



**Cyfoeth
Naturiol
Cymru
Natural
Resources
Wales**

CORE MANAGEMENT PLAN INCLUDING CONSERVATION OBJECTIVES

FOR

Afon Gwy / River Wye SAC



**Cyfoeth
Naturiol
Cymru
Natural
Resources
Wales**



Version	Date	Summary of changes made	Approved by
Version 3	September 2022	Revision of water quality targets for river features, updated formatting, clarification of the relationship between Conservation Objectives and Performance Indicators.	Anne Weedy
Version 2	September 2017	Update to water quality standards	Gillian Barter
Version 1	February 2008	Original plan	David Mitchell

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Preface

This document provides the main elements of Natural Resources Wales' management plan for the site(s) named. It sets out what needs to be achieved on the site(s), and advice on the action required. This document is made available through Natural Resources Wales' web site and may be revised in response to changing circumstances or new information. This is a technical document that supplements summary information on the Natural Resources Wales' web site.

One of the key functions of this document is to provide Natural Resources Wales' statement of the Conservation Objectives for the relevant Special Area of Conservation (SAC) and Special Protection Area (SPA) site(s). This is required to implement the changes through the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 in addition to the existing Conservation of Habitats and Species Regulations 2017. As a matter of Welsh Government Policy, the provisions of those regulations are also to be applied to Ramsar sites in Wales.

The River Wye SAC is a cross-border site between Wales and England; this plan and the Conservation Objectives only cover the parts of the SAC which are in Wales. [Conservation Objectives for the parts of the River Wye SAC which are in England](#) are available on Natural England's website (Natural England, 2018, 2019).

Vision for the site

This is a descriptive overview of what needs to be achieved for conservation on the site. It brings together and summarises the [Conservation Objectives](#) into a single, integrated statement about the site.

The purpose of the designation of SAC and SPA sites is to help secure the maintenance or restoration of habitats and species to favourable conservation status *for the foreseeable future*. Given that we foresee a changing climate, despite the uncertainty of the nature, degree and timing of those changes, we must address the need to ensure the resilience of each site to that changing environment. This will be achieved in the first instance by ensuring favourable condition of the important features, since a healthy feature is likely to be more resilient to the effects of climate change than one which is already stressed. Secondly, consideration must be given to those structures, functions and processes which maintain or boost the resilience of ecosystems to climate stress, including the avoidance, reduction or mitigation of other stress factors such as invasive species, nutrient enrichment, habitat and population fragmentation.

This site forms part of a wider network, and is ecologically connected with its surroundings and with other designated sites in the region. Although the focus of this document is on the individual site, the conservation objectives and management requirements need to be considered in the wider context. A connected network of sites is more robust than sites in isolation, and more resilient to pressures such as climate change.

Our vision for the River Wye SAC is to maintain or, where necessary, restore the river to high ecological status, including its largely unmodified and undisturbed physical character, so that all of its special features are able to sustain themselves in the long-term as part of a naturally functioning ecosystem. Allowing the natural processes of erosion and deposition to operate without undue interference and maintaining or restoring connectivity maintains the physical river habitat, which forms the foundation for this ecosystem. The quality and quantity of water, including natural flow variability, and the quality of adjacent habitats are maintained or restored to a level necessary to maintain the features in favourable condition for the foreseeable future. In places such as urban environments where natural processes are likely to cause significant damage to the public interest, artificial control measures are likely to be required.

The aquatic plant communities that characterise parts of the river are not only attractive but also give a good indication of the overall quality of the environment. They contain the variety and abundance of species expected for this type of river, in conditions of suitably clean water and bed substrate combined with a relatively stable flow regime. Patches of white-flowered water-crowfoots are widespread in the main river and in many of the tributaries. In the more shaded reaches aquatic plants may be scarce, consisting mainly of mosses and liverworts.

The special fish species found in the river, both residents such as the bullhead and brook lamprey, and migratory species such as the Atlantic salmon, sea lamprey and shad, which swim up river to spawn and go through their juvenile stages in the river,

are present in numbers that reflect a healthy and sustainable population supported by well-distributed good quality habitat. The migratory fish are able to complete their migrations and life cycles largely unhindered by artificial barriers such as weirs, pollution, or depleted flows.

The abundance of prey and widespread availability of undisturbed resting and breeding sites allows a large otter population to thrive. They are found along the entire length of the river and its main tributaries.

The Wye catchment forms an important refuge for the globally endangered white-clawed crayfish. The species is abundant and widely distributed in suitable habitat and is protected from the harmful effects of pesticide pollution and non-native crayfish. Non-native crayfish such as American signal crayfish are eradicated from the Wye catchment.

The presence of the River Wye SAC and its special wildlife enhances the economic and social values of the area by providing a high quality environment for ecotourism, outdoor activities and peaceful enjoyment by local people and visitors. The river catchment's functions of controlling flooding and supplying clean water are recognised and promoted through appropriate land management. The river is a focus for education to promote increased understanding of its biodiversity and the essential life support functions of its ecosystems.

Site description

Area and designations covered by this plan

Grid reference(s): SO109369

Unitary authority(ies): Powys County Council, Monmouthshire County Council

Area (hectares): 2234.89

Designations covered:

River Wye (Lower Wye) SSSI

River Wye (Upper Wye) SSSI

River Wye (Tributaries) SSSI

Afon Llynfi SSSI

Duhonw SSSI

Afon Irfon SSSI

River Ithon SSSI

Upper Wye Tributaries SSSI

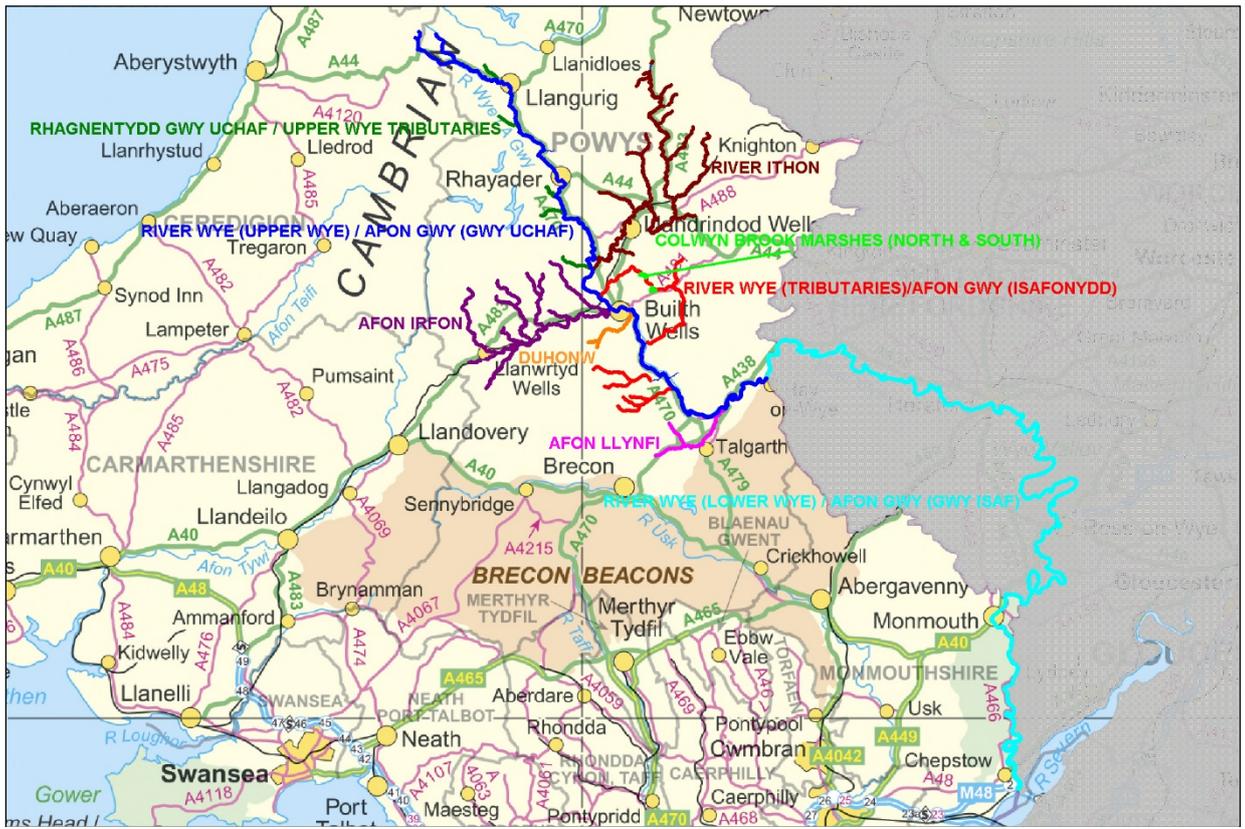
Colwyn Brook Marshes (North & South) SSSI

Notes:

A number of smaller SSSI have part of their area included within the River Wye SAC. These are not all included separately in this plan. Unless otherwise stated, management actions for adjacent SAC units also apply to these sites.

Detailed maps of the designated sites are available on the Natural Resources Wales web site.

A summary map showing the coverage of this document is shown below.



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Outline Description

The River Wye rises on Plynlimon in the Cambrian Mountains and flows in a generally south-easterly direction to enter the Severn Estuary at Chepstow. The upper catchment comprises several large sub-catchments, including the Irfon on the generally infertile upland landscape in the north-west, the Ithon in the north-east often on more low-lying, fertile terrain and the Lugg in the east in a predominantly low-lying fertile landscape much of which lies within England. The underlying geology consists predominantly of impermeable, acidic rocks of Silurian and Ordovician age in the north-west and more permeable Devonian Old Red Sandstone with a moderate base status in the middle and lower catchment. This geology produces a generally low to moderate nutrient status and a low to moderate base-flow index, making the river characteristically flashy. The run-off characteristics and nutrient status are significantly modified by land use in the catchment, which is predominantly pastoral with some woodland and commercial forestry in the headwaters and arable in the lower catchment and the Lugg. The Wye catchment is divided between Wales and England; the river forms the border from south of Monmouth to Chepstow and to the east of Hay-on-Wye.

The ecological structure and functions of the site are dependent on hydrological and geomorphological processes (often referred to as hydromorphological processes), as well as the quality of riparian habitats and connectivity of habitats. Animals that move around and sometimes leave the site, such as migratory fish and otters, may also be affected by factors operating outside the site.

Hydrological processes, in particular river flow (level and variability) and water chemistry, determine a range of habitat factors of importance to the SAC features, including current velocity, water depth, wetted area, substrate quality, dissolved oxygen levels and water temperature. Maintenance of both high 'spate' flows and base-flows is essential. Reductions in flow may reduce the ability of the adults of migratory fish to reach spawning sites. Water-crowfoot vegetation thrives in relatively stable, moderate flows and clean water. The flow regime should be characteristic of the river in order to support the functioning of the river ecosystem.

Geomorphological processes of erosion by water and subsequent deposition of eroded sediments downstream create the physical structure of the river habitats. While some sections of the river are naturally stable, especially where they flow over bedrock, others undergo continual and at times rapid change through the erosion and deposition of bed and bank sediments as is typical of meandering sections within floodplains (called 'alluvial' rivers). These processes help to sustain the river ecosystem by allowing a continued supply of clean gravels and other important substrates to be transported downstream. In addition, the freshly deposited and eroded surfaces, such as shingle banks and earth cliffs, enable processes of ecological succession to begin again, providing an essential habitat for specialist, early-successional species. Processes at the wider catchment scale generally govern processes of erosion and deposition occurring at the reach scale, although locally factors such as the effect of grazing levels on riparian vegetation structure may contribute to enhanced erosion rates. In general, management that interferes with natural geomorphological processes, for example preventing bank erosion through the use of hard revetments or removing large amounts of gravel, are likely to be damaging to the coherence of the ecosystem structure and functions.

Riparian habitats, including bank sides and habitats on adjacent land, are an integral part of the river ecosystem. Diverse and high quality riparian habitats have a vital role in maintaining the SAC features in a favourable condition. The type and condition of riparian vegetation influences shade and water temperature, nutrient run-off from adjacent land, the availability of woody debris to the channel and inputs of leaf litter and invertebrates to support in-stream consumers. Light, temperature and nutrient levels influence in-stream plant production and habitat suitability for the SAC features. Woody debris is very important as it provides refuge areas from predators, traps sediment to create spawning and juvenile habitat and forms the base of an important aquatic food chain. Otters require sufficient undisturbed riparian habitat for breeding and resting sites. It is important that appropriate amounts of tree cover, in general at least 50% high canopy cover, tall vegetation and other semi-natural habitats are maintained on the riverbanks and in adjacent areas, and that they are properly managed to support the SAC features. This may be achieved for example, through managing grazing levels, selective coppicing of riparian trees and restoring adjacent wetlands. In the urban sections the focus may be on maintaining the river

as a communication corridor but this will still require that sufficient riparian habitat is present and managed to enable the river corridor to function effectively.

Habitat connectivity is an important property of river ecosystem structure and function. Many of the fish that spawn in the river are migratory, depending on the maintenance of suitable conditions on their migration routes to allow the adults to reach available spawning habitat and juvenile fish to migrate downstream. For resident species, dispersal to new areas, or the prevention of dispersal causing isolated populations to become genetically distinct, may be important factors. Naturally isolated feature populations that are identified as having important genetic distinctiveness should be maintained. Artificial obstructions including weirs and bridge sills can reduce connectivity for some species. In addition, reaches subject to depleted flow levels, pollution, or disturbance due to noise, vibration or light, can all inhibit the movement of sensitive species. The dispersal of semi-terrestrial species, such as the otter, can be adversely affected by structures such as bridges under certain flow conditions, therefore these must be designed to allow safe passage. The continuity of riparian habitats enables a wide range of terrestrial species, for example lesser horseshoe bats, to migrate and disperse through the landscape. Connectivity should be maintained, or restored where necessary, as a means to ensure access for the features to sufficient habitat within the SAC.

External factors, operating outside the SAC, may also be influential, particularly for the migratory fish and otters. For example, salmon may be affected by barriers to migration in the Severn Estuary, inshore fishing and environmental conditions prevailing in their north Atlantic feeding grounds. Otters may be affected by developments that affect resting and breeding sites outside the SAC boundary.

Outline of Past and Current Management

There are many different aspects to the management of this large and complex site that may affect its conservation status. These are summarised in the Site Management Statements for the component SSSIs.

Management Units

The area covered by this plan has been divided into management units to enable practical communication about features, objectives, and management. This will also allow us to differentiate between the different designations where necessary. In this plan the management units have been based on the following:

- SAC/SSSI boundaries
- Natural hydromorphology, where there are significant differences in management issues/key features between reaches
- Units partly within England coincide with Natural England's equivalent units, as far as is practicable

The units include one or more River Basin Management Plan water bodies; as far as is practicable, unit boundaries coincide with these water body boundaries.

Maps showing the management units referred to in this plan can be viewed on Welsh Government's interactive website [Map Data Cymru](#).

The following table confirms the relationships between the management units and the designations covered:

Unique unit number	Site Unit Ref	SSSI	Unit Name	Water body IDs within unit
7727	1 a	River Wye (Lower Wye) / Afon Gwy (Gwy Isaf)	Wye Tidal Reach	GB530905415406
1804	1a	River Wye (Lower Wye) / Afon Gwy (Gwy Isaf)	Lower Wye, Brockweir bridge to estuary	GB530905415406
7726	1 b	River Wye (Lower Wye) / Afon Gwy (Gwy Isaf)	Wye conf Walford Bk to Bigsweir Bridge	GB109055037111
1802	1c	River Wye (Lower Wye) / Afon Gwy (Gwy Isaf)	Lower Wye, Wyastone to Redbrook	GB109055037111
1801	1d	River Wye (Lower Wye) / Afon Gwy (Gwy Isaf)	Lower Wye, Hay-on-Wye to Rhydspence	GB109055037116
7729	2 a	River Wye (Upper Wye) / Afon Gwy (Gwy Uchaf)	River Wye, Afon Irfon to Sgithwen Brook	GB109055037115 GB109055037116
7728	2 b	River Wye (Upper Wye) / Afon Gwy (Gwy Uchaf)	River Wye, River Ithon to Afon Irfon	GB109055037150
7733	2 c	River Wye (Upper Wye) / Afon Gwy (Gwy Uchaf)	River Wye, Afon Elan to River Ithon	GB109055042250
3525	2c	Bach Howey Gorge	Lower Bach Howey	GB109055037060
7732	2 d	River Wye (Upper Wye) / Afon Gwy (Gwy Uchaf)	River Wye, Afon Marteg to Afon Elan	GB109055042280
3524	2d	Marcheini Uplands, Gilfach Farm & Gamallt	Lower Marteg	GB109055042310
7731	2 e	River Wye (Upper Wye) / Afon Gwy (Gwy Uchaf)	River Wye, Afon Bidno to Afon Marteg	GB109055042320
7730	2 f	River Wye (Upper Wye) / Afon Gwy (Gwy Uchaf)	River Wye, Afon Tarennig to Afon Bidno	GB109055042330
7844	2i	River Wye (Upper Wye) / Afon Gwy (Gwy Uchaf)	River Wye, Sgithwen Brook to Hay Dulas	

Unique unit number	Site Unit Ref	SSSI	Unit Name	Water body IDs within unit
7739	3 a	Afon Llynfi	Lower Afon Llynfi	GB109055036950
7740	3 b	Afon Llynfi	Llynfi Dulas	GB109055036920
7741	3 c	Afon Llynfi	Triffrwd	GB109055036970
7657	4 a	River Wye (Tributaries) / Afon Gwy (Isafonydd)	Sgithwen Brook downstream of Cwm Rhiwiau	GB109055036990
7656	4 b	River Wye (Tributaries) / Afon Gwy (Isafonydd)	Sgithwen Brook headwaters	GB109055036990
7658	4 c	Erwood Dingle	Cletwr within Erwood Dingle SSSI	GB109055037030
7659	4 d	River Wye (Tributaries) / Afon Gwy (Isafonydd)	Cletwr Brook, Nant yr Offeiriad to Crickadarn Mill	GB109055037030
7660	4 e	River Wye (Tributaries) / Afon Gwy (Isafonydd)	Upper Cletwr Brook and Nant yr Offeiriad	GB109055037030
7662	4 f	Coed Aberedw	River Edw within Coed Aberedw SSSI	GB109055037080
7738	4 g	River Wye (Tributaries) / Afon Gwy (Isafonydd)	River Edw, Clas Brook to Aberedw	GB109055037080
7737	4 h	River Wye (Tributaries) / Afon Gwy (Isafonydd)	River Edw, Colwyn Brook to Clas Brook	GB109055037130
7736	4 i	River Wye (Tributaries) / Afon Gwy (Isafonydd)	River Edw, Nant Brook to Colwyn Brook	GB109055042200
7663	4 j	Caeau Coed Mawr (Coedmawr Fields)	River Edw within Caeau Coed Mawr SSSI	GB109055042200
7735	4 k	River Wye (Tributaries) / Afon Gwy (Isafonydd)	Colwyn Brook, Camnant to River Edw	GB109055042370
7664	4 l	River Wye (Tributaries) / Afon Gwy (Isafonydd)	Colwyn Brook, upstream of Camnant	GB109055042370
7734	4 m	River Wye (Tributaries) / Afon Gwy (Isafonydd)	Builth Road Dulas, Trecoed Brook to River Wye	GB109055037160

Unique unit number	Site Unit Ref	SSSI	Unit Name	Water body IDs within unit
7665	4 n	River Wye (Tributaries) / Afon Gwy (Isafonydd)	Builth Road Dulas, Bwlch to Trecoed Brook	GB109055037160
7742	5 a	Duhonw	Duhonw	GB109055037050
7661	5 b	Duhonw	Nant Bwch	GB109055037050
7743	6 a	Afon Irfon	Irfon conf Cledan to conf R Wye	GB109055037090
7750	6 b	Afon Irfon	Chwefri	GB109055042190
7666	6 c	Afon Irfon	Hafrena	GB109055037090
7744	6 d	Afon Irfon	Garth Dulas	GB109055041890
7668	6 e	Afon Irfon	Gwenwst	GB109055041890
7745	6 f	Afon Irfon	Afon Cammarch	GB109055041880
7667	6 g	Afon Irfon	Cnyffiad	GB109055041880
7746	6 h	Afon Irfon	Camddwr	GB109055037090
7747	6 i	Afon Irfon	Tirabad Dulas	GB109055036690
7748	6 j	Afon Irfon	Irfon conf Afon Gwestyn to conf Cledan	GB109055036760
7749	6 k	Afon Irfon	Afon Gwesyn	GB109055041870
7670	6 l	Afon Irfon	Cledan (downstream of Waen Rydd SSSI)	GB109055036680
7669	6 m	Waen Rydd	Cledan within Waen Rydd SSSI	GB109055036680
7671	6 n	Afon Irfon	Cledan upstream of Waen Rydd SSSI	GB109055036680
7757	7 a	River Ithon	Ithon, Camddwr to River Wye	GB109055042270
7755	7 b	River Ithon	Ithon, Gwenlas Brook to Aber Camddwr	GB109055042140
7753	7 c	River Ithon	Ithon, Llaethdy Brook to Gwenlas Brook	GB109055042150

Unique unit number	Site Unit Ref	SSSI	Unit Name	Water body IDs within unit
7751	7 d	River Ithon	Ithon, Camnant to Llaethdy Brook	GB109055042180
7764	7 e	River Ithon	Howey Brook, downstream of Three Wells	GB109055041900
7767	7 f	Coed Aberdulas	Nantmel Dulas within Coed Aberdulas SSSI	GB109055042080
7763	7 g	River Ithon	Nantmel Dulas	GB109055042080
7760	7 h	River Ithon	Clywedog Brook, Bachell Brook to River Ithon	GB109055042070
7761	7 i	River Ithon	Clywedog Brook, Abbeycwmhir to Bachell Brook	GB109055042090
7762	7 j	River Ithon	Bachell Brook	GB109055042120
7766	7 k	Coed Bryn-Person	Bachell Brook within Coed Bryn Person SSSI	GB109055042120
7759	7 l	River Ithon	Mithil Brook	GB109055041960
7758	7 m	River Ithon	Aran	GB109055042110
7756	7 n	River Ithon	Camddwr	GB109055042130
7675	7 o	River Ithon	Migram's Brook	GB109055042140
7676	7 p	River Ithon	Llymwynt Brook	GB109055042140
7765	7 q	Llymwynt Brook Pastures	Llymwynt Brook within Llymwynt Brook Pastures SSSI	GB109055042140
7754	7 r	River Ithon	Gwenlas Brook	GB109055042170
7752	7 s	River Ithon	Llaethdy Brook	GB109055042160
7677	7 t	River Ithon	Blue Lins Brook	GB109055042180
7678	7 u	Gweunydd Esgairdraenllwyn (Esgairdraenllwyn Pastures)	River Ithon within Gweunydd Esgairdraenllwyn SSSI	GB109055042180
7862	7u	River Ithon	Howey Brook, Three Wells	

Unique unit number	Site Unit Ref	SSSI	Unit Name	Water body IDs within unit
7841	7v	Maelienyd	Camddwr within Maelienydd SSSI	
7842	7w	Ithon Valley Woodlands	River Ithon within Ithon Valley Woodlands SSSI	
7843	7x	Rhos Penrhiw	Howey Brook within Rhos Penrhiw SSSI	
7672	8 a	Rhagnentydd Gwy Uchaf / Upper Wye Tributaries	Hirnant	GB109055042250
7673	8 b	Rhosydd Llanwrthwl	Llanwrthwl Dulas	GB109055042250
7861	8bi	Rhosydd Llanwrthwl	Dulas	
7769	8 c	Rhagnentydd Gwy Uchaf / Upper Wye Tributaries	Afon Elan	GB109055042260
7674	8 d	Rhagnentydd Gwy Uchaf / Upper Wye Tributaries	Nant y Dernol	GB109055042320
7770	8 e	Gweunydd Nant y Dernol	Nant y Dernol within Gweunydd Nant y Dernol	GB1090550423
7768	8 f	Rhagnentydd Gwy Uchaf / Upper Wye Tributaries	Afon Bidno	GB109055042340
7771	8 g	Carn Gafallt	Llanwrthwl Dulas within Carn Gafallt	GB109055042250
626	9a	Colwyn Brook Marshes (North & South)	Colwyn Brook Marshes, Bwlch	GB109055042370
3011	9b	Colwyn Brook Marshes (North & South)	Colwyn Brook Marshes, Caregeon	GB109055042370
3012	9c	Colwyn Brook Marshes (North & South)	Colwyn Brook Marshes, Cefn Bychan, SAC land	GB109055042370
3013	9d	Colwyn Brook Marshes (North & South)	Colwyn Brook Marshes, Carneddau, SAC land	GB109055042370
3014	9e	Colwyn Brook Marshes (North & South)	Colwyn Brook Marshes, Cilberllan, SAC land	N/A (Woodland unit)

Unique unit number	Site Unit Ref	SSSI	Unit Name	Water body IDs within unit
3015	9f	Colwyn Brook Marshes (North & South)	Colwyn Brook Marshes, Wern Heulog, SAC land	GB109055042370
3016	9g	Colwyn Brook Marshes (North & South)	Colwyn Brook Marshes, Matts Farm, SAC land	GB109055042370

The features

Confirmation of Features

*Annex II species present as a qualifying feature, but not a primary reason for site selection

Designated feature	Primary reason for site selection?	Relationships, nomenclature etc
Sea lamprey <i>Petromyzon marinus</i>	Yes	EU Species Code: 1095
Brook lamprey <i>Lampetra planeri</i>	Yes	EU Species Code: 1096
River Lamprey <i>Lampetra fluviatilis</i>	Yes	EU Species Code: 1099
Twaite shad <i>Alosa fallax</i>	Yes	EU Species Code: 1103
Allis shad <i>Alosa alosa</i>	No*	EU Species Code: 1102
Atlantic salmon <i>Salmo salar</i>	Yes	EU Species Code: 1106
Bullhead <i>Cottus gobio</i>	Yes	EU Species Code: 6965
European otter <i>Lutra lutra</i>	Yes	EU Species Code: 1355
Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation	Yes	EU Species Code: 3260
White-clawed crayfish <i>Austropotamobius pallipes</i>	Yes	EU Species Code: 1092
Quaking bogs and transition mires	No*	EU Species Code: 7140

Features and Management Units

This section sets out the relationship between the designated features and each management unit. This is intended to provide a clear statement about what each unit should be managed for, taking into account the varied needs of the different special features. All features are allocated to one of seven classes in each management unit. These classes are:

Key Features

KH - a 'Key Habitat' in the management unit, i.e. the habitat that is the main driver of management and focus of monitoring effort, perhaps because of the dependence of a key species (see KS below). There will usually only be one Key Habitat in a unit but there can be more, especially with large units.

KS – a 'Key Species' in the management unit, often driving both the selection and management of a Key Habitat.

Geo – an earth science feature that is the main driver of management and focus of monitoring effort in a unit.

Other Features

Sym - habitats, species and earth science features that are of importance in a unit but are not the main drivers of management or focus of monitoring. These features will benefit from management for the key feature(s) identified in the unit. These may be classed as 'Sym' (sympathetic) features because:

(a) they are present in the unit but may be of less conservation importance than the key feature; and/or

(b) they are present in the unit but in small areas/numbers, with the bulk of the feature in other units of the site; and/or

(c) their requirements are broader than and compatible with the management needs of the key feature(s), e.g. a mobile species that uses large parts of the site and surrounding areas: and/or

(d) key features (KH, KS) are closely associated with these features, and the conservation of key features depends on them being managed appropriately.

Nm - *an infrequently used category where features are at risk of decline within a unit as a result of meeting the management needs of the key feature(s), i.e. under Negative Management. These cases will usually be compensated for by management elsewhere in the plan, and can be used where minor occurrences of a feature would otherwise lead to apparent conflict with another key feature in a unit.*

Mn - Management units that are essential for the management of features elsewhere on a site e.g. livestock over-wintering area included within designation boundaries, buffer zones around water bodies, etc.

x – Features not known to be present in the management unit.

The table(s) below sets out the relationship between the features and management units identified in this plan:

River Wye (Lower Wye) / Afon Gwy (Gwy Isaf)					
Unique Unit No	7727	1804	7726	1802	1801
Site Unit Ref	1 a	1a	1 b	1c	1d
SAC	Yes	Yes	Yes	Yes	Yes
SSSI	Yes	Yes	Yes	Yes	Yes
SAC Features					
1. Sea lamprey	KS	KS	KS	KS	KS
2. River Lamprey	Sym	Sym	Sym	Sym	Sym
3. Brook lamprey				Sym	Sym
4. Twaite shad	KS	KS	KS	KS	KS
5. Allis shad	Sym	Sym	Sym	Sym	KS
6. Atlantic salmon	Sym	Sym	Sym	Sym	Sym
7. Bullhead				Sym	Sym
8. European otter	KS	KS	KS	KS	KS
9. Rivers with floating vegetation often dominated by water-crowfoot	KH		KH	KH	KH
10. White-clawed crayfish					Sym
11. Quaking bogs and transition mires					
SSSI Features					
Aquatic invertebrate assemblage	Sym		Sym	KS	
Assemblage of RDB and/or Nationally Scarce and/or Atlantic-Western Br	KS		KS	KS	Sym
<i>Gomphus vulgatissimus</i>	KS		KS	KS	KS
<i>Normandia nitens</i>				KS	
<i>Potamanthus luteus</i>	KS		KS	KS	Sym
<i>Pseudanodonta complanata</i>	KS		KS	KS	
River shingle invertebrate assemblage				KS	KS
Running water -Group A rivers-	KH		KH	KH	KH
Running water -Group B rivers-				KH	KH
<i>Stellaria nemorum</i> subsp. <i>montana</i> x subsp. <i>nemorum</i>	KS		KS	Sym	
<i>Synaptus filiformis</i>		KS			

- Twaite shad spawn in Unit 1c & possibly in 1d and migrate through Units 1a & 1b, where they may be subject to disturbance impacts, so are selected as key features in all units. Sea and river lamprey migrate though all units and may spawn.
- Management for twaite shad and sea lamprey is expected to also be sympathetic for Atlantic salmon, river/brook lamprey and bullhead.
- Specific management measures for otter relating to adjacent habitats and disturbance require its selection as a key feature in all units.
- The status of allis shad is uncertain in River Wye (Lower Wye) SSSI. It is assumed to be present in the same units as twaite shad.

- White-clawed crayfish have been recorded in the River Wye at Hay-on-Wye and in adjacent tributaries including Clyro Brook and Dulas Brook.

River Wye (Upper Wye) / Afon Gwy (Gwy Uchaf) Bach Howey Gorge 2c Marcheini Uplands, Gilfach Farm & Gamallt 2d									
Unique Unit No	7729	7728	7733	3525	7732	3524	7731	7730	7844
Site Unit Ref	2 a	2 b	2 c	2c	2 d	2d	2 e	2 f	2i
SAC	Yes								
SSSI	Yes								
SAC Features									
1. Sea lamprey	KS	Sym	Sym						KS
2. River Lamprey	KS	KS	KS	Sym	KS		Sym	Sym	KS
3. Brook lamprey	Sym	Sym	KS	Sym	KS	KS	KS	KS	Sym
4. Twaite shad	KS	KS	Sym						KH
5. Allis shad	Sym								Sym
6. Atlantic salmon	KS	Sym							
7. Bullhead	KS	KS	KS	Sym	KS	KS	KS	Sym	KS
8. European otter	KS	Sym	KS						
9. Rivers with floating vegetation often dominated by water-crowfoot	KH	KH							KH
10. White-clawed crayfish	Sym								Sym
11. Quaking bogs and transition mires									
SSSI Features									
<i>Allium schoenoprasum</i>	KS	KS							KS
Aquatic invertebrate assemblage					Sym				KS
Assemblage of RDB and Nationally Scarce lichens	KS				KS	KS	KH		KS
Assemblage of RDB and/or Nationally Scarce and/or Atlantic-Western Br	KS	KS		Sym		KS			
Assemblage of RDB and/or Nationally Scarce vascular plants	KS	KS							KS
<i>Collema dichotomum</i>	KS								KS
Eu-Oceanic Index of Ecological Continuity: Lichens						Sym			
<i>Festuca altissima</i>				KS					

**River Wye (Upper Wye) / Afon Gwy (Gwy Uchaf)
Bach Howey Gorge 2c
Marcheini Uplands, Gilfach Farm & Gamallt 2d**

Unique Unit No	7729	7728	7733	3525	7732	3524	7731	7730	7844
Site Unit Ref	2 a	2 b	2 c	2c	2 d	2d	2 e	2 f	2i
<i>Grimmia retracta</i>	KS								
<i>Orthotrichum sprucei</i>									KS
<i>Porocyphus kenmorensis</i>	KS								KS
<i>Potamanthus luteus</i>	KS	KS		Sym		KS			
<i>Potentilla rupestris</i>									KS
<i>Pterygiopsis lacustris</i>					KS		KS		
River shingle invertebrate assemblage									KS
Running water	KH	KH	KH		KH		KH	KH	KH
Running water -Group A rivers-								No value	KH
Running water -Group C rivers-			KH		KH		KH		
Semi-natural woodland				Sym					
<i>Stenelmis canaliculata</i>									

- Atlantic salmon is a key feature in Unit 2b due to the presence of spawning sites, although salmon may occasionally also spawn within Unit 2a.
- Twaite shad is recorded spawning throughout Unit 2a but only infrequently upstream of the River Irfon confluence.
- The status of Allis shad is uncertain in the River Wye SAC. Allis shad is assumed to be present in the same units as twaite shad, but normally migrates further upstream and therefore would be expected to occur in the upper river.
- Sea lamprey is frequently recorded spawning within Unit 2a; spawning has also been recorded within Unit 2b as far upstream as Rhayader.
- Management for Atlantic salmon, twaite shad and sea lamprey is expected to be sympathetic for river/brook lamprey and bullhead.
- Specific management measures for otter relating to adjacent habitats and disturbance require its selection as a key feature in all units.

Afon Llynfi

Unique Unit No	7739	7740	7741
Site Unit Ref	3 a	3 b	3 c
SAC	Yes	Yes	Yes
SSSI	Yes	Yes	Yes
SAC Features			
1. Sea lamprey <i>Petromyzon marinus</i>			

Afon Llynfi			
Unique Unit No	7739	7740	7741
Site Unit Ref	3 a	3 b	3 c
2. River Lamprey <i>Lampetra fluviatilis</i>	Sym	Sym	Sym
3. Brook lamprey <i>Lampetra planeri</i>	Sym	Sym	Sym
4. Twaite shad <i>Alosa fallax</i>			
5. Allis shad <i>Alosa alosa</i>			
6. Atlantic salmon <i>Salmo salar</i>	KS	KS	KS
7. Bullhead <i>Cottus gobio</i>	Sym	Sym	Sym
8. European otter <i>Lutra lutra</i>	KS	KS	KS
9. Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation	KH	KH	KH
10. White-clawed crayfish <i>Austropotamobius pallipes</i>	Sym	Sym	Sym
11. Quaking bogs and transition mires			
SSSI Features			

River Wye (Tributaries) / Afon Gwy (Isafonydd) 4a, 4b, 4d, 4e, 4g Erwood Dingle 4 c Coed Aberedw 4 f							
Unique Unit No	7657	7656	7658	7659	7660	7662	7738
Site Unit Ref	4 a	4 b	4 c	4 d	4 e	4 f	4 g
SAC	Yes						
SSSI	Yes						
SAC Features							
1. Sea lamprey <i>Petromyzon marinus</i>							
2. River Lamprey <i>Lampetra fluviatilis</i>			Sym			Sym	Sym
3. Brook lamprey <i>Lampetra planeri</i>	Sym						
4. Twaite shad <i>Alosa fallax</i>							
5. Allis shad <i>Alosa alosa</i>							
6. Atlantic salmon <i>Salmo salar</i>	Sym		KS	Sym	Sym	KS	KS
7. Bullhead <i>Cottus gobio</i>	Sym						
8. European otter <i>Lutra lutra</i>	KS						
9. Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation			KH			KH	KH
10. White-clawed crayfish <i>Austropotamobius pallipes</i>	KS	KS	Sym	KS	KS	Sym	

**River Wye (Tributaries) / Afon Gwy (Isafonydd) 4a, 4b, 4d, 4e, 4g
Erwood Dingle 4 c
Coed Aberedw 4 f**

Unique Unit No	7657	7656	7658	7659	7660	7662	7738
Site Unit Ref	4 a	4 b	4 c	4 d	4 e	4 f	4 g
11. Quaking bogs and transition mires							
SSSI Features							
<i>Austropotamobius pallipes</i> _1							KS
Running water			KH				
Wenlock			Geo				

**River Wye (Tributaries) / Afon Gwy (Isafonydd) 4 h, 4 i, 4 k, 4 l, 4 m, 4 n
Caeau Coed Mawr (Coedmawr Fields) 4 j**

Unique Unit No	7737	7736	7663	7735	7664	7734	7665
Site Unit Ref	4 h	4 i	4 j	4 k	4 l	4 m	4 n
SAC	Yes						
SSSI	Yes						
SAC Features							
1. Sea lamprey <i>Petromyzon marinus</i>							
2. River Lamprey <i>Lampetra fluviatilis</i>	Sym						
3. Brook lamprey <i>Lampetra planeri</i>	Sym						
4. Twaite shad <i>Alosa fallax</i>							
5. Allis shad <i>Alosa alosa</i>							
6. Atlantic salmon <i>Salmo salar</i>	KS						
7. Bullhead <i>Cottus gobio</i>	Sym						
8. European otter <i>Lutra lutra</i>	KS						
9. Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation			KH				
10. White-clawed crayfish <i>Austropotamobius pallipes</i>	KS		Sym	KS	KS	KS	Sym
11. Quaking bogs and transition mires							
SSSI Features							
<i>Austropotamobius pallipes</i> _1		KS					
Running water							

**River Wye (Tributaries) / Afon Gwy (Isafonydd) 4 h, 4 i, 4 k, 4 l, 4 m, 4 n
Caeau Coed Mawr (Coedmawr Fields) 4 j**

Unique Unit No	7737	7736	7663	7735	7664	7734	7665
Site Unit Ref	4 h	4 i	4 j	4 k	4 l	4 m	4 n
Wenlock						Geo	

- An important population of white-clawed crayfish occurs in these SSSIs.
- Twaité shad, allis shad and sea lamprey are not known to occur within this SSSI but habitat in the lower reaches may possibly be suitable.

Duhonw

Unique Unit No	7742	7661
Site Unit Ref	5 a	5 b
SAC	Yes	Yes
SSSI	Yes	Yes
SAC Features		
1. Sea lamprey <i>Petromyzon marinus</i>		
2. River Lamprey <i>Lampetra fluviatilis</i>	Sym	Sym
3. Brook lamprey <i>Lampetra planeri</i>	Sym	Sym
4. Twaité shad <i>Alosa fallax</i>		
5. Allis shad <i>Alosa alosa</i>		
6. Atlantic salmon <i>Salmo salar</i>	KS	KS
7. Bullhead <i>Cottus gobio</i>	Sym	Sym
8. European otter <i>Lutra lutra</i>	KS	KS
9. Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation	KH	KH
10. White-clawed crayfish <i>Austropotamobius pallipes</i>	Sym	Sym
11. Quaking bogs and transition mires		
SSSI Features		
<i>Bacidia circumspecta</i>	KS	KS

- An important population of white-clawed crayfish formerly occurred in this SSSI; restoration of the species here is a management objective.
- Twaité shad, allis shad and sea lamprey are thought not to occur within this SSSI.

Afon Irfon

Unique Unit No	7743	7750	7666	7744	7668	7745	7667
Site Unit Ref	6 a	6 b	6 c	6 d	6 e	6 f	6 g
SAC	Yes						

Afon Irfon							
Unique Unit No	7743	7750	7666	7744	7668	7745	7667
Site Unit Ref	6 a	6 b	6 c	6 d	6 e	6 f	6 g
SSSI	Yes						
SAC Features							
1. Sea lamprey <i>Petromyzon marinus</i>	Sym						
2. River Lamprey <i>Lampetra fluviatilis</i>	Sym						
3. Brook lamprey <i>Lampetra planeri</i>	Sym						
4. Twaite shad <i>Alosa fallax</i>	KS						
5. Allis shad <i>Alosa alosa</i>	Sym						
6. Atlantic salmon <i>Salmo salar</i>	KS						
7. Bullhead <i>Cottus gobio</i>	Sym						
8. European otter <i>Lutra lutra</i>	KS						
9. Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation	KH						
10. White-clawed crayfish <i>Austropotamobius pallipes</i>	KS	KS	KS	Sym	Sym	Sym	Sym
11. Quaking bogs and transition mires							
SSSI Features							
Assemblage of RDB and Nationally Scarce lichens	KS						
<i>Collema dichotomum</i>	KS						
Running water -Group B rivers-	KH						
Running water -Group C rivers-	KH						
Wenlock	Geo						

Afon Irfon Waen Rydd 6 m							
Unique Unit No	7746	7747	7748	7749	7670	7669	7671
Site Unit Ref	6 h	6 i	6 j	6 k	6 l	6 m	6 n
SAC	Yes						
SSSI	Yes						
SAC Features							
1. Sea lamprey <i>Petromyzon marinus</i>							
2. River Lamprey <i>Lampetra fluviatilis</i>	Sym						

Afon Irfon Waen Rydd 6 m							
Unique Unit No	7746	7747	7748	7749	7670	7669	7671
Site Unit Ref	6 h	6 i	6 j	6 k	6 l	6 m	6 n
3. Brook lamprey <i>Lampetra planeri</i>	Sym						
4. Twaite shad <i>Alosa fallax</i>							
5. Allis shad <i>Alosa alosa</i>							
6. Atlantic salmon <i>Salmo salar</i>	KS						
7. Bullhead <i>Cottus gobio</i>	Sym						
8. European otter <i>Lutra lutra</i>	KS						
9. Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation	KH						
10. White-clawed crayfish <i>Austropotamobius pallipes</i>	Sym						
11. Quaking bogs and transition mires							
SSSI Features							
Assemblage of RDB and Nationally Scarce lichens	KS						
<i>Collema dichotomum</i>							
Running water -Group B rivers-	KH						
Running water -Group C rivers-	KH						
Wenlock	Geo						

- Small populations of white-clawed crayfish are known to occur in the rivers Hafrena and Chwefri in this SSSI; restoration of the species here and to parts of its former range including the Garth Dulas is a management objective.
- Twaite shad is frequently recorded spawning in the lowest approximately 0.6km of the Afon Irfon and at the confluence with the River Wye.
- The status of Allis shad is uncertain in the River Wye SAC. Allis shad is assumed to be present in the same units as twaite shad, but normally migrates further upstream and therefore would be expected to occur in the upper river.
- Sea lamprey is reported spawning within the Afon Irfon.
- Atlantic salmon is recorded spawning throughout this SSSI but reproductive success is limited in parts of the upper Afon Irfon and Gwesyn due to acidification related to forestry.

River Ithon Coed Aberdulas 7 f									
Unique Unit No	7757	7755	7753	7751	7764	7767	7763	7760	7761
Site Unit Ref	7 a	7 b	7 c	7 d	7 e	7 f	7 g	7 h	7 i
SAC	Yes								
SSSI	Yes								
SAC Features									
1. Sea lamprey <i>Petromyzon marinus</i>									
2. River Lamprey <i>Lampetra fluviatilis</i>	Sym								
3. Brook lamprey <i>Lampetra planeri</i>	Sym								
4. Twaite shad <i>Alosa fallax</i>									
5. Allis shad <i>Alosa alosa</i>									
6. Atlantic salmon <i>Salmo salar</i>	KS	KS	KS	KS	KS	Sym	KS	KS	KS
7. Bullhead <i>Cottus gobio</i>	Sym								
8. European otter <i>Lutra lutra</i>	KS	Sym							
9. Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation	KH								
10. White-clawed crayfish <i>Austropotamobius pallipes</i>	Sym				Sym				
11. Quaking bogs and transition mires									
SSSI Features									
Marshy grassland									
Running water	KH	KH	KH	KH	Sym		Sym	Sym	Sym
Semi-natural woodland									
Swamp									

River Ithon Coed Bryn-Person 7 k Llymwynt Brook Pastures 7 q									
Unique Unit No	7762	7766	7759	7758	7756	7675	7676	7765	
Site Unit Ref	7 j	7 k	7 l	7 m	7 n	7 o	7 p	7 q	
SAC	Yes	Yes							
SSSI	Yes	Yes							
SAC Features									

River Ithon Coed Bryn-Person 7 k Llymwynt Brook Pastures 7 q								
Unique Unit No	7762	7766	7759	7758	7756	7675	7676	7765
Site Unit Ref	7 j	7 k	7 l	7 m	7 n	7 o	7 p	7 q
1. Sea lamprey <i>Petromyzon marinus</i>								
2. River Lamprey <i>Lampetra fluviatilis</i>	Sym							
3. Brook lamprey <i>Lampetra planeri</i>	Sym							
4. Twaite shad <i>Alosa fallax</i>								
5. Allis shad <i>Alosa alosa</i>								
6. Atlantic salmon <i>Salmo salar</i>	KS							
7. Bullhead <i>Cottus gobio</i>	Sym							
8. European otter <i>Lutra lutra</i>	KS							
9. Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation								
10. White-clawed crayfish <i>Austropotamobius pallipes</i>								
11. Quaking bogs and transition mires								
SSSI Features								
Marshy grassland								Sym
Running water	Sym		Sym	Sym	Sym	Sym	Sym	
Semi-natural woodland		Sym						
Swamp								KH

River Ithon Gweunydd Esgairdraenllwyn (Esgairdraenllwyn Pastures) 7 u Maelienyd 7 v Ithon Valley Woodlands 7 w Rhos Penrhiw 7 x								
Unique Unit No	7754	7752	7677	7678	7862	7841	7842	7843
Site Unit Ref	7 r	7 s	7 t	7 u	7u	7v	7w	7x
SAC	Yes							
SSSI	Yes							
SAC Features								
1. Sea lamprey <i>Petromyzon marinus</i>								

**River Ithon
Gweunydd Esgairdraenllwyn (Esgairdraenllwyn Pastures) 7 u
Maelienyd 7 v
Ithon Valley Woodlands 7 w
Rhos Penrhwi 7 x**

Unique Unit No	7754	7752	7677	7678	7862	7841	7842	7843
Site Unit Ref	7 r	7 s	7 t	7 u	7u	7v	7w	7x
2. River Lamprey <i>Lampetra fluviatilis</i>	Sym	Sym	Sym	Sym	Sym			Sym
3. Brook lamprey <i>Lampetra planeri</i>	Sym	Sym	Sym	Sym	Sym			Sym
4. Twaite shad <i>Alosa fallax</i>								
5. Allis shad <i>Alosa alosa</i>								
6. Atlantic salmon <i>Salmo salar</i>	KS	KS	KS	KS	KS			Sym
7. Bullhead <i>Cottus gobio</i>	Sym	Sym	Sym	Sym	Sym			Sym
8. European otter <i>Lutra lutra</i>	Sym	KS	KS	KS	KS	Sym	KS	KS
9. Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation								
10. White-clawed crayfish <i>Austropotamobius pallipes</i>								Sym
11. Quaking bogs and transition mires								
SSSI Features								
Marshy grassland				KH				
Running water	Sym	Sym	Sym					
Semi-natural woodland								
Swamp				KH				

- White-clawed crayfish has been recorded in this SSSI, including in Howey Brook, however its restoration to this sub-catchment is not a current management objective.
- Twaite shad, allis shad and sea lamprey are not known to occur within this SSSI but habitat in the lower reaches may possibly be suitable.

**Rhagnentydd Gwy Uchaf / Upper Wye Tributaries 8 a, 8 c, 8 d, 8 f
Rhosydd Llanwrthwl 8 b, 8bi
Gweunydd Nant y Dernol 8 e
Carn Gafallt 8 g**

Unique Unit No	7672	7673	7861	7769	7674	7770	7768	7771
Site Unit Ref	8 a	8 b	8bi	8 c	8 d	8 e	8 f	8 g
SAC	Yes							

SSSI	Yes							
SAC Features								
1. Sea lamprey <i>Petromyzon marinus</i>								
2. River Lamprey <i>Lampetra fluviatilis</i>	Sym		Sym	Sym	Sym	Sym	Sym	Sym
3. Brook lamprey <i>Lampetra planeri</i>	Sym		Sym	Sym	Sym	Sym	Sym	Sym
4. Twaite shad <i>Alosa fallax</i>								
5. Allis shad <i>Alosa alosa</i>								
6. Atlantic salmon <i>Salmo salar</i>	KS		KS	KS	KS	KS	KS	KS
7. Bullhead <i>Cottus gobio</i>	Sym		Sym	Sym	Sym	Sym	Sym	Sym
8. European otter <i>Lutra lutra</i>	KS		KS	KS	KS	KS	KS	KS
9. Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation	KH			KH	KH		KH	KH
10. White-clawed crayfish <i>Austropotamobius pallipes</i>								
11. Quaking bogs and transition mires								
SSSI Features								

- These SSSIs forms an important part of the spawning range of Atlantic salmon.

Colwyn Brook Marshes (North & South)							
Unique Unit No	626	3011	3012	3013	3014	3015	3016
Site Unit Ref	9a	9b	9c	9d	9e	9f	9g
SAC	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SSSI	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SAC Features							
1. Sea lamprey <i>Petromyzon marinus</i>							
2. River Lamprey <i>Lampetra fluviatilis</i>							
3. Brook lamprey <i>Lampetra planeri</i>		Sym	Sym	Sym	Sym	Sym	Sym
4. Twaite shad <i>Alosa fallax</i>							
5. Allis shad <i>Alosa alosa</i>							
6. Atlantic salmon <i>Salmo salar</i>							

Colwyn Brook Marshes (North & South)							
Unique Unit No	626	3011	3012	3013	3014	3015	3016
Site Unit Ref	9a	9b	9c	9d	9e	9f	9g
7. Bullhead <i>Cottus gobio</i>							
8. European otter <i>Lutra lutra</i>	KS	KS	KS	KS	KS	KS	KS
9. Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation							
10. White-clawed crayfish <i>Austropotamobius pallipes</i>			KS	KS	KS		KS
11. Quaking bogs and transition mires		KH	KH	Sym	Sym	KH	Sym
SSSI Features							
Fen -topogenous mires in valleys, basins and flood plains-		KH	KH	KH	KH	KH	KH
Marshy grassland	Sym	KH	KH	KH			KH

- This is the only component SSSI of the River Wye SAC that contains the feature 'quaking bogs and transition mires'.
- The site comprises 5 separate ownership units.

Conservation Objectives

Background to Conservation Objectives

Outline of the legal context and purpose of conservation objectives.

Conservation objectives for individual SACs and SPAs are required by the 1992 'Habitats' Directive (92/43/EEC) as implemented through the Conservation of Habitat and Species Regulations 2017 (As amended). The aim of the Habitats Directive is the maintenance, or where appropriate the restoration, of the 'favourable conservation status' (FCS) of habitats and species listed in the Annexes to the Directive (see Box). Therefore FCS provides the overarching framework for defining the conservation objectives for individual SACs.

Although neither the Birds Directive nor the Ramsar Convention refer to FCS, Natural Resources Wales considers that the overall aim of both those legal instruments is sufficiently similar to FCS to make it practical and proportionate to use the same guiding principle when establishing the conservation objectives for SPAs and Ramsar sites, as well as SACs. Therefore the Habitats Directive definition of FCS is considered to provide the overarching framework for conservation objectives for all SACs, SPAs and Ramsar sites in Wales.

Favourable conservation as defined in Articles 1(e) and 1(i) of the Habitats Directive: *“The conservation status of a natural habitat is the sum of the influences acting on it and its typical species that may affect its long-term natural distribution, structure and functions as well as the long term survival of its typical species. The conservation status of a natural habitat will be taken as favourable when:*

- its natural range and areas it covers within that range are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The conservation status of a species is the sum of the influences acting on the species that may affect the long-term distribution and abundance of its populations. The conservation status will be taken as 'favourable' when:

- population dynamics data on the species indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.”

The achievement of FCS is not an objective that applies at the level of the individual sites. Rather it is a wider objective to which each individual site contributes. Therefore the conservation objectives for an individual site are intended to express what is considered to be that site's appropriate contribution to achieving FCS. Since SACs are the most important mechanism in the Habitats Directive for achieving FCS, and the sites represent the most important areas for conservation of the Annex I habitat types and Annex II species, the objectives for each individual SAC should seek to ensure that the site makes a substantial contribution which properly reflects its importance in a local, national and European context and the particular reasons why the site was selected for inclusion in the UK National Sites Network of SACs. A similar approach is taken to setting conservation objectives for SPAs and Ramsar sites.

Achieving the conservation objectives of individual sites requires appropriate management and the control of factors which are influencing, or may influence the features.

The conservation objectives have a number of specific roles:

- **Communication:** The conservation objectives should help convey to stakeholders what are the reasons for the designation and what it is intended to achieve.
 - **Site planning and management:** The conservation objectives guide management of sites, to maintain or restore the designated habitats and species. They provide the basis for identifying what management is required both within the site boundary, and outside it, where achieving the objectives requires action to be taken outside the site.
 - **River Basin Management Planning:** Conservation Objectives for aquatic and water dependent SAC and SPA features are also used as the “standards and objectives” referred to in Article 4 (1c) of the Water Framework Directive (WFD) (2000/60/EC). In 2009, Welsh Ministers decided that where SAC and SPA conservation objectives are more stringent than ‘Good Ecological Status’ (GES) as defined in the WFD, they (and the standards they contain) are the objectives referred to in Article 4(1c) of the WFD.
 - **Assessing plans and projects:** Article 6(3) of the ‘Habitats’ Directive requires the assessment of proposed plans and projects in view of a site's conservation objectives. Subject to certain exceptions, plans or projects may not proceed unless it is established that they will not adversely affect the integrity of sites. There are similar requirements for the review of existing decisions and consents. Note that the assessment of plans and projects should be made in view of the entirety of the conservation objectives for the site, including the performance indicators.
- Monitoring and reporting:** In addition to foregoing purposes, conservation objectives provide the basis for defining the evidence that will be used for assessing the condition of a feature and the status of factors that affect it. That evidence is contained in a sub-set of conservation objectives called ‘performance indicators’. The performance indicators are those conservation objectives which are quantifiable and measurable, and which provide the

basis for monitoring and reporting. The performance indicators are set out in an Appendix to this document.

The conservation objectives in this document reflect Natural Resources Wales' current information and understanding of the site and its features and their importance in an international context. The conservation objectives are subject to review by Natural Resources Wales in the light of new knowledge.

Format of the conservation objectives

Each conservation objective is a composite statement defining a site-specific aspiration for each designated feature. This composite statement contains clauses that correspond to all the elements of FCS, namely:

For habitat features:

Extent should be stable in the long term, or where appropriate increasing*;

Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving;

Populations of the habitat's typical species must be being maintained or where appropriate increasing*;

Factors affecting the extent and quality of the habitat and its typical species (and thus affecting the habitat's future prospects) should be under appropriate control.

For species features:

The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term*;

The distribution of the population should be being maintained*;

There should be sufficient habitat, of sufficient quality, to support the population in the long term;

Factors affecting the population or its habitat should be under appropriate control.

The elements above constitute a generic checklist or guide to the elements that should normally be included in the conservation objectives, in order to ensure that the site makes an effective and appropriate contribution to achieving favourable conservation status for the habitats and species for which it is designated.

There is one conservation objective for each designated feature listed in part 3. In some cases, where there are distinct areas or forms of a designated habitat or separate populations of a designated species within a site, the conservation objective is sub-divided into different sections to enable different aspirations to be expressed for different occurrences of the features within the site.

As well as describing the aspirations for the condition of the feature, each conservation objective contains a statement that the factors which significantly affect the feature are under appropriate control.

Conservation Objective for the watercourse

The ecological status of the watercourse is a major determinant of FCS for all features. The required conservation objective for the watercourse is defined below.

- The capacity of the habitats in the SAC to support each feature at near-natural population levels, as determined by predominantly unmodified ecological and hydromorphological processes and characteristics, should be maintained as far as possible, or restored where necessary.
- The ecological status of the water environment should be sufficient to maintain a stable or increasing population of each feature. This will include elements of water quantity and quality, physical habitat and community composition and structure.
- Flow regime, water quality and physical habitat should be maintained in, or restored as far as possible to, a near-natural state, in order to support the coherence of ecosystem structure and function across the whole area of the SAC.
- All known breeding, spawning and nursery sites of species features should be maintained as suitable habitat as far as possible, except where natural processes cause them to change.
- Flows, water quality, substrate quality and quantity at fish spawning sites and nursery areas will not be depleted by abstraction, discharges, engineering or gravel extraction activities or other impacts to the extent that these sites are damaged or destroyed.
- The river planform and profile should be predominantly unmodified. Physical modifications having an adverse effect on the integrity of the SAC, including, but not limited to, revetments on active alluvial river banks using stone, concrete or waste materials, unsustainable extraction of gravel, addition or release of excessive quantities of fine sediment, will be avoided.
- River habitat SSSI features should be in favourable condition. Where the SAC habitat is not underpinned by a river habitat SSSI feature, the target is to maintain the characteristic physical features of the river channel, banks and riparian zone.
- Artificial factors impacting on the capability of each species feature to occupy the full extent of its natural range should be modified where necessary to allow passage, eg. weirs, bridge sills, acoustic barriers.
- Natural factors such as waterfalls, which may limit, wholly or partially, the natural range of a species feature or dispersal between naturally isolated populations, should not be modified.
- Flows during the normal migration periods of each migratory fish species feature will not be depleted by abstraction to the extent that passage upstream to spawning sites is hindered.
- Flow objectives will be agreed by NRW as necessary. It is anticipated that these limits will concur with the standards used by the Review of Consents process given in Appendix 3 of this document.

- Water quality targets follow those in the revised Common Standards Monitoring Guidance for Rivers (JNCC 2016). These are detailed in [Appendix 2](#) with targets for organic pollution (DO, BOD and ammonia), phosphate, trophic diatom index and acidification.
- Potential sources of pollution not addressed in the Review of Consents, such as contaminated land, will be considered in assessing plans and projects.
- Levels of suspended solids will be agreed by NRW for each Water Framework Directive water body in the Wye SAC as necessary. Measures including, but not limited to, the control of suspended sediment generated by agriculture, forestry and engineering works, will be taken to maintain suspended solids below these levels.

Conservation Objective for Features 1-7 (fish)

The 7 fish species designated under the EU Habitats Directive in the Wye (and their corresponding EU code) are: sea lamprey *Petromyzon marinus* (1095); brook lamprey *Lampetra planeri* (1096); river lamprey *Lampetra fluviatilis* (1099); twaite shad *Alosa fallax* (1103); Allis shad *Alosa alosa* (1102); Atlantic salmon *Salmo salar* (1106); and bullhead *Cottus gobio* (1163). Brook lamprey and river lamprey are generally indistinguishable for the purposes of monitoring; however, management requirements are similar. Twaite shad and allis shad are also generally indistinguishable for the purposes of monitoring; however, management requirements are similar.

Vision for features 1-7

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

FCS component	Supporting information / current knowledge
The conservation objective for the watercourse as defined in the section above must be met	
The population of the feature in the SAC is stable or increasing over the long term.	Refer to Status assessment sections for current assessments of feature populations. Entrainment in water abstractions directly impacts on population dynamics through reduced recruitment and survival rates. Fish stocking can adversely affect population dynamics through competition, predation, introduction of disease and alteration of population genetics.
The natural range of the feature in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future. The natural range is taken to mean those reaches where predominantly suitable habitat for each life stage	Some reaches of the River Wye SAC are more suitable for some features than others eg. the Edw has important populations of salmon but is not used by shad due to its small size. These differences influence the management priorities for individual reaches and are used to define the site units described in the section Features and management units . Further details of feature

FCS component	Supporting information / current knowledge
<p>exists over the long term. Suitable habitat is defined in terms of near-natural hydrological and geomorphological processes and forms e.g. suitable flows to allow upstream migration, depth of water and substrate type at spawning sites, and ecosystem structure and functions e.g. food supply (as described in Site description and Assessment of status). Suitable habitat need not be present throughout the SAC but where present must be secured for the foreseeable future. Natural factors such as waterfalls may limit the natural range of individual species. Existing artificial influences on natural range that cause an adverse effect on site integrity, such as physical barriers to migration, will be assessed.</p>	<p>habitat suitability are given in the Assessment section. In general, management for one feature is likely to be sympathetic for the other features present in the river, provided that the components of favourable conservation status for the watercourse as defined in the section above are secured.</p> <p>The characteristic channel morphology provides the diversity of water depths, current velocities and substrate types necessary to fulfil the habitat requirements of the features. The close proximity of different habitats facilitates movement of fish to new preferred habitats with age.</p> <p>Upland coniferous forestry plantations in parts of the upper catchment, including the Groes, Berwyn and Breffni catchments, adversely affect the run-off and sediment characteristics and water quality of the river. In a few locations there are also problems with toxic run-off from abandoned metal mines. Measures should be taken to restore the hydrological characteristics of headwater areas including wetland functions.</p> <p>Hydrological processes in the Wye are affected by abstraction and regulation releases from the Elan Valley reservoirs. While these effects cannot practicably be removed any adverse effects on the integrity of the SAC should be minimised as far as possible.</p> <p>Extensive coniferous forestry plantations in the upper catchment, including the Irfon catchment, adversely affect the run-off and sediment characteristics and water quality of the river. Measures should be taken to restore the hydrological characteristics of headwater areas including wetland functions.</p> <p>Shad and salmon migration can be affected by acoustic barriers and by high sediment loads, which can originate from a number of sources including construction works.</p>

FCS component	Supporting information / current knowledge
There is, and will continue to be, a sufficiently large habitat to maintain the feature's population in the SAC on a long-term basis.	

Conservation Objective for Feature 8: European otter *Lutra lutra* (EU Species Code: 1355)

Vision for feature 8

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

FCS component	Supporting information / current knowledge
The population of otters in the SAC is stable or increasing over the long term and reflects the natural carrying capacity of the habitat within the SAC, as determined by natural levels of prey abundance and associated territorial behaviour.	Refer to Assessment section for current assessment of feature population
<p>The natural range of otters in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future. The natural range is taken to mean those reaches that are potentially suitable to form part of a breeding territory and/or provide routes between breeding territories. The whole area of the Wye SAC is considered to form potentially suitable breeding habitat for otters. The size of breeding territories may vary depending on prey abundance. The population size should not be limited by the availability of suitable undisturbed breeding sites.</p> <p>Where these are insufficient they should be created through habitat enhancement and where necessary the provision of artificial holts. No otter breeding site should be subject to a level of disturbance that could have an adverse effect on breeding success. Where necessary, potentially harmful levels of disturbance must be managed.</p>	<p>Survey information shows that otters are widely distributed in the Wye catchment.</p> <p>However, an assessment of otter breeding habitat has indicated that there may be a shortage of suitable habitat around the middle reaches of the river, which may affect the long-term viability of the population. This should be addressed by habitat enhancement including stock exclusion from suitable woodlands near to the river but outside the floodplain.</p> <p>The decline in eel populations may be having an adverse effect on the population of otters in the Wye.</p>
The safe movement and dispersal of individuals around the SAC is facilitated by the provision, where necessary, of suitable	Road and bridge improvement schemes within the catchment should take appropriate measures

FCS component	Supporting information / current knowledge
riparian habitat, and underpasses, ledges, fencing etc at road bridges and other artificial barriers.	towards achievement of this objective.

Conservation Objective for Feature 9: Watercourses of plain to montane levels with the *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation (EU Habitat Code: 3260)

Vision for feature 9

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

FCS component	Supporting information / current knowledge
The conservation objective for the watercourse as defined in the section above must be met	
The natural range of the plant communities represented within this feature should be stable or increasing in the SAC. The natural range is taken to mean those reaches where predominantly suitable habitat exists over the long term. Suitable habitat and associated plant communities may vary from reach to reach. Suitable habitat is defined in terms of nearnatural hydrological and geomorphological processes and forms e.g. depth and stability of flow, stability of bed substrate, and ecosystem structure and functions e.g. nutrient levels, shade (as described in Outline description section). Suitable habitat for the feature need not be present throughout the SAC but where present must be secured for the foreseeable future, except where	Stands of this feature are known to be widespread in the River Wye SAC including many of the tributaries. However, further information on its natural range, distribution and variation is desirable. Sympathetic management will be promoted wherever the feature is present. Species indicative of unfavourable condition for this feature e.g. filamentous algae associated with eutrophication and invasive non-native species, should be maintained or restored below an acceptable threshold level, indicative of high ecological status within the SAC.

FCS component	Supporting information / current knowledge
natural processes cause it to decline in extent.	
The area covered by the feature within its natural range in the SAC should be stable or increasing.	Adverse factors may include elevated nutrient levels, shading or altered flow and/or sediment regimes. It is possible that reaches with slightly elevated nutrient levels and/or regulated flows may have a higher cover of the feature than under natural conditions, though species composition may also be affected.
The conservation status of the feature's typical species should be favourable. The typical species are defined with reference to the species composition of the appropriate JNCC river vegetation type for the particular river reach, unless differing from this type due to natural variability when other typical species may be defined as appropriate.	More information on the typical species expected within each management unit in the SAC is required. The effects of artificial factors such as flow regulation on species composition should be examined eg. river jelly lichen may prefer greater flow variability.

Conservation Objective for Feature 10: White-clawed crayfish *Austropotamobius pallipes* (EU Species Code: 1092)

Vision for feature 10

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

FCS component	Supporting information / current knowledge
The conservation objective for the watercourse as defined in the section above must be met	No value
The population of the feature in the SAC is stable or increasing over the long term.	Refer to current assessment of feature population. Presence of non-native crayfish adversely affects population dynamics through competition, predation and introduction of disease (crayfish plague). This is thought to invariably lead to local extinction of white-clawed crayfish. American signal crayfish are present in the Bachawy and Lugg and

FCS component	Supporting information / current knowledge
	<p>Arrow sub-catchments (outside the SAC) and have been reported in the Edw. The release of highly toxic sheep dips into streams has caused mass mortality and local extinction in the SAC from which populations may be very slow to recover.</p>
<p>The area covered by the feature within its natural range in the SAC should be stable or increasing.</p>	<p>Adverse factors may include elevated nutrient levels, shading or altered flow and/or sediment regimes.</p> <p>It is possible that reaches with slightly elevated nutrient levels and/or regulated flows may have a higher cover of the feature than under natural conditions, though species composition may also be affected.</p>
<p>The natural range of the feature in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future. The natural range is taken to mean those reaches where predominantly suitable habitat for each life stage exists over the long term. Suitable habitat is defined in terms of near-natural hydrological and geomorphological processes and forms eg. substrate type, water hardness and temperature, and ecosystem structure and functions eg. food supply, absence of invasive non-native competitors. Suitable habitat need not be present throughout the SAC but where present must be secured for the foreseeable future. Natural factors such as waterfalls may limit the natural range of individual species. Existing artificial influences on natural range that cause an adverse effect on site integrity should be assessed.</p>	<p>Some reaches of the Wye SAC are more suitable for some features than others eg. the natural range of white-clawed crayfish may be limited by water hardness and temperature (which may possibly also mediate competition with non-native crayfish to some extent). These differences influence the management priorities for individual reaches and are used to define the site management units. Eradication of American signal crayfish, or control of its spread in the Wye catchment is considered essential to the long-term suitability of the SAC for white-clawed crayfish. At present there are no known effective methods for eradication or long-term control of signal crayfish.</p> <p>Prevention of release of toxic sheep dips and other harmful diffuse pollution into water courses is essential.</p>
<p>There is, and will probably continue to be, a sufficiently large habitat to</p>	<p>Invasion of American signal crayfish is likely to make existing habitat in the Wye SAC unsuitable for white-clawed crayfish in the long term. There may be a need to</p>

FCS component	Supporting information / current knowledge
maintain the feature's population in the SAC on a long-term basis.	translocate white-clawed crayfish to suitable habitat outside its present (and historic) range.

Conservation Objective for Feature 11: Quaking bogs and transition mires (EU Habitat Code: 7410)

Vision for feature 11

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

FCS component	Supporting information / current knowledge
The conservation objective for the watercourse as defined in the section above must be met.	
The natural range of the plant communities represented within this feature should be stable or increasing in the SAC. The natural range is taken to mean those reaches where near-natural hydrological and geomorphological processes and landforms favour the development of this habitat. The feature need not be present in all suitable locations in the SAC but where present must be secured for the foreseeable future.	<p>This feature is represented within the SAC at Colwyn Brook Marshes SSSI. Other locations with similar habitat within and adjacent to the SAC are not considered to qualify as examples of this feature e.g. Waen Rhyd SSSI, but may have similar management requirements.</p> <p>Species indicative of unfavourable condition for this feature eg. invasive native trees and shrubs and non-native species, should be maintained or restored below an acceptable threshold level, indicative of high ecological status within the SAC.</p>
The area covered by the feature within its natural range in the SAC should be stable or increasing.	Adverse factors may include elevated nutrient levels or altered hydrological processes through drainage or groundwater abstraction.
The conservation status of the feature's typical species should be favourable. The typical species are defined with reference to the species composition of the	More information on the typical species expected within each management unit is required. Details to be confirmed.

FCS component	Supporting information / current knowledge
<p>appropriate NVC type(s), unless differing from this type due to natural variability/local distinctiveness when other typical/indicator species may be defined as appropriate.</p>	

Assessment of status and management requirements

This section provides a summary of the assessment of the status of each feature, and a summary of the management issues that need to be addressed to maintain or restore each feature.

Status and management requirements of Feature 1: sea lamprey *Petromyzon marinus*

Status of Feature: Unfavourable, Unclassified

Sea lamprey monitoring showed that overall catchment mean ammocoete density at 2.58 ammocoetes m⁻² in suitable habitat² considerably exceeded the target threshold of 0.1 m⁻² suggested by Harvey and Cowx (2003) and also complied with JNCC targets for spawning site and ammocoete distribution (JNCC 2016a). Sea lamprey ammocoetes were recorded in good numbers immediately upstream of the falls at Rhayader, their most upstream recorded site on the main Wye. They were also recorded in the Irfon and Ithon tributaries.

Management Requirements

The potential impact of flow depletion resulting from a small number of major abstraction licences, if they were to be fully utilised, was highlighted in the Review of Consents process. As a result of this process, flow targets have been set which are considered likely to significantly reduce or remove the potential impacts on SAC features. These targets (given in Appendix 2) are expressed as, 1) a flow duration curve using recent daily mean flow data, used to set abstraction licence conditions including 'hands-off flows', 2) hourly maximum abstraction rates for certain licences to reduce or remove the effect of diurnal flow variations. There are also requirements for screening of intakes to reduce or remove the impact of impingement and entrainment on juvenile fish migrating downstream.

Entrainment in water abstractions directly impacts on population dynamics through reduced recruitment and survival rates. Information on likely rates of entrainment of lamprey ammocoetes is required before acceptable levels can be assessed.

The extent and quality of suitable sea lamprey habitat must be maintained. Elevated levels of fines (particles <0.83mm) within spawning substrates can interfere with egg survival. Spawning habitat consists of well-oxygenated gravel/pebble substrate of >10cm depth in a range of water depths (0.2 to 1.5m). Sea and river lamprey tend to spawn in deeper water than brook lamprey. Nursery habitat consists of open-structured, aerated, silty and sandy substrates between 2 and 40cm depth generally in shallow (<0.5m) slack-water channel margins.

The currently favourable condition assessment suggests that there are no strongly adverse factors influencing this species. However, the species is likely to benefit

from positive management for the other SAC features, and may see further improvement in condition as a result. On-going monitoring will allow a better understanding of population fluctuations, distributional changes etc.

Status and management requirements of Features 2 and 3: brook lamprey *Lampetra planeri* and river lamprey *Lampetra fluviatilis*

Status of Features: Unfavourable, Unclassified

Brook/river lamprey monitoring showed that overall catchment mean ammocoete density considerably exceeded the JNCC target threshold. However, *Lampetra* ammocoetes were recorded at only 30 of the 54 sample sites (56%), thus failed to meet the criterion of presence in at least two thirds of sites within their natural range (Harvey and Cowx 2003, CCW 2006). However, further clarification is needed concerning a number of sample sites in the upper reaches (Upper Wye and Elan), which may reflect unsuitable habitat and be outside the natural ranges of the species (CCW 2006).

It has not been possible to distinguish between these two species during monitoring, due to the reliance on juvenile stages (ammocoetes). Anecdotal evidence suggests that both species are likely to be present in many reaches, though brook lamprey are expected to predominate in the headwaters and river lamprey may be the more abundant species in the main channel and the lower reaches of larger tributaries. More information on the relative abundance of these two species in different parts of the Wye SAC is desirable. Records of spawning adult river lamprey would be particularly useful.

Management Requirements

The extent and quality of suitable habitat for brook and river lamprey must be maintained. Elevated levels of fines (particles <0.83mm) within spawning substrates can interfere with egg survival. Spawning habitat consists of well-oxygenated gravel/pebble substrate of >10cm depth in a range of water depths (0.2 to 1.5m). Sea and river lamprey tend to spawn in deeper water than brook lamprey. Nursery habitat consists of open-structured, aerated, silty and sandy substrates between 2 and 40cm depth generally in shallow (<0.5m) slack-water channel margins.

Entrainment in water abstractions directly impacts on population dynamics through reduced recruitment and survival rates. Information on likely rates of entrainment of lamprey ammocoetes is required before acceptable levels can be assessed.

Status and Management Requirements of Features 4 and 5: twaite shad *Alosa fallax* and allis shad *Alosa alosa*

Status of Features: Unfavourable: Unclassified.

Monitoring of these species in the Wye relies on two methods:

- i. Kick sampling for eggs provides qualitative information on spawning distribution,
- ii. Netting for juveniles in the lower river and tidal reaches during late summer/autumn when juveniles drift downstream towards the estuary.

These methods do not distinguish between the two species. Allis shad is thought to be rare, with no recent confirmed records in the Wye, while twaite shad is relatively common. Kick sampling for eggs is only able to give a broad scale indication of presence or absence at sampled locations. Netting for juveniles gives a quantitative estimate of abundance, though may be subject to a high degree of uncertainty due to sampling error. This uncertainty is likely to be compounded by variation between years in the size of the adult run, spawning success and resulting numbers of juveniles. Poor adult runs are likely to result from unsuitable flows during the March to June migration period, in particular prolonged low flows, while poor survival of eggs and juveniles is related to spate flows in the mid to late summer which can flush them into the estuary prematurely.

CSM guidance states that adult run size should comply with an agreed target for each river, with no drop in the annual run greater than would be expected from variations in natural mortality alone. This attribute is not currently assessed in the Wye due to the absence of a suitable fish counter.

Physical barriers to migration are a major cause of unfavourable status of these species in Europe as a whole; however, there are not thought to be any significant barriers to shad migration in the Wye.

The current unfavourable status results from a precautionary assessment of feature abundance, and from the presence of adverse factors, in particular the potential for damaging flow depletion and entrainment/impingement in water intakes (Maitland and Hatton-Ellis 2003, CCW 2007)

Management Requirements

Development activities can cause temporary physical, acoustic, chemical and sediment barrier effects that need to be addressed in the assessment of specific plans and projects. Noise/vibration eg. due to impact piling, drilling, salmon fish counters present within or in close proximity to the river can create a barrier to shad migration. Barriers resulting from vibration, chemicals, low dissolved oxygen and artificially high sediment levels must be prevented at key times (generally March to June). The possible barrier effects that might be caused by the installation of an acoustic salmonid fish counter should also be evaluated.

The potential impact of flow depletion resulting from a small number of major abstraction licences, if they were to be fully utilised, was highlighted in the Review of Consents process. As a result of this process, flow targets have been set which are considered likely to significantly reduce or remove the impacts on SAC features. These targets (given in Appendix 2) are expressed as, 1) a flow duration curve using recent daily mean flow data, which is used to set abstraction licence conditions including 'hands-off flows', 2) hourly maximum abstraction rates for certain licences to reduce or remove the effect of diurnal flow variations. There are also requirements for screening of intakes to reduce or remove the impact of impingement and entrainment on juvenile shad drifting downstream and post-spawning adult shad.

The extent and quality of suitable shad habitat must be maintained. Spawning habitat is defined as stable, clean gravel/pebble-dominated (approximately 70%) substrate without an armoured layer and with <10% fines in the top 30 cm. Water depth during the spawning and incubation periods should be 50-75 cm. Holding areas are defined as pools of at least 200 cm depth, with cover from features such as undercut banks, vegetation, submerged objects and surface turbulence.

Anglers occasionally fish for shad, and they are sometimes taken in quite large numbers. Further research is necessary to define sustainable levels of angling. If this shows there is cause for concern a temporary cessation of fishing activity in the vicinity of known spawning grounds during the spawning period should be considered, particularly where shad are known to be taken regularly. Exploitation of shad is currently unregulated and controls are being considered through the review of freshwater fisheries legislation.

Commercial fishermen also take shad as a by-catch, with whitebait and shrimp fishing being of particular concern. Changes in fishing methods need to be promoted to minimize captures, while both anglers and trawler men should be encouraged to return alive any individuals caught.

Artificially enhanced densities of other fish may introduce unacceptable competition or predation pressure and the aim should be to minimise these risks in considering any proposals for stocking.

Status and Management Requirements of Feature 6: Atlantic salmon *Salmo salar*

Status of Feature: Unfavourable: Unclassified.

Monitoring of Atlantic salmon in the Wye relies on two methods:

Estimation of adult run size from angling catch returns,

Electro-fishing for juveniles in nursery areas.

The estimate of adult numbers is converted into an estimate of numbers of eggs deposited which is compared against an Egg Deposition Target (EDT), calculated by considering the area of suitable spawning habitat within the catchment. The equivalent adult run to achieve the EDT is described in terms of a Conservation Limit, which must be exceeded 4 years in 5 for the Management Target to be considered attained. Electro-fishing for juveniles is either quantitative or semi-quantitative, and estimated juvenile densities are classified in one of six categories A to F. The monitoring guidance produced by the LIFE in UK Rivers project recommends that ideally juvenile densities should be compared to predicted densities for the sample reach using the HABSCORE model (Cowx and Fraser 2003). These targets are calculated and monitored by NRW.

The current unfavourable status results from failure of the Management Target for adult run size as well as a precautionary assessment of juvenile distribution and abundance and the presence of adverse factors, in particular the potential for flow depletion and localised water quality failures. Acidification due to forestry is a factor in the upper reaches of the Wye and Irfon.

Management Requirements

The Atlantic salmon is the focus for much of the management activity carried out on the Wye. The relatively demanding water quality and spawning substrate quality requirements of this feature mean that reduction in diffuse pollution and siltation impacts is a high priority. Measures to address these problems include the establishment of buffer zones on reaches adjacent to intensively managed livestock grazing or arable land. Tree management, especially coppicing and pollarding to increase light levels to the channel, is also often carried out. Liming has also been carried out in some of the acidified headwaters. The Wye and Usk Foundation through their pHISH project have carried out much of this work in recent years. Other work has included removal of weirs and construction of fish passes to ease artificial barriers to salmon migration, reduction in exploitation pressure through buying out net fisheries in the estuary and the introduction of 'catch and release' byelaws.

Elevated levels of fines (particles <0.83mm) within spawning substrates can interfere with egg and fry survival. Clean substrate free from excessive siltation should predominate at suitable spawning sites. Spawning habitat is defined as stable coarse substrate without an armoured layer, in the pebble to cobble size range (16-256 mm) but with the majority being <150 mm. Water depth during the spawning and incubation periods should be 15-75 cm. Fry habitat is indicated by water of <20 cm deep and a gravel/pebble/cobble substrate. Parr habitat is indicated by water 20-40 cm deep and similar substrate. Holding areas are defined as pools of at least 1.5 m depth, with cover from features such as undercut banks, vegetation, submerged objects and surface turbulence. Coarse woody debris should not be removed from rivers as it plays a significant role in the formation of new gravel beds, and provides cover for fish and a source of food for invertebrates.

In the Wye catchment, the most significant sources of diffuse pollution and siltation are from agriculture, including fertiliser run-off, livestock manure, silage effluent and soil erosion from ploughed land. The most intensively used areas such as heavily trampled gateways and tracks can be especially significant sources of polluting run-off. Preventative measures can include surfacing of tracks and gateways, moving feeding areas, and separating clean and dirty water in farmyards. Farm operations should avoid ploughing land which is vulnerable to soil erosion or leaving such areas without crop cover during the winter.

Among toxic pollutants, sheep dip and silage effluent present a particular threat to aquatic animals in this predominantly rural area. Contamination by synthetic pyrethroid sheep dips, which are extremely toxic to aquatic invertebrates, has a devastating impact on crayfish populations and can deprive fish populations of food over large stretches of river. These impacts can arise if recently dipped sheep are allowed access to a stream or hard standing area, which drains into a watercourse. Pollution from organophosphate sheep dips and silage effluent can be very damaging locally. Pollution from slurry and other agricultural and industrial chemicals, including fuels, can kill all forms of aquatic life. All sheep dips and silage, fuel and chemical storage areas should be sited away from watercourses or bunded to contain leakage. Recently dipped sheep should be kept off stream banks. Used dip should be disposed of strictly in accordance with Environment Agency Regulations and guidelines. Statutory and voluntary agencies should work closely with landowners and occupiers to minimise the risk of any pollution incidents and enforce existing regulations.

Measures to control diffuse pollution in the water environment, including 'Catchment Sensitive Farming', may be implemented as a result of the Water Framework Directive and, along with existing agri-environment schemes, will help to achieve the conservation objectives for the SAC.

Discharges from sewage treatment works, urban drainage, engineering works such as road improvement schemes, contaminated land, and other domestic and industrial sources can also be significant causes of pollution, and must be managed appropriately. Current consents for discharges entering, or likely to impact upon the site should be monitored, reviewed and altered if necessary.

Overhanging trees provide valuable shade and food sources, whilst tree root systems provide important cover and flow refuges for juveniles. At least 50% high canopy cover to the water course/banks should be maintained, where appropriate. Some reaches may naturally have lower tree cover. Cover may also be lower in urban reaches.

In all river types, artificial barriers should be made passable. The impact of existing barriers in the Wye should be assessed on a case-by-case basis. Physical modification of barriers is required where depth/velocity/duration of flows is unsuitable to allow passage. Complete or partial natural barriers to potentially suitable spawning areas should not be modified or circumvented.

Development activities can cause temporary physical, acoustic, chemical and sediment barrier effects that need to be addressed in the assessment of specific plans and projects.

Entrainment in water abstractions directly impacts on population dynamics through reduced recruitment and survival rates. Intake screens must meet statutory requirements under the Salmon & Freshwater Fisheries Act.

The presence of artificially high densities of other fish can create unacceptably high levels of predatory and competitive pressure on juvenile salmon and the aim should be to minimise these risks in considering any proposals for stocking. Escapes from fish farms are a form of uncontrolled introduction and should be prevented by effective screening on all intakes and discharges.

Controls on exploitation should include migratory passage to the SAC within territorial waters, including estuarine and coastal net fisheries, as well as exploitation within the SAC from rod fisheries. Net Limitation Orders are used to control the estuarine fishery. Exploitation of salmon by rod fisheries is regulated by EA licensing and byelaws controlling the fishing season and allowable methods.

Status and Management Requirements of Feature 7: Bullhead *Cottus gobio*

Status of Feature: Unfavourable: Unclassified.

The current unfavourable status results from the presence of adverse factors, in particular localised water quality failures. Records obtained from juvenile salmon monitoring show that bullhead are widespread in the main river and tributaries. Quantitative information on bullhead abundance is being provided through targeted monitoring.

Management Requirements

Vertical drops of >18-20 cm are sufficient to prevent upstream movement of adult bullheads. They will therefore prevent recolonisation of upper reaches affected by lethal pollution episodes, and will also lead to constraints on genetic interactions that may have adverse consequences. New instream structures should be avoided, whilst the impact of existing artificial structures needs to be evaluated.

The extent and quality of suitable bullhead habitat must be maintained. Elevated levels of fines can interfere with egg and fry survival. Spawning habitat is defined as unsilted coarse (gravel/pebble/ cobble) dominated substrate: males guard sticky eggs on the underside of stones. Larger stones on a hard substrate providing clear spaces between the stream bed and the underside of pebbles/cobbles are therefore important.

The importance of submerged higher plants to bullhead survival is unclear, but it is likely that where such vegetation occurs it is used by the species for cover against predators. Weed cutting should be limited to no more than half of the channel width in a pattern of cutting creating a mosaic of bare substrate and beds of submerged plants. Slack-water areas provide important refuges against high flow conditions. Suitable refuges include pools, submerged tree root systems and marginal vegetation with >5 cm water depth.

Bullheads are particularly associated with woody debris in lowland reaches, where it is likely that it provides an alternative source of cover from predators and floods. It may also be used as an alternative spawning substrate. Debris dams and woody debris should be retained where characteristic of the river/reach. Woody debris removal should be minimised, and restricted to essential activities such as flood defence.

Maintenance of intermittent tree cover in conjunction with retention of woody debris helps to ensure that habitat conditions are suitable. At least 50% high canopy cover to the water course/banks should be maintained, where appropriate. Some reaches may naturally have lower tree cover. Cover may also be lower in urban reaches.

Bullhead densities have been found to be negatively correlated with densities of non-native crayfish, suggesting competitive and/or predator-prey interactions. Non-native crayfish should be absent from the SAC.

The presence of artificially high densities of salmonids and other fish will create unacceptably high levels of predatory and competitive pressure on juvenile and adult bullhead. Stocking of fish should be avoided in the SAC.

Escapes from fish farms are a form of uncontrolled introduction and should be prevented by effective screening on all intakes and discharges.

Bullheads are relatively sedentary and interactions between populations in different parts of the catchment and in different catchments are likely to be limited, suggesting the existence of genetically discrete populations. Since they are of no angling interest, deliberate transfers between sites are unlikely to have been undertaken in the past, such that the genetic integrity of populations is likely to be intact. There should be no stocking/transfers of bullhead unless agreed to be in the best interests of the population.

In general, management for other SAC features is expected to result in favourable habitat for bullhead, through improvements in water quality and flow regime and maintenance of suitable physical habitat.

Status and Management Requirements of Feature 8: European otter *Lutra lutra*

Status of Feature: Unfavourable.

The conservation status of otters in the Wye SAC is determined by monitoring their distribution, breeding success, and the condition of potential breeding and feeding habitat as outlined in the Performance Indicators. Their current condition is considered unfavourable due a lack of suitable breeding sites around the middle reaches of the river.

Management Requirements

The catchment within Wales should be capable of supporting at least 17 breeding females, based on one breeding female per 20km stretch of river⁵. It is possible that, if all the breeding sites achieve optimal habitat conditions and fish and amphibian stocks are secured, the catchment may then support further breeding animals. However, the amount of compression of home ranges that otters will accept cannot as yet be determined⁶.

Management should aim to ensure that there is sufficient undisturbed breeding habitat to support an otter population of a size determined by natural prey availability and associated territorial behaviour. The involvement of river users and land managers will be important in improving potential breeding habitat near to the river. Agri-environment schemes and the Better Woodlands for Wales scheme provide possible mechanisms for maintaining suitable sites, such as lightly grazed woodlands, areas of dense scrub, and tussocky fens with purple moor-grass.

Food availability is an important factor. Fish biomass should stay within expected natural fluctuations. A potential problem appears to be the decline in eel populations, and similar concerns are apparent with respect to amphibian numbers.

Measures to ensure the safe movement of otters around the catchment will be promoted, in particular the provision of ledges, tunnels and fencing on new road bridge schemes. Where bridges are being repaired or replaced, or at especially bad locations for otter road deaths, such features may be retro-fitted.

Certain areas of the SAC are critical to the movement of otters both within the system and to adjacent sites. The Wye SAC provides a key movement corridor for otters passing between the relatively high densities in mid Wales and the south-east Wales coastal strip (Seven Estuary and Gwent Levels). The function of this aspect of the site should be protected through the maintenance of suitable resting sites (in terms of size, quality and levels of disturbance) through urban centres such as Monmouth.

Pollution of rivers with toxic chemicals, such as PCBs, was one of the major factors identified in the widespread decline of otters during the last century. There should be no increase in pollutants potentially toxic to otters.

Status and Management Requirements of Feature 9: Water courses of plain to montane levels with the *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation

Status of Feature: Unfavourable: Unclassified.

The present unfavourable status of the feature results from reduced water quality in some tributaries of the Wye e.g. parts of the Ithon and Llynfi sub-catchments, due mainly to diffuse pollution from agriculture. (Note: status reported in error as Unfavourable: Declining in SAC feature status report to JNCC, 2006)

A further adverse factor is the over-abundance of invasive non-native species of bankside plant communities, which are included within the feature definition. Japanese knotweed and Himalayan balsam are widespread in the catchment, including the Irfon sub-catchment.

Management Requirements

Factors that are important to the favourable conservation status of this feature include flow, substrate quality and water quality, which in turn influence species composition and abundance. These factors often interact, producing unfavourable conditions by promoting the growth of a range of algae and other species indicative of eutrophication. Under conditions of prolonged low flows and high nutrient status, epiphytic algae may suppress the growth of aquatic flowering plants. Favourable management for this feature is therefore largely dependent on ensuring that sufficient depth, velocity and duration of flow and sufficiently low phosphate levels are maintained within the natural range of the vegetation. A favourable flow regime can be defined with reference to naturalised flows (removing the influence of artificial abstractions and discharges from flow records). While more sophisticated analysis of depth and velocity has been carried out locally for the Review of Consents process, a flow level criterion is generally applied to regulate abstractions. Based on current available information, the recent level of flow depletion downstream of major abstractions, and flow augmentation in middle reaches due to releases from the Elan Valley reservoirs, is not considered to be damaging to this feature, either through limiting its range or adversely affecting its community composition.

The conservation objectives require that the area covered by the feature is stable or increasing within its natural range, which is likely to require catchment-wide measures to control diffuse pollution from agriculture, as the principal source of phosphate. Measures should be targeted initially at reaches identified as holding potentially important stands of this vegetation that are also known to be suffering from diffuse pollution, such as parts of the Ithon catchment.

Invasive non-native plants are a detrimental impact on this feature. Japanese knotweed, Himalayan balsam and giant hogweed should be actively managed to control their spread and hopefully reduce their extent in the SAC.

Status and Management Requirements of Feature 10: White-clawed crayfish *Austropotamobius pallipes*

Status of Feature: Unfavourable: Declining.

There is considerable anecdotal evidence of a major decline in the distribution and abundance of the native white-clawed crayfish in the Wye catchment over the last few decades. Native crayfish may have been lost from the main river channel, from tributaries such as the Duhonw and Ithon and have almost disappeared from the Afon Irfon. Significant populations within the Wye SAC are now confined to the Sgithwen, Cletwr, Edw, Llynfi Dulas and Builth Road Dulas. The most recent assessment of the condition of crayfish in the Wye SAC, using modified Common Standards Monitoring techniques, found that populations are unfavourable⁹.

Management Requirements

The American signal crayfish is present in the Wye catchment and poses a very serious threat to the continued existence of the native white-clawed crayfish in the site and in Wales. Native crayfish are unable to co-exist where signal crayfish are present, due to the latter's superior competitive ability and a disease, crayfish plague, which it carries but to which native crayfish have no immunity. Signal crayfish are also extremely harmful to fish communities and the overall ecology of the river. It is illegal to release non-native crayfish into the wild, to keep live crayfish in most of Wales or to trap crayfish without a licence from the Natural Resources Wales. The regulations on the keeping, release and trapping of non-native crayfish in Wales should be strictly enforced. The signal crayfish eradication programme implemented by the statutory bodies and partner organisations should be continued.

American signal crayfish and crayfish plague are widespread and abundant in nearby catchments such as the Lugg, Arrow and Severn. Crayfish plague can be transferred to streams on wet fishing gear, boots, canoes, machinery, stocked fish etc., so measures such as raising awareness, disinfection facilities and where appropriate restrictions on access, should be implemented where a significant risk is identified.

Contamination by synthetic pyrethroid sheep dips has a devastating impact on crayfish populations. Impacts can arise if recently dipped sheep are allowed access to a stream or hard standing area, which drains into a watercourse. Pollution from organophosphate sheep dips and silage effluent can be very damaging locally. All sheep dips and silage, fuel and chemical storage areas should be sited away from watercourses or bunded to contain leakage. Recently dipped sheep should be kept off stream banks. Used dip should be disposed of strictly in accordance with Natural

Resources Wales Regulations and guidelines. Statutory and voluntary agencies should work closely with landowners and occupiers to minimise the risk of any pollution incidents and enforce existing regulations.

The statutory bodies and partner organisations should implement a programme of licensed translocations to enable white-clawed crayfish to be reintroduced to reaches where they have been wiped out by sheep dip pollution and/or crayfish plague outbreaks.

Engineering works such as bridge repairs in reaches where white-clawed crayfish are known to occur should include appropriate pollution prevention measures and a crayfish rescue by a suitably licensed person where there is a risk of physical damage to crayfish.

Status and Management Requirements of Feature 11: Transition mires and quaking bogs

Status of Feature: Unfavourable: Unclassified.

This feature is currently assessed as being in unfavourable condition due to under-grazing.

Management Requirements

A suitable grazing regime should be implemented by agreement with the land managers. Any risk of elevated nutrient status due to run-off into the site should be addressed by measures including buffer zones around the mire area and inflow streams

Action Plan

This section takes the management requirements outlined in the previous section a stage further, assessing the specific management interventions required on each management unit. This is based on a summary of the information held in Natural Resources Wales' Actions Database for sites. Please see [Management Units](#) section for information on links between units and underlying SSSIs.

Actions in Natural Resources Wales' actions database

Unique Unit No	Site Unit Ref	Unit Name	Summary Conservation Issues	Unit Status
7727	1 a	Wye Tidal Reach	Invasive Himalayan balsam, Japanese knotweed and giant hogweed may remain a threat to river bank habitats and hybrid wood stitchwort populations in particular. Information on the locations of the latter is needed. Need to consider local releases of rust fungus to control Himalayan balsam as part of the rollout of this measure by Defra. Restrictions on angling have been implemented to protect migrating salmon. Spates have been protected from upstream abstractions to encourage upstream migration of salmon.	Needs Action
7726	1 b	Wye conf Walford Bk to Bigsweir Bridge	Invasive Himalayan balsam, Japanese knotweed and giant hogweed may remain a threat to river bank habitats and hybrid wood stitchwort populations in particular. Information on the locations of the latter is needed. Need to consider local releases of rust fungus to control Himalayan balsam as part of the rollout of this measure by Defra. Restrictions on angling have been implemented to protect migrating salmon. Spates have been protected from upstream abstractions to encourage upstream migration of salmon.	Needs Action
1802	1c	Lower Wye, Wyastone to Redbrook	Entrainment of fish may occur in the abstractions at Monmouth. Excessive headroom in abstraction licences has potential to cause flow depletion. Invasive alien weeds may be a threat to bank side habitats. Fishing restrictions will need to be kept under review to protect migrating salmon.	Needs Action
1801	1d	Lower Wye, Hay-on-Wye to Rhydspence	A major issue here is the loss of open river shingle habitat (used by invertebrates and breeding birds) to invasive Himalayan balsam and scrub. An important area at Bronydd is no longer grazed. Loss of cattle grazing on the steeper river banks has reduced the amount of bare earth available as habitat for the club-tailed dragonfly. Large riverside trees supporting important moss communities require pollarding to extend there	Needs Action

Unique Unit No	Site Unit Ref	Unit Name	Summary Conservation Issues	Unit Status
			lives. Run-off of sediment and fertiliser from potato fields may also be a problem in some places.	
7729	2 a	River Wye, Afon Irfon to Sgithwen Brook	Invasive Himalayan balsam on this section is a threat to rare plant species and needs control. Signal crayfish may have colonised the lower end of this section from the Bach Howey? Water quality is generally good but there could be some issues with agricultural pollution? The potential impact of increased flow regulation from Elan reservoirs on populations of river jelly lichen on bedrock in this reach should be researched and monitored. Rare mosses at Nyth, Pwll-y-faedda and Glanyrafon, Erwood are vulnerable to shading from riverside trees.	Needs Action
7728	2 b	River Wye, River Ithon to Afon Irfon	Invasive Himalayan balsam on this section is a threat to rare plant species and needs control. The effectiveness of measures implemented to prevent entrainment of shad in the Dwr Cymru water supply intake needs to be confirmed. Water quality is generally good but there could be some issues with agricultural pollution?	Needs Action
7733	2 c	River Wye, Afon Elan to River Ithon	Invasive Himalayan balsam on is a threat on this section and may need control. Water quality is generally good but there could be some issues with agricultural pollution?	Needs Action
3525	2c	Lower Bach Howey	Project to eradicate signal crayfish from the Bachawy abandoned due to low chance of success.	Needs Action
7732	2 d	River Wye, Afon Marteg to Afon Elan	Invasive non-native plants are a threat on this section and may need control. Water quality is generally good but there could be some issues with agricultural pollution or point sources within Rhayader town?	Needs Action
3524	2d	Lower Marteg	Still some issues with diffuse agricultural pollution, including silt, coming down from the upper part of the catchment. The plantations on the headwaters need sensitive management by NRW.	Needs Action
7730	2 f	River Wye, Afon Tarennig to Afon Bidno	Agriculture, forestry and metal mine waste affect run-off regime and water quality. Some areas of river bank are heavily grazed and poached. Large scale channel reprofiling by farmers in the past has required intervention by NRW and its predecessors on occasions. Effects of these works on hydromorphology and fish habitat are likely to be ongoing. Invasive Japanese knotweed may be damaging the river bank habitat in places.	Needs Action

Unique Unit No	Site Unit Ref	Unit Name	Summary Conservation Issues	Unit Status
7844	2i	River Wye, Sgithwen Brook to Hay Dulas	This section is affected by diffuse agricultural pollution, including nutrients, siltation and pesticide residues from poultry and arable farming, which appear to be having a serious impact on sensitive aquatic invertebrates. There may also still be some issues with point source discharges from STWs and CSOs? Large shingle beds that were once important for specialist invertebrates are now largely dominated by Himalayan balsam, Japanese knotweed, coarse grasses and other tall weeds, or encroaching willow scrub, as result of loss of grazing in key areas. Intensive canoe traffic between Glasbury and Hay has led to people landing on the open river beaches and shingle islands that are used by nesting waders. Scrub encroachment is also an issue at location where rare plants grow.	Needs Action
7739	3 a	Lower Afon Llynfi	This catchment has been identified by monitoring as one of particular concern for diffuse pollution impacts, in combination with the point source impact from Talgarth STW. The diffuse pollution is partly associated with a waste management operation and anaerobic digester regulated under an Environmental Permit. Enforcement action is being taken in connection with the latter. Talgarth STW has been upgraded to achieve a proportionate reduction in the phosphate loading to the river.	Needs Action
7740	3 b	Llynfi Dulas	This catchment lies upstream of the significant diffuse and point source pollution impacts affecting the rest of the Llynfi catchment and is in comparatively good condition. The headwaters are on Llandefalle common where native white-clawed crayfish populations can still be found. The lower reaches have been fenced and riparian trees coppiced in c.2004 by the Wye and Usk Foundation. Hard blockstone revetment was installed at about this time to protect one short section of fence from potential erosion, which is a disproportionate management action that should no longer be considered acceptable in view of the site's conservation objectives.	Needs Action
7741	3 c	Triffwrdd	Native white-clawed crayfish have been recorded in this catchment and may still be present, especially in the headwaters. Biosecurity measures are appropriate to try to protect the remaining populations.	Needs Action

Unique Unit No	Site Unit Ref	Unit Name	Summary Conservation Issues	Unit Status
7657	4 a	Sgithwen Brook downstream of Cwm Rhiwiau	<p>An important white-clawed crayfish population occurs in the units upstream of this unit. Previously they were threatened by sheep-dip misuse and the population in this unit may have been wiped out by an episode of sheep dip pollution, though this issue is now considered to be under control due to restrictions on use. Invasive non-native signal crayfish and crayfish plague are still a risk to the population.</p> <p>The reach contains waterfalls and sloping bedrock sections which at least partially limit the upstream migration of salmon, and also help to protect the native crayfish population upstream. In the recent past, artificial modifications to these bedrock sections have been made by removing parts of the bedrock. This practice should now be considered unacceptable in view of the site's conservation objectives.</p>	Needs Action
7656	4 b	Sgithwen Brook headwaters	<p>This unit is very important for its native white-clawed crayfish population. It forms a natural 'ark site' due to barriers downstream in the form of natural waterfalls. Biosecurity measures to prevent invasion by signal crayfish and outbreaks of crayfish plague are very important to maintain feature condition in this unit. Farm pollution, particularly from sheep dip, is also a threat. Invasive non-native plants such as Himalayan balsam and Japanese knotweed may also be a threat in this unit.</p>	Needs Action
7658	4 c	Cletwr within Erwood Dingle SSSI	<p>The steep lower section of the Cletwr brook within the extensive semi-natural woodland of Erwood Dingle SSSI forms an important part of the SSSI. White-clawed crayfish is one of the designated features of this SSSI. The adjacent woodland on steep sloping ground leads to timber jams within the channel which are important habitat features that need to be retained.</p>	Needs Action
7659	4 d	Cletwr Brook, Nant yr Offeiriad to Crickadarn Mill	<p>This unit is very important for its native white-clawed crayfish population. It forms a natural 'ark site' due to barriers downstream in the form of natural waterfalls. Biosecurity measures to prevent invasion by signal crayfish and outbreaks of crayfish plague are very important to maintain feature condition in this unit. Farm pollution, particularly from sheep dip, is also a threat. Invasive non-native plants such as Himalayan balsam and Japanese knotweed may also be a threat in this unit.</p>	Needs Action
7660	4 e	Upper Cletwr Brook and Nant yr Offeiriad	<p>This unit is very important for its native white-clawed crayfish population. It forms a natural 'ark site' due to barriers downstream in the form of</p>	Needs Action

Unique Unit No	Site Unit Ref	Unit Name	Summary Conservation Issues	Unit Status
			<p>natural waterfalls. Biosecurity measures to prevent invasion by signal crayfish and outbreaks of crayfish plague are very important to maintain feature condition in this unit. Farm pollution, particularly from sheep dip, is also a threat. Invasive non-native plants such as Himalayan balsam and Japanese knotweed may also be a threat in this unit.</p>	
7662	4 f	River Edw within Coed Aberedw SSSI	<p>This tributary was formerly important for native white-clawed crayfish but since the time of SAC notification the species is suspected to have become extinct due to a crayfish plague outbreak. The river was extensively fenced along with selective coppicing of riparian trees in the early 2000s and these trees are now being re-coppiced and the fences repaired. Biosecurity measures are necessary to prevent further spread of crayfish plague and invasive species including signal crayfish and Himalayan balsam during management works. Coed Aberedw is likely to be used as a breeding site by otters and disturbance should be managed by managing access appropriately.</p>	Needs Action
7738	4 g	River Edw, Clas Brook to Aberedw	<p>This tributary was formerly important for native white-clawed crayfish but since the time of SAC notification the species was thought to have been lost (2015). However, there may be refugia in the tributaries from which native crayfish can re-colonise the Edw? The river was extensively fenced along with selective coppicing of riparian trees in the early 2000s and these trees are now being re-coppiced and the fences repaired. However over-grazing and silt run-off may still be an issue on some farms?</p> <p>Consequently, a population of native crayfish could be restored, subject to strict controls of sheep dip and other agricultural pollution and appropriate biosecurity measures to prevent the spread of crayfish plague and invasive species including signal crayfish and Himalayan balsam during management .works.</p>	Needs Action

Unique Unit No	Site Unit Ref	Unit Name	Summary Conservation Issues	Unit Status
7737	4 h	River Edw, Colwyn Brook to Clas Brook	<p>This tributary was formerly important for native white-clawed crayfish but since the time of SAC notification the species was thought to have been lost (2015). However, there may be refugia in the tributaries from which native crayfish can re-colonise the Edw? The river was extensively fenced along with selective coppicing of riparian trees in the early 2000s and these trees are now being re-coppiced and the fences repaired. However over-grazing and silt run-off may still be an issue on some farms?</p> <p>Consequently, a population of native crayfish could be restored, subject to strict controls of sheep dip and other agricultural pollution and appropriate biosecurity measures to prevent the spread of crayfish plague and invasive species including signal crayfish and Himalayan balsam during management .works.</p>	Needs Action
7736	4 i	River Edw, Nant Brook to Colwyn Brook	<p>This tributary was formerly important for native white-clawed crayfish but since the time of SAC notification the species was thought to have been lost (2015). However, there may be refugia in the tributaries from which native crayfish can re-colonise the Edw? The river was extensively fenced along with selective coppicing of riparian trees in the early 2000s and these trees are now being re-coppiced and the fences repaired. However over-grazing and silt run-off may still be an issue on some farms?</p> <p>Consequently, a population of native crayfish could be restored, subject to strict controls of sheep dip and other agricultural pollution and appropriate biosecurity measures to prevent the spread of crayfish plague and invasive species including signal crayfish and Himalayan balsam during management .works.</p>	Needs Action
7663	4 j	River Edw within Caeau Coed Mawr SSSI	<p>This tributary was formerly important for native white-clawed crayfish but since the time of SAC notification the species is suspected to have become extinct due to a crayfish plague outbreak. The river was extensively fenced along with selective coppicing of riparian trees in the early 2000s and these trees are now being re-coppiced and the fences repaired. Biosecurity measures are necessary to prevent further spread of crayfish plague and invasive species including signal crayfish and Himalayan balsam during management works.</p>	Needs Action

Unique Unit No	Site Unit Ref	Unit Name	Summary Conservation Issues	Unit Status
7735	4 k	Colwyn Brook, Camnant to River Edw	<p>Biosecurity measures are necessary to prevent further spread of crayfish plague and invasive species including signal crayfish and Himalayan balsam during management works.</p> <p>There may be issues with over-grazing of river banks and poaching locally and other forms of agricultural pollution including sheep-dip?</p>	Needs Action
7664	4 l	Colwyn Brook, upstream of Camnant	<p>Biosecurity measures are necessary to prevent further spread of crayfish plague and invasive species including signal crayfish and Himalayan balsam during management works. There may be issues with over-grazing of river banks and poaching locally and other forms of agricultural pollution including sheep-dip? There may be issues with over-grazing of river banks and poaching locally and other forms of agricultural pollution including sheep-dip?</p>	Needs Action
7734	4 m	Builth Road Dulas, Trecoed Brook to River Wye	<p>This tributary was formerly important for native white-clawed crayfish but since the time of SAC notification the species was thought to have been lost (2015). However, there may be refugia from which native crayfish can re-colonise? Over-grazing and silt run-off may be an issue on parts of this unit.</p> <p>Consequently, a population of native crayfish could be restored, subject to strict controls of sheep dip and other agricultural pollution and appropriate biosecurity measures to prevent the spread of crayfish plague and invasive species including signal crayfish and Himalayan balsam during management .works.</p>	Needs Action
7665	4 n	Builth Road Dulas, Bwlch to Trecoed Brook	<p>The lower end of this unit, extending into unit 7734, has been extensively diverted, straightened and resectioned, over a length of c.600m, prior to SAC notification. This has resulted in formation of a 'nick point' i.e. headward erosion at the upstream end of this straightened reach. This reach has been identified as a possible site for a re-meandering project, to restore the length and gradient of the river, reduce it's instability and reconnect it with the adjacent floodplain. A motocross track operates further upstrem in this unitt, which has required interventions by NRW and its predecessors to mitigate potential impacts on the site's features. Monitoring of the operation of the track is necessary to ensure that the track does not damage the site's interest by entering the river and that silty run-off and other potential impacts are sufficiently controlled. This tributary was formerly important for native white-clawed crayfish but since the time of SAC notification the</p>	Needs Action

Unique Unit No	Site Unit Ref	Unit Name	Summary Conservation Issues	Unit Status
			species is suspected to have been lost.. Biosecurity measures are necessary to prevent further spread of crayfish plague and invasive species including signal crayfish and Himalayan balsam during management works.	
7742	5 a	Duhonw	Native white-clawed crayfish were formerly present but are suspected to have become extinct in this tributary. The likelihood of invasion by signal crayfish means that re-introduction of white-clawed crayfish here is no longer considered viable. Signal crayfish are present in a pond (Pant-y-llyn) which drains into this river. Biosecurity measures are necessary to prevent further spread of crayfish plague and invasive species including signal crayfish and Himalayan balsam during management works.	Needs Action
7661	5 b	Nant Bwch	Biosecurity measures are necessary to prevent further spread of crayfish plague and invasive species including signal crayfish and Himalayan balsam during management works.	Needs Action
7743	6 a	Irfon conf Cledan to conf R Wye	A remnant white-clawed crayfish populations is thought to exist here. Reintroduction of this species in suitable tributary streams is being undertaken using stock reared at NRW Cynrig hatchery. Biosecurity measures are necessary to prevent further spread of crayfish plague and invasive species including signal crayfish and Himalayan balsam during management works. A large and important population of river jelly lichen is found in this reach. This and other aquatic lichens may be vulnerable to shading by overhanging trees. A large population of freshwater pearl mussel also occurs in this reach, although its long term viability is open to question due to the apparent lack of recruitment. A project involving rearing of pearl mussels in NRW Cynrig hatchery is seeking to address this issue. Any underlying causes of their decline including water quality issues must also be addressed but are not currently fully understood.	Needs Action
7750	6 b	Chwefri	A remnant white-clawed crayfish populations is thought to exist here. Reinforcement of this population is being undertaken using stock reared at NRW Cynrig hatchery. Biosecurity measures are necessary to prevent further spread of crayfish plague and invasive species including signal crayfish and Himalayan balsam during management works.	Needs Action

Unique Unit No	Site Unit Ref	Unit Name	Summary Conservation Issues	Unit Status
7666	6 c	Hafrena	A remnant white-clawed crayfish populations exists here (possibly run-off from the stone quarry at the top end of this stream favours crayfish by increasing dissolved calcium concentrations). Biosecurity measures are necessary to prevent further spread of crayfish plague and invasive species including signal crayfish and Himalayan balsam during management works.	Needs Action
7744	6 d	Garth Dulas	A management agreement is in place on a substantial parcel of land of local conservation value adjacent to the river at Garth, which enhances the conservation value of the SAC by providing habitat for otters and protecting water quality. This agreement is due for renewal in 2018 as a S16 agreement under the Environment (Wales) Act 2016, when its contribution to NRW's wider objectives including enhancing the resilience of ecosystems may be further explored, with the potential for it be used as a template for similar agreements in future. The NRW-managed forestry land at Garth Bank may also provide opportunities to further enhance the provision of connected habitat in the wider landscape for otters and other priority species, for example by symphthetic restoration of PAWS areas (plantations on ancient woodland sites).	Needs Action
7668	6 e	Gwenwst	The impact of forestry areas in the headwaters on the run-off regime of the river should be investigated and any measures taken, in particular on NRW-managed land, to mitigate this.	Needs Action
7745	6 f	Afon Cammarch	The impact of forestry areas in the headwaters on the run-off regime of the river should be investigated and any measures taken, in particular on NRW-managed land, to mitigate this. The lower middle part of this river was first notified as a SSSI in the 1970s as an example of an actively meandering alluvial river with its associated plant communities, and it was later incorporated into the wider Afon Irfon SSSI, which in contrast is predominantly more stable and bedrock-dominated. The actively meandering sections here must be managed appropriately by allowing the river space to move and, for example avoiding placing any fencing close to the river bank.	Needs Action
7667	6 g	Cnyffiad	The impact of forestry areas in the headwaters on the run-off regime of the river should be investigated and any measures taken, in particular on NRW-managed land, to mitigate this.	Needs Action

Unique Unit No	Site Unit Ref	Unit Name	Summary Conservation Issues	Unit Status
7746	6 h	Camddwr	The impact of forestry areas in the headwaters on the run-off regime of the river should be investigated and any measures taken, in particular on NRW-managed land, to mitigate this.	Needs Action
7747	6 i	Tirabad Dulas	The impact of forestry areas in the headwaters on the run-off regime of the river should be investigated and any measures taken, in particular on NRW-managed land, to mitigate this.	Needs Action
7748	6 j	Irfon conf Afon Gwestyn to conf Cledan	Extensive forestry areas in the headwaters are linked to acidification of this reach which severely limits fish populations. Management measures have been taken which attempt to address this issue including liming. In the longer term, ongoing reductions in levels of air pollution combined with changing catchment land use, for example to a higher proportion of broadleaved trees, should see a progressive reduction in acid run-off episodes. The impact of forestry areas in the headwaters on the run-off regime of the river should be investigated and any measures taken, in particular on NRW-managed land, to mitigate this.	Needs Action
7749	6 k	Afon Gwesyn	This tributary is largely unforested and therefore free from the acidification issues which affect neighbouring stream catchments. It is also largely within extensively grazed, semi-natural upland habitats (owned by National Trust) in its upper reaches. Accumulations of river gravel near to a property at Abergwesyn has caused concerns over flood risk in the past which has required input from NRW and its predecessors to regulate management activity so as to minimise impacts on SAC features including spawning salmon.	Needs Action
7670	6 l	Cledan (downstream of Waen Rydd SSSI)	As often the case throughout the SAC, relatively intensive livestock agriculture encroaches close to the river in places in this unit. No particular management issues recorded for the unit.	Needs Action
7669	6 m	Cledan within Waen Rydd SSSI	The river with its tortuous meanders here plays an important part in the hydrology of the wetland habitats of Waen Rydd SSSI, by helping to maintain high groundwater levels.	Needs Action
7671	6 n	Cledan upstream of Waen Rydd SSSI	Removal of river gravels in an attempt to enhance drainage of adjacent low-lying land and for improvements to access etc. has been carried out in the past and required input from NRW and its predecessors to minimise impacts on the SAC features including spawning salmon.	Needs Action

Unique Unit No	Site Unit Ref	Unit Name	Summary Conservation Issues	Unit Status
7757	7 a	Ithon, Camddwr to River Wye	<p>Diffuse pollution from agriculture is identified as a particular problem affecting this unit. This is partly due to the spreading of manure from intensive poultry units which are proliferating in the Ithon catchment. Other than through agricultural cross compliance, these operations are currently outside of regulatory control. Localised over-grazing of river banks and cultivation of riverside fields contribute to excessive silt run-off in places. Invasive non-native weeds affect the river banks in this unit. A targeted programme of control is needed, plus biosecurity measures to prevent further spread of invasive species during management works by statutory bodies. Unauthorised extraction of gravel has occurred on some farms in this unit in the past and required intervention by NRW and its predecessors to regulate the operations including specifying quantities to be taken. These consents are time-limited and may require renewal for ongoing operations at which time the effects of the operations should be reviewed.</p>	Needs Action
7755	7 b	Ithon, Gwenlas Brook to Aber Camddwr	<p>Diffuse pollution from agriculture is identified as a particular problem affecting this unit. This is partly due to the spreading of manure from intensive poultry units which are proliferating in the Ithon catchment. Other than through agricultural cross compliance, these operations are currently outside of regulatory control. Localised over-grazing of river banks and cultivation of riverside fields contribute to excessive silt run-off in places. Invasive non-native weeds may be present on the river banks in this unit. Assessment and a targeted programme of control may be needed, plus biosecurity measures to prevent further spread of invasive species during management works by statutory bodies. Unauthorised extraction of gravel has occurred on some farms in this unit in the past and required intervention by NRW and its predecessors to regulate the operations including specifying quantities to be taken. These consents are time-limited and may require renewal for ongoing operations at which time the effects of the operations should be reviewed.</p>	Needs Action
7753	7 c	Ithon, Llaethdy Brook to Gwenlas Brook	<p>Diffuse pollution from agriculture is identified as a particular problem affecting this unit. This is partly due to the spreading of manure from intensive poultry units which are proliferating in the Ithon catchment. Other than through agricultural cross compliance, these operations are currently outside of regulatory control. Localised over-grazing of river banks and cultivation of riverside fields contribute to excessive silt run-off in places. Invasive non-native weeds May be present on the</p>	Needs Action

Unique Unit No	Site Unit Ref	Unit Name	Summary Conservation Issues	Unit Status
			river banks in this unit. Assessment and a targetted programme of control may be needed, plus biosecurity measures to prevent further spread of invasive species during management works by statutory bodies. Unauthorised extraction of gravel has occurred on some farms in this unit in the past and required intervention by NRW and its predecessors to regulate the operations including specifying quantities to be taken. These consents are time-limited and may require renewal for ongoing operations at which time the effects of the operations should be reviewed.	
7751	7 d	Ithon, Camnant to Llaethdy Brook	Diffuse pollution from agriculture is identified as a particular problem affecting this unit. This is partly due to the spreading of manure from intensive poultry units which are proliferating in the Ithon catchment. Other than through agricultural cross compliance, these operations are currently outside of regulatory control. Invasive non-native weeds are a threat to this unit. Biosecurity measures are needed to prevent introduction of invasive species during management works by statutory bodies.	Needs Action
7764	7 e	Howey Brook, downstream of Three Wells	Diffuse pollution from agriculture is identified as a problem affecting this unit. This is partly due to the fertiliser use on improved fields adjoining the brook but also from silt run-off arising from localised over-grazing of banks and from development sites. Other than through agricultural cross compliance, most of these operations are currently outside of regulatory control. Invasive non-native weeds may be present on the river banks in this unit. Assessment and a targetted programme of control may be needed, plus biosecurity measures to prevent further spread of invasive species during management works by statutory bodies.	Needs Action
7767	7 f	Nantmel Dulas within Coed Aberdulas SSSI	Invasive balsam is being controlled by hand pulling under agreement..	Needs Action
7763	7 g	Nantmel Dulas	Diffuse pollution from agriculture is identified as a particular problem affecting this unit. This is partly due to the spreading of manure from intensive poultry units which are proliferating in the Ithon catchment. Other than through agricultural cross compliance, these operations are currently outside of regulatory control. Invasive non-native weeds affect the river banks in this unit. A targetted programme of control is needed, plus biosecurity measures to prevent further spread of invasive	Needs Action

Unique Unit No	Site Unit Ref	Unit Name	Summary Conservation Issues	Unit Status
			species during management works by statutory bodies.	
7760	7 h	Clywedog Brook, Bachell Brook to River Ithon	Diffuse pollution from agriculture is identified as a problem affecting this unit. This is partly due to the fertiliser use on improved fields adjoining the brook but also from silt run-off arising from localised over-grazing of banks. Other than through agricultural cross compliance, most of these operations are currently outside of regulatory control. Invasive non-native weeds May be present on the river banks in this unit. Assessment and a targetted programme of control may be needed, plus biosecurity measures to prevent further spread of invasive species during management works by statutory bodies.	Needs Action
7761	7 i	Clywedog Brook, Abbeycwmhir to Bachell Brook	Diffuse pollution from agriculture is identified as a problem affecting this unit. This is partly due to the fertiliser use on improved fields adjoining the brook but also from silt run-off arising from localised over-grazing of banks. Other than through agricultural cross compliance, most of these operations are currently outside of regulatory control. Invasive non-native weeds May be present on the river banks in this unit. Assessment and a targetted programme of control may be needed, plus biosecurity measures to prevent further spread of invasive species during management works by statutory bodies. The impact of forestry areas in the headwaters on the run-off regime of the river should be investigated and any measures taken, in particular on NRW-managed land, to mitigate this.	Needs Action
7762	7 j	Bachell Brook	Diffuse pollution from agriculture is identified as a problem affecting this unit. This is partly due to the fertiliser use on improved fields adjoining the watercourses. Other than through agricultural cross compliance, most of these operations are currently outside of regulatory control. Invasive non-native weeds affect the river banks in this unit. A targetted programme of control is needed, plus biosecurity measures to prevent further spread of invasive species during management works by statutory bodies. The impact of forestry areas in the headwaters on the run-off regime of the river should be investigated and any measures taken, in particular on NRW-managed land, to mitigate this.	Needs Action
7766	7 k	Bachell Brook within Coed Bryn Person SSSI	Invasive weeds affect river bank areas. Biosecurity measures are necessary to prevent further spread of invasive species including Himalayan balsam during management works. The impact of forestry areas in the headwaters on	Needs Action

Unique Unit No	Site Unit Ref	Unit Name	Summary Conservation Issues	Unit Status
			the run-off regime of the river should be investigated and any measures taken, in particular on NRW-managed land, to mitigate this.	
7759	7 l	Mithil Brook	Diffuse pollution from agriculture is identified as a particular problem affecting this unit. This is partly due to the spreading of manure from intensive poultry units which are proliferating in the Ithon catchment. Other than through agricultural cross compliance, these operations are currently outside of regulatory control. Himalayn balsam is believed to be problem in in this unit. The extent of the problem needs investigating prior to a targetted programme of control, plus biosecurity measures to prevent further spread of invasive species during management works by statutory bodies.	Needs Action
7758	7 m	Aran	Water quality status needs further investigation, especially phosphate target compliance and WFD classification. Some evidence of excessive siltation from RHS and fluvial audit. Diffuse pollution from agriculture is identified as a particular problem affecting this unit. This is partly due to the spreading of manure from intensive poultry units which are proliferating in the Ithon catchment. Other than through agricultural cross compliance, these operations are currently outside of regulatory control. A project to restore semi-natural flood plain grassland would help to reduce silt a nutrient run-off and restore riparian habitat in this unit. Himalayn balsam is believed to be problem in in this unit. The extent of the problem needs investigating prior to a targetted programme of control, plus biosecurity measures to prevent further spread of invasive species during management works by statutory bodies.	Needs Action
7756	7 n	Camddwr	Diffuse pollution from agriculture is identified as a particular problem affecting this unit. This is partly due to the spreading of manure from intensive poultry units which are proliferating in the Ithon catchment. Other than through agricultural cross compliance, these operations are currently outside of regulatory control. Invasive non-native weeds may be present on the river banks in this unit. Assessment and a targetted programme of control may be needed, plus biosecurity measures to prevent further spread of invasive species during management works by statutory bodies.	Needs Action
7754	7 r	Gwenlas Brook	Diffuse pollution from agriculture is identified as a problem affecting this unit. This is partly due to the fertiliser use on improved fields adjoining the brook but also from silt run-off arising from localised over-grazing of banks. Other than through agricultural cross compliance, most of	Needs Action

Unique Unit No	Site Unit Ref	Unit Name	Summary Conservation Issues	Unit Status
			these operations are currently outside of regulatory control. Invasive non-native weeds may be present on the river banks in this unit. Assessment and a targeted programme of control may be needed, plus biosecurity measures to prevent further spread of invasive species during management works by statutory bodies.	
7752	7 s	Llaethdy Brook	Diffuse pollution from agriculture is identified as a problem affecting this unit. This is partly due to the fertiliser use on improved fields adjoining the brook but also from silt run-off arising from localised over-grazing of banks. Other than through agricultural cross compliance, most of these operations are currently outside of regulatory control.	Needs Action
7678	7 u	River Ithon within Gweunydd Esgairdraenllwyn SSSI	Riverside land at Hafod Fach is managed as part of a Glastir Advanced 2014 contract.	Needs Action
7769	8 c	Afon Elan	The Afon Elan has a highly regulated flow regime and low water temperature due to Elan Valley Reservoirs but this is not believed to be having a significant impact on spawning salmon. Gravel replenishment has been carried out by the Wye and Usk Foundation downstream of Caban Coch dam and may need to be repeated. It is important that areas used to source gravel for this are not sensitive to damage.	Needs Action
626	9a	Colwyn Brook Marshes, Bwlch	Tir Gofal application not accepted. Still requires agri-environment funding to maintain favourable management?	Needs Action
3011	9b	Colwyn Brook Marshes, Caregeon	Now part of Cefn Bychan Farm. Ineligible for Glastir Advanced so alternative funding needed for suitable grazing and scrub control.	Needs Action
3012	9c	Colwyn Brook Marshes, Cefn Bychan, SAC land	Ongoing programme of scrub control required.	Needs Action
3013	9d	Colwyn Brook Marshes, Carneddau, SAC land	Suitable management under agreement with NRW.	Needs Action
3014	9e	Colwyn Brook Marshes, Cilberllan, SAC land	Glastir contract extended for 2 years Dec 2017. Still under-grazed despite being under a suitable Glastir option. Additional ponies sourced summer 2018 - needs following up in subsequent years.	Needs Action

Unique Unit No	Site Unit Ref	Unit Name	Summary Conservation Issues	Unit Status
			Owners not willing to put cattle on the land 2017-needs considering & discussing with them again.	
3015	9f	Colwyn Brook Marshes, Wern Heulog, SAC land	<p>This compartment has been left un-grazed for several years was heavily invaded by willow scrub.</p> <p>Not included in Glastir contract and owner not willing to S15 agreement for scrub control and follow on grazing. Most of the scrub now been tackled on this parcel (land ownership split down middle of parcel) via S16 on neighbouring land (Matts Farm) as no boundary fence on the ground. Suitable grazing by cattle or ponies is required to ensure scrub does not regrow to the extent it was.</p> <p>Invasive non-native plants such as Himalayan balsam and Japanese knotweed may also be a threat in this unit.</p>	Needs Action
3016	9g	Colwyn Brook Marshes, Matts Farm, SAC land	Grazing regime secured under S15 management agreement 2016. Programme of scrub control undertaken 2017 & 2018 to clear mature willow & birch from transition mire habitat. Need to ensure suitable follow up grazing takes place.	Needs Action

Glossary

This glossary defines some of the terms used in this **Core Management Plan**. Some of the definitions are based on definitions contained in other documents, including legislation and other publications of Natural Resources Wales and the UK nature conservation agencies.

Action	A recognisable and individually described act, undertaking or project of any kind, specified in section 5 or 6 of a Core Management Plan or Management Plan, as being required for protecting, managing or enhancing one or more of the features for which a site is designated.
Attribute	A quantifiable and monitorable characteristic of a feature that, in combination with other such attributes, describes its condition .
Common standards	See JNCC common standards .
Condition	A description of the state of a feature in terms of qualities or attributes that are relevant in a nature conservation context. For example, the condition of a habitat usually includes its extent and species composition and might also include aspects of its ecological functioning, spatial distribution and so on. The condition of a species population usually includes its total size and might also include its age structure, productivity, relationship to other populations and spatial distribution. Aspects of the habitat(s) on which a species population depends may also be considered as attributes of its condition. Condition is considered favourable when all the conservation objectives are being met.
Conservation management	Acts or undertaking of all kinds, including but not necessarily limited to actions , taken with the aim of achieving the conservation objectives of a site. Conservation management includes the taking of statutory and non-statutory measures, it can include the acts of any party and it may take place outside site boundaries as well as within sites. Conservation management may also be embedded within other frameworks for land/sea management carried out for purposes other than achieving the conservation objectives.

Conservation objective	The expression of the desired state of a feature , expressed as a composite statement defining the condition that we wish the feature to be in. Each feature has one conservation objective.
Core Management Plan	A Natural Resources Wales document containing the conservation objectives for a site and a summary of other information contained in a full site Management Plan .
Factor	Anything that has influenced, is influencing or may influence the condition of a feature . Factors can be natural processes, human activities or effects arising from natural process or human activities. They can be positive or negative in terms of their influence on features, and they can arise within a site or from outside the site. Physical, socio-economic or legal constraints on management of the site can also be considered as factors.
Favourable condition	See condition .
Favourable conservation status	The Habitats Directive definition of Favourable Conservation Status (FCS) is given in full in section 4.
Feature	The species population, habitat type or other entity for which a site is designated. The ecological or geological interest which justifies the designation of a site and which is the focus of conservation management .
Integrity	See Site integrity .
JNCC common standards	A set of principles developed jointly by the UK nature conservation agencies to help ensure a consistent approach to monitoring and reporting on the features of sites designated for nature conservation, supported by guidance on identification of attributes and monitoring methodologies.
Key Feature	The habitat or species population within a management unit that is the primary focus of management and monitoring in that unit.
Management Plan	The full expression of a designated site's legal status, vision, features, conservation objectives, performance indicators and management requirements. A complete management plan may

not reside in a single document, but may be contained in a number of documents (including in particular **the Core Management Plan**) and sets of electronically stored information.

Management Unit

An area within a site, defined according to one or more of a range of criteria, such as topography, location of **features**, tenure, patterns of land/sea use. The key characteristic of management units is to reflect the spatial scale at which site management and **monitoring** can be most effectively organised. They are used as the primary basis for differentiating priorities for conservation management and monitoring in different parts of a site, and for facilitating communication with those responsible for management of different parts of a site.

Monitoring

An intermittent (regular or irregular) series of observations in time, carried out to show the extent of compliance with a formulated standard or degree of deviation from an expected norm. In monitoring of sites designated for habitat and species conservation, the formulated standard is the quantified expression of favourable **condition** based on **attributes**.

Operational limits

The levels or values within which a **factor** is considered to be acceptable in terms of its influence on a **feature**. A factor may have both upper and lower operational limits, or only an upper limit or lower limit. For some factors an upper limit may be zero.

Performance indicators

A subset of the conservation objectives that are quantifiable and measurable. They consist of **attributes** and factors together with their associated target values (or ranges of values) which provide the standard against which information from **monitoring** and other sources is used to determine the degree to which the **conservation objectives** for a **feature** are being met.

Plan or project

Project: Any form of construction work, installation, development or other intervention in the environment, the carrying out or continuance of which is subject to a decision by any public body or statutory undertaker.

Plan: a document prepared or adopted by a public body or statutory undertaker, intended to influence decisions on the carrying out of **projects**.

Decisions on plans and projects which affect SAC, SPA and Ramsar sites are subject to specific legal and policy procedures.

Site integrity

This is defined in Welsh Government policy as the coherence of a site's ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it is designated.

Site Management Statement (SMS) The document containing Natural Resources Wales' views about the management of a site issued as part of the legal notification of an SSSI under section 28(4) of the Wildlife and Countryside Act 1981, as substituted.

Special Feature

See **feature**.

Specified limits

The levels or values for an **attribute** which define the degree to which the attribute can fluctuate without creating cause for concern about the **condition** of the **feature**. The range within the limits corresponds to favourable, the range outside the limits corresponds to unfavourable. Attributes may have lower specified limits, upper specified limits, or both.

Unit

See **management unit**.

Vision Statement

The statement conveying an impression of the whole site in the state that is intended to be the product of its **conservation management**. A 'pen portrait' outlining the **conditions** that should prevail when all the **conservation objectives** are met. A description of the site as it would be when all the **features** are in **favourable condition**.

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Appendix 1: Performance Indicators

These performance indicators describe the evidence, including in particular evidence to be obtained from monitoring of sites and features, that will be used to inform judgements about whether or not the [Conservation Objectives](#) are being met.

The assessment of plans and projects should be made in view of the entirety of the conservation objectives, including the performance indicators.

Feature 1 Sea lamprey *Petromyzon marinus*

Performance indicators for feature condition:

Attribute	Specified limits	Comments
a) Distribution within catchment	Suitable habitat adjacent to or downstream of suitable spawning sites should contain <i>Petromyzon</i> ammocoetes.	This attribute provides evidence of successful spawning and distribution trends. Spawning sites known to have been used within the previous 10 years and historical sites considered still to have suitable habitat have been identified. Spawning locations may move within and between sites due to natural processes and new sites may be discovered over time. Silt beds downstream of all spawning sites identified will be sampled for presence or absence of ammocoetes. Where apparently suitable habitat at any site is unoccupied feature condition will be considered unfavourable.
b) Ammocoete density	Ammocoetes should be present in at least four sampling sites each not less than 5km apart.	This standard CSM attribute establishes a minimum occupied spawning range, within any sampling period, of 15km.

Features 2 and 3 Brook lamprey *Lampetra planeri* and river lamprey *Lampetra fluviatilis*

Performance indicators for feature condition:

Attribute	Specified limits	Comments
a) Age/size structure of ammocoete population	<p>Samples of < 50 ammocoetes contain at least 2 size classes</p> <p>Samples of > 50 ammocoetes contain at least 3 size classes</p>	<p>This gives an indication of recruitment to the population over the several years preceding the survey. Failure of one or more years recruitment may be due to either short or long term impacts or natural factors such as natural flow variability, therefore would trigger further investigation of the cause rather than leading automatically to an unfavourable condition assessment.</p>
b) Distribution of ammocoetes within catchment	<p>Present at not less than 2/3 of sites surveyed within natural range</p> <p>No reduction in distribution of ammocoetes</p>	<p>The combined natural range of these two species in terms of ammocoete distribution includes all units above the tidal limit.</p> <p>Presence at less than 2/3 of sample sites will lead to an unfavourable condition assessment.</p> <p>Reduction in distribution will be defined as absence of ammocoetes from all samples within a single unit or sub-unit/tributary, and will lead to an unfavourable condition assessment.</p>
c) Ammocoete density	<p>Optimal habitat: > 10 m⁻²</p> <p>Overall catchment mean: > 5 m⁻²</p>	<p>Optimal habitat comprises beds of stable fine sediment or sand ≥15cm deep, low water velocity and the presence of organic detritus, as well as, in the Wye, shallower sediment, often patchy and interspersed among coarser substrate.</p>

Features 4 and 5 Twaité shad *Alosa fallax* and Allis shad *Alosa alosa*

Performance indicators for feature condition:

Attribute	Specified limits	Comments
a) Spawning distribution	No decline in spawning distribution	Spawning distribution is assessed by kick sampling for eggs and/or observations of spawning adults. A representative sample of sites within units 1C and 2A will be monitored at 3 yearly intervals. Absence from any site in 2 consecutive surveys will result in an unfavourable condition assessment.

Performance indicators for factors affecting the feature:

Attribute	Specified limits	Comments
a) Flow	Targets are set in relation to river/reach type(s)	Targets equate to those levels agreed and used in the Review of Consents (see Appendix 2). Shad are particularly sensitive to flow. The ideal regime is one of relatively high flows in March-May, to stimulate migration and allow maximum penetration of adults upstream, followed by rather low flows in June-September, which ensures that the juveniles are not washed prematurely into saline waters and grow rapidly under warmer conditions. The release of freshets to encourage salmonid migration should therefore be discouraged on shad rivers during this period.

Feature 6 Atlantic salmon *Salmo salar*

Performance indicators for feature condition:

Attribute	Specified limits	Comments
a) Adult run size	Conservation Limit complied with at least four years in five	CSM guidance states: Total run size at least matching an agreed reference level, including a seasonal pattern of migration characteristic of the river and maintenance of the multi-sea-winter component. A fish counter is in operation, but the results are currently not considered sufficiently reliable for this purpose (NRW pers. comm.).
b) Juvenile densities	Expected densities for each sample site	CSM guidance states: These should not differ significantly from those expected for the river

Attribute	Specified limits	Comments
	using HABSCORE	type/reach under conditions of high physical and chemical quality. Assessed using electrofishing data.

Performance indicators for factors affecting the feature:

Attribute	Specified limits	Comments
a) Biological quality	Biological GQA class A	This is the class required in the CSM guidance for Atlantic salmon, the most sensitive feature.
b) Chemical quality	Water quality targets in CSM guidance for Rivers (JNCC 2016)	These are detailed in Appendix 2 with targets for organic pollution (DO, BOD and ammonia), phosphate, trophic diatom index and acidification.
a) Flow	Targets are set in relation to river / reach type(s)	Targets equate to those levels agreed and used in the Review of Consents.

Feature 7 Bullhead *Cottus gobio*

Performance indicators for feature condition:

Attribute	Specified limits	Comments
a) Population densities	No less than 0.2 m ⁻² in sampled reaches	CSM guidance states that densities should be no less than 0.2 m ⁻² in upland rivers (source altitude >100m) and 0.5 m ⁻² in lowland rivers (source altitude ≤100m). A significant reduction in densities may also lead to an unfavourable condition assessment.
b) Distribution	Bullheads should be present in all suitable reaches. As a minimum, no decline in distribution from current	Suitable reaches will be mapped using fluvial audit information validated using the results of population monitoring. Absence of bullheads from any of these reaches, or from any previously occupied reach, revealed by on-going monitoring will result in an unfavourable condition assessment.

Attribute	Specified limits	Comments
c) Reproduction / age structure	Young-of-year fish should occur at densities at least equal to adults	This gives an indication of successful recruitment and a healthy population structure. Failure of this attribute on its own would not lead to an unfavourable condition assessment.

Feature 8 European Otter *Lutra lutra*

Performance indicators for feature condition:

Attribute	Specified limits	Comments
a) Distribution	Otter signs present at 82-90% of Otter Survey of Wales sites in sub-catchments	Ref: CCW Environmental Monitoring Report No 30 (Lyles 2006)
b) Breeding activity	Reports of cub/family sightings (no specified limit)	Ref: CCW Environmental Monitoring Report No 30 (Lyles 2006)
c) Actual and potential breeding sites	No decline in number and quality of mapped breeding sites in sub-catchments. Increase from 5 to 9 sites in Middle Wye sub-catchment (Lyles 2006)	Ref: CCW Environmental Monitoring Report No 30 (Lyles 2006) In the Wye catchment within Wales, 32 actual or potential breeding sites have been identified (19 within the Wye SAC), distributed throughout the catchment on the main river and tributaries. It is recommended that this should increase to at least 40 (23 within Wye SAC, Lyles 2006. Note: breeding territories typically contain more than one breeding site.

Feature 9 Watercourses of plain to montane levels with the *Ranunculon fluitantis* and *Callitricho-Batrachion* vegetation

Performance indicators for feature condition:

Attribute	Specified limits	Comments
a) Distribution within catchment	Distribution within site units	<i>Ranunculus</i> spp. will be present with a cover of at least 10% in any three representative sample 100m stretches of suitable habitat in: [reaches to be confirmed]
b) Typical species	Species list for reference vegetation type	Should conform to appropriate JNCC type or other list for site unit as appropriate. Details to be confirmed.

Performance indicators for factors affecting the feature:

Attribute	Specified limits	Comments
a) Native species	Cover of indicators of eutrophication maintained below threshold over the medium to long term	CSM guidance states: Care should be taken with the setting of these targets as thresholds may vary considerably by site and conservation goals. For the Wye SAC: Algae indicative of eutrophication (<i>Enteromorpha</i> spp., <i>Cladophora</i> spp. and <i>Vaucheria</i> spp.) should not have a cover value of greater than 10% in 3 consecutive years in: [reaches to be confirmed]
b) Alien / introduced species	No impact on native biota from alien or introduced species	In the CSM guidance, the SERCON scoring system for naturalness of aquatic and marginal macrophytes and naturalness of banks and riparian zone, are used to assess this attribute. SERCON protocols have not been applied in the Wye SAC, therefore assessment of this attribute relies on locally defined thresholds and expert judgement. Details to be confirmed

Feature 10 White-clawed crayfish *Austropotamobius pallipes*

Performance indicators for feature condition:

Attribute	Specified limits	Comments
a) Adult/juvenile densities	Abundance in habitat patches above threshold	Average number of crayfish in each habitat patch surveyed by stone turning and trapping combined should be greater than 1 (Roger and Watson 2004).
b) Distribution	Distribution in suitable reaches (monitoring units)	Suitable reaches within the relevant management units will be mapped using fluvial audit information validated with historic data and the results of population monitoring. Absence of white-clawed crayfish from any of these reaches revealed by on-going monitoring will result in an unfavourable condition assessment.

Performance indicators for factors affecting the feature:

Attribute	Specified limits	Comments
a) Invasive non-native crayfish	Absence of non-native crayfish from the SAC	Collation of <i>ad hoc</i> records of non-native crayfish in the Wye catchment and adjacent areas and monitoring in conjunction with control programmes using trapping.
b) Porcelain disease in white-clawed crayfish	Incidence <10%	Incidence to be recorded during population monitoring.

Feature 11 Quaking bogs and transition mires

Performance indicators for feature condition:

Attribute	Specified limits	Comments
a) Habitat extent	No reduction in total extent	This would be indicative of drying out due to a change in hydrological processes/wetland structure and function.
b) Habitat composition	No significant increase in woodland/scrub	This would be indicative of drying out due to a change in hydrological processes/wetland structure function and/or vegetation succession due to a change in grazing pressure.
c) Habitat structure	Cover of exposed substrate/litter	May indicate either over- or under-grazing.
d) Vegetation composition	Indicator species presence/frequency for reference vegetation type(s). No significant reduction in key type(s)	Should conform to appropriate NVC type(s) and/or locally defined vegetation composition criteria as appropriate. Shifts in vegetation composition may indicate change in hydrology, nutrient status and/or grazing pressure. Details to be confirmed

Performance indicators for factors affecting the feature:

Attribute	Specified limits	Comments
a) Native species	Cover of indicators of under-grazing, drainage, eutrophication or disturbance maintained below threshold	May include graminoids such as <i>Phragmites australis</i> , <i>Phalaris arundinacea</i> , <i>Glyceria maxima</i> , <i>Typha latifolia</i> , <i>Juncus</i> spp., <i>Molinia caerulea</i> ; tall herbs such as <i>Epilobium hirsutum</i> , <i>Urtica dioica</i> , <i>Pteridium aquilinum</i> , <i>Rubus fruticosus</i> ; bryophytes such as <i>Brachythecium rutabulum</i> , <i>Eurhynchium praelongum</i> , <i>Sphagnum recurvum</i> ; tree and shrub spp. (CSM Lowland fens guidance)
b) Invasive non-native species	No impact on native biota from invasive non-native or introduced species	Possible invasive non-natives include New Zealand swamp-stonecrop <i>Crassula helmsii</i> : although not recorded at the site, any records should be verified and followed up with control measures.

Appendix 2: Water Quality Targets

(as revised in Common Standards Monitoring guidance for Rivers, JNCC 2016)

River SACs designated under the Habitats Regulations 2017 (UK Gov, 2017) overlap river water bodies designated under Water Framework Directive Regulations (NRW, 2015; UK Gov, 2015). The water quality standards that apply come from the source legislation – i.e. for the water body the WFD Regulations standards and for a SAC the Habitats Regulations standards. Note that the words targets and standards are used under the various documents that sit under these two Regulations. We have interpreted these to mean the same thing and for this document we will use the term standard unless directly quoting from a specific document. Water quality standards for Special Area of Conservation (SAC) rivers are set via agreement at a UK level and presented in the JNCC Common Standards Monitoring (CSM) guidance (JNCC 2015, 2016).

However, having two sets of standards for the same area of river can lead to confusion both internally and externally as to which apply in a given situation. This Appendix sets out the standards for water quality attributes for water bodies in the River Wye SAC. Where they are more stringent, WFD Regulation 2017 standards are adopted as the CSM standards.

The River Wye SAC is a cross-border site between Wales and England; this plan and the Conservation Objectives only cover the parts of the SAC which are in Wales. There are two water bodies which are cross border and these water quality standards only apply to the parts of the water border which either form the border with England or which are within Wales. These water bodies are:

(i) R Wye - conf Walford Bk to Bigsweir Br

The standards apply to the 20km stretch at the downstream end of the water body, from the border at Lady Park Wood National Nature Reserve to Bisgweir Bridge as this stretch is either the border or is within Wales.

(ii) Wye - Scithwen Bk to Brewardine Br

The standards apply to the 25km stretch at the upstream end of the water body, from Scithwen Brook down to the border near Rhydspence as this stretch is either the border or is within Wales.

Organic pollution

The following table (Table 1a) provides the values for the physio-chemical attributes to be applied across all river types. Standards apply throughout the assessment unit, not just at sparsely distributed monitoring sites.

The standards for DO, BOD and un-ionised ammonia are the same for all river water bodies whereas the standard for total ammonia varies according to river type and previous WFD Regulations classification for ammonia (Table 1a). For the 90thile total ammonia the CSM standard is 0.25mg/l. However, if High Status under WFD is being reached for a water body for certain river types then the more stringent WFD

standard at 0.2mg/l is applied. This is due to the no deterioration principle. Total ammonia standards for each waterbody are given in Table 1b.

Table 1a. Organic pollution standards for SAC rivers

Organic pollution attribute	Unit	Test Statistic	Standard
Dissolved Oxygen (DO)	% saturation	10%ile	≥85
Biochemical Oxygen Demand (BOD)	mg l ⁻¹	Mean calculated over a 3-year period	≤1.5
Total Ammonia	mg l ⁻¹	90%ile	Varies by water body. See Table 1b.
95%ile un-ionised ammonia	mg l ⁻¹	95%ile	≤0.025

Table 1b. Organic pollution standards for water bodies in the River Wye SAC.

* Reason for total ammonia standard: some water bodies that meet WFD high status for ammonia have the WFD high target of 0.2 mg l⁻¹, all other water bodies have the CSM target of 0.25 mg l⁻¹.

Water Body ID	Water Body Name	Total Ammonia (90%ile, mg l ⁻¹)	Reason for total ammonia standard*
GB109055042340	Afon Bidno - source to conf R Wye	0.2	WFD (high)
GB109055041880	Afon Cammarch - source to conf R Irfon	0.2	WFD (high)
GB109055042190	Afon Chwefru - source to conf R Irfon	0.2	WFD (high)
GB109055042260	Afon Elan - Caban-coch Rsvr to conf R Wye	0.2	WFD (high)
GB109055041890	Afon Garth Dulas - source to conf R Irfon	0.2	WFD (high)
GB109055041870	Afon Gwesyn - source to conf R Irfon	0.2	WFD (high)
GB109055036950	Afon Llynfi - conf Dulas Bk to conf R Wye	0.2	WFD (high)
GB109055042310	Afon Marteg - source to conf R Wye	0.2	WFD (high)
GB109055042110	Aran - source to conf R Ithon	0.2	WFD (high)
GB109055037060	Bach Howey Bk - source to conf R Wye	0.2	WFD (high)
GB109055042120	Bachell Bk - source to conf Clywedog Bk	0.2	WFD (high)
GB109055037160	Builth Dulas Bk - source to conf R Wye	0.2	WFD (high)
GB109055042130	Camddwr Bk - source to conf R Ithon	0.2	WFD (high)
GB109055042370	Camnant Brook - source to confluence R Edw	0.2	WFD (high)
GB109055036680	Cledan - source to conf R Irfon	0.2	WFD (high)
GB109055037030	Clettwr Bk - source to conf R Wye	0.2	WFD (high)
GB109055042070	Clywedog Bk - conf Bachell Bk to conf R Ithon	0.2	WFD (high)

Water Body ID	Water Body Name	Total Ammonia (90%ile, mg l ⁻¹)	Reason for total ammonia standard*
GB109055042090	Clywedog Bk - source to conf Bachell Bk	0.2	WFD (high)
GB109055037050	Duhonw - source to conf R Wye	0.2	WFD (high)
GB109055036920	Dulas Bk - source to conf Afon Llynfi	0.2	WFD (high)
GB109055037130	Edw - conf Camnant Bk to conf Clas Bk	0.2	WFD (high)
GB109055037080	Edw - conf Clas Bk to conf R Wye	0.2	WFD (high)
GB109055042200	Edw - source to conf Colwyn Bk	0.2	WFD (high)
GB109055042170	Gwenlas Bk - source to conf R Ithon	0.2	WFD (high)
GB109055041900	Howey Bk - source to conf R Ithon	0.2	WFD (high)
GB109055036760	Irfon - conf Afon Gwesyn to conf Cledan	0.2	WFD (high)
GB109055037090	Irfon - conf Cledan to conf R Wye	0.2	WFD (high)
GB109055042270	Ithon - conf Camddwr Bk to conf R Wye	0.2	WFD (high)
GB109055042140	Ithon - conf Gwenlas Bk to conf Camddwr Bk	0.2	WFD (high)
GB109055042150	Ithon - conf Llaethdy Bk to conf Gwenlas Bk	0.2	WFD (high)
GB109055042180	Ithon - source to conf Llaethdy Bk	0.2	WFD (high)
GB109055042160	Llaethdy Bk - source to conf R Ithon	0.2	WFD (high)
GB109055041960	Mithil Bk - source to conf R Ithon	0.2	WFD (high)
GB109055042080	Nantmel Dulas - source to conf R Ithon	0.2	WFD (high)
GB109055036990	Scithwen Bk - source to conf R Wye	0.2	WFD (high)
GB109055036690	Tirabad Dulas - source to conf R Irfon	0.2	WFD (high)
GB109055036970	Triffrwd - source to Dulas	0.2	WFD (high)
GB109055042320	Wye - conf Afon Bidno to conf Afon Marteg	0.2	WFD (high)
GB109055042250	Wye - conf Afon Elan to conf R Ithon	0.2	WFD (high)
GB109055042330	Wye - conf Afon Tarenig to conf Afon Bidno	0.2	WFD (high)
GB109055037115	Wye - conf R Irfon to Scithwen Bk	0.2	WFD (high)
GB109055042280	Wye - conf to conf Afon Marteg to conf Afon Elan	0.2	WFD (high)
GB109055037111	Wye - conf Walford Bk to Bigsweir Br	0.25	CSM
GB109055037116	Wye - Scithwen Bk to Brewardine Br	0.2	WFD (high)
GB109055037150	Wye (Avon Gwy) - conf R Ithon to conf R Irfon	0.25	CSM

Reactive phosphorus

Phosphorous standards are set according to altitude, alkalinity, and river size, with the tightest targets in low alkalinity, high altitude headwater areas, reflecting natural variation (JNCC 2016). River Habitat Survey (EA, 2003) river flow categories are used to determine river size.

The process also includes an alignment procedure to ensure that standards are never less stringent than the Water Framework Directive (WFD) phosphorus standard for the same water body. If the WFD standard is more stringent than the CSM standard then the WFD standard applies.

Individual phosphorus standards for all waterbodies in the River Wye SAC are given in Table 2. As explained previously, the WFD phosphate standard for good ecological status has been applied where it is more stringent than CSM standards.

Table 2. Phosphorus standards and typology for all waterbodies in the River Wye SAC. * Phosphorus standard to be applied to annual and growing season means. Standards calculated from annual mean expressed in $\mu\text{g L}^{-1}$ SRP. ** Reason for phosphorus standard: CSM (near natural/max allowable) are derived from the CSM guidance for Rivers and WFD (good/high) from the relevant Water Framework Directive standard.

Water Body ID	Water Body Name	SAC Management Unit(s)	Phosphorus standard * ($\mu\text{g l}^{-1}$)	Reason for phosphorus standard**	CSM_ Alt type	CSM_ Alk type	River size
GB1090550 42340	Afon Bidno - source to conf R Wye	7768	10	CSM (max allowable)	high Alt >80m	low Alk <50mg/l	headwater
GB1090550 41880	Afon Cammarch - source to conf R Irfon	7745 7667	10	CSM (near natural)	high Alt >80m	low Alk <50mg/l	river
GB1090550 42190	Afon Chwefru - source to conf R Irfon	7750	10	CSM (max allowable)	high Alt >80m	low Alk <50mg/l	headwater
GB1090550 42260	Afon Elan - Caban-coch Rsvr to conf R Wye	7769	10	CSM (near natural)	high Alt >80m	low Alk <50mg/l	river
GB1090550 41890	Afon Garth Dulas - source to conf R Irfon	7744 7668	10	CSM (max allowable)	high Alt >80m	low Alk <50mg/l	headwater
GB1090550 41870	Afon Gwesyn - source to conf R Irfon	7749	10	CSM (max allowable)	high Alt >80m	low Alk <50mg/l	headwater
GB1090550 36950	Afon Llynfi - conf Dulas Bk to conf R Wye	7739	25	CSM (max allowable)	high Alt >80m	high Alk >50mg/l	river
GB1090550 42310	Afon Marteg - source to conf R Wye	3524 7732	13	WFD (high)	high Alt >80m	low Alk <50mg/l	river
GB1090550 42110	Aran - source to conf R Ithon	7758	15	CSM (max allowable)	high Alt >80m	high Alk >50mg/l	headwater

Water Body ID	Water Body Name	SAC Management Unit(s)	Phosphorus standard * ($\mu\text{g l}^{-1}$)	Reason for phosphorus standard**	CSM_Alt type	CSM_Alk type	River size
GB109055037060	Bach Howey Bk - source to conf R Wye	3525	15	CSM (max allowable)	high Alt >80m	high Alk >50mg/l	headwater
GB109055042120	Bachell Bk - source to conf Clywedog Bk	7762 7766	10	CSM (max allowable)	high Alt >80m	low Alk <50mg/l	headwater
GB109055037160	Builth Dulas Bk - source to conf R Wye	7734 7665	15	CSM (max allowable)	high Alt >80m	high Alk >50mg/l	headwater
GB109055042130	Camddwr Bk - source to conf R Ithon	7756	13	WFD (high)	high Alt >80m	high Alk >50mg/l	headwater
GB109055042370	Camnant Brook - source to confluence R Edw	7735 7664 3016 626 3011 3012 3013 3015	15	CSM (max allowable)	high Alt >80m	high Alk >50mg/l	headwater
GB109055036680	Cledan - source to conf R Irfon	7670 7669 7671	10	CSM (max allowable)	high Alt >80m	low Alk <50mg/l	headwater
GB109055037030	Clettwr Bk - source to conf R Wye	7658 7659 7660	15	CSM (max allowable)	high Alt >80m	high Alk >50mg/l	headwater
GB109055042070	Clywedog Bk - conf Bachell Bk to conf R Ithon	7760	10	CSM (near natural)	high Alt >80m	low Alk <50mg/l	river
GB109055042090	Clywedog Bk - source to conf Bachell Bk	7761	10	CSM (max allowable)	high Alt >80m	low Alk <50mg/l	headwater
GB109055037050	Duhonw - source to conf R Wye	7661 7742	15	CSM (max allowable)	high Alt >80m	high Alk >50mg/l	headwater
GB109055036920	Dulas Bk - source to conf Afon Llynfi	7740	25	CSM (max allowable)	high Alt >80m	high Alk >50mg/l	river
GB109055037130	Edw - conf Camnant Bk to conf Clas Bk	7737	15	CSM (near natural)	high Alt >80m	high Alk >50mg/l	river
GB109055037080	Edw - conf Clas Bk to conf R Wye	7738 7662	15	CSM (near natural)	high Alt >80m	high Alk >50mg/l	river
GB109055042200	Edw - source to conf Colwyn Bk	7736 7663	15	CSM (near natural)	high Alt >80m	high Alk >50mg/l	river
GB109055042170	Gwenlas Bk - source to conf R Ithon	7754	10	CSM (max allowable)	high Alt >80m	low Alk <50mg/l	headwater
GB109055041900	Howey Bk - source to conf R Ithon	7764	15	CSM (max allowable)	high Alt >80m	high Alk >50mg/l	headwater

Water Body ID	Water Body Name	SAC Management Unit(s)	Phosphorus standard * ($\mu\text{g l}^{-1}$)	Reason for phosphorus standard**	CSM_ Alt type	CSM_ Alk type	River size
GB109055036760	Irfon - conf Afon Gwesyn to conf Cledan	7748	10	CSM (near natural)	high Alt >80m	low Alk <50mg/l	river
GB109055037090	Irfon - conf Cledan to conf R Wye	7743 7666 7746	10	CSM (near natural)	high Alt >80m	low Alk <50mg/l	river
GB109055042270	Ithon - conf Camddwr Bk to conf R Wye	7757	25	CSM (max allowable)	high Alt >80m	high Alk >50mg/l	river
GB109055042140	Ithon - conf Gwenlas Bk to conf Camddwr Bk	7755 7675 7676 7765	10	CSM (max allowable)	high Alt >80m	low Alk <50mg/l	headwater
GB109055042150	Ithon - conf Llaethdy Bk to conf Gwenlas Bk	7753	10	CSM (max allowable)	high Alt >80m	low Alk <50mg/l	headwater
GB109055042180	Ithon - source to conf Llaethdy Bk	7751 7678 7677	10	CSM (max allowable)	high Alt >80m	low Alk <50mg/l	headwater
GB109055042160	Llaethdy Bk - source to conf R Ithon	7752	10	CSM (max allowable)	high Alt >80m	low Alk <50mg/l	headwater
GB109055041960	Mithil Bk - source to conf R Ithon	7759	15	CSM (max allowable)	high Alt >80m	high Alk >50mg/l	headwater
GB109055042080	Nantmel Dulas - source to conf R Ithon	7763 7767	10	CSM (max allowable)	high Alt >80m	low Alk <50mg/l	headwater
GB109055036990	Scithwen Bk - source to conf R Wye	7657 7656	15	CSM (max allowable)	high Alt >80m	high Alk >50mg/l	headwater
GB109055036690	Tirabad Dulas - source to conf R Irfon	7747	10	CSM (max allowable)	high Alt >80m	low Alk <50mg/l	headwater
GB109055036970	Triffrwd - source to Dulas	7741	15	CSM (max allowable)	high Alt >80m	high Alk >50mg/l	headwater
GB109055042320	Wye - conf Afon Bidno to conf Afon Marteg	7731 7674 7770	10	CSM (near natural)	high Alt >80m	low Alk <50mg/l	river
GB109055042250	Wye - conf Afon Elan to conf R Ithon	7733 7672 7673 7771	10	CSM (near natural)	high Alt >80m	low Alk <50mg/l	river
GB109055042330	Wye - conf Afon Tarenig to conf Afon Bidno	7730	10	CSM (near natural)	high Alt >80m	low Alk <50mg/l	river
GB109055037115	Wye - conf R Irfon to Scithwen Bk	7729	16	WFD (high)	high Alt >80m	low Alk <50mg/l	river

Water Body ID	Water Body Name	SAC Management Unit(s)	Phosphorus standard * ($\mu\text{g l}^{-1}$)	Reason for phosphorus standard**	CSM_Alt type	CSM_Alk type	River size
GB1090550 42280	Wye - conf to conf Afon Marteg to conf Afon Elan	7732	20	CSM (max allowable)	high Alt >80m	low Alk <50mg/l	river
GB1090550 37111	Wye - conf Walford Bk to Bigsweir Br	7726 1802	39	WFD (high)	low Alt <80m	high Alk >50mg/l	large river
GB1090550 37116	Wye - Scithwen Bk to Brewardine Br	1801 7729	20	CSM (max allowable)	high Alt >80m	low Alk <50mg/l	river
GB1090550 37150	Wye (Avon Gwy) - conf R Ithon to conf R Irfon	7728	15	WFD (high)	high Alt >80m	low Alk <50mg/l	river

Trophic diatom index

The standard should be equivalent to WFD high ecological status using the current version of the diatom classification tool (via light microscopy). This is a tool developed to measure increases in nutrient concentrations through assessing degree of change in floristic composition in benthic diatoms (algae) in streams and rivers.

Acidification

This standard only applies to assessment units whose water body type is classified as siliceous or peat. Other types have good buffering ability and so will not be affected by acidification. See tables 4a and 4b for standards for relevant water bodies in the River Wye SAC.

Only six out of the 45 WFD water bodies in the Wye are classified as at risk of acidification (Hankin *et al.* 2014). However, to comply with CSM guidance, acid standards have been applied for all relevant water bodies in the catchment.

Note that monitoring and reporting against these acidification standards will only be carried out for water bodies classified as either 'at risk' or 'probably at risk'. If ANC data is available then water bodies should be assessed against the ANC standard but if ANC data is not available then pH should be used.

Table 4a. Acidification standards for SAC rivers. *Acid Neutralising Capacity; ** Dissolved Organic Carbon

Standards for acidification	Method of assessment
ANC*: Mean ANC for all waters > 80 pH (Clear waters with DOC**<10 mg L-1): mean > 6.54 pH (Humic waters with DOC>10 mg L-1): mean > 5.1	Analysis of water chemistry data from environment agencies. At least 36 samples (3 years of data) are required, which must include winter samples.

Table 4b. Acidification standards for relevant waterbodies in the River Wye SAC.

Water Body ID	Water Body Name	Acidification risk	Acid Neutralising Capacity (ANC)	pH
GB109055036680	Cledan - source to conf R Irfon	Probably not at risk	>80	>6.54
GB109055036690	Tirabad Dulas - source to conf R Irfon	Probably not at risk	>80	>6.54
GB109055036760	Irfon - conf Afon Gwesyn to conf Cledan	Not at risk	>80	>6.54
GB109055037090	Irfon - conf Cledan to conf R Wye	Probably not at risk	>80	>6.54
GB109055037115	Wye - conf R Irfon to Scithwen Bk	Probably not at risk	>80	>6.54
GB109055037116	Wye - Scithwen Bk to Brewardine Br	NA	>80	>6.54
GB109055037150	Wye (Avon Gwy) - conf R Ithon to conf R Irfon	Probably not at risk	>80	>6.54
GB109055041870	Afon Gwesyn - source to conf R Irfon	Probably not at risk	>80	>6.54
GB109055041880	Afon Cammarch - source to conf R Irfon	At risk	>80	>6.54
GB109055041890	Afon Garth Dulas - source to conf R Irfon	At risk	>80	>6.54
GB109055042070	Clywedog Bk - conf Bachell Bk to conf R Ithon	Probably not at risk	>80	>6.54
GB109055042080	Nantmel Dulas - source to conf R Ithon	Probably not at risk	>80	>6.54
GB109055042090	Clywedog Bk - source to conf Bachell Bk	Probably at risk	>80	>6.54
GB109055042120	Bachell Bk - source to conf Clywedog Bk	Probably not at risk	>80	>6.54
GB109055042140	Ithon - conf Gwenlas Bk to conf Camddwr Bk	Probably not at risk	>80	>6.54
GB109055042150	Ithon - conf Llaethdy Bk to conf Gwenlas Bk	Probably not at risk	>80	>6.54
GB109055042160	Llaethdy Bk - source to conf R Ithon	Probably not at risk	>80	>6.54
GB109055042170	Gwenlas Bk - source to conf R Ithon	Probably not at risk	>80	>6.54
GB109055042180	Ithon - source to conf Llaethdy Bk	Probably not at risk	>80	>6.54

Water Body ID	Water Body Name	Acidification risk	Acid Neutralising Capacity (ANC)	pH
GB109055042190	Afon Chwefru - source to conf R Irfon	Probably not at risk	>80	>6.54
GB109055042250	Wye - conf Afon Elan to conf R Ithon	Probably not at risk	>80	>6.54
GB109055042260	Afon Elan - Caban-coch Rsvr to conf R Wye	Probably at risk	>80	>6.54
GB109055042280	Wye - conf to conf Afon Marteg to conf Afon Elan	Not at risk	>80	>6.54
GB109055042310	Afon Marteg - source to conf R Wye	Not at risk	>80	>6.54
GB109055042320	Wye - conf Afon Bidno to conf Afon Marteg	Probably not at risk	>80	>6.54
GB109055042330	Wye - conf Afon Tarenig to conf Afon Bidno	At risk	>80	>6.54
GB109055042340	Afon Bidno - source to conf R Wye	Probably at risk	>80	>6.54

Appendix 3. Standards used in the Wye Review of Consents for flow.

The flow standard used in the Environment Agency (EA) Resource Assessment and Management Framework (RAM) for the River Wye utilises the Habitats Directive Ecological River Flow (HDERF) objective throughout the year. The maximum permissible percentage reduction from naturalised flow levels is given in the table below. Within the River Wye SAC, all reaches above Rhydspence (the downstream end of Unit 1D) are classified as having Very High sensitivity to abstraction, and below Rhydspence as High sensitivity. Welsh Water’s Wye Transfer abstraction at Monmouth and Severn Trent Water’s Micheldean abstraction at Lydbrook are supported by regulation releases from the Elan Valley reservoirs when the flow at Redbrook gauging station falls below approximately Q90.

HDERF1 - River flow thresholds for SAC/SSSI rivers EW band (sensitivity)

Maximum % reduction from daily naturalised flow			
	>Qn50	Qn50-95	<Qn95
Very High	10	10	1-5
High	15	10	5-10

For reaches below reservoirs, the effect of abstraction from storage is excluded from the assessment, so that the standard flow is a ‘benchmark’ flow, incorporating the reservoir compensation release, rather than a naturalised flow. At times of low flow, compensation and regulation releases may increase the flow downstream of the reservoir above natural levels. There may also be effects resulting from reduced water temperature.

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