



Asiantaeth yr
Amgylchedd Cymru
Environment
Agency Wales

water abstraction getting the balance right

The Tawe, Loughor and Gower Catchment
Abstraction Management Strategy
Consultation Document

January 2007



We are Environment Agency Wales. It's our job to look after your environment and make it a **better place** – for you, and for future generations.

Your environment is the air you breathe, the water you drink and the ground you walk on. Working with business, Government and society as a whole, we are making your environment cleaner and healthier.

Environment Agency Wales. Out there, making your environment a better place.

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The Tawe, Loughor and Gower CAMS area overview



0 1.5 3 6 9 12 Kilometres

Legend

- CAMS area
- CAMS rivers
- Swansea canal
- Lakes/reservoirs
- Urban areas
- Surrounding area
- Sea

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Document structure and accompanying documents

What are CAMS?

Sections 1 and 2 outline what CAMS are and why we have produced this consultation document.

The main chapters

Section 3 of this document outlines the main principles of abstraction licensing that we follow in the catchment.

Section 4, the pale green pages, is the most important section. This is the proposed licensing strategy that we would like you to comment upon. If you are an existing licence holder it is this section that outlines what this strategy will mean for you.

A summary of the questions that we are asking you to comment upon is included on page 36.

Section 5 outlines how we are going to implement the strategy.

Background information

The following sections, Sections 6 to 8, provide interesting information about how we developed this strategy and the character of the catchment. You may find this background information useful to understand the issues we are consulting upon.

Technical information

The detailed technical information used to develop this proposed strategy and information about how we made our decisions is in the technical document.

1.0

This is the consultation document for the Tawe, Loughor and Gower Catchment Abstraction Management Strategy (CAMS). This proposed strategy gives you information on water resources and on how the abstraction licensing system works.

Your local CAMS

We are now using CAMS to manage water resources at a local level. They allow us to consult with the local community and other interested parties in our work to balance the needs of abstractors and other water users with those of the water environment.

Our consultation process will result in a local licensing strategy and a decision on whether time limited licences should be renewed and on what terms.

All catchments in England and Wales will have a CAMS.

This CAMS area includes the catchments of the rivers Tawe and Loughor and a number of smaller rivers in the surrounding area including the Gower. The smaller river catchments are the Lliedi, Morlais, Gwili, Lliw, Llan and Pennard Pill. The CAMS area falls largely within the City and County of Swansea and Carmarthenshire, with very small parts in Neath Port Talbot and Powys. The main towns in the area are Swansea, Llanelli, Pontardulais, Ystradgynlais and Ammanford.

The CAMS area is predominantly rural with much of the urban and industrial development concentrated around Swansea and Llanelli, and adjacent to the rivers in the Tawe and Amman Valleys. Industry, agriculture and tourism are of economic importance to the area.

There are important natural habitats within the area, many of which are included in Special Areas of Conservation (SACs) and numerous Sites of Special Scientific Interest (SSSIs), many of which are within the Gower Area of Outstanding Natural Beauty (AONB).

A technical document for the Tawe, Loughor and Gower CAMS, which contains the detailed technical information on which we have based this strategy, is available on this CD. You can also view a printed copy of this document at the address below.

The document *Managing Water Abstraction: The Catchment Abstraction Management Strategy Process* sets out both the national policy and the regulatory framework within which CAMS operates. A copy of this document is also on this CD. If you would like to be sent a paper copy of *Managing Water Abstraction* please contact us at the following address.

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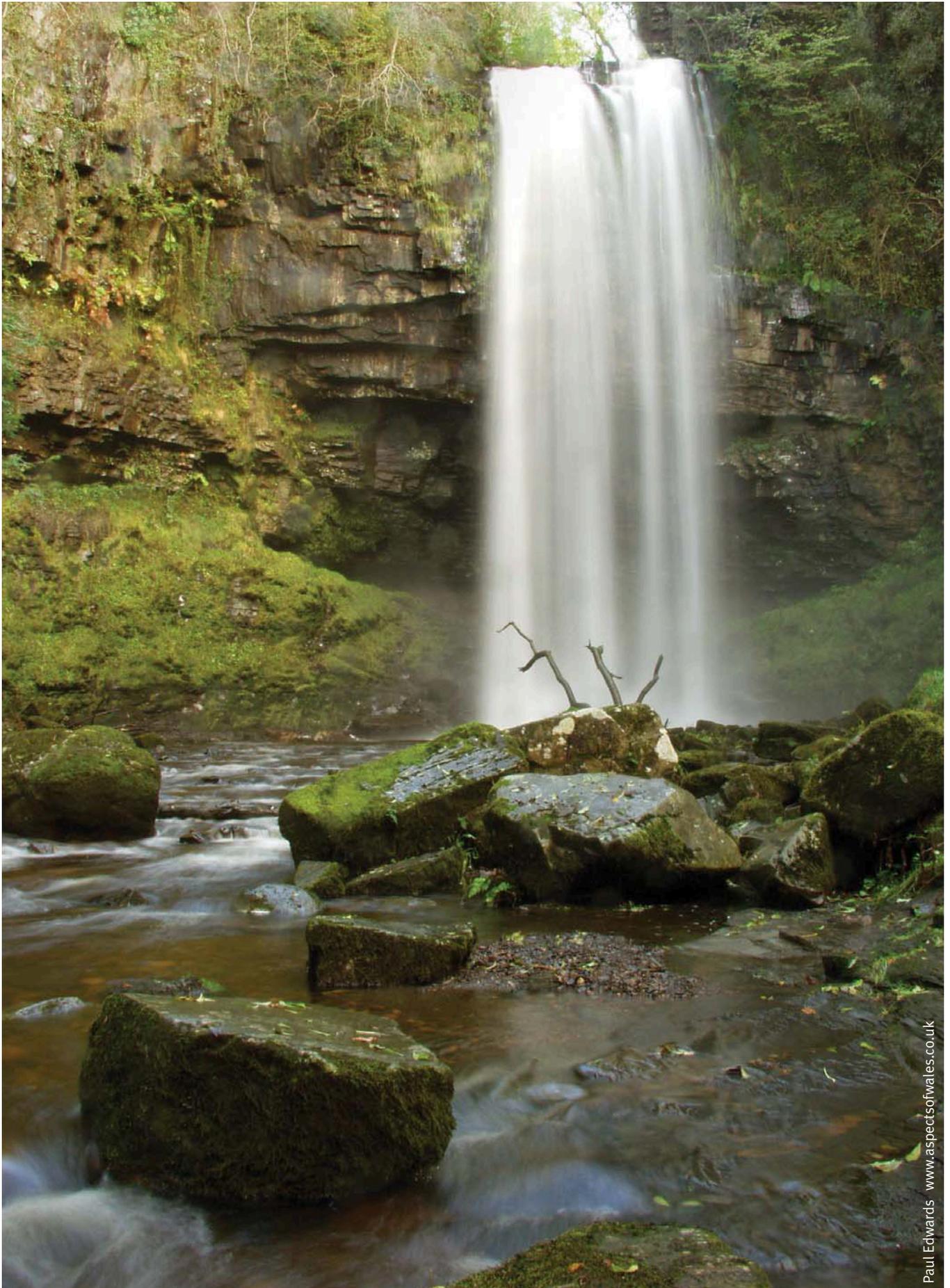
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Paul Edwards - www.aspectsofwales.co.uk

Henrhyd Falls, Nant Llech

2.0

We consult on CAMS because we need the information you provide to help draw up effective and sustainable plans.

Consultation on the Tawe, Loughor and Gower CAMS

We want to manage water resources in a catchment effectively and sustainably. To do this, it is important that we work with people that have an interest in the water resources and environment of the Tawe, Loughor and Gower catchments.

Once you have read this document we hope that you will send us your comments so that we can benefit from your views when we develop our strategy. To help us we would like you to comment on:

- the questions we have asked on the proposed licensing strategy;
- any additional information that you think would help us to develop our strategy.

We need to receive your comments by 3rd May 2007.

Please send your comments to:

Sonja Watts, Regulatory Officer (Water Resources)

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Tel: 01437 783039

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or by e-mail to:

cams.walesthwest@environment-agency.gov.uk

Once we have assessed your responses we will produce a written summary of them – we call this a statement of response. This highlights the main issues that you have raised and we will send a copy to everyone who responded. It will also be available to others on request. We may quote from your response in the summary but if you would like your response to be treated as confidential, please state this clearly.

We have also set up a Stakeholder Group. Its role is to represent the main interests in the catchment. The group helps us to identify important local issues, provides feedback on our proposals and considers the likely implications of different strategy options. The members of the Tawe, Loughor and Gower CAMS Stakeholder Group and the interests they represent are:

John Elfed Jones *Chairperson*

Ray Lockyer *Angling*

Alun Hughes *Water company and abstractors*

Leanne Kyte *Welsh Assembly Government
(new development)*

Dyfrig Jones *Conservation and recreation*

Paul Meller *City and County of Swansea*

Eifion Bowen *Carmarthenshire County Council*

Adrian Brain *Abstractors*

Rebecca Wright *Conservation (designated sites)*



Lower Lliw Reservoir

Thank you to those people that have already taken part in this consultation by:

- Responding to our awareness raising leaflet;
- Attending the CAMS Stakeholder Group;
- Responding to the targeted information requests.

3.0

The CAMS process provides the framework for any decision on an abstraction licence application

Main principles of abstraction licensing in the Tawe, Loughor and Gower catchments

3.1 National principles

3.1.1 Licence determination

Anyone wanting to take more than 20 cubic metres per day (m³/day) from a 'source of supply' (river, stream lake, well, etc.) must have an abstraction licence. The application process for abstraction is similar to the planning process in that we require the application to be advertised and may require supporting environmental information. When considering the application we check that the quantities applied for and the purpose of the abstraction are reasonable, that there is sufficient water available to support it and that the potential impacts on the environment and other water users are acceptable. Depending on the outcome of our investigations we will issue a licence either as applied for, or with conditions that restrict the abstraction to protect the environment or other users. In certain cases we may have to refuse the application. Any applicant who is not happy with our determination (decision) has the right to appeal against it.

Each application is determined on its own merits

Whilst the strategy that we develop may conclude that water is available to be licensed in the catchment, this does not guarantee that all applications will be successful. Each application will be determined upon its own merits/impacts.

We have split the catchment into areas of water that can be managed as individual units. The Tawe, Loughor and Gower CAMS has six Water Resource Management Units (WRMU - these are surface waters) and no Groundwater Management Units (GWMU – these are areas of water under the ground). These are shown on Map 2 on Page 9. GWMUs were not delineated within the Tawe, Loughor and Gower CAMS. This decision was made after taking into consideration the geology of the CAMS area, which is predominantly minor aquifers, and the relatively small number of groundwater abstractions. This decision was also taken in line with Section 4.6 of the RAM Guidance Manual. For more information on the RAM Guidance please refer to Chapter 3 of the technical document.

Where a proposal for an abstraction licence may have a potentially significant environmental effect, we may ask applicants to provide additional information about the likely environmental impact of the proposed

abstraction with their applications. To help identify these situations this document contains maps of all the WRMUs with the location of the main environmental features that are potentially vulnerable to the impacts of abstractions.

This document sets out our licensing strategy for the catchment. If you want to apply for a licence you should contact us on **08708 506506** for further advice and an application pack.

Abstractions are managed to protect the environment

To protect the environment we may issue a licence with conditions. One type of condition is referred to as a 'Hands-Off Flow'. This specifies that if the flow or level in the river drops below that which is required to protect the environment the abstraction must stop, hence 'Hands-Off Flow' (HOF).

A licence does not guarantee that water is available

It is important to understand that when we issue a licence we do not guarantee the supply of water. We have to protect the environment and rights of other abstractors. To do this we may add constraints to licences, as described above. The licence holder needs to understand the implications of this as it affects the reliability of supply. For example, in drier years it is more likely that conditions will come into effect and abstraction is more likely to be stopped. Details of 'Hands-Off Flow' conditions are described in more detail in Section 4.

Water efficiency and demand management

We need to make the best use of our existing water resources. Adopting water efficiency measures can help us achieve this goal. Water efficiency is one of the tests that will need to be satisfied before we grant a new licence or renew a time-limited licence. Therefore, it is important that abstractors maintain adequate records of water usage and that steps are taken to conserve water. We are currently consulting with interested parties on how best to implement water efficiency within the abstraction licensing system.

People, businesses, industry and farms across Wales take their water use for granted. Everyone can take simple water efficiency measures that can lead to both economic and environmental benefits. We argue that saving water can provide the following advantages:

- For society and the economy it creates opportunities to use water for other purposes;
- It improves our ability to adapt to the consequences of climate change;
- It ensures better levels of environmental protection, improving the environment for people and wildlife;
- It reduces the need to develop new, expensive and potentially environmentally damaging sources of water supply.

Providing water for public water supply accounts for the highest use of water, by volume, in Wales (excluding electricity generation). The water companies deliver half of their potable water to households. Each individual uses around 150 litres of water every day. An increase in the use of water minimisation practices in the home along with a general improvement in awareness of the value of water will not only stabilise our demand but will also reduce it.

About a third of the water supplied by water companies in Wales goes to commerce, industry and agriculture. The majority of commercial and industrial users are metered. There is considerable scope for reducing this water use. Many industrial and commercial users could make changes to their use of water that would reduce their water consumption and reduce the quantity of water treated prior to discharge. This would also reduce their bills.

We publish a range of free literature relating to water conservation and demand management with advice on improving water efficiency both in the home and at work. For further information on water efficiency, conservation and demand management please contact us or visit our website: how we help to save water.

Approach to time limiting of licences

All new licences and variations (other than downward variations or minor variations having no environmental impact) will have a time limit imposed. CAMS are the mechanism for managing time limits on licences by indicating whether they should be renewed and, if so, on what terms. Where possible, the intention is to have all time limits on licences within a CAMS area expiring on the same date (known as the "common end date"). However, there may be situations where shorter or longer time limits may be justified. The next common end date for the Tawe is 2017 and the Loughor and Gower rivers is 2018. The normal duration for a renewed licence will be 12 years. The rivers within this CAMS do not have the same common end date because the CAMS boundaries will change. After this strategy the rivers in this CAMS will be merged with other CAMS. The common end date reflects the date for the merged CAMS. For more information on changes to CAMS boundaries please refer to Managing Water Abstraction on the CD.

We will notify licence holders 18, 12 and 6 months before the expiry of their licence. If you hold a time limited licence you will then need to apply for a renewal of that licence. There is a presumption that time limited licences will be renewed if:

- Environmental sustainability is not in question;
- There is a continued justification of need for the water;
- The water is used efficiently.

We will also take into account any objections received to renewal of the licence. We will endeavour to give six years notice if a licence will not be renewed or is to be renewed but on more restrictive terms which impact significantly on the use of that licence. In very exceptional circumstances we may also grant licences for longer than 12 years.

3.1.2 Water rights trading

We want to make it easier to trade water rights. Such trading refers to the transfer of licensable water rights from one party to another. Abstractors may be able to pass on this right to others. More detailed information is available in Section 4 of Managing Water Abstraction and Chapter 7 of the technical document.

We sent licence holders a guidance leaflet – Water Rights Trading – in 2002. This explained the current opportunities for trading abstraction licences. In 2003 we consulted on more detailed proposals. We have now taken your responses into account and we will publish further information and guidance to coincide with the implementation of the relevant parts of the Water Act 2003. Further information is available on our website at www.environment-agency.gov.uk.

3.1.3 Environmental considerations

European law provides a very high level of protection to two types of designated sites due to their special environment. These are:

Special Areas of Conservation (SAC), which contribute to biodiversity by maintaining and restoring habitats and species;

Special Protection Areas (SPA), which provide protection to birds, and their nests, eggs and habitats.

Ramsar sites and Sites of Special Scientific Interest (SSSI) also carry a high level of environmental importance. Table 1 lists the water-related environmentally designated sites in this CAMS.

Habitats Regulations

Under the Habitats Regulations¹ we have to assess the affects of existing abstraction licences and any new applications to make sure they are not impacting on internationally important nature conservation sites. These sites are known as Special Areas of Conservation (SAC) and Special Protection Areas (SPA).

If your current licence is being reviewed under this legislation to assess its impact you will already have been sent a letter with information about the review. If you have not received a letter from us your licence is either not near a SAC/SPA or cannot have an impact on these sites.

If our assessment shows that a new application could have an impact on a SAC/SPA we will have to follow some strict rules in setting a time limit for that licence. These are:

- We may be able to grant the licence but only with a short time limit. This is so we can monitor the effect of the abstraction on a SAC/SPA and change the licence if necessary;
- If it cannot be determined that your application will not affect the site we have to either put conditions on the licence so that it cannot affect the site or refuse the application. If we grant the licence we may ask you to monitor the impact of the abstraction;
- If our assessment shows that there isn't an impact on the site we will manage it in line with this CAMS.

Any changes to existing licences required as a result of the Habitats Directive Review of Consents may override proposals for managing abstraction set out in the CAMS. This may also apply when considering applications for future abstractions. Such changes will be taken into account when the CAMS is reviewed (2013).

3.1.4 The Water Act 2003

The Water Act 2003 introduces a new statutory framework for managing water resources that will be implemented into the water resources abstraction licensing system over the next few years. The main changes that are still to be implemented include:

- New controls on previously exempt abstractions for mine and quarry de-watering, trickle and other forms of irrigation, transfers into canals and internal drainage districts;
- Stronger powers for water resources planning and management;
- More flexibility to the licensing regulations to improve their efficiency and to encourage water rights trading;
- Stronger powers on water conservation.

For more details on the Water Act 2003 and its implementation, see our website, www.environment-agency.gov.uk or contact your local Environment Agency office on **08708 506506**. The website will be updated to provide information as the Water Act 2003 is implemented.

3.1.5 Exempt purposes and areas

Some abstractions do not need to be licensed: for example, those that do not exceed 20 cubic metres per day. Within this CAMS area the transfer into Swansea Canal from the Tawe is currently exempt. This exemption will be removed following the implementation of the Water Act 2003.

¹ The Conservation (Natural Habitats, &c.) Regulations, 1994, (the Habitats Regulations).

Important local features that may effect water availability

Table 1 Presence of features that may affect water availability

Feature	Present	WRMU/GWMU
Water related Sites of Special Scientific Interest (SSSI)	Yes	
	Caeau Afon Gwili	WRMU2
	Caeau Ffos Fach	
	Caeau Lotwen	
	Broad Oak and Thornhill Meadows	
	Felin Fach Meadows, Cwmgwili	
	Graig Fawr, Pontardulais	
	Gweunydd Glan-y-Glasnant and Cae Gwynfryn	
	Caeau Blaenau-Mawr	
	Caeau Capel Hendre	
	Rhosydd Castell-Du and Plas-y-Bettws	
	Caeau Nant Garenig	
	Caeau Pant-y -Bryn	
	Mynydd Du	
	Tairgwaith	
	Penplas Grasslands	
	Cernydd Carmel	WRMU3
	Coed Llandyfan	
	Mynydd Du	
	Nant-y-Crimp	WRMU4
	Cefn Bryn Common	WRMU5
	Parkmill Woodlands and Llethrid Valley	
	Courthouse Grasslands	
	Fairwood, Pengwern and Welshmoor Commons	
	Pennard Valley	
	Rose Cottage, Llethrid	
	Cefn Gwrhyd-Rhydyfro	WRMU6
	Hafod Wennol Grasslands	
	Cilybebyll	
	Coed Cwm Du-Cilmaengwyn	
	Gwrhyd Meadows	
	Frondeg	
Craig y Rhiwarth		
Mynydd Du Nant Llech		
Ogof Ffynnon Du-Pant Mawr		

Important local features that may effect water availability

Table 1 Presence of features that may affect water availability

Feature	Present	WRMU/GWMU
	Rhos Hen Glyn Isaf	
	Waun Ton y Spyddaen	
	Ogof Ffynnon Ddu	
Water related Special Area of Conservation (SAC)	Yes	
	Caeau Mynydd Mawr	WRMU2
	Cernydd Carmel	WRMU3
	Gower Commons	WRMU5
	Carmarthen Bay and Estuaries	WRMU1, 2, 3, and 4
Water related Special Protection Area (SPA)	Yes	
	Burry Inlet	WRMU1, 2, 3, and 4
Water related Ramsar sites	Yes	
	Burry Inlet	WRMU1,2, 3, and 4

3.1.6 Impoundments

Applications for impoundments will be dealt with on a case-by-case basis.

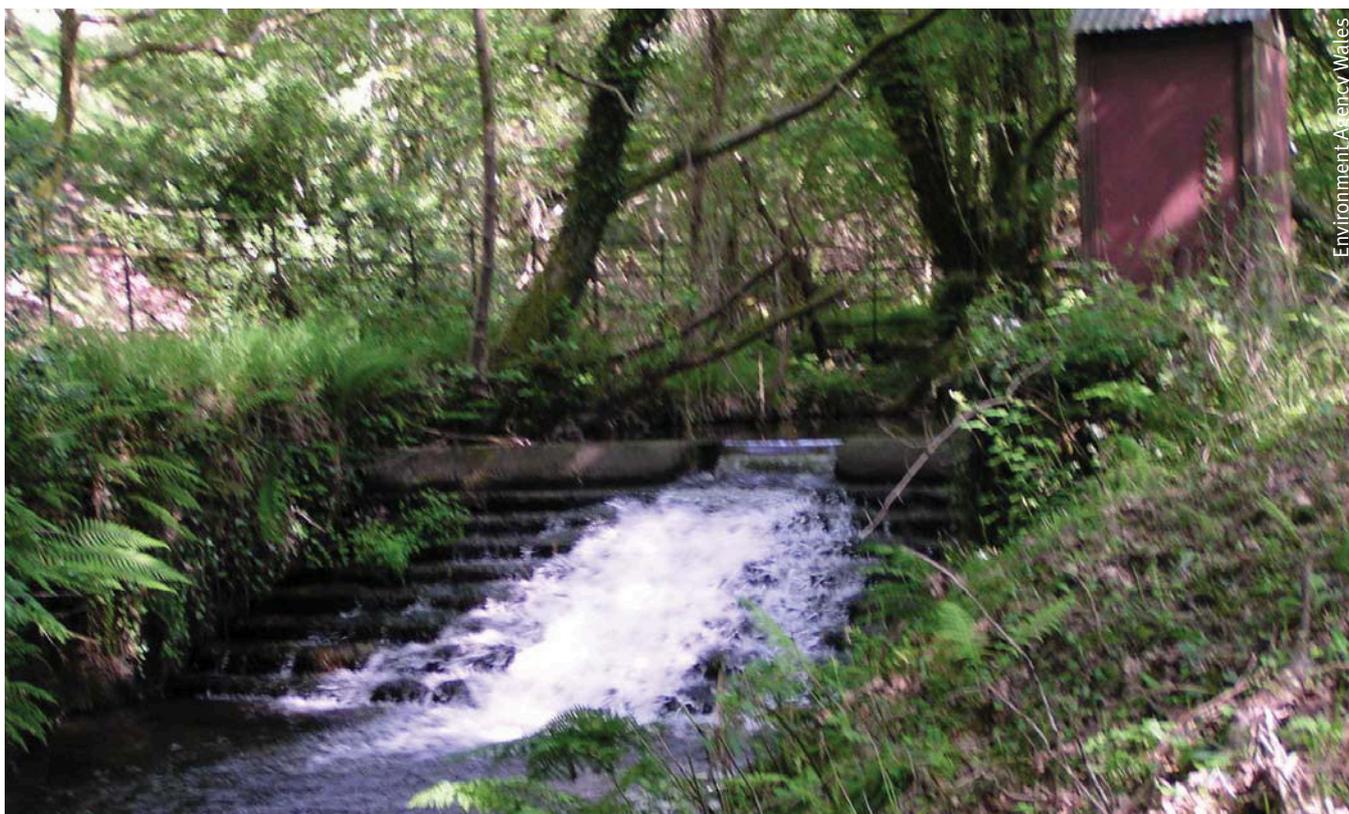
3.1.7 Management of new and renewal of existing licences

We carry out routine inspections to ensure that the conditions on a licence are being complied with. The

inspection programme allows Environment Agency officers to promote water efficiency and discuss future proposals with licence holders. As described earlier in this Section, there is a presumption that time-limited licences and licence variations will be renewed.

Table 2 Resource availability status categories

Indicative resource availability status	Licence Availability
Water available	Water is likely to be available at all flows including low flows. Restrictions may apply.
No water available	No water is available for further licensing at low flows. Water may be available at higher flows with appropriate restrictions.
Over licensed	Current actual abstraction is such that no water is available at low flows. If existing licences were used to their full allocation they could cause unacceptable environmental damage at low flows. Water may be available at high flows, with appropriate restrictions.
Over abstracted	Existing abstraction is causing unacceptable damage to the environment at low flows. Water may still be available at high flows, with appropriate restrictions.



Lower Lliw Weir

3.2 Catchment water resource availability

If you want to abstract water you need to know what water resources are available within a catchment and where abstraction for consumptive purposes is allowed. To provide this information we have developed a classification system. This gives a “resource availability status” and indicates:

- the relative balance between the environmental requirements for water and how much is licensed for abstraction;

- whether water is available for further abstraction;
- areas where abstraction needs to be reduced.

Licence applications still have to go through the normal licensing process. More information on this process is in Annexe 2 of Managing Water Abstraction.

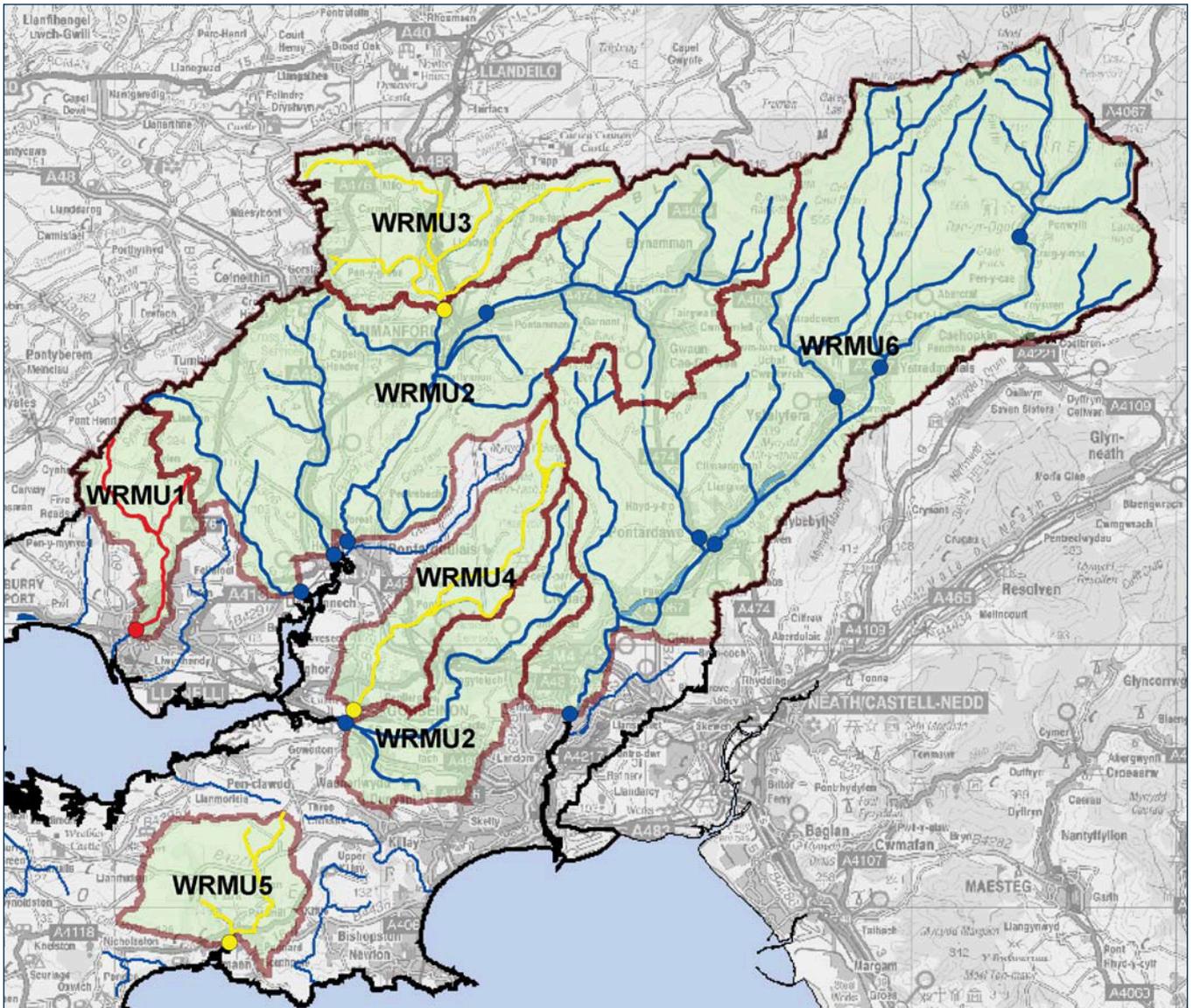
There are four categories of resource availability status, as shown in Table 2. If you need more information about what a resource availability status is and how they were calculated please refer to Section 6.2, page 40 of this document.

The resource availability status and target status for each WRMU and GWMU are shown in Table 3 and Map 3.

Table 3 Overview of the existing water resource availability and the target water resource availability at low flows for this CAMS.

WRMU/GWMU Name	Associated main river	Resource Availability Status			Details of the unit is on page
		Individual WRMU status	Target status in year 2013	Target status in year 2019	
WRMU1	Lliedi	Over abstracted	No water available	No water available	16
WRMU2	Morlais, Gwili, Loughor, Amman and Llan	Water available	Water available	Water available	19
WRMU3	Loughor	No water available	No water available	No water available	23
WRMU4	Lliw	No water available	No water available	No water available	26
WRMU5	Pennard Pill	No water available	No water available	No water available	28
WRMU6	Tawe	Water available	Water available	Water available	32

Map 3 Resource Availability Status (RAS) for each WRMU



Legend

Assessment Points

- Over licensed
- No Water Available
- Water Available

Surface Water Resource Availability Status (RAS)

- Over licensed
- No Water Available
- Water Available
- Water Resource Management Units (WRMUs)

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4.0

This section describes the licensing strategy and available water resource for each WRMU in the catchment.

Proposed abstraction licensing strategy

The proposed abstraction licensing strategy is supported by the Environment Agency's national principles of abstraction licensing described in Section 3.1. In applying these principles, and taking into account local issues, we aim to achieve the most sustainable approach to managing abstraction. This means both protecting the environment and considering economic and social needs.

Developers need to be aware of the water resource situation in each of the WRMUs. Developers need to discuss their proposals with the Environment Agency or Water Company in order to understand any issues that may constrain the amount of water available.

All applications for licences outside of a WRMU will be

assessed on a case by case basis through the licence determination process (Section 3.1.1).

It is important to note that this strategy may not apply to licences that return abstracted water close to the point of abstraction (non-consumptive abstractions) or result in a net benefit to the water environment.

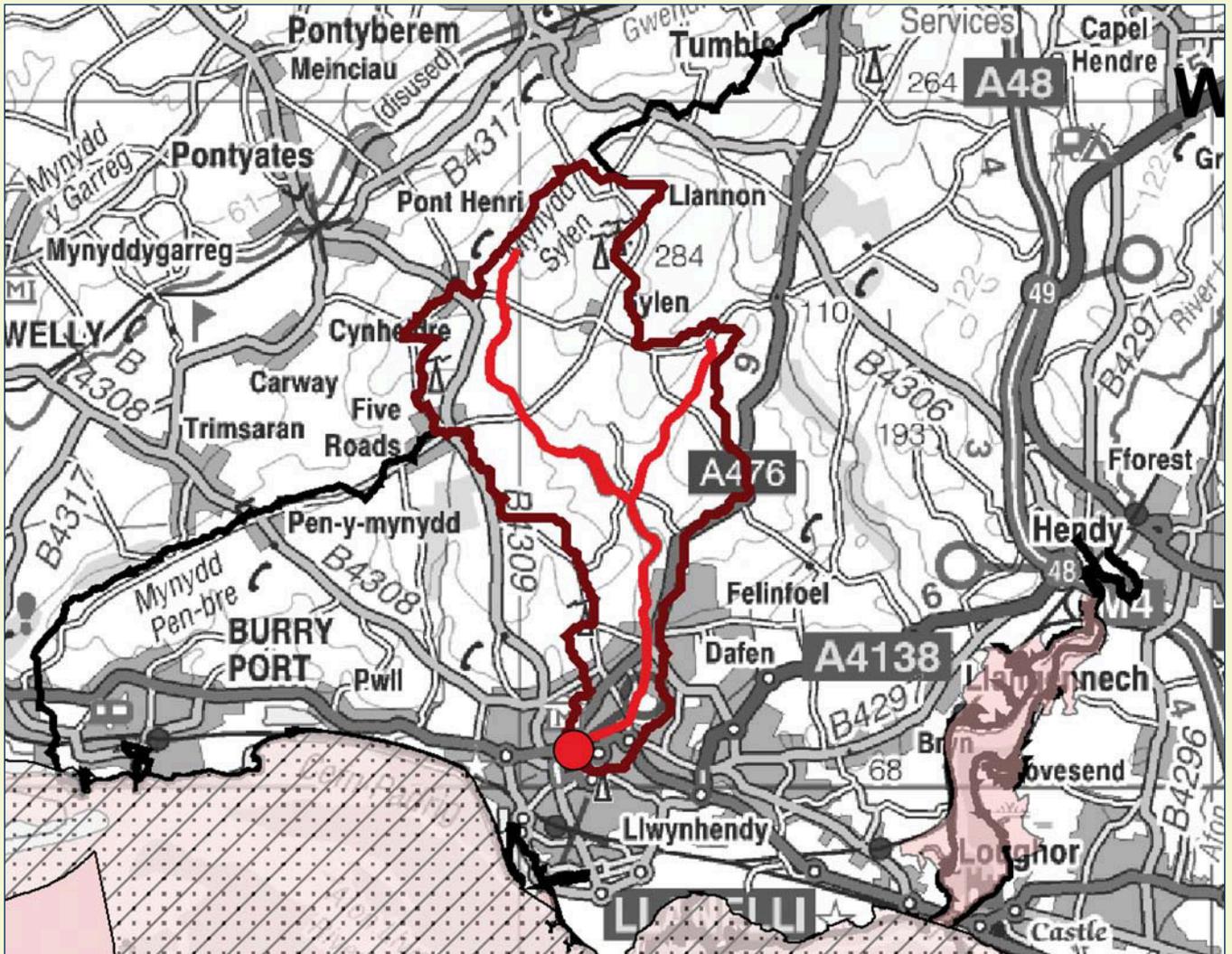
4.1 Water Resource Management Unit 1 - Lliedi

Map 4 shows the location of sites and features that may affect abstraction licence/water availability. See also Table 6.

Table 4 Existing low flow resource availability status and target low flow resource availability status for the Lliedi Water Resource Management Unit.

Associated main river	Individual WRMU status	Resource Availability Status		Comment
		Target status in 2013	Target status in 2019	
Lliedi	Over Abstracted	No water available	No water available	Achieving the target status of no water available is subject to the proposed voluntary release from the reservoir being sufficient to maintain the downstream ecology. No new consumptive abstractions will be permitted within this unit.

Map 4 Water resource management unit 1.



Legend

-  WRMU1
-  Assessment Point
-  Over abstracted
-  Carmarthan Bay & Estuaries SAC
-  Burry inlet SPA
-  Ramsar sites

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Our proposals

The water resource availability status (RAS) of this WRMU is 'over abstracted' at low flows. As shown in Table 4 the target status for this WRMU in 2013 is 'no water available'.

The target status is the outcome of the sustainability appraisal process. If you want more information about the sustainability appraisal process and how we came to this decision please refer to Chapter 3 of the technical document.

Strategy for new and existing licences

The strategy for this WRMU is to move to 'no water available'. The influence of the Lower Lliedi reservoir dominates the flow regime downstream of the reservoir within this unit and therefore influences our licensing strategy. Although there is no legal requirement or condition for any release to be made from the reservoir, in practice some flows are maintained. It is proposed that a voluntary agreement will be made with Dŵr Cymru Welsh Water (DCWW) to maintain an acceptable minimum flow below the reservoir which will prevent the ecology being compromised at low flows. When we are satisfied with the reservoir release it will be possible to override the 'over abstracted' status to a 'no water available' status. The target low flow resource availability status will be achieved once we can see that the flow from the reservoir is sufficient to do this.

This means that for **new** licences:

- No new consumptive abstraction licences will be granted at any flows;
- Non-consumptive licences would be considered, dependent on location, and may be subject to restrictions;
- New non-consumptive licences will be subject to a time limit of 31 March 2018;

- Both a SAC and a SPA are located downstream of the WRMU. These are not river sites but do have water requirements. Therefore we will need to take into account requirements of the Habitats Regulations which may mean more stringent restrictions than set out in the CAMS.

and for **existing** licences:

- There will be no impact on existing abstraction licences unless action needs to be taken as a result of the Habitats Directive Review of Consents identifying an adverse impact on designated sites.

How much water is available and what restrictions might apply

Table 5 gives an indication of how much water is available for further abstraction and the associated restrictions that may apply to **new or varied** abstraction licences from the main river. Tributaries to the main river may be subject to different restrictions and quantities. We will be able to advise you on this.

All abstraction licence applications will be subject to an assessment to take account of any local issues and will be granted on a first-come-first-served basis.

A Hands-Off Flow condition (HOF) states that if flow (in the river) falls below the level specified on the licence, the abstractor will be required to reduce or stop the abstraction.

Additional local information specific to this WRMU

There are no flow gauging stations on the Lliedi but flows (from spot gauging records) on this river showed a good correlation with the flow gauging station at Tir y Dail. Therefore data from Tir y Dail, together with spot gaugings from the Lliedi and computer model estimates were used to set the HOF on the Lliedi.

Table 5 How much water is available and for how long you can abstract it (in an average year).

Restriction/condition on abstraction	Amount of water available in MI/d	Number of days abstraction allowed (average year)	Explanation
Unconstrained abstraction	0	0	There is no unconstrained water available.
Once the unconstrained water has been licensed the HOF1 will be applied to new licences			
HOF1 = 4.5 MI/d (Q93)	0	0	There is no water available for consumptive abstraction with this constraint.
Once the HOF1 water has been licensed the HOF2 will be applied to new licences			
HOF2 = 8.2 MI/d (Q78)	0	0	As above.
Once the HOF2 water has been licensed the HOF3 will be applied to new licences			
HOF3 = 13.7 MI/d (Q61)	0	0	As above.

The quantities shown in Table 5 are accurate at the time this document was published and apply to the main rivers. For up to date information please contact us or look at the annual update of this information on our website at www.environment-agency.gov.uk/cams

Important local features that may affect water availability

Table 6 Presence of features that may affect water availability

Feature	Comment
Water related Special Area of Conservation (SAC) Carmarthen Bay and Estuaries	Requirements of species designated under the Habitats Directive will have to be considered and may affect the determination of new licences.
Water related Special Protection Area (SPA) Burry Inlet	Any potential to impact on the SPA will have to be considered and may affect the determination of new licences.
Water related Ramsar sites Burry Inlet	Any potential impact on the site will have to be considered and may affect the determination of new licences.

All new constrained non-consumptive licences may require a structure to be included at the point of abstraction to limit abstraction to periods of acceptable flow. This will ensure compliance with the HOF.

Issues for consultation

Question 1

We believe there are not sufficient resources in this WRMU to make additional water available for consumptive abstraction. Do you agree that we should not allow any further consumptive abstraction within this WRMU? If not, why not?

Question 2

Do you have any additional information about water resources in WRMU1?

4.2 Water Resource Management Unit 2 - Morlais, Gwili, Loughor (at tidal limit), Amman and Llan

Map 5 shows the location of sites and features that may affect abstraction licence/water availability. See also Table 9.

Our proposals

The water resource availability status of this WRMU is 'water available' at low flows. As shown in Table 7 the target status for this WRMU in 2013 is 'water available'.

The target status is the outcome of the sustainability appraisal process. If you want more information about the sustainability appraisal process and how we came to this decision please refer to Chapter 3 of the technical document.

Strategy for new and existing licences

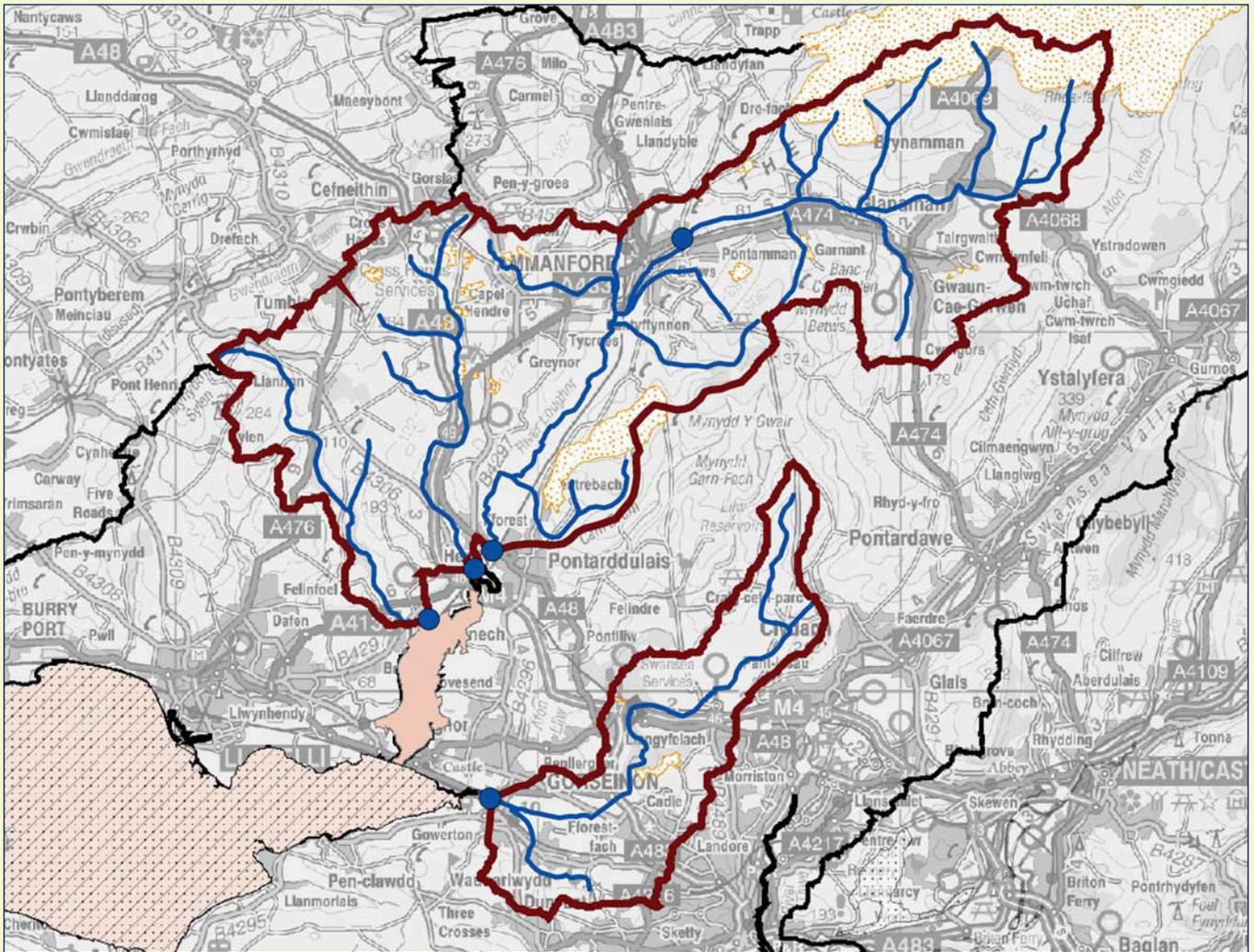
The strategy for this WRMU is to stay at 'water available'. This means that for **new** licences:

- We will consider unconstrained abstraction, both consumptive and non-consumptive, within this WRMU;
- We will consider abstractions for volumes of water above the available unconstrained volume but these will be restricted to protect low flows;
- New licences and variations to existing licences will be subject to a time limit of 31 March 2017 for the Llan catchment and 31 March 2018 for the Morlais, Gwili, Loughor and Amman catchments;

Table 7 Existing low flow resource availability status and target low flow resource availability status for the Morlais, Gwili, Loughor @ tidal limit, Amman and Llan Water Resource Management Unit.

Associated main river	Individual WRMU status	Resource Availability Status		Comment
		Target status in 2013	Target status in 2019	
Morlais, Gwili, Loughor @ tidal limit, Amman and Llan	Water available	Water available	Water available	

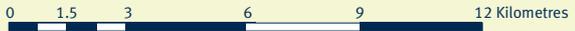
Map 5 Water resource management unit 2



Legend

-  WRMU2
-  Assessment Points
-  Water available
-  Carmarthen Bay & Estuaries SAC
-  Burry inlet SPA
-  Ramsar sites
-  SSSIs

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- There are SACs both within the WRMU and downstream of the WRMU which are not river sites but do have water requirements. Therefore we will need to take into account requirements of the Habitats Regulations which may mean more stringent restrictions than set out in the CAMS.

the outcome of the Habitats Directive Review of Consents. The type of change will depend on the degree of impact at the site and will be discussed at as early a stage as possible with the licence holder. Other minor changes, including the addition of water efficiency conditions, may also be made.

and for **existing** licences:

- There will be no impact on existing abstraction licences unless action needs to be taken as a result of the Habitats Directive Review of Consents identifying an adverse impact on designated sites;
- There is a presumption of renewal for existing time-limited licences;
- Renewals may be subject to changes determined by

How much water is available and what restrictions might apply

Table 8 gives an indication of how much water is available for further abstraction and the associated restrictions that may apply to **new** or **varied** abstraction licences from the main river. Tributaries to the main river may be subject to different restrictions and quantities. We will be able to advise you on this.

Table 8 How much water is available and for how long you can abstract it (in an average year).

Restriction/condition on abstraction	Amount of water available in Ml/d	Number of days abstraction allowed (average year)	Explanation
Unconstrained abstraction:			
Morlais	0.3 Ml/d	365	We will consider new consumptive, unconstrained abstractions up to 0.3 Ml/d on the River Morlais; 1.4 Ml/d on the River Gwili; 4.4 Ml/d on the River Loughor between Tir-y-Dail flow gauging station and the tidal limit; 0.9 Ml/d on the River Amman and 0.3 Ml/d on the River Llan. Unconstrained means you can abstract water all year round.
Gwili	1.4 Ml/d	365	
Loughor at tidal limit	4.4 Ml/d	365	
Amman	0.9 Ml/d	365	
Llan	0.3 Ml/d	365	
Once the unconstrained water has been licensed the HOF1 will be applied to new licences			
Morlais HOF 1 = 7.3 Ml/d (Q93)	0.8 Ml/d	339	We will consider new consumptive abstractions up to 0.8 Ml/d with a HOF of 7.3 Ml/d on the Morlais, 0.9 Ml/d with a HOF of 8.1 Ml/d on the Gwili, 6.8 Ml/d with a HOF of 97.1 Ml/d on the Loughor at tidal limit, 2.8 Ml/d with a HOF of 32.7 Ml/d on the Amman and 1.1 Ml/d with a HOF of 11 Ml/d on the Llan. With this condition you could abstract water for most of the year, except during times of very low flow.
Gwili HOF 1 = 8.1 Ml/d (Q93)	0.9 Ml/d	339	
Loughor @ tidal limit			
HOF 1 = 97.1 Ml/d (Q93)	6.8 Ml/d	339	
Amman HOF 1 = 32.7 Ml/d (Q93)	2.8 Ml/d	339	
Llan HOF 1 = 11 Ml/d (Q93)	1.1 Ml/d	339	
Once the HOF1 water has been licensed the HOF2 will be applied to new licences			
Morlais HOF 2 = 12.5 Ml/d (Q78)	1.2 Ml/d	284	We will consider new consumptive abstractions up to 1.2 Ml/d with a HOF of 12.5 Ml/d on the Morlais, 1.4 Ml/d with a HOF of 14.3 Ml/d on the Gwili, 10.2 Ml/d with a HOF of 142.6 Ml/d on the Loughor at tidal limit, 4.2 Ml/d with a HOF of 51.3 Ml/d on the Amman and 1.7 Ml/d with a HOF of 18.5 Ml/d on the Llan. With this condition you could still abstract water for the majority of the year, except during times of lower flow.
Gwili HOF 2 = 14.3 Ml/d(Q79)	1.4 Ml/d	288	
Loughor @ tidal limit			
HOF 2 = 142.6 Ml/d(Q80)	10.2 Ml/d	292	
Amman HOF 2 = 51.3 Ml/d (Q79)	4.2 Ml/d	288	
Llan HOF 2 = 18.5 Ml/d(Q79)	1.7 Ml/d	288	
Once the HOF2 water has been licensed the HOF3 will be applied to new licences			
Morlais HOF 3 = 20.5 Ml/d(Q61)	2.0 Ml/d	222	We will consider new consumptive abstractions up to 2 Ml/d with a HOF of 20.5 Ml/d on the Morlais, 2.3 Ml/d with a HOF of 23.6 Ml/d on the Gwili, 17.1 Ml/d with a HOF of 210.8 Ml/d on the Loughor at tidal limit, 7 Ml/d with a HOF of 79.1 Ml/d on the Amman and 2.8 Ml/d with a HOF of 29.9 Ml/d on the Llan. With this condition you could abstract water during times of medium to high flows.
Gwili HOF 3 = 23.6 Ml/d(Q62)	2.3 Ml/d	226	
Loughor @ tidal limit			
HOF 3 = 210.8 Ml/d(Q63)	17.1 Ml/d	230	
Amman HOF 3 = 79.1 Ml/d(Q62)	7.0 Ml/d	226	
LlanHOF 3 = 29.9 Ml/d(Q62)	2.8 Ml/d	226	

The quantities shown in Table 8 are accurate at the time this document was published and apply to the main rivers. For up to date information please contact us or look at the annual update of this information on our website at www.environment-agency.gov.uk/cams

Important local features that may affect water availability

Table 9 Presence of features that may affect water availability

Feature	Comment
Water related Sites of Special Scientific Interest (SSSI) Caeau Afon Gwili Caeau Ffos Fach Caeau Lotwen Broad Oak and Thornhill Meadows Felin Fach Meadows, Cwmgwili Gweunydd Glan-y-Glasnant and Cae Gwynfryn Caeau Blaenau-Mawr Caeau Capel Hendre Graig Fawr, Pontardulais Rhosydd Castell-Du and Plas-y -Bettws Caeau Nant Garenig Caeau Pant-y-Bryn Mynydd Du Tairgwaith Grasslands Penplas Grasslands	Specific water requirements of these sites may not be known at present but . these may have to be identified and protected in the future.
Water related Special Area of Conservation (SAC) Caeau Mynydd Mawr	Requirements of species designated under the Habitats Directive will have to be considered and may affect the determination of new licences.
Water related Special Protection Area (SPA) Burry Inlet	Any potential to impact on the SPA will have to be considered and may affect the determination of new licences.
Water related Ramsar sites Burry Inlet	Any potential impact on the site will have to be considered and may affect the determination of new licences.
Additional local features Cadle Heath Local Nature Reserve Candidate Sites of Importance for Nature Conservation (SINC)	Features of the sites would have to be considered in relation to any specific water requirements.

All abstraction licence applications will be subject to an assessment to take account of any local issues and will be granted on a first-come-first-served basis.

A Hands-Off Flow condition (HOF) states that if flow (in the river) falls below the level specified on the licence, the abstractor will be required to reduce or stop the abstraction.

Additional local information specific to this WRMU

The gauging station used to set the HOF on the Loughor is Tir y Dail flow gauging station. There are no gauging stations on any of the other rivers in this WRMU. Gauging stations in other WRMUs were used to set the HOF where there was an acceptable correlation with river flows in WRMU2 (obtained from spot gauging records). Modelled river flows were also used.

- River flows on the Morlais, Gwili, and Amman showed an acceptable correlation with Ynystanglws flow gauging station.
- River flows on the Llan showed an acceptable correlation with Tir y Dail flow gauging station.

Issues for consultation

Question 3

We believe there are enough resources in this unit to make additional water available for abstraction. Do you agree? If not, why not?

Question 4

Do you have any additional information about water resources in WRMU2?

4.3 Water Resource Management Unit 3 - Loughor (at Tir y Dail Flow Gauging Station)

Map 6 shows the location of sites and features that may affect abstraction licence/water availability. See also Table 12.

Our proposals

The water resource availability status of this WRMU is 'no water available' at low flows. As shown in Table 10 the target status for this WRMU in 2013 is 'no water available'.

The target status is the outcome of the sustainability appraisal process. If you want more information about the sustainability appraisal process and how we came to this decision please refer to Chapter 3 of the technical document.

Strategy for new and existing licences

The strategy for this WRMU is to stay at 'no water available'. This means that for **new** licences:

- There is no unconstrained water resource available so all new licences will be subject to restrictions;
- New licences will be restricted to prevent abstraction during approximately the lowest 20% of flows. A Hands-Off Flow condition will be included in any new licences to ensure lower flows are protected;
- Non-consumptive licences will be considered but could be subject to restrictions.
- New licences and variations to existing licences will be subject to a time limit of 31 March 2018 for the Loughor catchment;
- There are SACs both within the WRMU and downstream of the WRMU which are not river sites but do have water requirements. Therefore we will need to take into account requirements of the Habitats Regulations which may mean more stringent restrictions than set out in the CAMS.

and for **existing** licences:

- There will be no impact on existing abstraction licences unless action needs to be taken as a result of the Habitats Directive Review of Consents identifying an adverse impact on designated sites.

How much water is available and what restrictions might apply

Table 11 gives an indication of how much water is available for further abstraction and the associated restrictions that may apply to **new or varied** abstraction licences from the main river. Tributaries to the main river may be subject to different restrictions and quantities. We will be able to advise you on this. **All abstraction licence applications will be subject to an assessment to take account of any local issues and be granted on a first-come-first-served basis.**

A Hands-Off Flow condition (HOF) states that if flow (in the river) falls below the level specified on the licence, the abstractor will be required to reduce or stop the abstraction.

Additional local information specific to this WRMU

The gauging station used to set the HOF in this WRMU is Tir y Dail Flow Gauging Station. New constrained licences may require a structure to be included at the point of abstraction to limit abstraction to periods of acceptable flow. This will ensure compliance with the HOF.

Issues for consultation

Question 5

We believe that there are enough resources in this unit to make additional water available for abstraction. However, we propose to constrain any new licences to prevent abstraction at low flows. Do you agree with this approach? If not, why not?

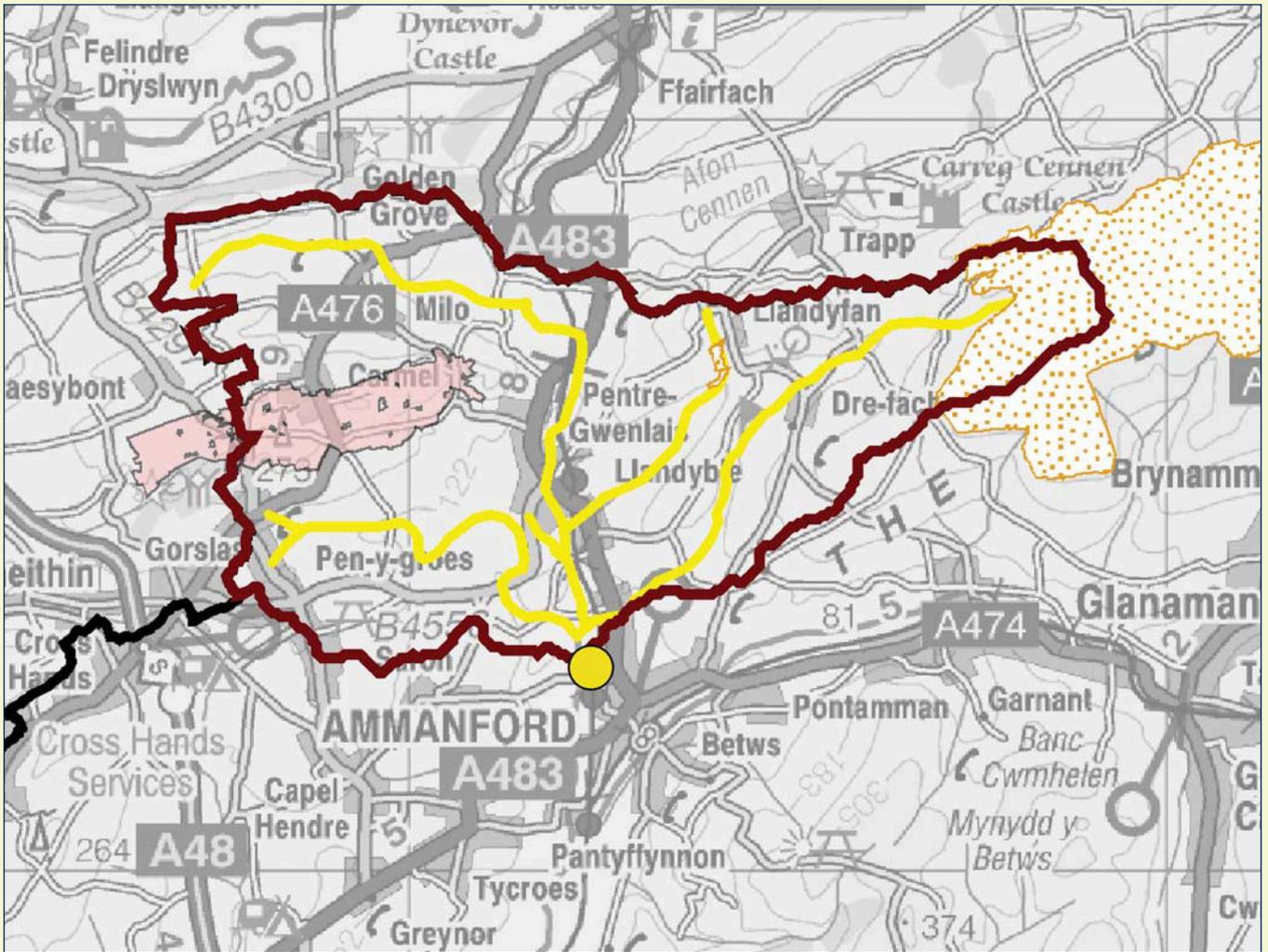
Question 6

Do you have any additional information about water resources in WRMU3?

Table 10 Existing low flow resource availability status and target low flow resource availability status for the Loughor Water Resource Management Unit.

Associated main river	Individual WRMU status	Resource Availability Status		Comment
		Target status in 2013	Target status in 2019	
Loughor at Tir y Dail flow gauging station	No water available	No water available	No water available	

Map 6 Water resource management unit 3



Legend

-  WRMU3
-  Assessment Point
-  No water available
-  Cernydd Carmel SAC
-  SSSIs

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0 0.5 1 2 3 4 Kilometres



Table 11 How much water is available and for how long you can abstract it (in an average year).

Restriction/condition on abstraction	Amount of water available in Ml/d	Number of days abstraction allowed (average year)	Explanation
Unconstrained abstraction	0	0	There is no unconstrained water available. Under the full licensed abstraction scenario there is a deficit of 4.6 Ml/d at Q95.
Once the unconstrained water has been licensed the HOF1 will be applied to new licences			
HOF 1 = 36.4 Ml/d (Q93)	0	0	There is no water available with this constraint.
Once the HOF1 water has been licensed the HOF2 will be applied to new licences			
HOF 2 = 50.7 Ml/d (Q80)	0.8 Ml/d	292	We will consider new consumptive abstractions up to 0.8 Ml/d with a HOF of 50.7 Ml/d. With this condition you could still abstract water for the majority of the year, except during times of lower flow.
Once the HOF2 water has been licensed the HOF3 will be applied to new licences			
HOF 3 = 72.2 Ml/d (Q63)	5.4 Ml/d	230	We will consider new consumptive abstractions up to 5.4 Ml/d with a HOF of 72.2 Ml/d. With this condition you could abstract water during times of medium to high flows.

The quantities shown in Table 11 are accurate at the time this document was published and apply to the main rivers. For up to date information please contact us or look at the annual update of this information on our website at www.environment-agency.gov.uk/cams

Important local features that may affect water availability

Table 12 Presence of features that may affect water availability

Feature	Comment
Water related Sites of Special Scientific Interest (SSSI) Cernydd Carmel Coed Llandyfan Mynydd Du	Features of some of these SSSIs will be considered under the Habitats Directive (see below) as they form part of the SACs listed below. Specific water requirements of these sites may not be known at present but these may have to be identified and protected in the future.
Water related Special Area of Conservation (SAC) Cernydd Carmel Carmarthen Bay and Estuaries	Requirements of species designated under the Habitats Directive will have to be considered and may affect the determination of new licences.
Water related Special Protection Area (SPA) Burry Inlet	Any potential to impact on the SPA will have to be considered and may affect the determination of new licences.
Water related Ramsar sites Burry Inlet	Any potential impact on the site will have to be considered and may affect the determination of new licences.
Additional local features Carmel National Nature Reserve	Features of the reserve would have to be considered in relation to any specific water requirements

Table 13 Existing low flow resource availability status and target low flow resource availability status for the Lliw Water Resource Management Unit.

Associated main river	Individual WRMU status	Resource Availability Status		Comment
		Target status in 2013	Target status in 2019	
Lliw	No water available	No water available	No water available	

4.4 Water Resource Management Unit 4 - Lliw

Map 7 shows the location of sites and features that may affect abstraction licence/water availability. See also Table 15.

Flows in the Lliw are heavily influenced by the Lliw reservoir. The initial resource availability status of this unit was calculated as 'over abstracted'. There are compensation flow releases made from the reservoir and these releases vary seasonally. These have been set to support the ecology downstream of the reservoir. Therefore we have overridden the resource availability status to 'no water available', however in this situation it means there is 'no water available' throughout the whole flow regime.

Our proposals

The water resource availability status of this WRMU is 'no water available' at low flows. As shown in Table 13 the target status for this WRMU in 2013 is 'no water available'.

The target status is the outcome of the sustainability appraisal process. If you want more information about the sustainability appraisal process and how we came to this decision please refer to Chapter 3 of the technical document.

Strategy for new and existing licences

The strategy for this WRMU is to stay at 'no water available'. This means that for **new** licences:

- No new consumptive abstraction licences will be granted at any flows;
- Non-consumptive licences would be considered, dependent on location, and may be subject to restrictions;
- New non-consumptive licences would have a time limit of 31 March 2017;
- Both a SAC and a SPA are located downstream of the WRMU. These are not river sites but do have water requirements. Therefore we will need to take into account requirements of the Habitats Regulations which may mean more stringent restrictions than set out in the CAMS.

and for **existing** licences:

- There will be no impact on existing abstraction licences unless action needs to be taken as a result of the Habitats Directive Review of Consents identifying an adverse impact on designated sites.

How much water is available and what restrictions might apply

Table 14 gives an indication of how much water is available for further abstraction and the associated restrictions that may apply to **new or varied** abstraction licences from the main river. Tributaries to the main river may be subject to different restrictions and quantities. We will be able to advise you on this. **All abstraction licence applications will be subject to an assessment to take account of any local issues and be granted on a first-come-first-served basis.**

A Hands-Off Flow condition (HOF) states that if flow (in the river) falls below the level specified on the licence, the abstractor will be required to reduce or stop the abstraction.

Additional local information specific to this WRMU

There are no flow gauging stations in this WRMU. River flows on the Lliw did not show an acceptable correlation with flow gauging stations in other WRMUs and so computer model estimates were used to produce the HOF.

Issues for consultation

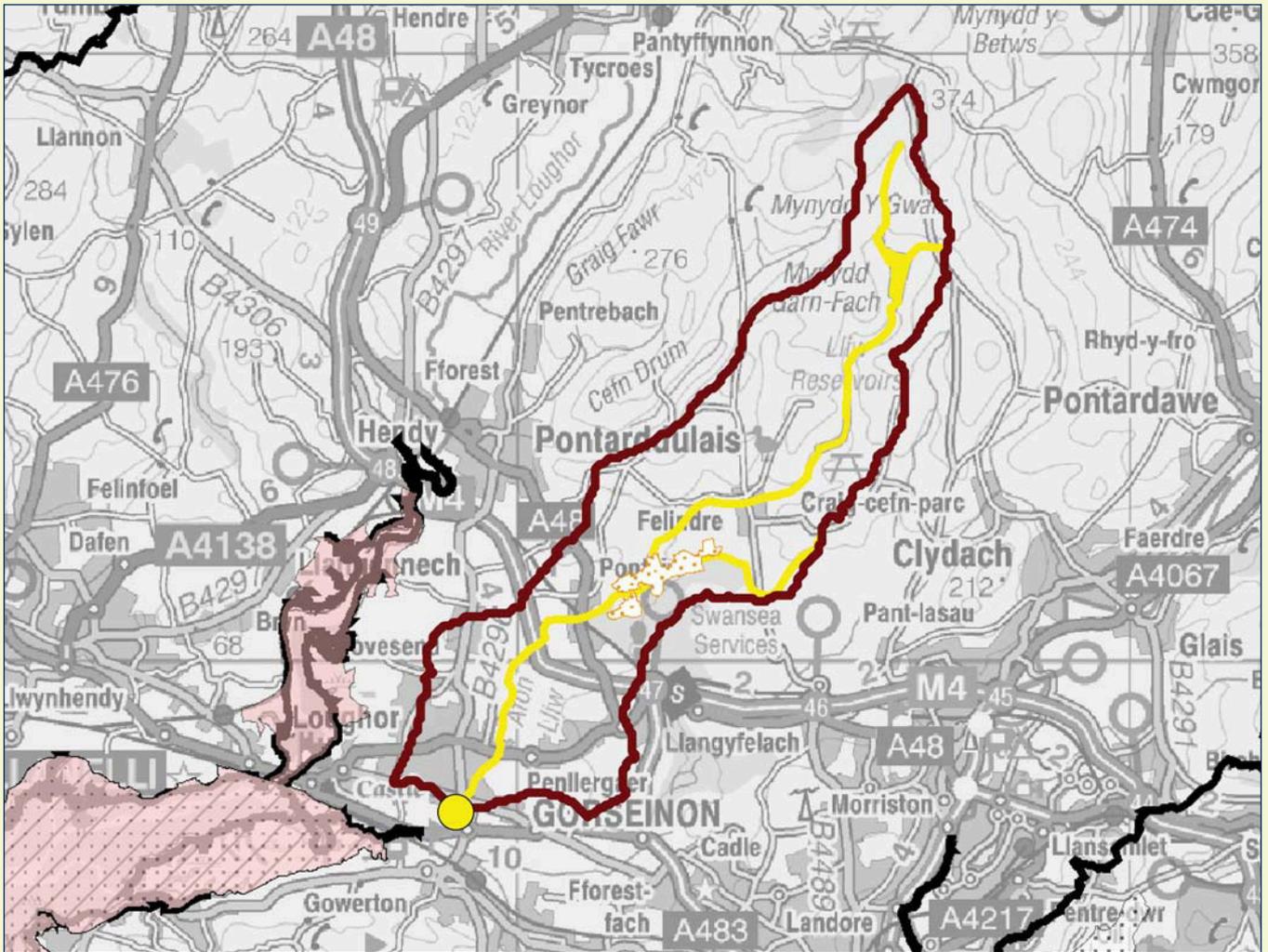
Question 7

We believe there are not enough resources to allow any new consumptive abstraction within WRMU4. Do you agree? If not, why not?

Question 8

Do you have any additional information about water resources in WRMU4?

Map 7 Water resource management unit 4



Legend

-  WRMU4
-  Assessment Point
-  No water available
-  Carmarthen Bay & Estuaries SAC
-  Burry inlet SPA
-  Ramsar sites
-  SSSIs

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0 0.5 1 2 3 4 Kilometres



Table 14 How much water is available and for how long you can abstract it (in an average year).

Restriction/condition on abstraction	Amount of water available in ML/d	Number of days abstraction allowed (average year)	Explanation
Unconstrained abstraction	0	0	There is no unconstrained water available for abstraction in this WRMU.
Once the unconstrained water has been licensed the HOF1 will be applied to new licences			
HOF1 = 10.2 ML/d (Q93)	0	0	There is no water available for consumptive abstraction within this WRMU.
Once the HOF1 water has been licensed the HOF2 will be applied to new licences			
HOF2 = 17.7 ML/d (Q80)	0	0	As above.
Once the HOF2 water has been licensed the HOF3 will be applied to new licences			
HOF3 = 28.9 ML/d (Q62)	0	0	As above.

The quantities shown in Table 14 are accurate at the time this document was published and apply to the main rivers. For up to date information please contact us or look at the annual update of this information on our website at www.environment-agency.gov.uk/cams

Important local features that may affect water availability

Table 15 Presence of features that may affect water availability

Feature	Comment
Water related Sites of Special Scientific Interest (SSSI) Nant-y-Crimp	Specific water requirements of the site may not be known at present but these may have to be identified and protected in the future.
Water related Special Area of Conservation (SAC) Carmarthen Bay and Estuaries	Requirements of species designated under the Habitats Directive will have to be considered and may affect the determination of new licences.
Water related Special Protection Area (SPA) Burry Inlet	Any potential to impact on the SPA will have to be considered and may affect the determination of new licences.
Water related Ramsar sites Burry Inlet	Any potential impact on the site will have to be considered and may affect the determination of new licences.
Additional local features Candidate Sites of Importance for Nature Conservation (SINC)	Features of the site would have to be considered in relation to any specific water requirements.

4.5 Water Resource Management

Unit 5 - Pennard Pill

Map 8 shows the location of sites and features that may affect abstraction licence/water availability. See also Table 18.

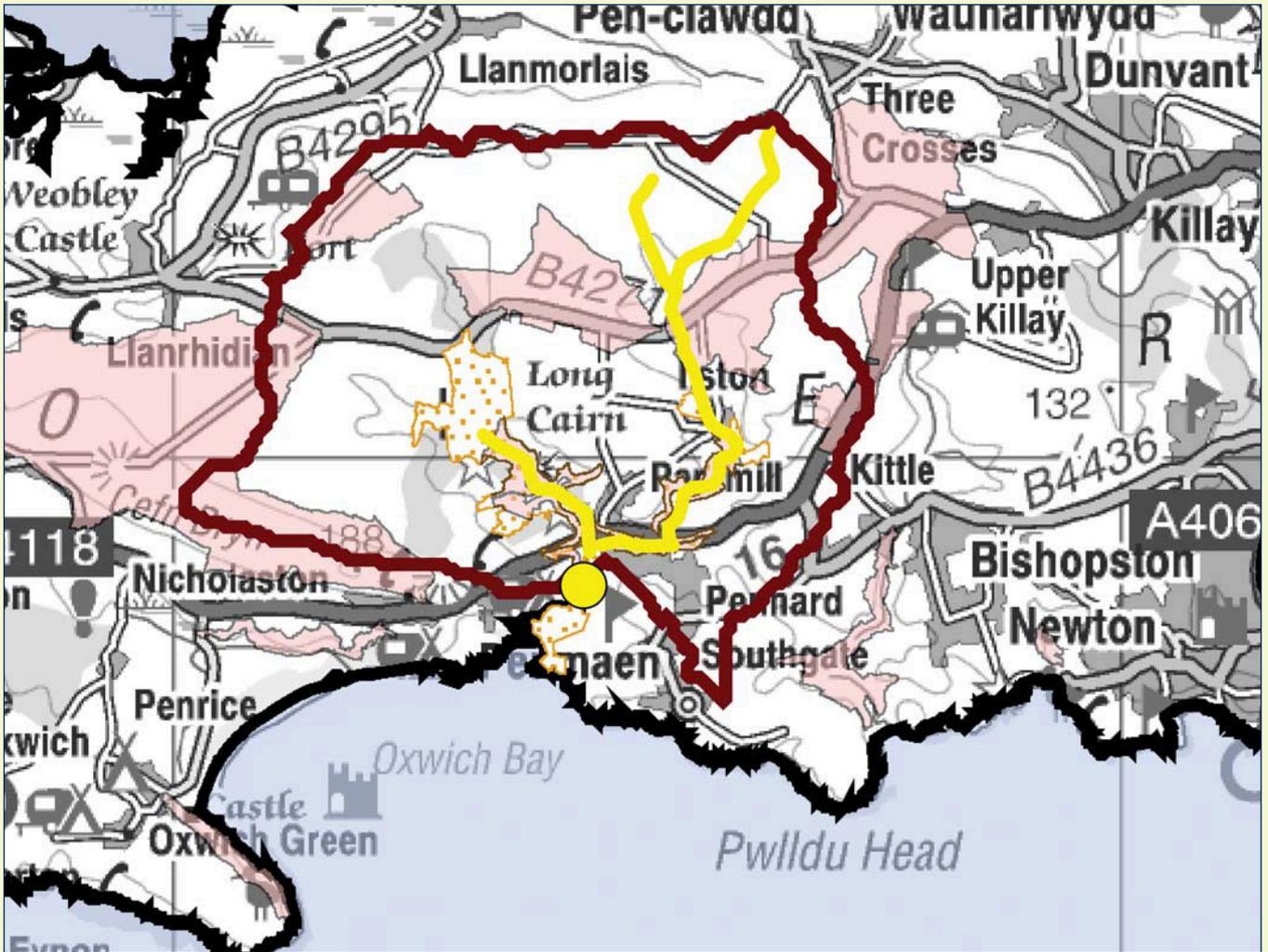
Our proposals

The water resource availability status of this WRMU is 'no water available' at low flows. As shown in Table 16 the target status for this WRMU in 2013 is 'no water available'.

Table 16 Existing low flow resource availability status and target low flow resource availability status for the Pennard Pill Water Resource Management Unit.

Associated main river	Individual WRMU status	Resource Availability Status		Comment
		Target status in 2013	Target status in 2019	
Pennard Pill	No water available	No water available	No water available	

Map 8 Water resource management unit 5



Legend

-  WRMU5
-  Assessment Point
-  No water available
-  SACs
-  SSSIs

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0 0.5 1 2 3 4 Kilometres





Pennard Pill

The target status is the outcome of the sustainability appraisal process. If you want more information about the sustainability appraisal process and how we came to this decision please refer to Chapter 3 of the technical document.

Strategy for new and existing licences

The strategy for this WRMU is to stay at 'no water available'. This means that for **new** licences:

- There is no unconstrained water resource available so all new licences will be subject to restrictions;
- New licences will be restricted to prevent abstraction during approximately the lowest 8% of flows. A Hands-Off Flow condition will be included in any new licences to ensure lower flows are protected;
- Non-consumptive licences will be considered but may be subject to restrictions.
- New licences and variations to existing licences will be subject to a time limit of 31 March 2018 for the Pennard Pill catchment.

and for **existing** licences:

- There will be no impact on existing abstraction licences unless action needs to be taken as a result of the Habitats Directive Review of Consents identifying an adverse impact on designated sites;
- There is a presumption of renewal for existing time-limited licences;

- Renewals may be subject to changes determined by the outcome of the Habitats Directive Review of Consents. The type of change will depend on the degree of impact at the site and will be discussed at as early a stage as possible with the licence holder. Other minor changes, including the addition of water efficiency conditions, may also be made.

How much water is available and what restrictions might apply

Table 17 gives an indication of how much water is available for further abstraction and the associated restrictions that may apply to **new or varied** abstraction licences from the main river. Tributaries to the main river may be subject to different restrictions and quantities. We will be able to advise you on this. **All abstraction licence applications will be subject to an assessment to take account of any local issues and will be granted on a first-come-first-served basis.**

A Hands-Off Flow condition (HOF) states that if flow (in the river) falls below the level specified on the licence, the abstractor will be required to reduce or stop the abstraction.

Additional local information specific to this WRMU

There are no flow gauging stations in this WRMU. River flows on Pennard Pill did not show an acceptable correlation with flow gauging stations in other WRMUs

Table 17 How much water is available and for how long you can abstract it (in an average year).

Restriction/condition on abstraction	Amount of water available in Ml/d	Number of days abstraction allowed (average year)	Explanation
Unconstrained abstraction	0	0	There is no unconstrained water available for abstraction in this WRMU. Under the full licensed abstraction scenario there is a Q95 deficit of 0.7 Ml/d.
Once the unconstrained water has been licensed the HOF1 will be applied to new licences			
HOF 1 = 6.3 Ml/d (Q91)	0.5 Ml/d	332	We will consider new consumptive abstractions up to 0.5 Ml/d with a HOF of 6.3 Ml/d. With this condition you could abstract water for most of the year, except during times of very low flow.
Once the HOF1 water has been licensed the HOF2 will be applied to new licences			
HOF 2 = 10.9 Ml/d (Q75)	1.4 Ml/d	273	We will consider new consumptive abstractions up to 1.4 Ml/d with a HOF of 10.9 Ml/d. With this condition you could still abstract water for the majority of the year, except during times of lower flow.
Once the HOF2 water has been licensed the HOF3 will be applied to new licences			
HOF 3 = 17.8 Ml/d (Q57)	3.4 Ml/d	208	We will consider new consumptive abstractions up to 3.4 Ml/d with a HOF of 17.8 Ml/d. With this condition you could abstract water during times of medium to high flows.

The quantities shown in Table 17 are accurate at the time this document was published and apply to the main rivers. For up to date information please contact us or look at the annual update of this information on our website at www.environment-agency.gov.uk/cams

Important local features that may affect water availability

Table 18 Presence of features that may affect water availability

Feature	Comment
Water related Sites of Special Scientific Interest (SSSI) Parkmill Woodlands and Llethrid Valley Courthouse Grasslands Fairwood, Pengwern and Welshmoor Commons Pennard Valley Rose Cottage, Llethrid	Features of some of these SSSIs will be considered under the Habitats Directive (see below) as they form part of the Gower Commons SAC listed below. Specific water requirements of these sites may not be known at present but these may have to be identified and protected in the future.
Water related Special Area of Conservation (SAC) Gower Commons	Requirements of species designated under the Habitats Directive will have to be considered and may affect the determination of new licences.

and so computer model estimates were used to produce the flows.

All new constrained licences may require a structure to be included at the point of abstraction to limit abstraction to periods of acceptable flow. This will ensure compliance with the HOF.

Issues for consultation

Question 9

We believe that there are enough resources in this unit to make additional water available for abstraction. However

we propose to constrain any new licences to prevent abstraction at low flows. Do you agree with this approach? If not, why not?

Question 10

Do you have any additional information about water resources in WRMU5?

4.6 Water Resource Management

Unit 6 - Tawe

Map 9 shows the location of sites and features that may affect abstraction licence/water availability. See also Table 21.

Our proposals

The water resource availability status of this WRMU is 'water available' at low flows. As shown in Table 19 the target status for this WRMU in 2013 is 'water available'.

The target status is the outcome of the sustainability appraisal process. If you want more information about the sustainability appraisal process and how we came to this decision please refer to Chapter 3 of the technical document.

Strategy for new and existing licences

The strategy for this WRMU is to stay at 'water available'. This means that for **new** licences:

- We will consider unconstrained abstraction, both consumptive and non-consumptive, within this WRMU;
- We will consider abstractions for quantities of water above the available unconstrained volume but these will be restricted to protect low flows;
- New licences and variations to existing licences will be subject to a time limit of 31 March 2017.

and for **existing** licences:

- There will be no impact on existing abstraction licences;
- There is a presumption of renewal for existing time-limited licences.

How much water is available and what restrictions might apply

Table 20 gives an indication of how much water is available for further abstraction and the associated restrictions that may apply to **new** or **varied** abstraction licences from the main river. Tributaries to the main river may be subject to different restrictions and quantities. We will be able to advise you on this.

All abstraction licence applications will be subject to an assessment to take account of any local issues and will be granted on a first-come-first-served basis.

A Hands-Off Flow condition (HOF) states that if flow (in the river) falls below the level specified on the licence, the abstractor will be required to reduce or stop the abstraction.

Consumptive abstraction on the river Tawe is restricted to 0.2Ml/d under the terms of the Tawe Barrage Hydropower Scheme abstraction licence consent to derogate.

The Agency is not allowed to issue a licence that will impact on the rights of a licensed abstraction downstream, without receiving a consent to derogate from the licence holder.

Occasionally when an abstraction licence is issued for a large percentage of the flow in a catchment, as for the Tawe Barrage Hydropower scheme, we will, at the time of issuing their licence, request that the licence holder provides us with a consent to derogate their rights up to an agreed volume. This volume can then be licensed in the catchment without the need for each prospective applicant to approach the licence holder who would be derogated.

See 'additional local information specific to this WRMU' below for further information.

Additional local information specific to this WRMU

The flow gauging station used to set the HOF in this WRMU is Ynystanglws.

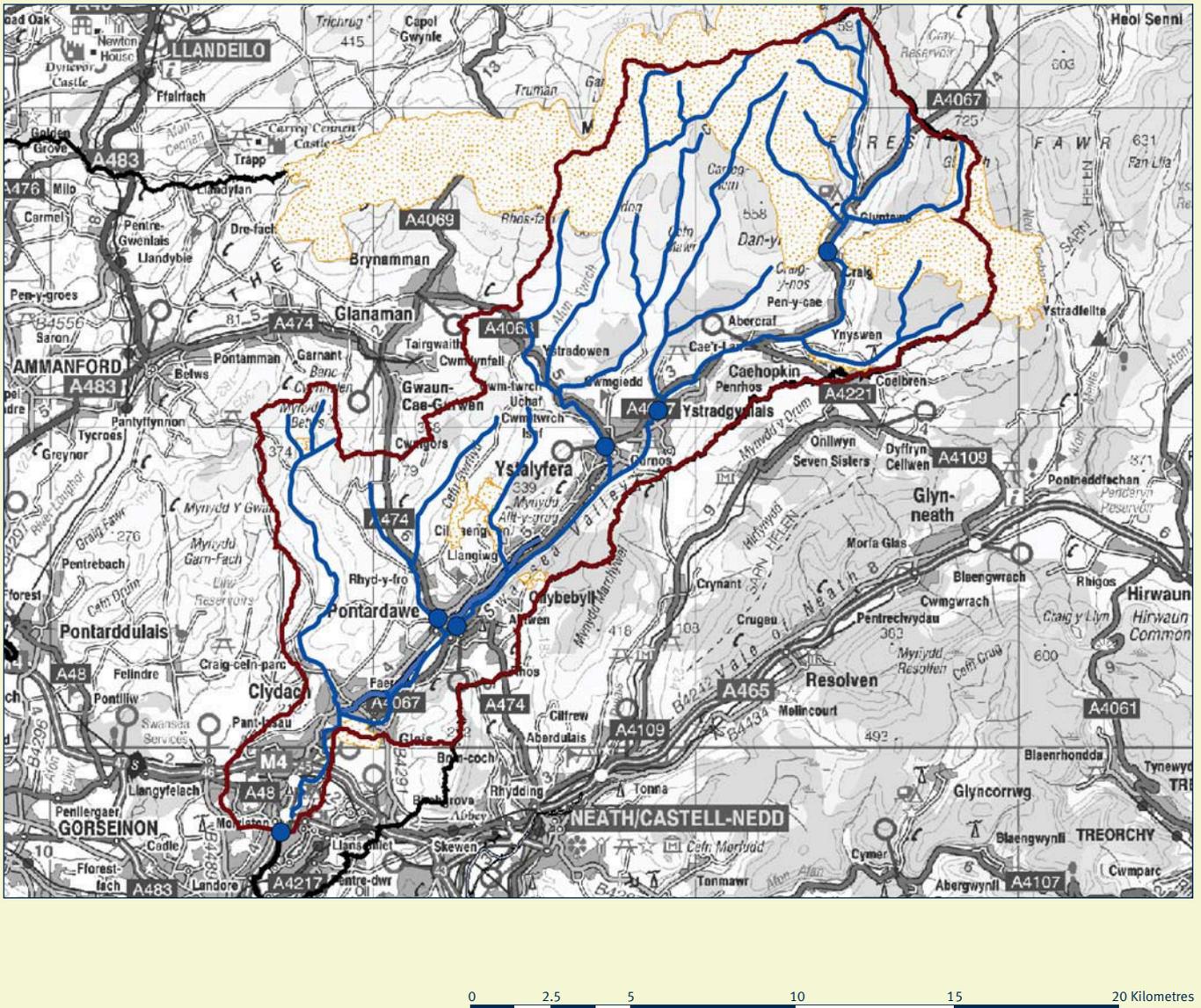
We will enforce restrictive conditions on new licences by monitoring flows at Ynystanglws flow gauging station. We will use this information to notify licence holders when they will have to stop abstracting due to low flows. In the upper reaches, and on smaller tributaries, it may not be appropriate to use this gauging station to impose HOF conditions. For new abstractions in these parts of the the catchments licence holder may have to install local control structures to limit abstraction.

Flows in the lower reaches of the Tawe are significantly enhanced by the discharges from several sewage treatment works. We have not made this additional volume available for licensing in this first cycle of CAMS. For this first assessment we have excluded this additional volume from our assessment of available resources within APs 10 and 11 in order to take a

Table 19 Existing low flow resource availability status and target low flow resource availability status for the Tawe Water Resource Management Unit.

Associated main river	Individual WRMU status	Resource Availability Status		Comment
		Target status in 2013	Target status in 2019	
Tawe	Water available	Water Available	Water Available	

Map 9 Water resource management unit 6



Legend

- WRMU6
- Assessment Points
- Water available
- Swansea canal
- SSSIs

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Table 20 How much water is available and for how long you can abstract it (in an average year).

Restriction/condition on abstraction	Amount of water available in Ml/d	Number of days abstraction allowed (average year)	Explanation
Unconstrained abstraction			
Tawe @Beaufort Weir	2.4	365	We will consider new unconstrained abstractions up to the volumes identified on the left.
Tawe u/s Upper Clydach confluence	1.5	365	
Upper Clydach	0.2	365	Unconstrained means you can abstract water all year round.
Tawe @Teddy Bear Br	2.4	365	
Twrch	1.1	365	
Tawe @Craig y Nos River	2.2	365	
Level Station (RLS)			
Unconstrained abstraction on the River Tawe	0.2	365	Under the terms of the existing consent to derogate we can only licence 0.2Ml/d without an applicant needing to obtain separate approval from the City and County of Swansea. Any volume in excess of 0.2Ml/d would require an applicant to obtain a consent to derogate from City and County of Swansea before we could licence the abstraction.(See 'Additional local information specific to this WRMU' below for more detail)
Once the unconstrained water has been licensed the HOF1 will be applied to new licences			
Tawe @Beaufort Weir	16.8	336	We will consider new abstractions with appropriate HOFs as identified on the left. With this condition you could abstract water for most of the year, except during times of very low flow.Under the terms of the consent to derogate we can only licence 0.2Ml/d without an applicant needing to obtain separate approval from the City and County of Swansea. Any volume in excess of 0.2Ml/d would require an applicant to obtain a consent to derogate from City and County of Swansea before we could licence the abstraction. (See 'Additional local information specific to this WRMU' below for more detail)
HOF 1 = 163 Ml/d (Q92)			
Tawe u/s Upper Clydach confluence	11.3	332	
HOF 1 = 86.7 Ml/d (Q91)			
Upper Clydach	0.8	339	
HOF 1 = 8.8 Ml/d (Q93)			
Tawe @Teddy Bear Br	4.6	339	
HOF 1 = 60.5 Ml/d (Q93)			
Twrch	2.5	339	
HOF 1 = 39.6 Ml/d (Q93)			
Tawe @Craig y Nos RLS	2.2	336	
HOF 1 = 29.9 Ml/d (Q92)			
Once the HOF1 water has been licensed the HOF2 will be applied to new licences			
Tawe @Beaufort Weir	28.1	277	We will consider new abstractions with appropriate HOFs as identified on the left. With this condition you could still abstract water for the majority of the year, except during times of lower flow. These quantities would not require a consent to derogate due to HOF.
HOF 2 = 253 Ml/d (Q76)			
Tawe u/s Upper Clydach confluence	18.3	274	
HOF 2 = 143 Ml/d (Q75)			
Upper Clydach	1.2	288	
HOF 2 = 14.2 Ml/d (Q79)			
Tawe @Teddy Bear Br	6.9	288	
HOF 2 = 91.3 Ml/d (Q79)			
Twrch	3.7	288	
HOF 2 = 56.2 Ml/d (Q79)			
Tawe @Craig y Nos RLS	3.3	285	
HOF 2 = 44.4 Ml/d (Q78)			
Once the HOF2 water has been licensed the HOF3 will be applied to new licences			
Tawe @Beaufort Weir	62.0	204	We will consider new abstractions with appropriate HOFs as identified on the left. With this condition you could abstract water during times of medium to high flows. These quantities would not require a consent to derogate due to HOF.
HOF 3 = 389 Ml/d (Q56)			
Tawe u/s Upper Clydach confluence	39.4	208	
HOF 3 = 227 Ml/d (Q57)			
Upper Clydach	2.0	226	
HOF 3 = 22.2 Ml/d (Q62)			
Tawe @Teddy Bear Br	11.6	223	
HOF 3 = 138 Ml/d (Q61)			
Twrch	6.2	223	
HOF 3 = 81 Ml/d (Q61)			
Tawe @Craig y Nos RLS	5.4	223	
HOF 3 = 66 Ml/d (Q61)			

The quantities shown in Table 20 are accurate at the time this document was published and apply to the main rivers. For up to date information please contact us or look at the annual update of this information on our website at www.environment-agency.gov.uk/cams

Important local features that may affect water availability

Table 21 Presence of features that may affect water availability

Feature	Comment
Water related Sites of Special Scientific Interest (SSSI) Cefn Gwrhyd-Rhydyfro; Hafod Wennol Grasslands; Cilybebyll; Coed Cwm Du-Cilmaengwyn; Gwrhyd Meadows; Frondeg; Craig y Rhiwarth; Mynydd Du; Nant Llech; Ogof Ffynnon Du-Pant Mawr; Rhos Hen Glyn Isaf; Waun Ton y Spyddaen; Rhos Hen-Glyn-Isaf; Ogof Ffynnon Ddu.	Specific water requirements of these sites may not be known at present but these may have to be identified and protected in the future
Additional local features 5 Candidate SINCS Dan-yr-Ogof National Nature Reserve Ogof Ffynnon Ddu National Nature Reserve	Features of the site would have to be considered in relation to any specific water requirements.
Consented discharges from Sewage Treatment Works (STWs).	Discharges from STWs enhance the natural flow in the Tawe. This additional volume could be licensed in future CAMS but for this cycle we have decided not to make this volume available in assessment points (APs) 10 and 11.
The Tawe Barrage Hydropower Scheme abstraction licence consent to derogate.	This agreement limits unconstrained, consumptive abstraction in the Tawe.

precautionary approach at low flows. The Tawe Barrage structure leads to water quality issues at low flows in the stretch between the barrage and the tidal limit. Air diffusers have been installed to help to resolve this problem. Taking this precautionary approach should ensure that additional abstraction does not exacerbate the water quality problem.

Although the volumes set out in Table 20 do not include the volumes from discharges, we believe the volumes available for licensing in this WRMU are sufficient to support demand for development over the period of this CAMS. We will review our approach in the next round of CAMS.

The water available for licensing within this unit is affected by the Tawe Barrage Hydropower Scheme abstraction licence. This licence is subject to a consent to derogate agreement between the City & County of Swansea and the Environment Agency.

Section 6 of this document explains how we assess how much water is potentially available for licensing and Table 20 gives an indication of quantities for this unit. However, under the terms of the consent to derogate only 0.2 Ml/d remains available for further unconstrained, consumptive abstraction in the Tawe catchment. Licensing volumes in excess of 0.2 Ml/d would be subject to agreement between the applicant and the City & County of Swansea. Without the agreement of the City & County of Swansea licensing,

volumes in excess of 0.2 Ml/d would be subject to a HOF condition of Q79. Please refer to Chapter 3 of the technical document for more information.

If you require more information on the impact of the consent to derogate on the licensing strategy, please contact us at the address given at the front of the document.

Issues for consultation

Question 11

We believe there are enough resources in this unit to make additional water available for abstraction. Do you agree? If not, why not?

Question 12

Do you consider that the surplus resources identified for the Tawe catchment will be sufficient to support development within the first cycle of CAMS?

Question 13

Do you have any additional information about water resources in WRMU6?

Summary of issues for consultation

We want you to be able to understand and contribute to the development of the Tawe, Loughor and Gower CAMS. That way we will, through an open and transparent process, develop a shared strategy for managing water resources. We welcome your comments on any part of the proposed licensing strategy set out in Section 3. A summary of the issues on which we are looking for a response are listed here.

All Water Resource Management Units

Do you have any specific concerns over any part of the proposed strategy?

What future issues within the area would you like to make us aware of?

Do you have any additional information about water resources in any of the WRMUs?

Water Resource Management Unit 1 - Lliedi

Question 1

We believe there are not sufficient resources in this WRMU to make additional water available for consumptive abstraction. Do you agree that we should not allow any further consumptive abstraction within this WRMU? If not, why not?

Question 2

Do you have any additional information about water resources in WRMU1?

Water Resource Management Unit 2 - Morlais, Gwili, Loughor @ tidal limit, Amman and Llan

Question 3

We believe there are enough resources in this unit to make additional water available for abstraction. Do you agree? If not, why not?

Question 4

Do you have any additional information about water resources in WRMU2?

Water Resource Management Unit 3 - Loughor at Tir Y Dail GS

Question 5

We believe that there are enough resources in this unit to make additional water available for abstraction. However, we propose to constrain any new licences to prevent abstraction at low flows. Do you agree with this approach? If not, why not?

Question 6

Do you have any additional information about water resources in WRMU3?

Water Resources Management Unit 4 - Lliw

Question 7

We believe there are not enough resources to allow any new consumptive abstraction within WRMU4. Do you agree? If not, why not?

Question 8

Do you have any additional information about water resources in WRMU4?

Water Resources Management Unit 5 - Pennard Pill

Question 9

We believe that there are enough resources in this unit to make additional water available for abstraction. However we propose to constrain any new licences to prevent abstraction at low flows. Do you agree with this approach? If not, why not?

Question 10

Do you have any additional information about water resources in WRMU5?

Water Resources Management Unit 6 - Tawe

Question 11

We believe there are enough resources in this unit to make additional water available for abstraction. Do you agree? If not, why not?

Question 12

Do you consider that the surplus resources identified for the Tawe catchment will be sufficient to support development within the first cycle of CAMS? If not, please explain why.

Question 13

Do you have any additional information about water resources in WRMU6?



5.0

These are the actions that we will undertake in the next six years to implement this strategy before it is reviewed in 2013.

Strategy actions

Table 22 outlines what we will do to assist in water resource management during the lifetime of the strategy.

Table 22 Actions to assist in water resource management

Description, aim and comments	WRMU/GWMU	Start	Finish	External partners
Hydrometric monitoring to improve the quality of flow data and the understanding of catchment hydrology. This will also help future assessment of abstraction impacts.	All WRMUs	Ongoing	Ongoing	
Routine monitoring of fisheries, invertebrates and plants to help identify any change in environmental impacts.	All WRMUs	Ongoing	Ongoing	
Increased groundwater level monitoring.	All WRMUs	Ongoing		
The development of additional Flow Gauging Stations within the CAMS area, resources permitted.	WRMUs 1, 2, 4, 5 and 6.			

6.0

The aim of CAMS is a shared strategy for the sustainable management of water resources within a catchment. We are also promoting a more consistent and structured approach to local water resource management. This applies to all CAMS that we are developing across England and Wales.

How this strategy was developed

6.1 Overview of the CAMS process

The same process is being used to develop all CAMS. There are five main stages in the production of a CAMS. These are:

1. An assessment of the water resource availability calculated using the Resource Assessment and Management Framework (RAM Framework);
2. An assessment of the pros and cons of the proposed water management strategy known as sustainability appraisal;
3. Consultation;
4. The publication of the CAMS;
5. Carrying out the strategy over the following six years.

An assessment of water resource availability - RAM Framework

This is a detailed investigation into water resource availability in each CAMS area. An assessment is made for a number of smaller units in each CAMS. The method we use to determine if water is available for abstraction is not open to consultation. Abstraction licence holders and interested parties are invited to provide information about the CAMS area that may inform our decision.

An assessment of the pros and cons of the proposed water management strategy - sustainability appraisal

This is a detailed investigation into the pros and cons that a number of management options will have on the

CAMS area. The impact on the economy, selected social criteria, natural resources and the environment are all considered during this process. The option that best meets the requirements of all four considerations is adopted as the management strategy for the CAMS.

Consultation

Consultation is an integral part of the CAMS process. It ensures that all interested parties can see clearly how this strategy is developed and have an opportunity to get involved. There are a number of occasions during the process that the public is invited to comment. Initially an awareness raising leaflet is produced to let people know that the CAMS for their area has been started. In the leaflet there is a general request for information to help us carry out the RAM Framework. A Stakeholder Group is set up with representatives from groups and individuals with an interest in the management of water in the catchment. The role of this group is to advise us during the process. This document offers you the chance to comment on our proposed strategy.

Publication and implementation of the CAMS

Following consultation the CAMS is finalised and published. The strategy is valid for six years and during this time changes to existing licences and new licences will be determined using the licensing policies set out in the CAMS strategy document, subject to the normal licensing considerations. After six years the strategy will be reviewed and updated. It will then be re-published and will again be valid for another six years. The CAMS

boundaries have recently been reviewed. For the next strategy the rivers in this CAMS will be merged with others to form a larger CAMS. For more information on merged CAMS refer to Managing Water Abstraction on the CD.

During the six-year period of the CAMS, we will review progress against the strategy. This will include a review of the process so those lessons that we learn can be incorporated into the production of new CAMS.

More detail on the resource assessment and sustainability appraisal for the Tawe, Loughor and Gower CAMS is provided in Section 6.2 and Section 6.3. The next section provides details about the Tawe, Loughor and Gower CAMS area.

6.2 Resource assessment and resource availability status

To manage water resources effectively, we need to understand how much water is available and where it is located. We do this by assessing resources, including surface water and groundwater.

We use water in many different ways. The most significant uses are general agriculture, spray irrigation, industrial use, power generation and water supply. For each different use, there may be great variation in the amount of water returned to the area from which the water was abstracted. Where water loss is high, we describe the abstraction as consumptive. This may restrict the availability of water for these purposes, unless a significant proportion of the abstracted water is returned to the water source close to the point of abstraction.

If you want to abstract water you need to know what water resources are available within a catchment and where abstraction for consumptive purposes is allowed. To provide this information we have developed a classification system. This gives a "resource availability status" and indicates:

- The relative balance between committed and available resources;
- Whether licences are likely to be available;
- Areas where abstraction needs to be reduced.

Licence applications still have to go through the normal licensing process. More information on this process is in Annexe 2 of Managing Water Abstraction on the CD.

There are four categories of resource availability status, as shown in Table 23.

We must ensure that we assess and manage water resources consistently. To do this we have adopted a standard approach for use in all CAMS areas.

To make the process as effective as possible we start by breaking down the CAMS catchment into smaller areas with similar characteristics - known as units. We then develop an understanding of the water resources in the area and assess the surface water and groundwater resources. We use all these results to determine the final status of each unit in terms of resource availability.

Depending on the nature of the CAMS, we give these units different names. Where groundwater resources are significant, they are called Groundwater Management Units (GWMU). For surface water, they are known as Water Resource Management Units (WRMU). These units are the focus of our assessments and our licensing of abstractions.

Table 23 Resource availability status categories at low flows.

Indicative resource availability status	Licence Availability
Water available	Water is likely to be available at all flows including low flows. Restrictions may apply.
No water available	No water is available for further licensing at low flows. Water may be available at higher flows with appropriate restrictions.
Over licensed	Current actual abstraction is such that no water is available at low flows. If existing licences were used to their full allocation they could cause unacceptable environmental damage at low flows. Water may be available at high flows, with appropriate restrictions.
Over abstracted	Existing abstraction is causing unacceptable damage to the environment at low flows. Water may still be available at high flows, with appropriate restrictions



Environmental monitoring, River Morlais

Resource assessment

Surface water assessment

Before we can assess the surface water resource, we have to decide how much of the river flow we want to protect - our ecological river flow objectives. These objectives are based on the sensitivity of the local ecology to variations in river flow. Or, to put it another way, how vulnerable the river is to the effects of removing water. We also take account of other flow needs. Once we know the minimum flow that we should aim to protect, we can calculate the amount of water that is available for abstraction. These assessments are undertaken at assessment points (APs) on the main rivers.

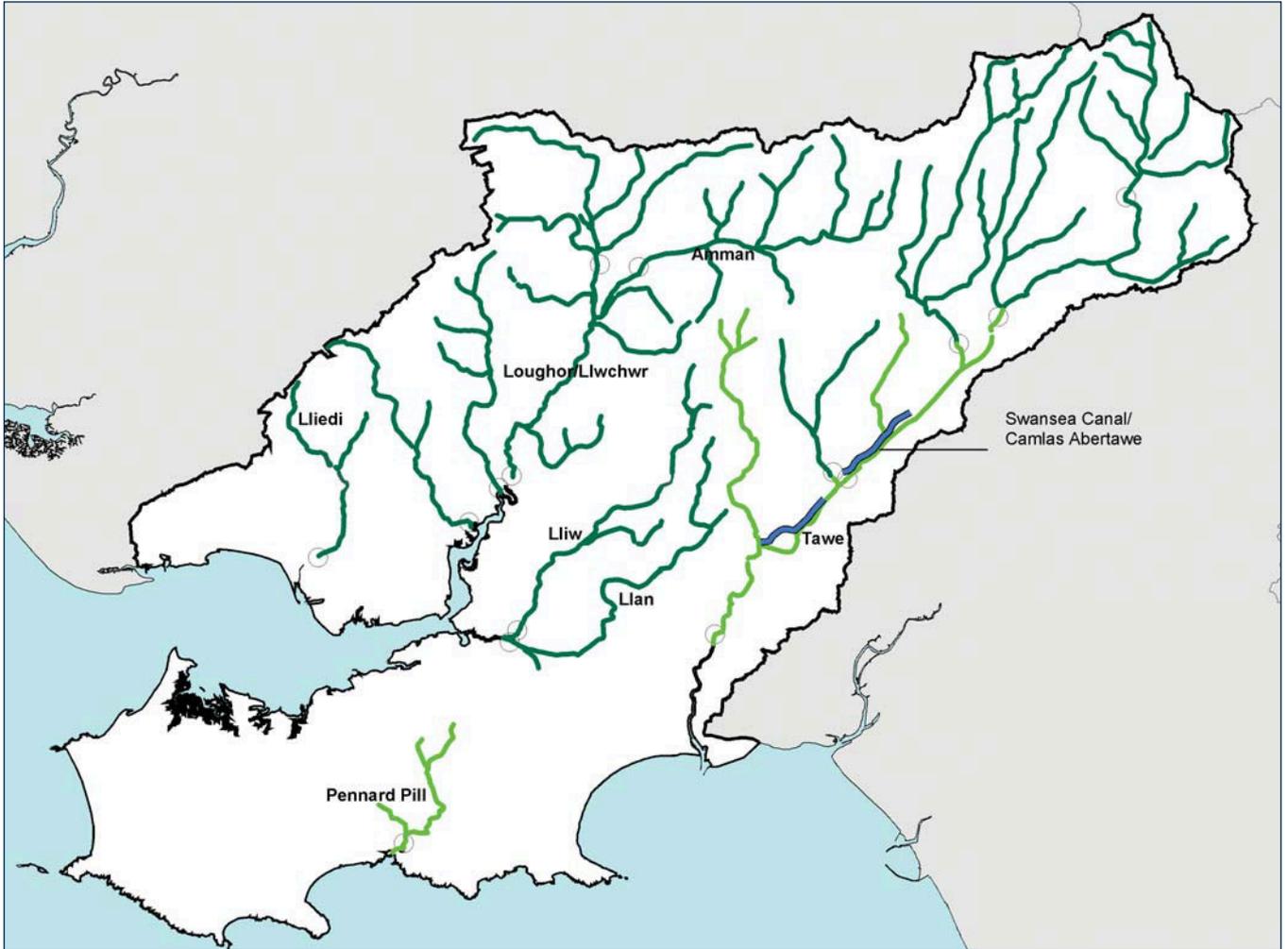
The first step is to give the reaches scores that represent their sensitivity to abstraction. The bands are Very High (VH), High (H), Moderate (M), Low (L) and Very Low (VL).

Table 24 and map 10 show the environmental weighting for each assessment point in the Tawe, Loughor and Gower CAMS area.

Table 24 Environmental weighting scores for each assessment point

Assessment point	Assessment point name	Environment weighting score
AP1	Lliedi upstream of Buckley's culvert	Very High
AP2	Morlais at tidal limit	Very High
AP3	Gwili at tidal limit	Very High
AP4	Loughor at tidal limit	Very High
AP5	Loughor at Tir y Dail FGS	Very High
AP6	Amman	Very High
AP7	Lliw at tidal limit	Very High
AP8	Llan at tidal limit	Very High
AP9	Pennard Pill at tidal limit	High
AP10	Tawe at Beaufort Weir	High
AP11	Tawe upstream of Upper Clydach confluence	High
AP12	Upper Clydach at Tawe confluence	Very High
AP13	Tawe at Teddy Bear Bridge	Very High
AP14	Twrch at Gurnos	Very High
AP15	Tawe at Craig y Nos RLS	Very High

Map 10 Environmental weighting scores for each assessment point



Legend

-  CAMS area
-  Assessment Points
-  Very High abstraction sensitivity
-  High abstraction sensitivity
-  Swansea canal

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0 1.5 3 6 9 12 Kilometres



Next we look at what would happen to river flows if all licences were fully utilised (i.e. the full licensed quantity was being abstracted). We compare the results with our river flow objectives. There will be either a surplus, a balance or a deficit.

This availability of water gives some indication as to whether new licences will be granted for the WRMU or whether we need to reduce water abstraction. However, there are significant variations in flow throughout the year. If we classify an area as over-licensed or over-abstracted, this generally indicates that no new licences will be granted. However, this applies only at times of low flow. When flows are higher, there may be some water available for abstraction. Our classification really relates to resource availability at low flow.

Variability of flow is necessary for many aquatic species. In order to maintain this flow variability, we sometimes include HOF conditions in our abstraction licences. These conditions require you to stop or reduce abstraction when the flow in the river falls below a specified quantity. When river flows are above this quantity, abstraction can take place. Low flows will occur more frequently during the summer months.

In order to maximise abstraction while maintaining the variability of flow, we stagger the quantities at which HOF conditions come into force. Licences are issued on a first-come, first-served basis. The first licences granted have the least restrictive HOF condition. As more licences are granted, more restrictive HOF conditions are used. This maintains variable flows in the river.

If you are thinking of applying for a new abstraction licence, you will want to know how likely the licence is to be granted, and to what extent any HOF condition would affect your right to abstract water. We show the likely impact of a HOF condition as a percentage. This indicates how much of the time you may be able to abstract water. It is based on the minimum amount of time over the long term that the scenario flow (the flow if all licences were fully utilised) exceeds our river flow objective (the level of river flow we wish to protect).

Our assessments assume that all licences are fully used. However, many licences are not used fully, so the real resource availability can be different. If we decide that an area is over-licensed, we use data from actual abstraction to establish whether the status should be over-abstracted - where actual flows are lower than our river flow objectives. In over-abstracted areas abstraction is already unsustainable. In over-licensed ones the classification represents the potential for damage should the full licensed amount be abstracted.

Rivers in the CAMS Area not covered by a WRMU

Some smaller coastal rivers have not been included in the WRMUs and have not been assessed using the CAMS resource assessment methodology. These rivers generally have a catchment area less than 20km² and a lack of hydrological and ecological data to support any assessment of resources. They also have a small number of abstraction licences present and are generally of a rural nature. The CAMS resource assessment is undertaken at a catchment scale with catchment significant resources. It is not a tool for smaller local assessments of smaller resources.

Tidal river reaches are also currently excluded from any assessment through the CAMS process. The hydrology and ecology of tidal waters would have to be assessed in a different way and this is currently outside of CAMS requirements.

As a result water resource availability has not been assessed for the following areas:

- The coastal area around Burry Port and Llanelli;
- The tidal reaches of the Loughor and Tawe;
- The majority of the Gower area, with the exception of Pennard Pill (WRMU5).

New abstractions in these areas outside of the WRMUs will be assessed on a case by case basis through the licence determination process (Section 3.1.1).

Groundwater assessment

To assess groundwater, five tests are proposed to determine groundwater resource availability. These are:

- Test 1: Comparison of inputs (recharge by rain and lateral groundwater flow) to outputs (abstraction and baseflow);
- Test 2: Comparison of environmentally acceptable summer baseflow to actual summer baseflow;
- Test 3: Observed trends in groundwater levels or quality;
- Test 4: Research, using historical maps or other evidence;
- Test 5: Optional local tests (in addition to the other tests) as a further check on the groundwater resource availability.

Integrating our assessments of surface water and groundwater

We integrate our results on resource availability for both the river reach and the GWMUs. This classification uses both the groundwater and surface water assessment results as well as subsequent checks.

GWMUs were not delineated within the Tawe, Loughor and Gower CAMS. This decision was made after taking into consideration the geology of the CAMS area, which is predominantly minor aquifers, and the relatively

small number of groundwater abstractions. This decision was also taken in line with Section 4.6 of the RAM Guidance Manual. For further information on groundwaters, including this section of the RAM Guidance, please refer to Chapters 2 and 3 of the technical document.

As no GWMUs have been assigned it has been assumed for this first CAMS cycle that groundwater abstractions have a 100 % impact on the river flows.

The results of the surface water assessment are available in the Tawe, Loughor and Gower CAMS technical document.

Description of each WRMU

Water Resource Management Unit 1

This WRMU comprises the Lliedi which has a catchment area of 20km². Its source rises on the slopes of Mynydd Sylen, south of Pontyberem, at 250m above sea level. The Lliedi then drains through the Upper Lliedi, then Cwm Lliedi reservoirs. From here it flows south, through western Llanelli, to the Loughor Estuary.

The river flows for this WRMU have been derived using current meter gaugings and computer modelled data. There are four licensed abstractions within this WRMU, for groundwater and surface water abstractions. The water company hold the largest abstraction, to supply untreated water to industry from surface waters. The flow regime within the WRMU is dominated by the operation of the Lliedi Reservoirs. Although there is no legal requirement or condition for any release to be made from the reservoir to provide a flow to the Lliedi, in practice some flows are maintained. The resource availability status for the WRMU is "over abstracted". Flows fail to meet the river flow objective for 95% of the time, which is on average 347 days per year.

Water Resource Management Unit 2

This WRMU consists of the Rivers Morlais, Gwili, the lower reaches of the Loughor from the tidal limit to Tir y Dail flow gauging station, the Amman and Llan (APs 2, 3, 4, 6 and 8).

The Morlais (AP2) rises at an altitude of 200m above sea level, 1km south of the village of Tumble. From here it flows south, through wooded valleys and agricultural land to the tidal limit between Hendy and Llangennech. It is 21km long, with a catchment area of 24 km². It is a very long, narrow catchment with no sizeable tributaries.

The Gwili (AP3) is 14 km from its source at Cross Hands, to the tidal limit at Hendy. The river flows from north to south and it's path is roughly followed by the A48 then the M4 motorway. Despite this, most of the 32km² catchment is rural, apart, that is, from the towns at either end.

The Amman (AP6) rises at Bylchau Rhos-fain in the Black Mountains, it passes through Brynamman to the south then turns to the west and flows through Glanamman, then Ammanford. Here it meets the Loughor (AP4). The river then continues through a gentler landscape, meandering along the valley bottom to the tidal limit and the start of the Loughor Estuary at Pontardulais. From source to the tidal limit the river is 23 km long.

The Llan (AP8) is located between the rivers Tawe and Loughor. It joins the Lliw at Gowerton before joining the river Loughor. The Llan rises at 260m above sea level on the slopes of Tor Clawdd. It is 19km long, and flows through the agricultural and forested catchment to Melin-Llan where it passes under the M4 motorway. From there to the tidal limit, the catchment is partially urban.

The river flows for this WRMU were derived from data provided by Ynystanglwys and Tir y Dail Flow Gauging Stations along with computer modelled data. There are seven licensed abstractions in this WRMU. These are for both surface water and groundwater abstractions. This WRMU has a resource availability status of "water available". Flows are above the river flow objective 100% of the time.

Water Resource Management Unit 3

This WRMU comprises the Loughor from its source, which rises at an altitude of 210m above sea level, 6km north-east of Ammanford, then flows through Ammanford to Tir y Dail Flow Gauging Station (AP5).

The river flows for this WRMU were derived from data provided by Tir y Dail Flow Gauging Station and naturalised daily mean flows (which removes any impacts of discharges and abstractions from the gauged flow). There are 5 licensed abstractions within this WRMU for both surface water abstractions and from groundwaters for water bottling. The largest licensed abstraction is for public water supply, but this has not been used in recent years. This WRMU has a resource availability status of "no water available". Flows fail to meet the river flow objective for 19% of the time (the lowest 19% of flows) which is on average 69 days.

Water Resource Management Unit 4

This WRMU comprises the Lliw (AP7) whose catchment is located between the rivers Tawe and Loughor. It joins the Llan at Gowerton before joining the river Loughor. The Lliw rises in open hill country, 2km upstream of the Upper Lliw Reservoir. It flows south through the Upper, then the Lower, Lliw reservoirs, then south-west to skirt Gorseinon before reaching the Estuary. The Lliw has a catchment area of 34km².



Paul Edwards, www.aspectsofwales.co.uk

Tawe valley from Craig-y-nos Country Park

The river flows for this WRMU were derived from computer modelled data.

There are only 2 licensed surface water abstractions within this WRMU. One is for a fish farm throughflow and the other is for potable water supply from the reservoir by the Water Company. The flow regime within the WRMU is dominated by the operation of the reservoirs. The initial resource availability status of this unit was calculated as 'over abstracted'. However, the compensation flow releases made from the reservoir vary seasonally and have been set to support the ecology downstream of the reservoir, so we have overridden the resource availability status to 'no water available'.

Water Resource Management Unit 5

This WRMU consists of Pennard Pill (AP9) which is made up of two main tributaries, the Killy Willy (also known as Ilston Stream) and Western tributary. The confluence of these tributaries is 0.5km upstream of the tidal limit. The total catchment area is 28km² and is mainly forested and agricultural.

The river flows for this WRMU were derived from computer modelled data.

There are only 3 licensed surface water abstractions within this WRMU. The largest abstraction is for public water supply, there is a small abstraction for a water mill and the other is a constrained abstraction for spray irrigation at a golf course. The resource availability status within this WRMU is "no water available". Flows fail to meet the river flow objective 8% of the time (the lowest 8% of flows) which is on average 29 days per year.

Water Resource Management Unit 6

This WRMU comprises of the River Tawe (APs 10, 11, 13, and 15), and its tributaries, the Upper Clydach (AP 12) and the Twrch (AP14). The Tawe has a total catchment area of 236km² and rises in the Black Mountain close to Llyn y Fan Fawr, at an altitude of 590m above sea level. It flows in a generally southerly direction to Glantawe, and the confluence with Nant Tywynni. The Tawe then flows through Craig y Nos Country Park, continuing in a south-westerly direction the river flows through Ystradgynlais to Ystalyfera, until it meets the Afon Twrch. There are many built up areas along the Tawe valley, including Pontardawe, Clydach, Trebanos and, of course, Swansea. The hills surrounding the middle and upper reaches are mainly utilised for forestry and agriculture, whereas the catchment of the lower reaches is urban. The two main tributaries of the Tawe are the Upper Clydach and the Lower Clydach and these join

the Tawe at Pontardawe and Clydach respectively. The river continues flowing south through Swansea to meet the sea next to the King's and Queen's Docks.

The river flows for this WRMU were derived from comparisons between computer modelled data and data provided by Ynystanglwys Flow Gauging Station and naturalised daily mean flows (which removes any impacts of discharges and abstractions from the gauged flow). There are 14 licensed surface water abstractions and 2 licensed groundwater abstractions within this unit. These abstractions are for various purposes including large and small industrial abstractions, water bottling, hydropower, spray irrigation and pond throughflows and top-ups. The resource availability status for this WRMU is "water available". Flows are above the river flow objective 100% of the time.

6.3 The sustainability appraisal

We have to make sure that the impact of our work is proportional to the benefits that the CAMS process brings. To do this we make an assessment against the government's four objectives for sustainable development, which relate to the environment, economy, society and resource use. We follow a largely qualitative approach to decide what the resource availability status for each water resource management unit should or could be at the end of each six-year cycle (Tier 1). We do this for all units in all CAMS areas. We also look at how we could improve water resources, by seeing how different options affect sustainability (Tier 2). We do this to determine the most sustainable options for managing the catchment in the future. Where necessary, these include options to recover resources. More information on the sustainability appraisal process is provided in Managing Water Abstraction, which is on the CD.

7.0

To help you understand some of the issues that we are asking you to comment upon - you may wish to know more about the character of the Tawe, Loughor and Gower catchments. This section contains background information on the Tawe, Loughor and Gower CAMS area. More detail can be found in the Tawe, Loughor and Gower CAMS technical document.

The Tawe, Loughor and Gower CAMS area

7.1 Introduction to the CAMS area

The Tawe, Loughor and Gower CAMS covers an area of approximately 587km². It encompasses a large part of Carmarthenshire and most of the City and County of Swansea. Small parts of Neath Port Talbot and Powys are also included around Ystalyfera and above Ystradgynlais respectively.

The CAMS area includes the catchments of the rivers Tawe, Loughor, Lliedi, Morlais, Gwili, Lliw, Llan and Pennard Pill. The Tawe catchment also hosts the Swansea Canal network which is supplied by an abstraction from the River Tawe at Panteg Weir. The canal structure runs from Godre'r-graig to Clydach but is culverted between Pontardawe and Trebanos.

The CAMS area is predominantly rural with much of the urban and industrial development concentrated around Swansea and Llanelli, and adjacent to the rivers in the Tawe and Amman Valleys.

The CAMS area supports a diverse range of natural habitats and includes parts of the Brecon Beacons National Park and the Gower Area of Outstanding Natural Beauty (AONB).

7.2 Hydrology

The CAMS rivers within the Tawe, Loughor and Gower CAMS area are: the Tawe and Pennard Pill, the Loughor and Amman, Lliedi, Morlais, Gwili, Lliw and the Llan. All are surface water dominated catchments.

The upper reaches of the Tawe catchment are formed from exposed limestone that provides heavy bed load from tributaries and has a rapid rate of rise. The steep upper reaches flatten out after Ystradgynlais to extensive flood plains.

Pennard Pill in the Gower is a heavily wooded catchment of predominantly undulating farmland before the river enters the sea at Three Cliffs Bay. The limestone catchment has a high run off in winter but often dries up in summer.

The upper Loughor catchment reacts very quickly to changes in river flows but dissipates below Ammanford where the river enters a broad flood plain. The Amman has a steep, stoney, limestone catchment that creates high bed load in floods.

The Morlais has a long, narrow, predominantly rural catchment with no sizeable tributaries whereas the Gwili is a flashy river with a steep catchment.

The Lliw and Lliedi have short, steep catchments which are balanced by the upstream reservoirs.

There are two flow gauging stations in the CAMS area. These are Tir y Dail on the Loughor and Ynystanglwyns on the Tawe. The annual mean flows at these gauging stations are 194 Ml/d (2.24 cumecs) and 1116 Ml/d (12.9 cumecs) respectively. There are eight level gauging stations throughout the CAMS area. Level gauging station records are not themselves used for the CAMS resource assessment, however, spot gaugings are often regularly taken at these sites, providing valuable information for deriving river flows.

There are 22 raingauges located throughout this CAMS area, the longest record dates back to 1909 at Victoria Park. Ten of the gauges are storage gauges, recording rainfall on a daily or monthly resolution. The 12 other gauges are 'tipping bucket', which record rainfall in 0.2 or 0.5mm 'tips'. Six of these gauges are connected to the telemetry system for use within the flood warning system.

7.3 Geology and Hydrogeology

The main aquifers in the Tawe, Loughor and Gower CAMS area comprise bedrock strata of the Coal Measures (Lower, Middle and Upper Measures), Carboniferous Limestone, Old Red Sandstone (ORS) (Brownstones, St Maughans and Raglan Mudstone Formations) and drift aquifers of fluvio-glacial deposits.

The groundwater supplies a component of baseflow to rivers either via spring discharges from valley sides or directly into the rivers. The current understanding of the hydraulic properties of the CAMS area is limited. However, given the nature of the strata it is anticipated that in general the permeability of the formations will be low and they will have a limited storage capacity. The groundwater flow is expected to be dominated by fractures within the Coal Measures and ORS and solution weathering (karstification) within the Carboniferous Limestone. Given the complex nature of the fractures and karstification and the limited understanding of the hydrogeological regime within the CAMS area, it is currently assumed that groundwater flow mirrors the topographical gradient and is bounded by structural features (fractures and faults) within the strata.

The drift aquifers are located within the base of the valley. These can be highly transmissive with a high storage capacity. The groundwater flow is believed to run perpendicular to the valley axis and discharge into the local river network.

The historical mining of the coalfield area has disrupted the natural groundwater flow regime due to extensive pumping of the mines to allow coal extraction. Investigations have been undertaken (by Wardell

Armstrong) to determine the degree of minewater recovery within the coalfield and to identify the potential locations for future emissions of minewater. They divided the South Wales Coalfield into blocks where connection between mines was known. There are four minewater blocks within this CAMS area and all have substantially recovered, but monitoring and inspections are still carried out to detect if new emissions have occurred.

7.4 Ecology, conservation and heritage

The high conservation value and diversity of wildlife in the CAMS area is reflected in the number of designated sites. There are 41 designated sites that have water related features, which include 36 Sites of Special Scientific Interest (SSSIs), 4 Special Areas of Conservation (SACs) and 1 Special Protection Area (SPA). The CAMS area also includes 3 National Nature Reserves (NNR), part of the Brecon Beacons National Park and the Gower Area of Outstanding Natural Beauty (AONB). The Lliedi, Loughor and Morlais Valleys are included within Special Landscape Areas designated within the Carmarthenshire Unitary Development Plan.

Carmarthen Bay and Estuaries SAC is designated for a number of species and habitats. These include otter, allis and twaite shad, river and sea lamprey and Atlantic salt meadows, estuaries, mudflats and sandbanks. Caeau Mynydd Mawr SAC (WRMU2) is designated for both species and habitat, namely the marsh fritillary butterfly and for its purple moor-grass meadows. Cernydd Carmel SAC (WRMU3) is designated for its habitats such as active raised bogs, turloughs and Northern Atlantic wet heaths. Gower Commons SAC is designated for both species and habitats which include southern damselfly, marsh fritillary butterfly, Northern Atlantic wet heaths and purple moor-grass meadows.

In addition to the water-related sites designated as SSSIs and SACs, there are many water dependent species and habitats on non-designated sites in the catchment. Many of these are recognised for their importance under the Countryside and Rights of Way Act 2000 (CROW 2000) (as amended), the EU Habitats Directive and the Local Biodiversity Action Plans. Species of note include otters, riverine birds, salmonids, brook lamprey, bullheads, bats, shad and water vole. Habitats of note include watercourses, bogs, fens, grazing marshes, wet woodland, reed beds and rush pastures.

There are 48 archaeological sites which have been designated as Scheduled Ancient Monuments (SAMs). Very few of these have a direct association with water with the exception of the following sites which are located within AP13: a canal aqueduct at Ystalyfera;



Panteg Fish Trap, River Tawe

remains of a lock and dry dock at Pantyffynnon; and a hut in the headwaters of the Tawe. However it is recognised that changes in water levels can affect undiscovered historic sites. For example, buried settlement remains, including buried ditches and rubbish pits, may lie below the water table and include waterlogged archaeological material.

7.5 Fisheries and angling

The rivers Tawe and Loughor are the most important brown trout and sea trout fisheries in the CAMS area. They are also important, although to a lesser extent, for their salmon. The upper reaches of both river catchments are important spawning grounds and juvenile rearing areas for both non-migratory and migratory salmonids.

The Tawe is a river recovering from an industrial heritage of pollution and the improving nature of the fishery reflects this. However, there are a number of limiting factors thought to be affecting fish stocks and these include natural and man-made obstructions to migration, gravel extraction and loss of habitat.

The Tawe Barrage, completed in 1992, has also impacted on fish migration. The original fish pass constructed within the barrage was found to be ineffective in assisting the passage of migratory salmonids and improvements to the fish pass were

completed in 2000. Water quality problems within the impoundment are also thought to have influenced salmonid migration and a remediation scheme to improve water quality was also completed in 2000.

Limiting factors thought to be affecting fish stocks on the Loughor include natural and man-made obstructions to migration, the affect of minewater discharges, sewage discharges and diffuse pollution on water quality, and habitat degradation.

Angling on the Tawe and the Loughor is controlled by a number of local angling clubs and these rivers are extensively fished. Local anglers do most of the fishing throughout the CAMS area, however, tourists and visiting anglers make a valuable contribution to the local economy. It has been estimated that anglers fishing for salmon and sea trout in Wales annually spend £3.4 million. It has been estimated that anglers fishing for salmon and sea trout have in recent years spent around £124 000 per annum on the Tawe and £70 000 per annum on the Loughor (figures on Anglers expenditure obtained from the Tawe and the Loughor Salmon Action Plans). This expenditure is particularly important for the local economy.

The lower reaches of the Gwili and Morlais are also good sea trout and brown trout fisheries, with the occasional salmon, and provide important spawning grounds and juvenile rearing areas for salmonids.

The Lliw, Llan, Lliedi and Pennard Pill all support resident brown trout populations with little angling activity. The Lliw, Llan and Pennard Pill support small runs of sea trout and the odd salmon, and provide important spawning grounds and juvenile rearing areas for brown trout and sea trout. The Lliedi is a good brown trout fishery and the Upper Lliedi reservoir is heavily stocked by local angling clubs as a put and take fishery.

Lamprey (resident and migratory), shad (migratory) and bullhead are some other resident species in some of the rivers.

The importance of fisheries in Wales generally is being recognised by the Welsh Assembly Government (WAG) who currently provide additional funding for fisheries improvement work as part of the Sustainable Fisheries Programme. The Environment Agency has recently delivered the partnership Objective 1 funded initiative 'Fishing Wales'. These projects have begun to tackle some of the major issues currently affecting our local fisheries. The main aim of this work has been to improve the contribution angling makes to the economy and local communities.

Since 2003, over £80 000 has been invested in the Tawe, Loughor and Gower catchments. This work has included major development and restoration works at Penllergaer pond and Fendrod Lake in Swansea. New angling platforms have been built on the Tawe and Loughor rivers, Clyne Pond and Gateway Fishery in Llanelli. Migratory fish access has been improved at the Amman/Loughor confluence by slowing water over a bridge apron to aid fish passage. 2.7km of bankside habitat has been improved, including schemes on the Marlais, Nant Gwrlais and Lower Clydach.

7.6 Water quality

The Environment Agency undertakes water quality monitoring across England and Wales. The General Quality Assessment (GQA) classifies the water quality of rivers. The GQA provides an assessment of current water quality and identifies any changes that may have occurred over time. It considers both the chemical and biological quality of the watercourses.

Most of the sites surveyed in the CAMS area have either 'very good' or 'good' chemical and biological quality and achieve the river quality objective. 100% of classified stretches fall within the River Ecosystem classifications 1 ('very good') or 2 ('good').

There are a small number of sites on the Amman and one tributary of the Tawe that have poor water quality and do not achieve the river quality objective. Poor water quality on the Amman has been associated with mine water and sewage discharges. Treatment systems

to improve these are currently being installed. Acidification in the headwaters and localised sheep-dip pollution also contribute to poor water quality. Poor water quality on the tributary of the Tawe has been associated with low flows as a result of the upstream reach being channelled.

7.7 Water abstraction

There are 7 licensed groundwater abstractions and 30 licensed surface water abstractions within the Tawe, Loughor and Gower CAMS resource assessment area, as outlined by the WRMUs. A number of abstractions, including the Tawe Barrage Hydropower Scheme abstraction, fall outside of these assessed areas. The location and range of abstraction volumes is shown in Map 11.

The following paragraphs provide a breakdown of the various licences within the CAMS WRMUs.

Approximately 99% of the licensed abstractions are from surface waters. Approximately 70% of these resources are taken for non-consumptive purposes, which means the water is returned to the river a short distance away (refer to figures 1 and 2).

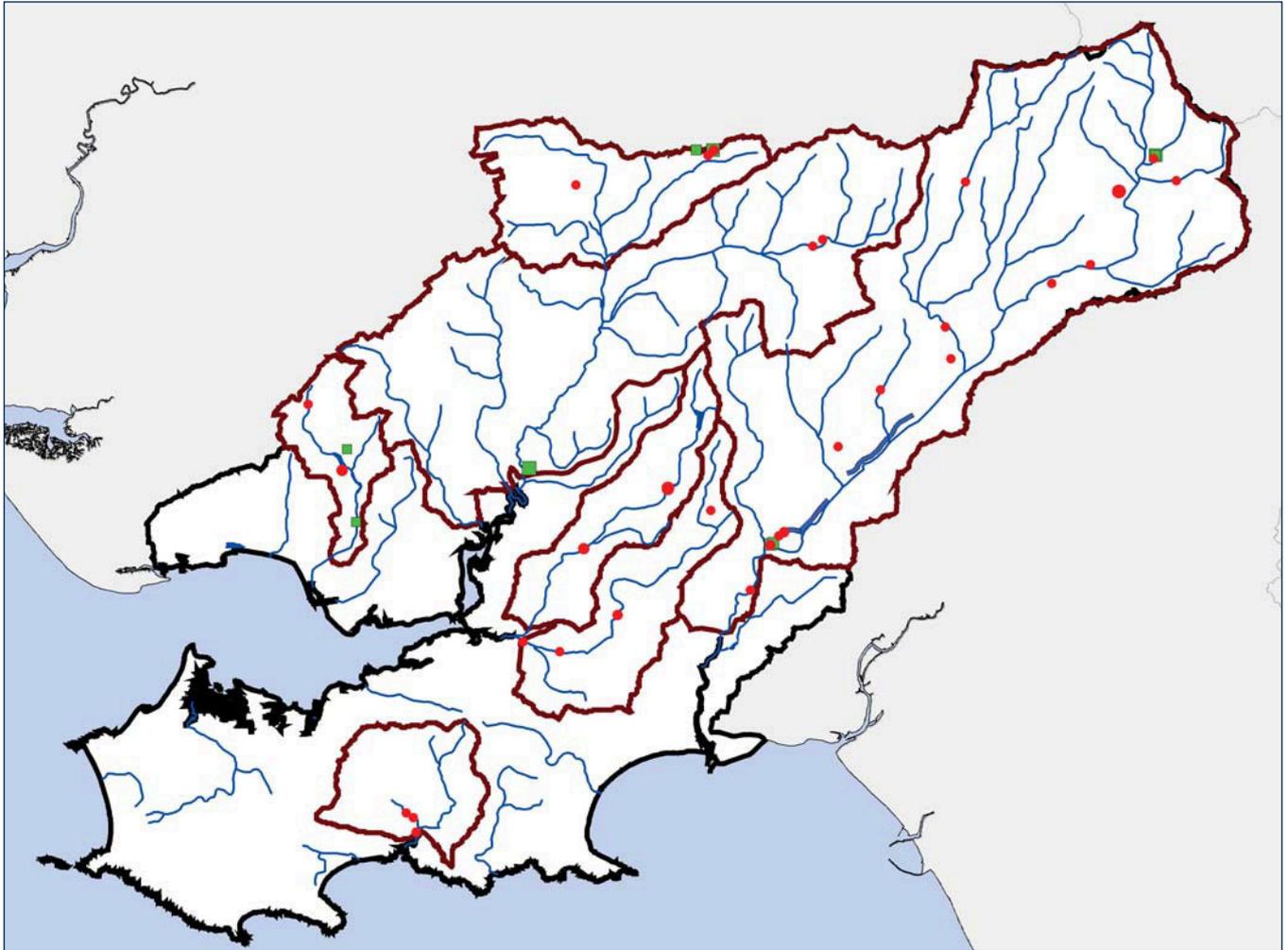
The largest abstraction is non-consumptive for a hydropower scheme at the top of the Tawe catchment and equates to approximately 46% of the total licensed abstraction volume. The Water Company abstractions equate to approximately 28% of the total consumptive abstraction volume. These surface water abstractions are for public water supply and also raw water for industrial purposes (refer to figure 3).

Industry equates to approximately 10% and the majority of this is for non-consumptive purposes. The largest industrial abstractors in the CAMS area are INCO who abstract from the River Tawe, and British Waterways who abstract from the Swansea Canal in order to supply INCO.

Approximately 15% of the total licensed volume is for pond throughflows, which is another non-consumptive purpose. Private water supplies, water bottling from groundwaters, other small general abstractions and the recently deregulated groundwater and surface water abstractions (for which we currently have records) equate to approximately 1% of the total licensed volume.

Within WRMU6 there is the potential for an additional abstraction from the River Tawe to the Swansea Canal for navigation; currently an exempt purpose. The abstraction for navigation is not presently utilised and is unlikely to be used in the near future.

Map 11 Licensed abstractions within the Tawe, Loughor and Gower CAMS water resource management units.



Legend

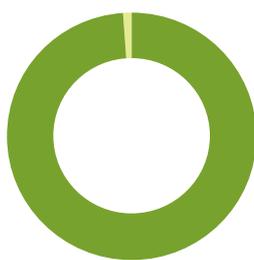
- Surface water abstractions
- Groundwater abstractions
- CAMS rivers
- Swansea canal
- Water Resource Management Units

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0 2 4 8 12 16 Kilometres

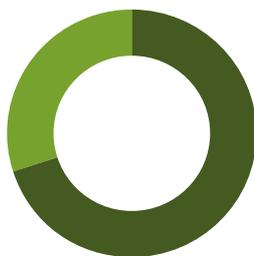


Figure 1 Surface water and Groundwater abstractions



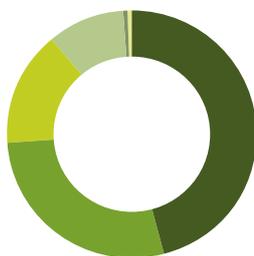
- SW abstractions (99%)
- GW abstractions (1%)

Figure 2 Consumptive & non consumptive abstractions



- Consumptive abstractions (30%)
- Non consumptive abstractions (70%)

Figure 3 Abstraction breakdown



- Water company abstractions (4 licences 28%)
- Amenity/other abstractions (8 licences 0.5%)
- Water bottling (8 licences 0.5%)
- Hydropower (1 licence 46%)
- Industry (10 licences 10%)
- Pond throughflows (6 licences 15%)

7.8 Recreation and tourism

Much of the recreation and tourism within the Tawe, Loughor and Gower CAMS area relates to the landscape and outdoor pursuit activities. Although water-related tourism is popular around the coastal areas, it is almost entirely sea and estuary based and tends not to be directly associated with the rivers in the CAMS area. It is recognised that tourism, at all scales, is important to the local economy.

Water based recreation is, however, undertaken at the Lliw and Lliedi reservoirs where activities such as sailing and canoeing take place and canoeing and kayaking have been reported on parts of the River Tawe. Other activities include fishing, cycling, golf, walking and bird watching.

The Gower Heritage Coast attracts large numbers of visitors due to its beautiful beaches and Area of Outstanding Natural Beauty (AONB) status. The Brecon Beacons National Park now forms part of the recently appointed Fforest Fawr Geopark which promotes sustainable tourism and development. The area's unique geological heritage is promoted in order to aid cultural revitalisation. Dan yr Ogof Show Caves, Craig y Nos Country Park, National Wetlands Centre Wales and the Millennium Coastal Park at Llanelli are other popular tourist destinations.

7.9 Industry and agriculture

Most of the industry within the Tawe, Loughor and Gower CAMS is concentrated around Swansea, Llanelli, and adjacent to the rivers in the Tawe and Amman Valleys. Swansea is known as Wales' second city and is a centre for commerce and light industry.

The Loughor and Gower catchments are dominated by agriculture, which is often supported by small exempt local abstractions. However, there are also a small number of licensed abstractions for spray irrigation.

The demand for water within the CAMS area is varied and includes abstractions for industry, agriculture, golf courses, public water supply and water bottling. Local industries, such as the steel works and brewery in Llanelli and the nickel and aluminium producers in the Swansea area, require water resources in order to operate and form an integral part of the local economy and community. Industry, agriculture and tourism are all of economic importance to the area.

7.10 Climate change

The latest UK Climate Impacts Programme (UKCIP) 2002 climate change scenarios indicate wetter winters and drier summers by the 2020s. Our water resources strategy includes consideration of the impact of climate

change on supply and demand for water across Wales. Water company water resources plans also consider the impact of climate change. New climate change scenarios by UKCIP will be published in 2007/08 and the results will inform our next water resources strategy.

7.11 Future developments in the CAMS area

The major developments in the CAMS area are the SA1 Swansea Waterfront project at Swansea Docks and the Llanelli Waterside development. The SA1 project includes large residential areas. Development at both SA1 and Llanelli Waterside include commercial, leisure/tourism, residential and educational premises, while manufacturing as well as processing industries are included in the development in the Llanelli Waterside area.

Other significant developments are proposed at Swansea Vale, Felindre, Ammanford, Dafen and Cross Hands and include office, manufacturing and processing industries. There is a small amount of residential development at Swansea Vale.

These developments will require a reliable water supply. Developers may seek abstraction licences from the Environment Agency for direct abstraction from rivers and groundwater or they may seek to secure water supplies from the Water Company. In its current water resources plan, Dŵr Cymru Welsh Water (DCWW) has forecast that it has sufficient water available to meet demand for water in this CAMS area for the next 25 years. However, the company is revising its forecasts in preparation for publishing a new water resources plan in 2009. Developers should discuss their proposals with the Water Company before making assumptions about water supply availability.

It is crucial that early discussions take place between developers and the Environment Agency or Water Company, in order to understand any issues that may constrain the amount of water available for development.

7.12 Links with other plans

There are various other plans and initiatives linked to the management of water resources. We are responsible for some but not all of these. Those most directly linked to CAMS are listed below. There are more details on these and other initiatives in the Tawe, Loughor and Gower CAMS technical document.

- Environment Agency Wales' Creating a better place
- Environment Agency Wales' Our local contribution
- Environment Agency's Managing Water Abstraction
- Environment Agency Wales' Water Resources Strategy
- Environment Agency Wales' and Water Company

Drought Plans

- Restoring Sustainable Abstraction (RSA) programme
- Local Biodiversity Action Plans (LBAPs)
- Draft Unitary Development Plan for City & County of Swansea
- Unitary Development Plan for Carmarthenshire
- Dŵr Cymru Welsh Water's Water Resource Plan
- Tawe and Loughor Salmon Action Plans
- Water Framework Directive River Basin Management Plans
- Swansea Environment Strategy
- Wales Spatial Plan

Once the final Tawe, Loughor and Gower CAMS Document and technical document are produced they will provide a reference for other Environment Agency initiatives and a source of information for external organisations in the development of their plans and strategies.

7.13 Environment Agency national and regional water resources strategies

In March 2001 the Environment Agency issued Water resources for the future: a strategy for England and Wales our national water resources strategy. The national strategy defines a strategic framework for water resources management, including abstraction licensing, with a forward look of 25 years.

It is based on the following key principles:

- Sustainable development
- The 'twin track' approach, which takes a balanced view, seeking the efficient use of water whilst bringing forward timely proposals for resource development where appropriate
- Robustness to uncertainty and change - we must consider all the options and adopt a flexible approach
- The precautionary principle - where there is uncertainty about the consequences, decisions should be cautious and we should seek to clarify the source of uncertainty. If there is a serious risk of environmental damage because of a proposed abstraction, the decision about that abstraction should ensure that the environment is protected. It also applies to a serious risk of failure of public water supply, which would be unacceptable in terms of its social and perhaps economic impacts.

To complement the National Water Resources Strategy, Environment Agency Wales launched Water resources for the future: a strategy for Wales, which defines the regional water resources strategy. The strategy identifies specific proposals and targets for developing and managing water resources sustainably in Wales.

² Water resources for the future: a strategy for England and Wales, Environment Agency, 2001

8.0

To help you understand some of the proposed changes we are making to abstraction management you may wish to know more about our existing licensing strategy in the catchment. This section outlines our existing licensing strategy.

Existing licensing strategy in the Tawe, Loughor and Gower CAMS area

Existing licensing strategy

There is no formal licensing strategy for the Tawe, Loughor and Gower CAMS area. Licences are currently determined on an individual basis under the Environment Agency's abstraction licensing system, in line with the statutory requirements of the Water Resources Act 1991, now amended by the Water Act 2003. More information on the licence determination process is provided in Annexe 2 of Managing Water Abstraction: the Catchment Abstraction Management Strategy Process on the CD.

The following issues are generally considered when determining a licence application within the Tawe, Loughor and Gower CAMS area.

New or increased abstractions would be assessed on a site-specific basis. These abstractions may be licensed but with HOF conditions set to protect the lowest flows where necessary.

The current policy is that new abstraction licences will be time limited to 31 March 2017 for the river Tawe and 31 March 2018 for the remaining rivers. This applies to nearly all new licences. Very small abstractions (abstractions of less than 20 cubic metres a day) are exempt from licensing requirements.

Licences for additional consumptive abstraction in the Tawe catchment will be granted subject to the Tawe Barrage HEP scheme abstraction licence consent to derogate.



Glossary

Abstracted flow

Hydrograph representation of flow removed from river or the ground by abstraction.

Abstraction

Removal of water from a source of supply (surface or groundwater).

Abstraction - actual

The volume of water actually abstracted as opposed to the volume of water that may be abstracted under the terms of an abstraction licence. Most individual abstraction records are reported to the Environment Agency each year.

Abstraction impact

The effect of abstractions taken directly from a body of water.

Abstraction licence

The authorisation granted by the Environment Agency to allow the removal of water.

Alluvial deposit

Layers of sands or gravels, which are transported by a river and then deposited in flatter areas such as flood plains or lake beds.

Aquifer

A geological formation that can store and transmit groundwater in significant quantities.

Aquifer transmissivity

A measure of the ease at which water moves through a porous medium.

Artificial impacts

Combined impacts of abstraction and discharge on flows at the assessment point.

Artificial influences

Catchment activities such as surface water abstractions, effluent returns and groundwater abstractions which, individually or collectively, have an influence on natural flows or levels.

Artificial recharge

Water which is deliberately discharged to groundwater for the purposes of groundwater management.

Assessment Point (AP)

Critical point in a catchment at which an assessment of available resources is made. Assessment Points are located at the extremities of identified reaches and Water Resource Management Units.

Baseflow

The component of river flow that is derived from groundwater sources rather than surface run-off.

Benchmark flow

The river flow regime selected as a context for setting river flow objectives (may be natural, partly natural or gauged).

Biodiversity

The living component of the natural world. It embraces all plant and animal species and communities associated with terrestrial, aquatic and marine habitats. It also includes genetic variation within species.

Biodiversity Action Plans

At the Earth Summit in Rio in 1992, governments from across the world pledged to take urgent action to secure the future of the earth's resources. In the UK, a national strategy has been developed for the conservation of biological diversity through the UK Biodiversity Action Plan.

Borehole

Well sunk into a water bearing rock from which water will be pumped.

Buffer zone

Strip of land alongside a river which protects it from intensive agricultural practises to help reduce the impact of farming.

Canal

An artificial watercourse used for navigation.

Catchment

The area from which precipitation and groundwater will collect and contribute to the flow of a specific river.

Compensation flow

Water released from reservoirs in order to maintain a certain flow or level further downstream of the river.

Confluence

The point where two or more streams or rivers meet.

Conjunctive use

A water supply system which relies on more than one source of water. This can include systems containing both surface water and groundwater sources.

Consent conditions

Terms under which a discharge consent is issued, typically covering limits on flow rate and quality of water discharged, in order to protect the needs of key end users.

Constrained abstraction impact

The influence of an abstraction source which operates within pre-defined flow / level or water quality constraints.

Consumptive use / Consumptiveness

Use of water where a significant proportion is not returned, either directly or indirectly, to the source of supply after use, e.g. spray irrigation.

Cubic metre (m³)

Equivalent to 219.969 gallons or 1,000 litres.

Demand

The amount of water required for use.

Demand management

The implementation of policies or measures which are used to control or influence the consumption or waste of water.

De-naturalisation

Process of converting a natural flow to an estimated existing or scenario flow by adding consumptive abstraction and discharge impacts.

Derogate

To depreciate or diminish - used in abstraction licensing where a proposed new licence would reduce resources to an existing authorised abstraction.

Designated water dependent sites

Nationally or internationally important (habitat) sites that have been legally recognised, which could be affected by water management or water quality issues.

Direct discharge (Surface Water)

The direct release into any surface waters, via a sealed pipe or other direct means, of any substance (trade effluents, sewage effluents, etc) other than uncontaminated rainwater run-off.

Discharge

The release of substances (i.e. water, sewage, etc.) into surface waters.

Discharge consent

A statutory document issued by the Environment Agency, which defines the legal limits and conditions on the discharge of effluent into controlled waters.

Drift deposit

A loose deposit of sand, gravel, clay, etc on top of solid rock.

Drought

A general term covering prolonged periods of below average rainfall resulting in low river flows and/or low recharge to groundwater, imposing significant strain on water resources and potentially the environment.

Drought order

A means where Water Companies and/or the Environment Agency apply to the Secretary of State for the imposition of restrictions in the uses of water.

Drought permit

Used by the Environment Agency in order to allow a Water Company to abstract water outside of the normal terms of an Abstraction Licence during a drought period.

Dry Weather Flow (DWF)

This can be thought of as the average flow in the driest week in the average summer.

Ecological River Flow Objectives / Level Requirements

The minimum river flows (or water levels) required to protect ecological objectives.

Ecosystem

A community of plants and animals viewed within its physical environment or habitat.

Effective rainfall

Rainfall which is used for recharge of aquifers or to support river flows after 'losses' due to evaporation and take-up by plants.

Environmental allocation

The amount of water that is required to support the ecology of a river.

Environmental impact

The total effect of any operation on the environment.

Environmental Weighting (EW)

An assessment of a river's sensitivity to abstraction based on physical characteristics, fisheries, plant life and invertebrates. It is specifically used in the CAMS RAM.

EU Water Framework Directive

First major review of European water policy. Seeks to improve water quality in rivers and groundwater in an integrated way (see Integrated River Basin Management).

Existing abstraction and discharge impacts

The amount by which all abstractions reduced natural flows in the scenario year, taking into account the consumptiveness of the use, the location of any effluent return and any lags or smoothing effects between abstraction and outflow impact. Based on estimated abstraction returns from the scenario year.

Fauna

Animal population of a particular area or period.

Flood plain

Land adjacent to a watercourse that is subject to flooding.

Flora

Plant population of a particular area or period.

Flow duration curve

A graph showing the plot of flow versus exceedance value. Thus Q95 (the natural river flow that is exceeded 95% of the time) will be a low rate of flow, and Q5 (the natural river flow which is only exceeded 5% of the time) will be a high rate of flow.

Flow regime

The statistical pattern of a river's varying (mean daily) flow rates.

Fluvial

A term applied to the action of rivers and streams.

Gauged flow records

Records of flow in a river as conventionally measured. They reflect natural runoff from the catchment and artificial influences (abstraction, discharge, etc) that occur upstream of the measurement point.

Gauging station

A site where the flow of a river is measured.

General Quality Assessment (GQA)

Method for assessing the general quality of inland and coastal waters.

Geomorphology

Scientific study of land forms and of the processes that formed them.

Groundwater

Water that is contained in underground rocks.

Groundwater baseflow

The contribution that groundwater makes to the flow of rivers. It maintains the flow of rivers during extended periods of dry weather.

Groundwater catchment

The area from which groundwater will collect and flow to a specific river or over a specific discharge boundary.

Groundwater Management Units (GWMU)

Administrative sub-divisions of aquifers, defined on geological and hydrogeological criteria, which form the basis for groundwater resource management and licensing policy decisions.

Habitat

Place in which a species or community of species live, with characteristic plants and animals.

Habitats Directive

A European directive on Conservation of Natural Habitats and of Wild Flora and Fauna. The Directive is implemented in the UK by the Conservation (Natural Habitats & c.) Regulations 1994 - commonly known as the 'Habitats Regulations'. The Directive created a network of protected areas across the European Union known as 'Natura 2000' sites.

Hands-Off Flow (HOF)

A condition attached to an abstraction licence which states that if flow (in the river) falls below the level specified on the licence, the abstractor will be required to reduce or stop the abstraction.

Hydrogeology

Branch of geology concerned with water within the Earth's crust.

Hydrological scenario

A way in which to assess resource availability. There are several ways to do this, including a long-term (defined period) flow duration curve, a hydrograph for a specified year with a specified return period, or a simulated scenario.

Hydrological yield

The unrestricted output of a source that can be sustained by the catchment or aquifer feeding the river.

Hydrology

The study of the Earth's water, in particular of water under and on the ground before it reaches the ocean or before it evaporates.

Hydrometric network

Networks of sites monitoring rainfall, river flow and other water levels. The data collected is used for water resources management and planning, water quality, ecological protection and improvement, flood defence design and flood warning.

Hydrometry

The measurement of water on or below the earth's surface.

Hydropower

The production of electricity by the force of fast moving water, usually by using turbines, water wheels, etc.

Impoundment

An artificial body of water or wastewater such as a pond or dam for collection or storage of water for future use.

Integrated River Basin Management

The method by which the EU Water Framework Directive will be implemented to ensure that all requirements and pressures on the water environment are taken into account.

Irrigation

The artificial distribution and application of water through man made systems in order to stimulate crop growth.

Land drainage

Actions taken to reduce waterlogging of land and to minimise flood risk.

Leakage

Water lost from a supply network between the point of supply and point of demand.

Licence

Formal permit allowing the holder to engage in an activity (in the context of this report, usually abstraction), subject to conditions specified in the licence itself and the legislation under which it was issued.

Licence application

Formal request by an individual or organisation to the competent authority for a licence. For abstraction licences, the competent authority is the Environment Agency.

Licence determination

A decision by the Environment Agency on what terms to grant or refuse a licence application, by reference to regulatory powers and duties.

Licence of right

A license that was introduced by the 1963 Water Resources Act in order to regulate abstractions. It is restricted mainly by the quantity of water authorised by abstraction. This type of licence is no longer issued.

Licensed abstraction and discharge impacts

The impacts of abstractions and discharges calculated for current abstraction licences and discharges based on full uptake of licensed abstraction rates and consumptiveness assumptions.

Licensed Entitlement

Amount of water that may be abstracted within the terms of a licence. Generally it is specified in terms of maximum per day, month, year or season. The monthly/annual amounts tend to be less than the factored daily equivalent.

Local Environment Agency Plan (LEAP)

Previously known as Catchment Management Plan. This was the process by which the Agency responded to environmental issues in a catchment. They have now been replaced by the Focus newsletter, which concentrates on the local environment to highlight work carried out within the area.

Low flow

It is usually determined at a given value of 'Q95', which means that flow falls below this level 5% of the time.

Low Flows 2000

A software package which originated from CEH, which can be used to generate low flow statistics for a catchment.

Main river

The watercourse shown on the statutory "Main River Maps" held by the Agency and Defra. The Agency has permissive powers to carry out works of maintenance and improvements on these rivers.

Maintained flow

The flow on a regulated river that is maintained by groundwater pumping, reservoir releases or inter-basin transfer.

Managing Water Abstraction

Document produced in May 2001 about the CAMS process. It was updated in July 2002.

Maximum % abstraction impact

An indicator of the maximum abstraction impacts relative to natural flows in a particular year.

Mean flow

A long term average of the daily flow.

Meteorological data

Information relating to atmospheric processes.

Minimum Acceptable Flow

The minimum acceptable flow of an inland watercourse as defined in Section 21 of the Water Resources Act 1991.

Minimum Maintained Flow

Statutory flow rate which must be maintained in regulated rivers.

Minimum Residual Flow

The flow set at a river gauging station to protect downstream uses. When flow falls below this level controlled abstractions are required to cease.

Mitigation

Reducing the environmental impact of a scheme, development or operation. It also refers to actions which can be taken to reduce such impacts.

MORECS

Meteorological Office Rainfall and Evaporation Calculation System. This is a generic name for Met. Office services involving the routine calculation of soil moisture and evaporation for Great Britain and uses a grid of 40 x 40 km squares. This grid-square gives subscribers a week-by-week snapshot view of current soil moisture over the country.

Native species

An indigenous animal or plant.

Natura 2000

The Habitats Directive established and protects a network of designated sites of the most important areas for wildlife across Europe. It consists of SPAs to protect bird species and SACs for the protection of habitats.

Natural flow regime

The river flow pattern with no abstraction from or discharge in to the catchment.

Natural flows

The flows which would exist in the absence of any artificial impacts.

Naturalisation

Process of converting gauged flows into natural flows by removing consumptive abstraction and discharge impacts.

Naturalised flow records

The measured flow with a best estimate of upstream abstractions from and discharges to the stream taken into account. These represent the runoff from the catchment that would occur if there were no artificial influences upstream.

Non-consumptive

This is where all abstracted water is returned to the source a relatively short distance downstream of the abstraction point. E.g. hydropower generation, fish farming.

OFWAT

Office of Water Services.

Peak flow

The maximum flow recorded during a high flow event.

Permeability

The capacity of soil or porous rock to transmit water.

Potable water

Water of a suitable quality for drinking.

Potential yield

The volume of water which can be withdrawn from a reservoir or aquifer in specified conditions, without depleting the source.

Precautionary principle

Where data within an area is incomplete but there is potential for significant environmental damage, all decisions err on the side of caution in order to protect the environment.

Prescribed flow

A generic term for any flow set down as a rule or guide to be followed under statute or regulation.

Primary gauging station

A permanent river flow gauging installation included in the National Surface Water Archive.

Protected right

Means a right to abstract, which someone has by virtue of the small abstractions exemptions defined in the Water Act 2003 or by virtue of having an abstraction licence. The right protected is the quantity that can be abstracted up to that allowed by the exemption or the terms of the licence. The small abstraction exemptions defined by the Water Act 2003 are for domestic and agricultural purposes (excluding spray irrigation) not exceeding 20 m³/d.

Presumption against

It cannot be taken for granted that a licence will be issued for abstraction from this area. A licence application will be fully assessed and it is highly likely that it will have some constraints.

Public Water Supply (PWS)

Term used to describe the supply of water provided by a water company.

Q50

The flow of a river which is exceeded on average for 50% of the time.

Q95

The flow of a river which is exceeded on average for 95% of the time.

RAM Framework

Resource Assessment and Management Framework - a technical framework for resource assessment (for the definition and reporting of CAMS) and subsequent resource management (including abstraction licensing).

Ramsar site

A site of international conservation importance classified at the 'Convention on Wetlands of International Importance' 1971, which was ratified by the UK Government in 1976.

Reach

Unit of a river between two Assessment Points, delineated for the purposes of abstraction licensing and resource management.

Recent actual abstraction and discharge impacts

The impacts of abstractions and discharges calculated for current abstraction licences and discharges based on recent abstraction returns or estimated from uptake and consumptiveness assumptions.

Recharge

Water which percolates downward from the surface into groundwater.

Regime (Flow)

The statistical pattern of a river's constantly varying (daily) flow rates.

Residual flow

The flow remaining in a river following the abstraction of water from it.

Restoring Sustainable Abstraction Programme (RSA)

The programme for resolving environmental problems caused by unsustainable abstraction in certain catchments.

Review of consents

The procedure by which the Environment Agency as a competent authority will apply the Habitats Regulations to review all relevant existing discharge consents, abstraction licences, permissions and activities which are likely to affect a designated European site.

Revocation

The cancellation of a licence and all associated rights and benefits.

River

An open channel of fresh water flowing along a definite course, usually towards the sea, which is fed by tributaries.

River Flow Objectives (RFOs)

The minimum river outflows required to protect ecological objectives within the area. It also considers effluent dilution requirements, navigation and other in-river needs.

River Quality Objective (RQOs)

An agreed strategic target, expressed in terms of River Ecosystem standards, which is used as the planning base for all activities affecting the water quality of a stretch of watercourse.

River reach

Unit of a river between two Assessment Points, delineated for the purposes of abstraction licensing and resource management.

Saline intrusion

Entry of salt water into an aquifer, from the sea or estuary, due to groundwater depression normally caused by excessive groundwater abstraction.

Salmonids

Family of fish (salmonidae) which includes many commercially farmed species such as the Salmon, Trout and Char.

Scenario abstraction and discharge impacts

The amount by which all the abstractions in the area reduce natural outflows, taking into account the consumptiveness of the use, the location of any effluent return and any lags or smoothing between abstraction and outflow impact. Based on an assumed abstraction and discharge scenario (e.g. 'Full Licensed Rate', 'Existing', 'Recent Actual' etc).

Scenario flows

The flow at a given assessment point based on a defined abstraction and discharge rate.

Site of Special Scientific Interest (SSSI)

An area given a statutory designation by English Nature or the Countryside Council for Wales because of its nature conservation value.

Source of supply

Either an inland water (river, stream, canal, lake, etc.) or underground strata.

Spate flows

A flash flood resulting from a sudden downpour of rain.

Special Area of Conservation (SAC)

An area classified under the EC Habitats Directive and agreed with the EU to contribute to biodiversity by maintaining and restoring habitats and species.

Special Protection Area (SPA)

An area classified under the EC Birds Directive to provide protection to birds, their nests, eggs and habitats.

Specific yield

The ratio of the volume of water that will drain, by gravity, from rock or soil that was initially saturated.

Spray Irrigation

Abstracted water sprayed onto grassland, fruit, vegetables, etc. During the summer period it has a high impact on water resources.

Springs

These occur where the water table intersects the ground's surface.

Strata

Layers of rock, including unconsolidated materials such as sands and gravels.

Surface Water

This is a general term used to describe all water features such as rivers, streams, springs, ponds and lakes.

Surface water catchment

The area from which runoff would naturally discharge to a defined point of a river, or over a defined boundary.

Surplus or Deficit

How much more or how much less abstraction impact is acceptable:= Scenario flows - RFOs.

Sustainable development

Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Sustainable management

The interpretation of the principles of sustainable development at a local or regional level within the boundaries of national and international political, economic and environmental decision making.

Telemetry

A means of collecting information by unmanned monitoring stations (often river flows or rainfall) using a computer that is connected to the public telephone system.

Threshold

A Hands-Off Flow (HOF) value within a sequence of HOFs, each individual MI/d higher than the previous.

Tidal limit

The most upstream point within an estuary or river where water levels are subject to tidal variation.

Time Limited Licence

Licence with specified end date.

Topography

Physical features of a geographical area.

Total rainfall

Precipitation as measured by a raingauge.

Treatment Works (also Waste Water Treatment Works)

Sewage Treatment Works or Water Treatment Works.

Unconstrained abstraction impact

Abstraction impacts not related to hydrological or water quality constraints. Also see Abstraction Impacts.

Underground Strata

A term used to signify geology under the surface soil layer.

Unlicensed Abstraction

An abstraction that is carried out unlawfully or that is exempt from licensing.

Usage factor

Proportion of the abstracted water which is either not directly returned to the river, or whose return to the river is separately accounted for as a consented effluent return.

Utilisation

See Uptake.

Water Resource Management Unit (WRMU)

An area that has similar groundwater and/or surface water characteristics and is managed in a similar way.

Water Resource(s)

The supply of groundwater and surface water in a given area.

Water Resources Strategies (The)

Strategy for Water Resource planning in England and Wales over the next 25 years which will ensure sustainable use and sufficient water for all human uses with an improved water environment. The strategies predict demand using different social and economic scenarios.

Water Rights Trading

The transfer of licensable water rights from one party to another for benefit.

Water table

Level below which the ground is saturated with water. May vary with rainfall and pumping of boreholes.

Watercourse

Any channel along which water flows.

Wetland

An area of low lying land where the water table is at or near the surface for most of the time, leading to characteristic habitats.

Yield

The reliable rate at which water can be drawn from a water resource. (See also Hydrological, Potential and Specific Yield).

List of Abbreviations

ADF

Average Daily Flow.

AMP

Asset Management Plan produced by the Water Companies for OFWAT. It sets out the investment programme by the water industry.

AOD (also mAOD)

Above Ordnance Datum: Land levels are measured relative to the average sea level at Newlyn in Cornwall. This average level is referred to as "Ordnance Datum". Contours on Ordnance Survey maps of the UK show heights above AOD in metres, hence mAOD.

AONB

Area of Outstanding Natural Beauty.

AP

Assessment Point.

BAP

Biodiversity Action Plan.

BW

British Waterways.

CAMS

Catchment Abstraction Management Strategy.

CCW

Countryside Council for Wales.

SAC

Special Area of Conservation.

SPA

Special Protection Area.

DEFRA

Department of the Environment, Food and Rural Affairs (succeeds former DETR and MAFF).

EIA

Environmental Impact Assessment.

EU

European Union.

FDC

Flow Duration Curve.

GIS

Geographical Information Systems.

GQA

General Quality Assessment.

GWABS

Groundwater Abstractions

GWDIS

Groundwater Discharges.

GWMU

Groundwater Management Unit.

HOF

Hands-Off Flow.

Km

Kilometres.

Km²

Square kilometres.

m³/s

Cubic metres per second.

MAF

Minimum Acceptable Flow.

mAOD

Metres above Ordnance Datum (mean sea level at Newlyn Cornwall 1915-1921).

ML, ML/d, ML/day

ML = megalitres = 1,000,000 litres = 1,000 cubic metres = 1,000 m³ = 220,000 gallons
ML/d = ML/day = ML per day, = thousand cubic metres per day (tcmd).

ML/a

ML/a = Megalitres per year.

mm

Millimetres.

MMF

Minimum Maintained Flow.

MRF

Minimum Residual Flow.

NGWCLC

National Groundwater and Contaminated Land Centre.

OFWAT

Office of Water Services.

PF

Prescribed Flow.

PWS

Public Water Supply.

Q50

Flow exceeded 50% of the time period considered.

Q95

Flow exceeded 95% of the time period considered.

R&D

Research and Development.

RFO

River Flow Objectives.

RQO

River Quality Objective.

SAC

Special Area of Conservation.

SPA

Special Protection Area.

SSSI

Site of Special Scientific Interest.

STW

Sewage Treatment Works.

SW

Surface Water.

SWABS

Surface Water Abstraction.

SWALP

Surface Water Abstraction Licensing Procedure.

SWDIS

Surface Water Discharges.

UWWTD

Urban Waste Water Treatment Directive.

UKCIP

United Kingdom Climate Impacts Programme.

WRMU

Water Resource Management Unit.

WWTW

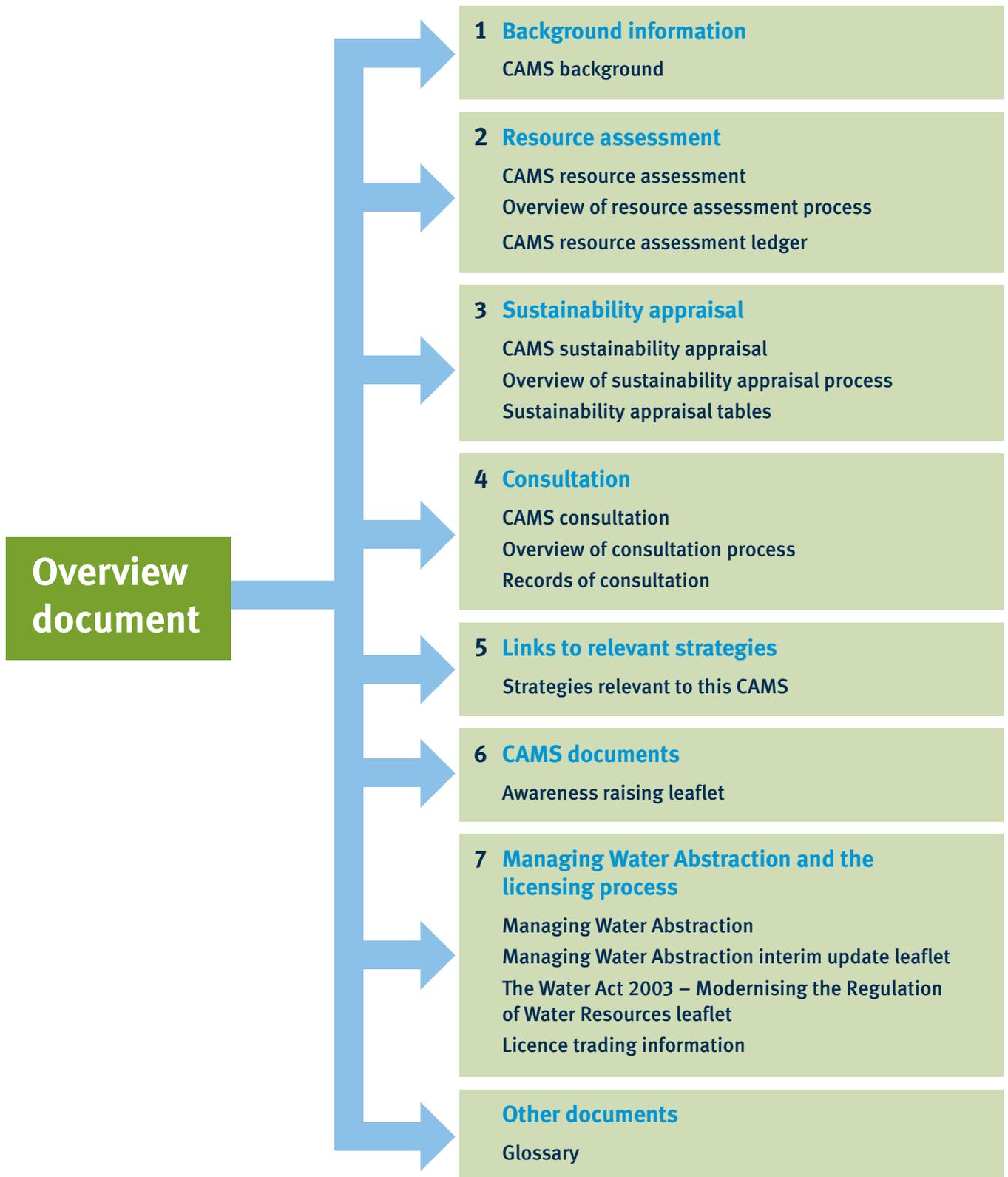
Waste Water Treatment Works.

WRc

Water Research Centre.



Appendix 1: Outline structure and information in technical document



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