidence\\_directory\\_appendix\\_2\\_literature\\_review.sflb.ashx](http://evidence.environment-agency.gov.uk/FCERM/Libraries/FCERM_Project_Documents/Working_with_natural_processes_evidence_directory_appendix_2_literature_review.sflb.ashx)

<sup>10</sup> <https://www.woodlandtrust.org.uk/mediafile/100263184/rr-wt-71014-planting-trees-to-protect-water.pdf?cb=e8ec241543fc42429dfcdd9f6f81bc0d>

<sup>11</sup> [https://www.forestry.gov.uk/pdf/FRMG004\\_Woodland4Water.pdf/\\$FILE/FRMG004\\_Woodland4Water.pdf](https://www.forestry.gov.uk/pdf/FRMG004_Woodland4Water.pdf/$FILE/FRMG004_Woodland4Water.pdf)

<sup>12</sup> Bird S.B., Emmett B.A., Sinclair F.L., Stevens P.A., Reynolds B., Nicholson S. and Jones T. (2003) Pontbren: Effects of tree planting on agricultural soils and their functions, Final Report, March 2003, available at: [http://www.ceh.ac.uk/sections/bef/Pontbren\\_report.html](http://www.ceh.ac.uk/sections/bef/Pontbren_report.html)

<sup>13</sup> Neonicotinoids Insecticides in British Freshwaters - 2016 Water Framework Directive Watch List Monitoring Results and Recommendations' (Shardlow 2017)

- siltation of watercourses following clear-felling

Woodland canopies, both broadleaf and conifer, intercept airborne pollutants such as sulphates and nitrates and this leads to increases in surface water acidity in catchments with high levels of woodland cover. The level of such diffuse pollution is on a general downward trend. However soils are responding slowly to high deposition levels from the last 50 years, and levels are projected to remain substantially higher than a century ago<sup>14</sup>. Afforested catchments are particularly concentrated in the uplands and there has only been limited recovery in streams in these catchments. Acidification remains an issue in acid sensitive catchments where soils have no buffering capacity. The acidification episodes are often short-term in the form of a pulse released during or immediately after a storm event and these pulses of acidity can outweigh the impact of gradual long term trends.

Extensive drainage installation for the establishment of forestry plantations at high altitudes, and especially where planted on peat, are a known past cause of acidification of freshwaters. Such drainage can cause on-going water quality issues. Establishment of commercial forests on peat should no longer happen as there is evidence to show this impact is worse for conifer plantations.

Point source pollution from forestry can arise from new drainage works prior to afforestation, from siltation associated with harvesting operations and from pesticide applications. The application of pesticides such as Cypermethrin, and more recently neonicotinoids, have taken their toll on freshwater invertebrates, reducing the sustainability of the freshwater and riparian food chain and contributing (along with agriculture) to what has recently been acknowledged as a massive reduction in insect species globally. In Wales, we understand that Cypermethrin is no longer used on the Welsh Government forest estate, but it is difficult to monitor pesticide use on privately owned and managed plantations.

Whilst the use of neonicotinoids in forestry is low compared to agriculture and horticulture, their use in forestry has a particular impact in upper catchment streams, which constitute important fish spawning grounds. Implementation of recommendations on increasing continuous cover forestry, and the introduction of biological control of weevils, should negate the need to use such pesticides in forestry.

Watercourses in forested areas also suffer from siltation when timber is harvested using clear-felling methods. Removing all the tree cover has a big impact in re-wetting soils, and the soil compaction and rutting associated with poorly managed timber harvesting can greatly reduce water infiltration and increase overland flow and sediment delivery to watercourses.<sup>15</sup> Forest roads and tracks can also contribute to this if they are not properly designed to ensure drainage does not enter forest streams and rivers.

WEL notes that the UK Forest Standard provides detailed guidance on minimum requirements for sustainable forest design and management. There is also Forestry Commission guidance on managing water pollution and managing forests in acid sensitive catchments, and a Woodlands for Wales policy statement on water and soil, with associated action plan.

We note that the UK Woodland Assurance Scheme (UKWAS) is currently the strongest mechanism for independently auditing sustainable forest management, and is the only mechanism available that monitors the extent to which guidance is actually implemented.

Regulation and guidance covers

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<sup>14</sup> [https://www.rivm.nl/media/documenten/cce/Workshops/Wallingford/Presentations/ICPMM\\_2017/Topic-2/4\\_UlliDragosits\\_UK\\_DepHist.pdf](https://www.rivm.nl/media/documenten/cce/Workshops/Wallingford/Presentations/ICPMM_2017/Topic-2/4_UlliDragosits_UK_DepHist.pdf)

<sup>15</sup> BIRKINSHAW, S.J., BATHURST, J.C., IROUMÉ, A. AND PALACIOS, H., 2011. The effect of forest cover on peak flow and sediment discharge – an integrated field and modelling study in central-southern Chile. *Hydrological Processes*, 25 (8), 1284-1297.

- forest design to reduce the pollutant scavenging effect of forests;
- assessment of impacts on Natura 2000 sites;
- use of riparian broadleaved buffer strips alongside watercourses to protect against acidification, pesticide pollution and soil erosion;
- legal requirements for pesticide usage;
- legal requirements for oil and fuel storage;
- design of forest roads and tracks to prevent pollution of watercourses from run-off;
- the benefits of ground covering vegetation in forests (with additional benefits for biodiversity as well as pollution mitigation);
- the benefits of continuous cover methods of felling, which not only reduce soil erosion but help to control pests such as pine weevil without the need for large inputs of pesticides and have a less dramatic impact on the landscape; and
- protection of open habitats such as blanket bog and wetlands that contribute to maintaining water quality and water flow regulation.

Recent NRW guidance gives specific recommendations on mitigating acidification, but is very tentatively worded.<sup>16</sup> Following this will reduce impacts but not prevent them entirely.

Measures recommended by NRW for the management of existing forests are:

- consider converting to continuous cover forestry or low impact silvicultural systems where possible;
- aim for early clearance of and increasing size of riparian zones, including those around narrow channels (<1m);
- aim to realign drains to remove linkages between artificial forest drainage and natural watercourses;
- aim to maintain boggy or wet areas as open space;
- disconnect roadside drains from natural watercourses; and
- avoid whole tree harvesting and ensure all watercourses (natural or artificial) are kept clear of any brash.

Further recommendations are made for new forest design, particularly relating to diversity of species, constraints on the construction of drainage and forest roads and the protection of riparian zones.

## What needs to be done to restore our freshwaters?

### 1. Effective planning and regulation

We need an effective planning and regulatory framework to ensure that we can implement improvement, and meet our legal WFD duty to ensure no deterioration of the freshwater environment. This should include:

- retention of the objectives of the Water Framework Directive, Nitrates Directive and other EU legislation affecting the freshwater environment in domestic law;
- NRW and Local Authorities pausing any granting of permissions (planning applications and permits) and NRW undertaking an assessment of in-combination effects on water and air quality (including compliance checks) for each catchment with Intensive Livestock Units (ILU);
- introduction of General Binding Rules or Basic Measures for land management, Water Protection Zones and/or new Nitrate Vulnerable Zones, replacing cross-compliance measures under the CAP, which must be complied with in order for land managers to receive public money;

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<sup>16</sup> <http://naturalresourceswales.gov.uk/media/679496/gn001-acidification-english.pdf>

- application of regulations to pre-1991 farm waste facilities to ensure pollution incidents do not occur due to failure of old facilities that are no longer fit for purpose;
- permanently banning Neonicotinoid pesticides and Cypermethrin from use in land management in Wales, and taking a precautionary approach to the introduction of new pesticides to ensure they do not harm our insects and pollute our waters;
- rigorous application of the UK Forestry Standard, with both the public forest estate and commercial foresters held to account via an independently audited scheme such as UKWAS;
- a mandatory requirement for new commercial plantings to design in the various recommendations made for the mitigation of acidification, including the need for continuous cover forests containing a more diverse range of species; and
- an NRW review of how the peat assessment tool is used in relation to restocking, to ensure planting on peat soils is not happening through misuse of this tool.

## **2. Strong enforcement**

WEL believes that an effective enforcement system needs to:

- tackle breaches of statutory requirements more effectively: polluters should pay fines that are proportionate to the turnover of their business, and land managers in receipt of public funding should demonstrate that they are delivering above and beyond statutory requirements;
- swiftly act upon regulatory breaches in relation to slurry/manure/waste management using a suite of solutions, including
  - NRW taking a targeted, proactive approach to enforcement in the areas most affected by pollution, combining advice to land managers with a willingness to fine polluters heavily where required; and
  - expanding the use of new technologies such as Lidar and GIS, which allow monitoring to take place continuously and issues to be identified before they become incidents.
- comprehensively monitor the cumulative impact of multiple new intensive livestock and poultry units on water quality and biodiversity; and
- ensure local authorities undertake their obligations under TAN5 in relation to cumulative impacts on designated sites (planning guidance specifically on the appropriate siting of intensive units may be necessary).

## **3. A new sustainable land management scheme**

Any new sustainable land management scheme for Wales should include priority actions for the freshwater environment including:

- riparian buffer strips and other green infrastructure, such as wetland buffers (Integrated Constructed Wetlands), designed alongside watercourses and other sensitive habitats to filter out chemicals, nitrates, phosphates, fine sediments and faecal pollutants;
- action to improve the abundance and quality of freshwater ponds;
- supporting land managers to effectively and appropriately tackle INNS alongside watercourses (this may require provision of expert advice to ensure it is managed correctly);
- the avoidance of bare earth in arable agriculture through the adoption of undersowing with appropriate cover crops, or minimum or zero tillage
- a stronger approach aimed at eliminating nitrate and phosphate pollution through regulation (for example, to prohibit the practice of field storage and spreading of poultry litter) and advice;
- sustainable accreditation for farmers to include training on how to create and implement an effective Farm Nutrient Management Plan that works on the basis of low-input systems;
- investigation of new solutions to slurry storage and waste management, such as the Gelli Aur project to investigate ways of de-watering and purifying slurry in order to reduce the volume of waste that needs to be stored;

- where catchments are acidified due to pollution from agriculture, forestry or mines, in addition to catchment restoration work, mitigation measures such as liming should continue to be undertaken following assessment of their ongoing suitability for the local environment; and
- the restoration of afforested peat sites to improve ecosystem resilience and secure the wider benefits peatland restoration provides.

**Wales Environment Link (WEL)** is a network of environmental, countryside and heritage Non-Governmental Organisations in Wales, most of whom have an all-Wales remit. WEL is a respected intermediary body between the government and the environmental NGO sector in Wales. Our vision is a healthy, sustainably managed environment and countryside with safeguarded heritage in which the people of Wales and future generations can prosper.

This position statement represents the consensus view of a group of WEL members working in this specialist area. Members may also produce information individually in order to raise more detailed issues that are important to their particular organisation.

