

Water for life and livelihoods



Dee River Basin District: Challenges and choices Facts and statistics

Background information

On 1 April Natural Resources Wales brought together the work of the Countryside Council for Wales, Environment Agency Wales and Forestry Commission Wales, as well as some functions of Welsh Government. Our purpose is to ensure that the natural resources of Wales are sustainably maintained, used and enhanced, now and in the future.

We will work for the communities of Wales to protect people and their homes as much as possible from environmental incidents like flooding and pollution. We will provide opportunities for them to learn, use and benefit from Wales' natural resources.

We will work for Wales' economy and enable the sustainable use of natural resources to support jobs & enterprise. We will help businesses and developers to understand and consider environmental limits when they make important decisions.

We will work to maintain and improve the quality of the environment for everyone. We will work towards making the environment and natural resources more resilient to climate change and other pressures.

This consultation has been produced to comply with the requirements of The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003, Regulation 12(1)(b) to “...not less than two years before the beginning of the plan period, publish a summary of the significant water management matters ... for consideration in relation to the river basin district”.

Front page photo credit – Dwr Cymru Welsh Water

Natural Resources Wales
29 Newport road
Cardiff
CF24 0TP
Email:
deerbd@naturalresourceswales.gov.uk
www.naturalresourceswales.gov.uk

All rights reserved. This document may be reproduced with prior permission of Natural Resources Wales.

Further copies of this report are available by contacting Natural Resources Wales on 0300 0653000 or by Email: deerbd@naturalresourceswales.gov.uk

Dee River Basin District: Facts and statistics

Contents

Current condition.....	2
Investigations programme.....	6
Protected areas.....	8
Climate change.....	16
Glossary of Terms.....	18
Further Information.....	22

List of maps, tables and graphs

Table 1 shows the 2009/2012 good or better ecological status for all water bodies	2
Figure 1 and 2 maps for 2009/2012 ecological status for transitional and surface waters (RBD).....	3
Figure 3 map for 2009 quantitative and chemical status of groundwater bodies	4
Figure 4 graph for ecological status for surface water bodies in 2009, 2010, 2011 and 2012	4
Table 2 shows the 2009/2012 good or better ecological status for different elements	5
Figure 5 graph of the significant issues affecting water bodies at RBD level	7
Figure 6 graph of the significant issues affecting water bodies by the sector	8
Figure 7 map for drinking water protected areas	10
Figure 8 map for groundwater safeguard zones	11
Figure 9 map for bathing water protected areas	12
Figure 10 map for freshwater fish and shellfish waters	13
Figure 11 map for water dependant SACs and special protection areas.....	14
Figure 12 map for Nitrate vulnerable zones and UWWT	15

Current condition and classification

The first Dee River Basin Management Plan published in December 2009 showed that 28% of surface waters met good ecological status/potential or better and 72% did not. By 2012, 30% of surface waters were at good ecological status/potential or better.

In 2009 83% of groundwater bodies were at good quantitative status and good chemical status. The groundwater classification will be updated for the next river basin management plan. Transitional waters in the Dee RBD did not meet good ecological status/potential in either 2009 or 2012 (see maps below).

The 2009 classification provides the baseline which is used for the current status of water bodies. Natural Resources Wales and the Environment Agency monitor our waters every year so that we can build a picture of how the environment is changing. Annual classification reviews provide an interim result which indicates the general direction of travel. These support but do not replace the 2009 baseline. Annual updates are intended to identify overall, year-on-year changes in status. A formal review of progress will be reported to Government (and Europe) in December 2015 when the next Dee River Basin Management Plan is published.

Table 1 below shows a summary of all water body types in the Dee RBD that met good ecological status/potential in 2009 and 2012.

Table 1: 2009 and 2012 good or better ecological status for all water bodies

Category	Total number of Water bodies	Number of Water bodies 'good or better' 2009	Percentage 2009	Number of Water bodies 'good or better' 2012	Percentage 2012
Canal	1	1	100	1	100
Lake	21	9	43	6	29
River	86	21	24	26	30
Transitional	1	0	0	0	0
Groundwater	6	4	67	n/a	n/a

The maps below show the ecological status of surface water, transitional and groundwater bodies in 2009 and 2012.

Figure 1: 2009 ecological status for transitional and surface water bodies

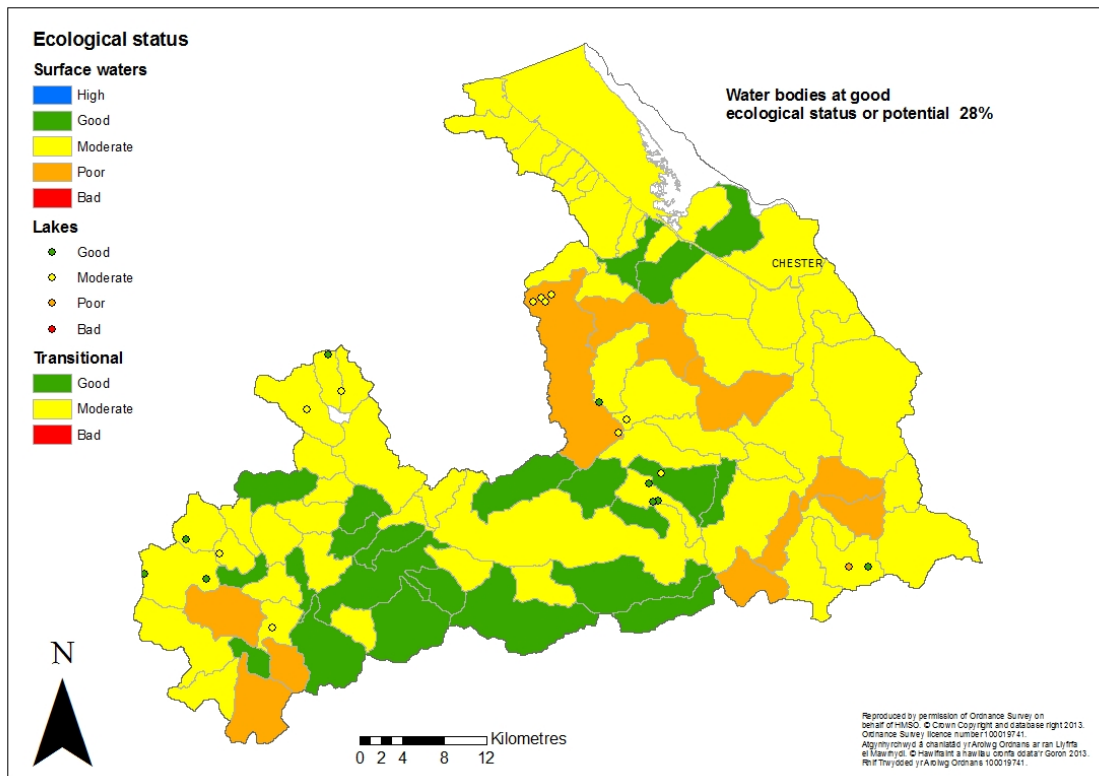


Figure 2: 2012 ecological status for transitional and surface water bodies

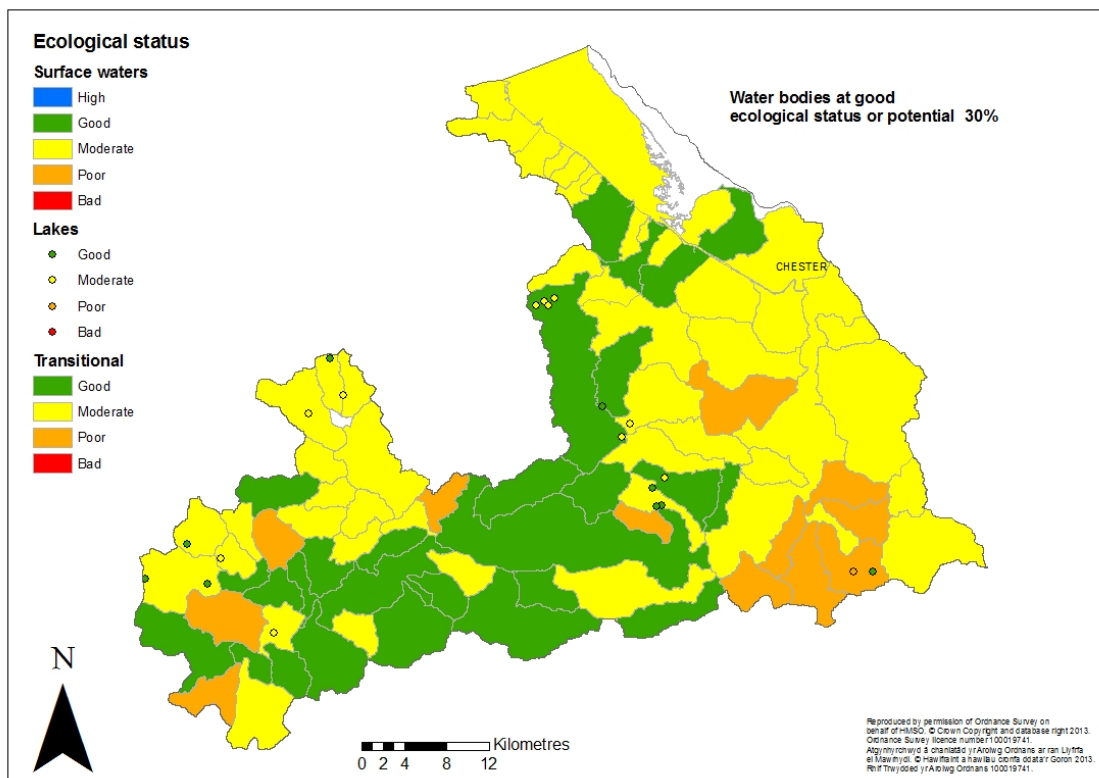
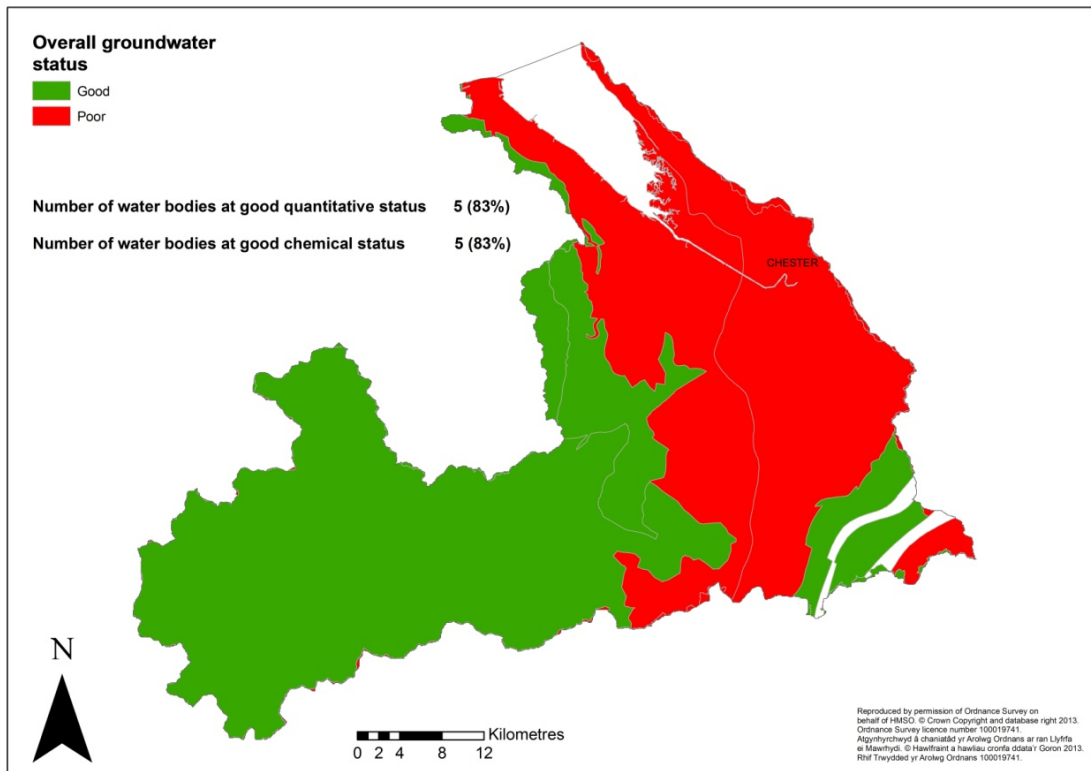


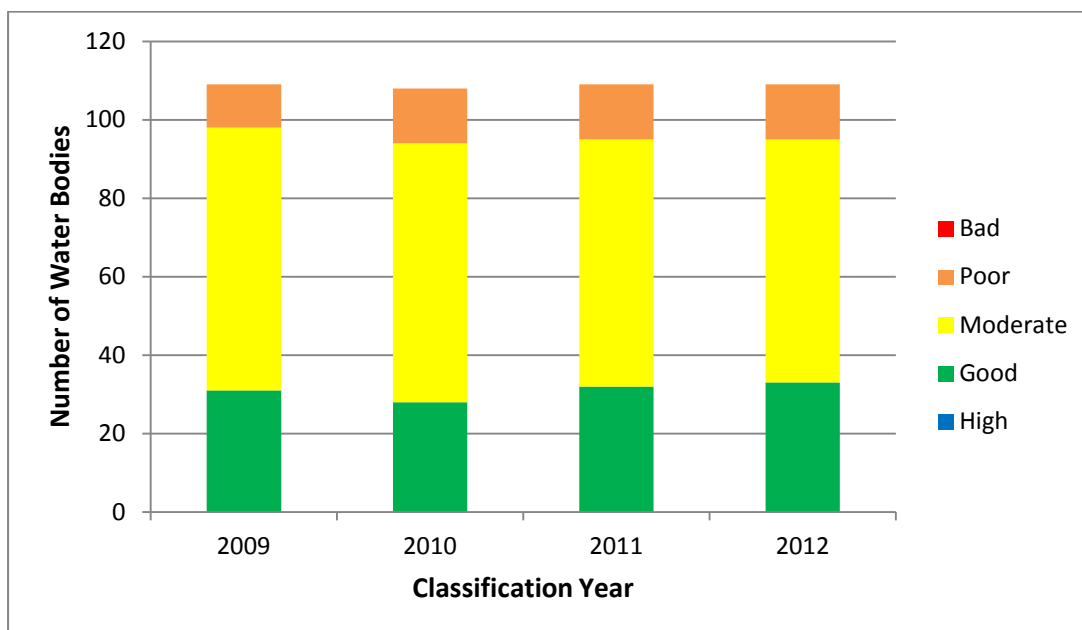
Figure 3: 2009 quantitative and chemical status of groundwater bodies



Changes in classification status

Figure 4 shows the change in ecological status of surface water bodies between 2009 and 2012 (high, good, moderate, poor or bad), and also the percentage of water body change for some individual elements between 2009 and 2012.

Figure 4: Ecological status for surface water bodies in 2009, 2010, 2011 and 2012



Note : there is no updated classification for groundwater bodies for interim years.

There has been a 2% improvement in the number of surface water bodies achieving good ecological status in the Dee River Basin District (RBD) since 2009. However this is not always the case when the data is looked at from an elemental level. The table below shows examples of changes in the percentage of water bodies at good or better status **for individual elements** between 2009 and 2012.

Table 2: 2009 and 2012 good or better ecological status for different elements

Biological Element	% of water bodies at good or better status for the element	
	2009	2012
Diatoms	83	69
Fish	42	58
Invertebrates	88	86
Macrophytes	54	55
Physico Chemical Element	2009	2012
Ammonia	96	92
Dissolved Oxygen	95	93
Phosphate	71	75

There are a number of reasons why some of the classification results in 2012 show deterioration from 2009. These include:

- **Improved and increased monitoring and data.** Our monitoring programme has changed since 2009 (including re-location of sampling points and monitoring new elements). It has improved our understanding of the water environment and based on what we know now, some water bodies have been recorded as having a lower ecological status. We are not able to monitor all waters, or for every element.
- **Recent environmental conditions.** Lower natural flows in rivers as a consequence of two dry winters (2010 and 2011) and a period of environmental stress due to rainfall stress, has influenced the deterioration of some elements by increasing the concentration of pollution.
- **The 'one out, all out' classification rule.** Ecological status is based on the worst failing element, termed the 'one out, all out' rule; improvements in individual elements therefore can be masked in the ecological status overall.

Investigations Programme

Since the River Basin Management Plans were published in 2009, Natural Resources Wales and the Environment Agency have carried out an extensive investigations programme (over 150 investigations not including those to ensure ‘no deterioration’) in the Dee RBD to find out why many water bodies are not in good condition. Our knowledge and understanding of the issues affecting water bodies has increased significantly. As a result, we are now in a better position to work with our partners to identify where the greatest environmental improvements can be made, which will provide the most benefit to everyone. Our investigations confirmed that the main reasons why water bodies are not in a good condition relate to issues such as, physical modifications and diffuse pollution from rural areas.

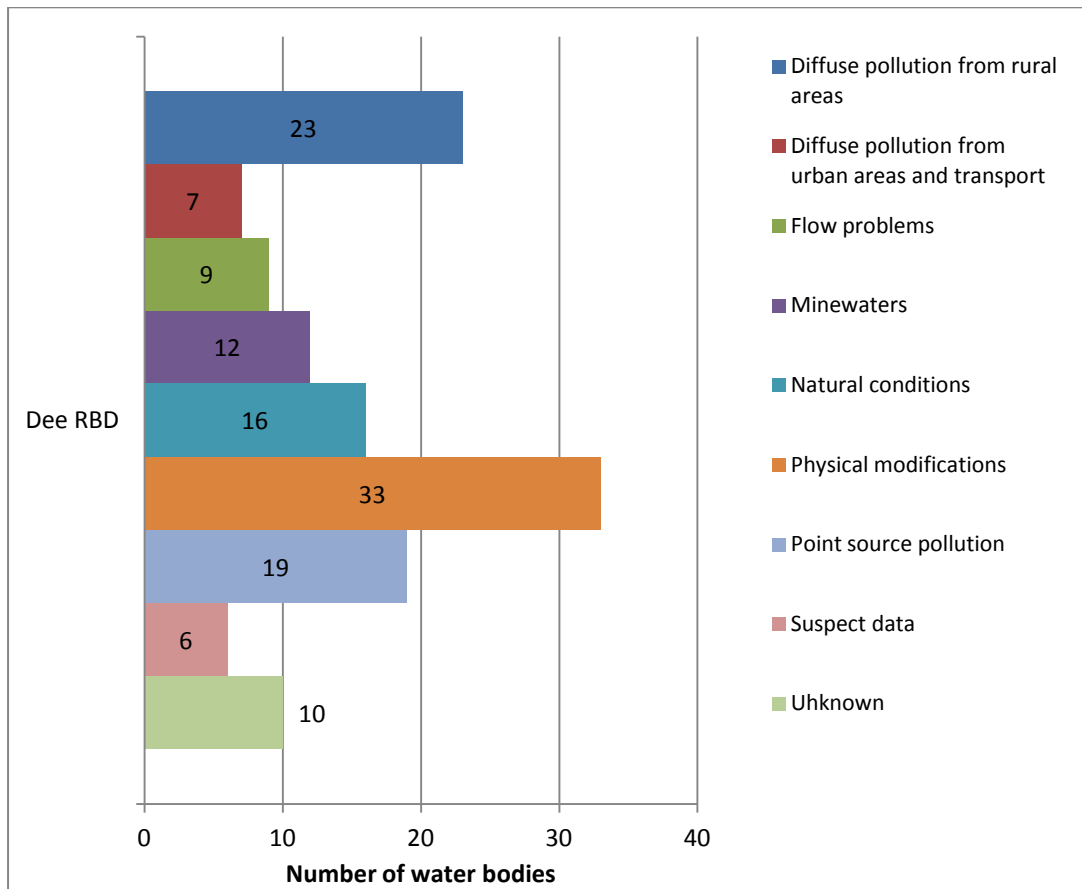
We have carried out:

- **35** investigations to confirm if a water body is not in good condition, where we had doubt in 2009.
- **85** investigations to find out why a water body is not in good condition. Figures 7 and 9 show our findings of these investigations.
- **31** further investigations are underway or planned to decide what actions could be taken to deal with the problem.

We have used the outputs from these investigations to update the ‘Reason for Failure’ database. Through analysis of this data we have improved our understanding of the cause of failures and subsequently identified what we think the big issues are in the Dee RBD. These issues are the basis of the Challenges and Choices consultation. Further detail on how the data was used to identify the big issues is available from ceri.jones@naturalresourceswales.gov.uk.

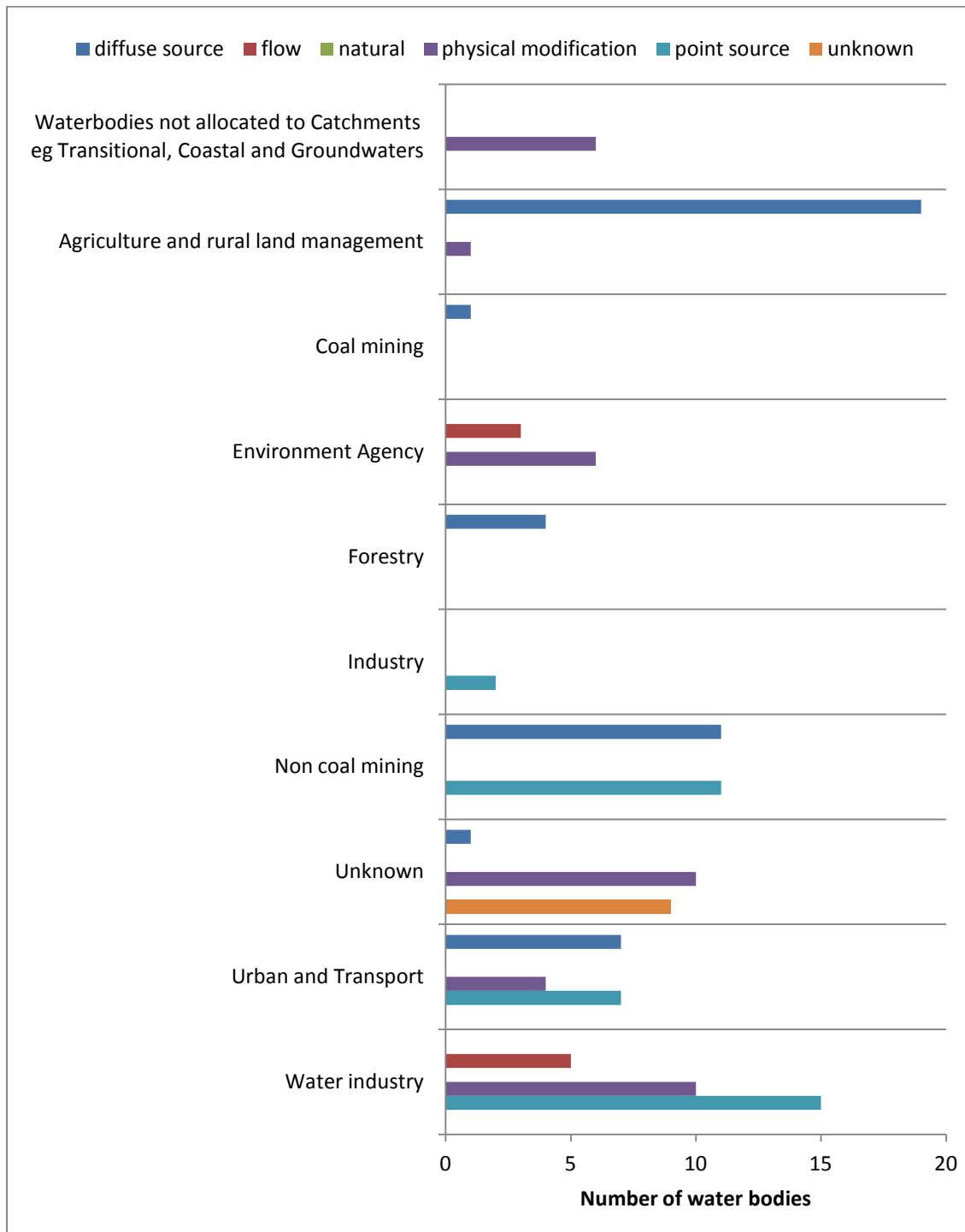
The graphs below provide an indication of the types of pressures acting on our water bodies, which in turn highlight the issues or challenges preventing water bodies achieving ‘good status/potential’ in the Dee RBD.

Figure 5: Significant water management issues in the Dee RBD (January 2013 'Reasons for Failure' data)



Note: The data above includes failures due to 'natural conditions' for example, a natural barrier to fish movement such as waterfalls or low flows caused by a natural occurrence such as a swallow hole. There are instances of suspect data which we are working hard to resolve and some unknowns, where we were unable to identify the reason for failure or the investigation was incomplete at the time of writing.

Figure 6: Number of water bodies failing by sector (January 2013 'Reasons for Failure' data)



Protected areas

There are many areas in the Dee RBD where the water environment is particularly important. These areas include rare wildlife habitats, bathing waters and areas where

drinking water is taken from. Known as 'protected areas', these areas are given particular legal protection. Protected areas are a priority for action to make sure that they meet their statutory objectives and can continue to provide their special uses.

The protected area locations in the Dee RBD are shown in Figures 7 to 12.

Natural Resources Wales is currently reviewing all Protected Area management plans, including the status of each of the features contained within the Protected Area. These are expected to be updated in time for the draft River Basin Management Plan consultation in June 2014. If you require details for specific features within a Protected Area please contact ceri.jones@naturalresourceswales.gov.uk

Figure 7: Drinking Water Protected Areas

Drinking Water Protected Areas (DrWPAs) ensure that the drinking water produced meets the requirements of the Drinking Water Directive and protects against deterioration in water quality.

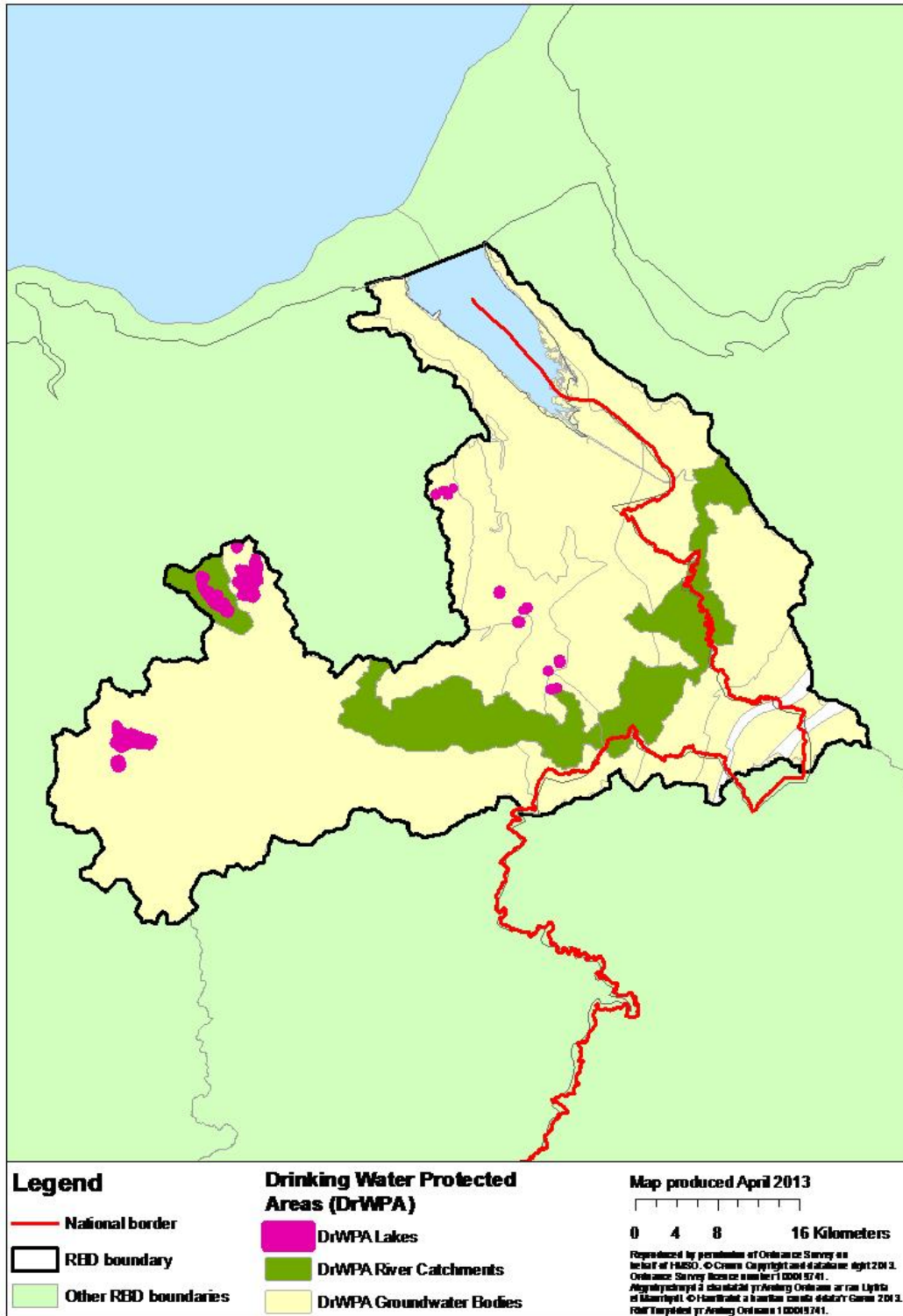


Figure 8: Groundwater Safeguard Zones

Groundwater Safeguard Zones ensure that the water produced meets the requirements of the Drinking Water Directive and protects against deterioration in water quality.

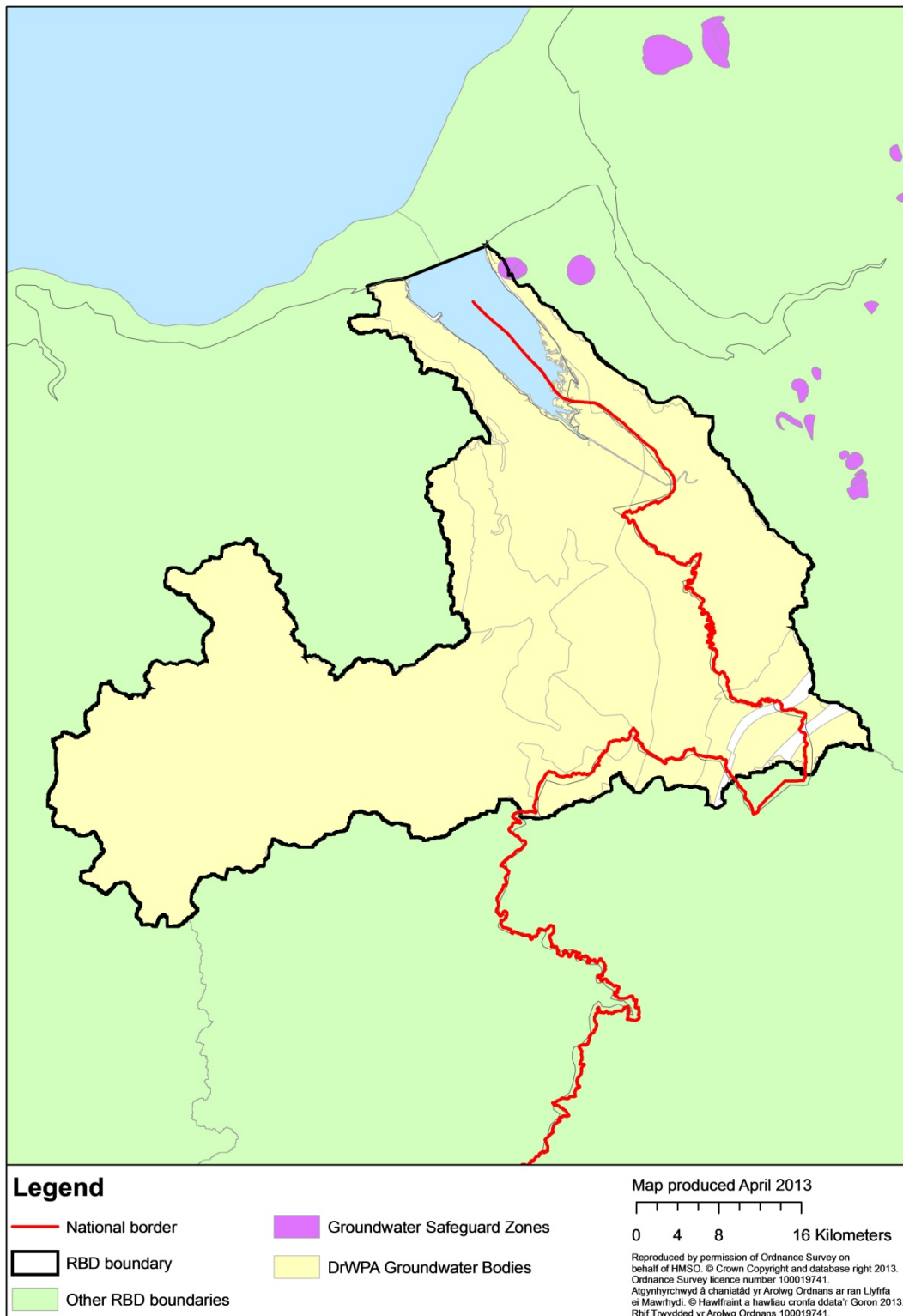


Figure 9: Bathing Water Protected Areas

Bathing waters are protected under the Bathing Water Directive to ensure that water quality at bathing beaches is regulated to protect human health and the environment.

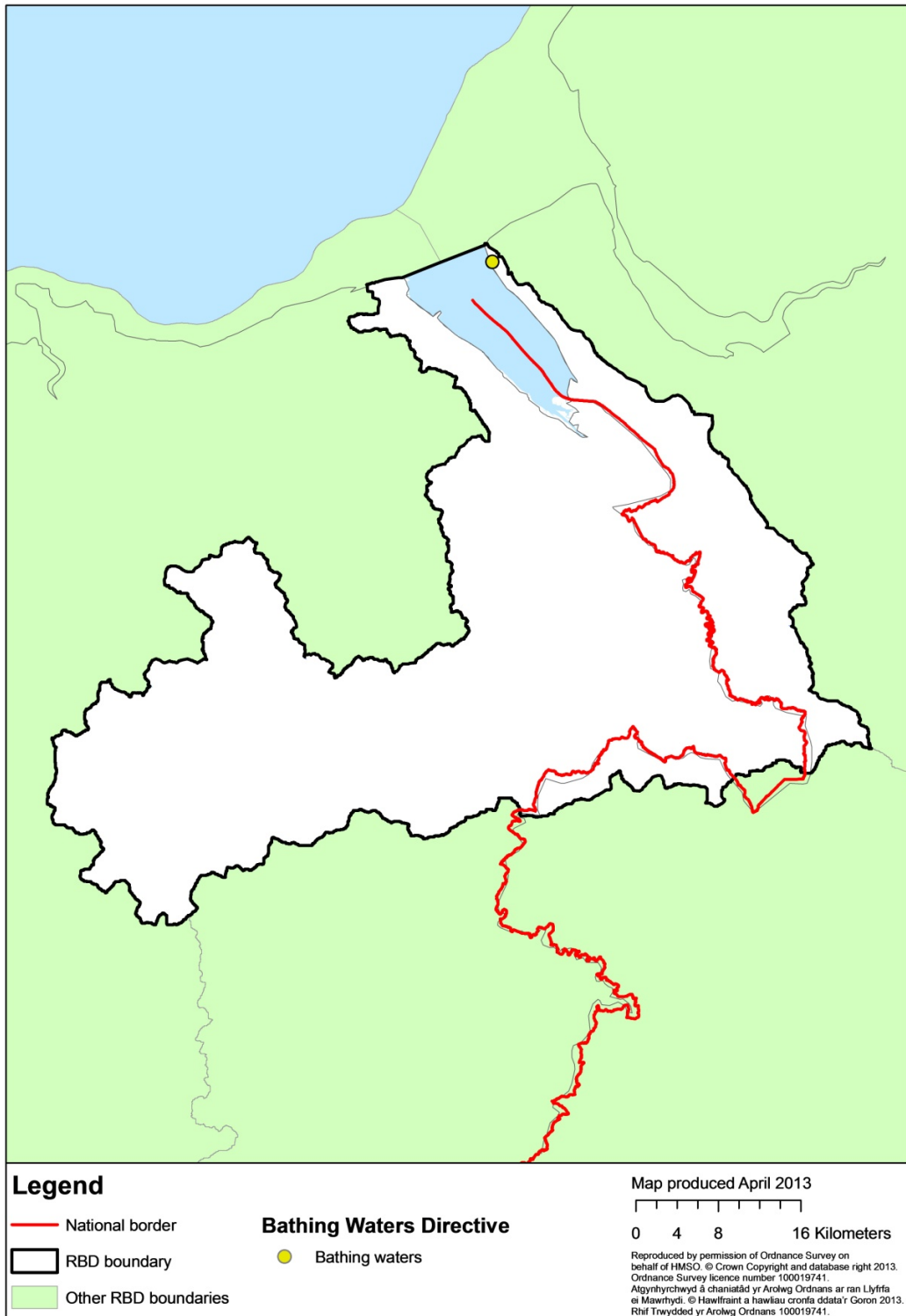


Figure 10: Freshwater Fish and Shellfish Waters

These are water bodies that are protected under the Shellfish Directive and/ or the Freshwater Fish Directive to protect or improve the quality of freshwaters and shellfish waters to enable them to support fish and shellfish.

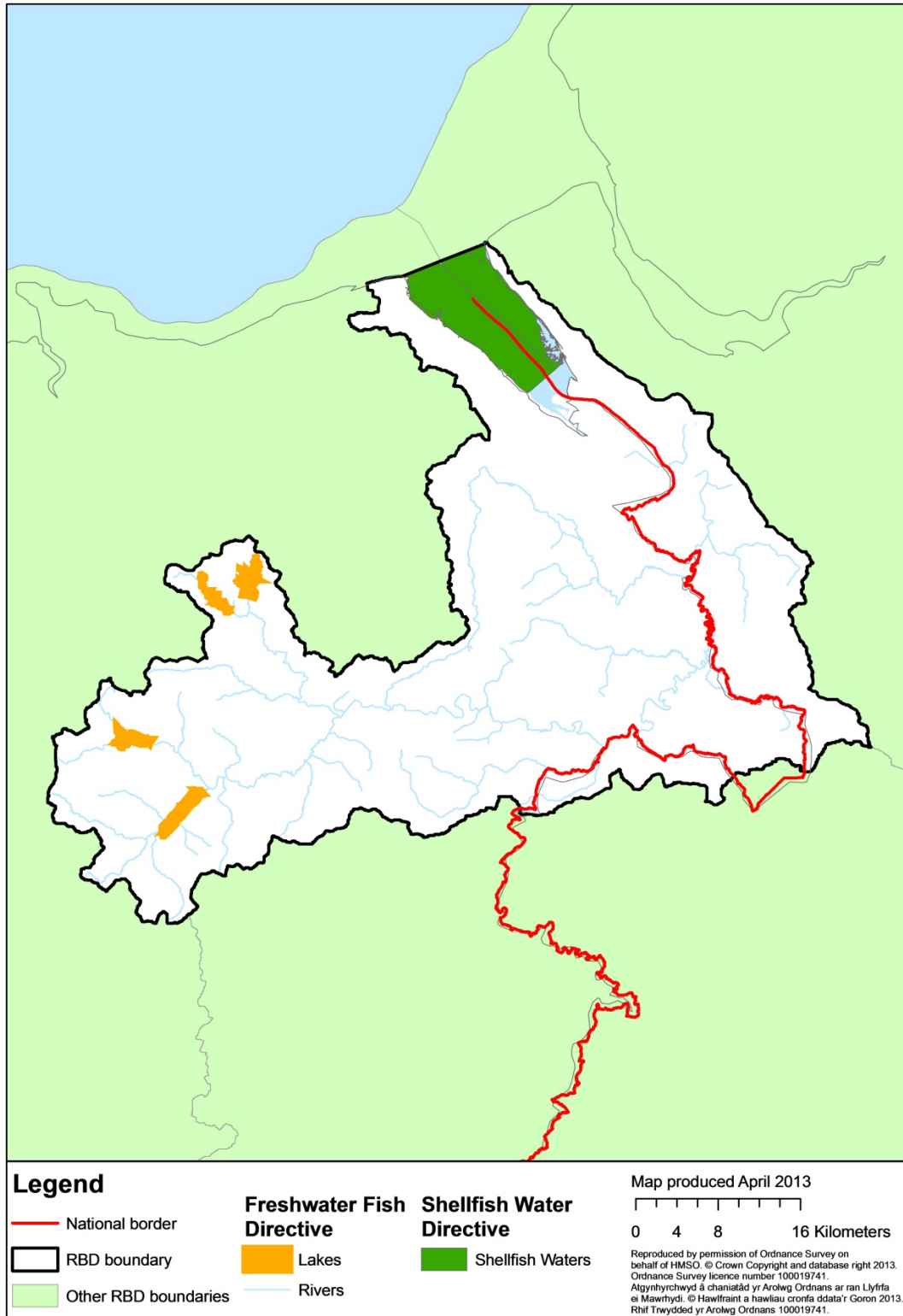


Figure 11: Water Dependant Special Areas of Conservation and Special Protection Areas

These are protected areas under the Habitats Directive for water dependent habitats and species.

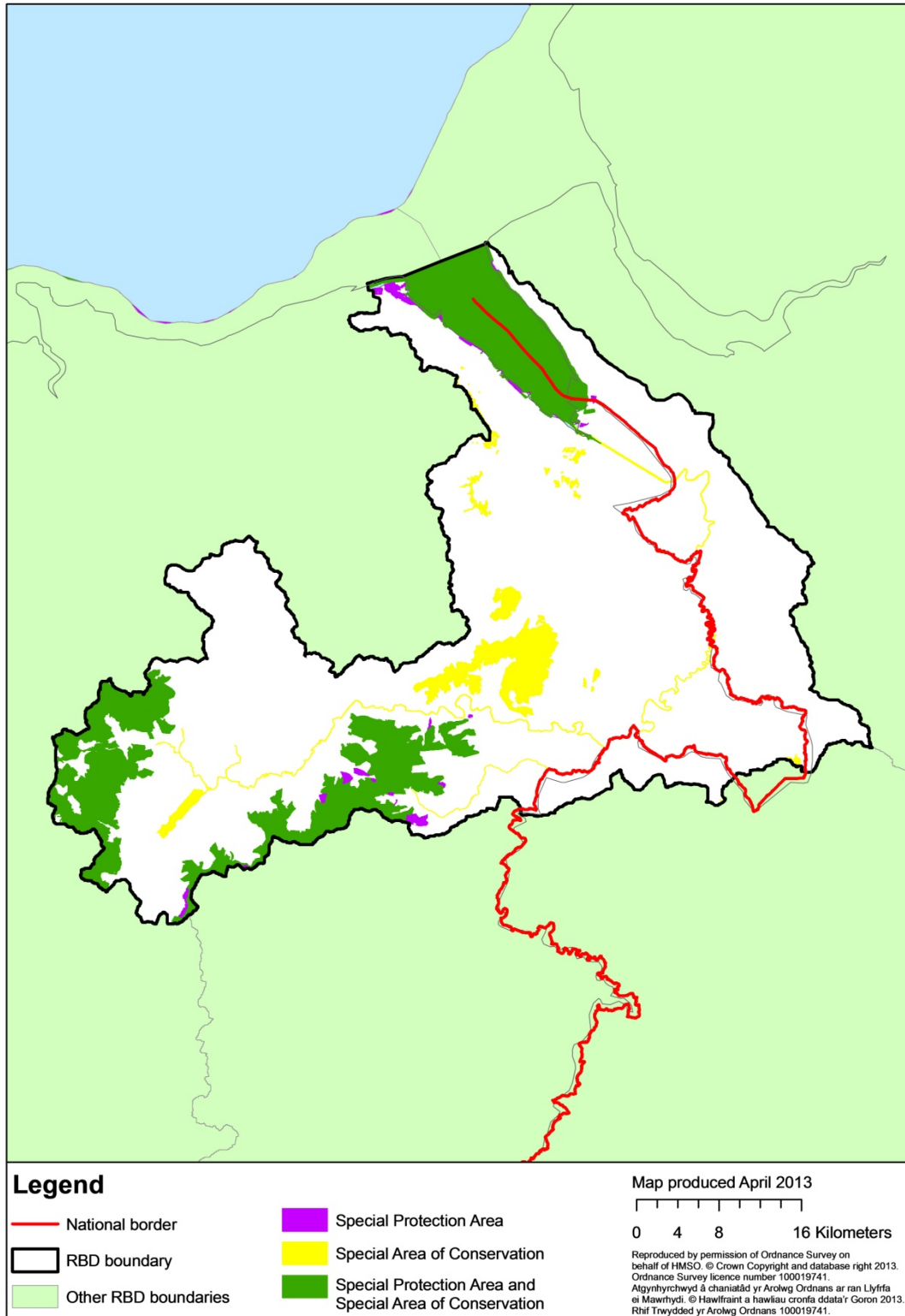
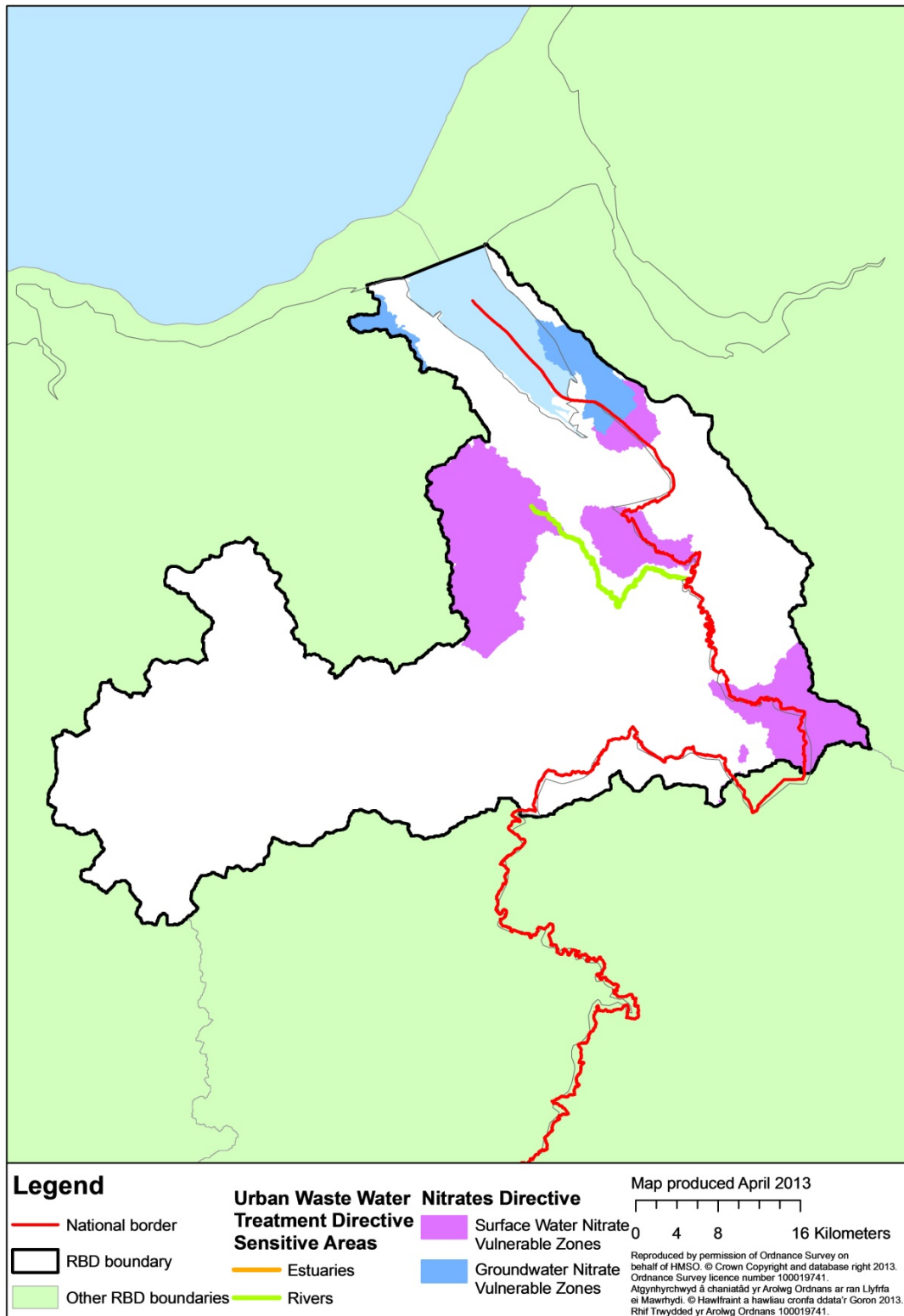


Figure 12: Nitrate Vulnerable Zones and Urban Wastewater Treatment Sensitive Areas

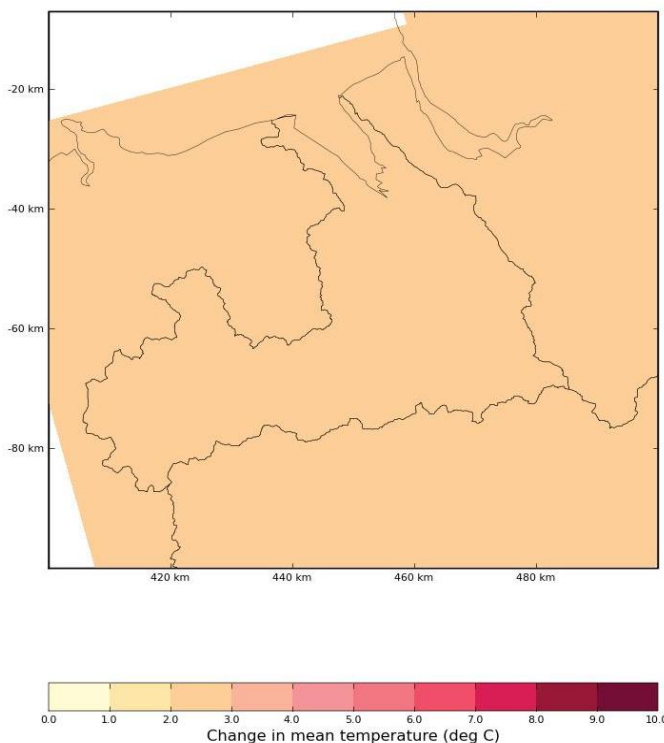
The Nitrates Directive aims to reduce water pollution by nitrates from agricultural sources and prevent further such pollution through the use of nitrate vulnerable zones. While the Urban Waste Water Treatment Directive protects sensitive areas of the environment from the adverse effects of urban waste water discharges and wastewater discharges from certain industrial sectors.



Climate Change

The water environment is particularly vulnerable to the effects of climate change. The weather we experienced in 2012 highlighted the challenges we face in delivering improvements to water ecosystems in a variable climate. We need to prepare for increasing variability as the climate continues to change. Before the end of the third river basin planning cycle (2027) the UK's climate is likely to change significantly. We must take account of climate change now to reduce the risk of poor investment decisions which may limit the extent to which Water Framework Directive objectives are met and the efficiency of achieving them. The climate change adaptation effort needs to be built into catchment planning to allow for greater climate variability and longer term increases in temperature.

There is evidence that climate change is increasing river water temperatures, and that rainfall intensity and peak river flows are increasing. As climate change continues there will be an increased pressure on our work to achieve good ecological status. These include the impact on fisheries from increased temperature, an increasing risk of diffuse pollution under heavy downpours and challenges in maintaining flows under drought conditions.



In our considerations of the significant water management issues for the Dee River Basin we have considered evidence from the outputs of the Climate Change Risk Assessment (CCRA, 2012)¹ and climate change projections using medium emissions to the 2050's from the UKCP09 (2012)²

The figure on the left displays the central estimate of predicted change in temperature for the Dee river basin in the 2050's. Mean temperature is predicted to increase by 2-3°C. Rainfall in winter could rise by 13% and in summer decrease by 17%. A statistical summary of the modelled predictions is given in the table below. It is very unlikely that future climate will be outside the range represented by the 10th and 90th percentiles

	10 th percentile	50 th percentile	90 th percentile
Summer rainfall %	6	-17	-37
Winter rainfall %	2	13	27
Summer temperature °C	1.2	2.6	4.4
Winter temperature °C	1.2	2.1	3.2

Pressures for the Dee RBD associated with climate change

- Abstraction and other artificial flow
- Biological (fisheries management, invasive non-native species) and microbiological organisms

- Organic pollution (sanitary determinand)
- Priority hazardous substance, priority substance and specific pollutants
- Nutrients (nitrogen and phosphorus)
- Sediment – increased from agriculture and urban run off
- Acidification
- Salinity- runoff from de-icing, incursion from tides and surges
- Physical modification – pressure on drainage and flood management

¹CCRA (2012) Available at: <http://www.defra.gov.uk/environment/climate/government/risk-assessment/>

²UKCP09 (2012) Available at: <http://ukclimateprojections.defra.gov.uk/>

Glossary of Terms

A more detailed glossary of terms used for River Basin Planning can be found in Annex N of the first Dee River Basin Management Plan.

Bathing Waters Directive	European Community legislation – (76/160/EEC) which requires Member States to take all necessary actions to ensure identified bathing waters meet certain quality standards prescribed for the protection of the environment and public health. The new Bathing Waters Directive (2006/7/EC) will repeal the original Bathing Water Directive by end of 2014 at the latest.
Chemical Status (surface waters)	The classification status for the surface water body. This is assessed by compliance with the environmental standards for chemicals that are listed in the Environmental Quality Standards Directive 2008/105/EC, which include priority substances, priority hazardous substances and eight other pollutants carried over from the Dangerous Substance Daughter Directives. Chemical status is recorded as good or fail. The chemical status classification for the water body, and the confidence in this (high or low), is determined by the worst test result.
Chemical Status (groundwater)	An expression of the overall quality of the groundwater body. The classification status for a groundwater body against the environmental criteria set out in the Water Framework Directive and the Groundwater Directive (2006/118/EC), as set out in Common Implementation Strategy (CIS) guidance document No 18. All five of the component tests for chemical status must be assessed as good or poor and the overall chemical status and the confidence in this (high or low) is determined by the worst test result.
Classification	Method for distinguishing the environmental condition or “status” of water bodies and putting them into one category or another.
Drinking Water Protected Areas	Bodies of water that are used or could be used in the future for the abstraction of water intended for human consumption.
Ecological potential	The status of a heavily modified or artificial water body measured against the maximum ecological quality it could achieve given the constraints imposed upon it by those heavily modified or artificial characteristics necessary for its use. There are five ecological potential classes for Heavily Modified Water Bodies/Artificial Water Bodies (maximum, good, moderate, poor and bad).
Ecological status	Ecological status applies to surface water bodies and is based on the following quality elements: biological quality, general chemical and physico-chemical quality, water quality with respect to specific pollutants (synthetic and non synthetic), and hydromorphological quality. There are five classes of ecological status (high, good, moderate, poor or bad). Ecological status and chemical status

	together define the overall surface water status of a water
Estuarine	For our purposes by estuarine we mean transitional (see definition).
Favourable Conservation Status	“Favourable Conservation Status (to protect and, where necessary, improve the water or water-dependent environment to the extent necessary to maintain at or restore to favourable conservation status the water-dependent habitats and species for which the Protected Area is designated”. Where this term is used in the River Basin Management Plans, the above definition applies.
Good chemical status (surface waters)	Means that concentrations of chemicals in the water body do not exceed the environmental standards specified in the Environmental Quality Standards Directive 2008/105/EC. These chemicals include Priority Substances, Priority Hazardous Substances and eight other pollutants carried over from the Dangerous Substance Daughter Directives.
Good chemical status (groundwater)	See chemical status (groundwater). Means the concentrations of pollutants in the groundwater body do not exceed the criteria set out in Article 3 of the Groundwater Daughter Directive (2006/118/EC).
Good ecological potential	Those surface waters which are identified as Heavily Modified Water Bodies and Artificial Water Bodies must achieve ‘good ecological potential’ (good potential is a recognition that changes to morphology may make good ecological status very difficult to meet). In the first cycle of river basin planning good potential may be defined in relation to the mitigation measures required to achieve it.
Good ecological status	The objective for a surface water body to have biological, structural and chemical characteristics similar to those expected under nearly undisturbed conditions.
Good quantitative status (groundwater)	See quantitative status (groundwater). Means the level of groundwater in the groundwater body meets the criteria set out in Annex V (2.1.2) of the Water Framework Directive.
Good status	Is a term meaning the status achieved by a surface water body when both the ecological status and its chemical status are at least good or, for groundwater, when both its quantitative status and chemical status are at good status.
Groundwater	All water which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil.
Heavily Modified Water Body	A surface water body that does not achieve good ecological status because of substantial changes to its physical character resulting from physical alterations caused by human use, and which has been designated, in accordance with criteria specified in the Water

	Framework Directive, as 'heavily modified'.
High ecological status	Is a state, in a surface water body, where the values of the hydromorphological, physico-chemical, and biological quality elements correspond to conditions undisturbed by anthropogenic activities.
Hydromorphology	Describes the hydrological and geomorphological processes and attributes of surface water bodies. For example for rivers, hydromorphology describes the form and function of the channel as well as its connectivity (up and downstream and with groundwater) and flow regime, which defines its ability to allow migration of aquatic organisms and maintain natural continuity of sediment transport through the fluvial system. The Water Framework Directive requires surface waters to be managed in such a way as to safeguard their hydrology and geomorphology so that ecology is protected.
Natura 2000 sites	Protected Areas established for the protection of habitats or species under the Birds Directive (79/409/EEC) (Special Protection Areas) and the Habitats Directive (92/43/EEC) (Special Areas of Conservation).
Nitrate Vulnerable Zone	The land draining to waters that contain, or are likely to contain, 50 mg/l of nitrate, or waters that are eutrophic or likely to become so. Within these zones an action programme under the Nitrates Directive is put in place which farmers have to observe to reduce nitrate pollution.
No deterioration (in water body status)	None of the quality elements used in the classification of water body status deteriorates to the extent that the overall status is reduced.
Objective (surface waters)	<p>Three different status objectives for each water body. These are:</p> <ul style="list-style-type: none"> • Overall status objective • Ecological status or potential objective; and • Chemical status objective <p>These are always accompanied by a date by when the objective will be achieved.</p> <p><u>Ecological status (or potential) objectives</u> will be derived from the predicted outcomes for the biological elements and physico-chemical elements, plus any reasons for not achieving good ecological status (or potential) by 2015.</p> <p><u>Chemical status objectives</u> will be derived from the predicted outcomes for the chemical elements plus any reasons for not achieving good chemical status by 2015.</p> <p><u>Overall status objectives</u> will be derived from the ecological status and chemical status objectives.</p>

Objective (groundwater)	<p>There are three status objectives for each groundwater body:</p> <ul style="list-style-type: none"> • Overall status objective; • Quantitative status objective; and • Chemical status objective. <p>These are always accompanied by a date by when the objective will be achieved.</p> <p><u>Overall status objectives</u> will be derived from the quantitative status and chemical status objectives</p> <p>In addition to status objectives there are also additional environmental objectives: to prevent deterioration of status, to prevent or limit the inputs of pollutants to groundwater and to reverse any significant and sustained upward trends in pollutant concentrations.</p>
Protected Areas	<p>Areas that have been designated as requiring special protection under Community legislation for the protection of their surface water and groundwater or for the protection of habitats and species directly depending on water.</p>
Quantitative status (groundwater)	<p>An expression of the degree to which a body of groundwater is affected by direct and indirect abstractions.</p> <p>The classification status for a groundwater body against the environmental criteria set out in the Water Framework Directive and as set out in Common Implementation Strategy Guidance Document No 18. All four of the component tests for quantitative status must be assessed as good or poor and the overall quantitative status and the confidence in this (high or low) is determined by the worst test result.</p>
River basin	<p>A river basin is the area of land from which all surface run-off and spring water flows through a sequence of streams, lakes and rivers into the sea at a single river mouth, estuary or delta. It comprises one or more individual catchments.</p>
River Basin District	<p>A river basin or several river basins, together with associated coastal waters.</p>
River Basin Management Plan	<p>For each River Basin District, the Water Framework Directive requires a River Basin Management Plan to be published. These are plans that set out the environmental objectives for all the water bodies within the River Basin District and how they will be achieved. The plans will be based upon a detailed analysis of the pressures on the water bodies and an assessment of their impacts. The plans must be reviewed and updated every six years.</p>
Special Area of	<p>Natura 2000 sites that are designated under the Habitats Directive.</p>

Conservation	
Special Protection Area	Natura 2000 sites that are designated under the Birds Directive.
Transitional water	A Water Framework Directive term for waters that are intermediate between fresh and marine water. Transitional waters include estuaries and saline lagoons.
Water body	A manageable unit of surface water, being the whole (or part) of a stream, river or canal, lake or reservoir, transitional water (estuary) or stretch of coastal water. A 'body of groundwater' is a distinct volume of groundwater within an aquifer or aquifers.

Further Information

If you would like further information on any of the above topics/data, please contact us either by email at; ardalbasnafondyfrdwy@cyfoethnaturiolcymru.gov.uk / deerbd@naturalresourceswales.gov.uk

Or call us on 0300 065 3000.

All written requests should be sent to;
 Jill Brown
 Natural Resources Wales
 Ty Cambria
 29 Newport Road,
 Cardiff,
 CF24 0TP