

Dŵr Cymru Welsh Water

Strategic Environmental Assessment of the Revised Draft Drought Plan 2020

Environmental Report



Report for

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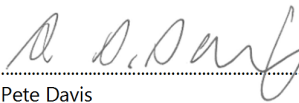
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Document revisions

No.	Details	Date
1	Draft Environmental Report	21.03.19
2	Final Environmental Report	27.03.19
3	Draft Revised (Post Consultation) Environmental Report	25.10.2019
3	Final (Post-consultation) Environmental Report	5.11.2019



Non-Technical Summary

Introduction

Dŵr Cymru Welsh Water (Welsh Water) is currently preparing its Drought Plan 2020. Consultation on a draft Drought Plan took place during the summer and the plan has now been revised. Adoption of the final Drought Plan will be in 2020.

Welsh Water's Drought Plan will set out how it will respond to drought conditions, ensuring the continued supply of water to customers during periods of low rainfall when water resources become depleted, whilst minimising any negative effects of actions taken. It will set out the short-term operational steps that the water company will take before, during and after a drought.

This Non-Technical Summary (NTS) provides an overview of the Environmental Report produced as part of the Strategic Environmental Assessment (SEA) of the Drought Plan. The SEA is being carried out on behalf of Welsh Water by Wood Environment & Infrastructure Solutions UK Limited (Wood) to assess the likely significant economic, social and environmental effects of the revised draft Drought Plan and to identify ways in which adverse effects can be avoided, minimised or mitigated and how any positive effects can be enhanced.

The Environmental Report presents the findings of the SEA of the revised draft Drought Plan.

The following sections of this NTS:

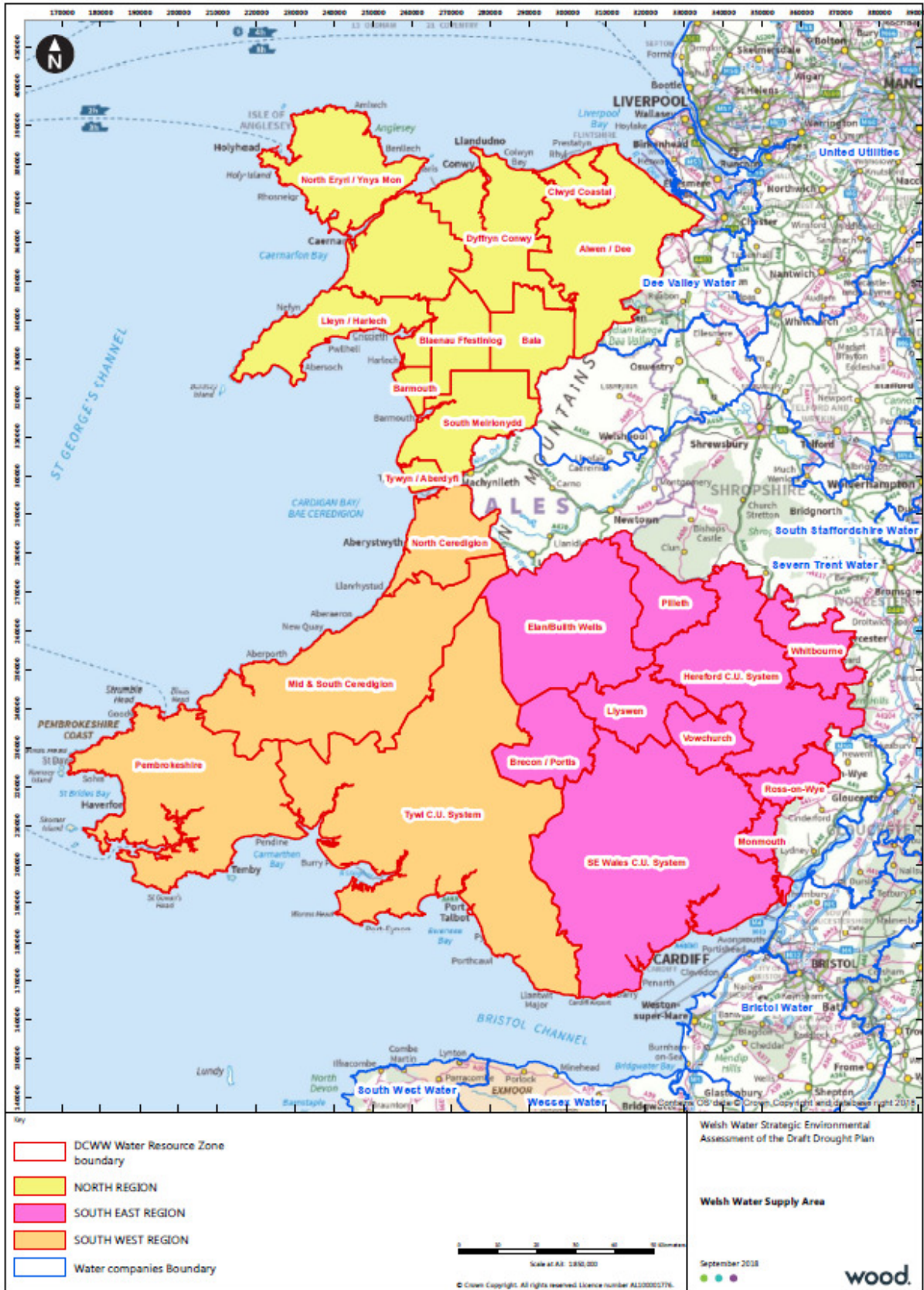
- provide an overview of the revised draft Drought Plan;
- describe the SEA process together with how it is applied to the revised draft Drought Plan;
- summarise the key economic, social and environmental issues relevant to the assessment of the revised draft Drought Plan;
- outline the approach to undertaking the assessment of the revised draft Drought Plan; and
- set out the next steps in the SEA process including how to respond to consultation on the Environmental Report.

What is the Drought Plan?

Welsh Water provides water services to some 3 million customers in much of Wales and small parts of Cheshire and Herefordshire in England. It also has over 100,000 business customers, and in total delivers more than 800 million litres of drinking water every day. Welsh Water supplies come primarily from surface water resources such as rivers and reservoirs (95 per cent of total resources). Groundwater sources constitute the remaining water resources, reflecting the geology of Wales which is unsuitable for supporting large scale groundwater supplies. The Welsh Water supply area is shown in **Figure NTS.1**.



Figure NTS.1 Welsh Water's Supply Area and Water Resource Zones





Under sections 39B and 39C of the Water Industry Act 1991 (as amended by the Water Act 2003), water companies are required to prepare and maintain statutory Drought Plans. The Drought Plan sets out the operational steps a water company will take before, during and after a drought to maintain essential water supplies to customers. The Water Industry Act 1991 (as amended) defines a Drought Plan as *'a plan for how the water undertaker will continue, during a period of drought, to discharge its duties to supply adequate quantities of wholesome water, with as little recourse as reasonably possible to drought orders or drought permits'*.

The Welsh Water Drought Plan 2020 builds on earlier Drought Plans that have been developed by Welsh Water since 1999. It is being prepared in accordance with the relevant Welsh Government¹ and Natural Resources Wales (NRW) guidance² and as Welsh Water's operational area includes small parts of Cheshire and Herefordshire, also the Department for Environment, Food & Rural Affairs' (Defra) and the Environment Agency's (EA's) guidance^{3,4}.

The revised draft Drought Plan details how Welsh Water will respond to drought conditions, ensuring the continued supply of potable water to its customers during periods of low rainfall when water resources are depleted and minimising any detrimental effects on the environment.

A draft Drought Plan was issued for consultation on the 25th July 2019 and ran for 8 weeks until the 19th September 2019. Following an analysis of consultation responses a revised draft Drought Plan 2020 has been prepared along with an accompanying Statement of Response, setting out how Welsh Water has taken account of the comments received. Changes included the withdrawal of specific Drought Plan measures, to ensure that the implementation would avoid adverse effects on the integrity of European sites.

Further information in respect of the preparation of the Drought Plan is set out in Section 1.3 of the Environmental Report.

What is Strategic Environmental Assessment (SEA)?

SEA became a statutory requirement following the adoption of Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (the SEA Directive). This was transposed into legislation on 20 July 2004 as Statutory Instrument 2004 No.1633 - The Environmental Assessment of Plans and Programmes Regulations 2004. The Welsh Government has transposed the Directive into appropriate Regulations: The Environmental Assessment of Plans and Programmes (Wales) Regulations 2004.

The objective of the SEA Directive is:

"to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view of contributing towards sustainable development".

Throughout the course of the development of the plan, policy or programme, the aim of SEA is to identify the potential impact of options proposed in the plan in terms of their environmental, economic and social effects. If any adverse effects are identified, these options can then be avoided or proposals modified to manage or mitigate adverse effects.

¹ Welsh Government (2017) *Guiding Principles for Developing Water Undertaker Drought Plans for 2020*. Available online: <https://gov.wales/docs/desh/publications/171030-drought-plan-guiding-principles-en.pdf>

² NRW (2017), *Water Company Drought Plan Technical Guideline*, December 2017. Available online: <https://cdn.naturalresources.wales/media/684414/final-wc-drought-plan-guidance-2017.pdf?mode=pad&rnd=13165671358000000>

³ Defra and the Environment Agency (2017) *How to Write a Drought Management Plan*. Available online: <https://www.gov.uk/government/collections/how-to-write-and-publish-a-drought-plan#write-your-plan>

⁴ Defra and the Environment Agency (2015) *Drought plans: environmental assessment and monitoring*. Available online: <https://www.gov.uk/guidance/drought-plans-environmental-assessment-and-monitoring>



In this context, the purpose of the SEA of the revised draft Drought Plan is to:

- identify the potentially significant environmental effects of the revised draft Drought Plan in terms of the measures being considered by Welsh Water to manage drought conditions;
- help identify appropriate measures to avoid, reduce or manage adverse effects and to enhance beneficial effects associated with the implementation of the revised draft Drought Plan wherever possible;
- give the statutory SEA bodies, stakeholders and the wider public the ability to see and comment upon the effects that the revised draft Drought Plan may have on them, their communities and their interests, and encourage them to make responses and suggest improvements to the revised draft Drought Plan; and
- inform Welsh Water's selection of drought management measures to be taken forward into the final Drought Plan.

SEA comprises five key stages:

- **Stage A:** Scoping;
- **Stage B:** Develop and Refine Alternatives and Assess Effects;
- **Stage C:** Prepare Environmental Report;
- **Stage D:** Consult on the Draft Plan and Environmental Report and Prepare the Post Adoption (SEA) Statement; and
- **Stage E:** Monitor Environmental Effects.

Stage A of the SEA of the revised draft Drought Plan was the production of a Scoping Report. The scoping stage itself comprised five tasks that are listed below:

- i. review of other relevant policies, plans, programmes and strategies (hereafter referred to as 'plans and programmes').
- ii. collation and analysis of baseline information.
- iii. identification of key sustainability issues.
- iv. development of the assessment framework.
- v. consultation on the scope of the SEA (this Scoping Report).

The Scoping Report was consulted on from 5th November to 7th December 2018 and set out the proposed framework for assessing the likely significant environmental effects of the Drought Plan. The framework has been used to assess the effects (including cumulative effects) of the drought management measures contained in the Drought Plan (**Stage B**). These assessments are presented in this Report (**Stage C**). The draft Drought Plan and accompanying documents including an earlier version of this Environmental Report were submitted to the Welsh Government with a request for publication. Following receipt of the direction to do so, Welsh Water published the documents for an 8 week consultation, beginning the 25th July 2019 (**Stage D**). Following consultation and an analysis of the responses, Welsh Water has prepared a Statement of Response to the representations received during the consultation period setting out how and why the draft Drought Plan has or has not been revised to take account of the consultation responses. Welsh Water has amended the draft Drought Plan and revised the Environmental Report to reflect these changes. Welsh Water will send the revised documentation to the Welsh Government for confirmation that all representations have been appropriately accounted for. Following further direction from the Welsh Government, Welsh Water will

publish the final Drought Plan and implement it accordingly. In conjunction with publishing the final Drought Plan, Welsh Water will also issue a Post Adoption Statement. This will set out the results of the consultation and SEA processes and the extent to which the findings of the SEA have been accommodated in the final Drought Plan. The SEA requires monitoring of any resulting environmental effects of the Drought Plan (**Stage E**).

Section 1.4 of the Environmental Report describes in further detail the requirement for SEA of the Drought Plan and the SEA process including its relationship with the preparation of Welsh Waters' Drought Plan.

What are the Key Environmental, Social and Economic Issues for the Drought Plan?

As part of the SEA process, a review has been undertaken to identify the key economic, social and environmental issues which are relevant to the assessment of the Drought Plan. These issues have been identified from a variety of sources, including a review of baseline data and other relevant plans and programmes. A summary of the issues identified as being most relevant to the assessment of the Drought Plan are shown in **Table NTS.1**.

Table NTS.1 Key Sustainability Issues Relevant to the Drought Plan

Topic Area	Key Economic, Social and Environmental Issues Relevant to the Drought Plan
Biodiversity	<ul style="list-style-type: none"> • The need to protect and enhance biodiversity in Wales, particularly within protected sites, species and habitats designated for nature conservation; • The need to continue to increase and improve the condition of priority habitats and habitats of priority species, and restore populations of these species and other specially protected species; • The need to avoid activities likely to cause irreversible damage to natural heritage; • The need to take opportunities to improve connectivity between fragmented habitats to create functioning habitat corridors; • The need to control the spread of Invasive Non-Native Species (INNS); and • The need to recognise the importance of allowing wildlife to adapt to climate change.
Geology Land use and Soils	<ul style="list-style-type: none"> • The need to protect, maintain and enhance geomorphological functions and services; • The need to influence how land is managed, promoting sustainable patterns of land use; • The need to conserve and enhance soil quality and function (including carbon sequestration); • The need to protect and avoid damage to Wales' geodiversity and conserve and enhance sites designated for geological interest; and • The need to manage impacts on soil resources, including control of pollution and remediation of contaminated land.
Water	<ul style="list-style-type: none"> • The need to protect, enhance and restore the quality of the rivers, lakes, estuarine and coastal waters taking into account WFD objectives; • The need to protect, enhance and restore the quantity and quality of groundwater resources taking into account WFD objectives; • The need to ensure sustainable and appropriate abstraction levels and water flow/levels in Wales' waters across the full range of regimes from low to high conditions and meet society's needs for a resilient water supply; • The need to ensure that the continued risk of flooding is reduced or where this is not possible, mitigated effectively using natural flood management and green engineering where possible; and • The potential effects of climate change and the need to build climate change resilience into the water environment and water management.

Topic Area	Key Economic, Social and Environmental Issues Relevant to the Drought Plan
Air quality and climate	<ul style="list-style-type: none"> • The need to minimise emissions of pollutant gases and particulates and enhance air quality arising from the implementation of the Drought Plan measures; • The need to reduce greenhouse gas emissions arising from implementation of the Drought Plan measures; • The need to take into account, and where possible adapt to, the potential effects of climate change; and • The need to increase environmental resilience to the effects of climate change.
Human Environment	<ul style="list-style-type: none"> • The need to ensure that the water requirements of people and visitors can be met at all times, in a sustainable way; • The need to ensure that water supplies remain affordable, in particular for deprived or vulnerable communities; • The need to ensure that the measures contained within the Drought Plan do not adversely affect the health and well-being of any member of the community; • The need to accommodate an increasing population whilst ensuring the continued provision of essential services including water supply; • The need to ensure that vulnerable people are not affected by implementation of the Drought Plan; • The need to ensure that the Drought Plan does not have an adverse economic impact; and • The need to ensure public awareness of both forthcoming and existing drought conditions in order to maintain resilient, reliable public water supplies without the need for emergency drought measures.
Material Assets and Resource Use	<ul style="list-style-type: none"> • There is only limited opportunity to transfer water between the 24 water resources zones operated by Welsh Water; • The need to minimise the demand for water resources through water efficiency measures (including metering) and the reduction of leakage in the region; • The need to reduce energy consumption; • The need to ensure the sustainable and efficient use of resources such as construction materials; and • The need to minimise waste arisings, promote reuse, recovery and recycling and minimise the impact of wastes on the environment and communities.
Cultural Heritage	<ul style="list-style-type: none"> • The need to conserve and enhance the historic significance of buildings, monuments, features, sites, places, areas and landscapes of archaeological and cultural heritage interest, and their settings during drought conditions; and • The need to avoid damage to important wetland areas with potential for paleoenvironmental deposits during drought conditions.
Landscape and Seascape	<ul style="list-style-type: none"> • The need to conserve and enhance landscape and seascape character, taking into account the effects of climate change; • The need to ensure the special qualities of designated landscapes are protected during drought conditions; and • The need to minimise any adverse impacts upon landscape and seascape that may result from measures in the Drought Plan.

The key sustainability issues listed in **Table NTS.1** above have informed the proposed framework that will be used to assess the effects of the Drought Plan.

Section 2 of the Environmental Report summarises the review of plans and programmes relevant to the Drought Plan and SEA that is contained at Appendix C.

Section 3 presents the baseline analysis of social, economic and environmental characteristics, along with how these are likely to change in the future.

The Approach to Assessing the Effects of the Drought Plan

A framework has been developed to assess the economic, social and environmental effects of the Drought Plan. This framework sets out a number of assessment objectives relating to the key issues identified in **Table NTS.1**. For each objective, guide questions are provided.



The performance of the proposed options within the Drought Plan and any reasonable alternatives have been assessed against these objectives to ensure that each option is assessed in a robust and consistent manner. The assessment framework that was used to assess the draft Drought Plan measures is shown in **Table NTS.2**.

The well-being goals of the Well-being of Future Generations (Wales) Act 2015 are fully reflected in the framework to help ensure alignment with national policy and legislation on sustainability. Additionally, those objectives that are directly related to the objective for the sustainable management of natural resources (SMNR), established in the Environment (Wales) Act 2016, are highlighted.





Table NTS.2 Assessment Framework

Topic Area	SEA Objective	Guide Questions	Welsh Government Well-being Goal(s)	Relevant to the Objective for SMNR?	SEA Directive Topic(s)
Biodiversity	1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity	<i>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar, SSSIs and priority habitats and species)?</i>	A prosperous Wales A resilient Wales A healthier Wales A globally responsible Wales	Yes	Biodiversity, Flora and Fauna
		<i>Will the draft Drought Plan measure protect and enhance non-designated sites and local biodiversity?</i>			
		<i>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</i>			
		<i>Will the draft Drought Plan measure affect the condition of ecosystems (including their connectivity, structure and functioning)?</i>			
		<i>Will the draft Drought Plan measure enhance the adaptability of ecosystems?</i>			
		<i>Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?</i>			
Geology and Soils	2. To ensure the appropriate and efficient use of land and	<i>Will additional land be required for the development or implementation</i>	A prosperous Wales A resilient Wales	Yes	Soils, Material Assets

Topic Area	SEA Objective	Guide Questions	Welsh Government Well-being Goal(s)	Relevant to the Objective for SMNR?	SEA Directive Topic(s)
	protect and enhance soil quality and geodiversity.	<p><i>of the draft Drought Plan measure or will the option require below ground works leading to land sterilisation?</i></p> <p><i>Will the draft Drought Plan measure utilise previously developed land?</i></p> <p><i>Will the draft Drought Plan measure minimise the loss of best and most versatile agricultural land?</i></p> <p><i>Will the draft Drought Plan measure affect upland (peat-dominated) and other wetland soils?</i></p> <p><i>Will the draft Drought Plan measure protect and enhance protected sites designated for their geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest?</i></p>	A globally responsible Wales		
Water	3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water Framework Directive	<p><i>Will the draft Drought Plan measure lead to a change in river flows, wetted width or river level?</i></p> <p><i>Will the draft Drought Plan measure affect surface water quality and quantity?</i></p> <p><i>Will the draft Drought Plan measure lead to changes in groundwater quality, quantity and recharge?</i></p> <p><i>Will the draft Drought Plan measure lead to the deterioration of Water Framework Directive (WFD)</i></p>	A prosperous Wales A resilient Wales A healthier Wales	Yes	Water, Biodiversity, Flora, Fauna

Topic Area	SEA Objective	Guide Questions	Welsh Government Well-being Goal(s)	Relevant to the Objective for SMNR?	SEA Directive Topic(s)
		<p><i>waterbody status (or potential) from, inter alia, changes in fluvial geomorphology?</i></p> <p><i>Will the draft Drought Plan measure jeopardise the achievement of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Water Framework Directive (WFD)?</i></p>			
Air Quality and Climate Change	4. To limit the causes and potential consequences of climate change and to adapt to future changes	<p><i>Will the draft Drought Plan measure reduce or minimise greenhouse gas emissions?</i></p> <p><i>Will the draft Drought Plan measure reduce vulnerability to the effects of climate change by appropriate adaptation?</i></p> <p><i>Will the draft Drought Plan measure increase environmental resilience to the effects of climate change including to impacts on water quality?</i></p> <p><i>Will the draft Drought Plan measure reduce or minimise air pollutant emissions?</i></p>	<p>A prosperous Wales</p> <p>A resilient Wales</p> <p>A healthier Wales</p> <p>A Wales of cohesive communities</p> <p>A globally responsible Wales</p>	Yes	Air Climatic Factors.
Human Environment – Human Health	5. To protect and enhance human health with special regard to vulnerable groups in society	<p><i>Will the draft Drought Plan measure ensure continuity of clean drinking water supply within statutory standards supply at times of drought?</i></p>	<p>A prosperous Wales</p> <p>A globally responsible Wales</p> <p>A resilient Wales</p> <p>A healthier Wales</p> <p>A more equal Wales</p>	Yes	Population, Human Health.

Topic Area	SEA Objective	Guide Questions	Welsh Government Well-being Goal(s)	Relevant to the Objective for SMNR?	SEA Directive Topic(s)
		<p><i>Will the draft Drought Plan measure affect the affordability of clean drinking water?</i></p> <p><i>Will the draft Drought Plan measure adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise levels)?</i></p> <p><i>Will the draft Drought Plan measures affect human health or the health of any vulnerable groups?</i></p> <p><i>Will the Drought Plan measure affect public access to, or enjoyment of, local green/blue space?</i></p> <p><i>Will the Drought Plan measure impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?</i></p>	A Wales of cohesive communities		
Human Environment - Social and Economic Well-Being	6. To maintain and enhance the economic and social needs of the local community	<p><i>Will the draft Drought Plan measure ensure sufficient water is available for people and visitors to maintain economic activity in times of drought?</i></p> <p><i>Will the draft Drought Plan measures affect local or regional economies?</i></p> <p><i>Will the draft Drought Plan measure affect opportunities for recreation at times of drought?</i></p>	<p>A prosperous Wales</p> <p>A resilient Wales</p> <p>A more equal Wales</p> <p>A globally responsible Wales</p> <p>A Wales of cohesive communities</p>	Yes	Population, Human Health, Water, Material Assets.



Topic Area	SEA Objective	Guide Questions	Welsh Government Well-being Goal(s)	Relevant to the Objective for SMNR?	SEA Directive Topic(s)
Material Assets and Resource Use	7. To promote the wise use of resources	<i>Will the draft Drought Plan measure seek to minimise the demand for additional raw materials?</i>	A prosperous Wales A resilient Wales A globally responsible Wales	Yes	Material Assets.
		<i>Will the draft Drought Plan measure seek to minimise energy consumption?</i>			
		<i>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</i>			
		<i>Will the draft Drought Plan measure encourage sustainable design or use of sustainable materials?</i>			
Cultural Heritage	8. To conserve and enhance the cultural, historic and industrial heritage resource.	<i>Will the draft Drought Plan measure conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</i>	A prosperous Wales A Wales of vibrant culture and thriving Welsh language	Yes	Cultural Heritage
		<i>Will the draft Drought Plan measure avoid or minimise damage to archaeologically important sites?</i>			
		<i>Will the draft Drought Plan measure avoid damage to important wetland areas with potential for paleoenvironmental deposits?</i>			
Landscape and Seascape	9. To protect and enhance landscape and seascape	<i>Is it likely that the draft Drought Plan measure will have significant visual impacts?</i>	A prosperous Wales A resilient Wales	Yes	Landscape

Topic Area	SEA Objective	Guide Questions	Welsh Government Well-being Goal(s)	Relevant to the Objective for SMNR?	SEA Directive Topic(s)
	character and other protected features	<p><i>Will the draft Drought Plan measure avoid adverse effects on, and enhance where possible, the special qualities of protected/designated landscapes (including woodlands) or seascapes such as National Parks or AONBs?</i></p> <p><i>Will the draft Drought Plan measure help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness?</i></p>	A Wales of cohesive communities A healthier Wales		

The draft and the revised draft Drought Plan options were assessed based on the nature of the effect, its timing and geographic scale, the sensitivity of the human or environmental receptor that could be affected, and how long any effect might last. Assessment matrices were used to capture the assessment of each measure in a consistent manner.

Specific guidance has been developed for what constitutes a significant effect, a minor effect or a neutral effect for each of the SEA objectives. These 'definitions of significance' help to ensure a consistent approach to interpreting the significance of effects and help the reader understand the decisions made by the assessor.

The SEA Directive and regulations require that the cumulative effects of a plan or programme are taken into account. This includes the cumulative effects of the revised draft Drought Plan in combination with other plans and programmes and the cumulative effects of individual measures within the revised draft Drought Plan, which in combination represent the proposed approach.

The results of the assessment will help inform Welsh Water's selection of water management options to be taken forward into the final Drought Plan.

Section 4 of the Environmental Report provides further information in relation to the approach to the assessment of the Drought Plan.

Section 5 presents the findings of the assessment of the measures in the revised draft Drought Plan.

The Criteria for Assessing Significance is contained at Appendix D, and detailed assessment matrices for each of the revised draft Drought Plan measures are presented at Appendix E.

Habitats Regulations Assessment

The Conservation of Habitats and Species Regulations 2017 (the 'Habitats Regulations') requires that competent authorities assess the potential impacts of plans and programmes on the Natura 2000 network of European protected sites⁵ to determine whether there will be any 'likely significant effects' on any European site as a result of the plan's implementation (either on its own or 'in combination' with other plans or projects); and, if so, whether these effects will result in any adverse effects on the site's integrity. The process by which the impacts of a plan or programme are assessed against the conservation objectives of a European site is known as Habitats Regulations Assessment (HRA)⁶.

The NRW guidance⁷ states that those responsible for preparing the drought plan "*must ensure that the drought plan meets the requirements of the Conservation of Habitats and Species Regulations 2017, and must undertake a HRA on the effects of your plan on European sites, alone or in combination with other plans or projects (e.g. the effects of drought management actions on European sites)*".

In accordance with the Habitats Regulations, what is commonly referred to as a HRA screening exercise has been undertaken to identify whether Welsh Water's revised draft Drought Plan will have any likely significant effects on any European sites (either alone or 'in combination' with other projects or plans). Where the

⁵ European protected sites refers to designated Special Areas of Conservation (SACs) and Special Protected Areas (SPAs), candidate SACs (those submitted formally to the EC but not yet adopted or designated), proposed SPAs and SACs (sites subject to consultation on whether they should be designated) and proposed and designated Ramsar sites, which are not European sites but under Welsh Government policy should have the same level of protection as SACs and SPAs. Within this report "European site" is used as a generic term for all of the above designated sites.

⁶ 'Appropriate Assessment' has been historically used as an umbrella term to describe the process of assessment as a whole. The whole process is now more accurately termed 'Habitats Regulations Assessment' (HRA), and 'Appropriate Assessment' is used to indicate the specific stage of HRA.

⁷ Natural Resources Wales (2017) *Water Company Drought Plan Technical Guidance*. Available online:

<https://cdn.naturalresources.wales/media/684414/final-wc-drought-plan-guidance-2017.pdf?mode=pad&rnd=13165671358000000>

[Accessed November 2018]

possibility of significant effects could not be excluded, a more detailed Appropriate Assessment has been carried out to determine whether these effects would adversely affect the site's integrity.

The HRA is undertaken and reported separately from the SEA. However, the conclusions of the HRA have helped to inform the proposed assessment process, particularly in respect of the potential effects of the revised draft Drought Plan measures on biodiversity.

The Potential Effects of the Revised Draft Drought Plan Options

Welsh Water has identified a range of demand-side measures that can broadly put into five categories and 20 supply-side options that require either a drought permit or drought order. The demand-side measures are not geographically distinct and hence could be implemented in any of the WRZs in Welsh Water's area. The 20 supply-side options are for 10 WRZs that are potentially vulnerable to severe drought. These WRZs are: North Eryri Ynys Mon; Clwyd Coastal; Tywyn Aberdyfi; Barmouth; Lleyn Harlech; SEWCUS; Tywi CUS; Mid and South Ceredigion; North Ceredigion; and Pembrokeshire.

The effects of each option were assessed during the construction phase and during the operational phase. **Table NTS.3** below summarises the significant effects of the options during construction.

While these options are presented together for ease of review, it should be noted that the measures would not necessarily all be implemented or would not necessarily be implemented in combination, even within a WRZ. The selection of the option or options to be implemented would be determined by a number of factors including the nature and intensity of the drought, operational requirements, and also on the potential environmental impacts of the option in question. Further, some of the options are mutually exclusive and could not be implemented in combination. These factors mean that the impacts of the revised draft Drought Plan options as set out below in **Tables NTS.3** and **NTS.4** are not necessarily additive.

Table NTS.3 shows that for the construction phase, significant effects were identified for one option in the SEWCUS WRZ. It was assessed as having significant negative effects against biodiversity (SEA Objective 1) which reflected the potential for construction works associated with the option to have adverse impacts on fish including Atlantic salmon and brown/sea trout within the Afon Rhonda Fawr (Option 8112-1). However, the likelihood of these impacts occurring and their exact magnitude is uncertain at this stage.

All other construction effects were assessed as minor or neutral.

Table NTS. 3 Effects of the revised draft Drought Plan options - Construction

WRZ	Ref	Option Name	Constriction (C) or Operation (O)	1. Biodiversity	2. Geology and Soils	3. Water	4. Air Quality and Climate Change	5. Human Health	6. Social and Economic Wellbeing	7. Material Assets and Resource Use	8. Cultural Heritage	9. Landscape and Seascapes
All (demand side measures)	DM1	Leakage Management	C	0/?	0	0	-/?	0	0	-/?	0	0
All (demand side measures)	DM2	Water Efficiency	C	0	0	0	0	0	0	0	0	0
All (demand side measures)	DM3	Temporary Use Bans (TUBs)	C	0	0	0	0	0	0	0	0	0
All (demand side measures)	DM4	Non Essential Use Bans (NEUBs)	C	0	0	0	0	0	0	0	0	0
All (demand side measures)	DM5	Extreme Measures	C	0	0	0	0	0	0	0	0	0
North Eryri Ynys Mon	8001-2	Removal of Llyn Cwellyn 10 MI/d abstraction limit	C	-	0	0	0	0	0	0	0	-
North Eryri Ynys Mon	8001-3	Reduction of Alaw Compensation Water	C	0	0	0	0	0	0	0	0	0
North Eryri Ynys Mon	8001-4	Reduction of Ffynnon Llugwy Compensation Water	C	0	0	0	0	0	0	0	0	0
North Eryri Ynys Mon	8001-5	Reduction of Cefni Reservoir Compensation Water	C	0	0	0	0	0	0	0	0	0
Clwyd Coastal	8012-2	Reduction of the regulation release from Aled Isaf and modification of the Hands Off Flow value at Bryn Aled	C	0	0	0	0	0	0	0	0	0
Clwyd Coastal	8012-4	Relaxation of the annual licences on Afon Aled and the Plas Uchaf and Dolwen Reservoirs	C	0	0	0	0	0	0	0	0	0



WRZ	Ref	Option Name	Constriction (C) or Operation (O)	1. Biodiversity	2. Geology and Soils	3. Water	4. Air Quality and Climate Change	5. Human Health	6. Social and Economic Wellbeing	7. Material Assets and Resource Use	8. Cultural Heritage	9. Landscape and Seascape
Clwyd Coastal	8012-5	Relaxation of the Llannerch boreholes annual licence	C	0	0	0	0	0	0	0	0	0
Clwyd Coastal	8012-6	Pumped (winter) refill from Aled Isaf to Llyn Aled	C	-	0	0	-	0	0	-	0	-
Tywyn Aberdyfi	8021-1	Tankering raw water from Dysynni	C	0	-	0	-	-	0	-	0	-
Barmouth	8033-2	Reduce compensation water releases from Llyn Bodlyn	C	0	0	0	0	0	0	0	0	0
Lleyn Harlech	8034-1	Afon Dwyfor Drought Permit	C	0	0	0	0	0	0	0	0	0
SEWCUS	8109-1	Reduce compensation water releases from Llwynon Reservoir	C	0	0	0	0	0	0	0	0	0
SEWCUS	8112-1	Emergency abstraction from the River Rhondda at Treherbert	C	--/?	0	-	-	--/?	0	-	0	-
SEWCUS	8116-3	Utilise the Dead Storage in Talybont Reservoir	C	-	0	0	0	0	0	-	0	-
SEWCUS	8119-1	Compensation Water Reduction of 50% at Pontsticill Reservoir	C	0	0	0	0	0	0	0	0	0
Tywi CUS	8201-3	Relax the maintained requirement below the Nantgaredig intake on the River Tywi	C	0	0	0	0	0	0	0	0	0
Mid and South Ceredigion	8202-1	Increase the Llechryd abstraction from 19 MI/d to 21 MI/d and obtain variation of annual licence amounts	C	0	0	0	0	0	0	0	0	0
North Ceredigion	8203-2	Pumped abstraction from Nantymoch (a HEP reservoir operated by Statkraft) into the raw water main between Llyn Llygad Rheidol Reservoir and Bontgoch WTW	C	0	0	0	-	0	0	-	0	0



WRZ	Ref	Option Name	Constriction (C) or Operation (O)	1. Biodiversity	2. Geology and Soils	3. Water	4. Air Quality and Climate Change	5. Human Health	6. Social and Economic Wellbeing	7. Material Assets and Resource Use	8. Cultural Heritage	9. Landscape and Seascape
Pembrokeshire	8206-2	Reduce the Compensation release from Preseli Reservoir by 50%	C	0	0	0	0	0	0	0	0	0
Pembrokeshire	8206-7	Use of freshet bank for public water supply - Llysyfran - (Pembs)	C	0	0	0	0	0	0	0	0	0

Table NTS.4 below summarises the significant effects of the options during operation. This shows that significant effects were identified during the operational phase for 12 options across six WRZs. Significant effects were identified with respect to biodiversity (SEA Objective 1), water (SEA Objective 3), climate change (SEA Objective 4), human health (SEA Objective 5), social and economic wellbeing (SEA Objective 6) and resource use (SEA Objective 7).

Four options in two WRZs (SEWCUS and Tywi CUS) were identified as having significant positive effects with respect to human health (SEA Objective 5). The options would help to ensure the continuity of water supplies during periods of drought, and effects have been assessed as significant due to the large yields involved. Two of these options were also assessed as having a significant positive effect on social and economic wellbeing (SEA Objective 6) due to the associated gains in deployable water output. No further significant positive effects have been identified.

10 options across the North Eryri Ynys Mon, Clwyd Coastal, Barmouth, SEWCUS, Tywi CUS and Pembrokeshire WRZs were assessed as having a significant negative effect on biodiversity (SEA Objective 1). This principally reflects the potential reduction in flows having major impacts on fish species, and to a lesser extent for some of the options, effects on macroinvertebrates, macrophytes and phytobenthos. One of these options, Option 8012-4, was assessed as having a mixed significant negative and minor positive effect, due to the potential for major impacts on macrophytes and moderate impacts on fish species, along with the potential for minor beneficial effects on a range of species within the affected reaches. All 10 options had an element of uncertainty at this stage.

Significant negative effects on water (SEA Objective 3) were identified for two options in the Clwyd Coastal and Barmouth WRZs. For Option 8012-4, this relates to significant hydrological impacts on the Aled Isaf, Llyn Aled, Dolwen Reservoir and Plas Uchaf Reservoir. The effect for Option 8033-2 reflects reduced compensations flows affecting water quantity, water quality and the WFD status of the Afon Ysgethin.

Two options have been identified as having significant effects with respect to climate change (SEA Objective 4) and resource use (SEA Objective 7). For Option 8012-6, these effects arise due to the need to pump water against a gradient, requiring a substantial (although unquantified) level of fuel resource and associated greenhouse gas emissions. For Option 8116-3, this reflects the potentially large volumes of water that would be abstracted and distributed during the operation of these options and the associated energy use and carbon emissions. These two options have been assessed as a mixed significant negative and minor positive effect on climate change due to the potential for the options to promote climate change adaptation by increasing resilience to drought.

No further significant negative effects have been identified. All other operational effects were assessed as minor or neutral.

Table NTS.4 Effects of the Revised Draft Drought Plan options - Operation

WRZ	Ref	Option Name	Constriction (C) or Operation (O)	1. Biodiversity	2. Geology and Soils	3. Water	4. Air Quality and Climate Change	5. Human Health	6. Social and Economic Wellbeing	7. Material Assets and Resource Use	8. Cultural Heritage	9. Landscape and Seascapes
All (demand side measures)	DM1	Leakage Management	O	0	0	+	+/?	+	0/?	+/?	0	0
All (demand side measures)	DM2	Water Efficiency	O	0/?	0	+	+/?	+	0/?	+/?	0	0
All (demand side measures)	DM3	Temporary Use Bans (TUBs)	O	0/?	0	+	+/?	+	0/?	+/?	0	0
All (demand side measures)	DM4	Non Essential Use Bans (NEUBs)	O	0/?	0	+	+/?	+	0/?	+/?	0	0
All (demand side measures)	DM5	Extreme Measures	O	0	0	+/?	+/?	+/-/?	0/?	+/?	0	0
North Eryri Ynys Mon	8001-2	Removal of Llyn Cwellyn 10 Ml/d abstraction limit	O	0	0	0	+/-	+	0	-	0	-
North Eryri Ynys Mon	8001-3	Reduction of Alaw Compensation Water	O	--/?	0	-	+	+	0	0	0	0
North Eryri Ynys Mon	8001-4	Reduction of Ffynnon Llugwy Compensation Water	O	--/?	0	-	+	+	0	0	0	-
North Eryri Ynys Mon	8001-5	Reduction of Cefni Reservoir Compensation Water	O	--/?	0	-	+	+	0	0	0	0
Clwyd Coastal	8012-2	Reduction of the regulation release from Aled Isaf and modification of the Hands Off Flow value at Bryn Aled	O	-	0	-	+	+	0/-	0	0	0/-
Clwyd Coastal	8012-4	Relaxation of the annual licences on Afon Aled and the Plas Uchaf and Dolwen Reservoirs	O	+/-/?	0	--	+	+	+	0	0	0

WRZ	Ref	Option Name	Constriction (C) or Operation (O)	1. Biodiversity	2. Geology and Soils	3. Water	4. Air Quality and Climate Change	5. Human Health	6. Social and Economic Wellbeing	7. Material Assets and Resource Use	8. Cultural Heritage	9. Landscape and Seascapes
Clwyd Coastal	8012-5	Relaxation of the Llannerch boreholes annual licence	O	-/?	0	-/?	+/-	+	0	-	0	0/?
Clwyd Coastal	8012-6	Pumped (winter) refill from Aled Isaf to Llyn Aled	O	-/?	0	0	--	0	0	--	0	-
Tywyn Aberdyfi	8021-1	Tankering raw water from Dysynni	O	0	0	0	+/-	+	0	-	0	-
Barmouth	8033-2	Reduce compensation water releases from Llyn Bodlyn	O	--/?	0	--	+	+	0	0	0	-
Lleyn Harlech	8034-1	Afon Dwyfor Drought Permit	O	0	0	0	+	+	0	0	0	0
SEWCUS	8109-1	Reduce compensation water releases from Llwynon Reservoir	O	--/?	0	-	+	++	+	0	0	0
SEWCUS	8112-1	Emergency abstraction from the River Rhondda at Treherbert	O	--/?	0	-/?	+/-	+	0	-	0	-
SEWCUS	8116-3	Utilise the Dead Storage in Talybont Reservoir	O	0/-	0	-	+/-	++	+	--	0	-
SEWCUS	8119-1	Compensation Water Reduction of 50% at Pontsticill Reservoir	O	--/?	0	-	+	++	+	0	0	0
Tywi CUS	8201-3	Relax the maintained requirement below the Nantgaredig intake on the River Tywi	O	--/?	0	-	+	++	++	0	0	0
Mid and South Ceredigion	8202-1	Increase the Llechryd abstraction from 19 MI/d to 21 MI/d and obtain variation of annual licence amounts	O	-/?	0	0	+	+	0	0	0	0
North Ceredigion	8203-2	Pumped abstraction from Nantymoch (a HEP reservoir operated by Statkraft) into the raw water main between Llyn Llygad Rheidol Reservoir and Bontgoch WTW	O	0	0	0	+/-	+	+	-	0	0/-



WRZ	Ref	Option Name	Constriction (C) or Operation (O)	1. Biodiversity	2. Geology and Soils	3. Water	4. Air Quality and Climate Change	5. Human Health	6. Social and Economic Wellbeing	7. Material Assets and Resource Use	8. Cultural Heritage	9. Landscape and Seascape
Pembrokeshire	8206-2	Reduce the Compensation release from Preseli Reservoir by 50%	0	--/?	0	-	+	+	0	0	0	-
Pembrokeshire	8206-7	Use of freshet bank for public water supply - Llysyfran - (Pembs)	0	0	0	0	+	+	0	0	0	0

Summary of the potential effects of the Revised Draft Drought Plan Options

The demand-side options have been assessed as having fewer and a smaller range of effects against the SEA objectives that comprise the assessment framework when compared to the supply-side options. This is because these options seek to reduce the demand for water from existing resources and do not result in any temporary increases in abstraction. Consequently, the operational effect of these options tends to be either neutral or positive.

In contrast to the demand-side options, there is a greater likelihood of significant effects arising from the construction and operation of supply-side options. A number of supply-side options will require additional temporary infrastructure to be constructed (temporary pumps, generators and above ground pipelines). Construction activities could lead to disturbance of habitat, effects on water quantity or quality (e.g. construction of temporary weirs) and can lead to disturbance of local residents and communities (e.g. noise and vibration). The presence of new above ground infrastructure can also lead to effects on landscape, especially in sensitive locations such as AONBs and National Parks, although such effects will be localised, transient and reversible. Environmental effects are potentially greater where there are sensitive receptors that may be affected during construction (e.g. sites designated for nature conservation or landscape designations). The majority of options, however, do not require additional infrastructure and therefore have no effects during construction. These include options to reduce compensation flow from reservoirs and other options that utilise existing sources.

During operation, there is considerable variation in the significance of effects of the supply-side options. In general, options that generate larger yields have significant benefits (in terms of human health and socio-economic wellbeing); however, they may also be associated with significant negative effects (in terms of effects on designated nature conservation sites (SSSIs) and fish species in particular). Options that require a reduction in compensation flows or temporary increases in abstraction could also have significant effects on water quantity and quality (where downstream flows are affected). Options that result in the temporary pumping of water over a kilometre or further, against the gradient, will require substantial quantities of energy and resources. All options will increase resilience to climate change.

There are a number of supply-side options that have been identified as having minor or neutral effects against the SEA objectives during operation. These options include those that make minor changes to existing abstraction licences.

The potential cumulative effects

The extent to which the revised draft Drought Plan options can act in combination is dependent on a number of variables. These include nature, location and timing of implementation of options, the number of options that are ultimately implemented either within a WRZ or across the supply area, and the interaction of these options with other plans or programmes. The effects are also dependent on the sensitivity of receptors to the effects of the options acting alone and in combination.

Fundamentally, the options included in the revised draft Drought Plan would not necessarily be implemented in combination. The options set out for each WRZ within the revised draft Drought Plan are a collection of measures that could be implemented on their own or in some circumstances together. The selection of the option or options to be implemented would be determined by a number of factors including the nature and intensity of the drought, operational requirements, and also on the potential environmental impacts of the option in question (as informed by the SEA and HRA of the Drought Plan). Further, some of the options are mutually exclusive and could not be implemented in combination.

These factors mean that the cumulative assessment of the impacts of the Drought Plan options is not necessarily additive, and in this respect it should be recognised that the revised draft Drought Plan differs from other plans and programmes such as the WRMP where a number of 'preferred' options are selected for implementation in each WRZ. This means that it is potentially misleading to assess specific combinations of

options either within a WRZ or across the supply area in an attempt to quantify the cumulative effects of options.

Within a WRZ, the primary considerations are the number of options in a WRZ, the locations of the options relative to each other, their hydrological connectivity, the likelihood of more than one option being implemented within the zone and the timing of implementation. Six of the WRZs contain only one supply-side option such that there is no potential for cumulative effects within these WRZs. In North Eryri Ynys Môn WRZ, the four options are located within different waterbodies which significantly reduces, but does not eliminate, the likelihood of (both positive and negative) cumulative effects against SEA objectives including climate change (SEA Objective 5), resource use (SEA Objective 7) and human health (SEA Objective 5). In SEWCUS, the four options are similarly located in different waterbodies and significant cumulative effects are unlikely.

Significant cumulative effects between different WRZs or with other plans and programmes (including Welsh Water's Water Resources Management Plan 2019, National Policy Statements (NPS) and Nationally Significant Infrastructure Projects (NSIPs), and other drought plans) have not been identified.

Section 5.13 of the Environmental Report contains further detail on secondary, cumulative and synergistic effects.

Contribution of the Revised Draft Drought Plan to Wales' Well-being Goals and the Objective for SMNR

In addition to considering the effects of the revised draft Drought Plan on the SEA objectives, an assessment has been undertaken of the contribution that the plan is likely to make to the achievement of the well-being goals established in the Well-being of Future Generations (Wales) Act 2015 and the objective for the Sustainable Management of Natural Resources (SMNR) set out in the Environment (Wales) Act 2016.

The assessment demonstrates that the revised draft Drought Plan is likely to support the achievement of the majority of the well-being goals for Wales. This principally reflects the objective of the Plan and its associated measures to ensure the continuity of drinking water supplies to Welsh Water's customers during periods of drought.

The construction (where applicable) and operation of many of the revised draft Drought Plan options will unavoidably require the use of natural resources and generate greenhouse gas emissions and could also result in adverse environmental effects, particularly during operation. However, it should be recognised that through the implementation of the proposed options, the revised draft Drought Plan will ensure the continued supply of potable water whilst minimising any detrimental effects on the environment. This will help protect and enhance the environment and promote the efficient use of water resources, making a long term contribution to the well-being goals for Wales and the objective for SMNR.

Mitigation measures

Where negative effects during the construction or operation of proposed Drought Plan options have been identified, there is the opportunity to reduce some of these potential negative effects through the use of mitigation measures. Potential mitigation measures are included within each of the assessment matrices in **Appendix E** of the Environmental Report although these should be considered as a starting point for more detailed consideration as options are planned and developed.

Examples include:

- The adoption of best practice construction techniques (such as the use of sediment traps) in order to minimise or avoid the effects of construction on designated sites.

- Measures to minimise impacts of fish and other species such as the targeted installation of woody debris features to provide fish with the habitat required to support feeding and development (growth), gravel washing of spawning areas, deployment of aeration equipment and re-stocking following drought.
- River flow and water quality monitoring during the implementation of supply-side measures.
- The rental or re-use of onsite equipment in order to minimise resource use.

The detail of this mitigation will reflect the nature of each proposed Drought Plan measure (and the anticipated effects) and will need to be considered during the planning phases of each of the Drought Plan measures if and when they are taken forward for implementation.

Section 5.15 of the Environmental Report presents further detail on mitigation and enhancement measures.

Using the findings of the assessment

The assessments have helped to highlight the range of potential environmental and social effects associated with the revised draft Drought Plan, including those that had been quantified and those that could only be identified qualitatively. The assessments outlined in this report highlighted where there are potential significant negative and positive effects of the revised draft Drought Plan, in addition to more minor effects. Furthermore, the assessments have helped to identify how some of the potential negative impacts can be mitigated and positive effects enhanced.

What are the Next Steps in the SEA Process?

Following consultation, Welsh Water has prepared a Statement of Response to the representations received during the consultation period setting out how and why the draft Drought Plan has or has not been revised to take account of the consultation responses. Welsh Water has amended the draft Drought Plan and revised the Environmental Report to reflect these changes. Welsh Water will send the revised documentation to the Welsh Government for confirmation that all representations have been appropriately accounted for. Following further direction from the Welsh Government, Welsh Water will publish the final Drought Plan and implement it accordingly.

In conjunction with publishing the final Drought Plan, Welsh Water will also issue a Post Adoption Statement. This will set out the results of the consultation and SEA process and the extent to which the findings of the SEA have been accommodated in the published Drought Plan.

As the plan is implemented, Welsh Water will monitor its effects on the environment through their existing processes, helping to ensure that the potential impacts identified in the SEA are considered in practice.

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1. Introduction

1.1 Overview

Dŵr Cymru Welsh Water (Welsh Water) provides water services to some 3 million customers in much of Wales and small parts of Cheshire and Herefordshire in England. It also has over 100,000 business customers and in total delivers more than 800 million litres of drinking water every day. Welsh Water supplies come primarily from surface water resources such as rivers and reservoirs (95 per cent of its total resources); groundwater sources constitute the remaining water resources, reflecting the geology of Wales which is unsuitable for supporting large scale groundwater supplies.

Welsh Water is currently preparing its Drought Plan 2020. The Drought Plan will detail how Welsh Water intends to respond to drought conditions, ensuring the continued supply of potable water to its customers during periods of low rainfall when water resources are depleted whilst minimising any detrimental effects on the environment. As part of the process to prepare the Drought Plan, Welsh Water consulted on a draft Drought Plan in order that regulators, stakeholders and the public could comment on the proposed measures for dealing with drought and contribute to the development of the plan. Following consultation, Welsh Water has prepared a Statement of Response to the representations received during the consultation period. Welsh Water has also amended the draft Drought Plan and revised the Environmental Report to reflect the changes arising from the consultation submissions. Welsh Water will send the revised documentation to the Welsh Government for confirmation that all representations have been appropriately accounted for. Following further direction from the Welsh Government, Welsh Water will publish the final Drought Plan and implement it accordingly.

As part of the plan preparation process, Welsh Water has appointed Wood Environment & Infrastructure Solutions UK Limited (Wood) to undertake a Strategic Environmental Assessment (SEA) of the Drought Plan. The SEA is being undertaken in accordance with Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (the SEA Directive) and The Environmental Assessment of Plans and Programmes Regulations 2004⁸ (the SEA Regulations). It assesses the likely economic, social and environmental effects of the Drought Plan and identifies ways in which adverse effects can be avoided, minimised or mitigated and how any positive effects can be enhanced. In doing so, the SEA has been used to inform the choice of options that comprise the Drought Plan, helping to optimise the contribution of the plan to sustainability. Guidance published by the Welsh Government⁹ states that those responsible for preparing a drought plan should carry out a SEA of their drought plan as part of the range of assessments required to inform the development of the plan.

1.2 Purpose of this Environmental Report

This Environmental Report presents the findings of the SEA of the revised draft Drought Plan. The purposes of the SEA of the revised draft Drought Plan and this Environmental Report are:

- to ensure that the likely significant potential environmental effects associated with the revised draft Drought Plan measures are identified, characterised and assessed;

⁸ Note that as Welsh Water's operational area includes both Wales and England, the UK wide SEA regulations are referenced in preference to the Wales only SEA regulations.

⁹ Welsh Government (2017) *Guiding Principles for Developing Water Undertaker Drought Plans for 2020*. Available online: <https://gov.wales/docs/desh/publications/171030-drought-plan-guiding-principles-en.pdf> [Accessed November 2018]

- to help identify appropriate measures to avoid, reduce or mitigate adverse effects and to enhance beneficial effects associated with the implementation of the revised draft Drought Plan wherever possible;
- to provide a framework for monitoring the potential significant effects arising from the implementation of the revised draft Drought Plan measures;
- to give the statutory consultees, stakeholders and the wider public the opportunity to review and comment upon the effects that the revised draft Drought Plan may have on them, their communities and their interests, and to encourage and support them to make responses and suggest improvements to the revised draft Drought Plan;
- to demonstrate that the revised draft Drought Plan has been developed in a manner consistent with the requirements of the SEA Regulations; and
- to help inform Welsh Water's decisions on the final form of the Drought Plan.

1.3 Welsh Water's Drought Plan 2020

Requirement to Prepare a Drought Plan

Under sections 39B and 39C of the Water Industry Act 1991 (as amended by the Water Act 2003), all water companies in England and Wales are required to prepare and maintain statutory drought plans. Drought plans set out the operational steps a water company will take before, during and after a drought to maintain essential water supplies to customers. The Water Industry Act 1991 (as amended) defines a drought plan as "a plan for how the water undertaker will continue, during a period of drought, to discharge its duties to supply adequate quantities of wholesome water, with as little recourse as reasonably possible to drought orders or drought permits".

Welsh Water's current Drought Plan¹⁰ was published in July 2015 and the company is currently preparing its next plan that will cover the period 2020 to 2025. The Drought Plan is being prepared in accordance with the guidance on drought plans published by the Welsh Government¹¹ and Natural Resources Wales (NRW) guidance¹² and as Welsh Water's operational area includes small parts of Cheshire and Herefordshire, also the Department for Environment, Food & Rural Affairs' (Defra's) and the Environment Agency's (EA's) guidance^{13,14}.

Drought Plan 2020

For operational purposes, Welsh Water divides its water supply area into three regions; North Wales, South West Wales and South East Wales. However, for water resources planning purposes, these regions are further subdivided into Water Resource Zones (WRZ). A WRZ is defined as the largest area in which water

¹⁰ Welsh Water (2015) *Drought Plan 2015*. Available online: <https://www.dwrcymru.com/en/My-Water/Water-Resources/Drought-Plan.aspx> [Accessed November 2018]

¹¹ Welsh Government (2017) *Guiding Principles for Developing Water Undertaker Drought Plans for 2020*. Available online: <https://gov.wales/docs/desh/publications/171030-drought-plan-guiding-principles-en.pdf> [Accessed November 2018]

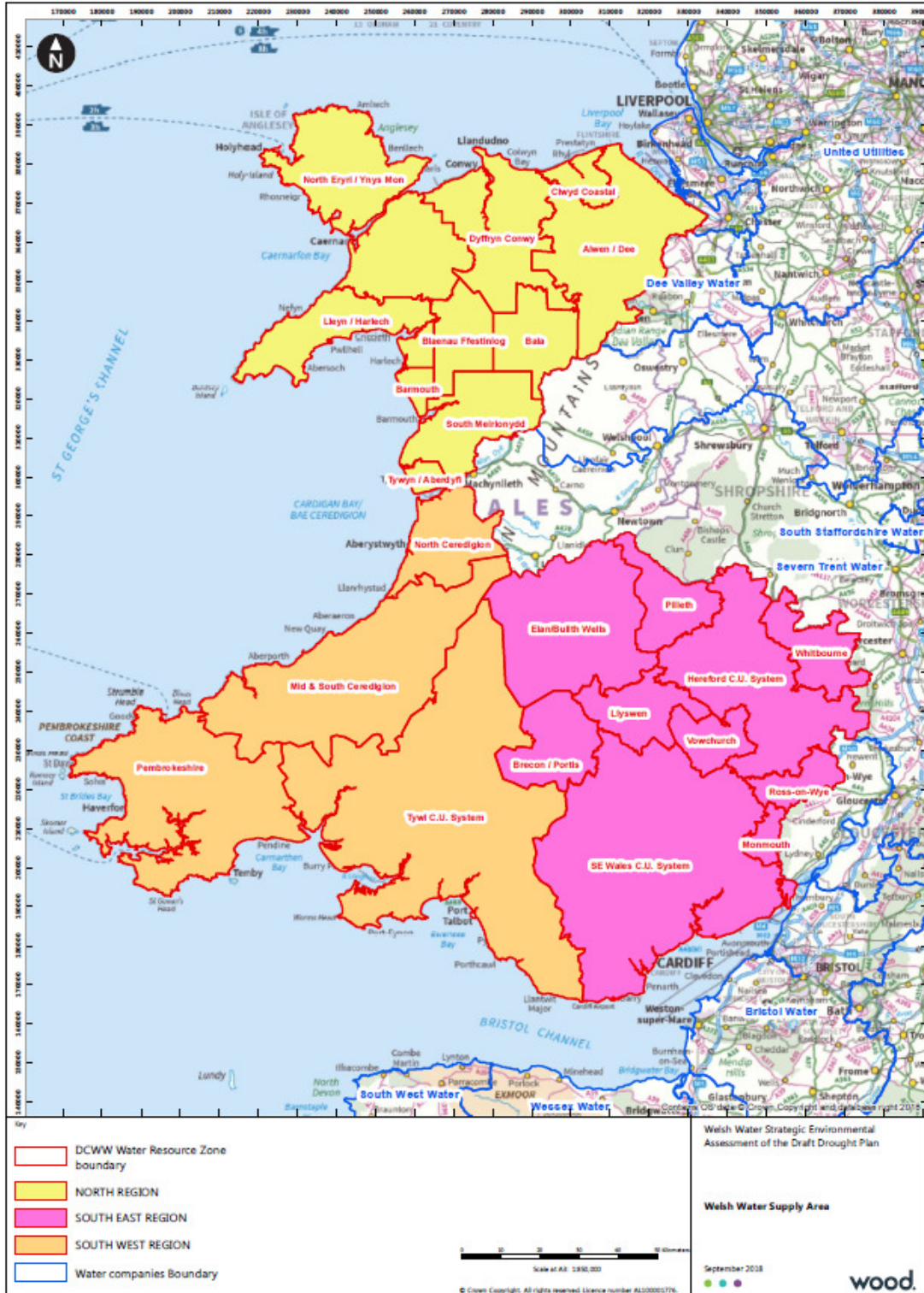
¹² NRW (2017), *Water Company Drought Plan Technical Guideline*, December 2017. Available online: <https://cdn.naturalresources.wales/media/684414/final-wc-drought-plan-guidance-2017.pdf?mode=pad&rnd=13165671358000000> [Accessed November 2018]

¹³ Defra and the Environment Agency (2017) *How to Write a Drought Management Plan*. Available online: <https://www.gov.uk/government/collections/how-to-write-and-publish-a-drought-plan#write-your-plan> [Accessed November 2018]

¹⁴ Defra and the Environment Agency (2015) *Drought plans: environmental assessment and monitoring*. Available online: <https://www.gov.uk/guidance/drought-plans-environmental-assessment-and-monitoring> [Accessed November 2018]

resources can be shared such that all customers, with some limitations, experience the same risk of water resource failure. **Figure 1.1** presents Welsh Water's 24 WRZs.

Figure 1.1 Welsh Water's Supply Area and Water Resource Zones



Welsh Water has used the Drought Vulnerability Framework¹⁵ (DVF), developed by UKWIR on behalf of the EA and NRW in 2017, to understand the vulnerability of its WRZs to more extreme droughts than it has historically experienced. Using this analysis of drought vulnerability, the first stage of developing the Drought Plan has been to define the hydrological indicators for identifying and measuring the onset of drought in each WRZ. The revised draft Drought Plan identifies the following indicators in this regard: rainfall, reservoir storage levels, river flows and levels of demand. Drought triggers have then been developed to identify when specific drought actions to reduce demand and, if necessary, obtain additional water resource may need to be implemented (i.e. when the water resource situation is moving into a drought). These triggers, which are decision making tools as part of an overall drought management framework, are used to categorise a drought into one of five stages in each of the 24 WRZs that make up Welsh Water's area. The stages are shown in **Table 1.1**.

Table 1.1 Welsh Water Drought Stages

Stage	Welsh Water Drought Stage
Stage 1	Normal operating conditions
Stage 2	Developing drought
Stage 3	Drought
Stage 4	Severe drought
Stage 5	Emergency Storage

For each stage, there are a range of drought management actions that can be implemented to ensure the continued supply of potable water. These actions are divided into two broad categories; demand-side measures and supply-side measures¹⁶. Demand-side measures are designed to reduce the demand for water during drought; supply-side measures relate to actions that can temporarily increase the amount of water available for supply during drought.

Five demand-side measures have been included in the revised draft Drought Plan; these measures are not geographically distinct and hence could be implemented in any of the WRZs in Welsh Water's area. Taking the effects of these measures into account, and following the application of the DVF, Welsh Water has identified 10 WRZs that are potentially vulnerable to drought risk. In the revised draft Drought Plan, a total of 20 supply-side measures are proposed for these WRZs.

The demand-side and supply-side measures included in the revised draft Drought Plan are listed in **Tables 1.2 and 1.3** below; detailed descriptions are contained in **Section 5**.

Table 1.2 Revised Draft Drought Plan Demand-side Measures

Ref	Option	Yield (Ml/d)	WRZ
DM1	Leakage Management	Various	All

¹⁵ UKWIR (2017) *Drought Vulnerability Framework*. Available online: <https://www.ukwir.org/drought-vulnerability-framework-0> [Accessed November 2018]

¹⁶ It should be noted that the terms 'measures' and 'options' are used interchangeably in this report to describe the draft Drought Plan actions.

Ref	Option	Yield (MI/d)	WRZ
DM2	Water Efficiency – customer messaging and device offering	Various	All
DM3	Temporary Use Bans (TUBs)	Various but estimated as 5% saving in demand	All
DM4	Non Essential Use Bans (NEUBs)	Various but estimated as 5% saving in demand (in addition to DM3)	All
DM5	Extreme measures e.g. pressure management and water rationing	Various	All

Table 1.3 Revised Draft Drought Plan Supply-side Measures

Ref	Option	Gain in Yield (MI/d)	WRZ
8001-2	Removal of Llyn Cwellyn 10 MI/d abstraction limit	2MI/d	North Eryri Ynys Mon
8001-3	Reduction of Alaw Compensation Water	1.5MI/d	North Eryri Ynys Mon
8001-4	Reduction of Ffynnon Llugwy Compensation Water	2.0MI/d	North Eryri Ynys Mon
8001-5	Reduction of Cefni Reservoir Compensation Water	0.9MI/d	North Eryri Ynys Mon
8012-2	Reduction of the regulation release from Aled Isaf and modification of the Hands Off Flow value at Bryn Aled	1.0MI/d	Clwyd Coastal
8012-4	Relaxation of the annual licences on Afon Aled and the Plas Uchaf and Dolwen Reservoirs	5.0MI/d	Clwyd Coastal
8012-5	Relaxation of the Llannerch boreholes annual licence	1.0MI/d	Clwyd Coastal
8012-6	Pumped (winter) refill from Aled Isaf to Llyn Aled	No net gain*	Clwyd Coastal
8021-1	Tankering raw water from Dysynni	1MI/d	Tywyn Aberdyfi
8033-2	Reduce compensation water releases from Llyn Bodlyn	1MI/d	Barmouth
8034-1	Afon Dwyfor Drought Permit	1MI/d	Lleyn Harlech
8109-1	Reduce compensation water releases from Llwynon Reservoir	9.1MI/d	South East Wales Conjunctive Use System (SEWCUS) - Llwynon, Sluvad, Court Farm
8112-1	Emergency abstraction from the River Rhondda at Treherbert	1MI/d	SEWCUS - Rhondda
8116-3	Utilise the Dead Storage in Talybont Reservoir	30 MI/d	SEWCUS - Talybont
8119-1	Compensation Water Reduction of 50% at Pontsticill Reservoir	9.1MI/d	SEWCUS - Pontsticill High Level
8201-3	Relax the maintained requirement below the Nantgaredig intake on the River Tywi	14 MI/d	Tywi CUS
8202-1	Increase the Llechryd abstraction from 19 MI/d to 21 MI/d and obtain variation of annual licence amounts	2MI/d	Mid and South Ceredigion

Ref	Option	Gain in Yield (MI/d)	WRZ
8203-2	Pumped abstraction from Nantymoch (a HEP reservoir operated by Statkraft) into the raw water main between Llyn Llygad Rheidol Reservoir and Bontgoch WTW	5MI/d	North Ceredigion
8206-2	Reduce the Compensation release from Preseli Reservoir by 50%	0.91MI/d	Pembrokeshire
8206-7	Use of freshet bank for public water supply - Llysyfran - (Pemb)	385MI storage volume	Pembrokeshire

*Option 8012-6 involves a water transfer between reservoirs and will therefore not provide any net gain.

Table 1.4 details the additional five options that were include in the draft Drought Plan that was published for consultation. As a result of consultation response from NRW to the draft Drought Plan and following further work and discussion, these have been removed from further consideration in the Drought Plan in order to ensure that the implementation of the final Drought Plan avoids any adverse effects on the integrity of European sites.

Table 1.4 Draft Drought Plan Supply-side Measures not taken forward following Consultation

Ref	Option	Gain in Yield (MI/d)	WRZ
8109-4	Emergency abstraction from the Afon Lwyd at New Inn	12MI/d	SEWCUS - Llwynon, Sluvad, Court Farm
8201-1	Reduce Crai compensation flow by 50%	3.4MI/d	Tywi Conjunctive Use System (CUS)
8201-4	Reduce Brianne compensation flow by 50%-winter refill only	34MI/d	Tywi CUS
8206-1	Reduce the required prescribe flow below the Crowhill Abstraction	18MI/d	Pembrokeshire
8206-8	Relax Canaston Hands-off flow	36.36 MI/d	Pembrokeshire

The Drought Plan has also identified seven standby or mothballed sources that could be reinstated during a drought. These are identified in **Table 1.5**. Welsh Water has committed to undertaken further assessment work of these mothballed sources before implementation (consistent with a consultation request from NRW).

Table 1.5 Mothballed sources

WRZ	Source	Licence	Type	Status
NEYM	Afon Rhythallt	23/65/16/0009	River Intake	Mothballed
SEWCUS	Grwyne Fawr	20/56/34/0018	Impounding reservoir	Mothballed
SEWCUS	Wentwood	20/56/72/0018	Impounding reservoir	Mothballed
SEWCUS	Pant yr Eos & Ynys Fro	20/56/11/0005 & 20/56/11/0007	Impounding reservoir	Mothballed

WRZ	Source	Licence	Type	Status
TYWI	Schwyll Well	21/58/44/0006	Groundwater Source	Mothballed
M&S Ceredigion	Aeron borehole	Licence exempt	Groundwater abstraction	Mothballed
Pembs	Milton Boreholes	Licence Exempt	Groundwater Abstraction	Mothballed

In accordance with legislation and associated drought plan guidance published by the Welsh Government and NRW, each supply-side measure has been subject to detailed environmental assessment with the findings presented in a series of Environmental Assessment Reports (EARs) that accompany the draft Drought Plan. The information for drought permits and orders included in a drought plan is to be 'as close' to application ready as possible, especially for those sites that have been identified as causing significant impact to the environment or are most likely to be required in a drought. The findings of these assessments have informed the SEA of the draft Drought Plan which has in-turn helped to guide the development of the plan.

1.4 Strategic Environmental Assessment

Overview

SEA became a statutory requirement following the adoption of Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment. This was transposed into legislation on 20 July 2004 as Statutory Instrument 2004 No.1633 - The Environmental Assessment of Plans and Programmes Regulations 2004. The Welsh Government has transposed the Directive into appropriate Regulations: The Environmental Assessment of Plans and Programmes (Wales) Regulations 2004.

The objective of the SEA Directive is:

"to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view of contributing towards sustainable development".

Throughout the course of the development of the plan, policy or programme, the aim of SEA is to identify the potential impact of options proposed in the plan in terms of their environmental, economic and social effects. If any adverse effects are identified, these options can then be avoided or proposals modified to manage or mitigate adverse effects.

Applying SEA to Drought Plans

The SEA Directive requires "an environmental assessment ... of certain plans and programmes which are likely to have significant effects on the environment" (Article 1). Plans and programmes are defined as those:

- "which are subject to preparation and/or adoption by an authority at national, regional or local level or which are prepared by an authority for adoption, through a legislative procedure by Parliament or Government; and
- which are required by legislative, regulatory or administrative provisions" (Article 2(a)).

Guidance produced by the European Commission (EC)¹⁷ indicates that in preparing plans for water resources, privatised utilities companies can be considered an authority because they are providing services that would be carried out by public authorities in a non-privatised regime. The preparation of a drought plan is a statutory requirement and therefore meets the requirements of Article 2(a) of the Directive.

Plans and programmes that may have significant effects on the environment are identified as those:

- “which are prepared for... water management... and which set the framework for future development consent of projects listed in Annexes I and II to Directive 85/337/EEC [the Environmental Impact Assessment Directive]; or
- which, in view of the likely effect on sites, have been determined to require an assessment pursuant to Article 6 or 7 of Directive 92/43/EEC [the Habitats Directive]” (Article 3, paragraph 2(a)).

Broadly, this includes plans that may include development of infrastructure to source, store, transfer or manage water, or may affect sites that have European designations (Special Areas of Conservation (SACs), Special Protection Areas (SPAs), and Ramsar sites). The Welsh Government guidance¹¹ states that those responsible for preparing drought plans should carry out a SEA as part of the range of assessments required to inform the development of their plans.

Unlike plans such as transport plans or land use plans where there is the expectation that the plan will be actioned during its lifetime, the various measures put forward in a drought plan may never be actioned as there may not be drought conditions that would require the measures to be triggered. As the timing, severity, duration, frequency and location of any drought that may occur during a plan’s lifetime isn’t known, which measures may be deployed in practice and their effects on the environment cannot be predicted. However, it is still possible to assess the likely significant effects of the use of such measures should they be required. It should also be noted that the assessment addresses the effects of the measures themselves, not the effects of the drought itself, which forms the baseline environment for the purposes of the assessment.

Screening

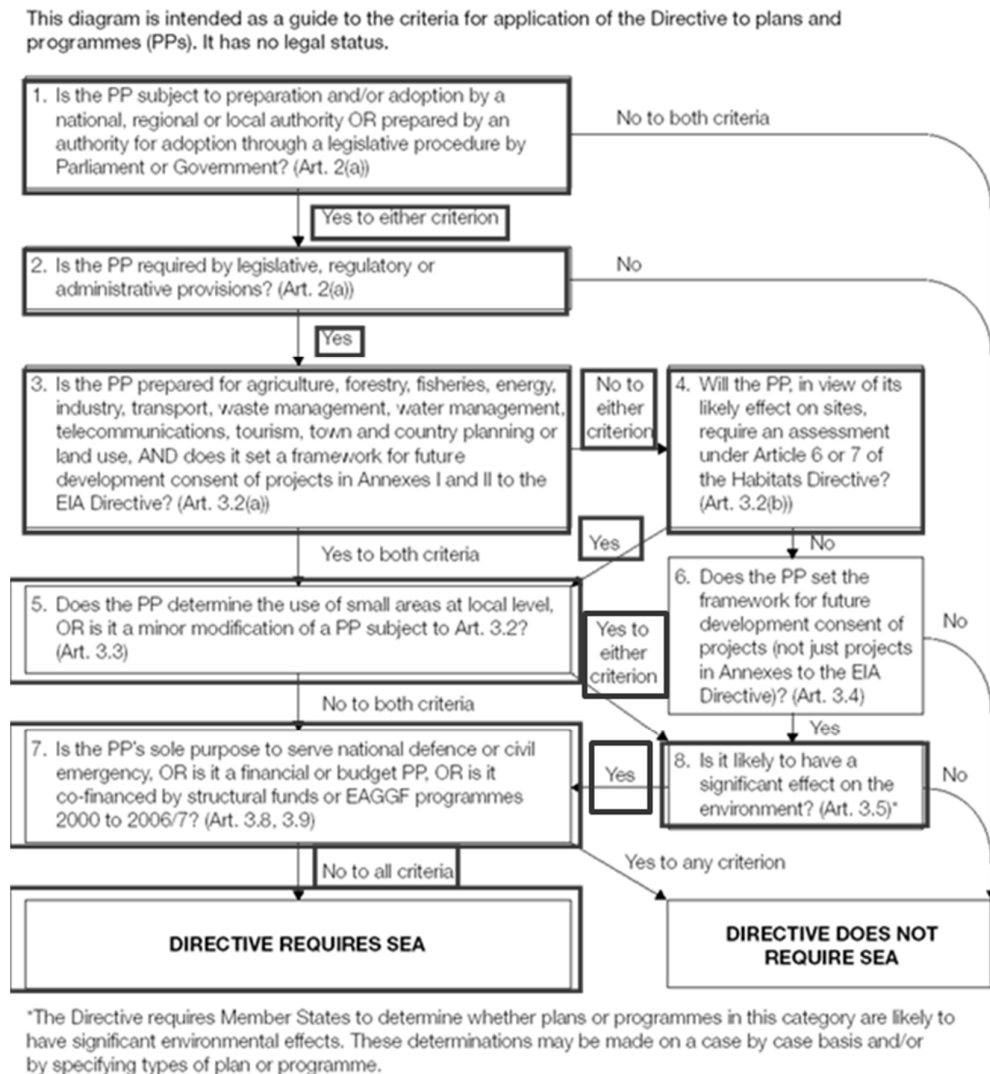
The NRW guidance¹² states that screening should be undertaken of drought plans to determine if all the stages of a SEA are required. In consequence, the flow diagram in the ODPM SEA Practical Guide¹⁸ has been applied to Welsh Water’s Drought Plan and is presented in **Figure 1.2** with the boxes and arrows highlighted describing the provisions and route through the flow chart that is applicable to the Drought Plan; this demonstrates that the Drought Plan falls within the scope of the SEA Directive.

The requirement for SEA of the Drought Plan is primarily due to the potential ‘significant effects’ of measures within the plan on sites designated under the Habitats Directive. It is also considered that the measures proposed within the Drought Plan could have a range of potentially significant effects on people and wider biodiversity from changes in river flows and groundwater levels.

¹⁷ EC (2003) *Implementation of Directive 2001/42 on the Assessment of the Effects of Certain Plans and Programmes on the Environment*. Available online: http://ec.europa.eu/environment/archives/eia/pdf/030923_sea_guidance.pdf [Accessed November 2018]

¹⁸ Office of the Deputy Prime Minister (2005) *A Practical Guide to the Strategic Environmental Assessment Directive* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/7657/practicalguidesea.pdf [Accessed November 2018]

Figure 1.2 SEA Screening of Welsh Water's Drought Plan



Stages of Strategic Environmental Assessment

Following screening, SEA comprises of five key stages:

- **Stage A:** Scoping;
- **Stage B:** Develop and Refine Alternatives and Assess Effects;
- **Stage C:** Prepare Environmental Report;
- **Stage D:** Consult on the Draft Plan and Environmental Report and Prepare the Post Adoption (SEA) Statement; and
- **Stage E:** Monitor Environmental Effects.

The first stage of SEA (**Stage A**) is the production of a Scoping Report. This reviews plans and programmes that could affect the Drought Plan or be affected by it, outlines baseline information for the plan area and sets out the proposed framework for assessing potential environmental effects. The SEA Scoping Report for

the Drought Plan was issued for consultation to the statutory consultation bodies (NRW, Cadw, the Welsh Government, EA, Natural England and Historic England) for a five week period between 5th November and 7th December 2018. Three responses to the consultation were received which resulted in amendments to the baseline information and assessment framework that has been used to assess the Drought Plan (a schedule of consultation responses to the Scoping Report is contained at **Appendix B**).

The draft and revised draft Drought Plan has been subject to assessment using the amended assessment framework (**Stage B**). This has comprised an assessment of both demand-side and supply-side measures, the findings of which are presented in this SEA Environmental Report (**Stage C**). The Environmental Report also includes proposals for monitoring the effects of the Drought Plan.

The draft Drought Plan and accompanying documents including an earlier version of this Environmental Report were submitted to the Welsh Government with a request for publication. Following receipt of the direction to do so, Welsh Water published the documents for an 8 week consultation, beginning the 25th July 2019 (**Stage D**). Following consultation and an analysis of the responses, Welsh Water has prepared a Statement of Response to the representations received during the consultation period setting out how and why the draft Drought Plan has or has not been revised to take account of the consultation responses. Welsh Water has amended the draft Drought Plan and revised the Environmental Report to reflect these changes. Welsh Water will send the revised documentation to the Welsh Government for confirmation that all representations have been appropriately accounted for. Following further direction from the Welsh Government, Welsh Water will publish the final Drought Plan and implement it accordingly. In conjunction with publishing the final Drought Plan, Welsh Water will also issue a Post Adoption Statement. This will set out the results of the consultation and SEA processes and the extent to which the findings of the SEA have been accommodated in the final Drought Plan.

During the period of the Drought Plan, Welsh Water will monitor any significant environmental effects arising from the plan's implementation (**Stage E**).

1.5 Habitats Regulations Assessment

The Conservation of Habitats and Species Regulations 2017 (the 'Habitats Regulations') requires that competent authorities assess the potential impacts of plans and programmes on the Natura 2000 network of European protected sites¹⁹ to determine whether there will be any 'likely significant effects' on any European site as a result of the plan's implementation (either on its own or 'in combination' with other plans or projects); and, if so, whether these effects will result in any adverse effects on the site's integrity. The process by which the impacts of a plan or programme are assessed against the conservation objectives of a European site is known as Habitats Regulations Assessment (HRA)²⁰.

The NRW guidance²¹ states that those responsible for preparing the drought plan "must ensure that the drought plan meets the requirements of the Conservation of Habitats and Species Regulations 2017, and must

¹⁹ European protected sites refers to designated Special Areas of Conservation (SACs) and Special Protected Areas (SPAs), candidate SACs (those submitted formally to the EC but not yet adopted or designated), proposed SPAs and SACs (sites subject to consultation on whether they should be designated) and proposed and designated Ramsar sites, which are not European sites but under Welsh Government policy should have the same level of protection as SACs and SPAs. Within this report "European site" is used as a generic term for all of the above designated sites.

²⁰ 'Appropriate Assessment' has been historically used as an umbrella term to describe the process of assessment as a whole. The whole process is now more accurately termed 'Habitats Regulations Assessment' (HRA), and 'Appropriate Assessment' is used to indicate the specific stage of HRA.

²¹ Natural Resources Wales (2017) *Water Company Drought Plan Technical Guidance*. Available online:

<https://cdn.naturalresources.wales/media/684414/final-wc-drought-plan-guidance-2017.pdf?mode=pad&rnd=131656713580000000>

[Accessed November 2018]

undertake a HRA on the effects of your plan on European sites, alone or in combination with other plans or projects (e.g. the effects of drought management actions on European sites)".

In accordance with the Habitats Regulations, what is commonly referred to as a HRA screening exercise has been undertaken to identify whether Welsh Water's revised draft Drought Plan will have any likely significant effects on any European sites (either alone or 'in combination' with other projects or plans). Where the possibility of significant effects could not be excluded, a more detailed Appropriate Assessment has been carried out to determine whether these effects would adversely affect the site's integrity.

The HRA is undertaken and reported separately from the SEA. However, the conclusions of the HRA have helped to inform the proposed assessment process, particularly in respect of the potential effects of the revised draft Drought Plan measures on biodiversity.

1.6 The Well-being of Future Generations (Wales) Act 2015

The *Well-being of Future Generations (Wales) Act 2015*²² places a duty on Welsh public bodies to carry out sustainable development. Welsh Water is not a public body; however, the Act, as noted in section 6(3), can apply to other parties 'who exercise functions of a public nature'. Whilst this interpretation is evolving, it is noted that for the purposes of SEA, as outlined in the EC guidance²³, Welsh Water, as a "privatised utilities company can be considered an authority because they are providing services that would be carried out by public authorities in a non-privatised regime".

In this Act, sustainable development is defined as "the process of improving the economic, social, environmental and cultural well-being of Wales by taking action, in accordance with the sustainable development principle, aimed at achieving the well-being goals". In this context, the sustainable development principle means that public bodies "must act in a manner which seeks to ensure that the needs of the present are met without compromising the ability of future generations to meet their own needs". In order to act in this manner, the Act sets out that a public body must take into account:

- *"the importance of balancing short term needs with the need to safeguard the ability to meet long term needs, especially where things done to meet short term needs may have detrimental long term effect;*
- *the need to take an integrated approach, by considering how—*
 - ▶ *(i) the body's well-being objectives may impact upon each of the well-being goals;*
 - ▶ *(ii) the body's well-being objectives impact upon each other or upon other public bodies' objectives, in particular where steps taken by the body may contribute to meeting one objective but may be detrimental to meeting another;*
- *the importance of involving other persons with an interest in achieving the well-being goals and of ensuring those persons reflect the diversity of the population of—*
 - ▶ *(i) Wales (where the body exercises functions in relation to the whole of Wales), or*
 - ▶ *(ii) the part of Wales in relation to which the body exercises functions;*
- *how acting in collaboration with any other person (or how different parts of the body acting together) could assist the body to meet its well-being objectives, or assist another body to meet its objectives;*

²² Available from <http://www.legislation.gov.uk/anaw/2015/2/contents/enacted> [Accessed November 2018]

²³ EC (2003) *Implementation of Directive 2001/42 on the Assessment of the Effects of Certain Plans and Programmes on the Environment*.

- *how deploying resources to prevent problems occurring or getting worse may contribute to meeting the body's well-being objectives, or another body's objectives."*

The seven well-being goals established in the Act are set out in **Table 1.6**.

Table 1.6 The Well-being Goals for Wales

Goal	Description of the Goal
A prosperous Wales	An innovative, productive and low carbon society which recognises the limits of the global environment and therefore uses resources efficiently and proportionately (including acting on climate change); and which develops a skilled and well-educated population in an economy which generates wealth and provides employment opportunities, allowing people to take advantage of the wealth generated through securing decent work.
A resilient Wales	A nation which maintains and enhances a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change (for example climate change).
A healthier Wales	A society in which people's physical and mental well-being is maximised and in which choices and behaviours that benefit future health are understood.
A more equal Wales	A society that enables people to fulfil their potential no matter what their background or circumstances (including their socio economic background and circumstances).
A Wales of cohesive communities	Attractive, viable, safe and well-connected communities.
A Wales of vibrant culture and thriving Welsh language	A society that promotes and protects culture, heritage and the Welsh language, and which encourages people to participate in the arts, and sports and recreation.
A globally responsible Wales	A nation which, when doing anything to improve the economic, social, environmental and cultural well-being of Wales, takes account of whether doing such a thing may make a positive contribution to global well-being.

The well-being goals have been fully reflected in the assessment methodology to help ensure alignment with national policy and legislation on sustainability. Specifically, the well-being goals relevant to each SEA objective are set out in the assessment framework (see **Table 4.2**) which has been used to assess the revised draft Drought Plan measures. Separate commentary on the revised draft Drought Plan's contribution to the well-being goals is presented in **Section 5.14** of this revised Environmental Report.

1.7 The Environment (Wales) Act 2016

The Environment (Wales) Act 2016²⁴ introduced a new legislative approach for the sustainable management of natural resources (SMNR) in Wales. It seeks to maintain and enhance the resilience of Wales' ecosystems and the services and benefits they provide and, in so doing, meet the needs of the present generation without compromising the ability of future generations to meet their needs. Section 3(1) of the Environment (Wales) Act defines SMNR as:

- using natural resources in a way and at a rate that promotes achievement of the SMNR objective;

²⁴ Welsh Government (2016) *The Environment (Wales) Act 2016*. Available online: <http://www.legislation.gov.uk/anaw/2016/3/contents/enacted> [Accessed November 2018]

- taking other action that promotes achievement of that objective; and
- not taking action that hinders achievement of that objective.

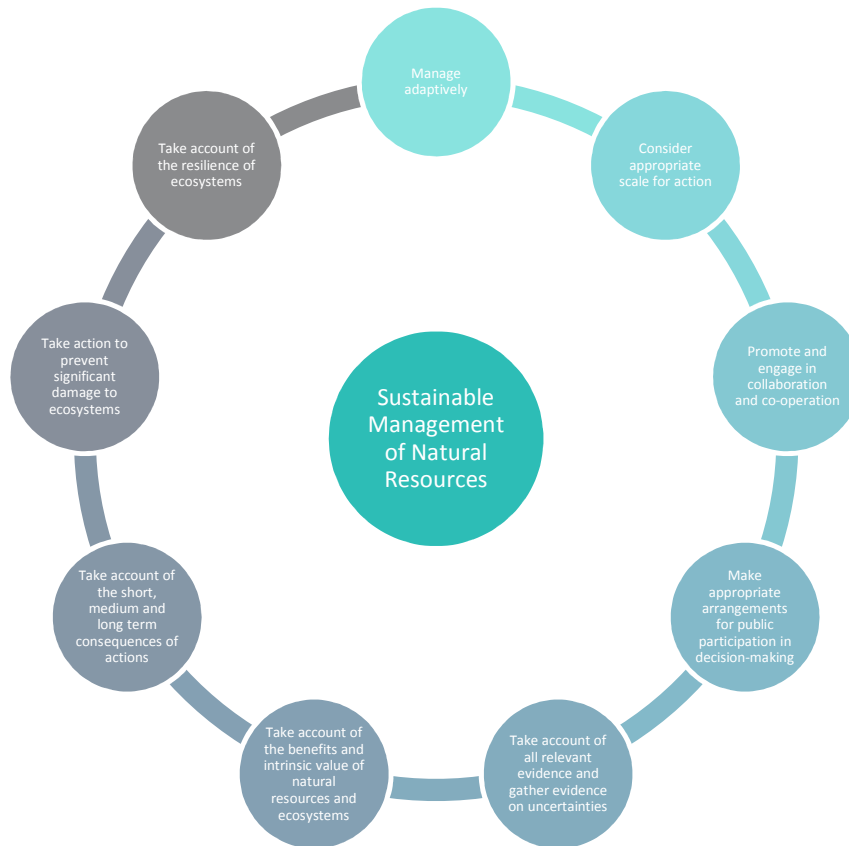
The objective for SMNR referred to above is *“to maintain and enhance the resilience of ecosystems and the benefits they provide and, in so doing—*

(a) meet the needs of present generations of people without compromising the ability of future generations to meet their needs, and

(b) contribute to the achievement of the well-being goals in section 4 of the Well-being of Future Generations (Wales) Act 2015”.

To achieve the objective of SMNR, the Act introduces a number of principles. These principles, which are to be applied equally, are highlighted in **Figure 1.3**.

Figure 1.3 Sustainable Management of Natural Resources – Principles



The SEA has assessed the likely contribution of the revised draft Drought Plan to the objective for SMNR by mapping the objective to each relevant SEA objective within the assessment framework (see **Table 4.2**). A separate summary of the assessment against the objective is presented in **Section 5.14** of this Environmental Report.

1.8 Environmental Report Structure

The remainder of this Environmental Report is structured as follows:

- **Section 2: Review of Plans and Programmes** - Provides an overview of the review of those plans and programmes relevant to the revised draft Drought Plan and SEA that is contained at **Appendix C**;
- **Section 3: Baseline Analysis** - Presents the baseline analysis of social, economic and environmental characteristics and identifies the key sustainability issues relevant to the revised draft Drought Plan and SEA;
- **Section 4: Approach to the Assessment** - Outlines the approach to the SEA of the revised draft Drought Plan including the assessment framework and the technical difficulties encountered in completing the assessment including assumptions and uncertainties;
- **Section 5: Assessment of the Drought Plan Measures** - Presents the findings of the assessment of the revised draft Drought Plan measures. Commentary is also provided on the cumulative effects of the revised draft Drought Plan and on the likely contribution of the plan to the achievement of the well-being goals established in the Well-being of Future Generations (Wales) Act 2015 and objective for SMNR contained in the Environment (Wales) Act 2016;
- **Section 6: Next Steps and Proposals for Monitoring** - Details the next steps in the SEA process including consultation details and presents views on how the environmental effects of the Drought Plan will be monitored.

The Environmental Report additionally contains a number appendices including a Quality Assurance Checklist (**Appendix A**), schedule of responses to the Scoping Report and the Environmental Report (**Appendix B**), review of plans and programmes (**Appendix C**), definitions of significance (**Appendix D**) and detailed assessment matrices (**Appendix E**).

Compliance with the SEA Regulations

This Environmental Report has been prepared to meet the requirements of the SEA Directive and associated Regulations. The Quality Assurance Checklist at **Appendix A** details how the requirements of the SEA Directive and its transposing regulations have been addressed in this Environmental Report. **Table 1.7** indicates the location in this report of the relevant information required under the SEA regulations.

Table 1.7 Information Provided in this Report to Meet the Requirements of the SEA Regulations

SEA Requirement	Section of this Report where Relevant Information is Presented
An outline of the contents and main objectives of the plan or programme, and of its relationship with other relevant plans and programmes.	1.3, 2, Appendix C
The relevant aspects of the current state of the environment and how it will change without implementation of the plan or programme.	3
The environmental characteristics of areas likely to be significantly affected.	3
Any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Council Directive 79/409/EEC on the conservation of wild birds and the Habitats Directive.	3 (also see HRA report)
The environmental protection objectives, established at International, Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation.	2, Appendix C

SEA Requirement	Section of this Report where Relevant Information is Presented
The likely significant effects on the environment, including short, medium and long-term effects, permanent and temporary effects, positive and negative effects, and secondary, cumulative and synergistic effects, on issues such as biodiversity, population, human health, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the inter-relationship between these issues.	5, 6, Appendix D
The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme.	5, Appendix D
An outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information.	1.3, 4.7
A description of the measures envisaged concerning monitoring.	6
A non-technical summary of the information provided.	Non-technical summary

2. Review of Plans and Programmes

2.1 Introduction

The SEA Regulations require a report containing “an outline of the contents, main objectives of the plan or programme and relationship with other relevant plans and programmes” (Schedule 2(1)) as well as “The environmental protection objectives, established at international (European) Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation” (Schedule 2(5)).

One of the first steps in undertaking the SEA of the Drought Plan is therefore to identify and review other relevant plans and programmes which could influence the plan. These may be plans and programmes at an international/European, national, regional or sub-regional level, commensurate with the scope of the Drought Plan. The review aims to identify the relationships between the Drought Plan and these other documents, i.e. how the Drought Plan could be affected by the other plans’ and programmes’ aims, objectives and/or targets, or how it could contribute to the achievement of their environmental and sustainability objectives. It is also a valuable source of information to support the completion of the social, economic and environmental baseline analysis and to determine the key issues for the Drought Plan and SEA (see **Section 3**).

The completed review of plans and programmes is used to provide the policy context for the subsequent assessment process and helps to inform the development of objectives that comprise the assessment framework (see **Section 4**).

2.2 Overview

The SEA Scoping Report included a review of plans and programmes, consistent with the requirements of the SEA Directive. Consultation responses to the Scoping Report identified additional plans and programmes for consideration in the review which have been subsequently included in this Environmental Report.

Over 100 international/European, national, regional/sub-regional and local level plans and programmes have been reviewed in preparing this Scoping Report. These are listed in **Table 2.1**, with the results of the review provided in **Appendix C**.

Table 2.1 Plans and Programmes Examined for the SEA of the Drought Plan

Plan / Programme
International / European Plans and Programmes
The Bonn Convention (or CMS) 1975
Bern Convention (1979)
Ramsar Convention (1971)
UNESCO World Heritage Convention (1972)
Kyoto Protocol 1997
Aarhus Convention (1998)
The Convention for the Protection of the Architectural Heritage of Europe (Granada Convention 1987)
The European Convention on the Protection of Archaeological Heritage (Valetta Convention 1992)
World Commission on Environment and Development (1987): Our Common Future (The Brundtland Report)
The World Summit on Sustainable Development (WSSD), Johannesburg, September 2002 - Commitments arising from Johannesburg Summit (2002)
United Nations Convention on Biodiversity (the Rio Convention, 1992)
European Landscape Convention 2000 (became binding March 2007)

Plan / Programme

The Paris Agreement (2016)

European Union (EU) Directives, Strategies & Policy Packages

European Commission (EC) (2006) Thematic Strategy for Soil Protection EU Directives on Environmental Impact Assessment (Codified Directive 2011/92/EU and Revised Directive 2014/52/EU)

EC (2011) A Resource- Efficient Europe- Flagship Initiative Under the Europe 2020 Strategy, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions (COM 2011/21)

EC (2011) A Roadmap for Moving to a Competitive Low Carbon Economy in 2050

EC (2013) Strategy on Adaptation to Climate Change

EC (2014) A Policy Framework for Climate and Energy in the Period from 2020 to 2030

EC (2015) 'Closing the loop - An EU Action Plan for the Circular Economy' policy package

EU (1991) Nitrates Directive (91/676/EEC)

EU (1991) Directive 91/271/EEC for Urban Waste-water Treatment

EU (1992) Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) & Subsequent Amendments

EU (1998) Drinking Water Directive (98/83/EC)

EU (1999) Directive on the Landfill of Waste (99/31/EC)

EU (2000) Water Framework Directive (2000/60/EC)

EU (2001) Directive on the Assessment of the Effects of Certain Plans and Programmes on the Environment (SEA Directive) (2001/42/EC)

EU (2001) National Emissions Ceiling Directive 2001/81/EC

EU (2002) Environmental Noise Directive (Directive 2002/49/EC)

EU (2002) Directive 2002/91/EC (2002) Directive 2002/91/EC on the Energy Performance of Buildings

EU (2004) Environmental Liability Directive (2004/35/EC)

EU (2005) Thematic Strategy on Air Pollution

EU (2006) Animal health requirements for aquaculture animals and products thereof, and on the prevention and control of certain diseases in aquatic animals (2006/88/EC)

EU (2006) Fresh Water Fish Directive (2006/44/EC)

EU (2006) Directive 2006/118EC on the protection of groundwater against pollution and deterioration

EU (2006) Bathing Waters Directive 2006/7/EC

EU (2006) Renewed EU Sustainable Development Strategy

EU (2006) Mining Waste Directive 2006/21/EC

EU (2007) Floods Directive 2007/60/EC

EU (2007) The Eel Directive 2007/1100/EC

EU (2008) Environmental Quality Standards Directive 2008/105/EC

EU (2008) Marine Strategy Framework Directive 2008/56/EC

EU (2008) Air Quality Directive (2008/50/EC) and previous directives (96/62/EC; 99/30/EC; 2000/69/EC & 2002/3/EC)

EU (2008) Directive on Waste (Directive 75/442/EEC, 2006/12/EC 2008/98/EC as amended)

EU (2009) Directive on the Conservation of Wild Birds (09/147/EC) (codified version of Council Directive 79/409/EEC as amended)

EU (2009) Renewable Energy Directive (2009/28/EC)

EU (2010) The Industrial Emissions Directive (2010/75/EU)

EU (2010) Energy 2020 - A Strategy for Competitive, Sustainable and Secure Energy

EU (2010) Europe 2020 - A Strategy for Smart, Sustainable and Inclusive Growth

EU (2011) EU Biodiversity Strategy to 2020 – towards implementation

EU (2011) Directives on *Environmental Impact Assessment (Codified Directive 2011/92/EU and Revised Directive 2014/52/EU)*

EU (2012) Energy Efficiency Directive (2012/27/EU)

EU (2014) Seventh Environmental Action Programme

EU (2015) Invasive Alien Species Regulation (1143/2014/EU)

National Plans and Programmes

Canal and River Trust (2015) Water Resources Strategy 2015 – 2020

Department for Communities and Local Government (DCLG) (2014) National Planning Policy for Waste

Department of Energy and Climate Change (DECC) (2010) CRC Energy Efficiency Scheme

DECC (2011) National Policy Statements for Energy Infrastructure

Department for Environment, Food and Rural Affairs (Defra) (2005) Making Space for Water: Taking forward a new Government strategy for flood and coastal erosion risk management in England (first Government response to 2004 consultation)

Defra (2011) Shoreline Management Plan Guidance

Defra (2011) Biodiversity 2020: A strategy for England's wildlife and ecosystem services

Defra (2007) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland

Plan / Programme

Defra, Scottish Government, Welsh Government (2015) The Great Britain Invasive Non-native Species Strategy
 Defra (2009) The Groundwater (England and Wales) Regulations 2009
 Defra (2010) Making Space for Nature: A Review of England's Wildlife Sites and Ecological Network
 Defra (2012) National Policy Statement for Waste Water
 Environment Agency (2008) Better Sea Trout and Salmon Fisheries: Our Strategy for 2008-2021
 Environment Agency (2011) National Flood and Coastal Erosion Risk Management Strategy for England
 Environment Agency (2016) Creating a Better Place: Our Ambition to 2020
 Environment Agency (undated) Restoring Sustainable Abstraction Programme
 Environment Agency (2013) Areas of Water Stress: Final Classification
 Environment Agency (various) Drought Plans
 The Historic Environment Group (2018) Historic Environment and Climate Change Sector Adaption Plan
 HM Government (1975) Salmon and Freshwater Fisheries Act
 HM Government (1975) Reservoirs Act
 HM Government (1981) Wildlife and Countryside Act
 HM Government (1991) Water Resources Act
 HM Government (1994) UK Biodiversity Action Plan
 HM Government (2000) Countryside Rights of Way Act 2000
 HM Government (2003) Water Act 2003
 HM Government (2005) UK Sustainable Development Strategy
 HM Government (2006) Natural Environment and Rural Communities Act 2006
 HM Government (2006) Climate Change and Sustainable Energy Act 2006
 HM Government (2008) Climate Change Act 2008
 HM Government (2009) Marine and Coastal Access Act 2009
 HM Government (2009) The Eels (England and Wales) Regulations 2009 (as amended 2011)
 HM Government (2010) Flood and Water Management Act 2010
 HM Government (2010) The Water Use (Temporary Bans) Order 2010
 HM Government (2011) UK Marine Policy Statement
 HM Government (2014) Water Act 2014
 HM Government (2015) Infrastructure Act 2015
 HM Government (2016) Environmental Permitting (England and Wales) Regulations 2016 (as amended 2018)
 HM Government (2017) Conservation of Habitats & Species Regulations 2017
 HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment
 HM Government (2018) The Water Supply (Water Quality) Regulations 2018
 HM Treasury (2016) National Infrastructure Delivery Plan
 Ministry of Housing, Communities and Local Government (MHCLG) (2018) National Planning Policy Framework
 Natural Resources Wales (2016) The State of Natural Resources Report (SoNaRR)
 Natural Resources Wales (2017) Drought Plan
 Natural Resources Wales (2017) Water Company Drought Plan Technical Guideline
 Ofwat (2008) Water Supply and Demand Policy
 Ofwat (2016) Water 2020
 Ofwat (2017) Resilience in the Round
 JNCC and Defra (2012) UK Post-2010 Biodiversity Framework
 Countryside Council for Wales (2001) Register of Landscapes of Historic Interest
 Valuing Our Environment Partnership (2010) Valuing the Welsh Historic Environment
 Waterwise (2017) Water Efficiency Strategy for the UK
 Welsh Government (1998) Technical Advice Note 14: Coastal Planning
 Welsh Government (2006) Environment Strategy for Wales
 Welsh Government (2008) One Wales One Planet: The Sustainable Development Scheme for Wales
 Welsh Government (2008) People, Places, Futures: The Wales Spatial Plan 2008 Update
 Welsh Government (2008-2015) Welsh Rural Development Plan Programme 2007 2014-2013 2020
 Welsh Government (2009) Technical Advice Note 5: Nature Conservation and Planning
 Welsh Government (2010) Climate Change Strategy for Wales
 Welsh Government (2010) National Transport Plan
 Welsh Government (2010) Towards Zero Waste, One Wales: One Planet – Overarching Waste Strategy Document for Wales
 Welsh Government (2010) The Biodiversity Framework for Wales
 Welsh Government (2011) Welsh Government Policy Statement: Preparing for a Changing Climate
 Welsh Government (2011) National Strategy for Flood and Coastal Erosion Risk Management in Wales
 Welsh Government (2012) Energy Wales: A Low Carbon Transition
 Welsh Government (2012) Historic Environment Strategy for Wales
 Welsh Government (2013) Partnership for Growth: The Welsh Government Strategy for Tourism 2013 – 2020
 Welsh Government (2015) Water Strategy for Wales
 Welsh Government (2015) Well-being of Future Generations (Wales) Act 2015

Plan / Programme

Welsh Government (2015) Nature Recovery Plan for Wales
 Welsh Government (2016) Technical Advice Note 12: Design
 Welsh Government (2016) Historic Environment (Wales) Act 2016
 Welsh Government (2016) The Environment (Wales) Act 2016
 Welsh Government (2016) Guiding Principles for Developing Water Resources Management Plans
 Welsh Government (2017) Guiding Principles for Developing Water Undertaker Drought Plans 2020
 Welsh Government (2017) Natural Resources Policy
 Welsh Government (2017) The Drought Plan (Wales) Direction 2017
 Welsh Government (2018) Planning Policy Wales (Edition 10)

Regional Plans and Programmes

Water Company (various) Drought Plans
 Water Company (various) Water Resources Management Plans
 Dŵr Cymru Welsh Water (2007) Our Sustainable Future
 Dŵr Cymru Welsh Water (2017) Making time for nature: Dŵr Cymru Welsh Water's plan for maintaining and enhancing biodiversity
 Dŵr Cymru Welsh Water (2018) Welsh Water 2050
 Natural Resources Wales (2015) (Various) River Basin Management Plans

Sub-regional/ Local Plans and Programmes

AONB Management Units (various) AONB Management Plans
 Defra (Various) Eel Management Plans
 Environment Agency (various) Catchment Flood Management Plans
 Environment Agency (various) River Basin Management Plans
 Environment Agency, Natural Resources Wales and Natural Scotland (2016) River Basin District Flood Risk Management Plans
 Environment Agency (undated) Wye Waterway Plan
 Environment Agency and Natural Resources Wales (various) Salmon Action Plans
 Local Biodiversity Action Plans (LBAPs), including Species and Habitats Action Plans (various)
 Local Geodiversity action Plans (LGAPs) (Various)
 Local Planning Authority (various) Land Use Plans
 National Park Management Plans (various)
 Natural Resources Wales (Various) Catchment Abstraction Management (Licencing) Strategies (CAMS)
 Public Services Boards (PSBs) (Various) PSB Assessments and Local Well-being Plans
 Shoreline Management Plans (various)

2.3 Policy Objectives Relevant to the Drought Plan

The Welsh Government's 'Guiding Principles for Developing Water undertaker Drought Plans' 2017 (the Guiding Principles) includes a section that identifies the guiding principles for the development of drought plans. It highlights the Water Strategy for Wales, which makes clear the importance that the Welsh Government attaches to adopting an integrated and sustainable approach to managing water resources. This requires the integrated management of natural resources to maximise economic and social benefits in an equitable way while protecting all ecosystems and the environment. Drought plans must set out how water supplies will be maintained in the event of a drought and undertakers are expected to plan against more challenging but plausible droughts beyond the capabilities of their current supply system.

The Guiding Principles also highlight that drought plans should focus on delivering towards improving the social, economic, environmental and cultural well-being of Wales as reflected in the seven well-being goals established in the Well-being of Future Generations (Wales) Act 2015, and they should support other organisations to meet their statutory requirements under that Act.

The review of other plans and programmes presented in **Appendix C** has identified a number of objectives and policy messages relevant to the Drought Plan. Reflecting the topics identified in Annex I of the SEA Directive and Schedule 2 of the SEA Regulations, these objectives and messages are set out for the following topic areas:

- Biodiversity;
- Geology and Soils;
- Water;
- Air Quality and Climate;
- Human Environment (including population and human health);
- Material Assets and Resource Use;
- Cultural Heritage; and
- Landscape.

The policy objectives and messages identified from the review of other plans and programmes are summarised in **Table 2.2**. It is important that the assessment takes these into account as this will help to highlight any areas where the Drought Plan will help or hinder the achievement of the objectives of the other plans. Only the key sources are included; however, it is acknowledged that many other plans and programmes could also be included. The relevance of the key objectives and policy measures to the assessment of the Drought Plan is also indicated in **Table 2.2**.

Table 2.2 Key Policy Objectives Identified in Other Plans and Programmes relevant to the Assessment of the Drought Plan

Key Objectives and Policy Messages	Key Sources	Relevant to the Assessment of the Drought Plan?
Biodiversity		
Conservation and enhancement of the levels and variety of biodiversity, including designated sites, priority species and habitats	Bern Convention; Bonn Convention; Habitats Directive; Invasive Alien Species Regulation; Ramsar Convention on Wetlands; Birds Directive; EU Biodiversity Strategy to 2020; Marine Strategy Framework Directive; Biodiversity 2020; Natural Environment White Paper; UK post 2010 Biodiversity Framework; Better Sea Trout and Salmon Fisheries; Eel Regulations; Wildlife and Countryside Act; UK Biodiversity Action Plan; Marine and Coastal Access Act; Conservation of Habitats & Species Regulations; A Green Future: Our 25 Year Plan to Improve the Environment; UK Marine Policy Statement; Countryside and Rights of Way Act; National Planning Policy Framework; Planning Policy Wales (Edition 10); Environment Strategy for Wales; TAN5: Nature Conservation and Planning; Environment (Wales) Act; Well-being of Future Generations (Wales) Act; Natural Resources Policy; Local Biodiversity Action Plans (BAP) including Species and Habitats Action Plans (various); Local Planning Authority Local Plans (various); AONB Management Plans; National Park Management Plans (various).	Yes

Key Objectives and Policy Messages	Key Sources	Relevant to the Assessment of the Drought Plan?
Geology and Soils		
Protection and enhancement of geology and soil quality	Thematic Strategy for Soil Protection; National Planning Policy Framework; Planning Policy Wales (Edition 10); TAN5: Nature Conservation and Planning; Natural Resources Policy; Local Planning Authority Local Plans (various); AONB Management Plans; National Park Management Plans (various).	Yes
Water		
Protection and enhancement of all water supplies and resources	Bathing Waters Directives; Drinking Water Directive; Nitrates Directive; Urban Waste Water Directive; Water Framework Directive; Environmental Quality Standards Directive; Restoring Sustainable Abstraction Programme; Future Water; A Green Future: Our 25 Year Plan to Improve the Environment; National Planning Policy Framework; Planning Policy Wales (Edition 10); Water Strategy for Wales; Natural Resources Wales Drought Plan; River Basin Management Plans (various); Water Company Drought Plans (various); Water Company Water Resource Management Plans (various); Abstraction Licensing Strategies (various); Local Planning Authority Local Plans (various).	Yes
Promoting the sustainable and efficient use of water	Water Framework Directive; Water for People and the Environment; Managing Water Extraction; Restoring Sustainable Abstraction Programme; Water Act; Water Supply and Demand Policy; A Green Future: Our 25 Year Plan to Improve the Environment; National Planning Policy Framework; Planning Policy Wales (Edition 10); Water Strategy for Wales; Natural Resources Wales Drought Plan; Natural Resources Policy; River Basin Management Plans (various); Water Company Drought Plans (various); Water Company Water Resource Management Plans (various); Abstraction Licensing Strategies (various); Local Planning Authority Local Plans (various).	Yes
Minimising flood risk and improving flood control infrastructure	Floods Directive; Water Framework Directive; Shoreline Management Plan Guidance; National Flood and Coastal Erosion Risk Management Strategy for England; Flood and Water Management	No

Key Objectives and Policy Messages	Key Sources	Relevant to the Assessment of the Drought Plan?
	Act; National Planning Policy Framework; Planning Policy Wales (Edition 10); TAN15: Development and Flood Risk; National Strategy for Flood and Coastal Erosion Risk Management in Wales; Shoreline Management Plans (various); Catchment Flood Management Plans (various); River Basin Management Plans (various); Catchment Flood Management Plans (various); Local Planning Authority Local Plans (various).	
Minimising the risk of drought	Water Framework Directive; Water for People and the Environment; Managing Water Extraction; Restoring Sustainable Abstraction Programme; Water Act; Water Supply and Demand Policy; National Planning Policy Framework; Planning Policy Wales (Edition 10); Water Strategy for Wales; Flood and Water Management Act 2010; The Water Use (Temporary Bans) Order 2010; National Planning Policy Framework; Water Company Drought Plan Technical Guideline; Guiding Principles for Developing Water Undertaker Drought Plans 2020; The Drought Plan (Wales) Direction 2017; Natural Resources Wales Drought Plan	Yes
Air Quality and Climate		
Ensuring air quality is maintained or enhanced and that emissions of air pollutants are kept to a minimum	Ambient Air Quality and Cleaner Air for Europe; National Emissions Ceiling Directive; Industrial Emissions Directive; Air Quality Strategy for England, Scotland, Wales and Northern Ireland; Air Pollution: Action in a Changing Climate; Air Quality Plans; National Planning Policy Framework; Planning Policy Wales (Edition 10); Local Planning Authority Local Plans (various).	Yes
Minimising the effects of climate change on natural resources, inhabitants and the economy	Strategy on Adaptation to Climate Change; National Adaptation Programme; Water for People and the Environment; UK Sustainable Development Strategy; National Flood and Coastal Erosion Risk Management Strategy for England; Adapting to Coastal Change; National Planning Policy Framework; People, Places, Futures: The Wales Spatial Plan 2008 Update; Planning Policy Wales (Edition 10); Environment Strategy for Wales; Climate Change Strategy for Wales; National Strategy for Flood and Coastal	Yes

Key Objectives and Policy Messages	Key Sources	Relevant to the Assessment of the Drought Plan?
	Erosion Risk Management in Wales; Natural Resources Policy; Natural Resources Wales Drought Plan; Water Resources Management Plans (various); River Basin Management Plans (various); Shoreline Management Plans (various); Catchment Flood Management Plans (various); Local Planning Authority Local Plans (various).	
Minimising emissions of greenhouse gases that cause climate change	Kyoto Protocol; Paris Agreement; Europe 2020; A Roadmap for Moving to a Competitive Low Carbon Economy in 2050; Climate Change Act; Renewable Energy Roadmap; National Planning Policy Framework; UK Sustainable Development Strategy; UK Renewable Energy Strategy; Environment Strategy for Wales; Climate Change Strategy for Wales; Environment (Wales) Act; Planning Policy Wales (Edition 10); Energy Wales; Local Planning Authority Local Plans (various).	Yes
Human Environment		
Addressing deprivation and reducing inequality	World Summit on Sustainable Development; Europe 2020; Sustainable Development Strategy; National Planning Policy Framework; People, Places, Futures: The Wales Spatial Plan 2008 Update; Energy Wales; Planning Policy Wales (Edition 10); Well-being of Future Generations (Wales) Act; Local Planning Authority Local Plans (various).	Yes
Promoting improvements to health and well-being	Aarhus Convention; Sustainable Development Strategy; World Summit on Sustainable Development; Seventh Environmental Action Programme to 2020; National Planning Policy Framework; Planning Policy Wales (Edition 10); Well-being of Future Generations (Wales) Act; Local Planning Authority Local Plans (various).	Yes
Providing high quality services, community facilities and social infrastructure that is accessible to all	National Planning Policy Framework; Planning Policy Wales (Edition 10); Local Planning Authority Local Plans (various).	No
Achieving sustainable economic growth and promoting key sectors in the local economy	World Summit on Sustainable Development; Europe 2020; UK Marine Policy Statement; Sustainable Development Strategy; National Planning Policy Framework; People, Places, Futures: The Wales Spatial Plan	Yes

Key Objectives and Policy Messages	Key Sources	Relevant to the Assessment of the Drought Plan?
	2008 Update; Planning Policy Wales (Edition 10); Well-being of Future Generations (Wales) Act; Local Planning Authority Local Plans (various).	
Improving and expanding the tourism economy	National Planning Policy Framework; Planning Policy Wales (Edition 10); Local Planning Authority Local Plans (various); AONB Management Plans (various); National Park Management Plans (various).	No
Maximising job opportunities for all and enhancing the quality of employment opportunities	Europe 2020; National Planning Policy Framework; Planning Policy Wales (Edition 10); Well-being of Future Generations (Wales) Act; Local Planning Authority Local Plans (various).	Yes
Minimising noise pollution	Environment Noise Directive; Guidelines for Community Noise; National Planning Policy Framework; Planning Policy Wales (Edition 10); Local Planning Authority Local Plans (various).	Yes
Promoting sustainable transport	Sustainable Development Strategy; A Roadmap for Moving to a Competitive Low Carbon Economy in 2050; National Planning Policy Framework; Planning Policy Wales (Edition 10); Local Planning Authority Local Plans (various).	No
Material Assets and Resource Use		
Minimising waste production, promoting re-use and recycling	Waste Framework Directive; Landfill of Waste Directive; Waste Management Plan for England; One Wales One Planet; Environment Strategy for Wales; National Planning Policy for Waste; Toward Zero Waste; Planning Policy Wales (Edition 10); Environment (Wales) Act; Local Planning Authority Local Plans (various).	Yes
Promoting the most effective and efficient use of natural resources	World Summit on Sustainable Development; Seventh Environmental Action Programme to 2020; Energy 2020; Europe 2020; UK Sustainable Development Strategy; One Wales One Planet; National Planning Policy for Waste; Towards Zero Waste; Environment (Wales) Act; Natural Resources Policy; Local Planning Authority Local Plans (various).	Yes

Key Objectives and Policy Messages	Key Sources	Relevant to the Assessment of the Drought Plan?
Promoting the use of sustainable/renewable energy	Seventh Environmental Action Programme to 2020; Energy 2020; A Roadmap for Moving to a Competitive Low Carbon Economy in 2050; Renewable Energy Directive; Sustainable Development Strategy; Carbon Plan; Climate Change Act; UK Renewable Energy Strategy; UK Renewable Energy Roadmap; UK Sustainable Development Strategy; National Planning Policy Framework; Climate Change Strategy for Wales; Energy Wales; Planning Policy Wales (Edition 10); Local Planning Authority Local Plans (various).	Yes
Promoting the use of sustainable design and construction and encouraging energy efficiency	Energy 2020; Energy Efficiency Directive; A Roadmap for Moving to a Competitive Low Carbon Economy in 2050; Renewable Energy Directive; UK Sustainable Development Strategy; Energy Wales; National Planning Policy Framework; Planning Policy Wales (Edition 10); Local Planning Authority Local Plans (various).	Yes
Cultural Heritage		
Protecting and enhancing cultural heritage and archaeological sites	World Heritage Convention; Heritage Protection for the 21st Century - White Paper; Ancient Monuments and Archaeological Areas Act; Planning (Listed Buildings and Conservation Areas) Act; National Planning Policy Framework; Planning Policy Wales (Edition 10); The National Heritage Act; Historic Environment (Wales) Act; Register of Landscapes of Historic Interest Well-being of Future Generations (Wales) Act; Local Planning Authority Local Plans (various).	Yes
Landscape		
Protecting and enhancing the quality and distinctiveness of natural landscapes and environmental resources	European Landscape Convention; National Planning Policy Framework; Planning Policy Wales (Edition 10); Environment Strategy for Wales; Register of Landscapes of Historic Interest; AONB Management Plans (various); Local Planning Authority Local Plans (various); National Park Management Plans (various).	Yes

3. Baseline Analysis

3.1 Introduction

The SEA Regulations require a report containing *'The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme'* (Schedule 2(2)), *'The environmental characteristics of areas likely to be significantly affected'* (Schedule 2(3)), and *'Any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Council Directive 79/409/EEC on the conservation of wild birds(1) and the Habitats Directive'* (Schedule 2(4)).

This section of the Environmental Report identifies and characterises current environmental baseline conditions, along with how these are likely to change in the future. Only with a knowledge of existing conditions, and a consideration of their likely evolution, can the effects of the Drought Plan be identified and appraised and its subsequent success or otherwise be monitored. This is also useful in determining the key issues for each topic that should be taken forward in the SEA, through the SEA objectives and guide questions. The analysis is presented for the following topics:

- Biodiversity;
- Geology, Land-use and Soils;
- Water;
- Air Quality and Climate;
- Human Environment (including population and human health);
- Material Assets and Resource Use;
- Cultural Heritage; and
- Landscape and Seascape.

The data has been drawn from a variety of sources, including a number of the plans and programmes reviewed as part of the SEA process (see **Section 2** of this report and **Appendix C**). Where appropriate, figures are referenced in this overview. The key sustainability issues arising from the review of baseline conditions are summarised for each topic.

3.2 Biodiversity

Baseline Characteristics

Biodiversity is defined as the variety of plants (flora) and animals (fauna) in an area, and their associated habitats. All ecological processes are the product of interactions between different groups of organisms and are dependent upon there being a range of these present. In this sense, biodiversity – the variety and variability of living organisms – ultimately underpins the functioning of all ecosystems and thereby the delivery of all ecosystem services (which are critical in: providing clean air and water, food and raw materials; helping to regulate the climate; and providing space for recreation and amenity). Protected sites are key in the protection of semi-natural habitats and species and can act as excellent examples of natural resource management. The importance of preserving biodiversity is recognised from an international to a local level.

Drought management measures have the potential to affect biodiversity, flora and fauna due to the operational abstraction of water during times of water stress. The sensitivity of environmental features that

can be affected by implementing drought management measures is site specific. A drought is transient and the deployment of a drought management measures would only be for a limited period of time. Therefore, the duration of effects on sensitive features and the reversibility of the effects post drought are important considerations.

Protected Sites

There are four categories of protected areas:

- Protected areas that are established through International Agreements (including Ramsar Sites, which are wetlands of international importance designated under the Ramsar Convention which are afforded the same degree of protection as European sites);
- Protected areas that are established under European Union Directives of other European Initiatives (including Special Protection Areas (SPAs) and Special Areas of Conservation (SACs) identified as making significant contribution to conserving designated habitats and species). In the UK, these form part of the 'Natura 2000' network of sites protected under the Habitats Directive (92/43/EEC);
- Protected areas that are established under National Legislation (Sites of Special Scientific Interest (SSSIs) and National Nature Reserves)); and
- Marine Protected Areas.

The importance of biodiversity in Wales is reflected by the number and variety of international, national and local nature conservation designations. More than 10 per cent of Wales' land cover is designated for nature conservation. Approximately 70 per cent of the Welsh coastline is designated as either SAC or SPA, with a range of habitats such as coastal saltmarsh, grazing marsh, mudflats, reedbeds, cliffs, dunes and shingle. Management of the coast including shoreline reinforcements, flood defence, drainage and land reclamation have threatened coastal habitats and create challenges for future management.

Important nature conservation sites (Ramsar sites, SPAs, SACs and candidate SACs, and SSSIs) across the Welsh Water supply area are shown in **Figures 3.1 and 3.2**. These figures are based on Geographical Information System (GIS) layers available in September 2018.

Figure 3.1 European Sites in the Welsh Water Supply Area

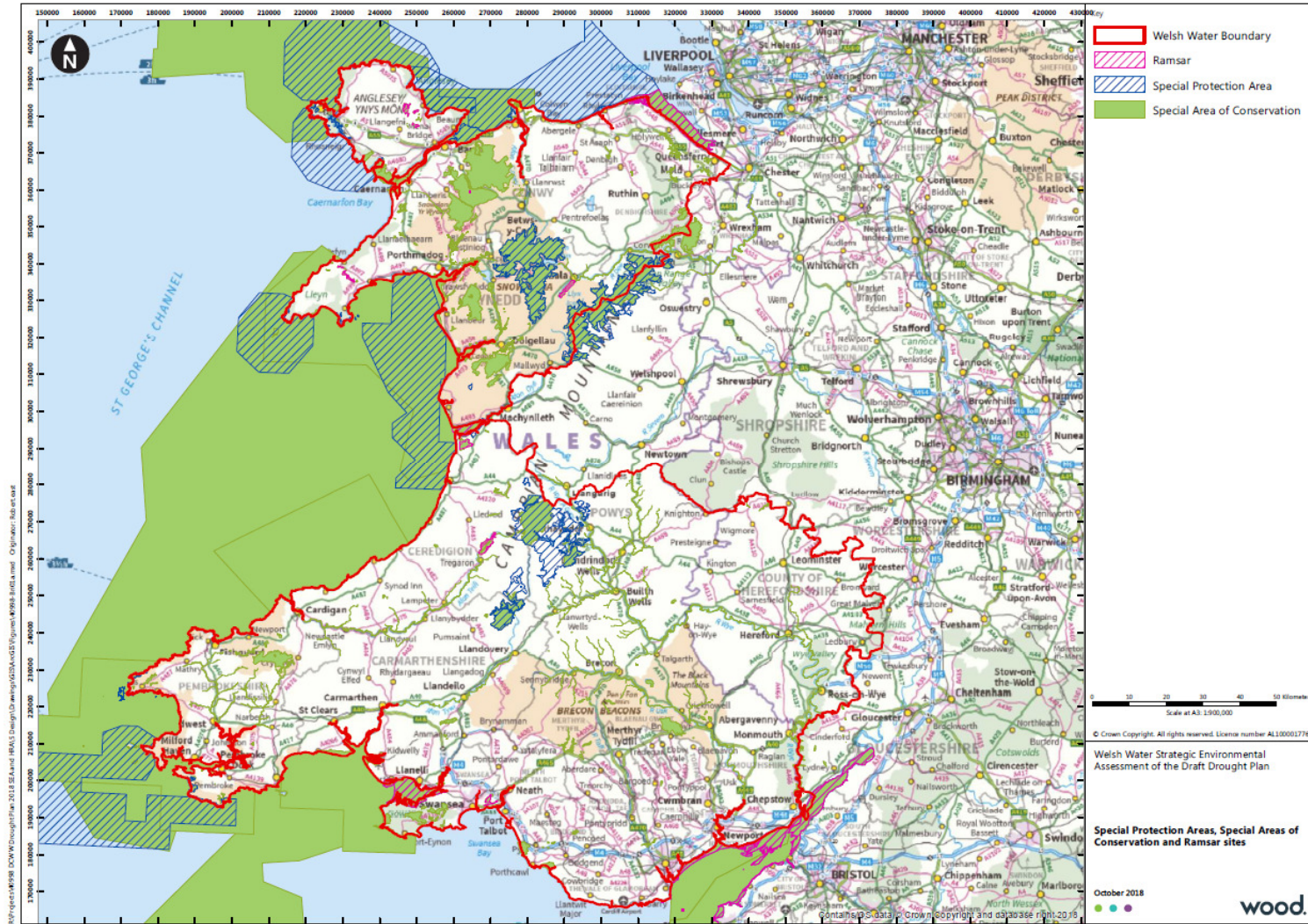
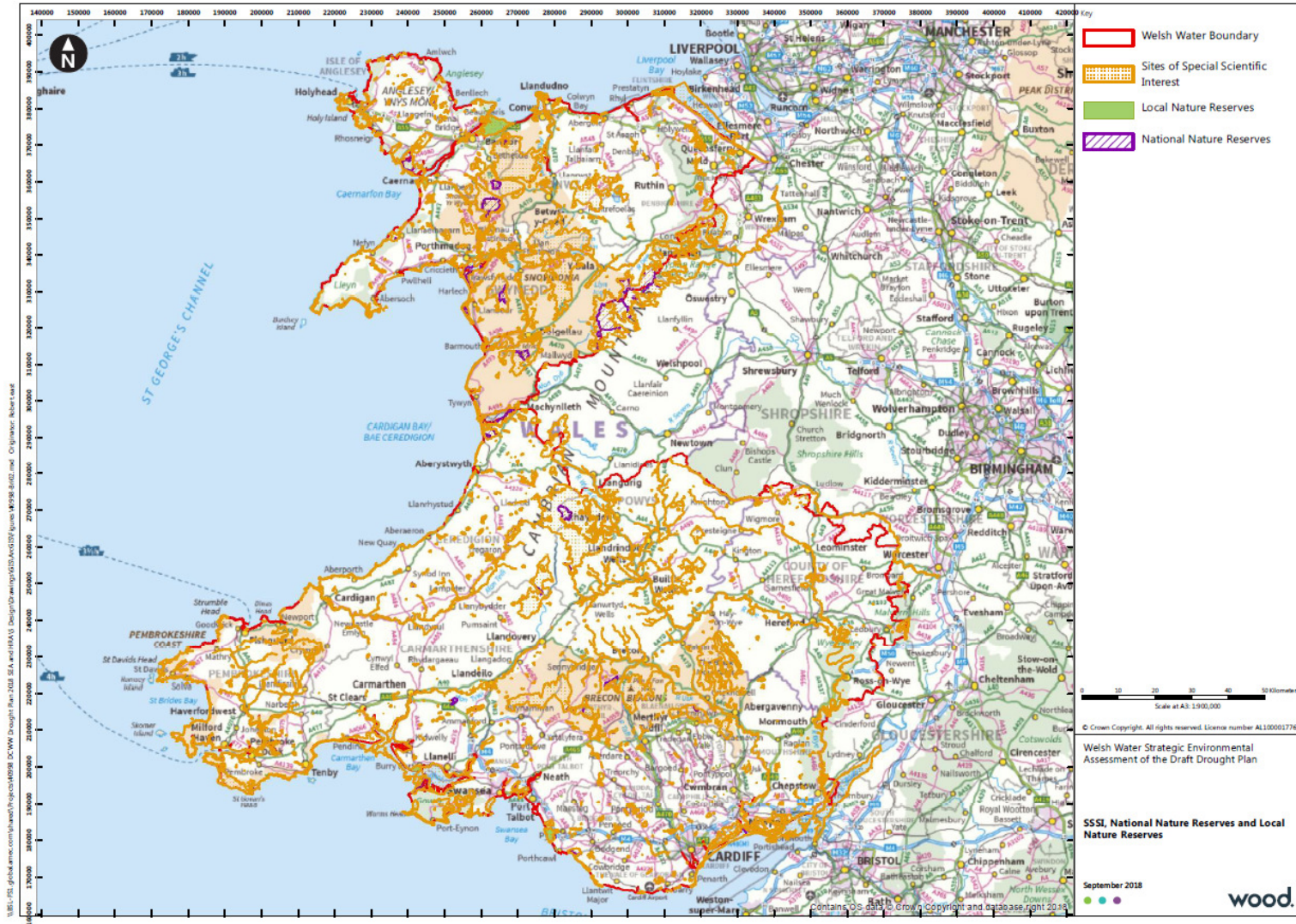


Figure 3.2 National and Local Nature Conservation Designations in the Welsh Water Supply Area



The number of protected areas in Wales and the Welsh Water supply areas are summarised in **Table 3.1**. Other internationally important sites to consider include the Rhinog Biogenetic Reserve in North Wales (Blaenau Ffestiniog WRZ) and the UNESCO biosphere reserve at Cors Fochno in the Dyfi estuary near Borth in Ceredigion (West Wales)²⁵. Interest features associated with these European sites are vulnerable (a function of sensitivity and exposure) to water resource permissions. Further information on this is available in the HRA report which accompanies this Scoping Report.

Table 3.1 Designations in Wales and the Welsh Water Supply Area²⁶

Designated Site Classification	Number of Sites within Welsh Water supply area (wholly or partially)	Total Area (hectares) within Welsh Water supply area	Number of sites in Wales (including cross border sites with England)
Ramsar	10	7,051	10
Special Area of Conservation (SAC)	98	110,345	94
Special Protection Areas (SPA)	19	67,614	19
Site of Special Scientific Interest (SSSI)	1,037	199,930	959
National Nature Reserve	71	16,028	68
Local Nature Reserve	100	3,114	93

The majority of SAC and SPA habitats in Wales are reported to be in unfavourable condition (75 per cent) in 2016 with the exception of caves (100 per cent in favourable condition), as shown in **Figure 3.3**. The condition of SAC and SPA species features on sites in Wales, as reported in 2013, remains mostly unfavourable (55%), with the exception of birds and mammals of which 86% and 68% were in favourable condition, respectively (**Figure 3.4**)²⁷

Butterflies are an example of species in unfavourable condition.²⁸

²⁵ The UNESCO Biosphere Reserve status is awarded in recognition of the way a local community lives sustainably in an area of special landscape quality with a rich wildlife. The designated area includes Aberystwyth, Llanbrynmair, Llanymawddwy, Corris Uchaf, and Aberdyfi.

²⁶ JNCC (2018 data release) *Protected Sites data* Available online: www.jncc.gov.uk [Accessed November 2018]

²⁷ NRW (2016) *State of Natural Resources Report (SoNaRR): Assessment of the Sustainable Management of Natural Resources*. Technical Report. Natural Resources Wales. Available online: <https://naturalresources.wales/evidence-and-data/research-and-reports/the-state-of-natural-resources-report-assessment-of-the-sustainable-management-of-natural-resources/?lang=en> [Accessed November 2018]

²⁸ Fox, R., Brereton, T.M., Asher, J., August, T.A., Botham, M.S., Bourn, N.A.D., Cruickshanks, K.L., Bulman, C.R., Ellis, S., Harrower, C.A., Middlebrook, I., Noble, D.G., Powney, G.D., Randle, Z., Warren, M.S. & Roy, D.B. (2015) *The State of the UK's Butterflies 2015*. Butterfly Conservation and the Centre for Ecology & Hydrology, Wareham, Dorset.

Figure 3.3 Percentage of Special Area of Conservation (SAC) habitat features in favourable and unfavourable condition. Number of habitat features in assessment shown in brackets.²⁹

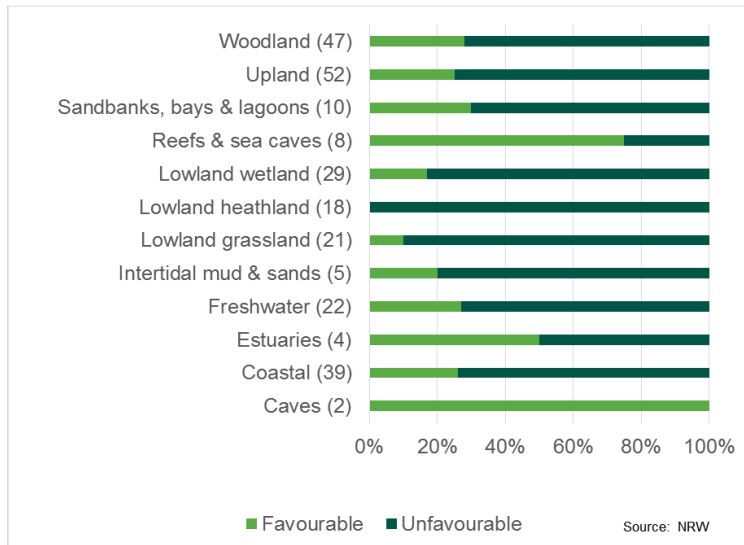
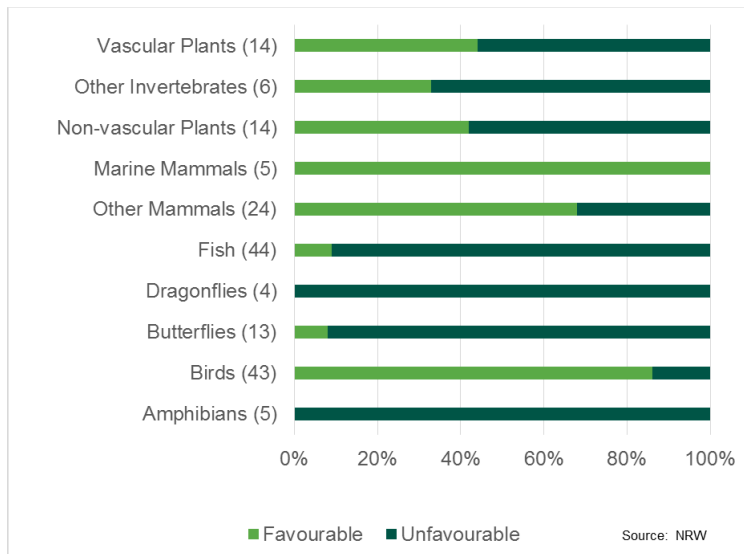


Figure 3.4 Overview of condition of Habitat and Bird Directive species features on SACs and SPAs. Number of features in assessment shown in brackets.³⁰



There are 1,037 SSSIs either wholly or partly within the Welsh Water supply area, totalling 199,930 hectares. The 2006 Rapid Review recorded the condition of SSSIs reported in Wales in 2006. Approximately 47 per cent of SSSIs were assessed to high confidence levels and the results showed that 32 per cent of sites were in

²⁹ NRW (2016) *State of Natural Resources Report (SoNaRR): Assessment of the Sustainable Management of Natural Resources*. Technical Report. Natural Resources Wales. Available online: <https://naturalresources.wales/evidence-and-data/research-and-reports/the-state-of-natural-resources-report-assessment-of-the-sustainable-management-of-natural-resources/?lang=en> [Accessed November 2018]

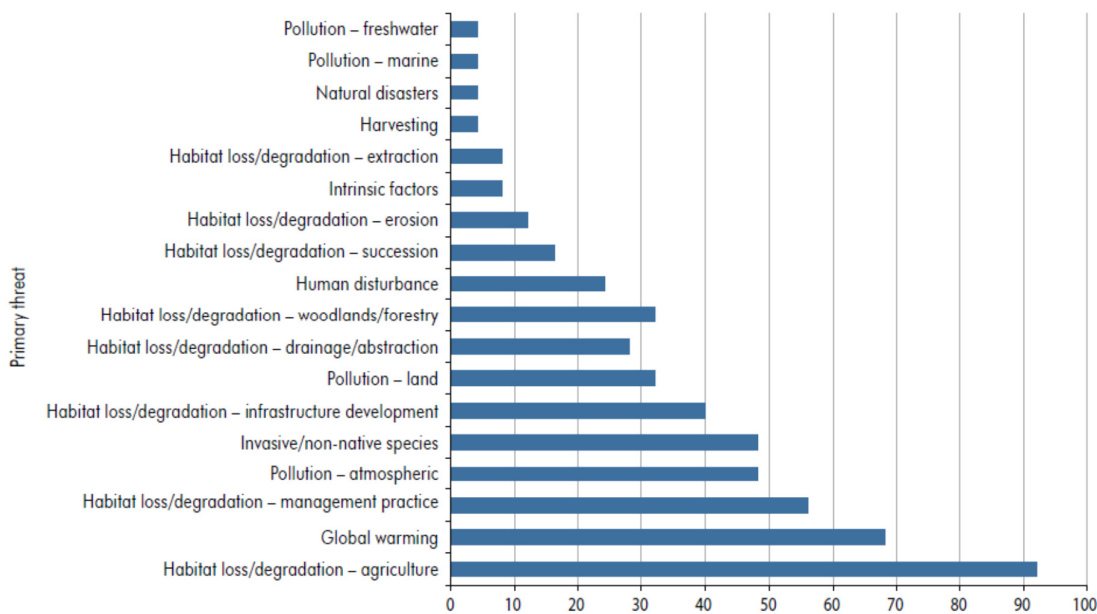
³⁰ NRW (2016) *State of Natural Resources Report (SoNaRR): Assessment of the Sustainable Management of Natural Resources*. Technical Report. Natural Resources Wales. Available online: <https://naturalresources.wales/evidence-and-data/research-and-reports/the-state-of-natural-resources-report-assessment-of-the-sustainable-management-of-natural-resources/?lang=en> [Accessed November 2018]

favourable condition and 68 per cent were in unfavourable condition³¹. Of the individual features for which SSSIs were designated:

- 47 per cent of all features were in favourable condition;
- 72 per cent of geological features were judged to be in favourable condition;
- 53 of species features (individual species and assemblages) were judged to be in favourable condition;
- 29 per cent of habitat features were judged to be in favourable condition.

In Wales, habitat fragmentation and biodiversity loss have been caused mainly by changing management and use of land and sea. These changes have been driven largely by development pressures and subsidy regimes that were established to meet the challenges of changing population structures, increasing consumption, technological progress and economic development. Threats to 25 terrestrial habitats were identified for the 2008 Biodiversity Action Plan (BAP) reporting round (**Figure 3.5**). These responses also highlight agriculture, climate change, pollution and invasive non-native species as major drivers of biodiversity change³².

Figure 3.5 Threats to Biodiversity in Wales³³



Priority species including Atlantic salmon and brown/sea trout are vulnerable to changes in water quality, quantity and barriers to migration, with salmon stocks at an all-time low across their North Atlantic range, and specific concern over trout rivers in south-west Wales. All of the 23 principal salmon rivers in Wales are classed as 'At Risk' of failing to achieve their conservation and management targets. Salmon supports the

³¹ Countryside Council for Wales (2006) *Condition of SSSI Sites and Features*.

³² JNCC (2008) *The UK Biodiversity Action Plan: Highlights from the 2008 reporting round*. Technical Report. Natural Resources Wales. Available online: http://jncc.defra.gov.uk/pdf/pub2010_UKBAPHighlightsReport2008.pdf [Accessed November 2018]

³³ JNCC (2008) *The UK Biodiversity Action Plan: Highlights from the 2008 reporting round*. Technical Report. Natural Resources Wales. Available online: http://jncc.defra.gov.uk/pdf/pub2010_UKBAPHighlightsReport2008.pdf [Accessed November 2018]

designation of six rivers in Wales under the Habitats Directive, and poor performance with respect to salmon will limit achievement of associated targets.³⁴

Of the land that Welsh Water owns, 60 per cent is of national conservation and biodiversity importance, supporting considerable numbers of some key species, such as otter, water vole and dormouse. Welsh Water investment is targeted at key areas to improve the quality of treated water that wastewater treatment works discharge into the surface water system, and also undertakes initiatives to reduce the levels of pesticides in the environment to protect water supplies and wildlife, as well as measures to protect designated sites under Welsh Water ownership³⁵.

Green Infrastructure

Green infrastructure consists of high quality natural and semi-natural areas which form a network of green spaces, water and other environmental features in urban and rural areas. Examples include trees, parks, gardens, road verges, allotments, green roofs/walls, sustainable drainage systems (SuDS), rivers and wetlands. Green infrastructure can provide new or improved wildlife habitats, as well as refuges for vulnerable species. It also has numerous other benefits, including reducing flood risk; removing air and water pollution with associated health benefits; reducing urban heating effects and capturing greenhouse gases; and increasing wellbeing and community cohesion. Green infrastructure can also create attractive high quality landscapes.³⁶

Welsh Water already contributes to the development of green infrastructure through the RainScope programme, which delivers sustainable drainage schemes across the supply area to reduce the number of flooding incidents and discharges from overflows. Schemes include landscaped basins that capture and filter surface water runoff from roofs and roads; landscaped channels to reduce the speed of surface water, allowing infiltration into the soil; grass channels; porous paving; and Geocellular storage systems to manage surface water runoff either as a soakaway or as a storage tank. These schemes also have the benefit of improving the local environment, creating habitats and increasing resilience to climate change.³⁷

Green infrastructure has links across biodiversity, soils and geology, flood risk, air quality and climate, human health and wellbeing, and landscape.

Future Trends

The '2011 UK National Ecosystem Assessment'³⁸, the 2013 'State of Nature Report'³⁹ and the 2016 'State of Nature Report'⁴⁰ show a continuing decline in biodiversity. Although the picture is varied, with some species experiencing recovery and others a decline, overall the threat is high. Deterioration in habitat condition

³⁴ NRW (2016) *Board Paper: Salmon and sea trout stock management – update*. Paper 22.16. Available online: <https://naturalresources.wales/media/677203/salmon-and-sea-trout-stock-management-update-nrw-b-2216.pdf> [Accessed November 2018]

³⁵ Welsh Water (2017) *Making time for nature: Dŵr Cymru Welsh Water's plan for maintaining and enhancing biodiversity*. Available online: <http://www.dwrcymru.com/en/Environment.aspx> [Accessed November 2018]

³⁶ Wildlife Trusts Wales (2016) *Green Infrastructure: A Catalyst for the Well-being of Future Generations In Wales*. Available online: http://www.wtwales.org/sites/default/files/green_infrastructure.pdf [Accessed November 2018]

³⁷ Welsh Water (2017) *RainScope*. Available online: <http://www.dwrcymru.com/en/My-Wastewater/RainScope.aspx> [Accessed November 2018]

³⁸ UK National Ecosystem Assessment (2014) *The UK National Ecosystem Assessment: Synthesis of the Key Findings*. UNEP-WCMC, LWEC, UK. Available online: <http://uknea.unep-wcmc.org/Resources/tabid/82/Default.aspx> [Accessed November 2018]

³⁹ Burns F, Eaton MA, Gregory RD et al. (2013) *State of Nature: Wales*. In *State of Nature report*. The State of Nature partnership. Available online: <https://www.bto.org/research-data-services/publications/state-nature/2013/state-nature-report-2013> [Accessed November 2018]

⁴⁰ Hayhow DB, Burns F, Eaton MA, Al Fulajj N, August TA, Babey L, Bacon L, Bingham, C, Boswell J, Boughey KL, Brereton T, Brookman E, Brooks DR, Bullock DJ, Burke O, Collis M, Corbet L, Cornish N, De Massimi S, Densham J, Dunn E, Elliott S, Gent T, Godber J, Hamilton S, Havery S, Hawkins S, Henney J, Holmes K, Hutchinson N, Isaac NJB, Johns D, Macadam CR, Mathews F, Nicolet P, Noble DG, Outhwaite. CL, Powney GD, Richardson P, Roy DB, Sims D, Smart S, Stevenson K, Stroud RA, Walker KJ, Webb JR, Webb TJ, Wynde R and Gregory RD (2016) *State of Nature 2016*. The State of Nature Partnership. Available online: http://www.rspb.org.uk/Images/State%20of%20Nature%20UK%20report_%20%20Sept_tcm9-424984.pdf [Accessed November 2018]

remains a significant concern with more than 50 per cent of BAP habitats in decline in Wales. The alteration of the composition of lowland semi-natural grasslands (due mainly to changing farming practices and urbanisation) in particular was one of the most rapid and widespread vegetation changes to have taken place in Wales during the 20th Century. Examples of large-scale habitat loss in Wales include:

- 30 per cent loss of semi-natural ancient woodland, post war;
- 97 per cent loss of lowland semi-natural grassland over the last century; and
- 51 per cent loss of lowland heathland and 95 per cent loss of wet heathland on the Llŷn Peninsula between 1920/22 and 1987/88⁴¹.

Three quarters of all features within all designated sites are in unfavourable or declining condition and only around 14 per cent of woodland is ancient semi-natural (which is of the highest biodiversity value). There has also been a decline in the quantity and quality of hedges, copses, small woods, ponds and ditches which act as habitat corridors and contribute to connectivity in the landscape. Some of the most widespread and significant effects on ecosystems are damage to vegetation from pollution such as exposure to ozone, eutrophication and acidification. Pollution from the use of herbicides, pesticides and fertilisers has direct impacts on the diversity of habitats and pollinators.

Historically, the marine environment around Wales has suffered significant habitat loss, with key examples being coastal habitat (particularly saltmarsh) and subtidal native oyster beds. It can be anticipated that the level of activities and developments in the marine environment will increase over the next 20 years, with potential negative impacts for marine ecology and biodiversity⁴².

There is currently limited data on the condition of SSSIs in Wales and consequently it has not been possible to identify trend-based data at this time. However, as it can take many years for habitats to recover from damage, it seems likely that there will be little change to SSSI conditions in the immediate future.

The key threats to Welsh biodiversity identified by the 2016 State of Nature report⁴³ include:

- Habitat loss and degradation, such as the loss of blanket bog;
- Fragmentation and isolation of habitats for many reasons, such as inappropriate development;
- Human population increases;
- Climate change;
- Excessive nutrient input and other forms of pollution;
- Over-exploitation and unsustainable use, including agricultural pressures; and
- Invasive alien species, for example rhododendron in Snowdonia.

Welsh Water proactively manages a number of sites, implementing biodiversity action plans to develop ongoing conservation work. This work is ongoing and has included providing or improving habitat for key species and monitoring species and habitat and runs both a Biodiversity Fund and a Water Framework Directive fund for projects that meet both of these drivers and support Welsh Water activities. Welsh water

⁴¹ NRW (2015) *A Snapshot of the State of Wales' Natural Resources, June 2015*. Available online: <http://naturalresources.wales/media/4797/snapshot-report.pdf> [Accessed November 2018]

⁴² Welsh Government (2015) *Wales' Marine Evidence Report*. Available online: <http://gov.wales/topics/environmentcountryside/marineandfisheries/marine-planning/other-supporting-evidence/wales-marine-evidence-report/?lang=en> [Accessed November 2018].

⁴³ Hayhow DB, Burns F, Eaton MA, Bacon L, Al-Fulaij N, Bladwell, S, Brookman E, Byrne J, Cheesman C, Davies D, De Massimi S, Elding C, Hobson R, Jones J, Lucas SR, Lynch S, Morgan L, Rowe, A, Sharp R, Smith RG, Stevenson K, Stretton TA, Taylor R and Gregory RD (2016) *State of Nature 2016: Wales. The State of Nature partnership*. Available online: http://www.rspb.org.uk/Images/StateofNature2016_Wales_English_1%20Sept%20pages_tcm9-425217.pdf [Accessed November 2018]

has also trialled initiatives such as “Pest Smart” and “Weed Wiper” which have worked well in addressing the effects of excessive nutrient input. Welsh Water also work with others to maintain and enhance biodiversity, including:

- Contributing to the Llyn Fens LIFE Project in Anglesey, the largest wetland restoration project in Wales;
- Working with NRW and the Brecon Beacons National Park Authority to deliver two peat restoration projects and leading on the Brecon Beacons “Mega catchment” project;
- Supporting charitable organisations to develop and deliver actions at a local level, contributing the wider national effort to ensure ‘good ecological status’ of watercourses under the Water Framework Directive; and
- Supporting organisations to deliver effective plans for the control or invasive non-native species. Two landscape projects have been supported to date – one in the Dee catchment and one in the Wye and Usk catchment.

Welsh Water has published Making Time for Nature⁴⁴ which sets out how, in the exercise of its functions, it proposes to comply with its duty to maintain and enhance biodiversity and in so doing promote the resilience of ecosystems.

Key Sustainability Issues

The key sustainability issues relevant to the Drought Plan arising from the baseline assessment for biodiversity are:

- The need to protect and enhance biodiversity in Wales, particularly within protected sites, species and habitats designated for nature conservation;
- The need to continue to increase and improve the condition of priority habitats and habitats of priority species, and restore populations of these species and other specially protected species;
- The need to avoid activities likely to cause irreversible damage to natural heritage;
- The need to take opportunities to improve connectivity between fragmented habitats to create functioning habitat corridors;
- The need to control the spread of Invasive Non-Native Species (INNS); and
- The need to recognise the importance of allowing wildlife to adapt to climate change

3.3 Geology, Land Use and Soils

Baseline Characteristics

Geology

Wales has some of the most varied geology in the world representing all geological periods and spanning 1.4 billion years of the Earth’s history. This diverse geology not only underpins biodiversity and landscape but

⁴⁴ Welsh Water (2016) *Making time for Nature*. Available online: <https://www.dwrcymru.com/-/media/Files/Environment/2017/Biodiversity-booklet---Final-English---Single-pages.pdf> [Accessed November 2018]

also provides important mineral resources⁴⁵. The bedrock geology of Wales is extremely varied and comprises sandstone, limestone and igneous rock. As a broad overview, the following rock types exist in a progression from North West to South East (predominant rock types): Ordovician; Silurian; and Devonian⁴⁶. The Permo-Triassic sandstone forms an important groundwater resource in North Wales, whilst peat, sand and gravel deposits along river valleys support strategic local water supplies.

Coal and metal mining has been very important to Wales historically. The South Wales Coalfield stretches across a large part of South Wales and is still mined to some extent, although less than previously (and from opencast or drift mines rather than deep mines). Lead and silver were once produced from mines in mid-Wales, from a series of mines inland from Aberystwyth. Copper, meanwhile, was mined in Snowdonia and at Parys Mountain on Anglesey, whilst gold was exploited around Dolgellau and Pumpsaint. A number of other metals were produced including zinc, arsenic, antimony and manganese. The geodiversity of Wales has led to the forming of landscapes and environmental settings that have strong cultural service value. For example, the mountains of Snowdonia attract tourists to Wales whilst coal mining has helped to define the cultural identity of the South Wales Valleys. Following a long history, metal mining has ceased and there is only localised coal mining and slate quarrying in Wales. The aggregates industry is now the main mineral extraction industry in Wales, including marine and terrestrially derived aggregates⁴⁷.

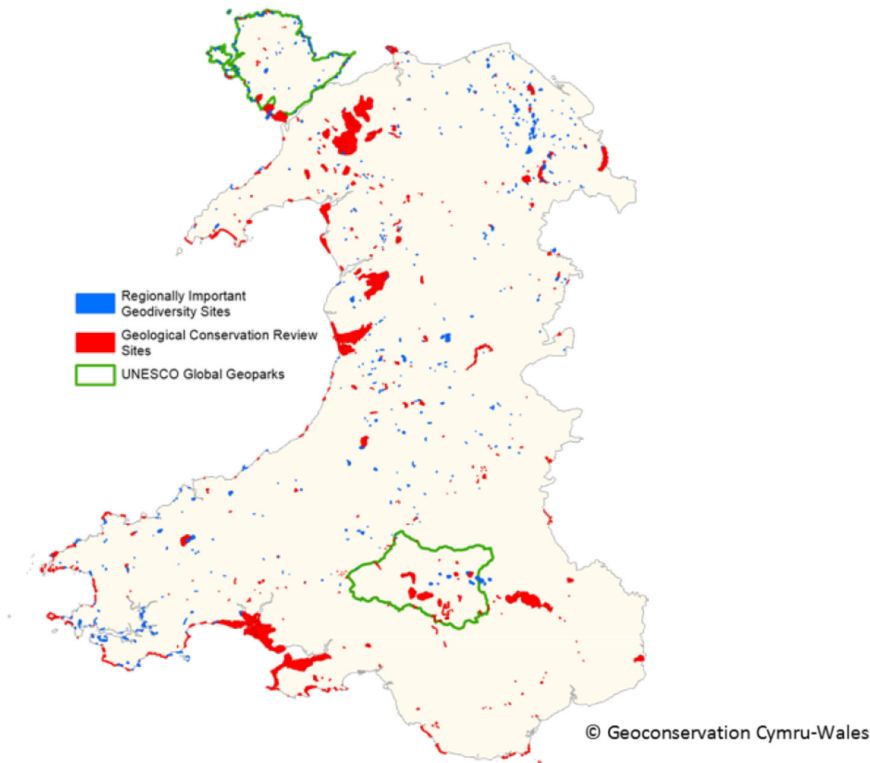
Within Wales, there are approximately 300 SSSIs designated for geology and earth science features covering 48,815 ha which contain some 500 geological features and 93 per cent of these features are in favourable condition. There are also 480 Geological Conservation Review (GCR) sites, 700 Regionally Important Geological / geomorphological Sites (RIGS), and two UNESCO Global Geoparks. The location of the geodiversity sites is shown on **Figure 3.6**. Fforest Fawr Global Geopark is within the Brecon Beacons National Park in South Wales and its geological heritage is of European significance, and the GeoMôn Global Geopark is located on Anglesey, northwest Wales⁴⁸.

⁴⁵ NRW (2016) *State of Natural Resources Report (SoNaRR): Assessment of the Sustainable Management of Natural Resources*. Technical Report. Natural Resources Wales. Available online: <https://naturalresources.wales/evidence-and-data/research-and-reports/the-state-of-natural-resources-report-assessment-of-the-sustainable-management-of-natural-resources/?lang=en> [Accessed November 2018]

⁴⁶ CCW (2005) *Strategic Environmental Assessment Guidance for Practitioners*. Available online: www.ccg.gov.uk/landscape-wildlife/managing-land-and-sea/environmental-assessment/strategic-environmental-assess.aspx [Accessed November 2018]

⁴⁷ NRW (2016) *State of Natural Resources Report (SoNaRR): Assessment of the Sustainable Management of Natural Resources*. Technical Report. Natural Resources Wales. Available online: <https://naturalresources.wales/evidence-and-data/research-and-reports/the-state-of-natural-resources-report-assessment-of-the-sustainable-management-of-natural-resources/?lang=en> [Accessed November 2018]

⁴⁸ NRW (2016) *State of Natural Resources Report (SoNaRR): Assessment of the Sustainable Management of Natural Resources*. Technical Report. Natural Resources Wales. Available online: <https://naturalresources.wales/evidence-and-data/research-and-reports/the-state-of-natural-resources-report-assessment-of-the-sustainable-management-of-natural-resources/?lang=en> [Accessed November 2018]

Figure 3.6 Welsh Geodiversity Sites⁴⁹

Land Use and Soil

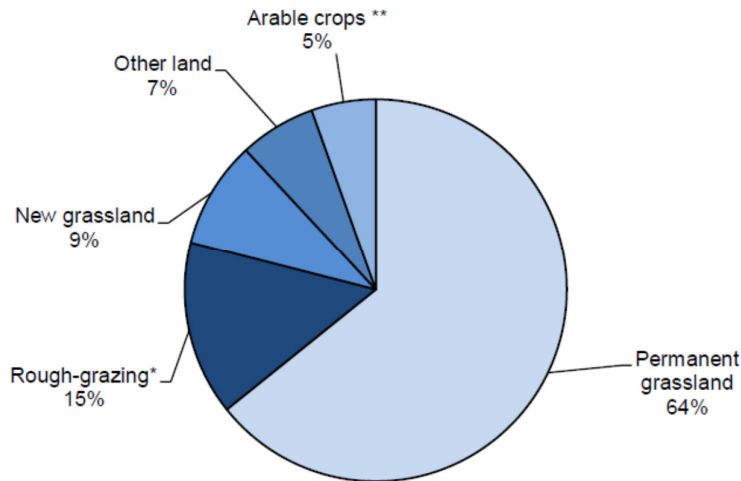
Land use in Wales is dominated by agricultural land under pasture and rough grazing (72.3 per cent); a small proportion of the land in Wales is under crop or 'other' types of agriculture (4.2 per cent) (urban land including land not otherwise specified accounts for 9.8 per cent of land area in Wales compared to 19.2 per cent in England). These characteristics reflect the climate, relief and soil type. This is illustrated in the split of the land on agricultural holdings by usage, as shown in **Figure 3.7**. A total of 11.2% of Wales is urban (compared to an 11.6 % UK average)⁵⁰ whilst 15% is woodland (compared to 13% in the UK)⁵¹.

⁴⁹ NRW (2016) *State of Natural Resources Report (SoNaRR): Assessment of the Sustainable Management of Natural Resources*. Technical Report. Natural Resources Wales. Available online: <https://naturalresources.wales/evidence-and-data/research-and-reports/the-state-of-natural-resources-report-assessment-of-the-sustainable-management-of-natural-resources/?lang=en> [Accessed November 2018]

⁵⁰ ONS (2015) *UK Natural Capital – Land Cover in the UK*. Available online: <http://webarchive.nationalarchives.gov.uk/20160106062803/http://www.ons.gov.uk/ons/rel/environmental/uk-natural-capital/land-cover-in-the-uk/index.html> [Accessed November 2018].

⁵¹ Forestry Commission (2017) *Forestry Statistics 2017*. Available online: <https://www.forestry.gov.uk/forestry/infd-7aqdgc> [Accessed November 2018]

Figure 3.7 Split of Land on Agricultural Holdings by Usage in Wales (2017)⁵²



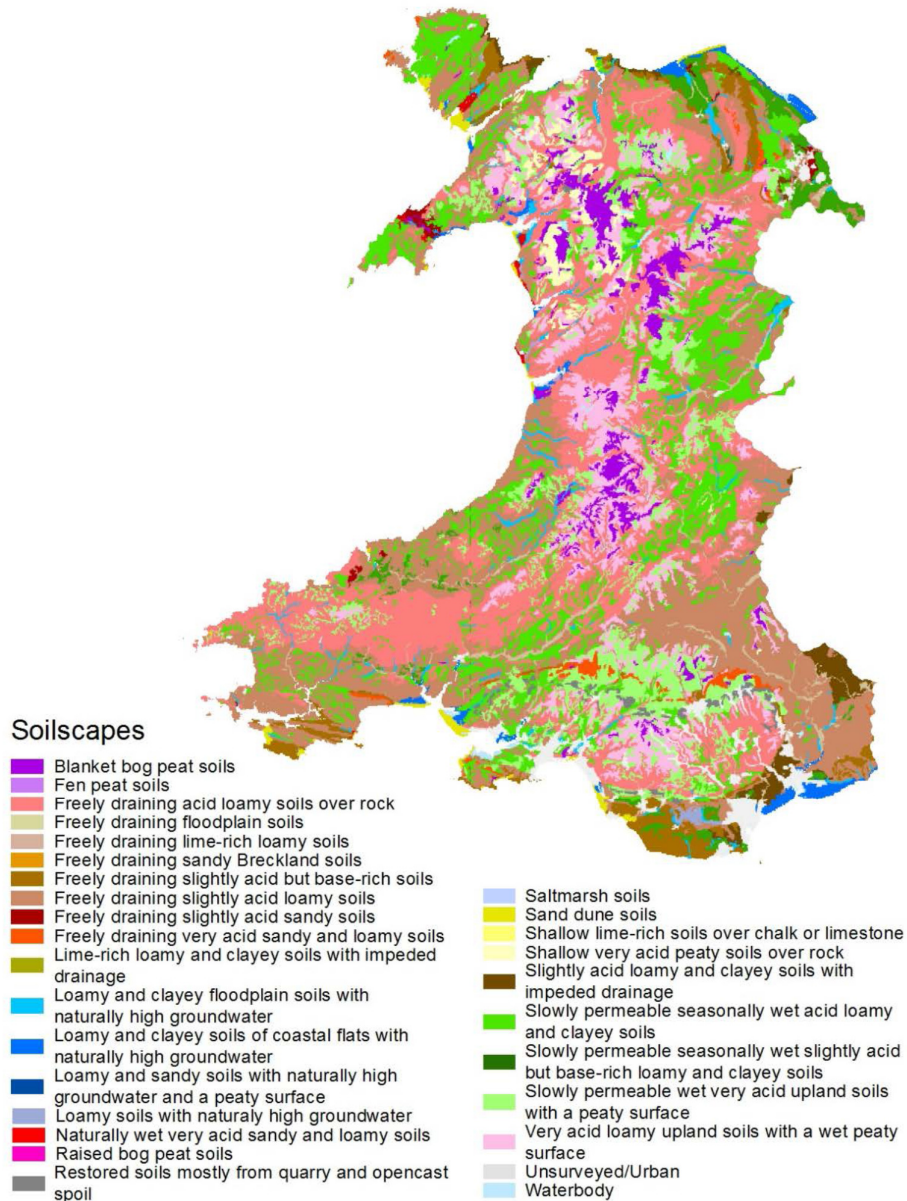
*Rough grazing where holder has sole rights (i.e. excludes common rough grazing).

**Includes horticulture (vegetables and fruit grown in the open, hardy nursery stock and glasshouse)

There are over 400 different soil types in Wales (**Figure 3.8**) which are contributing to, reflecting, and supporting the geodiversity and biodiversity, landscapes and land uses in Wales. The soils of best quality and most productive agricultural land are a scarce and finite resource in Wales; accounting for less than 7 per cent of land area. Soil quality has deteriorated across all habitats apart from woodlands where there has been some improvement. Only 30 per cent of the Welsh peat soil area is considered to be in 'good condition'. It is estimated that 74 per cent of acid sensitive habitat soils receive acidic deposition in excess of their capacity to neutralise air pollution⁵³.

⁵² Welsh Government (2017) *June 2017 Survey of Agriculture and Horticulture: Results for Wales*. Available online: <https://gov.wales/docs/statistics/2017/171121-survey-agriculture-horticulture-june-2017-en.pdf> [Accessed November 2018].

⁵³ NRW (2016) *State of Natural Resources Report (SoNaRR): Assessment of the Sustainable Management of Natural Resources*. Technical Report. Natural Resources Wales. Available online: <https://naturalresources.wales/evidence-and-data/research-and-reports/the-state-of-natural-resources-report-assessment-of-the-sustainable-management-of-natural-resources/?lang=en> [Accessed November 2018]

Figure 3.8 National Soil Map of Wales⁵⁴

The Agricultural Land Classification (ALC) System developed by Defra provides a method for assessing the quality of farmland. There are five grades of agricultural land quality plus non-agricultural and urban categories. **Table 3.2** shows agricultural land quality in Wales and England by ALC grade. Data for Wales show a much higher proportion of Grade 4 and 5 land than in England. Agricultural land quality is lower in the upland areas of Wales. The English areas of the Welsh Water area are generally of a higher agricultural

⁵⁴ NRW (2016) *State of Natural Resources Report (SoNaRR): Assessment of the Sustainable Management of Natural Resources*. Technical Report. Natural Resources Wales. Available online: <https://naturalresources.wales/evidence-and-data/research-and-reports/the-state-of-natural-resources-report-assessment-of-the-sustainable-management-of-natural-resources/?lang=en> [Accessed November 2018]

quality.⁵⁵ Poor soil quality combined with a hilly/mountainous landscape and wet climate means that the majority of agricultural land in Wales is restricted to the grazing of sheep and cattle.

Table 3.2 Agricultural Land Quality (as a percentage of land area)⁵⁶

Agricultural Land Grade	Wales	England
Grade 1 – Excellent	0.49	4.10
Grade 2 – Very Good	5.38	38.73
Grade 3 – Good / Moderate	32.86	39.51
Grade 4 – Poor	18.86	12.37
Grade 5 – Very Poor	23.38	1.32
Non agricultural	14.67	2.76
Urban	4.37	1.21

Alongside their agricultural use, soils and particularly peats store a significant amount of carbon. Soils also provide storage for water, foundations for urbanisation and woodlands, provision of minerals and metals and for biodiversity acting as both a habitat and a foundation for a range of habitats. However, soil erosion and acidification are prominent pressures. Fertile topsoil develops at a rate of less than 1 cm/century. An estimated 2.2 million tonnes of topsoil is eroded on an annual basis in the UK. Some agricultural practices (e.g. harvesting in wet conditions, leaving fields bare after harvest) result in large volumes of productive topsoil being compacted and degraded as well as eroded and deposited in adjacent water courses. There are also many impacts on the water environment as a result of eroded soils entering waterways.⁵⁷

Wales' peat habitats have been adversely affected by climate change, land management and atmospheric pollution and it is estimated that the extent of deep peat soils ($\geq 0.5\text{m}$) is now 90,995 ha.⁵⁸

Future Trends

Soils are dynamic and are influenced by many factors. Soil quality has deteriorated, soil erosion has increased and soil formation has been affected due to various human impacts including increased crop and livestock production, expanded urban areas, Wales' legacy of industrial land contamination from metal mines and other industry as well as atmospheric deposition and inappropriate management in some cases. Their function is therefore compromised. Soils in developed areas provide the same range of services as in other

⁵⁵ DATA.GOV.UK (2018) *Provisional Agricultural Land Classification (ALC)* Available online: <https://data.gov.uk/dataset/provisional-agricultural-land-classification-alc2> [Accessed November 2018]

⁵⁶ DATA.GOV.UK (2018) *Provisional Agricultural Land Classification (ALC)* Available online: <https://data.gov.uk/dataset/provisional-agricultural-land-classification-alc2> [Accessed November 2018]

⁵⁷ NRW (2015) *A Snapshot of the State of Wales' Natural Resources – June 2015*. Available online: <http://naturalresources.wales/media/4798/snapshot-report.pdf> [Accessed November 2018].

⁵⁸ Evans, C., Rawlins, B., Grebby, S., Scholefield, P. & Jones, P. (2015) *Glastir Monitoring & Evaluation Programme. Mapping the extent and condition of Welsh peat*. Welsh Government, NERC/Centre for Ecology & Hydrology.

environments but their quality can be degraded and destroyed by construction of buildings and infrastructure⁵⁹.

Geological hazards may change as a response to climate change. For example, coastal erosion, landslides and pollution from former mine sites⁶⁰. There are various risks to soil formation including organic matter loss as a result of climate warming, inundation of coastal soils from sea level rise, erosion and compaction from agriculture and soil sealing from development. Soil contamination is an additional threat posed by industry, urbanisation and mineral extraction which can affect biological processes of soil formation. Degradation in soil structure can also potentially be a factor in flooding whilst dissolved organic carbon (DOC) concentrations have increased in upland waters which suggests soil carbon stocks may be destabilising due to climate change.⁶¹

Woodlands are a fundamental part of the environment in Wales and there are a number of pressures on them. Pests and diseases are some of the major pressures which have had a significant impact on Welsh woodlands in recent years. The rate of new planting increased between 2009 and 2014 but in recent years it has fallen back⁶², and many of the best examples of semi-natural woodland (on protected sites) are in poor condition⁶³.

The 'Natural Resources Policy' identifies a number of aims of relevance to land use and soil, including:⁶⁴

- Better management of soil for carbon storage and sequestration;
- Safeguarding the best and most versatile agricultural land to improve soil quality, productive capacity and its resilience to degradation;
- Increasing green infrastructure in and around urban areas;
- Increasing canopy cover and well located woodland; and
- Peat bog management.

Key Sustainability Issues

The key sustainability issues relevant to the Drought Plan arising from the baseline assessment for geology and soils are:

- The need to protect, maintain and enhance geomorphological functions and services;
- The need to influence how land is managed, promoting sustainable patterns of land use;
- The need to conserve and enhance soil quality and function (including carbon sequestration);

⁵⁹ UK National Ecosystem Assessment (2011) *The UK National Ecosystem Assessment (NEA): Technical Report*. UNEP-WCMC, Cambridge. Chapter 20: Status and Changes in the UK's Ecosystems and their Services to Society: Wales. Pg 979-1044. Available online: <http://uknea.unep-wcmc.org/LinkClick.aspx?fileticket=StRD4fVq72c%3d&tabid=82> [Accessed November 2018].

⁶⁰ NRW (2016) *State of Natural Resources Report (SoNaRR): Assessment of the Sustainable Management of Natural Resources*. Technical Report. Natural Resources Wales. Available online: <https://naturalresources.wales/evidence-and-data/research-and-reports/the-state-of-natural-resources-report-assessment-of-the-sustainable-management-of-natural-resources/?lang=en> [Accessed November 2018]

⁶¹ NRW (2015) *A Snapshot of the State of Wales' Natural Resources – June 2015*. Available online: <http://naturalresources.wales/media/4798/snapshot-report.pdf> [Accessed November 2018].

⁶² Welsh Government (2016) *Woodlands for Wales Indicators 2015-16*. Available online: <http://gov.wales/docs/statistics/2016/161220-woodlands-wales-indicators-2015-16-en.pdf> [Accessed November 2018].

⁶³ UK National Ecosystem Assessment (2011) *The UK National Ecosystem Assessment (NEA): Technical Report*. UNEP-WCMC, Cambridge. Chapter 20: Status and Changes in the UK's Ecosystems and their Services to Society: Wales. Pg 979-1044. Available at <http://uknea.unep-wcmc.org/LinkClick.aspx?fileticket=StRD4fVq72c%3d&tabid=82> [Accessed November 2018].

⁶⁴ Welsh Government (2017) *Natural Resources Policy*. Available online: <http://gov.wales/docs/desh/publications/170821-natural-resources-policy-en.PDF> [Accessed November 2018]

- The need to protect and avoid damage to Wales' geodiversity and conserve and enhance sites designated for geological interest; and
- The need to manage impacts on soil resources, including control of pollution and remediation of contaminated land.

The Drought Plan is unlikely to affect land use as no permanent development will be required to meet the objectives of the plan.

3.4 Water

Baseline Characteristics

The number and type of water bodies in Wales is summarised in **Table 3.3**. Water is abstracted from water bodies for many purposes, including public water supply, agriculture, industry and electricity generation. In Wales, most of the water licensed for abstraction is from surface water rather than groundwater, with electricity generation being the sector abstracting the most (82 per cent), followed by public water supply (13 per cent), other industry (0.03 per cent), fish farming and amenity ponds (0.01 per cent). Spray irrigation, other agriculture and private water supplies account for a very low percentage of the total water abstracted⁶⁵.

Table 3.3 Number and Type of Water Bodies in Wales⁶⁶

Water body category	Natural	Artificial	Heavily modified	Total
River*	863	28	110	1001
Lake	29	3	90	122
Coastal	18	n/a	6	24
Estuarine	17	n/a	14	31
Groundwater	38	n/a	n/a	38
Total	965	31	220	1216

* River water bodies includes canals and surface water transfers.

Wales has relatively high rainfall compared to the rest of the UK, receiving on average 1,400 mm per year. There are however geographical differences across the Welsh Water supply area. Across Anglesey, the borders of Wales and Herefordshire, rainfall is around 700 mm per year, whilst the mountainous areas of the Brecon Beacons and Snowdonia receive substantially more rainfall, with the latter typically receiving more than 3,000mm of rainfall per year⁶⁷. Rainfall patterns combined with sources of demand drive the nature of the water resource system operated by Welsh Water. Only 3 per cent of the rainfall in Wales is used for public water supply, which is very different to the rest of the UK where up to 50 per cent of rainfall is used for public water supply.

⁶⁵ Environment Agency (2011) *The Case for change – current and future water availability*. Available online: <http://webarchive.nationalarchives.gov.uk/20140328084622/http://www.environment-agency.gov.uk/research/planning/135501.aspx> [Accessed November 2018].

⁶⁶ NRW (2015) *River Basin Planning Progress Report for Wales 2009 – 2015*. Available online: <https://naturalresources.wales/media/674595/progress-report-for-wales-2009-2015-final.pdf> [Accessed November 2018].

⁶⁷ Met Office (2016) *Wales: Climate*. Available online: <http://www.metoffice.gov.uk/climate/uk/regional-climates/wl> [Accessed November 2018].

Welsh Water manages its water supplies and demands across 24 water resource zones (WRZs). Welsh Water provides water services to some 3 million customers in much of Wales and small parts of Cheshire and Herefordshire in England. It also has over 100,000 business customers, and in total delivers more than 800 million litres of drinking water every day. This can increase by up to 20 per cent during a hot summer. Most of the water Welsh Water abstracts is supplied from impounding reservoirs although significant volumes are abstracted from lowland river sources such as those on the Rivers Wye and Usk in south east Wales, the River Towy in south west Wales and the River Dee in north Wales. Groundwater accounts for less than 5% of water supplies by Welsh Water but at a local level, may be the whole supply⁶⁸. River abstractions are the dominant supply in the Tywyn Aberdyfi, Llyswen, Hereford CUS, Whitbourne, Ross on Wye, and Monmouth zones. Reservoir supplies dominate the rest of Welsh Water's company area, with the remainder drawn from the ground through springs, wells and boreholes. There are groundwater sources in the Pilleth, Brecon/Portis, Clwyd Coastal, Pembrokeshire, Hereford and Vowchurch zones.

Water Availability

NRW has produced a series of Catchment Abstraction Management Strategies (CAMS) for the catchments within Wales and those that cross the England / Wales border. These CAMS set out how water resources will be managed in each catchment and provide information on how existing abstraction licences are managed and the availability of water for further abstraction. Within each CAMS, river flows and groundwater levels are monitored at Assessment Points (significant points on rivers) and assessed alongside the amount of water which has been abstracted on average over the previous six years and the situation if all abstraction licences were used to full capacity. This data is used to determine the water availability for each water body. Water availability falls into the following categories:

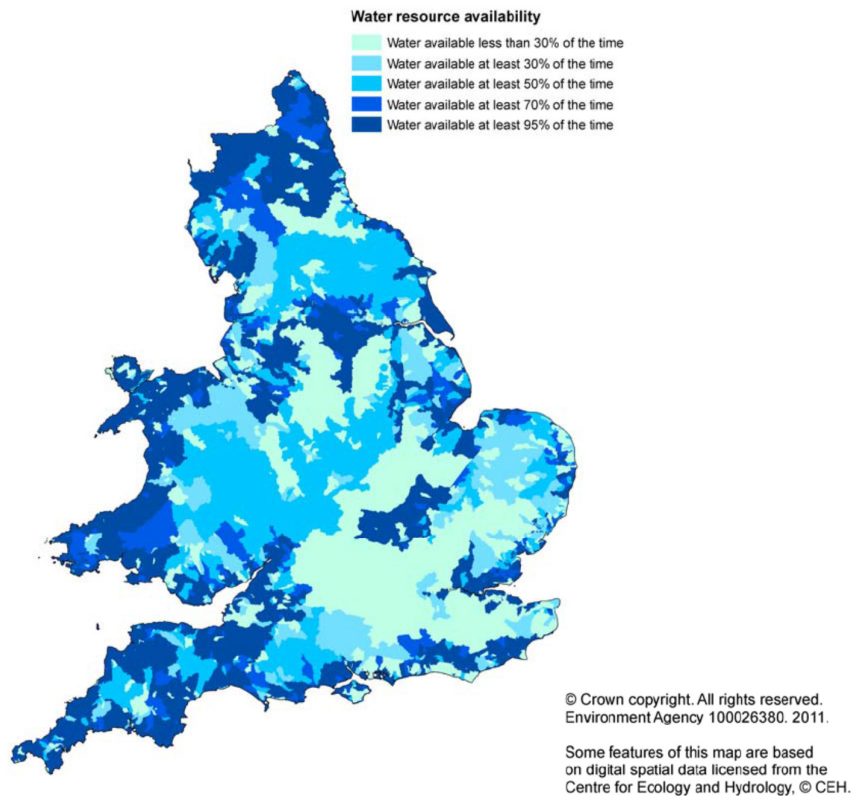
- **Water available for licensing:** There is more water than required to meet the needs of the environment. New licences can be considered depending on local and downstream impacts;
- **Restricted water available for licensing:** If all licensed water is abstracted there will not be enough water left for the needs of the environment. No new consumptive licences would be granted and restrictions may be in place. Trading from an existing licence holder can occur; and
- **Water not available for licensing:** Water body flows are below the indicative flow requirement to help support Good Ecological Status (as required by the Water Framework Directive). No further consumptive licences will be granted. Trading from an existing licence holder can occur.

Figure 3.9 shows how reliable new surface water and groundwater licences are, using the CAMS assessment. About 60 per cent of water bodies in Wales can provide a reliable source of water for new abstractions for at least 95 per cent of the time. Approximately 10 per cent of water bodies in Wales can only provide water for new abstractions 30 per cent or less of the time (less than 100 days a year)⁶⁹.

⁶⁸ Welsh Water (2019) *Draft Water Resources Management Plan 2019. Technical Report. March 2018*. Available online: <https://www.dwrcymru.com/en/My-Water/Water-Resources/Draft-Water-Resources-Management-Plan-2019.aspx> [Accessed November 2018].

⁶⁹ Environment Agency & NRW (2013) *Current and future water availability – addendum: A refresh of the Case for Change analysis, December 2013*. Available online: <http://webarchive.nationalarchives.gov.uk/20140328084622/http://www.environment-agency.gov.uk/research/planning/135501.aspx> [Accessed November 2018]

Figure 3.9 Water Resource Reliability: percentage of time water would be available for abstraction of new licences⁷⁰



Sustainability Reductions - Review of Consents

Under the Habitats Directive, Natural Resources Wales and the Environment Agency completed a review of all the consents (the RoC) that they regulated to ensure there were no detrimental impacts on the conservation interests in designated sites including SPAs and SACs. Discharge consents and water abstraction licences were included within this review.

The presence of a large number of SPAs and SACs in and adjacent to Welsh Water's supply area meant that a number of Welsh Water abstraction licences required modification in order to achieve the desired environmental outcomes for the primarily riverine European-designated sites (SACs) (River Wye, River Usk, River Teifi, River Towy, Cleddau Rivers, Rhinog, Migneint-Arenig-Dduallt, Afon Gwyrfai and Llyn Cwellyn). The negative impacts of the licences on designated sites, as determined by the regulator, included impacts on river flow and lake levels, fish entrainment through intake structures, groundwater level impacts and obstructions to fish passage.

Water Industry National Environment Programme (WINEP)

WINEP represents a set of actions that the Environment Agency have requested all water companies operating in England (including Welsh Water's supply area in England), to complete between 2020 and 2025, in order to contribute towards meeting their environmental obligations. A similar National Environment

⁷⁰ Environment Agency (2011) *The Case for change – current and future water availability*. Available online: <http://webarchive.nationalarchives.gov.uk/20140328084622/http://www.environment-agency.gov.uk/research/planning/135501.aspx> [Accessed November 2018].

Programme (NEP) applies in Wales. The WINEP actions will see up to £5 billion of investment by water companies in the natural environment through 2020 to 2025 (PR19). The investment comprises about 40% for meeting WFD drivers, 40% for meeting Urban Waste Water Treatment Directive drivers and 10% for meeting other drivers (including biodiversity). The investment aims to⁷¹:

- Protect and improve at least 6,000 km of our waters;
- Protect and improve 24 Bathing Waters and 10 Shellfish sites;
- Protect and improve 1,800 hectares of protected nature conservation sites; and
- Enhance nearly 900 km of river and 4,276 hectares through wider biodiversity improvements.

This will help tackle some of the biggest challenges facing the water environment, from the spread of invasive species, low flows and unsustainable abstraction to the effects of chemical and nutrient pollution. The measures in WINEP represent the basic measures required by water companies to meet their environmental obligations under their AMP7 investment plans. However, this also presents an opportunity for the industry to develop innovative approaches which will benefit customers, communities, the environment and natural capital. Welsh Water has recently (September 2018) submitted its PR19 investment plan to Ofwat which identifies an overall £2.3 billion capital investment programme. This includes £370 million of funding for the National Environment Programme that will:

- Upgrade 25 wastewater treatment works;
- Replace 7 wastewater treatment works in the Gwili Gwendraeth catchment; and
- Improve 15 high risk catchments.

The National Environment Programme will improve the quality of 400km of river.

Supply and Demand

Welsh Water forecasts water supply and demand in all of the 24 water resource zones (WRZs) taking into account the RoC and the NEP or WINEP. To account for future uncertainties, an additional amount of water is included in the assessment of the supply demand balance called 'Target Headroom'. For the WRZ to have a 'surplus', the water available for supply must be equal to or greater than the sum of the total forecast demand plus the target headroom. Where a shortfall against demand plus target headroom occurs (i.e. the water resource zone has a supply demand deficit) measures are required to address the shortfall. These could include measures to increase supply such as new abstractions or to reduce demand through additional leakage detection.

Welsh Water's Water Resources Management Plan 2019 presents the outcome of this assessment and identifies that two of the 24 WRZs are forecast to have a supply demand deficit over the planning period to 2050 unless management interventions such as demand management measures or new resources are implemented. The two WRZs are Pembrokeshire and Tywyn/Aberdyfi, which are shown in red on **Figure 3.10**. The Water Resources Management Plan 2019 ensures that a surplus of supply over demand is maintained in all WRZs.

⁷¹ Defra (2018) *£5 billion investment by water companies to benefit the natural environment*. Available online: <https://www.gov.uk/government/news/5-billion-investment-by-water-companies-to-benefit-the-natural-environment> [Accessed November 2018]

Figure 3.10 Welsh Water WRZs with supply demand deficit over the planning period to 2050⁷²

Welsh Water issued a draft Water Resource Management Plan for a 12 week consultation on 16th March 2018 and subsequently submitted a Revised Draft Water Resources Management Plan 2019 to Welsh Ministers. A direction to publish the Water Resources Management Plan 2019 has now been received by Welsh Water.

Wastewater Treatment

Welsh Water collects wastewater, including surface water from homes and businesses across the Welsh Water area. The wastewater is transported by the 30,000 km of sewer to one of the 838 wastewater treatment works (WwTWs) for treatment before being returned to the surface water system (rivers and the sea)⁷³.

WwTW discharge consent standards are set to maintain good water quality. In 2017 Welsh Water's WwTWs achieved 96.7 per cent compliance with their environmental permit conditions. NRW gives water companies a star rating for their overall performance in protecting the environment (including during return of treated water to rivers and the sea). Welsh Water were awarded a two out of four-star Environmental Performance Assessment (EPA) rating in 2017, which means it is a company 'requiring improvements'⁷⁴.

⁷² Welsh Water (2018) Revised Draft Water Resources Management Plan 2019. September 2018. Available online: <https://www.dwrcymru.com/en/My-Water/Water-Resources/Revised-Draft-Water-Resources-Management-Plan-2019.aspx> [Accessed December 2018].

⁷³ Welsh Water (2017) *Dŵr Cymru Welsh Water: Key Facts*. Available online: <http://www.dwrcymru.com/en/Company-Information/Dwr-Cymru-Welsh-Water/Key-Facts.aspx> [Accessed November 2018].

⁷⁴ DiscoverWater.co.uk (2018) *Environmental Performance Assessment*. Available online: <http://www.discoverwater.co.uk/environmental-performance> [accessed November 2018]

Water Quality

The quality of the water body that receives the output from the WwTW is important and the Water Framework Directive (WFD) (2000/60/EC) provides a mechanism for management of the water environment to ensure sustainable use of water. The WFD also seeks to protect and improve the quality, both ecological and chemical, of inland surface waters, ground waters and coastal waters. Under the WFD, River Basin Management Plans (RBMP) are prepared for each River Basin District. The Welsh Government reported on the River Basin Planning progress in 2015 and **Table 3.4** shows the percentage of water bodies in each River Basin District achieving poor, moderate or good status, both in 2009 and 2015.

Table 3.4 Overall status of water bodies as a percentage between 2009 and 2015⁷⁵

River Basin District	2009				2015				
	Bad	Poor	Moderate	Good	Not Assessed	Bad	Poor	Moderate	Good
Dee	0	11	58	30	0	0	5	63	31
Western Wales	0	7	63	30	0	0	5	57	38
Welsh part of the Severn River	1	12	50	37	1	1	8	47	43
Total (all water bodies)	1 (0.3%)	30 (10%)	171 (57.2%)	97 (32.4%)	1 (0.3%)	1 (0.3%)	18 (6%)	167 (56%)	112 (37.6%)

In 2009, 10 per cent of all water bodies were in poor condition, 57 per cent were in moderate condition and 33 per cent were in good condition. Since then, many improvements have been made both in monitoring and data collection and assessment. The 2015 classification shows that the percentage of water bodies achieving good or better status has increased to 38 per cent. The number of water bodies at poor status, meanwhile, has reduced to 6 per cent with a resulting increase in the number of water bodies at moderate status.

The main reasons for water body failure in Wales are pollution from abandoned mines and contaminated land, agricultural pollution, barriers to fish migration and impoundments. Sewage discharges, acidification, forestry, flood protection and land drainage, surface water drainage from urban and transport development, abstraction and industrial discharges are also factors. Eight transitional and eight coastal water bodies fail the WFD assessment for chemical status⁷⁶.

The Marine Strategy Framework Directive (MSFD) aims to achieve Good Environmental Status (GES) of the EU's marine waters by 2020 and to protect the resource base upon which marine-related economic and social activities depend. The Directive sets out 11 high level descriptors of GES and the status of these in Welsh waters is monitored for assessment of progress towards achieving GES. The Wales National Marine Plan will be a key tool for ensuring that the targets and measures to be determined by the UK for the MSFD can be implemented.

Bathing waters are very important for coastal communities, visitors and the economy in Wales. In 2017, 103 of the 104 designated Welsh bathing waters met the standards set by the Bathing Water Directive (2006/7/EC). Of the 104 bathing waters assessed in Wales, 80 were of an excellent standard, 18 achieved a

⁷⁵ Welsh Government (2015) *River Basin Planning Progress Report for Wales 2009-2015. Updated December 2015*. Available online: <http://naturalresources.wales/media/676155/progress-report-for-wales-2009-2015-english.pdf> [Accessed December 2018]

⁷⁶ NRW (2018) *Water Watch Wales Map Gallery*. Available online: <http://waterwatchwales.naturalresourceswales.gov.uk/en/> [Accessed November 2018]

good standard and 5 were classified as the minimum, sufficient, standard. One Welsh bathing water failed to comply with the Directive standards and was classified as poor – Cemaes, on Anglesey. This is the same bathing water that was non-compliant in 2016⁷⁷.

Across England and Wales new drinking water standards came into force, *The Water Supply (Water Quality) Regulations 2018* (which revised earlier versions of the regulations). Welsh Water's performance against the water quality tests (known as Overall Mean Zonal Compliance) for 2017 is 99.9 per cent, which is at the same level as the England and Wales average⁷⁸.

Nitrate Vulnerable Zones

Nitrate Vulnerable Zones (NVZs) are areas of land that drain into surface or ground water where nitrate levels are already high (greater than 50mg/l as NO₃), or may have high levels of nitrate in the future. It is important to manage nitrate concentrations in coastal waters, estuaries, rivers, lakes and groundwater as high nitrate concentrations can contaminate drinking water sources and can contribute to an overall deterioration in water quality leading to eutrophication. The most recent completed review of NVZs in Wales was undertaken in 2013 by the Environment Agency Wales. Currently, NVZs account for some 2.4% of land area in Wales.

Member states are required to review their implementation of the EC Nitrates Directive (91/676/EEC) every four years and to make appropriate amendments to the Nitrate Vulnerable Zones (NVZs) and/or the measures outlined in the Action Programme. The Welsh Government consulted on NVZ's and Action Programme requirements from September to December 2016, seeking views on the current measures for reducing pollution caused by nitrates from agricultural sources. Whilst the outcomes of the review are not yet finalised, the review recommended that all existing NVZ's, designated due to eutrophication in lakes, and surface water and groundwater contamination, are maintained. The review also recommended the designation of further NVZs (three for eutrophic freshwater areas, one eutrophic marine area, one groundwater area and two surface water areas)⁷⁹. Most respondents to the consultation recognised the significant impact nitrate pollution is having and agreed with the need for further action. Nearly 60% of responses supported an Action Programme to a 'Whole Wales' NVZ designation. Over coming months the Welsh Government will work with stakeholders for the appropriate mix of regulatory measures, voluntary initiatives and investment. Options to provide land managers with flexibility, where these would achieve the same or better outcomes than a regulatory approach, will be explored⁸⁰.

The State of Natural Resources Report (SoNaRR)⁸¹ identifies that the Loughor Estuary, River Loughor, River Wye, Tawe Estuary, Cardiff Bay, River Alyn are all designated as Urban Waste Water Treatment (UWWT) Directive Sensitive Areas (eutrophic). In these areas, better sewage treatment has been installed to remove nutrients and so protect waters that are threatened by eutrophication.

⁷⁷ NRW (2018) *Wales Bathing Water Report 2017*. Available online:

<https://cdn.naturalresources.wales/media/684898/wales-bathing-water-report-2017.pdf?mode=pad&rnd=13169548495000000> [Accessed November 2018].

⁷⁸ DiscoverWater.co.uk (2018) *Water quality results for all water companies*. Available online: <http://www.discoverwater.co.uk/quality> [Accessed November 2018]

⁷⁹ Welsh Government (2016) *Consultation Nitrate vulnerable zones in Wales*. Available online:

<https://consultations.gov.wales/consultations/nitrate-vulnerable-zones-wales> [Accessed November 2018]

⁸⁰ Welsh Government (2018) Consultation – summary of response Nitrate Vulnerable Zones in Wales. Review of the Designated Areas and Action Programme to Tackle Nitrate Pollution in Wales. Available online:

<https://beta.gov.wales/sites/default/files/consultations/2018-02/180223-summary-of-response-nitrate-vulnerable-zones-in-wales-en.pdf> [Accessed November 2018]

⁸¹ Natural Resources Wales (2016) *The State of Natural Resources Report (SoNaRR): Assessment of the Sustainable Management of Natural Resources*. Available online:

<https://cdn.naturalresources.wales/media/684348/chapter-3-state-and-trends-final-for-publication.pdf> [Accessed November 2018]

Flood Risk

Flood risk in Wales is a significant issue with many urban settlements built alongside rivers and streams and on river and coastal floodplains. The loss of natural coastal flood defences through coastal erosion, habitat loss and development pressure is also a key challenge. Climate change is likely to increase the frequency of extreme weather events resulting in more frequent and severe flooding. Coupled with rising sea levels, this is likely to affect Wales' natural resources, economy and communities.

The first National Strategy for Flood and Coastal Erosion Risk Management in Wales⁸² was published by the Welsh Government in 2011. The National Strategy provides the framework for flood and coastal erosion risk management in Wales. Within the National Strategy, Flood Risk Management Plans (FRMPs) were prepared by NRW and the Environment Agency setting out what measures will be taken to help manage the risk of flooding to people, the environment and economic activity at a River Basin District level. The published FRMPs provide a comprehensive overview of flood risk to people, economic activity and the natural and historic environment for the period December 2015 to December 2021. **Table 3.5** provides a summary of flood risk to people from rivers and the sea based on the information contained in the published FRMPs for the Western Wales⁸³, Severn River⁸⁴ and Dee River⁸⁵ River Basin Districts. Local Flood Risk Maps for Wales are available online from NRW⁸⁶, which incorporates the Welsh Government's Development Advice Map, in addition to separate local flood mapping for England⁸⁷. Over the period 2011 to 2014, £165 million has been invested in flood and coastal erosion risk management in Wales. This supported over 340 schemes to reduce the risk of flooding to approximately 6,700 properties.⁸⁸ An additional investment of £256 million in flood and coastal erosion risk management is predicted during 2016 to 2021⁸⁹.

Table 3.5 People at risk from flooding from rivers and the sea in Wales

River Basin District	High Risk	Medium Risk	Low Risk	Very Low Risk
Western Wales	16,857	24,095	105,719	1,170
Severn	32,600	62,100	240,650	33,050
Dee	3,300	2,500	20,500	150
Total	52,757	88,695	366,869	34,370

Data from the FRMPs for each River Basin Districts

⁸² Welsh Government (2011) *National Strategy for Flood and Coastal Erosion Risk Management in Wales*. Available online: <http://gov.wales/docs/desh/publications/111114floodingstrategyen.pdf> [Accessed November 2018]

⁸³ NRW (2016) *Western Wales Flood Risk Management Plan*. Available online: https://naturalresources.wales/media/675146/final_frmp_-_western-wales_pk26b82.pdf [Accessed November 2018]

⁸⁴ NRW and Environment Agency (2016). *Severn River Basin District Flood Risk Management Plan 2015-2021. Part A – Background and River basin District wide information*. Available online: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/507832/LIT_10213_SEVERN_FRMP_PART_A.pdf [Accessed November 2018]

⁸⁵ NRW and Environment Agency (2016) *Dee River Basin District Flood Risk Management Plan 2015-2021*. Available online: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/507153/LIT_10199_DEE_FRMP.pdf [Accessed November 2018]

⁸⁶ NRW (2018) *Long term flood risk*. Available online: <https://naturalresources.wales/evidence-and-data/maps/long-term-flood-risk/?lang=en> [Accessed November 2018]

⁸⁷ GOV.UK (2018) *Learn more about flood risk*. Available online: <https://flood-warning-information.service.gov.uk/long-term-flood-risk/map> [Accessed November 2018]

⁸⁸ NRW (2014) *Flood and Coastal Erosion Risk Management in Wales, 2011 – 2014*. First Report to the Minister under Section 18 of the Flood and Water Management Act 2010. Available online: <https://gov.wales/topics/environmentcountryside/epq/flooding/nationalstrategy/strategy/flood-coastal-erosion-risk-management-wales-11-14/?lang=en> [Accessed November 2018]

⁸⁹ GOV.Wales (2018) *Flood and coastal erosion- Key facts*. Available online: <https://gov.wales/topics/environmentcountryside/epq/flooding/?lang=en> [Accessed November 2018]

Fluvial and coastal flood risk is a problem within the Welsh Water supply area which is pertinent as water resources infrastructure can be rendered non-operational by flooding, putting customers' water supply at risk and increasing the risk of pollution. Gwynedd has the largest number of properties at significant risk (greater than a 1 in 75 chance in any given year). This is largely because of the coastal flood risk. Coastal flooding is also the cause of the significant risk to property in Newport⁹⁰. At Newport, flood risk is primarily attributable to tidally influenced flooding from the River Usk and tributaries running through Newport.⁹¹ Newport is reliant on flood defences of which will become more important in the future due to extreme flood or tidal events that could have serious consequences.

Future Baseline

Under the WFD, rivers in England and Wales were required to have achieved 'good ecological status' by 2015. Where this was not possible and subject to criteria set out in the WFD, the aim is to achieve good status by 2021 or 2027. The second River Basin Management Plan cycle, 2015 – 2021 recognises the large degree of uncertainty about achieving such significant increases to achieve good status or better by 2021. In Wales, NRW propose to improve compliance with good status by delivering measures locally in an integrated way to achieve improvements. This will involve targeting 21 water bodies in the Western Wales River Basin District⁹² and 7 water bodies in the Dee River Basin District⁹³. In the Severn River Basin District there are 7 programmes to achieve the 2021 outcomes. For example, in the Welsh area of the Severn River Basin District, Natural Resources Wales has made available £4.2 million for 2015-2018 to fund catchment level projects that benefit the wildlife, people and economy of Wales.

The State of Natural Resources Report (SoNaRR)⁹⁴ highlights that climate change may affect groundwater recharge in Wales and that by 2025, it is likely that groundwater recharge will decrease, resulting in decreased dry weather river flows and a general lowering of groundwater levels. This may have impacts on base-flow to rivers and wetlands in dry periods and affect small domestic and agricultural water supplies.

Reducing the risk of flooding as a key challenge in the future. Increased soil sealing and compaction from farming practices and urban development resulting in loss of water storage capacity and more surface water run-off will increase flood risk. The loss of natural coastal flood defences is also considered to be an important issue. Climate change is likely to exacerbate coastal erosion and flooding as a result of sea level rise and increased intensity, severity and frequency of storms over the next 100 years. The UK Climate Impacts Programme (UKCP18) forecasts that for the 2060 to 2079 period (under a high emissions scenario), there will be an increase in winter mean precipitation of up to 29 per cent (compared to the period 1981 to 2000) whilst sea levels are forecast to increase by up to 113 cm (by 2100, compared to the 1981 to 2000 period)⁹⁵.

The second UK Climate Change Risk Assessment Evidence Report (2017) forecasts large deficits by the 2050s in the provision of public water supplies under the upper bound scenario (high population growth and a high climate change impact), with projected deficits becoming more acute and widespread by the 2080s. Under a

⁹⁰ Environment Agency (2009) *Flooding in Wales: A National Assessment of Flood Risk*. Cardiff.

⁹¹ Environment Agency Wales (2010) *Managing Flood Risk: Wye and Usk Catchment Flood Management Plan*

⁹² NRW (2015) *Western Wales River Basin Management Plan 2015 – 2021 Summary December 2015*. Available online: <https://naturalresources.wales/media/676165/wwrbdsunary.pdf> [Accessed November 2018]

⁹³ NRW (2015) *Dee River Basin Management Plan 2015 – 2021 Summary Updated December 2015* Available online: <http://www.naturalresources.wales/media/682463/deerbdsunary.pdf> [Accessed November 2018]

⁹⁴ NRW (2016) *The State of Natural Resources Report (SoNaRR)* [available at <https://naturalresources.wales/evidence-and-data/research-and-reports/the-state-of-natural-resources-report-assessment-of-the-sustainable-management-of-natural-resources/?lang=en>] [Accessed November 2018].

⁹⁵ UKCP18 website. *UK Climate projections (2018) Headline findings*. Available online:

<https://www.metoffice.gov.uk/binaries/content/assets/mohippo/pdf/ukcp18/ukcp18-infographic-headline-findings-land.pdf> [Accessed March 2019].

lower bound scenario (a low population and medium climate change projection), Wales is projected to be in surplus at a national scale, with deficits more locally.⁹⁶ The Evidence Report is due to be updated in 2022 using the UKCP18 climate projections. According to the Water Resources Long-Term Planning Framework (2015-2065) there is a significant and growing risk of severe drought, with impacts arising from climate change, population growth and environmental drivers to reduce abstraction.⁹⁷

Key Sustainability Issues

The key sustainability issues relevant to the Drought Plan arising from the baseline assessment for water are:

- The need to protect, enhance and restore the quality of the rivers, lakes, estuarine and coastal waters taking into account WFD objectives;
- The need to protect, enhance and restore the quantity and quality of groundwater resources taking into account WFD objectives;
- The need to ensure sustainable and appropriate abstraction levels and water flow/levels in Wales' waters across the full range of regimes from low to high conditions and meet society's needs for a resilient water supply;
- The need to ensure that the continued risk of flooding is reduced or where this is not possible, mitigated effectively using natural flood management and green engineering where possible; and
- The potential effects of climate change and the need to build climate change resilience into the water environment and water management.

3.5 Air Quality and Climate Change

Baseline Characteristics

Good air quality is essential to ensure people and ecosystems are healthy, productive and balanced. The emission of pollutants to air can pose a hazard to human health (e.g. respiratory illnesses and lung conditions) and can also have a negative impact on the environment (e.g. changes to ecosystems and damage to vegetation when present within the atmosphere in excess of certain concentrations). Air quality within this context concerns the levels of pollutants emitted into the air and their significance, in terms of the risk of adverse effects on the environment and/or human health.

Emissions of gases into the air from transport, industry and agriculture can be transported significant distances by prevailing weather patterns and, via precipitation and deposition, eventually cause diffuse water pollution, the effects of which may be very long term. Pollutants may persist in groundwater or sediments for decades or centuries and nutrient-enriched lakes and acidified waters may take many years to recover. All sectors will be required to make cuts in air emissions to meet the targets of the National Emissions Ceilings Directive and the WFD.

Drought management measures may involve the operation of abstraction and treatment facilities at a greater level of intensity and/or in locations where such operations do not normally take place, with the potential for negative effects, although generally only in the short term.

⁹⁶ HR Wallingford (2015) *CCRA2: Updated projections for water availability for the UK*. Available online:

<https://www.theccc.org.uk/publication/climate-change-risk-assessment-ii-updated-projections-for-water-availability-for-the-uk/> [Accessed November 2018]

⁹⁷ Water UK (2016) *Water Resources Long-Term Planning Framework (2015-2065)*. Available online: <https://www.water.org.uk/water-resources-long-term-planning-framework> [Accessed November 2018]

The UK Government and Devolved Administrations are required to produce a national ambient air quality strategy, outlining objectives and standards for improving air quality. Local Authorities must regularly assess air quality in their area against the standards and objectives of the National Air Quality Strategy⁹⁸. Air Quality Management Areas (AQMAs) are declared by Local Authorities in specific locations where atmospheric concentrations of one or more pollutants (including pollutants such as nitrogen dioxide (NO₂), sulphur dioxide (SO₂) volatile organic compounds (VOCs) and fine particles up to 10µm in size (PM₁₀)) are either close to or exceeding statutory objectives set out within the National Air Quality Strategy.

There are 38 AQMAs reported in 2017 in Wales, the majority of which are in place around roads (**Table 3.6**). All the AQMAs were declared for nitrogen dioxide except for one which was declared for particulates. As shown in **Table 3.7**, Rhondda-Cynon-Taff Council has the most AQMAs in place (14), all for nitrogen dioxide and half have been in place for more than seven years⁹⁹.

Table 3.6 Number of AQMAs in Wales by Source (2017)¹⁰⁰

Source	Number of current AQMAs
County or Unitary Authority Road	19
Road transport unspecified	13
Mixture of road types	5
Industrial Source	1

Table 3.7 Number of AQMAs in Wales per Local Authority (2017)¹⁰¹

Local Authority	Number of Active AQMA	Pollutant AQMA in place for
Caerphilly County Borough Council	2	Nitrogen dioxide NO ₂
Cardiff County Council	4 (and 3 revoked)	Nitrogen dioxide NO ₂
Carmarthenshire County Council	3	Nitrogen dioxide NO ₂
City and County of Swansea	1	Nitrogen dioxide NO ₂
Merthyr Tydfil County Borough Council	1	Nitrogen dioxide NO ₂
Monmouthshire Council	2	Nitrogen dioxide NO ₂
Neath Port Talbot County Borough Council	1	Particulate Matter PM ₁₀
Newport City Council	9	Nitrogen dioxide NO ₂
Pembrokeshire Council	2	Nitrogen dioxide NO ₂
Powys County Council	1 revoked	Nitrogen dioxide NO ₂
Rhondda-Cynon-Taff Council	14 (and 1 revoked)	Nitrogen dioxide NO ₂

⁹⁸ Defra (2007). *Air Quality Strategy for England, Scotland, Wales and Northern Ireland*. Available online: www.defra.gov.uk/publications/2011/03/28/air-quality-strategy-vol2-pb12670/ [Accessed November 2018]

⁹⁹ Defra (2017). *Summary AQMA data*. Available online: <https://uk-air.defra.gov.uk/aqma/summary> [Accessed November 2018]

¹⁰⁰ Defra (2017) *Summary AQMA data*. Available online: <https://uk-air.defra.gov.uk/aqma/summary> [Accessed November 2018]

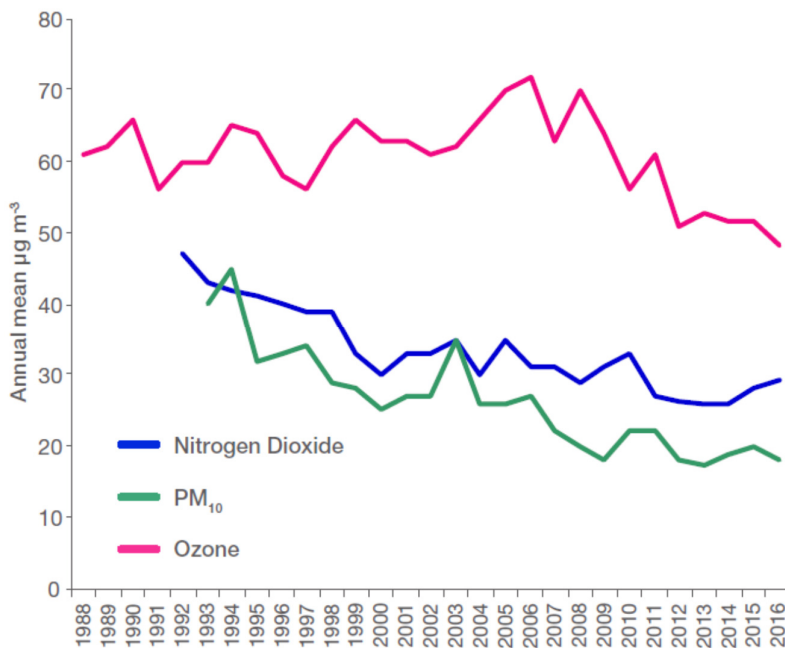
¹⁰¹ Defra (2017) *List of Local Authorities with AQMAs*. Available online: <https://uk-air.defra.gov.uk/aqma/list> [Accessed November 2018]

Local Authority	Number of Active AQMA	Pollutant AQMA in place for
Vale of Glamorgan Council	1	Nitrogen dioxide NO ₂

The 2016 Welsh Government Air Quality Report identifies that no monitoring sites in Wales exceeded any Air Quality Strategy (AQS) Objectives (or corresponding EU limit values) for carbon monoxide, sulphur dioxide, benzene or lead during 2016. Five monitoring sites (Rhondda Mountain Ash, Caerphilly Hafodyrnys, Newport M4 Junction 25, Swansea Hafod DOAS and Swansea Station Court High Street) exceeded the annual mean objective of 40 µg m⁻³ for nitrogen dioxide, one site (Caerphilly Hafodyrnys) exceeded the AQS Objective for nitrogen dioxide on more than the permitted 18 occasions and four sites exceeded the AQS Objective for ozone on more than the permitted 10 occasions. Urban air quality in Wales is generally worse than in rural areas. The main causes of pollution at urban sites are fine particles (PM₁₀) and ozone (O₃) whilst the main cause of pollution in rural areas is the variation in ozone levels, which is affected by the weather¹⁰².

The longer term trend in air quality in Wales shows a steady improvement, although with a slight recent reversal, in nitrogen dioxide and PM₁₀ concentrations since the 1990s except for ozone (**Figure 3.11**). This confirms that the local measures being put in place to reduce nitrogen dioxide and PM₁₀ concentrations are having the desired result, all be it on a national scale. Ozone is noted to be a regional pollutant and transboundary in nature, making it more difficult to control¹⁰³.

Figure 3.11 Ambient Pollutant Trends in Wales 1990 – 2016 ¹⁰⁴



Poor air quality is a significant public health issue. The Committee on the Medical Effects of Air Pollutants (COMEAP) has estimated that the burden of particulate air pollution in the UK in 2008 was equivalent to

¹⁰² Welsh Government (2016) *Air Pollution in Wales 2016*. Available online: <https://airquality.gov.wales/reports-seminars/reports> [Accessed November 2018].

¹⁰³ Welsh Government (2016) *Air Pollution in Wales 2016*. Available online: <https://airquality.gov.wales/reports-seminars/reports> [Accessed November 2018].

¹⁰⁴ Welsh Government (2016) *Air Pollution in Wales 2016*. Available online: <https://airquality.gov.wales/reports-seminars/reports> [Accessed November 2018].

nearly 29,000 deaths at typical ages and an associated loss of population life of 340,000 years. It has been estimated that removing all fine particulate air pollution would have a bigger impact on life expectancy in England and Wales than eliminating passive smoking or road traffic accidents. The economic cost from the impacts of air pollution in the UK is estimated at £9-19 billion every year; this is comparable to the economic cost of obesity (over £10 billion)¹⁰⁵.

Some of the most widespread and significant effects on ecosystems are damage from air pollution such as exposure to ozone and acidification. For example, emissions to air of sulphur and nitrogen containing pollutants from heavy industry, power generation and transport have caused acidification of freshwaters across Wales. A recent NRW WFD assessment estimated that 21 per cent of Welsh river and 36 per cent of Welsh lake water bodies were at risk of acidification.¹⁰⁶

Climate

Through the Climate Change Act 2008, the UK has set itself a target of reducing greenhouse gas emissions by at least 80 per cent compared to 1990 levels by 2050; and aims to meet 15 per cent of final energy consumption from renewable sources by 2020. The two key overarching targets for reducing greenhouse gas emissions in Wales are firstly to reduce emissions by 3 per cent annually in areas of devolved competence and, secondly, to reduce overall emissions by 40 per cent by 2020, against a 1990 baseline¹⁰⁷.

Carbon dioxide (CO₂) is the main greenhouse gas, accounting for about 81 per cent of the UK gas emissions in 2016 and is a major contributor to climate change. As seen in **Table 3.8** the largest CO₂ emissions in Wales in 2016 were from the industrial and commercial sectors, a similar trend to the UK. However, the 2016 carbon dioxide per capita emissions (**Table 3.8**) of 8.0 tonnes of CO₂ per person were higher than all other UK regions due to emissions from the industrial and commercial sector, highlighting the larger industrial base of the country compared to the UK and other regions. Since 2005 there has been an overall reduction in CO₂ emissions in Wales, and Wales has achieved a 24 per cent reduction over the period 2005 to 2016. There have been periods of fluctuation within this trend, such as rises in 2010 and 2012 due to economic factors and temperature variations. In 2013, there was also a notable increase in industrial and commercial emissions in Neath Port Talbot due to increased activity at large industrial sites.

Table 3.8 End User Carbon Dioxide Emissions 2016¹⁰⁸

	Industrial & commercial	Domestic	Transport	Land Use, Land Use Change and Forestry	Total	Change from previous year
Million Tonnes CO₂						
UK	143.0	102.4	128.1	-16.0	357.5	-6%

¹⁰⁵ Defra (2015) *Appendix 5: international, European and national standards for air quality in 2010 to 2015 Government policy: Environmental quality. Policy Paper*. Available online: <https://www.gov.uk/government/publications/2010-to-2015-government-policy-environmental-quality/2010-to-2015-government-policy-environmental-quality> [Accessed November 2018].

¹⁰⁶ NRW (2016) *State of Natural Resources Report (SoNaRR): Assessment of the Sustainable Management of Natural Resources*. Technical Report. Natural Resources Wales. Available online: <https://naturalresources.wales/evidence-and-data/research-and-reports/the-state-of-natural-resources-report-assessment-of-the-sustainable-management-of-natural-resources/?lang=en> [Accessed November 2018]

¹⁰⁷ Welsh Government (2010) *Climate Change Strategy for Wales*. Available online: <http://gov.wales/docs/desh/publications/101006ccstratfinalen.pdf> [Accessed November 2018].

¹⁰⁸ DECC (2018) *Local authority carbon dioxide emissions estimates 2016 Statistical Release: National Statistics*. Available online: <https://www.gov.uk/government/collections/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics> [Accessed November 2018]

Wales	14.1	5.2	6.4	-0.8	24.9	-5%
Tonnes CO₂ per person						
UK	2.2	1.6	2.0	-0.2	5.4	-7%
Wales	4.5	1.7	2.1	-0.2	8.0	-6%

The State of Natural Resources Report (SoNaRR)¹⁰⁹ identifies the evidence of climate change in Wales to date:

- daily mean temperature rose by 0.7°C between 1914 and 2006;
- there has been a 22.4 day reduction in air frosts per year between 1961 and 2006;
- there has been a significant 24% decline in summer rainfall in Wales between 1914 and 2006; and
- heavy precipitation events have increased in winter and decreased in summer between 1961 and 2006.

Drought measures could influence CO₂ emissions through additional temporary pumping and treatment requirements, however as additional pumping and treatment would already be taking place to meet the increased demands the effect is anticipated to be minor. The Drought Plan is a tactical response plan that sets out to ensure the maintenance of essential water supplies during times of drought, which may become more prevalent and intense due to the effects of climate change. The Drought Plan itself functions as a form of adaptation to some of the effects of climate change.

In 2017/2018 Welsh Water operational carbon emissions fell by 71% to 62ktCO₂e from 212 ktCO₂e in 2016/2017. This reduction was due to a change in electricity supply contract which ensures electricity is from renewable sources. Welsh Water's renewable energy production in 2017/2018 increased to 98GWh from 87 GWh in 2016/2017 with increases in hydro generation (to 42 from 37 GWh) and the first full year of wind energy generation (6 GWh)¹¹⁰.

Future Trends

The improvement in air quality seen since 1990 has levelled off and in some cases the recent trends show a slight reversal. The levels of pollutants released from all sources are expected to continue to fall as abatement technology improves. However, there will be local increases in air pollution from urbanisation, road traffic and intensification of agriculture¹¹¹. In Wales (and the rest of the UK), nitrogen dioxide is the pollutant that most widely exceeds the AQS Objective. PM₁₀ concentrations have generally decreased in recent years, at both urban background and urban traffic sites. Ozone concentrations, meanwhile, have tended to be highest at rural locations, although there are no clear trends as concentrations vary considerably from year to year because of variation in meteorological factors¹¹².

¹⁰⁹ NRW (2016) *The State of Natural Resources Report (SoNaRR)* [available at <https://naturalresources.wales/evidence-and-data/research-and-reports/the-state-of-natural-resources-report-assessment-of-the-sustainable-management-of-natural-resources/?lang=en> [Accessed November 2018].

¹¹⁰ Welsh Water (2018) *Glas Cymru Report & Accounts 2017-2018*. Available online: http://www.dwrcymru.com/en/Reading_Room_Library/Company-Reports.aspx [Accessed November 2018]

¹¹¹ NRW (2016) *State of Natural Resources Report (SoNaRR): Assessment of the Sustainable Management of Natural Resources*. Technical Report. Natural Resources Wales. Available online: <https://naturalresources.wales/evidence-and-data/research-and-reports/the-state-of-natural-resources-report-assessment-of-the-sustainable-management-of-natural-resources/?lang=en> [Accessed November 2018]

¹¹² Welsh Government (2016) *Air Pollution in Wales 2016*. Available online: <https://airquality.gov.wales/reports-seminars/reports> [Accessed November 2018].

The Welsh Government supplemental plan to the UK plan for tackling roadside nitrogen dioxide concentrations (2017) sets out actions the Welsh Government will take to reduce concentrations of nitrogen dioxide around roads where levels are above legal limits in Wales. These managed roads include

- A494 at Deeside; (North Wales Zone);
- A483 near Wrexham; (North Wales Zone);
- M4 between junctions 41 and 42 (Port Talbot);(Swansea and South Wales Zone);
- M4 between junctions 25 and 26 (Newport); (South Wales Zone); and
- A470 between Upper Boat and Pontypridd. (South Wales Zone).

Implementation of measures such as enforcing a 50 miles per hour speed limit is predicted to reduce nitrogen dioxide emissions by up to 18%¹¹³.

Under Defra's 2018 draft Clean Air Strategy, the Welsh Government has announced that it will publish The Clean Air Plan for Wales in early 2019. The Clean Air Plan for Wales will include¹¹⁴:

- Clean Air Zone Framework to allow Local Authorities to establish Clean Air Zones in high pollution areas;
- Improvements to Local Authority reporting on air quality issues; and
- The establishment of a National Air Quality Assessment and Monitoring Centre for Wales.

Climate

UKCP18 provides the following predictions on changes in climate in Wales for the period 2060 to 2079 (based on a high emissions scenario for a location in central Wales):

- winter temperature: a change in temperature of between 0.7 and 4.1°C;
- summer temperature: a change in temperature of between 0.9 and 5.9°C;
- winter precipitation: an increase of up to 29 per cent; and
- summer precipitation: 38 per cent drier to 3 per cent wetter.

Sea levels are also forecast to rise, with relative sea levels in Cardiff forecast to increase by up to 113 cm (by 2100, compared to the 1981 to 2000 period)¹¹⁵.

The changes in climate are expected to result in an increase in the number of flash flooding events, increased pressure on the capacity of the sewerage system, increased frequency of summer water shortages and low flows in rivers which will result in the loss of habitats and species¹¹⁶.

¹¹³ Welsh Government (2018) *Consultation Document. Tackling roadside nitrogen dioxide concentrations in Wales Welsh Government supplemental plan to the UK plan for tackling roadside nitrogen dioxide concentrations 2017*. Available online: <https://beta.gov.wales/sites/default/files/consultations/2018-04/180425-air-quality-plan-consultation-en.pdf> [Accessed November 2018].

¹¹⁴ Defra (2018) *Air quality: draft Clean Air Strategy 2018* Available online: <https://consult.defra.gov.uk/environmental-quality/clean-air-strategy-consultation/> [Accessed November 2018].

¹¹⁵ UKCP18 website. *UK Climate projections (2018) Headline findings*. Available online: <https://www.metoffice.gov.uk/binaries/content/assets/mohippo/pdf/ukcp18/ukcp18-infographic-headline-findings-land.pdf> [Accessed March 2019].

¹¹⁶ Welsh Government (2010) *Climate Change Strategy for Wales*. Available online: <http://gov.wales/docs/desh/publications/101006ccstratfinalen.pdf> [Accessed November 2018]

The changes in average temperatures and rainfall as a result of climate change are likely to cause hotter, drier summers which will potentially result in:

- Increased maximum summer temperatures that are likely to lead to increased thermal discomfort in buildings;
- Increased health problems in the summer, including heat related deaths and those linked to high air pollution. Elevated summer temperatures cause health problems both directly and indirectly, via elevated levels of air pollutants;
- Increased summer water shortages as summer rainfall decreases;
- Growth in summer tourism; and
- Changes to the natural environment including impacts on habitats and species associated with changing temperatures and water availability (in both summer and winter).

Milder winters are expected to result in:

- A reduction in the number and severity of annual frosts and snowfall, caused by the likely increased temperatures during the winter months which could lead to longer growing seasons for suitable crops and grasslands;
- Less cold weather transport disruption;
- Reduced demand for winter heating;
- Less cold weather related illnesses;
- Increased river and urban flooding, due to the increased incidence and severity of extreme rainfall events;
- Increased pressure on sewer systems with associated water quality impacts; and
- Increased localised flooding as a result of pressures on the sewerage/drainage network due to exceeded capacity.

Under the second UK Climate Change Risk Assessment evidence report, there are significant reductions projected in the availability of public water supplies by the 2050s and the 2080s under both a medium and high climate change scenario.⁹⁶ Climate change is also identified as one of the potential key drivers associated with a significant and growing risk of severe drought.⁹⁷

The Kyoto Protocol's first commitment period ended in 2012, which had set a legally binding target for the UK to reduce its greenhouse gas emissions by 12.5 per cent (compared to the 1990 base year) across 2008 to 2012. The 2015 United Nations Climate Change Conference (COP21) negotiated the Paris Agreement, a global agreement to (*inter alia*) hold the increase in the global average temperature to well below 2 °C above pre-industrial levels and to increase the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development.

The UK Climate Change Act 2008 set legally binding targets for the UK to reduce greenhouse gas emissions by at least 80 per cent by 2050, and CO₂ emissions by at least 26 per cent by 2020, both set against a 1990 baseline. Under the requirements of the Act, the Government has set five-year carbon budgets to set out a trajectory for emissions reductions to 2050. Budgets have been set covering the periods 2008-12, 2013-17, 2018-22, 2023-27 and 2028-32, equivalent to 22 per cent, 28 per cent, 34 per cent, 50 per cent and 57 per cent reductions in carbon emissions compared to 1990 levels respectively.

The Climate Change Strategy for Wales¹¹⁷ sets out the Welsh Government's policy intentions in relation to climate change. It reiterates the One Wales commitments to 3 per cent annual carbon reductions and states that, by 2020, the Welsh Government expects to see:

- Businesses have reduced energy costs and emissions;
- Employees actively engaged in reducing emissions from their workplaces;
- Consumers demanding low carbon goods and services and concerned about sustainability performance of businesses;
- Growth of social enterprises and community businesses providing low carbon goods and services locally; and
- More businesses operating, and people employed in, businesses that provide low carbon goods and services.

In 2007, Welsh Water committed to reducing carbon emissions by 25 per cent by 2015 and by 50 per cent by 2035¹¹⁸. Although the 2015 target (230ktCO₂e) was not achieved in 2015 with emissions totalling 233 ktCO₂e¹¹⁹ the carbon emissions in 2017/2018 have fallen to 62ktCO₂e. This reduction was due to a change in electricity supply contract which ensures electricity is from green renewable sources¹²⁰.

There is a degree of conflict between increasing the level of treatment of waste water required to meet stricter environmental quality standards and the energy use and associated emissions that result from the improved treatment processes.

Key Sustainability Issues

The key sustainability issues relevant to the Drought Plan arising from the baseline assessment for air quality and climate are:

- The need to minimise emissions of pollutant gases and particulates and enhance air quality arising from the implementation of the Drought Plan measures;
- The need to reduce greenhouse gas emissions arising from implementation of the Drought Plan measures;
- The need to take into account, and where possible adapt to, the potential effects of climate change; and
- The need to increase environmental resilience to the effects of climate change.

¹¹⁷ Welsh Government (2010) Climate Change Strategy for Wales. Available online at:

<http://gov.wales/docs/desh/publications/101006ccstratfinalen.pdf> [Accessed November 2018]

¹¹⁸ Welsh Water (2007) Our Sustainable Future. Available online at: <https://www.dwrcymru.com/en/Environment/Our-Sustainable-Future.aspx> [Accessed November 2018]

¹¹⁹ Welsh Water (2015) *Welsh Water Report and Accounts 2015*. Available online:

http://www.dwrcymru.com/en/Reading_Room_Library/Company-Reports.aspx [Accessed November 2018]

¹²⁰ Welsh Water (2018) *Glas Cymru Report & Accounts 2017-2018*. Available online:

http://www.dwrcymru.com/en/Reading_Room_Library/Company-Reports.aspx [Accessed November 2018]

3.6 Human Environment

Baseline Characteristics

The population of Wales at the time of the 2011 Census was 3,063,800. The 2017 mid-year population estimate indicates the population of Wales to be 3,125,200, an increase of 61,400 from 2011¹²¹. The 2017 mid-year population estimates indicate that population density in Wales had increased from 147.8 people per square kilometre in 2011 to 150.7 people per square kilometre in 2017¹²².

The change in Wales' population between 2001 - 2011 and 2011 - 2017 is shown in **Table 3.9**. The table includes all counties in Welsh Water's area, in both Wales¹²³ and England¹²⁴.

Table 3.9 Population of Welsh Waters Area by County

County	2001 Population	2011 Population	Population change between 2001 and 2011 (%)	2017 Population	Population change between 2011 and 2017 (%)
Isle of Anglesey	67,898	69,833	2.8	69,794	-0.1
Gwynedd	116,699	121,155	3.8	123,742	2.1
Conwy	108,651	114,682	5.6	116,863	1.9
Denbighshire	92,525	94,152	1.8	95,159	1.1
Flintshire	147,930	152,080	2.8	155,155	2.0
Wrexham	127,653	134,009	5.0	135,571	1.2
Powys	126,134	132,878	5.3	132,515	-0.3
Ceredigion	74,942	75,217	0.4	73,076	-2.9
Pembrokeshire	112,538	121,974	8.4	124,711	2.2

¹²¹ ONS (2018) *Wales population mid-year estimate 2017*. Available online:

<https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/timeseries/wapop/pop> [Accessed November 2018]

¹²² Stats Wales (2018) *Population density (persons per square kilometre) by local authority and year*. Available online:

<https://statswales.gov.wales/Catalogue/Population-and-Migration/Population/Density/populationdensity-by-localauthority-year> [Accessed November 2018]

¹²³ Stats Wales (2018) *Components of population change, by local authority and component*. Available online:

<https://statswales.gov.wales/Catalogue/Population-and-Migration/Population/Components-of-Change/components-of-population-change-by-local-authority-component> [Accessed November 2018]

¹²⁴ ONS (2018) *All people population, County of Herefordshire*. Available online:

https://www.nomisweb.co.uk/reports/lmp/la/1946157169/subreports/pop_time_series/report.aspx [Accessed November 2018]

County	2001 Population	2011 Population	Population change between 2001 and 2011 (%)	2017 Population	Population change between 2011 and 2017 (%)
Carmarthenshire	172,874	183,004	5.9	186,452	1.8
Swansea	224,475	237,311	5.7	245,480	3.3
Neath Port Talbot	134,834	139,638	3.6	142,090	1.7
Bridgend	128,224	138,471	8.0	144,288	4.0
Vale of Glamorgan	119,276	126,435	6.0	130,690	3.3
Cardiff	311,443	341,402	9.6	362,756	5.9
Rhondda Cynon Taf	232,370	234,459	0.9	239,127	2.0
Merthyr Tydfil	56,218	58,493	4.0	59,953	2.4
Caerphilly	169,045	178,101	5.4	180,795	1.5
Blaenau Gwent	70,537	69,798	-1.0	69,609	-0.3
Torfaen	91,214	91,060	-0.2	92,264	1.3
Monmouthshire	84,458	91,016	7.8	93,590	2.8
Newport	136,932	144,803	5.7	151,485	4.4
WALES	2,906,870	3,049,971	4.9	3,125,165	2.4
Herefordshire	174,900	183,600	5.0	191,000	3.9

Welsh Water provides water supply and sewerage services to approximately 3 million people. Although the majority of people are located in Wales, the company also supplies water to areas of England (approximately 228,000 customers¹²⁵).

¹²⁵ Estimate based on June Return 2011 population by WRZ and percentage of WRZ land area lying within England

Table 3.10 provides information in relation to changes in population density between 2011 and 2017. Overall densities have increased although there are instances, most notably Ceredigion, where densities have fallen.

Table 3.10 Population Density per square Kilometre of land area by Welsh Authorities¹²⁶

	Population Density Mid-year 2011	Population Density Mid-year 2017	Change 2011-2017	% Change 2011- 2017
Wales	147.8	150.7	3.0	2.0
Isle of Anglesey	98.3	98.1	-0.2	-0.2
Gwynedd	47.9	48.8	0.9	1.8
Conwy	102.4	103.8	1.4	1.3
Denbighshire	112.2	113.7	1.5	1.3
Flintshire	349.0	354.6	5.7	1.6
Wrexham	268.1	269.1	1.0	0.4
Powys	25.7	25.6	-0.1	-0.4
Ceredigion	42.2	40.9	-1.2	-2.9
Pembrokeshire	75.7	77.0	1.3	1.7
Carmarthenshire	77.6	78.7	1.1	1.4
Swansea	628.7	646.6	17.9	2.8
Neath Port Talbot	317.0	322.0	5.0	1.6
Bridgend	556.0	575.5	19.5	3.5
Vale of Glamorgan	382.6	394.7	12.1	3.2
Cardiff	2451.7	2574.6	122.9	5.0
Rhondda Cynon Taf	552.6	563.8	11.2	2.0
Merthyr Tydfil	528.1	538.0	9.9	1.9
Caerphilly	644.5	651.8	7.3	1.1

¹²⁶ Stats Wales (2018) *Population Density (persons per square kilometre) by local authority and year*. Available online: <https://statswales.gov.wales/Catalogue/Population-and-Migration/Population/Density/populationdensity-by-localauthority-year> [Accessed November 2018]

	Population Density Mid-year 2011	Population Density Mid-year 2017	Change 2011-2017	% Change 2011- 2017
Blaenau Gwent	642.1	640.2	-1.9	-0.3
Torfaen	725.5	734.0	8.5	1.2
Monmouthshire	107.8	110.2	2.5	2.3
Newport	765.2	795.1	29.9	3.9

There were 1,303,826 households in Wales in 2011, increasing to 1,349,911 in 2017¹²⁷, a 3.6% increase.

Information on the size of households is provided below in **Table 3.11**. This shows a decline in household size in all areas although the change varies from -0.002% in Merthyr Tydfil to -2.4% in Rhondda Cynon Taf.

¹²⁷ Stats Wales (2018) *Households by Type and Year*. Available online:

<https://statswales.gov.wales/Catalogue/Housing/Households/Estimates/households-by-type-year> [Accessed November 2018]

Table 3.11 Change in household size (2001-2017)

	2011	2016	Change	% change
Wales	2.31	2.28	-0.03	-1.5%
Isle of Anglesey	2.25	2.22	-0.03	-1.3%
Gwynedd	2.24	2.22	-0.02	-1.0%
Conwy	2.2	2.17	-0.03	-1.3%
Denbighshire	2.28	2.26	-0.02	-0.7%
Flintshire	2.38	2.34	-0.04	-1.7%
Wrexham	2.34	2.30	-0.04	-1.9%
Powys	2.24	2.19	-0.05	-2.1%
Ceredigion	2.25	2.20	-0.05	-2.0%
Pembrokeshire	2.27	2.22	-0.05	-2.2%
Carmarthenshire	2.3	2.27	-0.03	-1.2%
Swansea	2.26	2.23	-0.03	-1.5%
Neath Port Talbot	2.3	2.28	-0.02	-0.7%
Bridgend	2.34	2.31	-0.03	-1.4%
Vale of Glamorgan	2.32	2.28	-0.04	-1.8%
Rhondda Cynon Taf	2.33	2.27	-0.06	-2.4%
Merthyr Tydfil	2.4	2.40	0.00	-0.0%
Caerphilly	2.39	2.35	-0.04	-1.6%
Blaenau Gwent	2.28	2.23	-0.05	-2.2%
Torfaen	2.34	2.31	-0.03	-1.2%
Monmouthshire	2.34	2.31	-0.03	-1.4%
Newport	2.35	2.33	-0.02	-0.8%
Cardiff	2.34	2.31	-0.03	-1.4%

Health

Life expectancy is used as a broad measure of the health of an area and where a person is born largely influences how long they will live. In Wales the average life expectancy at birth for the period 2015 to 2017 was 78.32 for men and 82.28 for women, compared to 79.2 and 82.9 years respectively for the United Kingdom. Life expectancy at birth declined by 0.1 years in 2015 to 2017 for both males and females in Wales¹²⁸.

The National Survey for Wales 2017-18¹²⁹ identified that 19% of adults' smoke, with 7% using e-cigarettes. A total of 18% of adults drank over the weekly guidelines and 23% ate 5 or more portions of fruit and vegetables a day. Just over half of the people surveyed, 53%, were active for 150 minutes or more the previous week. With regards to obesity, 60% of people were found to be overweight or obese. Taking into account all of these indicators of health, 10% of people were found to have 0 or 1 healthy behaviours.

The survey also identified:

- Healthcare providers:
 - ▶ 68% of people had visited a dentist in the last 12 months;
 - ▶ 50% had visited an optician in the last 12 months;
 - ▶ 8% had seen an out of hours GP or GP nurse; and
 - ▶ 14% had used NHS Direct Wales.
- Medicines:
 - ▶ In the previous 4 weeks, 54% of people had purchased conventional medicines; and
 - ▶ 52% were receiving a long-term prescription (more than 12 months).
- Drug support services:
 - ▶ Overall 81% of adults felt they were well-informed about drugs the effect of drugs; and
 - ▶ People were most likely to seek advice on drugs from parents, friends or their GP. They were less likely to use online services.

Table 3.12 identifies the percentage of the adult population (those over 16 years of age) who have a range of illnesses and the percentage whose health is identified as either fair or poor. The overall trend in general health is declining, with the latest statistics for 2015 showing some improvement.¹³⁰

¹²⁸ ONS (2018) *Statistical bulletin: National life tables, UK: 2015 to 2017*. Available online:

<https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/lifeexpectancies/bulletins/nationallifetablesunitedkingdom/2015to2017> [Accessed November 2018]

¹²⁹ Welsh Government (2018) *National Survey for Wales 2017-18*. Available at:

<https://gov.wales/statistics-and-research/national-survey/?tab=current&lang=en> [Accessed November 2018]

¹³⁰ Stats Wales (2016) *Illnesses by gender and year*. Available at:

<https://stats.wales.gov.wales/Catalogue/Health-and-Social-Care/Welsh-Health-Survey> [Accessed November 2018]

Table 3.12 Illness by gender and year

	High blood pressure (%)	Any heart condition excluding high blood pressure (%)	Any respiratory illness (%)	Any mental illness (%)	Arthritis (%)	Diabetes (%)	Currently treated for any illness (%)	Limited a lot by health problem/Disability (%)	Limited at all by health problem/Disability (%)	General health status: fair or poor (%)
Men aged 16 +										
2011	20.0	9.7	12.6	7.9	9.0	7.5	45.1	15.1	31.5	19.1
2012	20.2	9.9	12.5	8.3	8.5	8.2	45.9	14.6	31.3	18.8
2013	19.8	9.9	12.6	9.1	8.9	8.0	46.6	14.9	30.2	18.4
2014	19.8	9.6	12.1	8.9	8.7	8.2	46.1	13.7	30.7	17.8
2015	19.8	9.4	13.3	9.9	8.8	8.3	47.1	14.4	30.7	18.1
Women aged 16 +										
2011	20.8	7.6	15.0	14.0	15.6	5.8	52.7	17.2	36.3	22.3
2012	19.4	7.6	15.0	14.2	15.1	5.8	52.4	16.6	36.1	22.1
2013	19.7	7.0	15.5	14.3	15.1	6.0	52.8	16.9	35.1	20.8
2014	19.4	7.5	14.1	15.1	14.6	6.3	53.4	16.3	35.4	20.7
2015	19.7	7.3	15.1	15.5	14.7	6.4	53.9	16.5	36.0	20.6
All aged 16 +										
2011	20.4	8.6	13.9	11.0	12.4	6.6	49.0	16.2	34.0	20.7
2012	19.8	8.7	13.7	11.3	11.9	7.0	49.2	15.6	33.7	20.5
2013	19.8	8.4	14.1	11.8	12.1	7.0	49.8	15.9	32.7	19.6
2014	19.6	8.5	13.1	12.1	11.7	7.2	49.9	15.0	33.1	19.3
2015	19.7	8.3	14.2	12.8	11.8	7.3	50.6	15.5	33.4	19.4

Economy

Table 3.13 shows the proportion of economically active people during the period May 2018 to July 2018 in Wales was 77.8% of the 16 – 64 year age group. This is 1 percentage point lower than the figure for the United Kingdom (UK) over the same period (78.8%). Economically active in this context is defined by the ONS as those persons of working age who are employed or looking to be employed. Approximately 3.8% of those aged 16 and over were unemployed over the period May 2018 to July 2018 in Wales, the same as for the UK.

Table 3.13 Economic Activity (May 2018 – July 2018)¹³¹

	Wales	Wales (%)	UK	UK (%)
Economically Active	1,540,000	77.8	33,758,000	78.8
In Employment	1,482,000	74.8	32,397,000	75.5
Unemployed	59,000	3.8	1,361,000	4.0
Economically Inactive	420,000	22.2	8,759,000	21.2

Table 3.14 shows the breakdown of the workforce by industry sector as at June 2018. The table indicates that the largest proportion of jobs in Wales are in human health and social work activities, and wholesale and retail trade, similar to UK trends. A total of 12,000 jobs (0.8%) in Wales are within the water supply, sewerage and waste management sector, similar to the proportion of jobs in this sector for the UK as a whole (0.6%). In 2017 Welsh Water directly employed almost 3,200 people and supported a further 3,000 jobs¹³².

Table 3.14 Workforce jobs by industry – seasonally adjusted (June 2017)¹³³

Industry Sector	Wales	Wales (%)	UK	UK (%)
A : Agriculture, forestry and fishing	60,000	3.9	425,000	1.2
B : Mining and quarrying	3,000	0.2	66,000	0.2
C : Manufacturing	144,000	9.4	2,708,000	7.7
D : Electricity, gas, steam and air conditioning	7,000	0.5	142,000	0.4
E : Water supply; sewerage, waste management	12,000	0.8	217,000	0.6
F : Construction	122,000	7.9	2,308,000	6.6
G : Wholesale and retail trade; repair of vehicles	211,000	13.7	4,941,000	14.0
H : Transportation and storage	50,000	3.3	1,748,000	5.0
I : Accommodation and food service activities	123,000	8.0	2,455,000	7.0
J : Information and communication	36,000	2.3	1,514,000	4.3
K : Financial and insurance activities	29,000	1.9	1,126,000	3.2
L : Real estate activities	16,000	1.0	550,000	1.6

¹³¹ Nomis (2018) *Labour Supply Headline indicators – seasonally adjusted (May 2018-Jul 2018)*. Available online: <https://www.nomisweb.co.uk/reports/lmp/gor/2013265930/report.aspx?town=wales> [Accessed November 2018]

¹³² Glas Cymru (2017) *Report & Accounts 2016-2017*. Available online: http://www.dwrcymru.com/en/Reading_Room_Library/Company-Reports.aspx [Accessed November 2018]

¹³³ Nomis (2018) *Labour Demand, Workforce jobs by industry section– seasonally adjusted*. Available online: <https://www.nomisweb.co.uk/reports/lmp/gor/2013265930/report.aspx?town=wales> [Accessed November 2018]

Industry Sector	Wales	Wales (%)	UK	UK (%)
M : Professional, scientific and technical activities	75,000	4.9	3,039,000	8.6
N : Administrative and support service activities	90,000	5.9	3,023,000	8.6
O : Public administration and defence	89,000	5.8	1,494,000	4.2
P : Education	136,000	8.8	2,931,000	8.3
Q : Human health and social work activities	254,000	16.5	4,413,000	12.5
R : Arts, entertainment and recreation	38,000	2.5	1,018,000	2.9
S : Other service activities	43,000	2.8	958,000	2.7
T : Activities of households as employers	2,000	0.1	68,000	0.2

Table 3.15 shows that in 2016 there were 98,445 active business enterprises in Wales. This is a 10.8% increase since 2005, with 10% of that increase being from 2011-2015. However, the national increase has seen regional variations. The Mid Wales region has seen a decrease of -1.4% over the period 2011 to 2016, with Ceredigion seeing the biggest decrease in Wales at -3.3%. The South East Wales region had the biggest increase of 15.7%, with Rhondda Cynon Taff (19.9%) and Cardiff (19.1%) having the greatest increase in Wales over the period.

Table 3.15 Number of Active Business Enterprises between 2005 and 2016¹³⁴

Area	2005	2011	2016	Change between 2005 and 2016 (%)	Change between 2011 and 2016 (%)
WALES	87,780	88,590	98,445	10.8	10.0
Isle of Anglesey	2,015	2,015	2,105	4.3	4.3
Gwynedd	4,360	4,405	4,490	2.9	1.9
Conwy	3,770	3,755	4,015	6.1	6.5
Denbighshire	3,140	3,135	3,385	7.2	7.4
Flintshire	4,510	4,590	5,340	15.5	14.0
Wrexham	3,455	3,810	4,095	15.6	7.0
Powys	5,800	5,860	5,830	0.5	-0.5
Ceredigion	2,995	2,945	2,850	-5.1	-3.3
Pembrokeshire	4,615	4,525	4,585	-0.7	1.3

¹³⁴ Stats Wales (2017) *Active Business Enterprises by area and year 2017*. Available online: <https://statswales.gov.wales/Catalogue/Business-Economy-and-Labour-Market/Businesses/Business-Demography/activebusinessenterprises-by-area-year> [Accessed November 2018]

Area	2005	2011	2016	Change between 2005 and 2016 (%)	Change between 2011 and 2016 (%)
Carmarthenshire	5,920	5,870	6,135	3.5	4.3
Swansea	6,320	6,280	6,895	8.3	8.9
Neath Port Talbot	2,985	3,050	3,240	7.9	5.9
Bridgend	3,555	3,625	4,085	13.0	11.3
Vale of Glamorgan	3,770	3,835	4,510	16.4	15.0
Cardiff	10,080	10,255	12,670	20.4	19.1
Rhondda Cynon Taff	4,950	5,090	6,355	22.1	19.9
Merthyr Tydfil	1,090	1,155	1,425	23.5	18.9
Caerphilly	3,615	3,685	4,265	15.2	13.6
Blaenau Gwent	1,275	1,215	1,340	4.9	9.3
Torfaen	2,100	2,010	2,295	8.5	12.4
Monmouthshire	3,680	3,720	4,120	10.7	9.7
Newport	3,780	3,760	4,415	14.4	14.8

Although the majority of customers are located in Wales, the company also supplies water to small parts of Cheshire and Herefordshire.

Transport

Welsh Transport Statistics states that the total combined length of roads in Wales in 2017/18 was approximately 34,800 km. In 2017/18, 4.9% of the motorway network and 1.8% of the trunk road network required close monitoring of structural condition. Powys contains the largest road network of all the Welsh local authorities. It also accounts for the highest proportion of all A Trunk roads (27.3%), B and C roads (21.1%) and minor surfaced roads (12.2%), resulting in an overall 15.8% of the total road length of Wales. During 2016-17 Powys had the highest proportion of road network in need of further investigation due to its condition, 18.8%.¹³⁵

In 2017, the total volume of motorised traffic in Wales was 29.1 billion vehicle kilometres, which is equivalent to 9,306 vehicles kilometres (5,782 miles) per head of the population over the year. In 2017, the total volume of traffic in Wales was 0.3% lower than the record high in 2016 and 3.9% higher than the previous peak in 2007. Within this total volume of traffic, cars accounted for 78% of the total. Vehicles travelled mostly on the major roads, with 65.7% of motor traffic in Wales either on motorways or A roads.¹³⁶

Vehicle movements are essential to everyday operations within Welsh Water. In 2015, 6% of Welsh Water's gross annual operational greenhouse gas emissions was from the company owned office and transport

¹³⁵ Welsh Government (2018) *Road lengths and conditions*. Available online: <https://gov.wales/statistics-and-research/road-lengths-conditions/?lang=en> [Accessed November 2018]

¹³⁶ Welsh Government (2018) *Road Traffic*. Available online: <https://gov.wales/statistics-and-research/road-traffic/?lang=en> [Accessed November 2018]

fleet.¹³⁷ In the accounting year 2016-2017 a small rise in transport emissions over the previous year was identified.¹³⁸

Tourism

In Wales, 9.0 million domestic tourism trips were taken during 2017, which represents a decrease of 5.5 per cent since 2006. 5.7 million of the 9.0 million domestic tourism visits were holiday trips, which is an increase on the 5.6 million in 2016. The total spend attributed to domestic tourism trips in Wales in 2017 was £1.6 billion, down from £1.7 billion spent in 2016¹³⁹.

In 2015, the number of people directly employed in tourism in Wales was 132,400, which represents approximately 10% of the Welsh workforce¹⁴⁰. The highest numbers of tourism jobs are in Cardiff and Swansea. However, the tourism industries in the coastal areas of North and West Wales play a vital role in local economies. For Wales as a whole, 50.7% of the total holiday spend is derived from trips where the main place visited was seaside or coastal, with the second largest destination by percentage spend being either countryside or village locations at 25.7%¹⁴¹.

With specific regard to water resources, large seasonal fluxes in tourist numbers create additional demand on water resources in summer months when demand is already at its highest. There may be an increasing trend in the near future in light of the expected increase in domestic holidays due to the current economic situation.

Welsh Water manages 91 reservoirs and 40,000 hectares of land which includes four visitor centres, sporting recreational and leisure facilities that between them attract around one million visitors each year, making a valuable contribution to tourism and the local economy.¹⁴² The principal reservoirs also support angling. Inland fisheries contribute strongly to the economic wellbeing of Wales and are estimated to generate £74 million expenditure per year by anglers in Wales.³⁴ Welsh Water's waste water management activities influence the tourist industry due to the impacts on River and Bathing Water quality.

Welsh Index of Multiple Deprivation

The Welsh Index of Multiple Deprivation (WIMD) is the official measure of deprivation for small areas in Wales and identifies whether an area is more or less deprived relative to other small areas in Wales. It was developed for the Welsh Government by the Statistical Directorate and the Local Government Data Unit (Wales). Deprivation refers to unmet need, which is caused by a lack of resources. The WIMD is based on eight different indicators of deprivation: income, employment, health, education, access to services, community safety, physical environment and housing.

Figure 3.12 shows the WIMD 2014 by Lower Super Output Area (LSOA) for Wales¹⁴³. There are 1,909 LSOA in Wales. The indices highlight that there are some distinct pockets of deprivation, which are predominantly

¹³⁷ Welsh Water (2015) *Welsh Water Report and Accounts 2015*. Available online:

http://www.dwrcymru.com/en/Reading_Room_Library/Company-Reports.aspx [Accessed November 2018]

¹³⁸ Welsh Water (2018) *Welsh Water Report and Accounts 2016-17*. Available online:

https://www.dwrcymru.com/en/Reading_Room_Library/Company-Reports.aspx [Accessed November 2018]

¹³⁹ Welsh Government (2018) *Great Britain Tourism Survey*. Available online:

<https://gov.wales/statistics-and-research/great-britain-tourist-survey/?lang=en> [Accessed November 2018]

¹⁴⁰ Welsh Government (2016) *Partnership for Growth: Strategy for Tourism 2013-2020. Strategy Progress Review*. Available online:

<http://llyw.cymru/docs/drah/publications/161116-strategy-review-en.pdf> [Accessed November 2018]

¹⁴¹ Welsh Government (2018) *Great Britain Tourism Survey*. Available online:

<https://gov.wales/statistics-and-research/great-britain-tourist-survey/?lang=en> [Accessed November 2018]

¹⁴² Welsh Water (2018) *Welsh Water Report and Accounts 2016-17*. Available online:

https://www.dwrcymru.com/en/Reading_Room_Library/Company-Reports.aspx [Accessed November 2018]

¹⁴³ Welsh Government (2014) *Welsh Index of Multiple Deprivation 2014. Executive Summary, revised*. Available online:

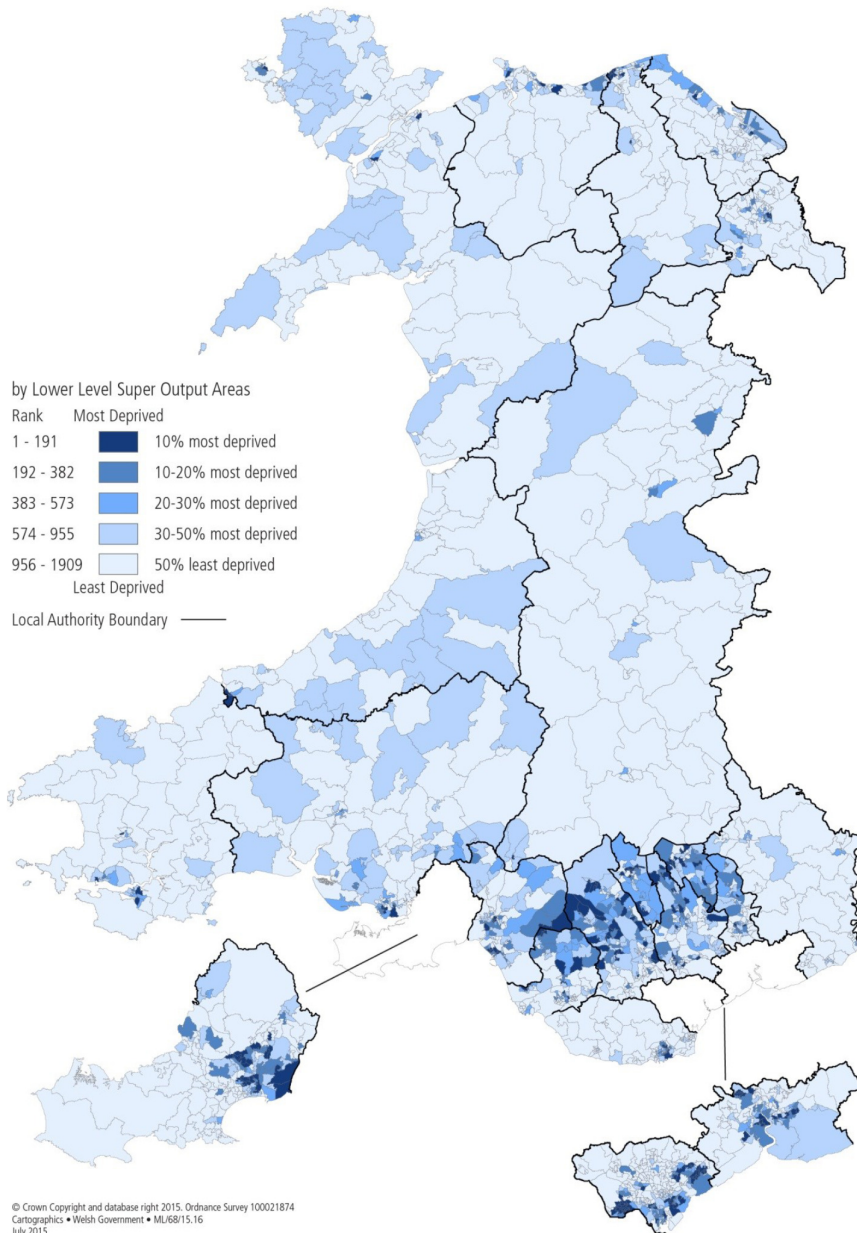
<https://gov.wales/statistics-and-research/welsh-index-multiple-deprivation/?lang=en> [Accessed November 2018]

in the South Wales valleys and cities, and some North Wales coastal and border towns. Blaenau Gwent is the local authority with the highest proportion of LSOAs (23.4%) in the most deprived 10% in Wales.

Levels of deprivation, particularly income deprivation, affect the ability of customers to pay for water and may also impact on total water usage. In 2016/17 Welsh Water helped approximately 70,000 customers who were struggling to pay their bills through a range of customer assistance funds. In 2016/17, the amount owed by Welsh Water customers who could not pay or chose not to pay their bills was £23 million (3% of annual turnover), a decrease of £5 million from 2014.³⁴

Figure 3.12 Index of Multiple Deprivation in Wales (taken from WIMD 2014 Executive Summary)¹⁴⁴

Welsh Index of Multiple Deprivation 2014

Welsh Index of Multiple Deprivation

¹⁴⁴ Welsh Government (2014) *Welsh Index of Multiple Deprivation 2014. Executive Summary, revised*. Available online: <http://gov.wales/docs/statistics/2015/150812-wimd-2014-summary-revised-en.pdf> [Accessed November 2018]

Welsh Language

As at the 2011 Census, 19.0% (562,016) of people living in Wales aged 3 and over could understand, speak, read or write Welsh. The local authority of Blaenau Gwent had the lowest percentage of people able to speak Welsh at 7.8%, whilst Gwynedd had the highest percentage at 65.4%¹⁴⁵.

Of the 562,016 people that could understand, speak, read or write Welsh in 2011, 76.6% could speak, read and write Welsh; 8.1% could speak and read but could not write Welsh; 14.3% could speak but could not read or write Welsh; 23.1% could understand spoken Welsh only; and 13.1% had a combination of skills¹⁴⁶. This represents a decline in the number of people able to understand, speak, read or write Welsh since 2001.

All Welsh Water publications are bilingual and there is a dedicated Welsh language line for customers.

Likely Evolution of the Baseline without the Drought Plan

As shown in **Figure 3.13** the population within Wales is projected to increase from 3,092,036 in 2014 to 3,259,522 in 2039, an increase of 5.42%.

Figure 3.13 Projected Population Change for Wales 2014 - 2039¹⁴⁷

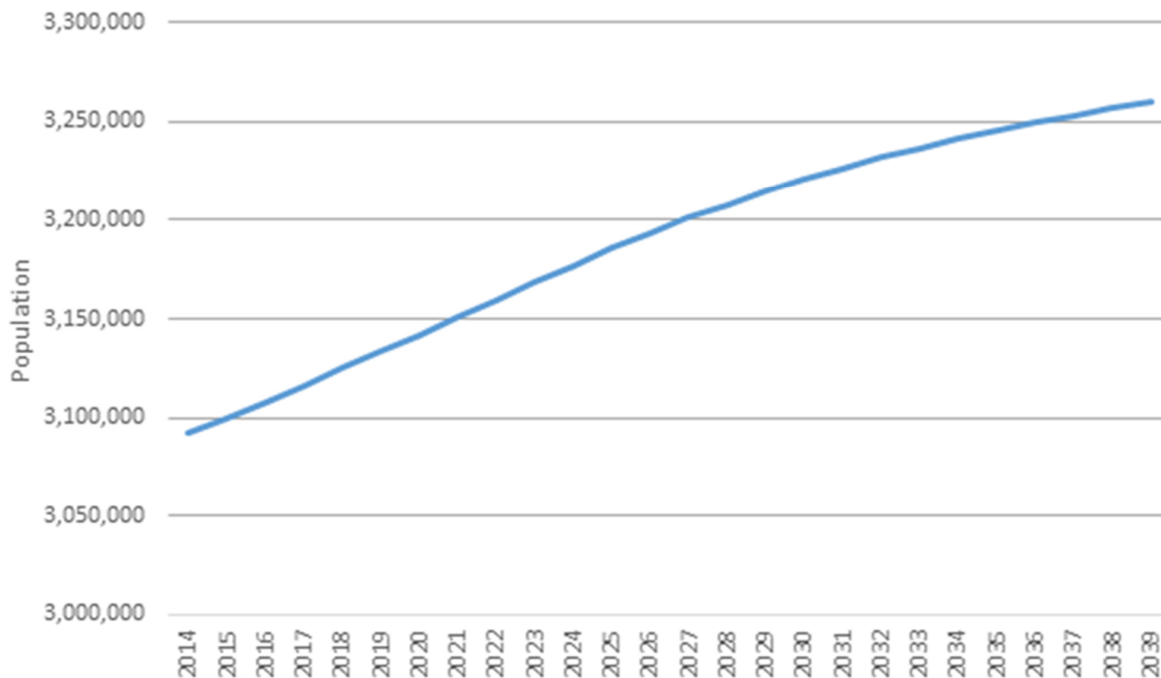


Table 3.16 outlines the projected population change for each of the counties within the Welsh Water area over the same period. There are population decreases for a number of Welsh counties (shown by a negative

¹⁴⁵ ONS (2011) *Welsh speakers by local authority, gender and detailed age groups*. Available online:

<https://stats.wales.gov.uk/Catalogue/Welsh-Language/WelshSpeakers-by-LocalAuthority-Gender-DetailedAgeGroups-2011Census> [Accessed November 2018]

¹⁴⁶ ONS (2011) *Welsh language skills by local authority, gender and detailed age groups*. Available online:

<https://stats.wales.gov.uk/Catalogue/Welsh-Language/WelshLanguageSkills-by-LocalAuthority-Gender-DetailedAgeGroups-2011Census> [Accessed November 2018]

¹⁴⁷ Stats Wales (2016) *Local Authority Population projection Wales 2014*. Available online:

<http://gov.wales/statistics-and-research/local-authority-population-projections/?lang=en> [Accessed November 2018]

number in the table). The biggest population increase, 25.51%, is predicted to be in Cardiff over the period 2014 to 2039, with the second biggest increase in Herefordshire, 11.49%.

Table 3.16 Projected Population Change 2014 – 2039 by County¹⁴⁸

County	Population change between 2014 and 2039 (%)	County	Population change between 2014 and 2039 (%)
Isle of Anglesey	-2.59	Bridgend	4.99
Gwynedd	8.43	Vale of Glamorgan	0.35
Conwy	1.66	Rhondda Cynon Taf	4.05
Denbighshire	2.67	Merthyr Tydfil	-1.70
Flintshire	1.34	Caerphilly	1.10
Wrexham	9.70	Blaenau Gwent	-4.90
Powys	-7.73	Torfaen	-0.41
Ceredigion	8.79	Monmouthshire	0.13
Pembrokeshire	-1.17	Newport	7.93
Carmarthenshire	2.17	Cardiff	25.51
Swansea	8.97	Herefordshire	11.49
Neath Port Talbot	1.58		

The 2011-based household projections show that, by 2036, the number of households in Wales is projected to increase by 14.6% to 1,494,188¹⁴⁹. As shown in **Table 3.17**, 2011-based household projections for Wales' areas indicate that the greatest population increase will be in Cardiff (41.3%). Whilst there is no overall change in the number of households in Blaenau Gwent, the numbers are predicted to fluctuate to a peak in 2025 before reducing again.

Table 3.17 Projected Percentage Change in Household Numbers 2014 – 2039 by County¹⁵⁰

County	Number of households change between 2011 and 2036 (%)	County	Number of households change between 2011 and 2036 (%)
Isle of Anglesey	2.0	Bridgend	14.5
Gwynedd	12.5	Vale of Glamorgan	13.9
Conwy	3.6	Rhondda Cynon Taf	9.4

¹⁴⁸ *Ibid*

¹⁴⁹ Stats Wales (2016) *Household Projections by local authority and year, 2011-based*. Available online: <https://statswales.gov.wales/Catalogue/Housing/Households/Projections/Local-Authority/2011-Based/HouseholdProjections-by-LocalAuthority-Year> [Accessed November 2018]

¹⁵⁰ *Ibid*

County	Number of households change between 2011 and 2036 (%)	County	Number of households change between 2011 and 2036 (%)
Denbighshire	10.5	Merthyr Tydfil	8.0
Flintshire	7.8	Caerphilly	7.7
Wrexham	27.3	Blaenau Gwent	0.0
Powys	8.0	Torfaen	5.5
Ceredigion	8.3	Monmouthshire	4.0
Pembrokeshire	8.4	Newport	21.1
Carmarthenshire	14.6	Cardiff	41.3
Swansea	21.1	Herefordshire	19.9
Neath Port Talbot	4.6		

In addition to population growth driving household demand, economic growth is likely to increase water use by businesses. During periods of water stress, the provision of water to a larger population could mean less water is available for business use.¹⁵¹⁹⁷

The Welsh Government's Understanding Wales' Future¹⁵² outlines some key trends:

- The number of older people will rise significantly;
- The number of children is projected to rise in the medium term, before falling slightly in the longer term;
- Life expectancy is expected to continue to increase;
- The number of households is growing faster than the population, and there is a long run trend to smaller households (with a large increase in the number of single person households);
- Current rates of house building are not keeping pace with growth in the number of households, and on current trends this gap will widen, contributing to further house price inflation in the long term;
- All other things remaining unchanged, the projected increase in population and ageing demographic profile means the number being treated for illnesses will increase; and
- Health inequalities within Wales are widening.

Recognising the impact of deprivation upon some household's ability to pay their water bill, Welsh Water's social tariff called 'HelpU' helps the most disadvantaged customers. The HelpU charge from 1 April 2018 to 31 March 2019 is £197.37.¹⁵³

¹⁵¹ Water UK (2016) *Water Resources Long-Term Planning Framework (2015-2065)*. Available online: <https://www.water.org.uk/water-resources-long-term-planning-framework> [Accessed November 2018]

¹⁵² Welsh Government (2012) *Understanding Wales' Future, A resource to help us think systematically about the future of Wales*. Available online: <http://gov.wales/docs/caecd/research/120109futureswalesen.pdf> [Accessed November 2018]

¹⁵³ Welsh Water (2018) *HelpU*. Available online: <https://www.dwrcymru.com/en/My-Account/Helpu.aspx> [Accessed November 2018]

Key Sustainability Issues Relevant to the Drought Plan

The key sustainability issues relevant to the Drought Plan arising from the analysis of the human environment baseline are:

- The need to ensure that the water requirements of people and visitors can be met at all times, in a sustainable way;
- The need to ensure that water supplies remain affordable, in particular for deprived or vulnerable communities;
- The need to ensure that the measures contained within the Drought Plan do not adversely affect the health and well-being of any member of the community;
- The need to accommodate an increasing population whilst ensuring the continued provision of essential services including water supply;
- The need to ensure that vulnerable people are not affected by implementation of the Drought Plan;
- The need to ensure that the Drought Plan does not have an adverse economic impact; and
- The need to ensure public awareness of both forthcoming and existing drought conditions in order to maintain resilient, reliable public water supplies without the need for emergency drought measures.

3.7 Material Assets and Resource Use

Assets

In 2015 Welsh Water supplied water to a population of 3,023,024 and sewerage to a population of 3,206,763. To facilitate this Welsh Water operates a large network of infrastructure assets including^{154, 15573}:

- 79 impounding reservoirs;
- 835 wastewater treatment works;
- 63 water treatment works;
- 491 service reservoirs;
- Over 2,237 sewage pumping stations;
- Circa 3,200 combined sewer overflows;
- 27,500km of water mains;
- Over 36,000km of sewers;
- Four visitor centres; and
- Circa 42,000 hectares of land, much of which has high nature conservation and recreational value.

¹⁵⁴ Water UK (2015) *Industry facts and figures 2015*. Available online: <https://www.water.org.uk/publications/reports/industry-facts-and-figures-2015> [Accessed November 2018]

¹⁵⁵ Welsh Water (2018) *Welsh Water 2050*. Available online: <https://www.dwrcymru.com/en/Company-Information/Business-Planning/Welsh-Water-2050.aspx> [Accessed November 2018]

In 2011, as a requirement of the *Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011*, approximately 17,000km of private sewers and lateral drains were transferred to Welsh Water, almost doubling Welsh Waters' sewer network. In 2013 Welsh Water commenced a process of adopting the 800 or more private pumping stations in Welsh Waters operating area by 2016. A total of 115 private sewer pumping stations were adopted in 2014, many in a poor state of repair.

Between 2010 and 2015 Welsh Water:

- Rebuilt, refurbished or upgraded 12 water treatment works (investing £120 million);
- Replaced or upgraded 40 wastewater treatment works (investing £29 million);
- Built a new watersports and visitor centre at Llandegfedd Reservoir (investing £2.5 million);
- Provided two new laboratories in Glaslyn, Newport and Bretton, North Wales (investing £11 million); and
- Implemented 'RainScape' urban drainage project at Llanelli and Gowerton (investing £15 million).

Because of the topography of Wales, Welsh Water has more "water resource zones" than elsewhere in England. Its 24 water resource zones represent a fifth of the total for England and Wales. The landscape means that each of these zones is essentially self-contained with only limited opportunity to transfer water across zonal boundaries under normal operating conditions. This results in less flexibility to manage potential drought impacts and may require local measures to be put in place even if the overall position with regard to water availability in Wales is healthy.¹⁵⁶

Water Demand

Welsh Water¹⁵⁷ abstracts around 800 MI/d from the environment for public water supply. This can increase by up to 20% during a hot summer. The geographical variation regionally within the Welsh Water area results in regional variation in water supplies. The source of supply can be divided into two broad categories, storage (e.g. a reservoir) and non-storage (e.g. a river), and this will affect the ability to respond to demand. Welsh Water's supplies are almost entirely made up from upland reservoir and river sources. Of the 24 Welsh Water WRZs the primary source of water is groundwater for three WRZs, reservoir storage for six WRZs and surface water for 15 WRZs.

Welsh Water operate a number of transfers that help meet demands for water during peak periods. Through a series of operational actions to the potable network, Welsh Water is able to re-zone particular areas of demand onto alternative sources in a neighbouring area. This reduces the demand on the zone to a certain extent. The external transfers of water are principally to Severn Trent Water and Dee Valley Water. The transfers between Welsh Water and Severn Trent in the Mid Wales areas have arisen primarily as a function of the geography of the area where it is more economic to utilise supplies from outside of the company boundary than it is to extend our existing network. The Ross on Wye import from Severn Trent provides the whole of the supply for that WRZ¹⁵⁸.

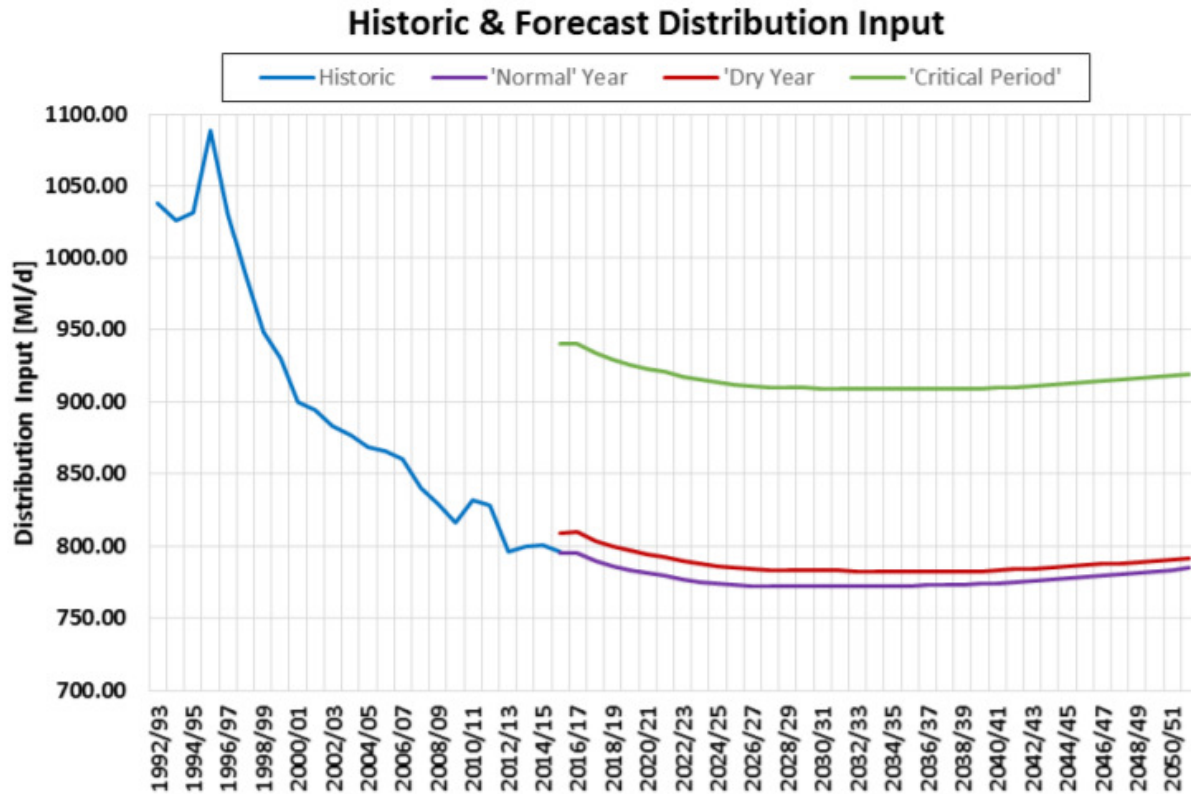
There has been a long term steady decline in water demand in the Welsh Water area (**Figure 3.14**) and this trend is expected to continue until the late 2030s, at which point demand is anticipated to increase as a result of climate change.

¹⁵⁶ Welsh Water (2015) *Drought Plan 2015*. Available online:

<https://www.dwrcymru.com/en/My-Water/Water-Resources/Drought-Plan.aspx> [Accessed November 2018]

¹⁵⁷ Welsh Water (2019) *Draft Water Resources Management Plan 2019*. Available online: <https://www.dwrcymru.com/en/My-Water/Water-Resources/Draft-Water-Resources-Management-Plan-2019.aspx> [Accessed November 2018]

¹⁵⁸ *Ibid*

Figure 3.14 Welsh Water long term water demand (taken directly from Welsh Water's WRMP 2019)¹⁵⁹

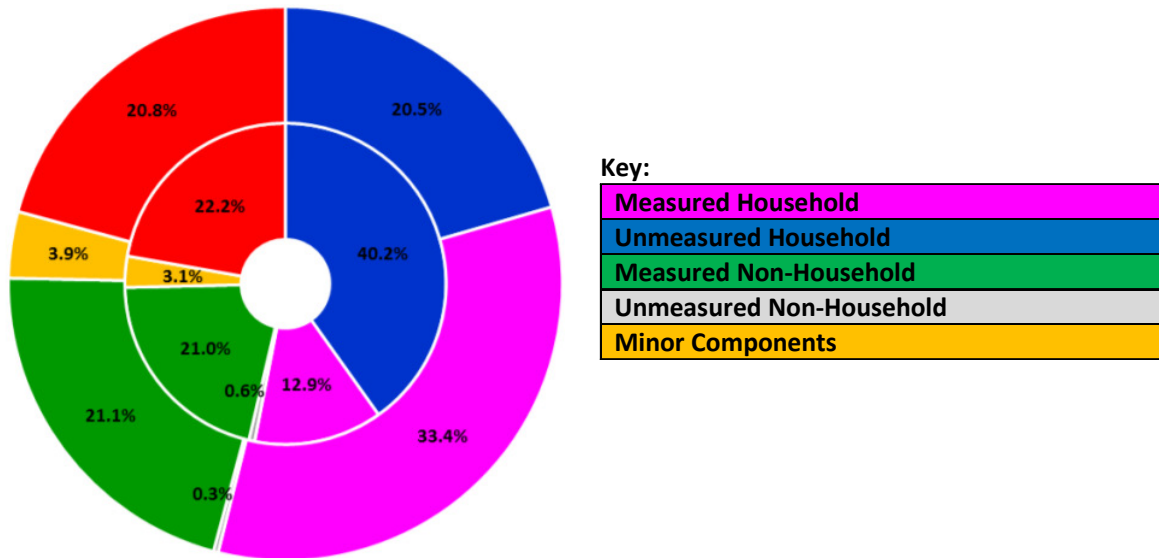
During April 2017 to March 2018 the average daily water usage in the Welsh Water area was 151 litres per person per day (l/p/d)¹⁶⁰. This is an increase on the previous two years, which were 143 and 145 l/p/d respectively. The average water use for England and Wales over the last three years has been 140, 141 and 141 l/p/d.

There is a difference between metered and non-metered water usage, with metered water usage in the Welsh Water area in 2017/18 being 132 l/p/d, which is slightly above the average for England and Wales (129 l/p/d). The non-metered water usage levels in the Welsh Water area in 2017/18 was 161 l/p/d, slightly lower than the average for England and Wales which was 162 l/p/d.

Figure 3.15 shows a comparison of the proportion of the regional Total Dry Year Demand attributed to each component in the Base Year and 2049/50. Over half of the demand is currently from households. The overall percentage of the total demand from household is anticipated to remain similar in 2049/50.

¹⁵⁹ Welsh Water (2019) *Draft Water Resources Management Plan 2019*. Available online: <https://www.dwrcymru.com/en/My-Water/Water-Resources/Draft-Water-Resources-Management-Plan-2019.aspx> [Accessed November 2018]

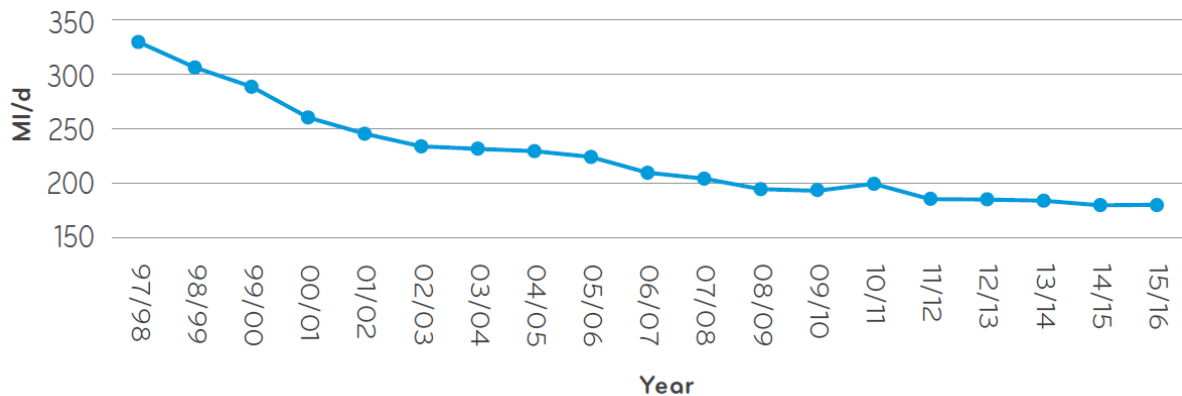
¹⁶⁰ Discover Water (2018) *The amount we use*. Available online at: <http://www.discoverwater.co.uk/amount-we-use> [Accessed November 2018]

Figure 3.15 Components of the 2015/16 (Inner) and 2049/50 (Outer) Welsh Water Demand¹⁶¹

Leakage

Leakage levels¹⁶² are affected by a number of factors including the length, age and condition of the water mains network as well as weather conditions. The change in climate to hotter, drier summers, combined with a growing population means waters resources need to be managed more efficiently.

In 2016/17 Welsh Water had reduced leakage by 4.43 million litres per day (MI/d), from 179.86 MI/d in 2015/16 to 175.43 MI/d in 2016/17¹⁶³. **Figure 3.16** shows how leakage in Welsh Waters area has decreased significantly since 1997.

Figure 3.16 Welsh Water leakage volumes¹⁶⁴

¹⁶¹ Welsh Water (2019) *Draft Water Resources Management Plan 2019*. Available online: <https://www.dwrcymru.com/en/My-Water/Water-Resources/Draft-Water-Resources-Management-Plan-2019.aspx> [Accessed November 2018]

¹⁶² Leakage - The water lost between the treatment works and the customer.

¹⁶³ Welsh Water (2018) *Welsh Water Report and Accounts 2016-17*. Available online: https://www.dwrcymru.com/en/Reading_Room_Library/Company-Reports.aspx [Accessed November 2018]

¹⁶⁴ Welsh Water (2016) *Helping to manage and sustain our environment 2015-2016*. Available online: <http://www.dwrcymru.com/en/Environment/Our-Sustainable-Future/Environment-Report.aspx> [Accessed November 2018]

Emerging evidence indicates that leakage beyond customer boundary boxes is higher than currently reported, and consequently network leakage is lower, mainly affecting the 60% of households that are unmetered.¹⁶⁵ The number of Welsh Water pipe bursts has risen each year since 2015/16, from 110 pipe bursts per 1,000km of pipe to 152 pipe bursts per 1,000km of pipe. As shown in **Table 3.18**, this is lower than the same figures for England and Wales.

Table 3.18 Number of pipe bursts in company pipe network (per 1,000 km of pipe)¹⁶⁶

	2015-16	2016-17	2017-18
England and Wales Average	132	153	159
Welsh Water	110	133	152

Table 3.19 shows the number of properties in the Welsh Water Area flooded with sewage between 2011/12 and 2016/17. The number of properties flooded has fluctuated over the period with an overall reduction in the number from the peak in 2013/14 to 2016/17. Variations in these figures are likely as there are a number of things that can cause a sewer to flood, with blockages becoming a more frequent cause. Also, changes in climate resulting in heavier, more intense rainfall can overwhelm the sewer and drainage system. Whilst newer systems keep drainage separate from sewer systems, in locations such as cities these systems are often combined. Pressure on the sewerage/drainage system also poses a risk of more frequent localised flooding as a result of exceeding network capacity.

Table 3.19 Number of properties in Welsh Water area flooded with sewage^{167,168}

Year	11/12	12/13	13/14	14/15	15/16	16/17
Number of properties flooded	186	219	306	265	223	242

Water Efficiency

Welsh Water's water efficiency initiatives save a combined 1.5 million litres of water per day. Welsh water currently supplies 17,500 domestic customers a water efficiency 'Welcome Pack' when they opt for a water meter, or where a new property is connected to the network. Currently, some 440,000 customers are on a metered supply, and this increases by around 4% every year¹⁶⁹.

To reduce leakages across the network, Welsh Water aims to develop methods to regularly survey 10,000 km of trunk mains using new technology, and to progress the 'Toilet and tap' initiative to get a better understanding of leakages beyond the customer boundary. Welsh Water will undertake free repairs or replacements on a targeted proportion of customer supply pipe leaks and invest in water efficiency

¹⁶⁵ Welsh Water (2018) *Draft Water Resources Management Plan 2019*. Available online: <https://www.dwrcymru.com/en/My-Water/Water-Resources/Draft-Water-Resources-Management-Plan-2019.aspx> [Accessed November 2018]

¹⁶⁶ Discover Water. Number of pipe (main) bursts. Available online at: <http://www.discoverwater.co.uk/loss-of-supply> [Accessed November 2018]

¹⁶⁷ Welsh Water (2016) *Helping to manage and sustain our environment 2015-2016*. Available online: <http://www.dwrcymru.com/en/Environment/Our-Sustainable-Future/Environment-Report.aspx> [Accessed November 2018]

¹⁶⁸ Welsh Water (2018) *Welsh Water Report and Accounts 2016-17*. Available online: https://www.dwrcymru.com/en/Reading_Room_Library/Company-Reports.aspx [Accessed November 2018]

¹⁶⁹ Ibid

messaging and education. Overall, Welsh Water intends to meet Ofwat's target of a 15% reduction in total leakage by the end of AMP7.¹⁷⁰

Energy Use

To supply drinking water and remove and treat wastewater requires energy. Topography and volumes can increase or decrease this energy demand further. The topography and size of the Welsh Water area means water and wastewater have to be pumped over large areas, and Welsh Water is one of the largest energy users in Wales¹⁷¹. In 2011/16 Welsh Water used 467 GWh of energy to pump and treat wastewater¹⁷².

Total energy consumption in Wales over the period 2005 to 2015 has reduced year-on-year from 108,524 Gigawatt hours (GWh) to 93,455 GWh, a decrease of 13.9%. Over the same period, total UK energy consumption has decreased by 15.4%. 'Industry and Commercial' was the largest energy consuming sector in Wales in 2015 (accounting for 49.9% of total energy consumption) ahead of 'Domestic' (25.1%) and Transport (25.0%). This contrasts to trends for the UK as a whole where there is a more even distribution of energy consumption across these three sectors (Industrial and Commercial 37.1%, Domestic 31.7% and Transport 31.2%), a split which is similar for Herefordshire also¹⁷³.

Figure 3.17 shows that the amount of electricity in Wales produced from renewable sources steadily increased from 2003 and 2015, with a slight drop in 2016. Welsh Water's renewable energy generation in 2017/18 was 97.89 GWh, an increase on 2016/17 levels (86.5 GWh). The largest sources of renewable energy for Welsh Water was Combined Heat and Power (CHP) engines, fuelled by biogas produced at sludge treatment centres (generating 35 GWh), followed by 13 GWh of biomethane injected into the gas grid at Five Fords Energy park. There are also 24,000 solar panels installed on 25 different Welsh Water sites, and an organic waste treatment centre adjacent to the wastewater site in Cardiff. Green energy accounts for around 20% of Welsh Water's electricity use¹⁷⁴.

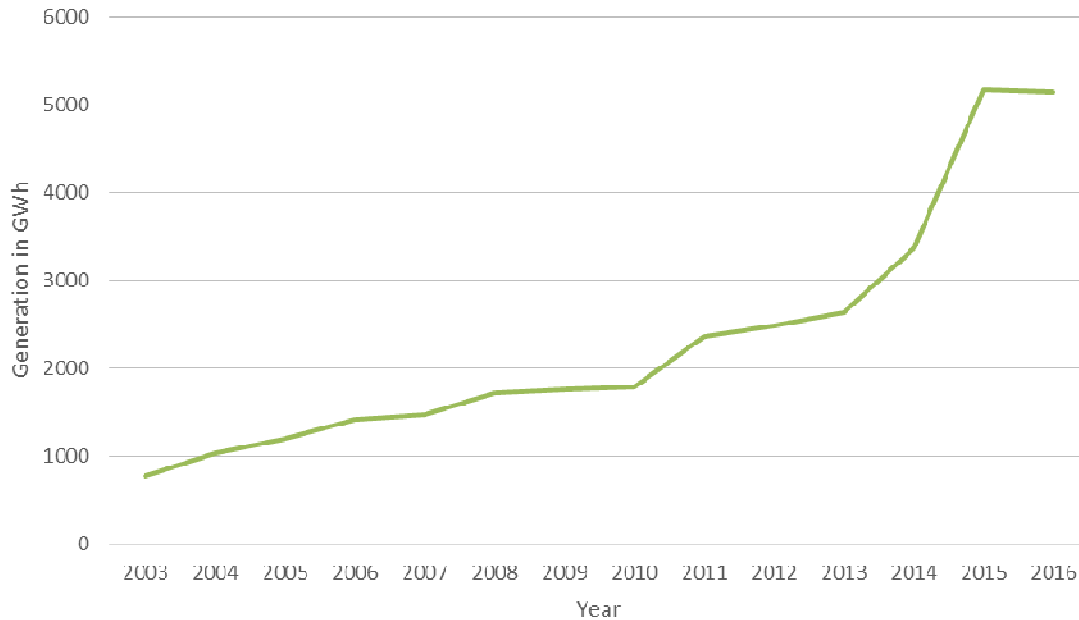
¹⁷⁰ Welsh Water (2018) *Welsh Water 2050*. Available online: <https://www.dwrcymru.com/en/Environment/Our-Sustainable-Future.aspx> [Accessed November 2018]

¹⁷¹ Welsh Water (2018) *Welsh Water Report and Accounts 2016-17*. Available online: https://www.dwrcymru.com/en/Reading_Room_Library/Company-Reports.aspx [Accessed November 2018]

¹⁷² Welsh Water (2018) *Sustainable Energy*. Available online: <http://www.dwrcymru.com/en/Education/Secondary/Sustainable-energy.aspx> [Accessed November 2018]

¹⁷³ Department for Business, Energy and Industrial Strategy (2017) *Sub-national total final energy consumption statistics: 2005 - 2015*. Available online: <https://www.gov.uk/government/statistical-data-sets/total-final-energy-consumption-at-regional-and-local-authority-level> [Accessed November 2018]

¹⁷⁴ Welsh Water (2018) *Welsh Water Report and Accounts 2017-18*. Available online: https://www.dwrcymru.com/en/Reading_Room_Library/Company-Reports.aspx [Accessed November 2018]

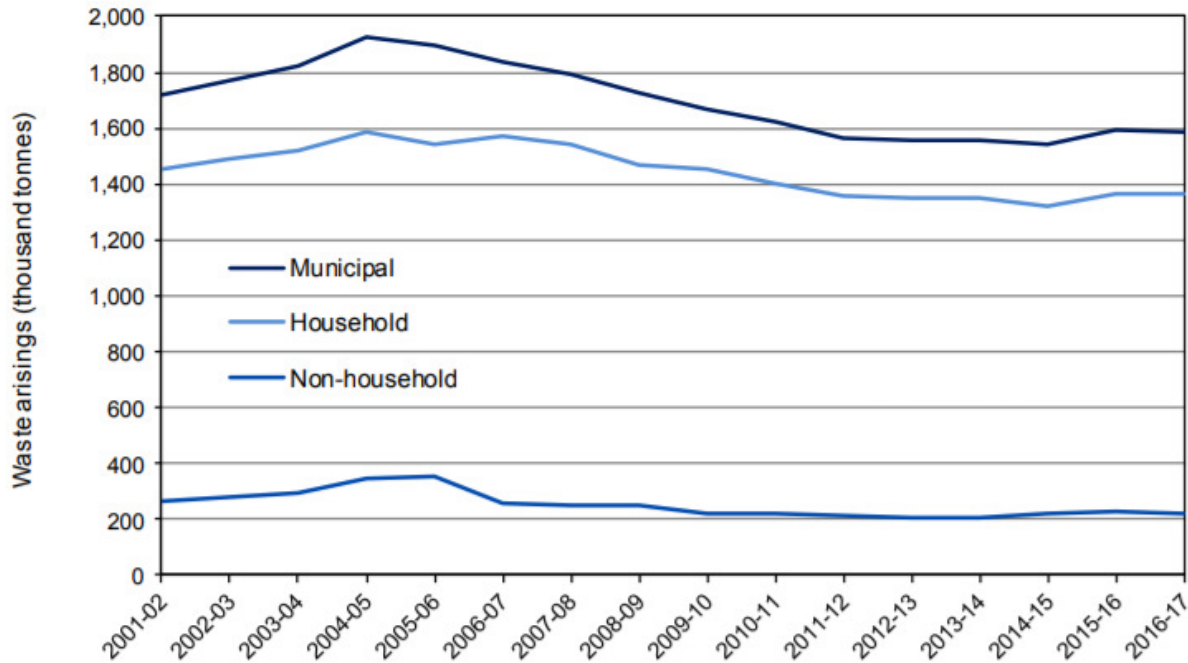
Figure 3.17 Total Electricity Generated from Renewable Sources in Wales per Year¹⁷⁵

Material Use and Waste Generation

Following a steady historical increase, the total amount of local authority municipal waste (excluding abandoned vehicles) generated in Wales peaked at over 1.9 million tonnes in 2004-05, coinciding with the peak in household waste generated. The amount of local authority municipal waste generated in Wales has since been generally falling. During 2016-17, the amount of waste generated decreased by 0.3 per cent, falling to 1.59 million tonnes, when compared to 2015-16. This was due to a 0.1 per cent decrease in the amount of household waste generated, and a 1.4 per cent decrease in the amount of non-household waste generated during 2016-17 when compared to the previous year (see **Figure 3.18**). The percentage of local authority municipal waste that was prepared for reuse, recycled or composted in Wales has continued to increase from 5% in 1998/99 to 63.8% in 2016/17, with the average household rate being slightly below this at 61.4% and the non-household rate being higher at 77.7%.¹⁷⁶

¹⁷⁵ Department of Business, Energy and Industrial Strategy (2017) *Regional Renewable Statistics 2003 – 2016: Generation*. Available online: <https://www.gov.uk/government/statistics/regional-renewable-statistics> [Accessed November 2018]

¹⁷⁶ Welsh Government (2017) *Local Authority Waste Management Report for Wales, 2017-17*. Available online: <https://gov.wales/docs/statistics/2017/171019-local-authority-municipal-waste-management-2016-17-en.pdf> [Accessed November 2018]

Figure 3.18 Total local authority municipal waste generated in Wales¹⁷⁷

Operationally, Welsh Water requires materials in its treatment processes including a wide range of chemicals for both water and wastewater treatment. In 2018, Welsh Water used £9.6m worth of chemicals in its operations¹⁷⁸. Welsh Water also produces waste mainly in the form of 'sludge' through the treatment of water for water supply (water treatment work sludge) and the treatment of wastewater (sewage sludge, or 'biosolids'). During 2015 a gas-to-grid plant was also completed at the Five Fords Wastewater Treatment Works in Wrexham to enable gas created during the waste treatment process to be upgraded to bio-methane gas and then redirected into the local gas distribution network. Other forms of waste include administrative waste.

Likely Evolution of the Baseline without the Drought Plan

Welsh Water are investing £1.7 billion between 2015 and 2020 to maintain and improve the extensive network of Welsh Water assets. By 2020 Welsh Water aim to have improved the resilience score of water assets to 87% and wastewater assets to 78% (in 2014 resilience score for water was 84.7% and wastewater 75.6%).

The average quantity of water supplied in the Welsh Water area in a normal year reduced over the 23 years preceding 2015/16 by 200 MI/day, from 1,000 MI/day to 800 MI/day. About half of this is down to reduced leakage, the rest is due to reduced demand from heavy industry and reduction in usage by customers. Around 80% of this demand for water is from the major cities and towns of south Wales around Cardiff, Swansea, Newport, Bridgend, Carmarthen and the surrounding Valleys.¹⁷⁹

In WRMP19, Welsh Water projects that demand during a normal year will reduce from 809.17 MI/d in 2015/16 to 789.6 MI/d in 2049/50. The forecast consumption per user type for 2049/50 is presented in **Table 3.21**. There is an overall increase in the number of measured households and a corresponding reduction in

¹⁷⁷ Ibid

¹⁷⁸ Welsh Water (2018) *Report and Accounts 2017-2018*. Available online: <http://www.dwrwymru.com/en/Environment/Water-Resources/Water-Resource-Management-Plan.aspx> [Accessed November 2018]

¹⁷⁹ Welsh Water (2018) *Draft Water Resources Management Plan 2019*. Available on line at: <https://www.dwrwymru.com/en/My-Water/Water-Resources/Draft-Water-Resources-Management-Plan-2019.aspx> [Accessed November 2018]

unmeasured households between 2015/16 and 2049/50. This is where the most significant change occurs with the other components of demand only changing by a small amount over the same period.

Table 3.21 Components of the 2049/50 Welsh Water Demand and the difference between 2015/16 demand

	2015/16	2049/50	Difference
Total Demand	809.17 MI/d	789.6 MI/d	- 19.57
Leakage	22.2%	20.8%	- 1.4%
Minor Components	3.1%	3.9%	0.7%
Unmeasured Non-household	0.6%	0.3%	- 0.3%
Measured Non-household	21%	21.1%	0.1%
Unmeasured household	40.2%	20.5%	- 19.7%
Measured household	12.9%	33.4%	20.5%

Even with the reduction in demand predicted from 2016 to 2045, Welsh Water predict that two WRZs will fall into a potential supply deficit over this period. **Table 3.22** outlines the WRZ and the likely deficit.

Table 3.22 Welsh Water WRMP deficit zones (taken from WRMP19)

Water Resource Zone	Max. deficit over planning period (MI/d)	First year of deficit	Reasons for deficit	Measures in WRMP19 to address forecast deficit in WRZ
Pembrokeshire	14	2022	<ul style="list-style-type: none"> Review of Consents driven licence changes Climate Change impact on Target Headroom and DO 	Welsh Water is proposing asset upgrades at Canaston Bridge raw water pumping station which would allow finer control of abstraction volumes from the Afon Cleddau, and hence reduce unnecessary over-release of compensation flows from Llys y Fran reservoir. This would require new variable rate low-lift pumps in addition to an increase in available bankside storage.
Tywyn Aberdyfi	1.52	2020	<ul style="list-style-type: none"> Climate Change impact on Target Headroom and DO Single source zone 	<p>Welsh Water is proposing a new abstraction from Afon Dysynni at Pont y Garth, with transfer to Pen y Bont Water Treatment Works (WTW) via a new raw water transfer main. A new pumping station would also be required. This will operate within the maximum WTW capacity.</p> <p>An 8MI non-impounding raw water reservoir is also proposed adjacent to Pen y Bont WTW in order to provide a buffer raw water supply and improve the resilience of the Tywyn Aberdyfi system. The reservoir will be filled from the existing Afon Fathew source in winter (under existing licence volumes).</p> <p>The two schemes are not expected to supply water to Pen y Bont WTW at the same time.</p>

Welsh Water manages leakage control through the establishment of District Meter Areas (DMA). DMA's have been used to target planned interventions to detect leakage. Leakage comprises of 1,153 discrete monitored areas measuring flows into this area of the network and are monitored and reported. Leakage is assessed between 12.00am and 06:00am and an estimate of night time consumption (household and non-household) is made and deducted from the direct flow measurement.¹⁸⁰

Wales' energy consumption has declined since 2005 and this trend is expected to continue due to energy efficiency improvements (although an increase in economic activity and fluctuations in oil and gas prices may affect this). There is also expected to be an increase in energy use from renewables and in this context, the UK has a legally binding target for 15% of energy consumption to be from renewable sources by 2020.¹⁸¹ In this wider context Welsh Water plan to significantly increase its renewable energy generation, with a target of doubling generation from renewable sources by 2020 and reducing energy use by 5% over the same period.

In 2010 the Welsh Government launched the 'Towards Zero Waste' (TZW) initiative, which sets out the aim to be recycling 70% of waste in Wales by 2025 and to be a zero waste nation by 2050¹⁸². The July 2015 progress report¹⁸³ states that total waste arisings per annum have decreased from 14.5 million tonnes in 2007 to 8.4 million tonnes in 2012. This is an 8.4% reduction per year, against a target of a 1.4% reduction per year. The report also outlines that Wales leads the UK in recycling municipal waste, achieving 54.3% in 2013/14. In 2012 the 50% of commercial waste and 68% of industrial waste was sent to recycling. The TZW sets the target of 67% of commercial and industrial waste to be recycled by 2019-20 and 70% by 2024-25.

Key Sustainability Issues Relevant to the Drought Plan

The key sustainability issues relevant to the drought plan arising from the analysis of the material assets and resource use baseline are:

- There is only limited opportunity to transfer water between the 24 water resources zones operated by Welsh Water;
- The need to minimise the demand for water resources through water efficiency measures (including metering) and the reduction of leakage in the region;
- The need to reduce energy consumption;
- The need to ensure the sustainable and efficient use of resources such as construction materials; and
- The need to minimise waste arisings, promote reuse, recovery and recycling and minimise the impact of wastes on the environment and communities.

3.8 Cultural Heritage

The historic environment of Wales is both unique and irreplaceable and contributes greatly to the Welsh sense of identity and culture and is an important economic and social asset. In Wales, there are three World

¹⁸⁰ Welsh Water (2018) *Draft Water Resources Management Plan 2019*. Available online:

<http://www.dwr.cymru.com/en/Environment/Water-Resources/Water-Resource-Management-Plan.aspx> [Accessed November 2018]

¹⁸¹ HM Government (2008) *Climate Change Act 2008*. Available online: <https://www.legislation.gov.uk/ukpga/2008/27/contents>

[Accessed November 2018]

¹⁸² Welsh Government (2010) *Towards Zero Waste. One Wales: One Planet*. Available online:

<http://gov.wales/docs/desh/publications/100621wastetowardszeroen.pdf> [Accessed November 2018]

¹⁸³ Welsh Government (2015) *Towards Zero Waste 2010-2015. Progress report*. Available online:

<http://gov.wales/docs/desh/publications/150724-towards-zero-waste-progress-report-en.pdf> [Accessed November 2018]

Heritage Sites (Pontcysyllte Aqueduct and Canal, Blaenavon Industrial Landscape, and Castles and Town Walls of King Edward in Gwynedd) and approximately 4,184 scheduled monuments. Additionally, there are 29,964 listed buildings, 529 conservation areas and 390 historic parks and gardens. The Historic Landscapes Register for Wales, meanwhile, has identified 58 landscapes across Wales which are regarded as representing the best examples of the variety of historic landscapes in Wales¹⁸⁴.

The Welsh Water Supply Area contains, either wholly or overlaps with, the following national and local designations:

- 3 World Heritage Sites;
- 4,004 scheduled monuments;
- 554 Grade I listed buildings;
- 2,219 Grade II* listed buildings;
- 28,993 Grade II listed buildings;
- 451 Conservation Areas;
- 362 registered parks and gardens; and
- 1 protected wreck site.

Cadw's regional field monument wardens monitor the condition of all statutorily protected monuments on a five-year programme. Heritage features within the Drought Plan area are shown in **Figures 3.19 and 3.20** and landscapes of historic interest are shown in **Figure 3.22**.

A 2015 report by Cadw found that for a sample percentage of listed buildings in Wales between 2013 and 2015, those classed as 'at risk' fell slightly from 9% to 8% in 2015; those classed as 'vulnerable' fell slightly from 14% to 12%; and those classed as 'not at risk' increased slightly from 77% to 79%. The percentage of listed buildings in 'Very bad' condition remained at around 2% over the period and 'Good' condition increased from 53% to 55% from 2013 to 2015. Buildings in 'Poor' or 'Fair' condition decreased from 2013 to 2015.¹⁸⁵ The distribution of Listed Buildings within Welsh Waters Supply Areas is shown on **Figure 3.20**.

¹⁸⁴ CADW (2007) *Caring for Historic Landscape*. Available online: http://cadw.gov.wales/docs/cadw/publications/Caring_for_Historic_Landscapes_EN_CY.pdf [Accessed November 2018]

¹⁸⁵ Cadw (2015) *Condition & use Survey of Listed Buildings in Wales: 2015 Update*. Available online at: <http://cadw.gov.wales/docs/cadw/publications/historicenvironment/20161206conditionandusesurveyoflistedbuildings2015.pdf> [Accessed November 2018]

Figure 3.19 Cultural Heritage Features in Welsh Water Supply Area

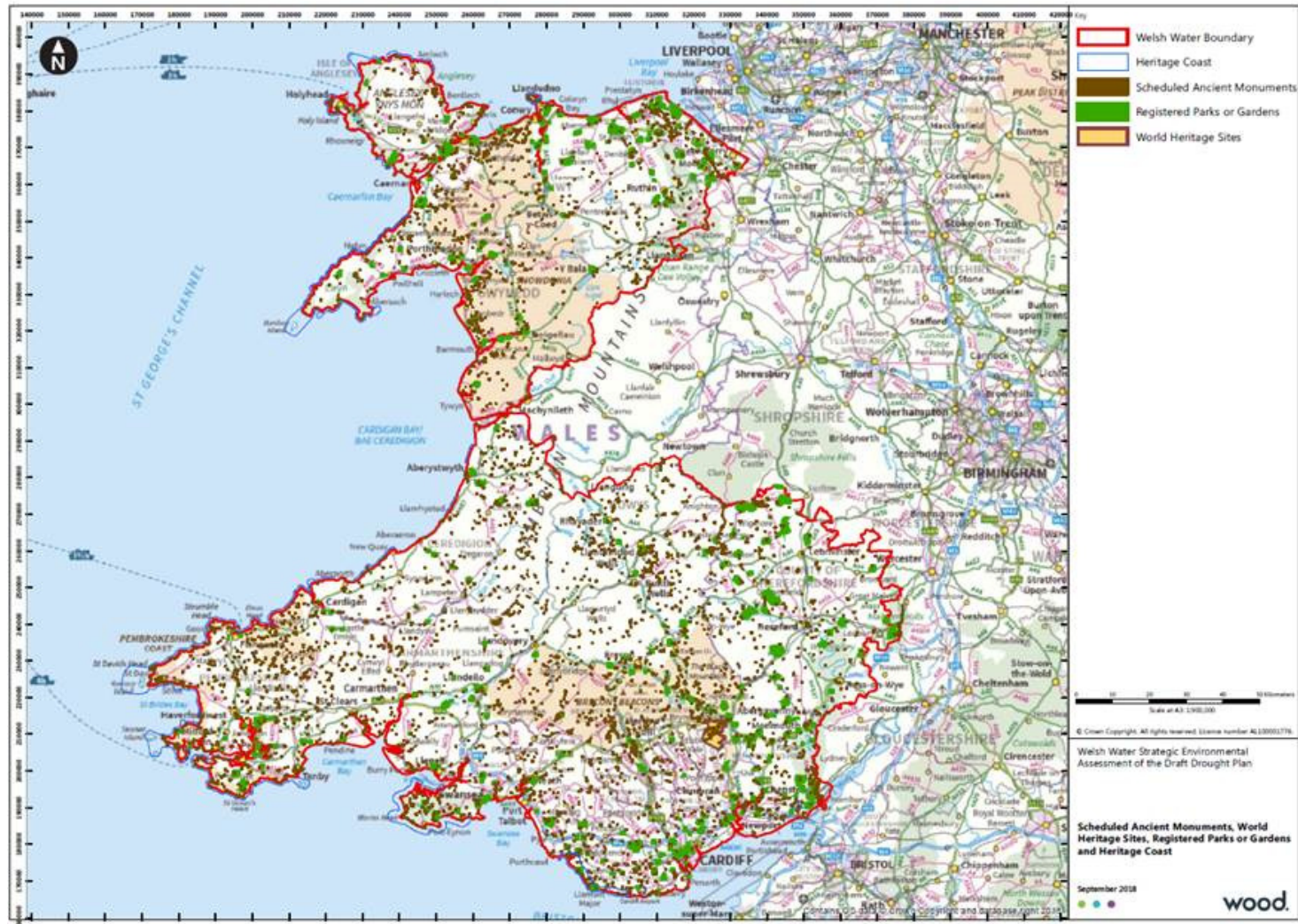
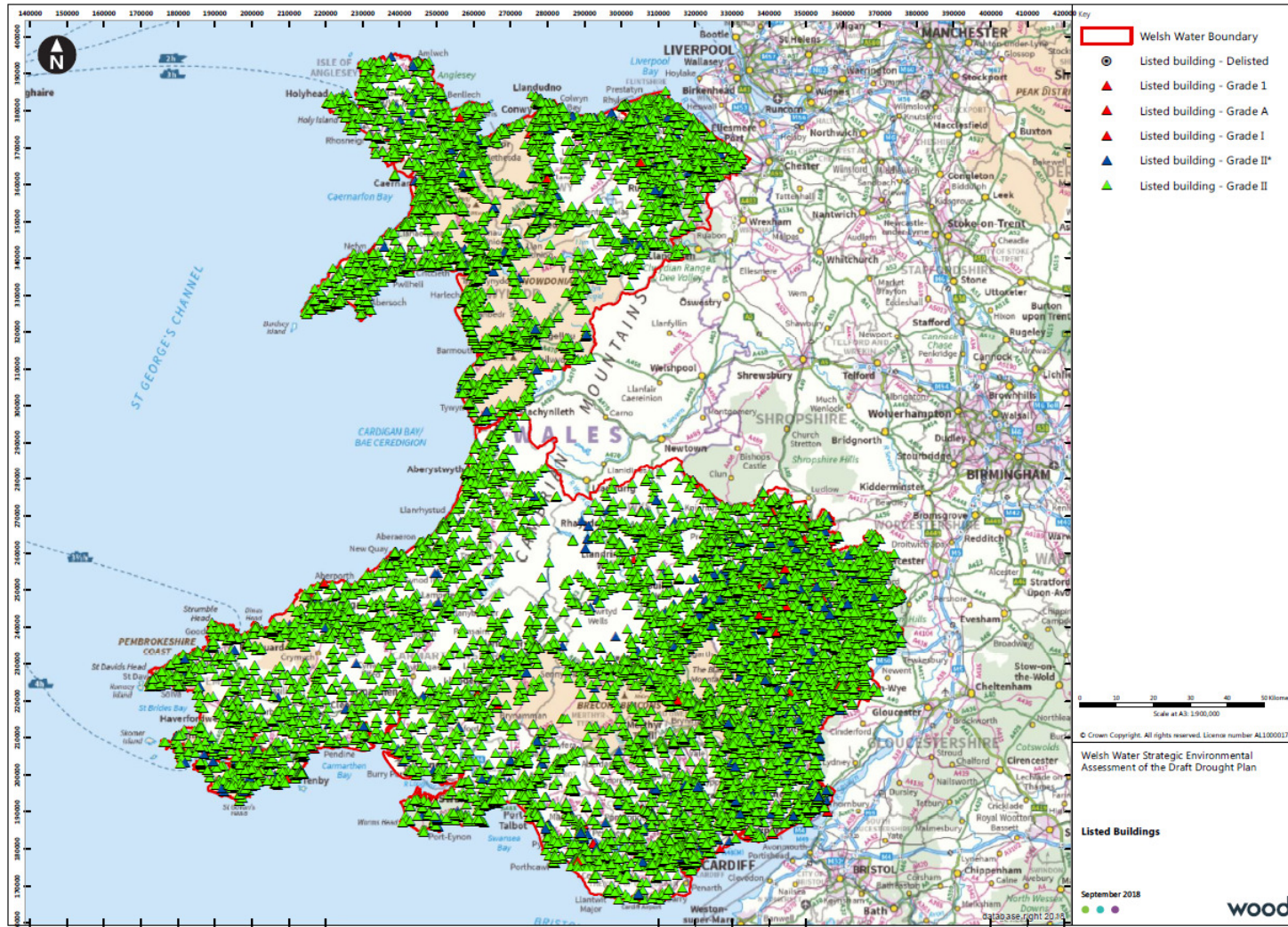


Figure 3.20 Listed Buildings in Welsh Water Supply Area



Cadw and other stakeholders produced the Register of Landscapes of Historic Interest in Wales¹⁸⁶ as a means of identifying, and to provide information on, the most important and best-surviving historic landscapes in Wales. The Register has been issued in two parts, covering 36 'outstanding' and 22 'special' historic landscape areas. All landscape areas identified on the Register are of national importance in the Welsh context. **Section 3.9** provides more detail on the extent of 'outstanding' and 'special' landscape areas.

The Welsh Water area may contain a large number of undesignated cultural heritage assets, many of which may be of considerable significance (some of national quality, although not formally designated). Historic Environment Records (HERs) held by local authorities include both designated and undesignated assets.

Likely Evolution of the Baseline without the Drought Plan

Wales' cultural heritage assets are vulnerable to disturbance from development, land management and the effects of climate change. However, (as a broad indicator) the percentage of listed buildings classified as 'At risk' or 'Vulnerable' by Cadw fell between 2013 and 2015 (as outline above).

Managing the risk of drought can impact on, or enhance, the historic components of the Welsh landscapes and built assets including historic woodlands, field systems and hedgerows, traditional buildings and ancient monuments and archaeological sites. The protection, preservation and settings of cultural heritage assets needs to be considered when locating any new development including drought management infrastructure.

Key Sustainability Issues Relevant to the Drought Plan

The key sustainability issues relevant to the drought plan and the SEA, arising from the analysis of the cultural heritage baseline are:

- The need to conserve and enhance the historic significance of buildings, monuments, features, sites, places, areas and landscapes of archaeological and cultural heritage interest, and their settings during drought conditions; and
- The need to avoid damage to important wetland areas with potential for paleoenvironmental deposits during drought conditions.

3.9 Landscape and Seascape

Baseline Characteristics

Landscape is defined by The European Landscape Convention¹⁸⁷ as "*an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors*". This definition is stated as covering natural, rural, urban and peri-urban (i.e. the urban-rural fringe) and includes land, inland water and marine areas. There is currently no legal definition for seascape although the UK Marine Policy Statement (MPS) (2011)¹⁸⁸ sets out that seascape should be taken as meaning landscapes with views of the coast or seas, and coasts and the adjacent marine environment with cultural, historical and archaeological links with each other.

¹⁸⁶ Cadw (2007) *Welsh Government and Countryside Council for Wales: Historic Landscapes*. Available online: http://cadw.gov.wales/docs/cadw/publications/Caring_for_Historic_Landscapes_EN_CY.pdf [Accessed November 2018]

¹⁸⁷ Council of Europe (2000) *European Landscape Convention*. Available online: <https://rm.coe.int/CoERMPublicCommonSearchServices/DisplayDCTMContent?documentId=09000016802f80c6> [Accessed November 2018]

¹⁸⁸ Defra (2011) *UK Marine Policy statement*. Available online: <https://www.gov.uk/government/publications/uk-marine-policy-statement> [Accessed November 2018]

Wales is characterised by a beautiful and rugged landscape, which ranges from the mountains and lakes of Snowdonia and the estuaries of the mid-Wales coast, to the beaches and cliffs of Pembrokeshire, and the industrial heritage of the South Wales Valleys. Wales is generally a predominantly pastoral landscape with agriculturally improved grassland being the single most extensive habitat type, followed by semi-improved grassland.

There are three National Parks covering 20% (287,830 ha) of Wales (Brecon Beacons, Snowdonia and Pembrokeshire Coast National Parks) and five AONBs (one of which straddles England and Wales (the Wye Valley AONB), covering 65,926 ha (**Figure 3.21**). Collectively these are referred to as 'designated landscapes', which have specific Special Qualities that should be protected and enhanced. Other areas designated for their landscape quality include 495 km of Heritage Coast (see **Figure 3.22**) and 58 landscapes of outstanding/special historic interest.¹⁸⁹ In total, over 52% of Wales is nationally or internationally valued for its scenic quality and character, often recognised as iconic landscapes providing a clear sense of place and identity.¹⁹⁰

The large area of designated landscapes throughout Wales demonstrates their value to people as a cultural service. Many people find beauty, tranquillity or aesthetic value in the landscapes and seascapes of Wales and which in-turn promotes social and mental wellbeing as well as the physical benefits of recreational ways of appreciating such landscapes (such as walking, climbing and cycling).

The Landscape Map of Wales¹⁹¹ recognises 48 sub-regional Landscape Character Areas across Wales, as shown in **Figure 3.23**. Each has a distinctive sense of place that enables it to be recognised as a single area (for example, a range of hills or a major urban area). Local detail is recorded in LANDMAP, an all-Wales landscape resource where landscape characteristics, qualities and influences on the landscape are recorded and evaluated. It includes nationally consistent, quality assured spatial datasets covering geological landscape, landscape habitats, visual and sensory, historic landscape and cultural landscape, evaluating their importance from a national to local scale.

Cadw and other stakeholders produced the Register of Landscapes of Historic Interest in Wales¹⁹² as a means of identifying, and to provide information on, the most important and best-surviving historic landscapes in Wales. The Register has been issued in two parts, covering thirty six 'outstanding' and twenty-two 'special' historic landscape areas. All landscape areas identified on the Register are of national importance in the Welsh context.¹⁹³

The coastlines and seascapes of Wales are also important to the nation's sense of identity and are valued resources for nature conservation with substantial historic environment interest. Wales has 4,067 km² (20%) of land designated as National Park on or near the coast and 844 km² (4%) as AONB. Wales' coastlines also provide an important contribution to the nation's economy. For example, 3,594 million visitor trips were attributed to coastal tourism in 2013 with the most popular draws being landscape, countryside and the beach. This brought £602m to the economy, with growth predicted at 10%¹⁹⁴.

¹⁸⁹ Cadw (2014) *The Registered Landscapes of Outstanding and of Special Interest in Wales*. Available online: <http://lle.gov.wales/catalogue/item/RegisteredLandscapesOfOutstandingHistoricInterestInWales?lang=en> [Accessed November 2018]

¹⁹⁰ Natural Resources Wales (2015) *A Snapshot of the State of Wales' Natural Resources*. Available online: <http://naturalresources.wales/media/4798/snapshot-report.pdf> [Accessed November 2018]

¹⁹¹ Natural Resources Wales (2018) *Interactive Maps – LANDMAP*. Available online: <http://landmap-maps.naturalresources.wales/default.aspx> [Accessed November 2018]

¹⁹² Cadw, Welsh Government and Countryside Council for Wales (2007) *Historic Landscapes*. Available online: http://cadw.gov.wales/docs/cadw/publications/Caring_for_Historic_Landscapes_EN_CY.pdf [Accessed November 2018]

¹⁹³ Cadw (et al) (2007) *Guide to Good Practice on using the Register of Landscapes of Historic Interest in Wales in the Planning and Development Process*. Available online: <http://www.dyfedarchaeology.org.uk/GuidetoGoodPracticeEngl.pdf> [Accessed November 2018]

¹⁹⁴ Welsh Government (2015) *Wales' Marine Evidence Report*. Available online: <http://gov.wales/docs/drah/publications/151008-wales-marine-evidence-report-master-october-2015-en.pdf> [Accessed November 2018]

A suite of National Marine Character Areas have been identified by NRW and which reflect the unique combinations of natural, cultural and perceptual influences in different areas. There are a total of 29 Marine Character Areas, as shown in **Figure 3.24**.

In 2009, over 115,600 km² of Wales (55% of the total area) was identified as 'tranquil', as defined by the Countryside Council for Wales (now NRW) Wales Tranquil Areas Map. The 2009 Tranquil Areas Map is shown in **Figure 3.25**. Factors that contribute to how tranquil a place feels include the presence of nature, feeling safe, low noise, visually pleasing surroundings and a relaxing atmosphere¹⁹⁵. The two largest tranquil areas in Wales are both over 1,000 km². These areas are part of the Berwyn Mountains, bordered by the towns of Dolgellau, Bala, Llangollen and Welshpool, and the southern part of the Cambrian Mountains, bordered by Llangurig, Rhayader, Llandoverly, Lampeter and Tregaron. Between 1997 and 2009, there was a loss of tranquil areas of nearly 1,500km² of land. This is over 6% of the total land area of Wales and is greater than the area of the Brecon Beacons National Park¹⁹⁶.

¹⁹⁵ Welsh Government (2012) *Tranquillity*. Available online: <http://gov.wales/topics/environmentcountryside/epq/noiseandnuisance/environmentalnoise/tranquillity?lang=en> [Accessed November 2018]

¹⁹⁶ Landscape Institute (2017) *Tranquillity – An Overview*. Available online: <https://www.landscapeinstitute.org/wp-content/uploads/2017/01/Tranquillity-An-Overview.pdf> [Accessed November 2018]

Figure 3.21 Landscape Designations in Wales

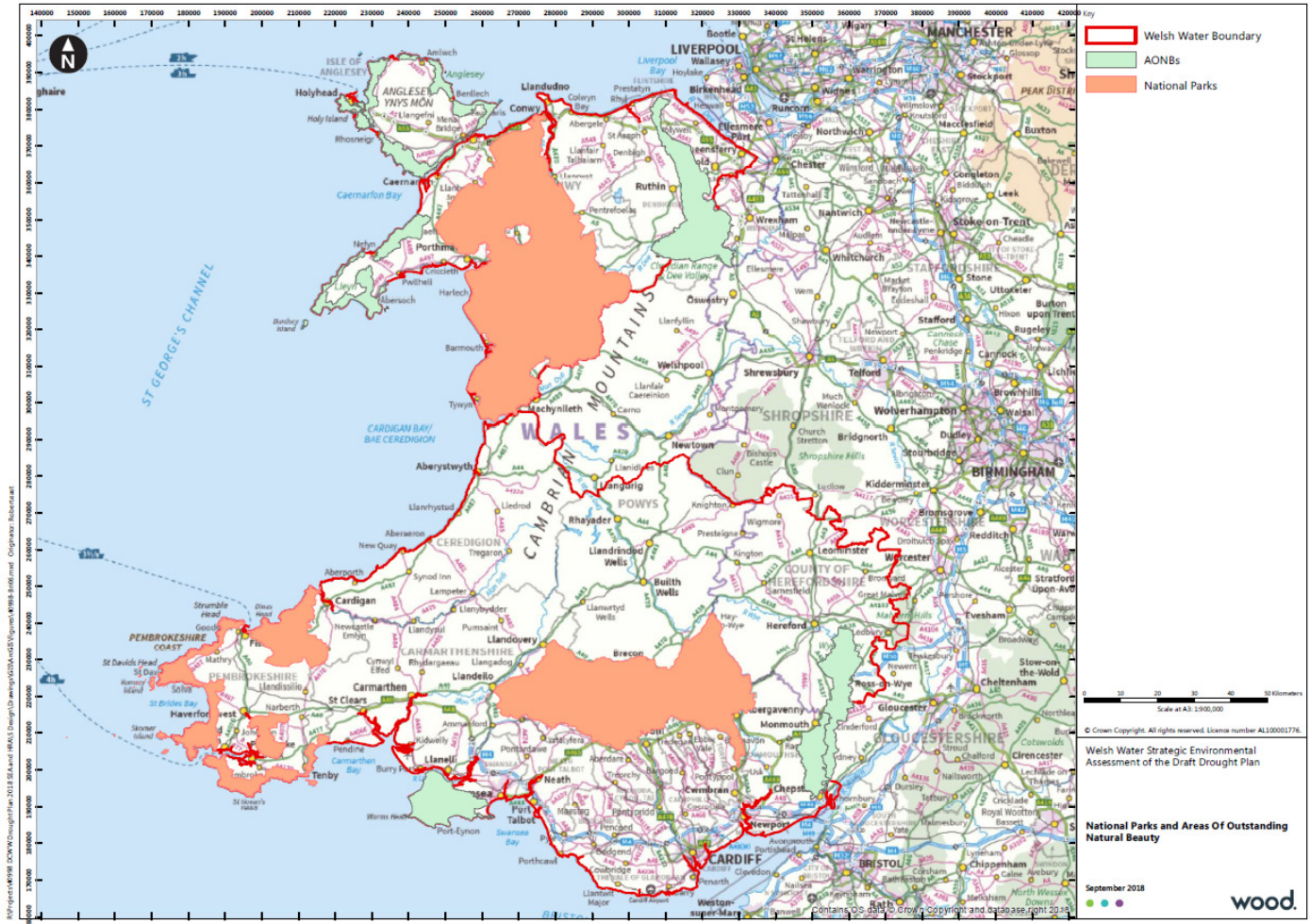


Figure 3.22 Landscape of Historic Interest in Wales

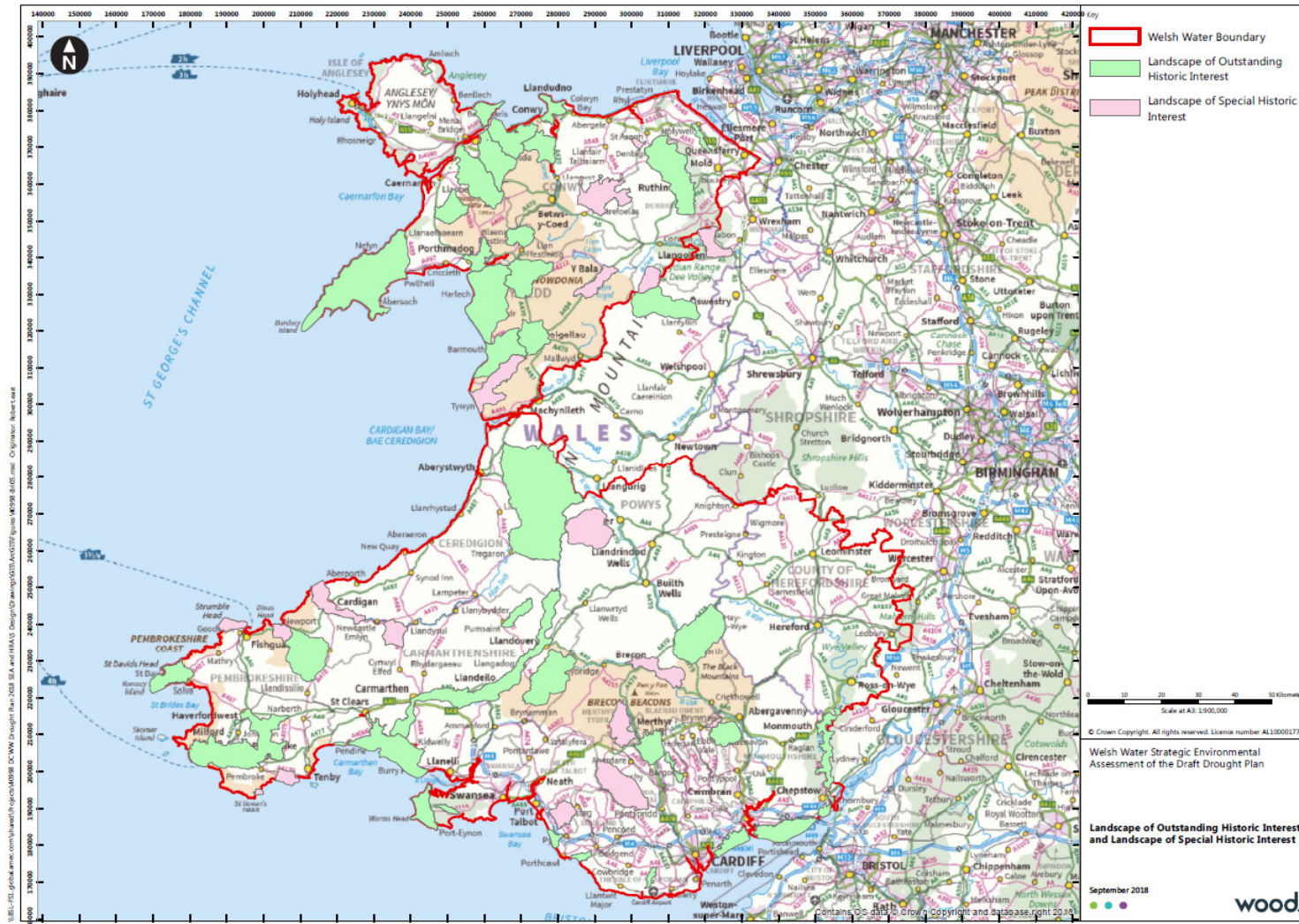


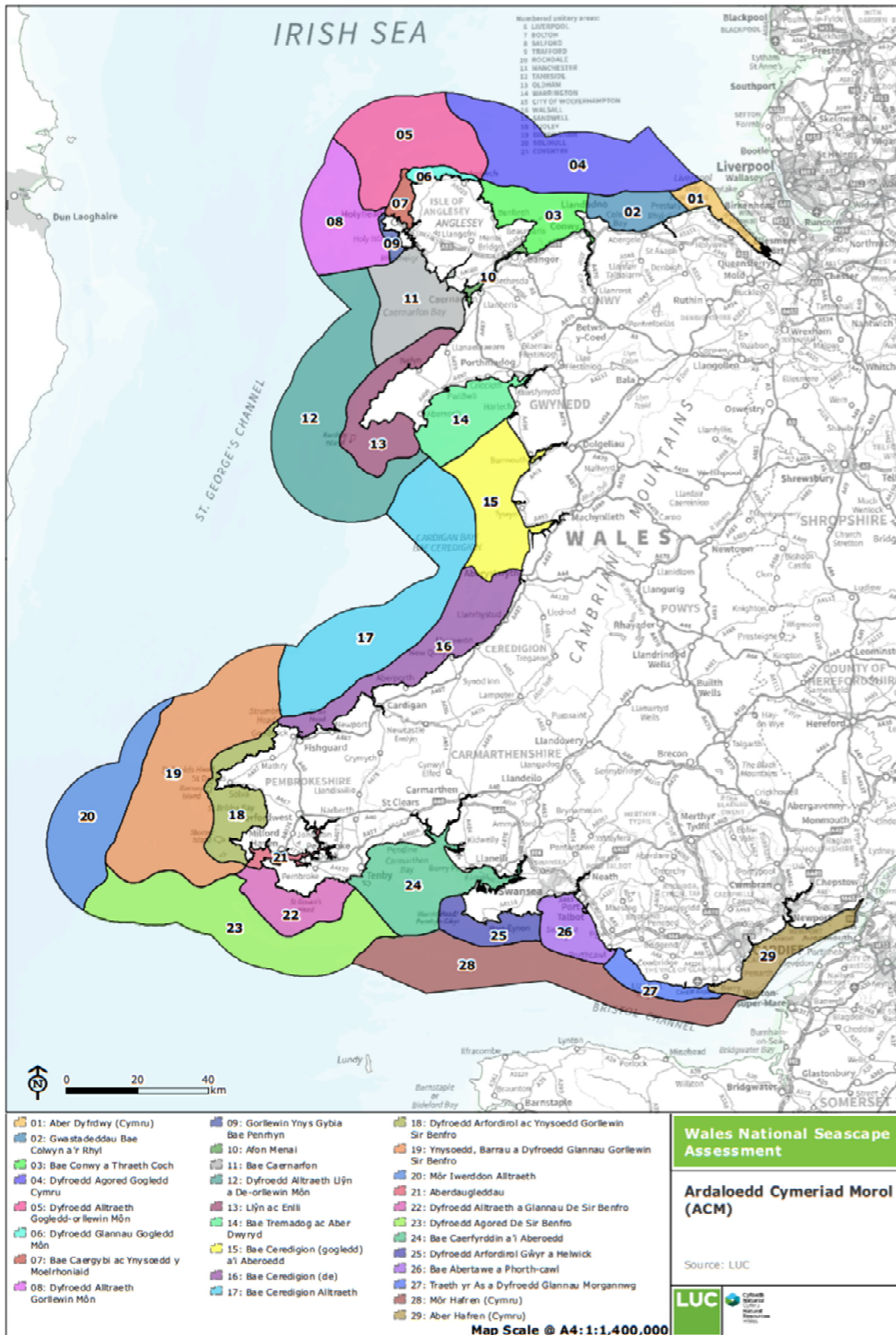
Figure 3.23 National Landscape Character Areas of Wales



- | | |
|--|--|
| 1 Anglesey Coast | 25 Ceredigion |
| 2 Central Anglesey | 26 Upper Wye Valley |
| 3 Arfon | 27 The Spas and Wells of Central Wales |
| 4 Llyn | 28 Eppynt Plateau and Valleys |
| 5 Tremadoc Bay | 29 Wye and Usk Vales |
| 6 Eryri | 30 Brecon Beacons and Black Mountains |
| 7 Conwy Valley | 31 Central Monmouthshire |
| 8 Colwyn and Northern Coastline | 32 Wye Valley and Wentwood |
| 9 Y Rhos | 33 Gwendraeth Vales |
| 10 Denbigh Moors | 34 Gwent Levels |
| 11 Vale of Clwyd | 35 Cardiff and Newport |
| 12 Clwydian Range | 36 Vale of Glamorgan |
| 13 Deeside and Wrexham | 37 South Wales Valleys |
| 14 Maelor | 38 Swansea Bay |
| 15 Vale of Llangollen and Dee Valley | 39 Gower |
| 16 Y Berwyn | 40 Teifi Valley |
| 17 Montgomeryshire Hills and Vales | 41 Tywi Valley |
| 18 Shropshire Hills (part) | 42 Pembroke and Carmarthen Foothills |
| 19 Severn Valley | 43 West and North Pembrokeshire Coast |
| 20 Radnorshire Hills | 44 Taf and Cleddau Vales |
| 21 Cambrian Mountains | 45 Taf, Tywi and Gwendraeth Estuaries |
| 22 Aberdyfi Coast | 46 Preseli Hills |
| 23 Rheidol and Ystwyth Hills and Valleys | 47 South Pembrokeshire Coast |
| 24 Ceredigion Coast | 48 Milford Haven |

Source: Natural Resources Wales. National Landscape Character Areas (NLCA). Available online: <https://naturalresources.wales/evidence-and-data/maps/nlca/?lang=en> [Accessed November 2018]

Figure 3.24 National Marine Character Areas for Wales

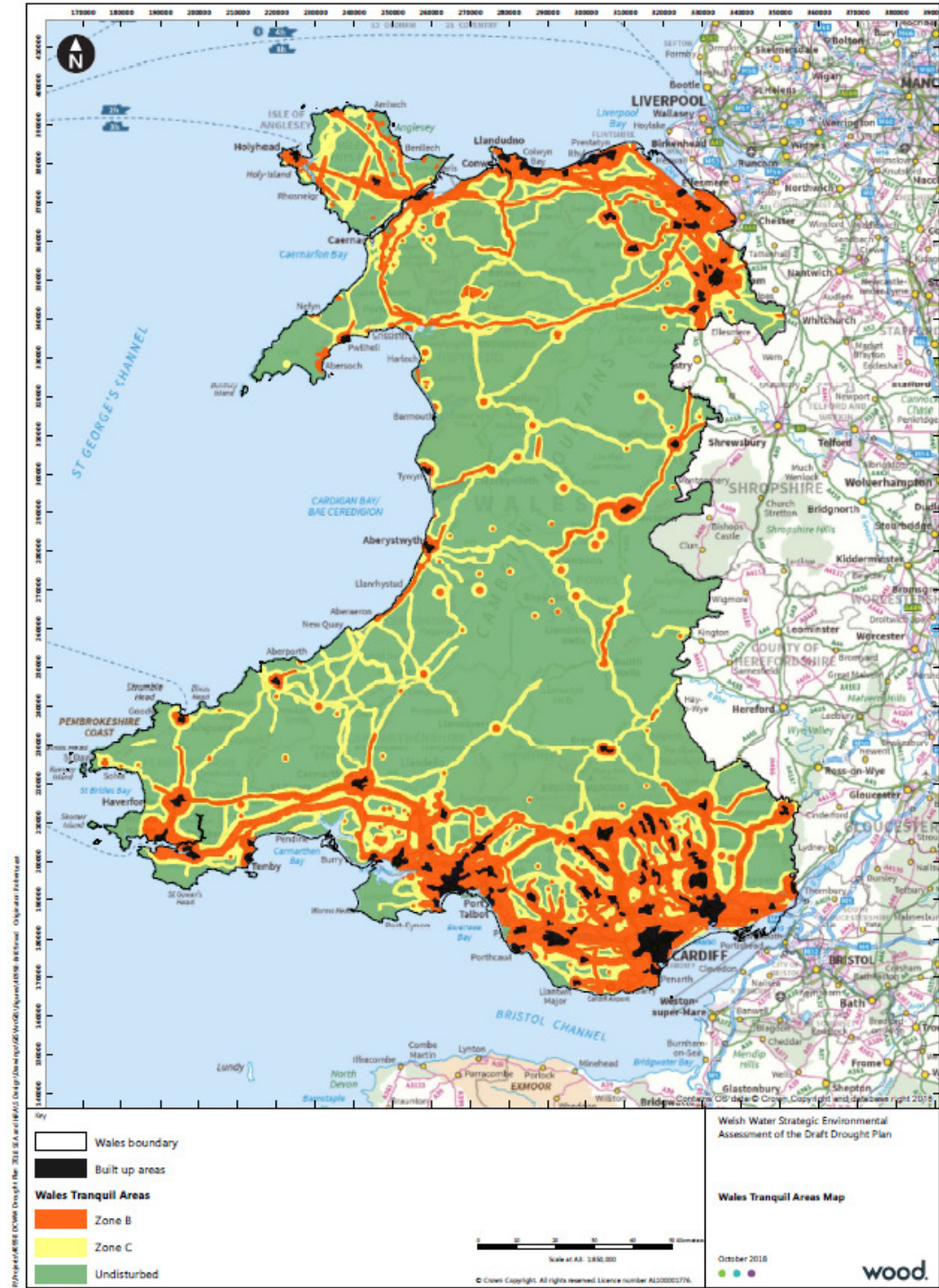


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 CB:VG EB:Goosen_V LUC/LON 6262-00_037_RPT_MCA_PORTRAIT_version_WELSH 23/07/2015

Source: Natural Resources Wales (2015) National Seascape Assessment for Wales. Available online:
<https://naturalresources.wales/media/675208/mca-00-technical-report-summary-method-appendix.pdf> [Accessed November 2018]



Figure 3.25 2009 Wales Tranquil Areas Map



Source: Natural Resources Wales. Available online: <http://lle.gov.wales/catalogue/item/TranquilAreasWales> [Accessed November 2018]

Likely Evolution of the Baseline without the Drought Plan

Recent key factors determining landscape change are, in particular, the expansion of settlements, commercial and industrial development, road improvements, onshore windfarms and turbines and recreational related developments. Key changes in the natural environment affecting landscape character include the felling of conifers and replanting with broadleaves, woodland expansion, changing bracken cover, reduced habitat diversity in places and reduced bog. With specific regard to seascape, Wales' Marine Evidence Report (2015) highlights that developments in the inshore planning area are increasingly likely to encroach on the seascape around the Welsh coastline, in particular renewable energy infrastructure. These factors are likely to continue to affect Wales' landscape and seascape character.

The changing climate will also affect Wales' distinctive landscapes and seascapes. Changes in weather patterns and soil conditions will alter the vegetation that is an important landscape feature whilst flooding and coastal erosion may affect landscape and seascape character. Responses to climate change such as the introduction of new crops and land uses may also have an impact on the visual appearance of the landscape whilst new flood defences could affect seascape.

Key Sustainability Issues Relevant to the Drought Plan

The key sustainability issues relevant to the Drought Plan arising from the analysis of the landscape and seascape baseline are:

- The need to conserve and enhance landscape and seascape character, taking into account the effects of climate change;
- The need to ensure the special qualities of designated landscapes are protected during drought conditions; and
- The need to minimise any adverse impacts upon landscape and seascape that may result from measures in the Drought Plan.

3.10 Summary of the Key Sustainability Issues

From the analysis of the baseline presented in the preceding sections, a number of key sustainability issues have been identified. These issues are summarised in **Table 3.23**.

Table 3.23 Key Sustainability Issues

Topic Area	Key Economic, Social and Environmental Issues
Biodiversity	<ul style="list-style-type: none"> • The need to protect and enhance biodiversity in Wales, particularly within protected sites, species and habitats designated for nature conservation; • The need to continue to increase and improve the condition of priority habitats and habitats of priority species, and restore populations of these species and other specially protected species; • The need to avoid activities likely to cause irreversible damage to natural heritage; • The need to take opportunities to improve connectivity between fragmented habitats to create functioning habitat corridors; • The need to control the spread of Invasive Non-Native Species (INNS); and • The need to recognise the importance of allowing wildlife to adapt to climate change.
Geology, Land Use and Soils	<ul style="list-style-type: none"> • The need to protect, maintain and enhance geomorphological functions and services; • The need to influence how land is managed, promoting sustainable patterns of land use; • The need to conserve and enhance soil quality and function (including carbon sequestration);

Topic Area	Key Economic, Social and Environmental Issues
	<ul style="list-style-type: none"> The need to protect and avoid damage to Wales' geodiversity and conserve and enhance sites designated for geological interest; and The need to manage impacts on soil resources, including control of pollution and remediation of contaminated land.
Water	<ul style="list-style-type: none"> The need to protect, enhance and restore the quality of the rivers, lakes, estuarine and coastal waters taking into account WFD objectives; The need to protect, enhance and restore the quantity and quality of groundwater resources taking into account WFD objectives; The need to ensure sustainable and appropriate abstraction levels and water flow/levels in Wales' waters across the full range of regimes from low to high conditions and meet society's needs for a resilient water supply; The need to ensure that the continued risk of flooding is reduced or where this is not possible, mitigated effectively using natural flood management and green engineering where possible; and The potential effects of climate change and the need to build climate change resilience into the water environment and water management.
Air Quality and Climate	<ul style="list-style-type: none"> The need to minimise emissions of pollutant gases and particulates and enhance air quality arising from the implementation of the Drought Plan measures; The need to reduce greenhouse gas emissions arising from implementation of the Drought Plan measures; The need to take into account, and where possible adapt to, the potential effects of climate change; and The need to increase environmental resilience to the effects of climate change.
Human Environment	<ul style="list-style-type: none"> The need to ensure that the water requirements of people and visitors can be met at all times, in a sustainable way; The need to ensure that water supplies remain affordable, in particular for deprived or vulnerable communities; The need to ensure that the measures contained within the Drought Plan do not adversely affect the health and well-being of any member of the community; The need to accommodate an increasing population whilst ensuring the continued provision of essential services including water supply; The need to ensure that vulnerable people are not affected by implementation of the Drought Plan; The need to ensure that the Drought Plan does not have an adverse economic impact; and The need to ensure public awareness of both forthcoming and existing drought conditions in order to maintain resilient, reliable public water supplies without the need for emergency drought measures.
Material Assets and Resource Use	<ul style="list-style-type: none"> There is only limited opportunity to transfer water between the 24 water resources zones operated by Welsh Water; The need to minimise the demand for water resources through water efficiency measures (including metering) and the reduction of leakage in the region; The need to reduce energy consumption; The need to ensure the sustainable and efficient use of resources such as construction materials; and The need to minimise waste arisings, promote reuse, recovery and recycling and minimise the impact of wastes on the environment and communities.
Cultural Heritage	<ul style="list-style-type: none"> The need to conserve and enhance the historic significance of buildings, monuments, features, sites, places, areas and landscapes of archaeological and cultural heritage interest, and their settings during drought conditions; The need to avoid damage to important wetland areas with potential for paleoenvironmental deposits during drought conditions.
Landscape and Seascape	<ul style="list-style-type: none"> The need to conserve and enhance landscape and seascape character, taking into account the effects of climate change; The need to ensure the special qualities of designated landscapes are protected during drought conditions; and

Topic Area	Key Economic, Social and Environmental Issues
	<ul style="list-style-type: none"><li>• The need to minimise any adverse impacts upon landscape and seascape that may result from measures in the Drought Plan.

3.11 Limitations of the Data and Assumptions Made

The information used has been sourced, so far as is possible, from the most recent datasets available utilising a wide range of authoritative and official sources. It is important to acknowledge that there are variable time lags between raw data collection and its publication. Consequently, at the time of this Environment Report's publication, the baseline or predicted future trends may have varied from those described above.

4. Approach to the Assessment

4.1 Introduction

This section describes the approach to the assessment of the draft and revised draft Drought Plan. It draws on the information contained in Sections 2 and 3, as well as the responses received to consultation on the Scoping Report, to define the scope of the assessment (in terms of the environmental and socio-economic issues considered) and sets out the SEA objectives and guide questions that comprise the assessment framework. The section then outlines how this assessment framework has been used to appraise the measures contained in the revised draft Drought Plan before highlighting the difficulties encountered during the assessment process.

4.2 The Scope of the Assessment

The aim of this SEA is to identify, describe and evaluate the likely significant effects of implementing the Drought Plan on the environment. Annex I of the SEA Directive and Schedule 2 of the SEA Regulations require that the assessment includes information on the *“likely significant effects on the environment, including on issues such as: biodiversity; population; human health; fauna; flora; soil; water; air; climatic factors; material assets; cultural heritage, including architectural and archaeological heritage; landscape; and the inter-relationship between the issues referred to”*.

The key policy objectives identified from the review of other plans and programmes relevant to the assessment of the Drought Plan and the economic, social and environmental issues arising from the analysis of the baseline, together with the characteristics of the potential drought management measures, have been used to define the scope of the assessment. In **Table 4.1**, each of the eight SEA topic areas is considered in turn.

Table 4.1 Basis for Scoping Out Certain Issues from the SEA

SEA Topic Area	Included in Drought Plan SEA?	Justification for scoping the topic out of the SEA
Biodiversity (flora and fauna)	Yes	Included within SEA framework.
Geology, Land Use and Soils	Yes	Included within SEA framework.
Water	Yes	Included within SEA framework, however it is not necessary to consider minimising flood risk and improving flood control measures as the Plan is intended for use during periods of drought.
Air Quality and Climate Change	Yes	Included within SEA framework.
Human Environment	Yes	Included within SEA framework, however providing access to high quality services, community facilities and accessible social infrastructure accessible is considered to be outside of the purpose and objectives of the Drought Plan.
Material Assets and Resource Use	Yes	Included within SEA framework.

SEA Topic Area	Included in Drought Plan SEA?	Justification for scoping the topic out of the SEA
Cultural Heritage	Yes	Included within SEA framework.
Landscape and Seascape	Yes	Included within SEA framework.

In this instance, all topics have been scoped in; however, as identified in **Table 4.1**, certain aspects of the water and human environment topics are noted as being scoped out. The primary reasons for this are that the measures within the Drought Plan will be actioned during periods of drought, so it is therefore very unlikely to correspond to any flood risk events. Drought Plans are also a focussed set of measures specific to drought management and therefore are not considered to affect accessibility to community facilities. This approach is consistent with that taken in the SEA for the current 2015 Drought Plan.

4.3 Assessment Framework

Establishing appropriate SEA objectives and guide questions is central to assessing the effects of the Drought Plan on the environment. Each of the draft and revised draft Drought Plan measures has been assessed against the SEA objectives to determine the scale and significance of the effect. By assessing each of the measures against the objectives, it is more apparent where the revised draft Drought Plan will contribute to sustainability, where it might have a negative effect and where enhancements could be made. Guide questions focus the assessment on specific aspects of the objective that reflect issues identified from the review of baseline and contextual information relating to the Welsh Water area.

The SEA objectives and guide questions used in the assessment of the revised and revised draft Drought Plan reflect the topics contained in Annex I of the SEA Directive and have been informed by:

- the SEA objectives and guide questions developed as part of the SEA of the 2015 Drought Plan;
- the review of relevant plans and programmes and the associated key policy objectives and messages (**Section 2** and **Appendix C**);
- the baseline information and key sustainability issues contained in **Section 3**; and
- responses received to consultation on the SEA Scoping Report (see **Appendix B**).

The final assessment framework is presented in **Table 4.2**. The well-being goals of the *Well-being of Future Generations (Wales) Act 2015* (see **Table 1.4**) are fully reflected in the framework to help ensure alignment with national policy and legislation on sustainability. Additionally, those objectives that are directly related to the objective for SMNR, established in the *Environment (Wales) Act 2016*, are highlighted.

Table 4.2 Assessment Framework

Topic Area	SEA Objective	Guide Questions	Welsh Government Well-being Goal(s)	Relevant to the Objective for SMNR?	SEA Directive Topic(s)
Biodiversity	1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity	<i>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar, SSSIs and priority habitats and species)?</i>	A prosperous Wales A resilient Wales A healthier Wales A globally responsible Wales	Yes	Biodiversity, Flora and Fauna
		<i>Will the draft Drought Plan measure protect and enhance non-designated sites and local biodiversity?</i>			
		<i>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</i>			
		<i>Will the draft Drought Plan measure affect the condition of ecosystems (including their connectivity, structure and functioning)?</i>			
		<i>Will the draft Drought Plan measure enhance the adaptability of ecosystems?</i>			
		<i>Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?</i>			
Geology and Soils	2. To ensure the appropriate and efficient use of land and	<i>Will additional land be required for the development or implementation</i>	A prosperous Wales A resilient Wales	Yes	Soils, Material Assets

Topic Area	SEA Objective	Guide Questions	Welsh Government Well-being Goal(s)	Relevant to the Objective for SMNR?	SEA Directive Topic(s)
	protect and enhance soil quality and geodiversity.	<p><i>of the draft Drought Plan measure or will the option require below ground works leading to land sterilisation?</i></p> <p><i>Will the draft Drought Plan measure utilise previously developed land?</i></p> <p><i>Will the draft Drought Plan measure minimise the loss of best and most versatile agricultural land?</i></p> <p><i>Will the draft Drought Plan measure affect upland (peat-dominated) and other wetland soils?</i></p> <p><i>Will the draft Drought Plan measure protect and enhance protected sites designated for their geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest?</i></p>	A globally responsible Wales		
Water	3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water Framework Directive	<p><i>Will the draft Drought Plan measure lead to a change in river flows, wetted width or river level?</i></p> <p><i>Will the draft Drought Plan measure affect surface water quality and quantity?</i></p> <p><i>Will the draft Drought Plan measure lead to changes in groundwater quality, quantity and recharge?</i></p> <p><i>Will the draft Drought Plan measure lead to the deterioration of Water Framework Directive (WFD)</i></p>	A prosperous Wales A resilient Wales A healthier Wales	Yes	Water, Biodiversity, Flora, Fauna

Topic Area	SEA Objective	Guide Questions	Welsh Government Well-being Goal(s)	Relevant to the Objective for SMNR?	SEA Directive Topic(s)
		<p><i>waterbody status (or potential) from, inter alia, changes in fluvial geomorphology?</i></p> <p><i>Will the draft Drought Plan measure jeopardise the achievement of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Water Framework Directive (WFD)?</i></p>			
Air Quality and Climate Change	4. To limit the causes and potential consequences of climate change and to adapt to future changes	<p><i>Will the draft Drought Plan measure reduce or minimise greenhouse gas emissions?</i></p> <p><i>Will the draft Drought Plan measure reduce vulnerability to the effects of climate change by appropriate adaptation?</i></p> <p><i>Will the draft Drought Plan measure increase environmental resilience to the effects of climate change including to impacts on water quality?</i></p> <p><i>Will the draft Drought Plan measure reduce or minimise air pollutant emissions?</i></p>	<p>A prosperous Wales</p> <p>A resilient Wales</p> <p>A healthier Wales</p> <p>A Wales of cohesive communities</p> <p>A globally responsible Wales</p>	Yes	Air Climatic Factors.
Human Environment – Human Health	5. To protect and enhance human health with special regard to vulnerable groups in society	<p><i>Will the draft Drought Plan measure ensure continuity of clean drinking water supply within statutory standards supply at times of drought?</i></p>	<p>A prosperous Wales</p> <p>A globally responsible Wales</p> <p>A resilient Wales</p> <p>A healthier Wales</p> <p>A more equal Wales</p>	Yes	Population, Human Health.

Topic Area	SEA Objective	Guide Questions	Welsh Government Well-being Goal(s)	Relevant to the Objective for SMNR?	SEA Directive Topic(s)
		<p><i>Will the draft Drought Plan measure affect the affordability of clean drinking water?</i></p> <p><i>Will the draft Drought Plan measure adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise levels)?</i></p> <p><i>Will the draft Drought Plan measures affect human health or the health of any vulnerable groups?</i></p> <p><i>Will the Drought Plan measure affect public access to, or enjoyment of, local green/blue space?</i></p> <p><i>Will the Drought Plan measure impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?</i></p>	A Wales of cohesive communities		
Human Environment - Social and Economic Well-Being	6. To maintain and enhance the economic and social needs of the local community	<p><i>Will the draft Drought Plan measure ensure sufficient water is available for people and visitors to maintain economic activity in times of drought?</i></p> <p><i>Will the draft Drought Plan measures affect local or regional economies?</i></p> <p><i>Will the draft Drought Plan measure affect opportunities for recreation at times of drought?</i></p>	<p>A prosperous Wales</p> <p>A resilient Wales</p> <p>A more equal Wales</p> <p>A globally responsible Wales</p> <p>A Wales of cohesive communities</p>	Yes	Population, Human Health, Water, Material Assets.

Topic Area	SEA Objective	Guide Questions	Welsh Government Well-being Goal(s)	Relevant to the Objective for SMNR?	SEA Directive Topic(s)
Material Assets and Resource Use	7. To promote the wise use of resources	<i>Will the draft Drought Plan measure seek to minimise the demand for additional raw materials?</i>	A prosperous Wales A resilient Wales A globally responsible Wales	Yes	Material Assets.
		<i>Will the draft Drought Plan measure seek to minimise energy consumption?</i>			
		<i>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</i>			
		<i>Will the draft Drought Plan measure encourage sustainable design or use of sustainable materials?</i>			
Cultural Heritage	8. To conserve and enhance the cultural, historic and industrial heritage resource.	<i>Will the draft Drought Plan measure conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</i>	A prosperous Wales A Wales of vibrant culture and thriving Welsh language	Yes	Cultural Heritage
		<i>Will the draft Drought Plan measure avoid or minimise damage to archaeologically important sites?</i>			
		<i>Will the draft Drought Plan measure avoid damage to important wetland areas with potential for paleoenvironmental deposits?</i>			
Landscape and Seascape	9. To protect and enhance landscape and seascape	<i>Is it likely that the draft Drought Plan measure will have significant visual impacts?</i>	A prosperous Wales A resilient Wales	Yes	Landscape

Topic Area	SEA Objective	Guide Questions	Welsh Government Well-being Goal(s)	Relevant to the Objective for SMNR?	SEA Directive Topic(s)
	character and other protected features	<p><i>Will the draft Drought Plan measure avoid adverse effects on, and enhance where possible, the special qualities of protected/designated landscapes (including woodlands) or seascapes such as National Parks or AONBs?</i></p> <p><i>Will the draft Drought Plan measure help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness?</i></p>	<p>A Wales of cohesive communities</p> <p>A healthier Wales</p>		

4.4 Assessment Methodology

Both the construction (where applicable) and operational effects of each revised draft Drought Plan measure have been assessed against all of the SEA objectives that comprise the assessment framework. This approach recognises that the environmental effects of the measures under consideration are likely to be different in nature in their construction (i.e. enabling/installation or implementation) and in their operational phases; it also ensures consistency across the assessment of demand-side and supply-side options.

A matrix similar to that shown in **Table 4.3** has been used to capture the assessment of each measure in a consistent manner, a key to the meaning of the symbols is presented in **Table 4.4**. The completed assessment matrices are contained in **Appendix E** and a summary of the findings of the assessment is presented in **Section 5**. The commentary section of the matrices provides justification for how the assessment was reached and includes consideration of the following:

- the nature of the potential effect (what is expected to happen);
- the timing and duration of the potential effect (e.g. short, medium or long term);
- the geographic scale of the potential effect (e.g. local, regional, national);
- the location of the potential effect (e.g. whether it affects rural or urban communities, or those in particular parts of the supply area);
- the potential effect on vulnerable communities or sensitive habitats;
- the reasons for whether the effect is considered significant;
- the reasons for any uncertainty, where this is identified; and
- the potential to avoid, minimise, reduce, mitigate or compensate for the identified effect(s) with evidence (where available).

Where relevant, other information and assessments including the HRA and EARs prepared for each measure have been referenced as appropriate.

Specific guidance has been developed for what constitutes a significant effect, a minor effect or a neutral effect for each of the SEA objectives. These 'definitions of significance' help to ensure a consistent approach to interpreting the significance of effects and enable the reader understand the decisions made by the assessor. The definitions of significance are set out in **Appendix D**.

Table 4.3 Example Appraisal Matrix

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity	<p><i>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs)?</i></p> <p><i>Will the draft Drought Plan measure protect and enhance protect and enhance non-designated sites and local biodiversity?</i></p> <p><i>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</i></p> <p><i>Will the draft Drought Plan measure lead to a change in ecological functionality or connectivity?</i></p> <p><i>Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?</i></p>	-	+	<p>Effects of Construction A description of the likely significant effects of the option on the SEA objectives during construction has been included here.</p> <p>Effects of Operation A description of the likely significant effects of the option on the SEA objectives during operation has been included here.</p> <p>Mitigation Potential mitigation has included here.</p> <p>Assumptions Assumptions made in undertaking the assessment have been included here.</p> <p>Uncertainty Uncertainties identified in undertaking the assessment have been included here.</p>

Table 4.4 Key to Assessment Matrices

Score	Description	Symbol
Significant Positive Effect	Significant positive effect of the draft Drought Plan measure on this objective	++
Minor Positive Effect	Positive effect of the draft Drought Plan measure on this objective	+
Neutral	Overall neutral effect of the draft Drought Plan measure on this objective	0
Minor Negative Effect	Negative effect of the draft Drought Plan measure on this objective	-
Significant Negative Effect	Significant negative effect of the draft Drought Plan measure on this objective	--
No Relationship	There is no clear relationship between the draft Drought Plan measure and the achievement of the objective or the relationship is negligible.	~
Uncertain	The draft Drought Plan measure has an uncertain relationship to the objective or the relationship is dependent on the way in which the aspect is managed. In addition, insufficient information may be available to enable an assessment to be made.	?

4.5 Secondary, Cumulative and Synergistic Effects

The SEA Regulations require that the cumulative effects of a plan or programme are taken into account. This includes the cumulative effects of the revised draft Drought Plan in combination with other plans and programmes and the cumulative effects of individual measures within the revised draft Drought Plan, which in combination represent the proposed approach.

The cumulative assessment has considered the impact of the proposed measures set out in the revised draft Drought Plan with those in other relevant plans and programmes identified in **Section 2** and in particular cumulative impacts with other water company drought plans and water resources management plans due to the synergies in the approach to managing water resources.

The assessment of the cumulative effects of the revised draft Drought Plan is presented in **Section 5.4**.

4.6 Contribution of the Revised Draft Drought Plan to Wales' Well-being Goals and the Objective for the Sustainable Management of Natural Resources

Informed by the assessment of the revised draft Drought Plan measures against the SEA objectives, a judgement has been made regarding whether, and the extent to which, the revised draft Drought Plan would support or detract from the achievement of each of the well-being goals for Wales and the objective for SMNR. A matrix has been used to record this assessment and the results are presented in **Section 5.5**.

4.7 Difficulties Encountered in Undertaking the Assessment

The SEA Directive requires the identification of any difficulties (such as technical deficiencies or lack of knowledge) encountered during the assessment process. The difficulties encountered in undertaking the SEA of the revised draft Drought Plan are summarised below:

- In undertaking this assessment, a balance was needed between the information provided as an overview of the whole area and the detail of a specific location. For example, the baseline section of this report considers strategic information; however, in order to assess some of the potential effects, it was necessary to be aware of the local characteristics. Throughout the whole process, it was necessary to balance the need for enough information to undertake a robust assessment, while retaining its strategic focus.
- Only limited quantitative information is currently available for each measure. For the supply-side measures, the yield of the measure has been provided by Welsh Water but other information such as the amount of materials required (and the carbon embodied within these) and operational power requirements and carbon emissions have not been quantified. Consequently, it has been necessary to estimate the likely resource use, energy consumption and carbon emissions for each measure. These qualitative estimates are based on the amount of additional infrastructure that Welsh Water consider will be required to implement the measure and the distance and topography over which water may need to be transferred. In this respect, the estimates of resource use, energy consumption and carbon emissions used in this assessment can only be considered indicative.
- The assessment presented in this Environmental Report draws heavily on information compiled by Welsh Water in the EARs prepared in support of the revised draft Drought Plan. The EARs describe the nature and extent of the baseline and drought year data that would be required in order to differentiate the impacts resulting solely from the implementation of a Drought Order or Drought Permit with those resulting naturally as a result of the drought itself. The EARs do not constitute an Environmental Report which would describe the impact assessment of the implementation of a proposed Drought Order/Drought Permit on the environment, although they do contain a review of the hydrological influence and significance of the option.
- For some measures, there remains uncertainty associated with the potential effects. This reflects the exact timing/duration of the option's implementation (even within the confirmed option period), flow conditions at the time of implementation and the presence and health of potentially affected species.
- Whilst the assessment of the cumulative effects of the implementation of the revised draft Drought Plan and other plans and programmes has been based on the most up to date information available at the time of writing, in many cases there is a lack of detailed information at this stage to make robust conclusions. This is a typical issue encountered during the assessment of drought plans.

5. Assessment of the Revised Draft Drought Plan

5.1 Introduction

This section presents the findings of the assessment of the measures identified for the revised draft Drought Plan. The types of measures are broadly categorised as demand-side measures and supply-side measures; demand-side measures are designed to reduce the demand for water during drought; supply-side measures relate to actions that can temporarily increase the amount of water available for supply during drought.

As set out in **Section 1.3**, Welsh Water has identified a range of demand-side measures that can broadly put into five categories and 20 supply-side options that require either a drought permit or drought order. The demand-side measures have been included in the revised draft Drought Plan; these measures are not geographically distinct and hence could be implemented in any of the WRZs in Welsh Water's area. The 20 supply-side measures are for 10 WRZs that are potentially vulnerable to severe drought. These WRZs include: North Eryri Ynys Mon; Clwyd Coastal; Tywyn Aberdyfi; Barmouth; Lleyn Harlech; SEWCUS; Tywi CUS; Mid and South Ceredigion; North Ceredigion; and Pembrokeshire.

All of the revised draft Drought Plan measures have been assessed using the framework and approach set out in **Section 4** to identify the likely significant environmental effects. Each measure has been assessed against the SEA objectives to identify its potential effects in both the short term (during construction) and medium/long term (during operation), taking into account the nature of the effect, its timing and geographic scale, the sensitivity of the human or environmental receptor that could be affected, and how long any effect might last. Where quantified information is available for the measure, the assessment has also been informed by reference to threshold values set out in the definitions of significance (see **Appendix D**).

The findings of the assessment are presented in Sections 5.2 to 5.12 below. A 'generic' approach has been taken to assessing the demand-side measures, reflecting the fact that they could be implemented in any of Welsh Water's 24 WRZs (**Section 5.2**), with the effects of the supply-side options for each of the 10 WRZs presented in **Sections 5.3 to 5.12**. The cumulative, synergistic and secondary effects of the revised draft Drought Plan are considered in **Section 5.13** with commentary then provided in **Section 5.14** on the performance of the revised draft Drought Plan against the well-being goals of the Well-being of Future Generations (Wales) Act 2015 and the objective for SMNR set out in the Environment (Wales) Act 2016. An overview of the mitigation and enhancement measures identified during the assessment is set out in **Section 5.15**.

5.2 Demand-side Measures

A total of five demand-side measures have been included in the revised draft Drought Plan; these are listed in **Table 5.1**. A summary of the assessment of these options is presented in **Table 5.2** with commentary on the likely significant construction and operational effects provided below. Detailed assessments are contained at **Appendix E**.

The demand-side measures are not geographically distinct and hence could be implemented in any of Welsh Water's WRZs. In this section, the 'generic' assessment of each of the options is presented, along with discussion of how the findings might vary when the options are implemented in different WRZs.

Table 5.1 Revised Draft Drought Plan Demand-side Measures

Ref	Option	Yield (MI/d)	Description
DM1	Leakage Management	Various	<p>This option involves increasing leakage reduction activity to reduce losses from the water supply network during a drought. Two types of leakage reduction would be undertaken:</p> <ul style="list-style-type: none"> • Active Leakage Control – this would involve increasing the number of leakage technicians within each WRZ where this option is implemented. Increasing the number of leakage technicians would enable leaks to be located and fixed more promptly than is the case with fewer resources. • Pressure Management – Pressure management involves proactively managing pressure within the distribution network to reduce leakage. <p>The scale of the works depends on the size of the WRZ and the level of leakage within each zone. It is also dependent on the effectiveness of the works to locate and fix leakage.</p>
DM2	Water Efficiency – customer messaging and device offering	Various	<p>This option involves an increased level of water efficiency messaging to customers. This would involve the distribution of simple retrofit devices (e.g. cistern devices, showerheads etc.) and water efficiency information to household and businesses within the water resource zones targeted. The implementation of this option would be accompanied by a media campaign.</p> <p>No construction would arise from the implementation of this option.</p>
DM3	Temporary Use Bans (TUBs)	Various but estimated as 5% saving in demand	<p>This option involves the implementation of temporary use bans on customers. Temporary use bans include restrictions on the use of hosepipes. The implementation of this option would be accompanied by a media campaign.</p> <p>No construction would arise from the implementation of this option.</p>
DM4	Non Essential Use Bans (NEUBs)	Various but estimated as 5% saving in demand (in addition to DM3)	<p>This option involves the implementation of NEUBs on customers under the Drought Direction 2011. NEUBs include restrictions on, for example, the cleaning of non-domestic premises, filtering or maintaining ponds and non-domestic swimming pools and operating mechanical vehicle washers. NEUBs would be imposed extremely infrequently with a 1 in 100 year drought return period or even rarer event being needed to trigger them.</p> <p>No construction would arise from the implementation of this option.</p>
DM5	Extreme measures e.g. pressure management and water rationing	Various	<p>This option would involve water rationing through the use of widespread enhanced pressure management or localised use of standpipes. Such measures would only be employed in very exceptional circumstances under emergency drought order.</p> <p>No construction would arise from the implementation of this option.</p>

Table 5.2 Demand-side Measures Assessment Summary (all WRZs)

Ref	Option Name	Constriction (C) or Operation (O)	1. Biodiversity	2. Geology and Soils	3. Water	4. Air Quality and Climate Change	5. Human Health	6. Social and Economic Wellbeing	7. Material Assets and Resource Use	8. Cultural Heritage	9. Landscape and Seascapes
DM1	Leakage Management	C	0/?	0	0	-/?	0	0	-/?	0	0
		O	0	0	+	+/?	+	0/?	+/?	0	0
DM2	Water Efficiency	C	0	0	0	0	0	0	0	0	0
		O	0/?	0	+	+/?	+	0/?	+/?	0	0
DM3	Temporary Use Bans (TUBs)	C	0	0	0	0	0	0	0	0	0
		O	0/?	0	+	+/?	+	0/?	+/?	0	0
DM4	Non Essential Use Bans (NEUBs)	C	0	0	0	0	0	0	0	0	0
		O	0/?	0	+	+/?	+	0/?	+/?	0	0
DM5	Extreme Measures	C	0	0	0	0	0	0	0	0	0
		O	0	0	+/?	+/?	+/-/?	0/?	+/?	0	0

Construction Effects

No significant positive or minor positive effects, or significant negative effects, have been identified during the assessment of the demand-side measures.

Pipeline repair under Option DM1 (Leakage Management) would result in carbon emissions arising from the embodied carbon in materials in addition to the use of plant and vehicle movements. There would also be an increase in resource use for pipeline repair and construction waste along with fuel usage for vehicles and machinery. In consequence, Option DM1 has been assessed as having a minor negative effect on climate change (SEA Objective 4) and resource use (SEA Objective 7), although as resource use and carbon emissions have not been quantified at this stage, some uncertainty remains. Reflecting the scale and nature of construction, effects associated with this option on the remaining SEA objectives have been assessed as neutral.

Options DM2 to DM4 would not involve any construction activity and in consequence, effects associated with the implementation of these options have been assessed as neutral across all of the SEA objectives.

Operational Effects

No significant positive effects have been identified during the assessment of the demand-side measures.

During operation, the demand-side measures are likely to have positive effects on water (SEA Objective 3) as they will reduce either leakage from the water supply network (Option DM1) or the demand for water (Options DM2 to DM4), helping to protect water resources and secure drinking water supplies in a time of drought. Minor positive effects have also been identified in respect of climate change (SEA Objective 4) and resource use (SEA Objective 7). This reflects the fact that, whilst resource use, energy and carbon emissions associated with the options have not been quantified and would vary by resource zone, the measures are likely to contribute towards a minor reduction in energy use and emissions associated with the treatment and

distribution of water. Further, the options will support climate change adaptation by securing drinking water supplies during periods of drought and for this reason, a minor positive effect has also been identified in respect of human health (Objective 7).

No significant negative operational effects have been identified during the assessment of the demand-side measures. The implementation of extreme measures under Option DM5 will help to ensure that there is water available during extreme drought conditions. However, water rationing through widespread enhanced pressure management or localised use of standpipes could have temporary adverse effects on human health due to disruption to water supplies (though this would be necessary to ensure that some supply is maintained in emergency conditions) and impacts on opportunities for recreation (e.g. swimming). There is also the potential for water rationing to cause stress and anxiety which could affect human health. On balance, the option has been assessed as having a mixed minor positive and minor negative effect on this objective, although some uncertainty remains (reflecting the likelihood of the measure being implemented).

Further Consideration of Demand-side Measures

The assessment is of the 'generic' effects of the revised draft Drought Plan demand-side measures on the SEA objectives, irrespective of the WRZ. Consideration has also been given to how the generic assessments may change between WRZs for the options.

The assessments against the four SEA objectives shown with operational effects in **Table 5.2** (water, climate change, human health and resource use) are considered most likely to be sensitive to variations in the five demand-side options between the WRZs. In WRZs where yields are potentially greatest (e.g. SEWCUS), there is potential for the yield of the options to cross the thresholds of significance used in this assessment (e.g. where an option leads to a yield of >5MI/d, the effect against SEA Objective 5 (health) moves from a minor positive to a significant positive). In this context, significant positive effects may be recorded against all four of these objectives and, in addition, against SEA Objective 7 (social and economic wellbeing). In all cases, the effects against the SEA objectives will be proportional to the yield of the option; where larger yields result, the effects against the objectives will be greater.

5.3 North Eryri Ynys Mon

Four supply-side measures have been identified and assessed for the North Eryri Ynys Mon WRZ; these are listed in **Table 5.3**. A summary of the assessment of the options is presented in **Table 5.4** with commentary on the likely significant construction and operational effects provided below. Detailed assessments are contained at **Appendix E**.

Table 5.3 Revised Draft Drought Plan Supply-side Measures: North Eryri Ynys Mon

Ref	Option	Yield (MI/d)	Description
8001-2	Removal of Llyn Cwellyn 10 MI/d abstraction limit	2MI/d	<p>Llyn Cwellyn is a reservoir in North Wales which supplies drinking water as part of the North Eryri Ynys Mon WRZ.</p> <p>The option (drought order) involves the relaxation of the low lake level abstraction rate at Llyn Cwellyn. When lake levels have fallen below 0.8m below spillway and the daily abstraction rate has reduced to 10MI/d in the current licence conditions, the drought option proposes to operate the abstraction at a daily rate of 12MI/d. The lake level at which abstraction ceases would be maintained as per the current licence conditions of 2.6m below spillway during the period 16 September to 15 November and 2.0m below spillway at all other times. Compensation releases would be maintained as per the current licence conditions of 11.4MI/d when lake level is between 0.8m and 2.6m below spillway. Freshet releases would not be impacted by the drought option.</p>

Ref	Option	Yield (MI/d)	Description
			<p>The drought order may remain in force for a period of up to six months, and they can be extended for up to a further six months. However, the period of implementation for this drought order would only be May to October, as confirmed by water resources modelling carried out by Welsh Water.</p> <p>The option would require a small amount of additional infrastructure. Abstraction from Llyn Cwellyn that is more than 2.0m below the spillway is below the gravity-draw off and pumping is required to transfer water from the lake to the existing intakes in the dam wall, and also to pump water from the lake into the Afon Gwyrfai (for compensation releases). This is expected to be a few tens of metres of pipe from the lake to the intakes and spillway, with associated pumps and a power supply (assumed to be from generators).</p>
8001-3	Reduction of Alaw Compensation Water	1.5MI/d	<p>Llyn Alaw is a reservoir in North Wales which supplies drinking water to parts of Gwynedd and Anglesey, as part of the North Eryri Ynys Mon WRZ. It lies in the northern part of the island of Anglesey, near Llanfachraeth.</p> <p>If granted, this option would involve a reduction in the statutory compensation release from Alaw Reservoir to the Afon Alaw of 1.5MI/d, from 3.2MI/d to 1.7 MI/d. This will conserve the longevity of reservoir storage for use in direct supply during a drought and improve the probability of reservoir winter refill. The drought permit scheme will influence the downstream Afon Alaw from the outflow at Alaw Reservoir to the tidal limit.</p> <p>Drought permits may remain in force for a period of up to six months, and they can be extended for up to a further six months. However, the period of implementation for this drought permit would only be July to December, as confirmed by water resources modelling carried out by Welsh Water.</p> <p>No additional infrastructure would be required to enable this option to be implemented.</p>
8001-4	Reduction of Ffynnon Llugwy Compensation Water	2.0MI/d	<p>Ffynnon Llugwy is a reservoir in North Wales which supplies drinking water to Bangor and Eastern Anglesey, as part of the North Eryri Ynys Môn WRZ. It lies on the upper Afon Llugwy, a tributary of the River Conwy, in the county of Gwynedd between Carnedd Llewelyn and Clyn Cowlyd in the northern part of Snowdonia National Park.</p> <p>If granted, this drought permit would involve a reduction in the compensation flow release from Ffynnon Llugwy to the Afon Llugwy from 4.5MI/d to 2.5MI/d. This will conserve the longevity of reservoir storage for use in direct supply during a drought and improve the probability of reservoir winter refill. The drought permit will influence the downstream Afon Llugwy as far as the Llyn Cowlyd stream capture leat, and potentially further downstream depending on the abstraction and compensation arrangements at the leat.</p> <p>The drought permit may remain in force for a period of up to six months, and it can be extended for up to a further six months. However, the period of implementation for this drought permit would only be July to December, as confirmed by water resources modelling carried out by Welsh Water.</p>
8001-5	Reduction of Cefni Reservoir Compensation Water	0.9MI/d	<p>Cefni Reservoir is a reservoir in North Wales which supplies drinking water as part of the North Eryri Ynys Mon WRZ. It lies in the centre of the Isle of Anglesey.</p> <p>The option involves a proposed reduction in the statutory compensation release from Cefni Reservoir to the Afon Cefni of 0.9MI/d, from 1.8MI/d to 0.9MI/d. Drought permits may remain in force for a period of up to six months, and they can be extended for up to a further six months. The period of implementation for this drought permit would only be July to December, as confirmed by water resources modelling carried out by Welsh Water.</p>

Ref	Option	Yield (MI/d)	Description
The option would make use of existing infrastructure and would not require construction of new infrastructure.			

Table 5.4 Supply-side Measures Assessment Summary: North Eryri Ynys Mon

Ref	Option Name	Constriction (C) or Operation (O)	1. Biodiversity	2. Geology and Soils	3. Water	4. Air Quality and Climate Change	5. Human Health	6. Social and Economic Wellbeing	7. Material Assets and Resource Use	8. Cultural Heritage	9. Landscape and Seascape
8001-2	Removal of Llyn Cwellyn 10 MI/d abstraction limit	C	-	0	0	0	0	0	0	0	-
		O	0	0	0	+/-	+	0	-	0	-
8001-3	Reduction of Alaw Compensation Water	C	0	0	0	0	0	0	0	0	0
		O	--/?	0	-	+	+	0	0	0	0
8001-4	Reduction of Ffynnon Llugwy Compensation Water	C	0	0	0	0	0	0	0	0	0
		O	--/?	0	-	+	+	0	0	0	-
8001-5	Reduction of Cefni Reservoir Compensation Water	C	0	0	0	0	0	0	0	0	0
		O	--/?	0	-	+	+	0	0	0	0

Construction Effects

No significant positive or minor positive construction effects, or significant negative effects, have been identified during the assessment.

Option 8001-2 has been assessed as having a minor negative effect on biodiversity (SEA Objective 1) due to the potential for (albeit very limited) impacts on habitat connectivity and disturbance of species in the Afon Gwyrfa i Llyn Cwellyn SAC/SSSI from temporary site works. Negative effects have also been identified for this option in respect of landscape (SEA Objective 9) due to the potential for construction activity to affect the special qualities of Snowdonia National Park, although due to the small scale and localised nature of the works required, such effects would not be substantial. Reflecting the small scale and nature of construction activity required, effects associated with this option on the remaining SEA objectives have been assessed as neutral.

The remaining measures in this WRZ would not require any construction activity and in consequence, effects associated with the implementation of these options have been assessed as neutral across all of the SEA objectives.

Operational Effects

No significant positive effects have been identified during the assessment. All of the measures in the North Eryri Ynys Mon WRZ have been assessed as having a minor positive effect on climate change (SEA Objective 4) and human health (SEA Objective 5). This reflects the yields of these options which will help to ensure the

continuity of water supply during times of drought, maintaining health and promoting climate change resilience.

Options 8001-3, 8001-4 and 8001-5 have been assessed (on a precautionary basis) as having a significant negative effect on biodiversity (SEA Objective 1). This assessment principally reflects the potential for the reductions in compensation flows associated with these options to have major impacts on fish species such as lamprey, Atlantic salmon and brown trout (due to, for example, loss of spawning and juvenile habitat and delays and potential cessation of adult and smolt migrations); for Option 8001-5, these impacts could affect Dingle LNR. However, the likelihood of these impacts occurring and their exact magnitude is uncertain as it depends on the exact timing/duration of the option's implementation, flow conditions and the presence of fish species affected. Option 8001-2, meanwhile, has been assessed as having a minor negative effect on SEA Objective 1.

No further significant negative effects have been identified during the assessment. Options 8001-3, 8001-4 and 8001-5 have been assessed as having a minor negative effect on water (SEA Objective 3) due to changes in river flows and water quality associated with reductions in compensation flows.

A minor negative effect on climate change (SEA Objective 4) and resource use (SEA Objective 7) has been identified in respect of Option 8001-2 due to the energy required (and associated greenhouse gas emissions) to enable the abstraction of water. This option has also been assessed as having a minor negative on landscape (SEA Objective 9) due to the potential for new above ground infrastructure to affect the special qualities of Snowdonia National Park. Option 8001-4 has additionally been assessed as having a minor negative effect on SEA Objective 9 due to landscape/visual impacts associated with reduced flows in the Afon Llugwy (which also flows through Snowdonia National Park).

5.4 Clwyd Coastal

Four supply-side measures have been identified and assessed for the Clwyd Coastal WRZ; these are listed in **Table 5.5**. A summary of the assessment of these options is presented in **Table 5.6** with commentary on the likely significant construction and operational effects provided below. Detailed assessments are contained at **Appendix E**.

Table 5.5 Revised Draft Drought Plan Supply-side Measures: Clwyd Coastal

Ref	Option	Yield (MI/d)	Description
8012-2	Reduction of the regulation release from Aled Isaf and modification of the Hands Off Flow value at Bryn Aled	2.0MI/d	<p>The drought permit involves a proposed reduction of 2MI/d in the regulation release rate from Aled Isaf Reservoir whenever abstraction is taking place and residual flow at Bryn Aled is below 29.5MI/d. This would conserve the longevity of total reservoir storage for regulation releases to the Afon Aled for abstraction at the Bryn Aled intake.</p> <p>Drought actions and any future application for a drought permit would be managed by the Aled and Clwyd Consultative Group which would be convened under the terms of the Section 20 Operating Agreement with NRW.</p> <p>Drought permits can be granted for a period of up to six months, and they can be extended for up to a further six months. However, the period of implementation for this drought order would only be September to January, as confirmed by water resources modelling carried out by Welsh Water.</p>
8012-4	Relaxation of the annual licences on Afon Aled and	5.0MI/d	The drought permit involves a relaxing the annual licence conditions on the Bryn Alde intake and Plas Uchaf and Dowlen Reservoir abstraction, to enable Welsh Water to abstract from the Aled

Ref	Option	Yield (MI/d)	Description
	the Plas Uchaf and Dolwen Reservoirs		<p>catchment at high demands of up to the daily licensed maximum rates, to meet higher than usual demands in drought conditions.</p> <p>Drought permits can be granted for a period of up to six months, and they can be extended for up to a further six months. However, the period of implementation for this drought order would only be November to March, as confirmed by water resources modelling carried out by Welsh Water.</p>
8012-5	Relaxation of the Llannerch boreholes annual licence	1.0MI/d	<p>The drought permit involves a change in the abstraction licence at Llannerch through a temporary cessation of the annual abstraction rate condition. The maximum daily abstraction rate of 13.64MI/d would still be applicable. The average daily abstraction that would be permissible within 12 months would be raised by 4.3MI/d from 9.34MI/d to 13.64MI/d. This would provide a modest increase in water resource during a drought and increase the security of supply in the Clwyd Coastal WRZ by assisting post-drought winter refill of the Aled Reservoirs, by reducing demand from that resource.</p> <p>Drought permits may remain in force for a period of up to six months, and they can be extended for up to a further six months. However, the period of implementation for this drought permit would only be September to January, as confirmed by water resources modelling carried out by Welsh Water.</p>
8012-6	Pumped (winter) refill from Aled Isaf to Llyn Aled	No net gain	<p>Under the drought permit water from Aled Isaf Reservoir would be pumped up to Llyn Aled Reservoir to support refill. Such usage is not authorised by the existing abstraction licence and a drought permit would be required. Daily pumping rates have not been specified at this stage and so the assessment is based on an assumed transfer rate of 19.5MI/d.</p> <p>Drought actions and any future application for a drought permit would be managed by the Aled Consultative Group which would be convened under the terms of the Section 20 Operating Agreement with NRW. The drought permit period would only be between November to February. This has been confirmed by Welsh Water's water resources modelling and understanding of operating the assets.</p>

Table 5.6 Supply-side Measures Assessment Summary: Clwyd Coastal

Ref	Option Name	Constriction (C) or Operation (O)	1. Biodiversity	2. Geology and Soils	3. Water	4. Air Quality and Climate Change	5. Human Health	6. Social and Economic Wellbeing	7. Material Assets and Resource Use	8. Cultural Heritage	9. Landscape and Seascapes
8012-2	Reduction of the regulation release from Aled Isaf and modification of the Hands Off Flow value at Bryn Aled	C	0	0	0	0	0	0	0	0	0
		O	-	0	-	+	+	0/-	0	0	0/-
8012-4	Relaxation of the annual licences on Afon Aled and the Plas Uchaf and Dolwen Reservoirs	C	0	0	0	0	0	0	0	0	0
		O	+/- /?	0	--	+	+	+	0	0	0

Ref	Option Name	Constriction (C) or Operation (O)	1. Biodiversity	2. Geology and Soils	3. Water	4. Air Quality and Climate Change	5. Human Health	6. Social and Economic Wellbeing	7. Material Assets and Resource Use	8. Cultural Heritage	9. Landscape and Seascape
8012-5	Relaxation of the Llannerch boreholes annual licence	C	0	0	0	0	0	0	0	0	0
		O	-/?	0	-/?	+/-	+	0	-	0	0/?
8012-6	Pumped (winter) refill from Aled Isaf to Llyn Aled	C	-	0	0	-	0	0	-	0	-
		O	-/?	0	0	--	0	0	--	0	-

Construction Effects

No significant positive or minor positive construction effects, or significant negative effects, have been identified during the assessment.

Option 8012-6 has been assessed as having a minor negative effect on biodiversity (SEA Objective 1) due to the immediate proximity of any infrastructure to the sensitive features of the Mynydd Hiraethog SSSI. Negative effects have also been identified for this option in respect of climate change (SEA Objective 4) and resource use (SEA Objective 7) due to the requirement to move and operate plant and materials and the associated greenhouse gas emissions. A minor negative has been identified for landscape (SEA Objective 9) due to the visual intrusion of construction in a non-landscape designated area. Reflecting the small scale and nature of construction activity required, effects associated with this option on the remaining SEA objectives have been assessed as neutral.

The remaining measures in this WRZ would not require any construction activity and in consequence, effects associated with the implementation of these options have been assessed as neutral across all of the SEA objectives.

Operational Effects

No significant positive effects have been identified during the assessment.

Options 8012-2, 8012-5 and 8012-6 have been assessed (on a precautionary basis) as having a minor negative effect on biodiversity (SEA Objective 1). This assessment principally reflects the potential for the reductions in compensation flows associated with these options to have major impacts on fish species such as lamprey, Atlantic salmon and brown trout (due to, for example, loss of spawning and juvenile habitat and delays and potential cessation of adult and smolt migrations). However, the likelihood of these impacts occurring and their exact magnitude is uncertain as it depends on the exact timing/duration of the option's implementation, flow conditions and the presence of fish species affected. Option 8012-4 has been assessed as having a mixed minor positive / significant negative effect on SEA Objective 1 due to the potential for major impacts on macrophytes within the affected reservoirs, moderate impacts on fish species in Reach 3 along with the potential for minor beneficial effects on a range of species within the affected reaches.

Option 8012-4 was assessed as having a significant negative effect on water (SEA Objective 3) as a result of significant hydrological impacts on the Aled Isaf, Llyn Aled, Dolwen Reservoir and Plas Uchaf Reservoir. These hydrological impacts are assessed as leading to major impacts on the physical environment of the river, including water quality.

Option 8012-6 was assessed as having a significant negative effect both in terms of climate change (SEA Objective 4) and resource use (SEA Objective 7). Both of these effects are as a result of the need to pump water against the gradient, requiring a substantial (although unquantified) level of fuel resource and associated greenhouse gas emissions.

No further significant negative effects have been identified during the assessment. Options 8012-2 and 8012-5 have been assessed as having a minor negative effect on water (SEA Objective 3) due to changes in river flows and water quality associated with reductions in compensation flows. These options, and option.

Options 8012-2, 8012-4 and 8012-5 have been identified as having a minor positive effect on climate change in recognition of the role of the option in improving drought resilience. In the case of 8012-5, a minor negative was also identified in recognition of the possible additional energy consumption and associated carbon emissions during operation of the option.

Options 8012-2, 8012-4 and 8012-5 have been identified as having a minor positive effect on human health (SEA Objective 5) due to the gain in yield.

A neutral to minor negative effect has been identified for social and economic wellbeing (SEA Objective 6) for option 8012-2 in recognition of the impact on Afon Aled's fishing use and visual amenity value associated with reduced flows and wetted with / depth, but this recognises the uncertainty in extent and significance of this. A minor positive has been identified against option 8012-4 for this objective due to the increase in yield.

A minor negative was identified for landscape (SEA Objective 9) for option 8012-6 due to the visual intrusion of the option in a non-landscape designated area. A neutral / minor negative effect has been determined against this objective for option 8012-2 due to the potential visual change in Afon Aled flows (which may be noticeable by those living, working or involved in recreational activities), but recognises the uncertainty in extent and significance of this.

5.5 Tywyn Aberdyfi

One supply-side measure has been identified and assessed for the Tywyn Aberdyfi WRZ; this is summarised in **Table 5.7**. A summary of the assessment of the option is presented in **Table 5.8** with commentary on the likely significant construction and operational effects provided below. A detailed assessment is contained at **Appendix E**.

Table 5.7 Revised Draft Drought Plan Supply-side Measures: Tywyn Aberdyfi

Ref	Option	Yield (Ml/d)	Description
8021-1	Tankering raw water from Dysynni	1Ml/d	The drought permit would authorise a temporary daily abstraction of up to 1Ml/d from a temporary intake on the Afon Dysynni in the Pont y Garth area. Drought permits may remain in force for a period of up to six months, and they can be extended for up to a further six months.

Table 5.8 Supply-side Measures Assessment Summary: Tywyn Aberdyfi

Ref	Option Name	Constriction (C) or Operation (O)	1. Biodiversity	2. Geology and Soils	3. Water	4. Air Quality and Climate Change	5. Human Health	6. Social and Economic Wellbeing	7. Material Assets and Resource Use	8. Cultural Heritage	9. Landscape and Seascapes
8021-1	Tankering raw water from Dysynni	C	0	-	0	-	-	0	-	0	-
		O	0	0	0	+/-	+	0	-	0	-

Construction Effects

No significant positive or minor positive construction effects have been identified during the assessment.

No significant negative effects have been identified during the assessment.

A minor negative effect on geology and soils (SEA Objective 2) has been assessed due to the potential for disruption to soils during construction. Minor negative effects have also been identified in respect of climate change (SEA Objective 4) and resource use (SEA Objective 7) due to the resources consumed (and carbon emitted) when transporting infrastructure/materials to site and the embodied carbon in temporary infrastructure.

The assessment has identified that construction works associated with Option 8021-1 could have minor adverse effects on health (SEA Objective 5) due to noise and vibration impacts on a limited number of nearby residential receptors. However, any adverse effects in this regard would be short term and temporary.

Option 8021-1 will involve the development of new above-ground infrastructure (intake structure and hardstanding) within Snowdonia National Park; however, as it is small scale and temporary, it has not been assessed as significant.

Operational Effects

No significant positive effects have been identified during the assessment. The additional yield associated with Option 8021-1 (1 MI/d) would help to ensure continuity of water supply during times of drought, maintaining health and promoting climate change resilience. This has been assessed as having a minor positive effect on climate change (SEA Objective 4) and human health (SEA Objective 5).

Option 8021-1 will involve the abstraction and tankering of up to 1.0 MI/d of water from Pont y Garth to the inlet at Penybont WTW, requiring fuel and generating associated emissions to air (including greenhouse gases) from vehicle movements and the pumping of water. This has been assessed as having a minor negative effect on climate change (SEA Objective 4) and resource use (SEA Objective 7).

As noted above, Option 8021-1 will require new above-ground infrastructure (intake structure and hardstanding) within Snowdonia National Park and in consequence, there is the potential for the measure to affect the special qualities of the National Park. Landscape and visual impacts may also arise from tanker movements associated with this option. Overall, a minor negative effect on landscape (SEA Objective 9) has therefore been identified, as the effects are short term, temporary and reversible.

The effects of Option 8021-1 on the remaining SEA objectives are assessed as neutral. This principally reflects the findings of the EAR for this measure which indicate that the operation of the option will have negligible hydrological impacts.

5.6 Barmouth

One supply-side measure has been identified and assessed for the Barmouth WRZ; this is summarised in **Table 5.9**. A summary of the assessment of the option is presented in **Table 5.10** with commentary on the likely significant construction and operational effects provided below. A detailed assessment is contained at **Appendix E**.

Table 5.9 Revised Draft Drought Plan Supply-side Measures: Barmouth

Ref	Option	Yield (Ml/d)	Description
8033-2	Reduce compensation water releases from Llyn Bodlyn	1 Ml/d	<p>This option would require Welsh Water to make an application to NRW for a drought order to vary the conditions of its abstraction licence from Llyn Bodlyn to reduce the compensation release from Llyn Bodlyn to the Afon Ysgethin from 2.18Ml/d to 1.18Ml/d. This will conserve reservoir storage for use in direct supply during a drought and improve the probability of reservoir winter refill.</p> <p>Drought permits can be granted for a period of up to six months, and they can be extended for up to a further six months. However, the period of implementation for this drought order would only be July to October, as confirmed by water resources modelling carried out by Welsh Water</p> <p>No new infrastructure would be required for this option.</p>

Table 5.10 Supply-side Measures Assessment Summary: Barmouth

Ref	Option Name	Constriction (C) or Operation (O)	1. Biodiversity	2. Geology and Soils	3. Water	4. Air Quality and Climate Change	5. Human Health	6. Social and Economic Wellbeing	7. Material Assets and Resource Use	8. Cultural Heritage	9. Landscape and Seascapes
8033-2	Reduce compensation water releases from Llyn Bodlyn	C	0	0	0	0	0	0	0	0	0
		O	--/?	0	--	+	+	0	0	0	-

Construction Effects

Option 8033-2 would not require any new infrastructure or involve construction works and in consequence, construction effects associated with this measure have been assessed as neutral across all of the SEA objectives.

Operational Effects

No significant positive effects have been identified during the assessment. The additional yield associated with Option 8033-2 (1 Ml/d) would help to ensure continuity of water supply during times of drought, maintaining health and promoting climate change resilience. This has been assessed as having a minor positive effect on climate change (SEA Objective 4) and human health (SEA Objective 5).

Option 8033-2 has been assessed as having a potentially significant negative effect on biodiversity (SEA Objective 1). This is due to the potential for reduced flows in the Afon Ysgethin associated with the measure

to have significant negative effects on fish (in particular brown trout), and to a lesser extent, effects on macroinvertebrates, macrophytes and phytobenthos. However, it should be noted that the likelihood of these impacts occurring and their exact magnitude is uncertain as it depends on the exact timing/duration of the option's implementation, flow conditions and the presence of species affected. A significant negative effect has also been identified in respect of water (SEA Objective 3) as a result of the potential for reduced compensations flows to affect water quantity, water quality and the WFD status of the Afon Ysgethin.

No further significant negative effects have been identified during the assessment. Option 8033-2 has been assessed as having a negative effect on landscape (SEA Objective 9) due to the potential for reduced flows in the Afon Ysgethin to (albeit temporarily) affect the landscape character of Snowdonia National Park.

5.7 Lleyn Harlech

One supply-side measure has been identified and assessed for the Lleyn Harlech WRZ; this is summarised in **Table 5.11**. A summary of the assessment of the option is presented in **Table 5.12** with commentary on the likely significant construction and operational effects provided below. A detailed assessment is contained at **Appendix E**.

Table 5.11 Revised Draft Drought Plan Supply-side Measures: Lleyn Harlech

Ref	Option	Yield (Ml/d)	Description
8034-1	Afon Dwyfor Drought Permit	1 Ml/d	<p>The drought permit involves a temporary increase of 1Ml/d in the daily abstraction rate at the Garndolbenmaen intake, without a corresponding increase in the daily regulation release rate from Llyn Cwmystradllyn when flow at Dolbenmaen weir is below the seasonal flow constraint limit.</p> <p>Drought permits can be granted for a period of up to six months, and they can be extended for up to a further six months. However, the period of implementation for this drought order is restricted to September to January, as confirmed by water resources modelling carried out by Welsh Water.</p>

Table 5.12 Supply-side Measures Assessment Summary: Lleyn Harlech

Ref	Option Name	Constriction (C) or Operation (O)	1. Biodiversity	2. Geology and Soils	3. Water	4. Air Quality and Climate Change	5. Human Health	6. Social and Economic Wellbeing	7. Material Assets and Resource Use	8. Cultural Heritage	9. Landscape and Seascapes
8034-1	Afon Dwyfor Drought Permit	C	0	0	0	0	0	0	0	0	0
		O	0	0	0	+	+	0	0	0	0

Construction Effects

Option 8034-1 would not require any new infrastructure or involve construction works and in consequence, construction effects have been assessed as neutral across all of the SEA objectives.

Operational Effects

No significant positive effects have been identified during the assessment. The additional yield associated with Option 8034-1 (1 MI/d) would help to ensure continuity of water supply during times of drought, maintaining health and promoting climate change resilience. This has been assessed as having a minor positive effect on climate change (SEA Objective 4) and human health (SEA Objective 5).

No significant negative or minor negative effects have been identified during the assessment and the effects of Option 8034-1 on the remaining SEA objectives are assessed as neutral. This reflects the findings of the EAR for this measure which indicate that the operation of the option will have negligible hydrological impacts.

5.8 SEWCUS

A total of four supply-side measures have been identified and assessed for the SEWCUS WRZ; these are listed in **Table 5.13**. A summary of the assessment of these options is presented in **Table 5.14** with commentary on the likely significant construction and operational effects provided below. Detailed assessments are contained at **Appendix E**.

Table 5.13 Revised Draft Drought Plan Supply-side Measures: SEWCUS

Ref	Option	Yield (MI/d)	Description
8109-1	Reduce compensation water releases from Llwynon Reservoir	9.1MI/d	<p>Llwynon Reservoir sits as the furthest downstream of the three Taf Fawr Reservoirs, with Cantref and Beacons Reservoirs feeding into Llwynon from upstream. Together, they form a major water supply for the SEWCUS (Llwynon, Sluvad, Court Farm) water resource zone, providing 34,100 MI potable supply per year. The potable supply is transferred, via gravity alone, directly to Llwynon WTW. The reservoirs release into the Afon Taf Fawr, flowing into the River Taff after its confluence with Afon Taf Fechan. DCWW also hold a second abstraction licence for Llwynon Reservoir, to release a further 18.2 MI/day into the Afon Taf Fawr for non-consumptive use in the fisheries immediately downstream of the reservoir impoundment. The non-consumptiveness also means it effectively acts as a compensation release for the Afon Fawr and River Taff.</p> <p>The drought option involves a proposed reduction in the non-consumptive fisheries abstraction from Llwynon Reservoir to the Taf Fawr (which is in effect the compensation release) by 9.1 MI/d, from 18.2 MI/d to 9.1 MI/d. This will conserve the longevity of reservoir storage for use in direct supply during a drought and improve the probability of reservoir winter refill.</p> <p>Drought orders may remain in force for a period of up to six months, and they can be extended for up to a further six months. However, the period of implementation for this drought order is restricted to September to November, as confirmed by water resources modelling carried out by Welsh Water.</p>
8112-1	Emergency abstraction from the River Rhondda at Treherbert	1MI/d	<p>The drought permit involves a new, unsupported emergency river abstraction of 1MI/d from the Afon Rhondda Fawr adjacent to Treherbert to support raw water supply to the raw water storage reservoir at Tynywaun WTW. To enable the abstraction, a low, temporary weir constructed of sandbags, would be required across the Afon Rhondda Fawr. A modest volume of water would be available from this drought permit scheme during a drought, and there is benefit to supply locally through provision of an immediate additional water resource to an existing WTW.</p>

Ref	Option	Yield (MI/d)	Description
			Drought permits may remain in force for a period of up to six months, and they can be extended for up to a further six months. However, the period of implementation for this drought permit would only be to September to November, as confirmed by water resources modelling carried out by Welsh Water.
8116-3	Utilise the Dead Storage in Talybont Reservoir	9.1 MI/d	<p>Talybont impounding reservoir is located in the Brecon Beacons National Park in mid Wales, in the headwaters of the Nant Caerfanell stream which is a tributary of the River Usk. The reservoir is within SEWCUS Water Resource Zone (WRZ). The compensation flow release from Talybont Reservoir sustains flow in the Nant Caerfanell. This provides a substantial proportion of the flow in the downstream river during low flow periods. The reservoir is supplemented by an abstraction on the Nant Clydach, which is connected through a gravity fed pipe.</p> <p>DCWW hold a licence to abstract up to 26,555 MI of water from Talybont Reservoir per annum. The licence is subject to a maximum daily abstraction rate and seasonal compensation flow requirements. The abstraction for potable supply is made directly from the reservoir and piped by gravity to Talybont (WTW) for treatment before going into public supply.</p> <p>The option involves pumped abstraction of 30MI/d from the dead storage zone for up to 30 days. The option may be required in severe drawdown conditions when storage approaches the dead storage zone in Talybont Reservoir.</p> <p>The option could be required at any time of the year, although inspection of historic reservoir storage records indicates that storage generally reaches its lowest levels during the autumn period (September to November). Water resources modelling undertaken by Welsh Water indicates that this option would only be implemented during the period September to November inclusive. It is assumed that a reduction of 50% in the statutory compensation flow release to the Nant Caerfanell (as permitted in the abstraction licence relating to the compensation flow control line) is already in place prior to the option being implemented.</p> <p>To enable abstraction of 'dead storage' the installation of temporary pumps and pipelines is assumed to be required. It is also assumed that compensation requirements will be fed from the dead storage during the operation.</p>
8119-1	Compensation Water Reduction of 50% at Pontsticill Reservoir	9.1MI/d	<p>The drought permit involves a proposed reduction in the statutory compensation release from Pontsticill Reservoir to the Taf Fechan by 9.1MI/d, from 19.1MI/d to 10MI/d. This will conserve the longevity of reservoir storage for use in direct supply during a drought and improve the probability of reservoir winter refill.</p> <p>Drought orders may remain in force for a period of up to six months, and they can be extended for up to a further six months. However, the period of implementation for this drought order would only be September to November, as confirmed by water resources modelling carried out by Welsh Water.</p>

Table 5.14 Supply-side Measures Assessment Summary: SEWCUS

Ref	Option Name	Constriction (C) or Operation (O)	1. Biodiversity	2. Geology and Soils	3. Water	4. Air Quality and Climate Change	5. Human Health	6. Social and Economic Wellbeing	7. Material Assets and Resource Use	8. Cultural Heritage	9. Landscape and Seascapes
8109-1	Reduce compensation water releases from Llwynon Reservoir	C	0	0	0	0	0	0	0	0	0
		O	--/?	0	-	+	++	+	0	0	0
8112-1	Emergency abstraction from the River Rhondda at Treherbert	C	--/?	0	-	-	--/?	0	-	0	-
		O	--/?	0	--/?	+/-	+	0	-	0	-
8116-3	Utilise the Dead Storage in Talybont Reservoir	C	-	0	0	0	0	0	-	0	-
		O	0/-	0	-	+/-	++	+	--	0	-
8119-1	Compensation Water Reduction of 50% at Pontsticill Reservoir	C	0	0	0	0	0	0	0	0	0
		O	--/?	0	-	+	++	+	0	0	0

Construction Effects

No significant positive or minor positive effects have been identified during the assessment.

Option 8112-1 has been assessed as having a significant negative effect on biodiversity (SEA Objective 1) during construction. This reflects the potential for construction works associated with this options to have adverse impacts on fish including Atlantic salmon and brown/sea trout within the Afon Rhonda Fawr. However, the likelihood of these impacts occurring and their exact magnitude is uncertain at this stage. The effects of the remaining measures on SEA Objective 1 have been assessed as either minor negative or neutral.

No further significant negative effects have been identified during the assessment. Commensurate with the scale and nature of construction works required under Option 8112-1, this measure has been assessed as having minor negative effects on water (SEA Objective 3), due to the potential for the installation of temporary weirs to result in some disturbance to in-river sediments, human health (SEA Objective 5), in light of the potential for noise and vibration impacts arising from construction activity and associated vehicle movements to affect sensitive receptors, and climate change (SEA Objective 4) and resource use (SEA Objective 7), as there would be increased resource use and carbon emissions (including embodied carbon) associated with construction materials and the operation of plant/ vehicle movements. The remaining measures have been assessed as having neutral effects on these SEA objectives.

All of the options involving construction works (8112-1 and 8116-3) have been assessed as having a minor negative effect on landscape (SEA Objective 12) due to impacts on visual amenity associated with construction activity (for Option 8116-3, this would include works within the Brecon Beacons National Park). However, any landscape and visual effects would be short term and temporary and are unlikely to be substantial.

Operational Effects

All four supply-side measures in the SEWCUS WRZ would help to ensure the continuity of water supplies during periods of drought. With the exception of Option 8112-1, significant positive effects have therefore

been identified in respect of human health (SEA Objective 5) for all of the options in this WRZ (reflecting its smaller yield (1 MI/d), the effects of Option 8112-1 on this objective have been assessed as minor positive).

No further significant positive effects have been identified during the assessment. All of the measures have been assessed as having a minor positive effect on climate change (SEA Objective 4). This reflects the potential for the options to promote climate change adaptation by increasing resilience to drought. Reflecting the larger yields of Options 8109-1, 8116-3 and 8119-1, positive effects have also been identified in respect of social and economic wellbeing (SEA Objective 6) for these measures.

With the exception of Option 8116-3, all of the options in this WRZ have been assessed as having a potentially significant negative effect on biodiversity (SEA Objective 1). This assessment reflects the potential for reduced river flows associated with the operation of these options to affect species such as brown trout and bullhead. However, it should be noted that the likelihood of the impacts on biodiversity outlined above occurring and their exact magnitude is uncertain as it depends on the exact timing/duration of the option's implementation, flow conditions and the presence of fish species affected.

Option 8116-3 has been assessed as having significant negative effects on climate change (SEA Objective 4) and resource use (SEA Objective 7). This reflects the potentially large volumes of water that would be abstracted and distributed during the operation of these options and the associated energy use and carbon emissions. Option 8112-1 has been assessed as having a minor negative effect on these SEA objectives, commensurate with the anticipated energy requirements of this measure (effects associated with the remaining measures on this SEA objective are assessed as neutral).

No further significant negative effects have been identified during the assessment. Due to changes in river flows (and in respect of Option 8116-3, levels in Talybont Reservoir), water quality and/or ecological status associated with the measures, all of the options in the SEWCUS WRZ have been assessed as having a minor negative effect on water (SEA Objective 3). Options 8112-1 and 8116-3 have also been assessed as having a minor negative effect on landscape (SEA Objective 9) due to the visual impact of new infrastructure and reduced river flows (including reduced levels in Talybont Reservoir under Option 8116-3).

5.9 Tywi CUS

One supply-side measure has been identified and assessed for the Tywi CUS WRZ; this is listed in **Table 5.15**. A summary of the assessment of these options is presented in **Table 5.16** with commentary on the likely significant construction and operational effects provided below. Detailed assessments are contained at **Appendix E**.

Table 5.15 Revised Draft Drought Plan Supply-side Measures: Tywi CUS

Ref	Option	Yield (MI/d)	Description
8201-3	Relax the maintained requirement below the Nantgaredig intake on the River Tywi	14 MI/d	<p>This drought order involves a change in the abstraction conditions at the Nantgaredig intake to relax the requirement to maintain the downstream flow at an instantaneous daily minimum of 136MI/d. Instead, the downstream flow requirement of 136MI/d would be temporarily assessed as a 7-day rolling average, with the daily instantaneous minimum flow requirement temporarily reduced to 116MI/d. This would enable Welsh Water to more efficiently target a rolling average downstream flow of 136MI/d, whilst reducing the need to over-release at times of very low flow due to the time of travel between the reservoir and the downstream abstraction intake (24 hours or more) and the difficulties of predicting the next day's gauged flows.</p> <p>Drought orders may remain in force for a period of up to six months, and they can be extended for up to a further six months. However, the period of implementation for</p>

this drought order **would only** be September to November, as confirmed by water resources modelling carried out by Welsh Water.

Table 5.16 Supply-side Measures Assessment Summary: Tywi CUS

Ref	Option Name	Constriction (C) or Operation (O)	1. Biodiversity	2. Geology and Soils	3. Water	4. Air Quality and Climate Change	5. Human Health	6. Social and Economic Wellbeing	7. Material Assets and Resource Use	8. Cultural Heritage	9. Landscape and Seascapes
8201-3	Relax the maintained requirement below the Nantgaredig intake on the River Tywi	C	0	0	0	0	0	0	0	0	0
		O	--/?	0	-	+	++	++	0	0	0

Construction Effects

The measure in the Tywi CUS WRZ would not require any new infrastructure or involve construction works and in consequence, construction effects have been assessed as neutral across all of the SEA objectives.

Operational Effects

Option 8201-3 would help to ensure the continuity of water supply during periods of drought. Significant positive effects have therefore been identified in respect of human health (SEA Objective 5) and social and economic wellbeing (SEA Objective 6) reflecting the large yield (14 Ml/d).

No further significant positive effects have been identified during the assessment. The option has also been assessed as having a minor positive effect on climate change (SEA Objective 4) by increasing resilience to drought.

Option 8201-3 has been assessed as having a potentially significant negative effect on biodiversity (SEA Objective 1).

No further significant negative effects have been identified during the assessment. Due to changes in river flows, water quality and ecological status associated with the measure, the option has been assessed as having a minor negative effect on water (SEA Objective 3).

5.10 Mid and South Ceredigion

One supply-side measure has been identified and assessed for the Mid and South Ceredigion WRZ; this is summarised in **Table 5.17**. A summary of the assessment of the option is presented in **Table 5.18** with commentary on the likely significant construction and operational effects provided below. A detailed assessment is contained at **Appendix E**.

Table 5.17 Revised Draft Drought Plan Supply-side Measures: Mid and South Ceredigion

Ref	Option	Yield (Ml/d)	Description
8202-1	Increase the Llechryd abstraction from 19 Ml/d to 21 Ml/d and obtain variation of annual licence amounts	2Ml/d	<p>Llechryd WTW is located in the south-west of the Mid and South Ceredigion WRZ. It is fed by an abstraction from the nearby Afon Teifi. The intake for the WTW is about 4.4km upstream of the tidal limit.</p> <p>The option involves a proposed increase in the daily abstraction rate at the Llechryd intake, whereby the licence condition relating to the abstraction rate in any 24 hour period would be increased by 2Ml/d, from 19Ml/d to 21Ml/d. This would also require amendment of the hourly abstraction rate condition. The option would increase the unsupported river abstraction from the Afon Teifi.</p> <p>Drought orders may remain in force for a period of up to six months, and they can be extended for up to a further six months. There is an all year period of implementation for this drought order, however implementation is likely to occur in the summer period, as confirmed by water resources modelling carried out by Welsh Water.</p> <p>No additional infrastructure would be required to enable this option to be implemented.</p>

Table 5.18 Supply-side Measures Assessment Summary: Mid and South Ceredigion

Ref	Option Name	Construction (C) or Operation (O)	1. Biodiversity	2. Geology and Soils	3. Water	4. Air Quality and Climate Change	5. Human Health	6. Social and Economic Wellbeing	7. Material Assets and Resource Use	8. Cultural Heritage	9. Landscape and Seascapes
8202-1	Increase the Llechryd abstraction from 19 Ml/d to 21 Ml/d and obtain variation of annual licence amounts	C	0	0	0	0	0	0	0	0	0
		O	-/?	0	0	+	+	0	0	0	0

Construction Effects

Option 8202-1 would not require any new infrastructure or involve construction works and in consequence, construction effects have been assessed as neutral across all of the SEA objectives.

Operational Effects

No significant positive effects have been identified during the assessment. The additional yield associated with Option 8202-1 (2 Ml/d) would help to ensure continuity of water supply during times of drought, maintaining health and promoting climate change resilience. This has been assessed as having a minor positive effect on climate change (SEA Objective 4) and human health (SEA Objective 5).

No significant negative effects have been identified during the assessment. Option 8202-1 has been assessed as having a minor negative effect (with some uncertainty) on biodiversity (SEA Objective 1). This principally reflects the potential for the operation of this measures to have impacts on the Afon Teifi/ River Teifi SAC and SSSI due to increased abstraction from the Afon Teifi. In this regard, the HRA for this option has concluded that the effects on the Afon Teifi/ River Teifi SAC as a result of its operation "are likely to be marginal based on the hydrological assessment."

The effects of Option 8202-1 on the remaining SEA objectives are assessed as neutral. This reflects the findings of the EAR for this measure which indicate that the operation of the option will have negligible hydrological impacts.

5.11 North Ceredigion

One supply-side measure has been identified and assessed for the North Ceredigion WRZ; this is summarised in **Table 5.19**. A summary of the assessment of the option is presented in **Table 5.20** with commentary on the likely significant construction and operational effects provided below. A detailed assessment is contained at **Appendix E**.

Table 5.19 Revised Draft Drought Plan Supply-side Measures: North Ceredigion

Ref	Option	Yield (MI/d)	Description
8203-2	Pumped abstraction from Nantymoch (a HEP reservoir operated by Statkraft) into the raw water main between Llyn Llygad Rheidol Reservoir and Bontgoch WTW	5MI/d	<p>Nantymoch is a reservoir in West Wales which forms part of the Cwm Rheidol hydroelectric power (HEP) scheme and the headwaters of the reservoir include the Afon Hengwm, as part of the North Ceredigion WRZ. Downstream, the reservoir flows into the Afon Rheidol, and continues on to Dinas Reservoir, located east of Aberystwyth. The EAR states that details of existing operating arrangements are currently not known, although it is understood that up to 160MI/d may be released from Nantymoch Reservoir to drive a 13MW hydro-electric plant as the water passes downstream via the Afon Rheidol to Dinas Reservoir.</p> <p>The option involves a temporary pumped abstraction from Nantymoch Reservoir, of up to 5MI/d, to be transferred into the raw water main between Llyn Llygad Rheidol Reservoir and Bontgoch water treatment works (WTW), to support demands in the North Ceredigion WRZ. Drought permits may remain in force for a period of up to six months, and they can be extended for up to a further six months.</p> <p>To enable this option to be implemented, pumping would be required to abstract the water and to transfer to the raw water main between Llyn Llygad Rheidol Reservoir and Bontgoch WTW. The exact nature and location of temporary infrastructure is not known at present; however, it is likely to require above ground pumps and generator(s) and pipelines. The distance between the abstraction point (at the foot of Nantymoch Reservoir) and the raw water main (located just south of the dam itself over which the pipeline would be laid) is estimated to be approximately 400m.</p>

Table 5.20 Supply-side Measures Assessment Summary: North Ceredigion

Ref	Option Name	Constriction (C) or Operation (O)	1. Biodiversity	2. Geology and Soils	3. Water	4. Air Quality and Climate Change	5. Human Health	6. Social and Economic Wellbeing	7. Material Assets and Resource Use	8. Cultural Heritage	9. Landscape and Seascap
8203-2	Pumped abstraction from Nantymoch (a HEP reservoir operated by Statkraft) into the raw water main between Llyn Llygad Rheidol Reservoir and Bontgoch WTW	C	0	0	0	-	0	0	-	0	0
O		0	0	0	0	+/-	+	+	-	0	0/-

Construction Effects

No significant positive or minor positive construction effects, or significant negative effects, have been identified during the assessment.

Option 8203-2 has been assessed as having a minor negative effect on climate change (SEA Objective 4) and resource use (SEA Objective 7). This is due to the resources consumed (and carbon emitted) when transporting infrastructure/materials to site and the embodied carbon in temporary infrastructure.

The effects of Option 8203-2 on the remaining SEA objectives have been assessed as neutral which principally reflects the small scale of construction activity associated with this measure and the location of new infrastructure vis-à-vis sensitive receptors.

Operational Effects

No significant positive effects have been identified during the assessment. The operation of Option 8203-2 will ensure the continuity of water supplies during periods of drought, helping to enhance resilience to the impacts of climate change. A minor positive effect has therefore been identified in respect of SEA Objective 4.

Option 8203-2 has been assessed as having a positive effect on human health (SEA Objective 5) and social and economic wellbeing (SEA Objective 6) which will help to meet the water needs of residents, businesses and visitors during periods of drought. However, it is noted that the yield of this option (5 MI/d) is at the limit value for a minor effect.

No significant negative effects have been identified during the assessment. Option 8203-2 has been assessed as having a minor negative effect on climate change (SEA Objective 4) and resource use (SEA Objective 7) due to the energy required during operation (for the pumping of water) and associated carbon emissions. A neutral/minor negative effect, meanwhile, has been identified in respect of landscape (SEA Objective 9) due to the need for above-ground infrastructure including pipeline and the resulting potential for effects on local landscape character and visual amenity (though recognising that any landscape/visual impacts would be short term and temporary).

The effects of Option 8202-1 on the remaining SEA objectives are assessed as neutral. This principally reflects the findings of the EAR for this measure which indicate that the operation of the option will have negligible hydrological impacts.

5.12 Pembrokeshire

Two supply-side measures have been identified and assessed for the Pembrokeshire WRZ; these are listed in **Table 5.21**. A summary of the assessment of these options is presented in **Table 5.22** with commentary on the likely significant construction and operational effects provided below. Detailed assessments are contained at **Appendix E**.

Table 5.21 Revised Draft Drought Plan Supply-side Measures: Pembrokeshire

Ref	Option	Yield (MI/d)	Description
8206-2	Reduce the Compensation release from Preseli Reservoir by 50%	0.91MI/d	The drought order involves a proposed reduction in the statutory compensation release from Rosebush Reservoir to the Afon Syfynwy from 1.82MI/d to 0.91MI/d. This will conserve the longevity of reservoir storage for use in direct supply during a drought, and improve the probability of reservoir refill during the winter.

Ref	Option	Yield (MI/d)	Description
			Drought orders may remain in force for a period of up to six months, and they can be extended for up to a further six months. However, the period of implementation for this drought order would only be August to November, as confirmed by water resources modelling carried out by Welsh Water.
8206-7	Use of freshet bank for public water supply - Llysyfran - (Pembs)	425MI storage volume	<p>In accordance with the Llys-y-Fran Reservoir Section 158 operating agreement, a total of 995MI of the storage volume within Llys-y-Fran Reservoir is allocated to the freshet bank, to be released for fisheries management purposes at the direction of Natural Resources Wales (NRW). The drought order involves using 425MI (approximately 40%) of this volume of storage for public water supply, so that only a limited number (three) of freshet releases could take place during the period of implementation.</p> <p>Drought orders may remain in force for a period of up to six months, and they can be extended for up to a further six months. However, the period of implementation for this drought order would only be August to November.</p>

Table 5.22 Supply-side Measures Assessment Summary: Pembrokeshire

Ref	Option Name	Constriction (C) or Operation (O)	1. Biodiversity	2. Geology and Soils	3. Water	4. Air Quality and Climate Change	5. Human Health	6. Social and Economic Wellbeing	7. Material Assets and Resource Use	8. Cultural Heritage	9. Landscape and Seascape
8206-2	Reduce the Compensation release from Preseli Reservoir by 50%	C	0	0	0	0	0	0	0	0	0
		O	--/?	0	-	+	+	0	0	0	-
8206-7	Use of freshet bank for public water supply - Llysyfran - (Pembs)	C	0	0	0	0	0	0	0	0	0
		O	0	0	0	+	+	0	0	0	0

Construction Effects

The two measures in the Pembrokeshire WRZ would not require any new infrastructure or involve construction works and in consequence, construction effects have been assessed as neutral across all of the SEA objectives.

Operational Effects

No significant positive effects have been identified during the assessment.

Both supply-side measures in the Pembrokeshire WRZ would help to ensure the continuity of water supplies during periods of drought. Positive effects have therefore been identified in respect of human health (SEA Objective 5).

Both measures have been assessed as having a minor positive effect on climate change (SEA Objective 4). This reflects the potential for the options to promote climate change adaptation by increasing resilience to drought.

Option 8206-2 has been assessed as having a potentially significant negative effect on biodiversity (SEA Objective 1). For this option, this assessment reflects the potential for impacts on the Afonydd Cleddau / Cleddau Rivers SAC and Eastern Cleddau Rivers SSSI. However, whilst the HRA screened in the potential effects of the option on river lamprey and bullhead at the appropriate assessment stage, it concluded no adverse effects for either species due to the absence of species within surveyed stretches of the river. The operation of the option could potentially have major adverse impacts on brown and sea trout. However, it should be noted that the likelihood of the impacts on biodiversity occurring and their exact magnitude is uncertain as it depends on the exact timing/duration of the option's implementation, flow conditions and the presence of fish species affected.

Option 8206-2 has been assessed as having minor negative effects on this objective due to reductions in flows and water quality.

Option 8206-2 has also been assessed as having a minor negative effect on landscape (SEA Objective 9) due to the potential for reduced flows and associated impact on visual amenity in the Pembrokeshire Coast National Park.

5.13 Secondary, Cumulative and Synergistic Effects

The SEA Directive requires that the cumulative impact of a plan and programme are taken into account. This SEA considers cumulative effects in terms of:

- The potential cumulative impact of individual measures within a WRZ;
- The potential cumulative impact of individual measures between WRZs; and
- The cumulative impacts of the revised draft Drought Plan in combination with other plans and programmes.

Overview of the Cumulative effects of Revised Draft Drought Plan Options

The extent to which the revised draft Drought Plan options can act in combination is dependent on a number of variables. These include the nature, location and timing of option implementation, the number of options that are ultimately implemented either within a WRZ or across the supply area, and the interaction of these options with other plans or programmes. The effects are also dependent on the sensitivity of receptors to the effects of the options acting alone and in-combination.

Fundamentally, the options included in the revised draft Drought Plan would not necessarily be implemented in-combination. The options set out for each WRZ within the revised draft Drought Plan are a collection of measures that could be implemented on their own or in some circumstances together. For example, there are four options identified within the North Eryri Ynys Môn WRZ. All of these options are equally feasible in their own right, but they would not necessarily be implemented in-combination. The selection of the option or options to be implemented would be determined by a number of factors including the nature and intensity of the drought, operational requirements, and also on the potential environmental impacts of the option in question (as informed by the SEA and HRA of the Drought Plan). Further, some of the options are mutually exclusive and could not be implemented in-combination.

These factors mean that the cumulative assessment of the impacts of the revised draft Drought Plan options is not necessarily additive, and in this respect it should be recognised that the revised draft Drought Plan differs from other plans and programmes such as the WRMP where a number of 'preferred' options are selected for implementation in each WRZ. This means that it is potentially misleading to assess specific

combinations of options either within a WRZ or across the supply area in an attempt to quantify the cumulative effects of options.

In **Table 5.23**, an overview of the potential for cumulative effects within a WRZ, between WRZ and with other plans and programmes is presented against the eight SEA objectives in the assessment framework. These issues are explored further in the following sections.

Table 5.23 General Commentary on the Potential for Options to Act in combination against the Assessment Framework

Objective	Potential for Cumulative Effects within WRZs?	Potential for Cumulative Effects between WRZs?	Potential for Cumulative with Other Plans and Programmes?
1. Biodiversity	<p>Cumulative effects are most likely where measures are located within same catchment. Even where located in separate catchments, there is the potential for cumulative effects on receptors such as coastal designated sites into which rivers from a number of catchments may flow (e.g. Severn Estuary, Lleyn and Sarnau SAC).</p> <p>There is also the potential for cumulative 'general disturbance' to biodiversity from the construction and operation of measures; the more measures that are implemented within a WRZ, the greater the potential for disturbance of biodiversity.</p>	<p>Potential cumulative effects between WRZs are similar to those listed within WRZs. There is a greater likelihood of cumulative effects on lower reaches of water bodies that cross WRZ boundaries, specifically of the large rivers in Wales including the Dee, Wye and Usk.</p> <p>There is also greater potential for cumulative effects on receptors such as coastal designated sites.</p>	Potential for cumulative effects depending on the nature, location and timing of the revised draft Drought Plan measure and other plans and programmes.
2. Geology and Soils	<p>Cumulative effects are most likely where measures are located within same catchment/water body, where measures have potential to affect the same receptors.</p> <p>Where not located in same catchment, effects will be additive, with potentially greater areas of soils being affected by larger numbers of measures.</p>	<p>Potential cumulative effects between WRZs are similar to those listed within WRZs. There is a greater likelihood of cumulative effects on wetland soils located adjacent to lower reaches of water bodies that cross WRZ boundaries, specifically of the large rivers in Wales including the Dee, Wye and Usk</p>	As above.
3. Water	<p>Cumulative effects are most likely where measures are located within same catchment/water body. Cumulative effects are less likely where measures within a WRZ would be implemented within different catchments, although there is the potential for measures to act in combination on the ultimate downstream receptor (e.g. reductions in flows in Severn/Wye/Usk/Taff entering the Severn Estuary).</p>	<p>Potential cumulative effects between WRZs are similar to those listed within WRZs. There is a greater likelihood of cumulative effects on lower reaches of water bodies that cross WRZ boundaries, specifically of the large rivers in Wales including the Dee, Wye and Usk.</p>	As above.
4. Climate change	<p>Measures can act cumulatively regardless of their location within a WRZ. Effects are additive; the more measures implemented within a zone, the greater the amounts of materials and energy used (and carbon emitted) and the greater the effects against this SEA objective.</p>	<p>Effects are additive between WRZs. The more options implemented across the zones, the greater the amounts of materials and energy used (and greenhouse gasses emitted) and the greater the effects against this SEA objective.</p>	As above.

Objective	Potential for Cumulative Effects within WRZs?	Potential for Cumulative Effects between WRZs?	Potential for Cumulative with Other Plans and Programmes?
5. Human Health	<p>Potential cumulative effects from disturbance to those living and working in WRZs where measures are located close together.</p> <p>Benefits of yield are additive; the more measures implemented within a zone, the greater the yield and the greater the benefits will be to security of supply during drought.</p>	<p>Potential cumulative effects between WRZs are similar to those listed within WRZs.</p> <p>Benefits of yield are additive; the more measures implemented, the greater the yield and the greater the benefits will be to security of supply during drought across the supply area.</p>	As above.
6. Economic and Social Needs	<p>Potential for cumulative effects on recreational activity where measures are located close together or where located in the same catchment/water body.</p> <p>Benefits of yield are additive; the more options implemented within a zone, the greater the yield and the greater the benefits will be to maintaining economic activity during a drought.</p>	<p>Potential cumulative effects on recreational activity where measures are located close together or where located in the same catchment/water body, specifically of the large rivers in Wales including the Dee, Wye and Usk. Also where multiple options are located within recreational areas such as National Parks.</p> <p>Benefits of yield are additive; the more options implemented, the greater the yield and the greater the benefits will be to maintaining economic activity during a drought across the supply area.</p>	As above.
7. Resource Use	<p>Measures can act cumulatively regardless of location within a WRZ. Effects are additive; the more measures implemented within a zone, the greater the amounts of materials and energy used and the greater the effects will be against this objective.</p>	<p>Options can act cumulatively regardless of location. Effects are additive between WRZs; the more measures implemented, the greater the amounts of materials and energy used and the greater the effects will be against this objective.</p>	As above.
8. Cultural Heritage	<p>Potential for cumulative effects on heritage assets where measures are located in close proximity to each other.</p>	<p>Potential cumulative effects between WRZs are similar to those listed within WRZs.</p>	As above.
9. Landscape and Seascape	<p>Potential for cumulative effects where measures are located in close proximity to each other. Effects will be greater for measures requiring new infrastructure in sensitive landscapes (AONB, National Parks).</p>	<p>Potential cumulative effects between WRZs are similar to those listed within WRZs. Effects will be greater for measures requiring new infrastructure in sensitive landscapes (AONB, National Parks)</p>	As above.

The Potential Cumulative Impact of Individual Measures within a Water Resource Zone

As described above, the extent to which the revised draft Drought Plan options can act in-combination is dependent on a number of variables. Within a WRZ, the primary considerations are the number of measures in a zone, the locations of the options relative to each other, the potential hydrological connectivity of the options, the likelihood of more than one option being implemented within the zone and the timing of implementation.

Table 5.24 considers the extent to which cumulative effects within a WRZ are possible from the supply-side options based on the number of options within a zone and their location relative to one another. Six of the WRZs contain only one supply-side option such that there is no potential for cumulative effects within these WRZs. In North Eryri Ynys Môn WRZ, the four options are located within different waterbodies which significantly reduces, but does not eliminate, the likelihood of (both positive and negative) cumulative effects against SEA objectives including climate change (SEA Objective 5), resource use (SEA Objective 7) and human

health (SEA Objective 5). The four options in SEWCUS and the two options in Pembrokeshire are similarly located in different waterbodies and in consequence, the significant cumulative effects are also unlikely.

For the Clwyd Coastal, there is the potential for cumulative effects due to the options acting in-combination on receptors, should more than one option be implemented within a WRZ; however, due to the distances to sensitive receptors, their resilience to short term changes and the substantial tidal flux leads to a conclusion that significant cumulative effects are unlikely.

Table 5.24 Potential for Options to Act in Combination within WRZs

Water Resource Zone		Potential for within WRZ Cumulative Effects?	Comments
8001	North Eryri / Ynys Môn	Yes	<p>The four options in this WRZ affect different waterbodies and therefore significant cumulative effects are unlikely. However, cumulative effects (particularly in relation to climate change, resource use and human health) are possible.</p> <p>With regard to the potential in-combination effects of Options 8001-3 and 8001-5, the HRA has concluded that <i>"The Anglesey Terns / Morwenoliaid Ynys Môn SPA is the downstream receptor for these options. The effects of these options 'alone' will be negligible. With regard to 'in combination' effects, the options will not affect the same areas of the site (so no risk of coincident geographical effects) and as the interest features of the site are not particularly sensitive to the outcomes of the options or reliant on the areas of the SPA that are potentially exposed there is no risk of cumulative effects on behaviours (e.g. simultaneous displacement from feeding areas etc.). There will therefore be no significant 'inter-option' in combination effects"</i>.</p> <p>With regard to the Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC, the HRA states that Options 8001-2 and 8001-4 will not affect the same areas of the SAC and there will therefore be no significant 'inter-option' in combination effects.</p>
8012	Clwyd Coastal	Yes	<p>All options in this zone are within the catchment of the Afon Clwyd and could therefore act in combination.</p> <p>The HRA has identified that the Liverpool Bay / Bae Lerpwl SPA is the downstream receptor for the options in this WRZ. The HRA states that <i>"The effects of these options 'alone' will be negligible, although all options will affect the River Clwyd which enters the SPA at Rhyl. However, it is several kilometres from the tidal limit of the Clwyd to the boundary of the SPA and so any residual hydrological effects will be largely attenuated by the SPA boundary. Furthermore, the open nature of the coast at this point ensures that the tidal flux in the marine areas is substantial, and this will be the dominant factor influencing habitat and marine biotopes locally. Furthermore, the interest features of the SPA will not be particularly sensitive to minor short-term changes in fresh-water inputs to the site, and any effects on the 'typical species' of the SPA habitats would be extremely local to the Clwyd estuary and would not result in consequent significant effects on the interest features. There will therefore be no significant 'inter-option' in combination effects."</i></p>
8021	Twyn / Aberdyfi	No	Only one option in this zone.
8033	Barmouth	No	Only one option in this zone.
8034	Lleyn / Harlech	No	Only one option in this zone.

Water Resource Zone		Potential for within WRZ Cumulative Effects?	Comments
8121	SEWCUS	Yes	The four options in this WRZ affect different waterbodies and therefore significant cumulative effects are unlikely. However, cumulative effects (particularly in relation to human health, climate change and resource use) are possible.
8201	Tywi CUS	No	Only one option in this zone.
8202	Mid and South Ceredigion	No	Only one option in this zone.
8203	North Ceredigion	No	Only one option in this zone.
8206	Pembrokeshire	No	The two options affect different rivers (Western Cleddau and Llys-y-Fran) and therefore significant cumulative effects are unlikely.

Cumulative Effects Between Water Resource Zones

The assessment of cumulative effects also needs to consider the potential for the cumulative effect from the implementation of options within different WRZs.

The HRA has identified that the Pen Llyn a'r Sarnau/ Lleyen Peninsula and the Sarnau SAC is the downstream receptor for Options 8021-1, 8033-2 and 8034-1. However, it concludes that these options will not affect the same areas of the SAC and as the mobile interest features of the site are not particularly sensitive to the outcomes of the options or reliant on the areas of the SAC that are potentially exposed, there is no risk of cumulative effects on behaviours (e.g. simultaneous displacement from feeding areas etc.).

Cumulative Effects of the Revised Draft Drought Plan In-combination with Other Plans and Programmes

The following subsections consider the cumulative effects of the revised draft Drought Plan in-combination with other plans and programmes including:

- Welsh Water's Water Resources Management Plan 2019 and water resource demand;
- National Policy Statements (NPS) and Nationally Significant Infrastructure Projects (NSIPs); and
- other drought plans.

The cumulative effects of the revised draft Drought Plan in-combination with other plans and programmes are difficult to accurately assess given the inherent uncertainties concerning (*inter alia*): future changes to baseline environmental conditions; future drought conditions and the requirement to implement one or more of the measures contained in the revised draft Drought Plan within a WRZ; future population and economic growth; and the deliverability of some NSIPs (and the potential for new NSIPs to be brought forward). As such, it will be necessary to keep under review these factors as the Drought Plan is implemented (e.g. in EARs) to ensure that the latest and most up to date information is taken into account.

Welsh Water's Water Resources Management Plan 2019 and Water Resource Demand

Welsh Water's WRMP explicitly accounts for growth forecasts when calculating future water demand (and hence areas with potential deficits). This means that 'in combination' water-resource effects with growth promoted by other plans or projects are considered and accounted for during the WRMP development process and its deficit calculations. Potential 'in combination' effects in respect of water-resource demands

due to other plans or projects are therefore unlikely since these demands are explicitly modelled when determining deficit zones and hence developing WRMP options.

In theory, if a WRMP option results in less 'spare' water being available then drought conditions may occur more frequently, and require a longer period for recovery from any temporary effects (depending on the hydrological functioning of the system); however, this type of effect is managed through licence conditions and minimum flow requirements, and Drought Plan options to alter such flow requirements would only be deployed after substantial additional study.

Therefore, the WRMP and water resource demand cannot arguably operate in-combination with the revised draft Drought Plan: if the WRMP options are implemented then they will become a part of the baseline against which the effects of the Drought Plan options will be assessed (with the Drought Plan options then permitted or not at the application stage); until the point of implementation, the Drought Plan options would operate 'alone' in a drought situation. Furthermore, the implementation of a WRMP option will invariably require that the Drought Plan for that WRZ be revised, since the fundamental operational parameters of the WRZ will have changed. Finally, the impacts will depend entirely on the nature of the drought situation. The Drought Plan will not therefore operate 'in combination' with the WRMP or associated land-use plans that may influence water resource demand.

National Policy Statements and Nationally Significant Infrastructure Projects

The Planning Act 2008 introduced a procedure to streamline the decision-making process for NSIPs. Under the Act, a developer wishing to construct a NSIP must first apply to the Secretary of State for development consent. National Policy Statements (NPSs) establish the need for specific types of infrastructure and provide planning guidance for promoters of NSIPs, and the basis for the examination by the Examining Authority and decisions by the Secretary of State on development consent order applications. A number of NPSs have been published which set out the definition, and in some cases the location, of NSIPs. The current status of NPSs is set out in **Table 5.25**.

Table 5.21 Current Status of National Policy Statements

National Policy Statement (NPS)	Status	Are Potential Locations of NSIPs included in the NPS?
Overarching Energy EN-1	Designated July 2011	No
Fossil Fuel Electricity Generating Infrastructure EN-2	Designated July 2011	No
Renewable Energy Infrastructure EN-3	Designated July 2011	No
Gas Supply Infrastructure and Oil and Gas Pipelines EN-4	Designated July 2011	No
Electricity Networks Infrastructure EN-5	Designated July 2011	No
Nuclear Power Generation EN-6	Designated July 2011	Yes
Ports	Designated January 2012	No

National Policy Statement (NPS)	Status	Are Potential Locations of NSIPs included in the NPS?
Waste Water Infrastructure	Designated March 2012	Yes
Hazardous Waste Infrastructure	Designated June 2013	No
National Networks	Designated January 2015	No
Airports NPS: new runway capacity and infrastructure at airports in the South East of England	Designated June 2018	Yes
Water Resources Infrastructure	Draft published November 2018	No
Geological Disposal Infrastructure	Draft published January 2018	No

The revised draft Drought Plan is not expected to have any adverse cumulative effects in-combination with the NPSs listed above. This is because the NPSs are either not site specific or because specific NSIP proposals are unlikely to affect, or be affected by, the measures that comprise the revised draft Drought Plan.

The Nuclear Power NPS (EN-6) sets out eight potentially suitable sites for the deployment of new nuclear power stations in England and Wales. Of these sites, one (Wylfa) is located within the Welsh Water supply area. The Wylfa site is located on the Isle of Anglesey, within the North Eryri / Ynys Môn WRZ. Whilst there is at least the potential for in-combination effects to arise, given the scale of options in this zone, their temporary nature, and the fact that water resource requirements associated with this NSIP have been taken into account by Welsh Water in its water resource planning, this is considered to be extremely unlikely.

Two NSIPs are set out in the Waste Water Treatment NPS; however, both of these are located in London and are not expected to have any effect on water demand in the Welsh Water region. Similarly, the Airports NPS concerns runway capacity in the South East of England only.

Defra is currently preparing a NPS for water resources. This will set out the need for NSIPs related to water resources, and the Government's policies to deliver them. Whilst this NPS will not be site specific, implementation of the revised draft Drought Plan is likely to support the objectives of the NPS for improving water supply resilience which is likely to generate cumulative positive effects in respect of, in particular, climate change (SEA Objective 4), human health (SEA Objective 5) and economic and social well-being (SEA Objective 6).

Other known major projects that are likely to increase water resource demand have been taken into account during the development of Welsh Water's WRMP¹⁹⁷ and determination of future deficits (and hence the baseline for the revised draft Drought Plan). Reference has been made to the Planning Inspectorates National Infrastructure Projects database¹⁹⁸ which includes major projects, subject to the requirements of the Planning Act 2008. It includes projects:

¹⁹⁷ See the *Demand Forecasts for Water Resources Management Plan 2010 Technical Report*, which is included in the appendices to the WRMP.

¹⁹⁸ See <https://infrastructure.planninginspectorate.gov.uk/projects/> [Accessed March 2019].

- where the developer has advised the Planning Inspectorate in writing that they intend to submit an application in the future;
- where an application has already been made to the Planning Inspectorate and is undergoing the development consent process;
- where a DCO application has been determined.

Table 5.26 identifies those currently identified NSIPs within the WRZs for which supply-side measures have been identified in the revised draft Drought Plan. However, it must be recognised that a meaningful assessment of in-combination effects in this regard is not possible at this point in the drought planning process as there is no certainty over when the revised draft Drought Plan options might be deployed, nor necessarily the timescales for implementation of the NSIPs.

Table 5.26 Current NSIPs and known major projects with the potential for 'in combination' effects with the Drought Plan options

Project	Status	Summary	Interaction with Drought Plan Measures
Wylfa Newydd Nuclear Power Station	Examination	New nuclear power station on Anglesey; significant construction / operational effects.	<p>Significant in-combination effects associated with this NSIP and the Drought Plan measures are not anticipated.</p> <p>The HRA of the Drought Plan has identified that the zone of influence (ZoI) will not extend to the marine sites within the ZoI of other options in North Wales (including Pen Llyn a'r Sarnau/ Lley Peninsula and the Sarnau SAC; Northern Cardigan Bay / Gogledd Bae Ceredigion SPA; and West Wales Marine / Gorllewin Cymru Forol SAC). There is a theoretical risk of mobile species associated with these sites being affected, although the effects of the Drought Plan measures on these species will be negligible and in combination effects would not be expected.</p>
Glyn Rhonwy Pumped Storage	Decided	Conversion of two disused slate quarries into a Pumped Storage Battery with a capacity of up to 99.9MW.	No in-combination effects associated with this NSIP and the Drought Plan measures are anticipated.
South Hook Combined Heat & Power Station	Decided	New Combined Heat & Power Station located on the northern edge of Milford Haven, approximately 30km downstream of the abstraction at Canaston Bridge.	<p>Significant in-combination effects associated with this NSIP and the Drought Plan measures are not anticipated.</p> <p>The HRA of the Drought Plan states "for the South Hook scheme identified four European sites with features that are also potentially exposed to the effects of the DP options, as follows:</p> <ul style="list-style-type: none"> • Afonydd Cleddau/ Cleddau Rivers SAC • Pembrokeshire Marine/ Sir Benfro Forol SAC • Pembrokeshire Bat Sites and Bosherton Lakes/ Safleoedd Ystum Sir Benfro a Llynnoedd Bosherton SAC • Limestone Coast of South West Wales/ Arfordir Calchfaen de Orllewin Cymru SAC <p>Modelling work undertaken for the HRA of the South Hook scheme suggests that the 'zone of influence' of operational and construction effects (principally discharges to Milford Haven, including warm water discharges) will not extend substantially upstream beyond the town of Milford Haven itself; as this point is at least 25km downstream of Canaston Bridge, and in a marine environment, it is certain that the zones of influence of the South Hook</p>

Project	Status	Summary	Interaction with Drought Plan Measures
			<p>scheme and the DP will not intersect, and so coincident in combination effects on the habitat features of Afonydd Cleddau/ Cleddau Rivers SAC or Pembrokeshire Marine/ Sir Benfro Forol SAC will not occur.</p> <p>The mobile species of these SACs are theoretically vulnerable to in combination effects where these affect species at different points in their range or lifecycle. However, the HRA of the South Hook scheme also concluded that there would be no adverse effects on the mobile species of these SACs."</p>
Abergelli Power	Examination	Gas-fired peaking plant and connection infrastructure with a capacity of up to 299 MW.	No in-combination effects associated with this NSIP and the Drought Plan measures are anticipated due to distance.
Tidal Lagoon Swansea Bay	Decided	Tidal lagoon and associated electricity generating infrastructure with a nominal capacity of 240MW.	No in-combination effects associated with this NSIP and the Drought Plan measures are anticipated due to distance.
Internal Power Generation Enhancement for Port Talbot Steelworks	Decided	Enhancement of existing 95.7 Mega Watt electrical (MWe) power station and installation of two new boilers (nominally 164 Mega Watt Thermal (MWth)) and two turbines (nominally 65 Mega Watt Electrical (MWe)) each.	No in-combination effects associated with this NSIP and the Drought Plan measures are anticipated due to distance.

Water Company and Environment Agency/Natural Resources Wales Drought Plans

The potential for cumulative effects resulting from the options within different water company drought plans is dependent on many of the factors including the timing of need of each respective option and the relative location of the options to each other. The greatest potential for cumulative effects on the majority of the SEA objectives will occur where options are located within the same catchments. However, it should be noted that cumulative effects will not occur where two water companies apply for Drought Orders or Drought Permits that affect the same water bodies. Where unacceptable risks to, for example designated sites, arise the Drought Order or Drought Permit will not be granted. For these reasons, cumulative effects against most SEA objectives will be avoided.

There is uncertainty relating to the nature and location of environmental drought order applications that may be made by Natural Resources Wales and the Environment Agency, and therefore also the potential for cumulative effects with options identified in the revised draft Drought Plan. However, as the Droughts Plans of Welsh Water and the Environment Agency seek to protect the environment, the potential for significant cumulative effects in-combination with Welsh Water's revised draft Drought Plan is considered negligible.

5.14 Contribution of the Revised Draft Drought Plan to Wales' Well-being Goals and the Objective for SMNR

As set out in **Section 1.6**, the *Well-being of Future Generations (Wales) Act 2015* places a duty on public bodies including Welsh Water to carry out sustainable development, aimed at achieving the seven well-being goals for Wales. The well-being goals established by the Act are as follows:

- A prosperous Wales;
- A resilient Wales;
- A healthier Wales;
- A more equal Wales;
- A Wales of cohesive communities;
- A Wales of vibrant culture and thriving Welsh language; and
- A globally responsible Wales.

The *Environment (Wales) Act 2016*, meanwhile, has established an objective for the sustainable management of natural resources (SMNR) “to maintain and enhance the resilience of ecosystems and the benefits they provide and, in so doing—

(a) meet the needs of present generations of people without compromising the ability of future generations to meet their needs, and

(b) contribute to the achievement of the well-being goals in section 4 of the *Well-being of Future Generations (Wales) Act 2015*”.

The well-being goals and SMNR objective have been mapped to the SEA objectives that comprise the SEA assessment framework (see **Section 4.3**). Through the assessment of the revised draft Drought Plan measures against the SEA objectives, it is therefore possible to assess the contribution that the implementation of the Plan would make to the achievement of the goals and objective.

A matrix has been used to record this assessment and is presented in **Table 5.27** below. Informed by the assessment of the supply-side and demand-side measures against the SEA objectives, as well as the cumulative effects of the revised draft Drought Plan (as summarised in the preceding section), a judgement has been made regarding whether, and the extent to which, the revised draft Drought Plan would support or detract from the achievement of each well-being goal (and by extension, the SMNR objective) in-turn with commentary provided to justify the conclusions reached.

Table 5.27 Assessment of the Contribution of the Revised Draft Drought Plan to the Well-being Goals for Wales

Well-being Goals	Related SEA Objective	Contribution to the Well-being Goal	Commentary
<p>A prosperous Wales: An innovative, productive and low carbon society which recognises the limits of the global environment and therefore uses resources efficiently and proportionately (including acting on climate change); and which develops a skilled and well-</p>	SEA Objectives 1, 2, 3, 4, 5, 6, 7, 8, 9	↕	<p>The assessment of the revised draft Drought Plan measures has identified that, where measures involve the construction of new infrastructure, the associated capital expenditure may generate benefits in respect of the supply chain and local employment creation. Whilst at the individual scheme level such benefits are likely to be negligible, cumulatively they have been assessed as supporting the achievement of the well-being goal ‘a prosperous Wales’. The operation of the measures will also help to ensure the continuity of drinking water supplies during periods of drought which may in-turn support economic and population growth and improve resilience to the effects of climate change.</p> <p>The assessment of the revised draft Drought Plan measures against the SEA objectives has also, however, highlighted the</p>

Well-being Goals	Related SEA Objective	Contribution to the Well-being Goal	Commentary
educated population in an economy which generates wealth and provides employment opportunities, allowing people to take advantage of the wealth generated through securing decent work.			potential for direct and indirect adverse environmental effects which has been assessed as not supporting the achievement of this well-being goal. These effects would be most significant during the operation of the supply-side measures and, in some cases, would include resource use and the emissions of greenhouse gases. However, it should be recognised that through the implementation of the measures, the revised draft Drought Plan seeks to ensure the continued supply of potable water whilst minimising any detrimental effects on the environment.
A resilient Wales: A nation which maintains and enhances a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change (for example climate change).	SEA Objectives 1, 2, 3, 4, 5, 6, 7, 9	↕	Overall, the revised draft Drought Plan seeks to ensure the continued supply of potable water during periods of drought and in this way, it will improve resilience to the effects of climate change, supporting the achievement of the well-being goal 'a resilient Wales'. During operation, the demand-side measures in particular are likely to have positive effects on water as they will either reduce leakage from the water supply network or the demand for water, helping to protect water resources. The assessment of the revised draft Drought Plan measures against the SEA objectives has identified the potential for direct and indirect adverse environmental effects which has been assessed as not supporting the achievement of this well-being goal. These effects would be particularly felt during the operation of the supply-side measures and could include impacts on (inter alia) biodiversity, soils, water and landscape which contribute to the resilience of Wales' ecosystems. However, these effects would be largely temporary and it is likely that adverse impacts would be mitigated where possible at the project level.
A healthier Wales: A society in which people's physical and mental well-being is maximised and in which choices and behaviours that benefit future health are understood.	SEA Objectives 1, 3, 4, 5, 9	↕	It is expected that the revised draft Drought Plan will help to ensure the continuity of water supplies to Welsh Water customers during periods of drought. This has been assessed as supporting the achievement of the well-being goal 'a healthier Wales'. Emissions to air, alongside noise and vibration disturbance, during construction of the supply-side measures (where applicable) may have minor adverse effects on human health which has been assessed as not supporting the achievement of this well-being goal. However, any adverse impacts in this regard would be temporary and localised and, further, are likely to be managed through the implementation of best practice construction methods. There is the potential for the operation of the revised draft Drought Plan measures to affect biodiversity, water quality and quantity and landscape which may have indirect adverse impacts on human health (for example, due to impacts on recreation). However, any health effects in this regard would be temporary and are unlikely to be significant.
A more equal Wales: A society that enables people to fulfil their potential no matter what their background	SEA Objectives 5, 6	↑	As noted above, the revised draft Drought Plan measures will help to ensure the continuity of a safe and secure drinking water supply during periods of drought. This has been assessed as supporting the achievement of the well-being goal 'a more equal Wales'.

Well-being Goals	Related SEA Objective	Contribution to the Well-being Goal	Commentary
or circumstances (including their socio economic background and circumstances).			The assessment of the revised draft Drought Plan measures has identified that, where measures involve the construction of new infrastructure, the associated capital expenditure may generate benefits in respect of the supply chain and local employment creation. Whilst at the individual scheme level such benefits are likely to be negligible, cumulatively they have been assessed as supporting the achievement of this well-being goal.
<p>A Wales of cohesive communities: Attractive, viable, safe and well-connected communities.</p>	SEA Objectives 4, 5, 6, 9	↕	<p>The revised draft Drought Plan measures will help to ensure the continuity of a safe and secure drinking water supply during periods of drought which may in-turn support the sustainability of communities in the Welsh Water area. This has been assessed as supporting the achievement of the well-being goal 'a Wales of cohesive communities'.</p> <p>Emissions to air, alongside noise and vibration disturbance, during construction of the supply-side measures (where applicable) may have minor adverse effects on host communities which has been assessed as not supporting the achievement of this well-being goal. However, any adverse impacts in this regard would be temporary and localised and, further, are likely to be managed through the implementation of best practice construction methods. Further, the majority of measures are relatively remote with development likely to be distant from main settlements.</p> <p>The assessment of the revised draft Drought Plan measures against the SEA objectives has also highlighted the potential for direct and indirect adverse environmental effects including in respect of landscape which could affect the attractiveness of communities. However, any effects in this regard would be temporary and localised.</p>
<p>A Wales of vibrant culture and thriving Welsh language: A society that promotes and protects culture, heritage and the Welsh language, and which encourages people to participate in the arts, and sports and recreation.</p>	SEA Objective 8	↔	<p>Capital expenditure associated with the construction of the revised draft Drought Plan measures (where applicable) is unlikely to be of a scale that would contribute towards retaining local, Welsh speakers.</p> <p>The assessment of the revised draft Drought Plan measures against the SEA objectives has not identified adverse effects in respect of cultural heritage during the construction or operational phases of the options.</p> <p>There is the potential for the operation of the revised draft Drought Plan measures to affect biodiversity, water quality and quantity and landscape which may have indirect adverse impacts on recreation. However, any effects in this regard would be temporary and are unlikely to be significant.</p> <p>Overall, the revised draft Drought Plan is not expected to make a contribution to the achievement of the well-being goal, 'a Wales of vibrant culture and thriving Welsh language'.</p>
<p>A globally responsible Wales: A nation which, when doing anything to improve the economic,</p>	SEA Objectives 1, 2, 4, 5, 6, 7	↔	Taking into account the nature and scale of the revised draft Drought Plan measures, and that effects associated with their construction and operation would be predominantly felt at a local/sub-regional level, it is not expected that the revised draft Drought Plan would make a contribution to this well-being goal.

Well-being Goals	Related SEA Objective	Contribution to the Well-being Goal	Commentary
social, environmental and cultural well-being of Wales, takes account of whether doing such a thing may make a positive contribution to global well-being.			It is recognised that the construction and operation of the measures would result in resource use and greenhouse gas emissions; however, in the context of national (Wales) and global emissions, any impact in this regard would be negligible.

Key

Symbol	Effect
↑	The revised draft Drought Plan supports the achievement of the well-being goal.
↔	The revised draft Drought Plan will not make a contribution to the achievement of the well-being goal.
↓	The revised draft Drought Plan does not support the achievement of the well-being goal.

Table 5.27 demonstrates that the revised draft Drought Plan is likely to support the achievement of the majority of the well-being goals for Wales. This principally reflects the objective of the Plan and its associated measures to ensure the continuity of drinking water supplies to Welsh Water's customers during periods of drought.

The construction (where applicable) and operation of many of the revised draft Drought Plan measures will unavoidably require the use of natural resources and generate greenhouse gas emissions and could also result in adverse environmental effects, particularly during operation. However, it should be recognised that through the implementation of the proposed measures, the revised draft Drought Plan will ensure the continued supply of potable water whilst minimising any detrimental effects on the environment. This will help protect and enhance the environment and promote the efficient use of water resources, making a long term contribution to the well-being goals for Wales and the objective for SMNR.

5.15 Mitigation and Enhancement

The potential effects of the revised draft Drought Plan measures are described in the sections above. In some cases, there is an opportunity to reduce some of the potential negative effects identified. The detail of this mitigation needs to be considered during the planning phases of each of the individual measures if and when they are taken forward for implementation.

Potential mitigation measures are included within each of the assessment matrices in **Appendix E** although these should be considered as a starting point for more detailed consideration as options are planned and developed. Where EARs have been developed for the options, these also include the identification of relevant mitigation at the species level which has informed the assessment of the revised draft Drought Plan measures contained in this report.

Specific mitigation measures in the options assessment matrices include, for example:

- The adoption of best practice construction techniques (such as the use of sediment traps) in order to minimise or avoid the effects of construction on designated sites.
- Measures to minimise impacts of fish and other species such as the targeted installation of woody debris features to provide fish with the habitat required to support feeding and development (growth), gravel washing of spawning areas, deployment of aeration equipment and re-stocking following drought.
- River flow and water quality monitoring during the implementation of supply-side measures.
- The rental or re-use of onsite equipment in order to minimise resource use.

Species Specific Measures and Biodiversity

Most species-specific avoidance or mitigation measures can only be determined at the scheme level, following scheme-specific surveys, and 'best-practice' mitigation for a species will vary according to a range of factors that cannot be determined at this stage. In addition, some general 'best-practice' measures may not be relevant or appropriate to the interest features of the European sites concerned (for example, clearing vegetation over winter is usually advocated to avoid impacts on nesting birds; however, this is unlikely to be necessary to avoid effects on some SPA species (such as overwintering estuarine birds) and the winter removal of vegetation might actually have a negative effect on these species through disturbance).

However, the following general measures should be followed where possible to minimise the potential for impacts on species that are European site interest features unless project-level environmental studies or HRA indicate that they are not required or not appropriate, or that alternative or additional measures are more appropriate / necessary:

- Scheme design will aim to minimise the environmental effects by 'designing to avoid' potential habitat features that may be used by species that are European site interest features when outside the site boundary (e.g. linear features such as hedges or stream corridors; large areas of scrub or woodland; mature trees; etc.) through scheme-specific routing studies;
- The works programme and requirements for each measure will be determined at the earliest opportunity to allow investigation schemes, surveys and mitigation to be appropriately scheduled and to provide sufficient time for consultations with NRW;
- Night-time working, or working around dusk / dawn, should be avoided to reduce the likelihood of negative effects on nocturnal species;
- Any lighting required (either temporary or permanent) will be designed with an ecologist to ensure that potential 'displacement' effects on nocturnal animals, particularly SAC bat species, are avoided;
- All compounds / pipe stores etc. will be sited, fenced or otherwise arranged to prevent vulnerable SAC species from accessing them;
- All materials will be stored away from commuting routes / foraging areas that may be used by species that are European site interest features;
- All excavations will have ramps or battered ends to prevent species becoming trapped; and
- Pipe-caps must be installed overnight to prevent species entering and becoming trapped in any laid pipe-work.

For those options where an EAR has been prepared, further species-specific mitigation measures and these will be further developed in consultation with NRW. The range of mitigation measures included in the EARs fall into three general activity types:

- measures to reduce impacts at source;
- measures to modify environmental conditions in the river/reservoir; and
- management of sensitive ecological species and communities.

The generic types of mitigation measures including the EARs that could be considered at the on-set of drought, during implementation of the drought permit/order and post-drought permit/order implementation are highlighted in **Table 5.28**.

Table 5.28 Potential Generic Mitigation Measures Considered to Address Adverse Effects of the Revised Draft Drought Plan Supply-side Measures

Type of Mitigation	Typical Application
Temporary reduction or cessation of the terms of the Drought Order/Permit	Where continuous water quality monitoring (typically DO) and/or fish distress monitoring indicate a sharp deterioration in aquatic conditions, modifications to abstraction licence conditions under the terms of the order/permit may need to be reduced or cease altogether until conditions have improved. The precise trigger levels for considering such action would be set out in discussion with NRW at the time of application taking account of the time of year and prevailing environmental conditions. Temporary cessation of the implementation of the order/permit may be required as a means of mitigating ecological effect, balanced against the need to safeguard public water supplies.
Fish distress monitoring with triggers and response plan	Regular visual observations carried out on key stretches of rivers or lakes to detect signs of large-scale fish distress and agree appropriate mitigation with NRW specific to the conditions identified. This might include temporary oxygenation measures.
Protection of 'spate flows'	Temporary increases in river flows following periods of rain can be important to flush sediment/pollutants from the system or promote fish passage. Where possible, the terms of the drought order/permit could be temporarily reduced/suspended so that these spate flows are preferentially allowed to pass through the system. This decision would need to be taken in dialogue with NRW to take account of the prevailing conditions and considering the merits of encouraging fish migration during a drought.
Reduce fish predation	Consider (where feasible) a limited and targeted reduction of predation risk on fish through either the provision of refugia, in the form of artificial or natural habitat provision or improvement, or the placement of piscivorous bird scarers (in areas remote from residential locations). The merits of each option and subsequent deployment would be subject to review on a case-by-case basis in consultation with NRW.
Physical works	In some cases, temporary physical in-river works such as channel narrowing or provision of refugia could be carried out to mitigate environmental risks. If any physical works are likely to impact fish passage, appropriate mitigation measures will need to be considered as part of the design of the works.
Compensation flows	In some cases, it may be possible to use other sources of water to provide compensation flows within surface water courses to temporarily mitigate the impact of the drought order/permit
Provision of alternative water supplies	If there is a risk of derogation of other abstractors from the drought order/permit, it may be possible for Welsh Water to provide alternative water supplies or lower pumps in boreholes. Provision is otherwise provided in legislation ¹⁹⁹ for compensation to be agreed with the abstractor.

¹⁹⁹ Schedule 9 of the Water Resources Act (WRA) 1991

Scheme Design and Planning

All measures will be subject to project-level environmental assessment in the EARs that would accompany Drought Permit and Drought Order applications, which will include assessments of their potential to affect European sites during their construction or operation. These assessments will consider or identify (*inter alia*):

- opportunities for avoiding potential effects on European sites through design (e.g. alternative pipeline routes; micro-siting; etc);
- construction measures that need to be incorporated into scheme design and or planning to avoid or mitigate potential effects – for example, ensuring that sufficient space is available for pollution prevention measures to be installed, such as sediment traps; and
- operational regimes required to ensure no adverse effects occur (e.g. compensation releases – although note that these measures can only be identified through detailed investigation schemes).

Pollution Prevention

The habitats of European sites are most likely to be affected indirectly, through construction-site derived pollutants, rather than through direct encroachment. There is a substantial body of general construction good-practice which is applicable to all of the proposed measures and can be relied on (at this level) to prevent significant or adverse effects on a European site occurring as a result of construction site-derived pollutants. The following guidance documents detail the current industry best-practices in construction that are relevant to the proposed schemes:

- NRW, SEPA & NIEA, Guidance for Pollution Prevention (GPPs) (which are replacing the previous Pollution Prevention Guidelines (PPGs) when published) [online]. Available at: <http://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/>
 - PPG1: Understanding Your Environmental Responsibilities - Good Environmental Practices (July 2013; under review);
 - GPP5: Works and maintenance in or near water (January 2017);
 - PPG6: Working at construction and demolition sites (March 2012; under review);
 - GPP21: Pollution incident response planning (July 2017); and
 - PPG22: Incident response - dealing with spills (April 2011; under review).
- Venables R. *et al.* (2000) Environmental Handbook for Building and Civil Engineering Projects. 2nd Edition. Construction Industry Research and Information Association (CIRIA), London.

The best-practice procedures and measures detailed in these documents will be followed for all construction works derived from the draft Drought Plan as a minimum standard, unless scheme-specific investigations identify additional measures and / or more appropriate non-standard approaches for dealing with potential site-derived pollutants.

Effects on Water

As noted above, the EARs prepared for the supply-side measures have identified potential mitigation measures where adverse impacts on flows and water quality are predicted. These will be further developed in consultation with NRW.

Effects on Human Health and Social and Economic Well-being

Construction activities should be undertaken so as to minimise short term adverse effects on recreational areas, such as footpaths, and on landscape and biodiversity. Noise, traffic disruption and visual impacts should also be considered. Welsh Water and its contractors are enrolled in the Considerate Constructors Scheme, a voluntary scheme which commits those contractors in the Scheme to be considerate and good neighbours, as well as clean, respectful, safe, environmentally conscious, responsible and accountable. Care should also be taken during construction regarding the potential for contaminants such as silt, concrete or fuel oil to pollute water courses via surface run off. This can be mitigated by undertaking all construction activities in accordance with relevant best practice pollution prevention guidance.

To maximise economic benefits in the Welsh Water area, it is recommended that, where possible, work is carried out by local firms and contractors or by those with a policy for training and skills development that could help contribute to the local economy and meet employment needs.

Effects Climate Change and Resource Use

Due to the temporary and remote nature of many of the supply-side measures, it is likely to be difficult to mitigate effects on climate change for those schemes which have operational energy requirements. Where temporary pumping or treatment infrastructure is located in rural or remote areas, it is likely that generators will be required. In such circumstances, it is unlikely to be possible to use on-site energy generation or renewable sources of energy. However, the use of low emission plant could be used where feasible.

Where significant raw materials are required for options, this can be mitigated by utilising recycled and locally sourced materials. Construction and operational wastes should also be reused/recycled where appropriate.

Effects on Cultural Heritage and Landscape

Supply-side measures could have a negative effect on landscape if new infrastructure is required, particularly where development cannot be located on previously developed land and/or where schemes are located within landscapes recognised for their importance and special qualities (National Parks and AONBs). In order to minimise such effects, new structures could be located close to existing structures or hedgerows and trees to provide some screening; however, due to the temporary nature of the revised draft Drought Plan measures, it is unlikely to be practicable to utilise local building styles or incorporate landscaping schemes (e.g. tree/ hedge planting).

The potential for adverse impacts of the settings of cultural heritage assets should be considered early in the design process and any adverse effects minimised, for example through micro-siting/alternative pipeline routes to avoid designated sites.

6. Conclusions and Next Steps

6.1 Summary

The Revised Draft Drought Plan

Welsh Water has developed the revised draft Drought Plan using the Drought Vulnerability Framework (DVF) to understand the vulnerability of its WRZs to more extreme droughts. As a result, the revised draft Drought Plan has identified 10 WRZs that are potentially vulnerable to drought risk. The revised draft Drought Plan includes five demand-side options and 20 supply-side options that could be implemented in the event of a drought to ensure the continued supply of potable water to its customers during periods of low rainfall when water resources are depleted whilst minimising any detrimental effects on the environment.

The measures set out for each WRZ within the revised draft Drought Plan are a collection of options that could be implemented on their own or in some circumstances together. All of the options are equally feasible in their own right, but they would not necessarily be implemented in combination. The selection of the option or options to be implemented would be determined by a number of factors including the nature and intensity of the drought, operational requirements, and also on the potential environmental impacts of the option in question (as informed by the SEA and HRA of the revised draft Drought Plan, and the EAR of the option).

The Effects of the Demand- and Supply-Side Options

The demand-side options have been assessed as having fewer and a smaller range of effects against the SEA objectives that comprise the assessment framework when compared to the supply-side options. This is because these options seek to reduce the demand for water from existing resources and do not result in any temporary increases in abstraction. Consequently, the operational effect of these options tends to be either neutral or positive.

In contrast to the demand-side options, there is a greater likelihood of significant effects arising from the construction and operation of supply-side options. A number of supply-side options will require additional temporary infrastructure to be constructed (temporary pumps, generators and above ground pipelines). Construction activities could lead to disturbance of habitat, effects on water quantity or quality (e.g. construction of temporary weirs) and can lead to disturbance of local residents and communities (e.g. noise and vibration). The presence of new above ground infrastructure can also lead to effects on landscape, especially in sensitive locations such as AONBs and National Parks, although such effects will be localised, transient and reversible. Environmental effects are potentially greater where there are sensitive receptors that may be affected during construction (e.g. sites designated for nature conservation or landscape designations). The majority of options, however, do not require additional infrastructure and therefore have no effects during construction. These include options to reduce compensation flow from reservoirs and other options that utilise existing sources.

During operation, there is considerable variation in the significance of effects of the supply-side options. In general, options that generate larger yields have significant benefits (in terms of human health and socio-economic wellbeing); however, they may also be associated with significant negative effects (in terms of effects on designated nature conservation sites (SSSIs) and FISH species in particular. Options that require a reduction in compensation flows or temporary increases in abstraction could also have significant effects on water quantity and quality (where downstream flows are affected). Options that result in the temporary pumping of water over a kilometre or further, against the gradient, will require substantial quantities of energy and resources. All options will increase resilience to climate change.

There are a number of supply-side options that have been identified as having minor or neutral effects against the SEA objectives during operation. These options include those that make minor changes to existing abstraction licences.

The Effects on the Wellbeing Goals and SMNR

The revised draft Drought Plan is likely to support the achievement of the majority of the well-being goals for Wales. This principally reflects the objective of the Plan and its associated measures to ensure the continuity of drinking water supplies to Welsh Water's customers during periods of drought. Through the implementation of the proposed measures, the revised draft Drought Plan will ensure the continued supply of potable water whilst minimising any detrimental effects on the environment. This will help protect and enhance the environment and promote the efficient use of water resources, making a long term contribution to the well-being goals for Wales and the objective for SMNR.

6.2 Next Steps

Following consultation, Welsh Water has prepared a Statement of Response to the representations received during the consultation period setting out how and why the draft Drought Plan has or has not been revised to take account of the consultation responses. Welsh Water has amended the draft Drought Plan and revised the Environmental Report to reflect these changes. Welsh Water will send the revised documentation to the Welsh Government for confirmation that all representations have been appropriately accounted for. Following further direction from the Welsh Government, Welsh Water will publish the final Drought Plan and implement it accordingly. In conjunction with publishing the final Drought Plan, Welsh Water will also issue a Post Adoption Statement. This will set out the results of the consultation and SEA process and the extent to which the findings of the SEA have been accommodated in the published Drought Plan.

6.3 How the Environmental Effects will be Considered Going Forward

Once the revised draft Drought Plan has been agreed, the options within the Drought Plan may need to be implemented through specific projects in the event of a drought. Where options require a Drought Permit or Drought Order, Welsh Water will have to apply to Natural Resources Wales or the Welsh Government. As part of this process, Welsh Water will have to include an Environmental Assessment Report (EAR) with each application describing the expected environmental effects of the proposal. As part of the preparation of the revised draft Drought Plan, 'shelf ready' EARs have been prepared for all the supply-side options and these would be updated for submission. Where necessary, these include Appropriate Assessments, addressing the requirements of the Habitats Regulations.

6.4 Monitoring the Effects of the Drought Plan

Welsh Water will continue to develop its final Drought Plan in consultation with stakeholders. Subject to the approval of Welsh Ministers, Welsh Water expects to publish the final Drought Plan before the end of 2019.

If the Drought Plan is implemented and specific options deployed within a WRZ, its effects on the environment and people will need to be taken into account. In this regard, it is a requirement of the SEA Directive to establish how the significant effects of the Drought Plan will be monitored. Monitoring can help to answer questions such as:

- Were the SEA predictions of effects accurate?
- Are mitigation measures performing as well as expected?

- Are there any adverse effects? Are these within acceptable limits, or is remedial action desirable?

Environmental effects of options will be measured through the use of environmental monitoring plan (EMPs) which, consistent with NRW guidance, will be completed for each supply-side option. Each EMP will set out:

- the new monitoring data to be used to address gaps in understanding of:
 - ▶ the environmental sensitivity of a site and any damage the proposed measure may cause;
 - ▶ the normal (baseline) conditions at a site;
 - ▶ the recovery of the environment after drought;
 - ▶ how the impacts of the measures will be assessed during and after a drought;
 - ▶ how the data will be used to review and refine drought triggers and mitigation measures (if relevant).
- the feature(s) to be monitored and the methods used;
- the location of survey sites;
- the timing and frequency of monitoring; and
- who will undertake the monitoring.

Welsh Water expects to monitor the effects of the Drought Plan alongside the other impacts of its operations, and as such, is likely to rely on existing sources of information that are collected either by Welsh Water or by other relevant organisations such as the NRW. For example, Welsh Water already collects certain data for an annual review process (the Annual Performance Report) that is submitted to the Office of Water Services (Ofwat) and their own environmental reporting. A substantial amount of relevant information is also collated by the NRW²⁰⁰, and via the Welsh Government StatsWales website²⁰¹.

Table 6.1 indicates some of the issues currently monitored or which could be monitored in future, and how they relate to the SEA objectives used in the SEA of the Drought Plan. This list is provisional and indicative only; monitoring proposals will be considered further and a final monitoring framework that satisfies the requirements of the SEA Directive will be presented in the Post Adoption Statement.

Table 6.1 Potential Indicators for Monitoring Effects

Objective	Indicator	Source of Information	Commentary
1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity	Condition of specific protected sites (e.g. SACs, SPAs, SSSIs)	Welsh Water, Natural Resources Wales (NRW)	Option-specific environmental monitoring plans (EMPs) set out detailed approaches for monitoring, based on the species and habitats potentially affected. This monitoring would be followed in the event of an option being implemented. Additionally, open communication between NRW and Welsh Water results

²⁰⁰ Natural Resources Wales (2019) *Evidence and Data*. Available online at: <http://gov.wales/statistics-and-research/?lang=en>
<https://naturalresources.wales/evidence-and-data/?lang=en>

²⁰¹ Welsh Government (2019) *StatsWales: Environment and Countryside*. Available online at: <https://statswales.gov.wales/Catalogue/Environment-and-Countryside>

Objective	Indicator	Source of Information	Commentary
			in up-to-date information and identification of any potential issues.
	Biological monitoring (macroinvertebrates, macrophytes, fisheries, bird surveys)	Welsh Water	Option-specific EMPs set out detailed approaches for monitoring, based on the species and habitats potentially affected. This monitoring would be followed in the event of an option being implemented.
2. To contribute to the sustainable use of land and protect and enhance soil quality and geodiversity	Area of previously undeveloped land used during construction	Welsh Water	Welsh Water could record the area of previously undeveloped land that is built on as a result of the Drought Plan measures.
	Condition of sites designated for geological interest (e.g. geological SSSIs) on water industry land holdings	Welsh Water, NRW	Option-specific EMPs set out detailed approaches for monitoring. This monitoring would be followed in the event of an option being implemented.
3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water Framework Directive	River flows, river levels, lake and reservoir levels. Water quality of surface waters. Groundwater levels, recharge characteristics and abstracted groundwater quality	Welsh Water, NRW	Option-specific EMPs set out detailed approaches for monitoring water quality and quantity. This monitoring would be followed in the event of an option being implemented. Previous studies can also be used to inform monitoring and assessment. For example Review of Consents (RoC) documentation and any Drought Permit (DP) Environmental Assessments.
	Leakage Water saved through demand management/ water efficiency measures	Welsh Water	Welsh Water report these data to Ofwat as part of the annual returns process.
4. To limit the causes and potential consequences of climate change and to adapt to future changes	Quantity of greenhouse gas emissions per megalitre of water supplied.	Welsh Water	Welsh Water energy managers can use company data, and guidance from the UKWIR greenhouse gas workbook and BEIS (Department for Business, Energy & Industrial Strategy) conversion factors to derive this information.
	Energy use used in the operation of options.	Welsh Water	Welsh Water should hold and record energy consumption data e.g. via accounts / invoices.
	Renewable energy generated or purchased.	Welsh Water	Welsh Water should record renewable energy generation data, in addition to data on renewable energy purchased e.g. via accounts / invoices.

Objective	Indicator	Source of Information	Commentary
5. To protect and enhance human health with special regard to vulnerable groups in society	Compliance with drinking water standards at customers' taps (%).	Welsh Water	Welsh Water reports these data to Ofwat as part of the statutory returns process (Annual Performance Report) and to the Drinking Water Inspectorate.
	Compliance with water quality standards under the EC Bathing Waters Directive.	NRW	NRW monitors the compliance of bathing waters and report this annually.
	Number of nuisance-related complaints e.g. noise, dust.	Welsh Water	Welsh Water could record the number of nuisance-related complaints made in relation to implementation of the Drought Plan.
6. To maintain and enhance the economic and social needs of the local community	Number of Welsh Water sites with public access which provide sporting, recreational and leisure resources and number of visits per year.	Welsh Water	Welsh Water hold information on the number of annual visitors to sites where specific visitor facilities are provided (e.g. Llyn Brenig). These could be analysed to determine effects of drought operation on visitor use.
7. To promote the wise use of resources	Amount of recycled / reused materials used	Welsh Water (contractors/consultants)	Information on the use of recycled / reused materials should be held by construction managers and accounts (contractors / consultants accounts, waste or procurement records).
	Proportion of waste sent to landfill	Welsh Water (services data)	Information on waste disposal to landfill should be held by Welsh Water.
	Chemicals Use in Water Supply	Welsh Water (services data)	Information (quantities, composition) on chemical use should be held in accounts.
8. To conserve and enhance the cultural, historic and industrial heritage resource	Loss / damage or discovery / protection of cultural, historic and industrial heritage features.	Welsh Water, Cadw	Cadw's regional field monument wardens monitor the condition of all statutorily protected monuments on a five-year programme.
9. To protect and enhance landscape character and other protected features	Loss or damage to landscape character and features of designated sites.	Welsh Water	Welsh Water could record the number and size of infrastructure built within designated landscape sites.

Appendix A

Quality Assurance Checklist

The Government's Guidance on SEA²⁰² contains a quality assurance checklist to help ensure that the requirements of the SEA Directive are met. Those requirements relevant to the scoping stage of the SEA of revised draft Drought Plan have been set out below.

Quality Assurance Checklist	
Objectives and Context	
The plan's or programme's purpose and objectives are made clear.	The purpose of the revised draft Drought Plan is set out in Section 1.3 of this Environmental Report. The objectives of the revised draft Drought Plan are set out in Section 1.3 .
Environmental issues and constraints, including international and EC environmental protection objectives, are considered in developing objectives and targets.	Key environmental issues identified through a review of relevant plans and programmes (see Section 2 and Appendix C of this report) and analysis of baseline conditions (see Section 3) have informed the development of the assessment framework presented in Section 4.3 .
SEA objectives, where used, are clearly set out and linked to indicators and targets where appropriate.	SEA objectives and guide questions are set out in Section 4.3 of this report. Potential indicators are set out in Section 6.4 of this report.
Links with other related plans, programmes and policies are identified and explained.	Links are identified in Section 2 and Appendix C .
Conflicts that exist between SEA objectives, between SEA and plan objectives and between SEA objectives and other plan objectives are identified and described.	Conflicts between the SEA objectives and the options put forward by Welsh Water have been identified in the assessment matrices included in Appendix E .
Scoping	
Consultation Bodies are consulted in appropriate ways and at appropriate times on the content and scope of the Environmental Report.	The SEA Scoping Report was consulted upon and responses to this are included in this Environmental Report (see Appendix B).
The assessment focuses on significant issues.	The scope of the assessment reflects the geographic extent of the Welsh Water area and provides a comprehensive approach to assessment (reflecting the large number of interactions dependent on the continued supply of water). This enables the assessment to determine which impacts will be considered significant.
Technical, procedural and other difficulties encountered are discussed; assumptions and uncertainties are made explicit.	General difficulties and assumptions are set out in Section 4.7 of this report, with issues related to specific feasible and preferred options set out in the assessment sections of this report (Appendix E). Baseline data limitations are discussed in Section 3.11 .
Reasons are given for eliminating issues from further consideration.	The proposed scope of the assessment is set out in Section 4.2 . All SEA topics have been scoped in to the assessment.

²⁰² Office of the Deputy Prime Minister (2005) *A Practical Guide to the Strategic Environmental Assessment Directive*.

Quality Assurance Checklist	
Alternatives	
Realistic alternatives are considered for key issues, and the reasons for choosing them are documented.	All options were assessed as set out in Section 5 and Appendix E of this report.
Alternatives include 'do minimum' and/or 'business as usual' scenarios wherever relevant.	A 'do minimum' and/or 'business as usual' scenario is not appropriate for the revised draft Drought Plan due to the need to provide sufficient water to customers.
The environmental effects (both adverse and beneficial) of each alternative are identified and compared.	This is included in Section 5 and Appendix E of this report.
Inconsistencies between the alternatives and other relevant plans, programmes or policies are identified and explained.	No inconsistencies were identified.
Reasons are given for selection or elimination of alternatives.	This is set out in Section 1.3 of this report.
Baseline Information	
Relevant aspects of the current state of the environment and their likely evolution without the plan or programme are described.	Section 3 of this report characterises the current environmental baseline conditions, along with how these are likely to change in the future.
Environmental characteristics of areas likely to be significantly affected are described, including areas wider than the physical boundary of the plan area where it is likely to be affected by the plan.	The environmental characteristics of the Welsh Water area are described in Section 3 .
Difficulties such as deficiencies in information or methods are explained.	Baseline data limitations are discussed in Section 3.11 . Further difficulties and limitations are set out in Section 4.7 .
Prediction and Evaluation of Likely Significant Environmental Effects	
Effects identified include the types listed in the Directive (biodiversity, population, human health, fauna, flora, soil, water, air, climate factors, material assets, cultural heritage and landscape), as relevant; other likely environmental effects are also covered, as appropriate.	The potential effects of the options are identified in Section 5 and Appendix E .
Both positive and negative effects are considered, and the duration of effects (short, medium or long-term) is addressed.	The nature and duration of potential effects has been set out in the detailed assessment matrices contained in Appendix E of this report.
Likely secondary, cumulative and synergistic effects are identified where practicable.	Information on secondary, cumulative and synergistic effects is set out in Section 5.13 . Where identified, effects are also set out in the detailed assessment matrices contained in Appendix E of this report.
Inter-relationships between effects are considered where practicable.	These relationships are identified where appropriate in the detailed assessment matrices contained in Appendix E of this report.
The prediction and evaluation of effects makes use of relevant accepted standards, regulations, and thresholds.	Relevant standards have been used where appropriate in undertaking the assessment.
Methods used to evaluate the effects are described.	Information on the methods used for evaluation of potential effects is included in Section 4 and in the detailed assessment matrices contained in Appendix E of this report. The definitions of significance used in the assessment are set out in Appendix D .
Mitigation Measures	
Measures envisaged to prevent, reduce and offset any significant adverse effects of implementing the plan or programme are indicated.	Mitigation measures for potential negative effects are set out in Section 5.15 and in the commentary to the matrices in Appendix E .

Quality Assurance Checklist	
Issues to be taken into account in project consents are identified.	Issues to be taken into account in project consents are included in the appraisal matrices in Appendix E .
The Environmental Report	
Is clear and concise in its layout and presentation.	We believe the report is clear and concise.
Uses simple, clear language and avoids or explains technical terms.	The report uses accessible language wherever possible.
Uses maps and other illustrations where appropriate.	Maps and illustrations have been utilised in the report.
Explains the methodology used.	The method used is set out in the report in Section 4 .
Explains who was consulted and what methods of consultation were used.	Appendix B of this report outlines the consultation that has been carried out to-date.
Identifies sources of information, including expert judgement and matters of opinion.	Sources of information are included throughout the report.
Contains a non-technical summary covering the overall approach to the SEA, the objectives of the plan, the main options considered, and any changes to the plan resulting from the SEA.	A Non-Technical Summary has been included as part of the report.
Consultation	
The SEA is consulted on as an integral part of the plan-making process.	The previously issued SEA Scoping Report was consulted upon and responses are included in this Environmental Report (see Appendix B).
Consultation Bodies and the public likely to be affected by, or having an interest in, the plan or programme are consulted in ways and at times which give them an early and effective opportunity within appropriate time frames to express their opinions on the draft plan and Environmental Report.	Consultation on the draft Drought Plan and an earlier version of this Environmental Report was undertaken by Welsh Water for an 8 week consultation, beginning the 25th July 2019 (see Appendix B).
Decision-making and Information on the Decision	
The Environmental Report and the opinions of those consulted are taken into account in finalising and adopting the plan or programme.	This revised Environmental Report has been amended to reflect the revisions made to the draft Drought Plan following consultation (see Section 1.3).
An explanation is given of how they have been taken into account.	This revised Environmental Report has been amended to reflect the revisions made to the draft Drought Plan following consultation (see Section 1.3).
Reasons are given for choosing the plan or programme as adopted, in the light of other reasonable alternatives considered.	This will be set out in the Post Adoption Statement to be issued along with the final Drought Plan.
Monitoring Measures	
Measures proposed for monitoring are clear, practicable and linked to the indicators and objectives used in the SEA.	The report sets out potential monitoring measures that Welsh Water could use in Section 6.4 .
Monitoring is used, where appropriate, during implementation of the plan or programme to make good deficiencies in baseline information in the SEA.	The suggestions for monitoring are included in Section 6.4 of the report.
Monitoring enables unforeseen adverse effects to be identified at an early stage. (These effects may include predictions which prove to be incorrect.)	The suggestions for monitoring made in Section 6.4 are for Welsh Water to act on, with monitoring taking place following implementation of the Drought Plan.
Proposals are made for action in response to significant adverse effects.	Mitigation methods are outlined for the preferred options in Section 5.15 of this report and Appendix E .



Appendix B

Consultation Responses



Table B.1 Scoping Report Natural Resources Wales

Consultation Question	Section	Consultee Response	Response/Action
Q1. Do you think that this scoping report sets out sufficient information to establish the context for the SEA of the draft Drought Plan in terms of the review of plans and programmes and baseline evidence and analysis? If not, which areas do you think have been missed and where is information on these topics available from?	General	<p>We welcome the information identified as part of the review of relevant plans and programmes and the baseline evidence and analysis presented within your scoping report. However, we consider that some of the baseline evidence is out of date, particularly in respect to the Water Framework Directive (WFD) information. We also consider that there is some other baseline evidence, plans and programmes relevant to the drought plan that should be considered as part of your review. Our recommendations are set out in the attached Annex 1.</p>	<p>Comment noted.</p> <p>Responses/actions addressing the comments made in Annex 1 of the NRW submission are provided below in our response to Q1.</p>
	Section 2: Review of Plans and Programmes	<p>We consider that there are some omissions from the review of plans and programmes that should be considered for the Welsh resource zones. A list of plans and programmes to include are as follows:</p> <ul style="list-style-type: none"> • UK Climate Change Risk Assessment Evidence Report (2017) • The Environmental Permitting (England & Wales) Regulations (2016) - replaces the Groundwater (England and Wales) Regulations 2009 • Welsh Government’s National Indicators for Wales (2016) • Canal & River Trust Water Resources Strategy (2015) • Public Service Boards (PSBs) – PSB Assessments and Local Well-being Plans (various) • Waterwise - Water Efficiency Strategy for UK (2017) • NRW River Basin Management Plans 2015-2020 • NRW Abstraction Licensing Strategies (Various) • NRW drought plan (available on request) • Geodiversity Action Plans (various) • Welsh Government Nature Recovery Action Plan for Wales (2015) • DCWW Environment Report 2015-2016 • DCWW Biodiversity Plan (2017) • DCWW Welsh Water 2050 (2018) • Historic Environment Group Wales – Historic Environment and Climate Change Sector Adaptation Plan (2018) 	<p>Comment noted.</p> <p>The review of plans and programmes presented in Appendix C will be updated to reflect this response.</p> <p>A number of the documents identified are not considered to be plans and programmes in the context of the SEA Directive and Regulations and in consequence, they have not been included in the review of plans and programmes e.g. UK Climate Change Risk Assessment Evidence Report (2017), Welsh Government’s National Indicators for Wales (2016) and DCWW Environment Report 2015-2016. However, where appropriate, the findings of these reports will be used in amending the baseline analysis for the relevant topics.</p>

Consultation Question	Section	Consultee Response	Response/Action
		<p>Note that the State of Natural Resources Report (SoNaRR, 2016) was published by Natural Resources Wales (rather than the Welsh Government).</p> <p>It would be useful if you could separate out the plans related to the relevant regulators, for example, provide an individual line for NRW Flood Risk Management Plans.</p> <p>Future plans (for awareness)</p> <ul style="list-style-type: none"> Natural Resources Wales – Area Statements (2019) <p>It is also worth acknowledging the Welsh Government's National Development Framework (NDF). We recognise that it is not expected to be published until March 2020. However, the Welsh Government will be consulting on main issues, options and preferred option, supported by environmental reports and assessments early next year. More information on the timetable and background can be found at: http://gov.wales/docs/desh/publications/161206statement-of-public-participation-en.pdf</p>	<p>A number of identified plans e.g. the Public Service Boards (PSBs) Local Well-being Plans, NRW RBMPs and NRW ALS will be summarised collectively by plan or strategy type. It is considered inappropriate to review each individually. The Flood Risk Management Plans will be separated out by author.</p> <p>The authorship of the SoNaRR report has been updated.</p> <p>Whilst it is useful future context, particularly where plans are proposed that could be adopted before the SEA is completed, it is not appropriate to include in detail draft plans within the review of plans and programmes, given the level of change that can occur between draft and adopted stages.</p>
	Section 3: Baseline Analysis	<p>Fisheries/Biodiversity</p> <p>We would encourage you to consider more widely issues around salmonid fish spawning and recruitment in tributaries that can be influenced by reservoir releases. Therefore, consider how you may off-set any environmental impact of options relating to dams and reservoirs (e.g. reduction in compensation releases).</p> <p>Due regard should be given to Dŵr Cymru's Biodiversity and Resilience of Ecosystems Duty under section 6 of Environment (Wales) Act. In addition, you should consider the section 7 list of priority habitats and species.</p>	<p>Comment noted.</p> <p>The Scoping Report identifies potential impacts on salmonid fish from drought supply-side options by stating that "<i>Priority species including Atlantic salmon and brown/sea trout are vulnerable to changes in water quality, quantity and barriers to migration, with salmon stocks at an all-time low across their North Atlantic range, and specific concern over trout rivers in south-west Wales.</i>"</p> <p>Impacts on salmonid fish have been considered and mitigation measures identified during the assessment of drought supply-side options, where appropriate. Consideration has also been given to Dŵr</p>

Consultation Question	Section	Consultee Response	Response/Action
			Cymru's Biodiversity and Resilience of Ecosystems Duty under section 6 of Environment (Wales) Act and Section 7 List of Priority Habitats and Species.
	Section 3: Baseline Analysis	<p>Fluvial Geomorphology</p> <p>We would recommend that you consider any potential changes to 'fluvial geomorphology' (for example sediment loading) from your drought supply-side options and therefore any potential impacts to WFD status.</p>	<p>Comment noted.</p> <p>Impacts on fluvial geomorphology have been considered during the assessment of drought supply-side options where appropriate.</p>
	Section 3: Baseline Analysis	<p>Water bodies in Wales</p> <p>The number and type of water bodies in Wales has been summarised in Table 3.3 and lists a total of 1216 water bodies. This information relates to the 1st cycle of WFD River Basin Districts and is out of date. In cycle 2 we have a total of 942 water bodies. Therefore, the SEA should be using the best available information from WFD Cycle 2. These datasets are publically available from Geoportal lle.</p>	<p>Comment noted. The number and type of water bodies provided in Table 3.3 are from NRW (2015) River Basin Planning Progress Report for Wales 2009 – 2015. This information includes an update to the WFD Cycle 1, specifically NRW's review of water bodies listed as Heavily Modified Water Bodies.</p> <p>Equivalent information is not available using the datatest referred to in this response and in consequence, Table 3.3 has not been updated.</p>
	Section 3: Baseline Analysis	<p>NEP</p> <p>Regarding Water Industry Natural environment programme (WINEP, page 43), this section is unclear, as to whether it is talking solely about England or England and Wales combined. In Wales, it is still called National Environment Programme (NEP). The figures provided appear to come from .gov, which is for investment in England only as set out by the Environment Agency. Therefore, the SEA baseline assessment should also include a breakdown of specific investment goals for Wales.</p>	<p>Agreed.</p> <p>Section 3.4 of the Scoping Report refers to both WINEP in England and NEP in Wales and states that "WINEP represents a set of actions that the Environment Agency have requested all water companies operating in England (including Welsh Water's supply area in England), to complete between 2020 and 2025, in order to contribute towards meeting their environmental obligations. A similar National Environment Programme (NEP) applies in Wales. "). This section has been</p>

Consultation Question	Section	Consultee Response	Response/Action
			updated in the Environmental Report using information on specific investment in Wales detailed in the River Basin Management Plans and supplemented, where available, by additional publicly available information.
	Section 3: Baseline Analysis	<p>Supply and Demand</p> <p>The information provided in the baseline section related to Dŵr Cymru' s draft water resources management plan, which has been superseded by different demand forecasts (including leakage and per capita consumption reductions) and revised deficit positions within the revised plan (June 2018). Going forward, we recommend that the information is based on the revised plan.</p>	<p>Agreed.</p> <p>This section has been revised to ensure the most recent supply and demand forecast/scenarios provided in the Revised Draft Water Resources Management Plan (September 2018)²⁰³ is referenced.</p>
	Section 3: Baseline Analysis	<p>Wastewater Treatment</p> <p>Please note under Wastewater treatment (pg. 45): two-out of four star rating equates to "requiring improvements" as per information provided on our website: https://naturalresources.wales/about-us/news-and-events/news/nrw-publishes-annual-report-into-dwr-cymru-welsh-water-s-performance/?lang=en</p>	<p>Agreed.</p> <p>The definition of the rating has been added to the commentary.</p>
	Section 3: Baseline Analysis	<p>Nitrate Vulnerable Zones</p> <p>Under Nitrate Zones (pg. 47), please title this as Nitrate Vulnerable Zones. We have also found the information within this section contradictory. The first sentence is stating that the last review was by Environment Agency Wales in 2013 and the second states the Welsh Government did a review in 2016-17.</p> <p>We acknowledge that whilst a review was completed in 2016, the outcomes have not been finalised. Furthermore, Urban Waste Water Treatment Directive sensitive areas (eutrophic) have been left out of this assessment – therefore please refer to NRW's SoNaRR chapter 3 and its references for more information.</p>	<p>Comment noted.</p> <p>The relevant section of the Environmental Report has been updated to reflect this response as follows:</p> <ul style="list-style-type: none"> The title of this section will be re-named as Nitrate Vulnerable Zones. The Scoping Report states that "<i>The most recent review of NVZs in Wales was undertaken in 2013 by the Environment Agency Wales [...] The Welsh Government consulted on NVZ's</i>

²⁰³ Welsh Water (September 2018) *Revised Draft Water Resource Management Plan 2019*. Available at <https://www.dwrcymru.com/en/My-Water/Water-Resources/Revised-Draft-Water-Resources-Management-Plan-2019.aspx>

Consultation Question	Section	Consultee Response	Response/Action
			<p>and Action Programme requirements from September to December 2016," Additional commentary has been included in this section to clarify that the documents and responses of the 2016 NVZ consultation are published in the Welsh Government website²⁰⁴ but the outcome of the NVZ review has not yet been finalised.</p> <ul style="list-style-type: none"> • Consideration will be given to the Urban Waste Water Treatment Directive sensitive areas (eutrophic) including the areas identified by the Directive as Sensitive Areas.
	Section 3: Baseline Analysis	<p>Water Quality</p> <p>Table 3.4 (pg. 46) relates to the percentage of water bodies in each River Basin District achieving poor, moderate or good status, both in 2009 and 2015. The information in this section do not match those that have been published by NRW in our river basin planning progress report 2009-2015. We recommend that the SEA references the correct information within our report available at this link:</p> <p>https://cdn.naturalresources.wales/media/676155/progress-report-for-wales-2009-2015-english.pdf?mode=pad&rnd=131596369400000000</p> <p>In addition to the SEA report states - The 'Wales' Marine Evidence Report' (2015)⁷⁴ highlights that no transitional or coastal water bodies in Wales fail the assessment of chemical status, based on priority hazardous substances defined in the WFD. However, in numerous instances, ecological status /potential has not been reported as good. This statement is incorrect as the WFD classification reports eight transitional and eight coastal water bodies that fail the assessment for chemical status. This is available externally on Water Watch Wales.</p> <p>We also acknowledge that under future baseline section, this only quotes target water body figures for the Dee and the Western Wales River Basin Districts. This section should also include the Welsh part of the Severn River Basin District.</p>	<p>Comment noted.</p> <p>The relevant section of the Environment Report have been updated to reflect this response as follows:</p> <ul style="list-style-type: none"> • We confirm that the data provided in Table 3.4 is based on NRW (2015) River Basin Planning Progress Report for Wales 2009 – 2015. . The status categories of 'bad' and 'not assessed' have been added to Table 3.4 to capture the 3 water bodies in the Welsh Part of the Severn River to which the categories are applicable. • The WFD classification of transitional and coastal water bodies which was based on the Wales' Marine Evidence Report' (2015) has been updated using the latest WFD Classification. It is noted that whilst the Cycle 2 interim

²⁰⁴ Welsh Government (2018) Consultation outcome: Nitrate vulnerable zones in Wales. Available at <https://beta.gov.wales/nitrate-vulnerable-zones-wales>

Consultation Question	Section	Consultee Response	Response/Action
		<p>Under the Key Sustainability Issues for Water we would like you to consider the following amendments:</p> <ul style="list-style-type: none"> - The need to maintain and further improve the quality of the rivers, estuarine and coastal waters taking into account WFD objectives; - can you add lakes and consider amending the wording protect, enhance and restore - The need to maintain the quantity and quality of groundwater resources taking into account WFD objectives; can you change it to protect, enhance and restore - The need to ensure sustainable and appropriate abstraction levels and water flow/levels in Wales' waters across the full range of regimes from low to high conditions and meet society's needs for a resilient water supply; - The need to ensure that the continued risk of flooding is reduced or where this is not possible, mitigated effectively; using natural flood management and green engineering where possible and - The potential effects of climate change and the need to build climate change resilience into the water environment and water management. 	<p>classification on the status of freshwater water bodies has been recently published on Water Watch Wales the Cycle 2 interim marine classification is expected in the winter of 2018/2019.</p> <ul style="list-style-type: none"> • The Future Baseline Section includes additional commentary on the actions being taken to improve the water bodies in the Welsh part of the Severn RBD which will be targeted by NRW to improve compliance with good status. • The Key Sustainability Issues Section has been amended to reflect the comments.
	Appendix B: Review of Plans and Programmes	<p>In addition, within appendix B, under the European Union (2000) EU Water Framework Directive (2000/60/EC) it would be beneficial to reference the actual purpose of the Directive rather than amending the descriptions. Some further amendments are recommended as follows:</p> <p>Key targets and indicators relevant to the draft Drought Plan and SEA are:</p> <ul style="list-style-type: none"> - Achievement of good ecological status and good surface water chemical status by 2015; unless alternative objectives have been identified - Achievement of good ecological potential and good surface water chemical status for heavily modified water bodies and artificial water bodies; - Prevention of deterioration from one status class to another; duplicated below - Achievement of water-related objectives and standards for protected areas; - Achievement of good groundwater quantitative and chemical status by 2015; - Prevention of deterioration from one status class to another; - can you add in including of each element - Reversal of any significant and sustained upward trends in pollutant concentrations and prevent or limit input of pollutants to groundwater; - Achievement of water related objectives and standards for protected areas contributes to mitigating the effects of floods and droughts. <p>Note that the Bathing Waters directive section should be updated as currently includes the 1976 standards which were amended in 2006.</p>	<p>Agreed.</p> <p>The review of the WFD and Bathing Waters Directive has been amended to include additional information.</p>

Consultation Question	Section	Consultee Response	Response/Action
	Section 3: Baseline Analysis	<p>Flood Risk</p> <p>We acknowledge that it has been stated that flood risk has been scoped out of the SEA. However, there is a paragraph included to cover this area (pg. 47). In here, the challenges have been identified and flood risk has been noted as a key sustainability issue. Flood risk is also picked up under climate change (pg. 55) and the report does identify the need to take account of and adapt to the potential effects of climate change and to increase resilience to effects of climate change. The links with climate change and flood risk is also summarised in Table 3.23. Therefore, it appears to not have been scoped out of SEA as it has been considered under the proposed assessment framework and key sustainability issues.</p>	<p>Comment noted.</p> <p>Flood risk is included in the presentation of the baseline, with information included as has been noted to provide a comprehensive description of the environment, and issues that could be relevant to the assessment. However, as set out in Table 4.1, the topic has then been scoped out from the assessment framework as follows <i>"it is not necessary to consider minimising flood risk and improving flood control measures as the Plan is intended for use during periods of drought."</i></p> <p>In consequence, an SEA assessment objective has not been included for flood risk, and it will not be part of the subsequent assessment of the Drought Plan options.</p> <p>No changes have been made.</p>
	Section 3: Baseline Analysis	<p>Landscape</p> <p>We recommend adding to the Wellbeing Goals column that Landscape also contributes significantly to a 'Prosperous Wales' e.g. Wales' 3 National Parks attract 12 million visitors per annum, spending around £1billion on goods and services (Valuing Wales' National Parks, Arup 2013).</p>	<p>Agreed.</p> <p>Additional commentary has been added to reflect your comments.</p>
	Section 4: Approach to the Assessment	<p>Proposed Assessment Framework</p> <p>a) The biodiversity assessment should consider a question relating to how the drought plan will affect Dŵr Cymru' s Biodiversity and Resilience of Ecosystems Duty (s6) and the section 7 list under the Environment (Wales) Act.</p> <p>b) Under water, we recommend adding the following question:</p>	<p>Agreed.</p> <p>The Environment (Wales) Act 2016 section 6 duty requires that a <i>"public authority must seek to maintain and enhance biodiversity in the exercise of functions in relation to Wales, and in so doing promote the resilience of</i></p>

Consultation Question	Section	Consultee Response	Response/Action
		<p>- "Will the draft Drought plan measure jeopardise the attainment of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the directive?"</p> <p>c) Under human health, we also recommend adding the following questions:</p> <p>- "Will the option affect public access to, or enjoyment of, local green/blue space?"</p> <p>- "Will the option impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?"</p>	<p><i>ecosystems, so far as consistent with the proper exercise of those functions.</i></p> <p><i>(2) In complying with subsection (1), a public authority must take account of the resilience of ecosystems, in particular the following aspects—</i></p> <p><i>(a) diversity between and within ecosystems;</i></p> <p><i>(b) the connections between and within ecosystems;</i></p> <p><i>(c) the scale of ecosystems;</i></p> <p><i>(d) the condition of ecosystems (including their structure and functioning);</i></p> <p><i>(e) the adaptability of ecosystems."</i></p> <p>The guide questions for SEA Objective 1 (biodiversity) contained in Table 4.2 has been reviewed against these criteria to ensure that they are appropriately reflected.</p> <p>The guide questions for SEA Objective 5 (human health) has been revised to include the additional guide questions.</p>
<p>Q2. Do you agree with the main economic, social and environmental issues identified are relevant to the SEA of the draft Drought Plan? If not, which issues do you think need to be included or excluded?</p>	General	<p>We welcome how you are considering the Well-being of Future Generations (Wales) Act and the Environment (Wales) Act within the SEA scoping. We expect that the SEA should consider the company's duties under section 6 and 7 of the Environment (Wales) Act - i.e. the biodiversity and resilience of ecosystems duty (s6) and the list of habitats and species of priority importance for biodiversity (s7). Therefore, these duties should be included in the SEA scoping.</p> <p>There are some additional issues relevant to the Plan that should be considered as part of your review. These are set out in our detailed comments in the attached Annex 1.</p>	<p>Comment noted.</p> <p>The duties under the Environment (Wales) Act 2016 are identified in the review of plans and programmes contained in Appendix C, with the implications for the Drought Plan 2020 and SEA also detailed.</p> <p>The guide questions within the SEA assessment framework have been amended to ensure the extent to which the draft Drought Plan 2020 options are consistent with the duties under the Environment (Wales) Act 2016 can be assessed. .</p>

Consultation Question	Section	Consultee Response	Response/Action
<p>Q3. Do you agree that the proposed approach to the SEA of the draft Drought Plan?</p> <p>Do the SEA objectives and guide questions that comprise the assessment framework cover sufficient range of the environmental, social and economic topics?</p> <p>If not, which objectives/guide questions should be amended, and other objectives/guide questions do you believe should be included?</p>	Section 4: Approach to the Assessment	We agree with most of the draft objectives for the SEA as set out in your proposed assessment framework (Table 4.2). We recommend that there are some changes that could be incorporate within your framework. These are set out in the attached Annex 1.	<p>Comment noted.</p> <p>A revised SEA assessment framework, incorporating proposed changes is set out in Table 4.2 of this report.</p>

Table B.2 Scoping Report Environment Agency

Consultation Question	Section	Consultee Response	Response/Action
SEA Scoping Report (the EA did not structure their response by the consultation questions)	General	No specific comments, it is as clear and comprehensive as an assessment of this scale can be. Both the SEA and HRA scoping documents are good pieces of work.	Comment noted.
HRA Summary of Scope and Approach	General	Pleased to see that People v. Wind has been taken into account. Pleased that the HRA is placing an emphasis on measures which will have a likely significant effect over and above the effects occurring as a result of natural drought conditions. Both the SEA and HRA scoping documents are good pieces of work.	Comment noted.
Environmental Assessment Reports (EARs) (the EA also provided additional commentary on the EARs)	General	Leintwardine EAR – although the 0.1MI/d may not seem much of an increase, in view of the frequency with which the Teme has dried up (including immediately upstream of the confluence with the River Clun) recently, would question whether any increase would be acceptable and cause minimal effect. This situation of the river drying up more frequently is a cause of concern to both the Agency and Natural England as the river is a SSSI and there is already a perception that it may be related to the public water supply abstraction. It appears investigations were carried out but in 1990 and 1991 and it has been suggested that a review of the current available information/data/knowledge is undertaken and further investigations carried out, if necessary. There is also concern that monitoring and setting of HoFs is related to gauging down at Tenbury Wells where the river is very different. The Vowchurch Dore EAR seems more comprehensive and more ready to recognise ‘uncertainty’ – again this river also runs dry above the abstraction boreholes but am aware that a recent variation and test pumping took this into account. Therefore have more confidence in this assessment. A general concern that the River Teme SSSI is already drying out (and it seems to be more frequently) and we also have recent experience of the River Dore at Peterchurch drying up but unsure of the reasons behind this.	Comments noted.

Table B.3 Cadw

Consultation Question	Section	Consultee Response	Response/Action
SEA Scoping Report (Cadw did not structure their response by the consultation questions)	General	Having reviewed the report, it is our view that the scoping for the proposed SEA is appropriate.	Comment noted.

Table B.4 Environmental Report Natural Resources Wales

Section	Consultee Response	Response/Action
General	<p>In relation to the SEA Environmental Report, given that there is at least three options where adverse effects on site integrity cannot be ruled out, we are concerned that the SEA has not assigned a significant negative (--) assessment against the biodiversity receptor (see Tables NTS1 to NTS4 of the report). Our concern is that the inclusion of question marks (-/?) within the assessment appears to play down the significance of this impact. Therefore, the SEA Environmental Report should be amended to reflect the significance of the HRA conclusions in the final plan, as discussed in this response.</p>	<p>Comment noted.</p> <p>The revised Environmental Report has been amended to reflect the amended Drought Plan. Four options where it was concluded that adverse effect on the integrity of European sites could not be ruled out have been removed (8109-4 Lwyd, 8201-1 Crai, 8206-1 Crowhill, 8206-8 Canaston, 8201-4 Brianne). For those remaining options, no adverse effects on European sites have been identified. This is detailed in the individual option assessments (Appendix E) and summarised in the main body of the report (Section 5) and in the NTS.</p>

Appendix C

Review of Plans and Programmes

International / European Plans and Programmes	
Purpose of the Document, including Objectives and Targets relevant to the Drought Plan and SEA	Relationships and Influences on the Drought Plan and the SEA
The Bonn Convention (or CMS) 1975 <i>The Convention on the Conservation of Migratory Species of Wild Animals</i>	
<p>The Convention on the Conservation of Migratory Species of Wild Animals (also known as the Bonn Convention or CMS) is an intergovernmental treaty under the United Nations Environment Programme. The convention was signed in 1979 ratified in the UK in 1985.</p> <p>The convention aims to ensure contracting parties work together to conserve terrestrial, marine and avian migratory species and their habitats (on a global scale) by providing strict protection for endangered migratory species.</p> <p>Overarching objectives set for the Parties are:</p> <ul style="list-style-type: none"> - Should promote, co-operate in and support research relating to migratory species; - Shall endeavour to provide immediate protection for migratory species; - Shall endeavour to conclude Agreements covering the conservation and management of migratory species included in Appendix II. <p>Setting targets is the responsibility of member states.</p>	<p>The draft Drought Plan should take into account the habitats and species that have been identified under this directive, and should include provision for their protection, preservation and improvement.</p> <p>The SEA assessment framework should include biodiversity, incorporating the importance of conserving migratory species.</p>
The Bern Convention 1979	
<p>The Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention) was adopted in Bern, Switzerland in 1979, and came into force in 1982.</p> <p>The principal objectives are:</p> <ul style="list-style-type: none"> - To conserve wild flora and fauna and their natural habitats, especially those species and habitats whose conservation requires the co-operation of several States; - To promote such co-operation. Particular emphasis is given to endangered and vulnerable species, including endangered and vulnerable migratory species; - In order to achieve this the Convention imposes legal obligations on contracting parties, protecting over 500 wild plant species and more than 1000 wild animal species. <p>Targets for Contracting Parties are:</p> <ul style="list-style-type: none"> - Promoting national policies for the conservation of wild flora, wild fauna and natural habitats, with particular attention to endangered and vulnerable species, especially endemic ones, and endangered habitats, in accordance with the provisions of this Convention; - Undertaking in its planning and development policies, and in its measures against pollution, to have regard to the conservation of wild flora and fauna; - Promoting education and disseminating general information on the need to conserve species of wild flora and fauna and their habitats. 	<p>The draft Drought Plan should take into account the habitats and species that have been identified under the Convention, and should include provision for the preservation, protection and improvement of the quality of the environment as appropriate.</p> <p>The SEA assessment framework should incorporate the conservation provisions of the Convention particularly the protection of wild flora, fauna and natural habitats.</p>
UNESCO (1971) <i>The Ramsar Convention on Wetlands</i>	

International / European Plans and Programmes	
Purpose of the Document, including Objectives and Targets relevant to the Drought Plan and SEA	Relationships and Influences on the Drought Plan and the SEA
<p>The Convention on Wetlands of International Importance was signed in Ramsar, Iran in 1971. It is an intergovernmental treaty which provides the framework for national action and international co-operation for the conservation and wise use of wetlands and their resources, as a means to achieving sustainable development throughout the world.</p> <p>The original emphasis was on the conservation and wise use of wetlands primarily to provide habitat for waterbirds, however over the years the Convention has broadened its scope to incorporate all aspects of wetland conservation and wise use, recognising wetlands as ecosystems that are extremely important for biodiversity conservation and for the well-being of human communities.</p> <p><i>'The Convention's mission is the conservation and wise use of all wetlands through local, regional and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world'</i> (Ramsar COP8, 2002).</p> <p>A Strategic Plan 2009-2015 has been adopted to provide guidance on how efforts for implementing the Convention on Wetlands should be focussed. The strategy has 5 goals:</p> <ul style="list-style-type: none"> - Wise use: The wise use of all wetlands being achieved in all Parties, including more participative management of wetlands, and conservation decisions being made with an awareness of the importance of the ecosystem services provided by wetlands; - Wetlands of International Importance: Parties designating and managing Ramsar sites within their territories with a view to supporting an international network of Wetlands of International Importance, fully implementing their reporting commitments under Articles 3 and 8.2, and using the Montreux Record as part of the Convention's governance process, as appropriate; - International cooperation: Parties developing their coherent national approaches to the implementation of the Ramsar Convention in such a way as to benefit from developing effective partnerships with related conventions and international agencies and with other Parties to the Convention on Wetlands; - Institutional capacity and effectiveness: Increasing success of the Convention in achieving the conservation and wise use of wetlands, as measured by agreed effectiveness indicators, and increased recognition of the Convention's achievements by other sectors of governments and civil society; - Membership: All countries eligible for accession to have joined the Ramsar Convention by 2015. <p>A number of strategic key results are set out in the strategy against each of the 5 goals, e.g. by 2015 global wetland distribution and status data and information should be available through Webportal mechanisms, Ramsar guidance on the maintenance of ecological character to be have been applied with a priority upon recognized internationally important wetlands not yet designated as Ramsar sites.</p>	<p>The draft Drought Plan should ensure the protection and wise use of wetlands.</p> <p>The SEA assessment framework should incorporate the protection of wetland sites listed under the Ramsar convention.</p>
UNESCO World Heritage Convention (1972)	
<p>The Convention defines the kind of natural or cultural sites which can be considered for inscription on the World Heritage List. In addition to this, countries are required to:</p> <ul style="list-style-type: none"> • Ensure that measures are taken for the protection, conservation and presentation of cultural and natural heritage • Adopt a general policy that gives cultural and natural heritage a function in the life of the community • Integrate the protection of heritage into comprehensive planning programmes 	<p>The assessment framework should include an objective on heritage and archaeological issues.</p>



International / European Plans and Programmes	
Purpose of the Document, including Objectives and Targets relevant to the Drought Plan and SEA	Relationships and Influences on the Drought Plan and the SEA
The Kyoto Protocol 1997	
<p>The Kyoto Protocol was adopted in Kyoto, Japan, on 11 December 1997 and entered into force on 16 February 2005. It is an international agreement linked to the United Nations Framework Convention on Climate Change. The major feature of the Kyoto Protocol is that it sets binding targets for industrialized countries for reducing greenhouse gas (GHG) emissions. These amounted to an average of five per cent against 1990 levels in the first commitment period (2008 to 2012). The Protocol is planned to be extended to 2020 (the Kyoto second commitment period), pending ratification of the Doha Agreement.</p>	<p>The draft Drought Plan should aim to reduce greenhouse gas emissions.</p> <p>The SEA assessment framework should include objectives/guide questions related to reducing greenhouse gas emissions.</p>
The Aarhus Convention 1998	
<p>To contribute to the protection of present and future generations to live in an environment adequate to his or her health and well-being. This will be achieved through each Party subject to the convention guaranteeing the rights of access to information, public participation in decision-making, and access to justice in environmental matters in accordance with the provisions of this Convention.</p> <p>To establish and maintain a clear, transparent and consistent framework to implement the provisions of this Convention. This will be achieved through each Party taking the necessary legislative, regulatory and other measures, including measures to achieve compatibility between the provisions implementing the information, public participation and access-to-justice provisions in this Convention, as well as proper enforcement measures.</p> <p>Responsibility for implementation is deferred to the member states.</p>	<p>The development of the draft Drought Plan needs to be a transparent process.</p> <p>SEA should show a strong sense of safeguarding the lives of future generations and ensure that enough time is provided for consultation on the SEA documents in line with the Aarhus convention of establishing and maintaining a transparent clear framework.</p>
The Convention for the Protection of the Architectural Heritage of Europe (Granada Convention, 1987)	
<p>The main purpose of the convention is to reinforce and promote policies for the conservation and enhancement of Europe's heritage and to foster closer European co-operation in defence of heritage. Recognition that conservation of heritage is a cultural purpose and integrated conservation of heritage is an important factor in the improvement of quality of life.</p>	<p>The SEA assessment framework should include an objective on the conservation and enhancement of heritage and decision making criteria on architectural heritage.</p>
The European Convention on the Protection of Archaeological Heritage (Valetta Convention)	
<p>Agreement that the conservation and enhancement of an archaeological heritage is one of the goals of urban and regional planning policy. It is concerned in particular with the need for co-operation between archaeologists and planners to ensure optimum conservation of archaeological heritage.</p>	<p>The SA Framework should include an objective on the conservation and enhancement of heritage and decision making criteria on archaeological heritage.</p>
World Commission on Environment and Development (1987) <i>Our Common Future (The Brundtland Report)</i>	
<p>The Brundtland Report is concerned with the world's economy and its environment. The objective is to provide an expanding and sustainable economy while protecting a sustainable environment. The Report was a call by the United Nations:</p> <ul style="list-style-type: none"> to propose long-term environmental strategies for achieving sustainable development by the year 2000 and beyond; to strengthen co-operation among developing countries and between countries at different stages of economic and social development to achieve common and mutually supportive objectives which take account of the interrelationships between people, resources, environment and development; 	<p>The SEA and draft Drought Plan should seek to contribute to sustainable development.</p>

International / European Plans and Programmes	
Purpose of the Document, including Objectives and Targets relevant to the Drought Plan and SEA	Relationships and Influences on the Drought Plan and the SEA
<ul style="list-style-type: none"> to consider ways and means by which the international community can deal more effectively with environment concerns; and to help define shared perceptions of long-term environmental issues and the appropriate efforts needed to deal successfully with the problems of protecting and enhancing the environment, a long term agenda for action during the coming decades, and aspirational goals for the world community. 	
The World Summit on Sustainable Development, Johannesburg (September 2002)	
<p>The World Summit resulted in the Johannesburg Declaration on Sustainable Development and a Plan of Implementation. The declaration reaffirms principles already agreed upon at the Rio Earth Summit UNCED in 1992 and the UN Millennium Summit in 1999. It recognises that poverty eradication is a key condition for sustainable development and addresses issues such as cultural diversity, patterns of production and consumption, health issues, armed conflicts, the new dimension created by globalisation, gender issues and financing for development.</p> <p>The implementation plan sets out actions to achieve sustainable development such as poverty eradication, changing unsustainable patterns of consumption and production, protecting and managing the natural resource base of economic and social development, sustainable development in a globalizing world and health and sustainable development.</p> <p>Sustainable development in England is delivered through the sustainable development strategy, Securing the Future, and in Wales through One Wales: One Planet, The Sustainable Development Scheme of the Welsh Government.</p>	<p>The draft Drought Plan should promote sustainable development.</p> <p>The SEA should help to deliver sustainable development through the balanced assessment of the draft Drought Plan.</p>
United Nations Convention on Biodiversity (the Rio Convention, 1992)	
<p>The Convention on Biodiversity called for the development and enforcement of national strategies and associated action plans to identify, conserve and protect existing biological diversity, and to enhance it wherever possible. In the UK, the UK Biodiversity Action Plan was then established to conserve and enhance biodiversity in the UK through the use of Habitats and Species Action Plans to help the most threatened species and habitats to recover and to contribute to the conservation of global biodiversity.</p>	<p>The assessment framework should include protection and enhancement of biodiversity.</p>
European Landscape Convention 2000 (became binding March 2007)	
<p>The European Landscape Convention was adopted on 20 October 2000 in Florence and came into force on 1 March 2004 (Council of Europe Treaty Series no. 176). It is open for signature by member states of the Council of Europe and for accession by the European Community and European non-member states. The UK Government signed the European Landscape Convention in 2006 and it became binding from March 2007.</p> <p>The aims of the Convention are to promote landscape protection, management and planning, and to organise European co-operation on landscape issues.</p> <p>Responsibility for implementation has been deferred to the signatories. Articles 5 (general measures) and 6 (specific measures) set out measures that the signatories will undertake, e.g. integrating landscape into policies with possible direct or indirect impact on landscape and to introduce instruments aimed at protecting, managing and/or planning the landscape.</p>	<p>The draft Drought Plan should take landscape into account.</p> <p>The SEA assessment framework should include landscape.</p>
The Paris Agreement 2016	
<p>The Paris Agreement was adopted at the 2015 Climate Change Conference, which aims to limit global temperature rises to 2 degrees. It was adopted by 195 countries at the Conference but will</p>	<p>The draft Drought Plan should aim to reduce greenhouse gas emissions.</p>



International / European Plans and Programmes	
Purpose of the Document, including Objectives and Targets relevant to the Drought Plan and SEA	Relationships and Influences on the Drought Plan and the SEA
not come into force in 2020 unless ratified by at least 55 countries. The Agreement opened for signature in April 2016.	The SEA assessment framework should include greenhouse gas emissions.
European Commission (2006) <i>Thematic Strategy for Soil Protection</i>	
<p>The <i>Thematic Strategy for Soil Protection</i> consists of a Communication from the Commission to the other European Institutions, a proposal for a framework Directive (a European law), and an Impact Assessment.</p> <p>It sets out an EU strategy for soil protection with an overall objective of the protection and sustainable use of soil, based on the following guiding principles:</p> <p>(1) Preventing further soil degradation and preserving its functions:</p> <ul style="list-style-type: none"> - when soil is used and its functions are exploited, action has to be taken on soil use and management patterns; and - when soil acts as a sink/receptor of the effects of human activities or environmental phenomena, action has to be taken at source. <p>(2) Restoring degraded soils to a level of functionality consistent at least with current and intended use, thus also considering the cost implications of the restoration of soil.</p> <p>The strategy proposes introducing a framework Directive setting out common principles for protecting soils across the EU, with Member States deciding how best to protect soil and how use it in a sustainable way on their own territory.</p>	<p>The draft Drought Plan should take potential effects on soil into account.</p> <p>The SEA assessment framework should include soils.</p>
European Commission (EC) (2011) <i>A Resource- Efficient Europe- Flagship Initiative Under the Europe 2020 Strategy, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions (COM 2011/21)</i>	
<p>This flagship initiative aims to create a framework for policies to support the shift towards a resource-efficient and low-carbon economy which will help to:</p> <ul style="list-style-type: none"> • Boost economic performance while reducing resource use; • Identify and create new opportunities for economic growth and greater innovation and boost the EU's competitiveness; • Ensure security of supply of essential resources; and • Fight against climate change and limit the environmental impacts of resource use. 	<p>The draft Drought Plan should seek opportunities to ensure reductions in resource use and to ensure security of supply of water.</p> <p>The SEA framework should include objectives relating to resource use.</p>
European Commission (2011) <i>A Roadmap for Moving to a Competitive Low Carbon Economy in 2050</i>	
<p>The EU already has short term targets in place to reduce its emissions to 20% below 1990 levels by 2020; to increase the share of renewable energy to 20%; and to make a 20% improvement in energy efficiency. The 2050 roadmap looks beyond 2020 at longer term objectives.</p> <p>The roadmap suggests that by 2050, the EU should cut its emissions to 80% below 1990 levels through domestic reductions alone. It sets out milestones which form a cost-effective pathway to this goal - reductions of 40% by 2030 and 60% by 2040. It also shows how the main sectors responsible for Europe's emissions - power generation, industry, transport, buildings and construction, as well as agriculture - can make the transition to a low-carbon economy most cost-effectively.</p>	<p>The assessment framework should recognise that certain development proposals require an EIA to be undertaken, resulting in the identification of any likely significant environmental effects and associated mitigation measures.</p>
European Commission (2013) <i>Strategy on Adaptation to Climate Change</i>	

International / European Plans and Programmes	
Purpose of the Document, including Objectives and Targets relevant to the Drought Plan and SEA	Relationships and Influences on the Drought Plan and the SEA
<p>The EU strategy aims to make Europe more climate-resilient by adapting to the changing climate. It aims to provide a coherent approach to enhance preparedness and capacity to respond to the impacts of climate change. The three key objectives of the strategy are:</p> <ul style="list-style-type: none"> • Promoting action by Member States – encouraging Member States to adopt adaptation strategies and provide funding to boost capacity; • 'Climate-proofing' action at EU level – promoting adaptation in vulnerable sectors such as agriculture and fisheries; and • Better informed decision-making – addressing gaps in knowledge and improving the European information sharing platform, Climate-ADAPT. 	<p>The assessment framework should include criteria relating to climate resilience.</p>
European Commission (2014) A Policy Framework for Climate and Energy in the Period from 2020 to 2030	
<p>The 2030 climate and energy framework was adopted in 2014 and builds on the 2020 targets. It sets three key targets for 2030:</p> <ul style="list-style-type: none"> • at least 40% cuts in greenhouse gas emissions (from 1990 levels); • at least 27% share for renewable energy; and • at least 27% improvement in energy efficiency. <p>The greenhouse gas emissions and renewable energy targets are binding, while the energy efficiency target will be reviewed in 2020.</p>	<p>The draft Drought Plan should support longer term targets for reducing greenhouse gas emissions, increasing renewable energy and energy efficiency.</p> <p>The SEA assessment framework should include the consideration of energy and greenhouse gas emissions.</p>
European Commission (2015) 'Closing the loop - An EU Action Plan for the Circular Economy' policy package	
<p>This document sets out actions to implement the European Commission's long term vision of significantly reducing waste landfilling and increasing recycling.</p>	<p>The SEA should consider opportunities for the draft Drought Plan to contribute/enable the circular economy.</p>
European Union (1991) The Nitrates Directive (91/676/EEC)	
<p>The Nitrates Directive is designed to reduce water pollution caused by nitrate from agriculture. The directive requires Defra and the Welsh Government to identify surface or ground waters that are, or could be high in nitrate from agricultural sources.</p> <p>Once a water body is identified as being high in nitrate all land draining to that water is designated a Nitrate Vulnerable Zone. Within these zones, farmers must observe an action programme of measures which include restricting the timing and application of fertilisers and manure, and keeping accurate records.</p>	<p>The draft Drought Plan should be consistent with the aim to reduce water pollution caused by nitrate from agriculture.</p> <p>The SEA assessment framework should include water quality.</p>
European Union (1991) 91/271/EEC for Urban Waste-water Treatment	
<p>The aim of the Urban Waste Water Directive is to protect the environment from the adverse effects of waste water discharges. It sets out guidelines and legislation for the collection, treatment and discharge of urban waste water. The Directive was adopted by member states in May 1991 and is transposed into law in England and Wales by The Urban Waste Water Treatment (England & Wales) Regulations 1994 (as amended*). The Regulations require that all significant discharges are treated to at least secondary treatment. They also set standards and deadlines for the provision of sewage systems, the treatment of sewage according to the size of the community served by the sewage treatment works and the sensitivity of receiving waters to their discharges.</p>	<p>The draft Drought Plan needs to consider the implication of the Directive.</p> <p>The SEA assessment framework should include water quality.</p>

International / European Plans and Programmes	
Purpose of the Document, including Objectives and Targets relevant to the Drought Plan and SEA	Relationships and Influences on the Drought Plan and the SEA
<p>* The Regulations were amended in 2003 by The Urban Waste Water Treatment (England & Wales) (Amendment) Regulations 2003.</p> <p>Responsibility for Implementation is deferred to member states.</p>	
European Union (1992) <i>The Habitats Directive 92/43/EEC</i>	
<p>The Habitats Directive seeks to conserve natural habitats. Conservation of natural habitats requires member states to identify special areas of conservation and to maintain where necessary landscape features of importance to wildlife and flora.</p> <p>It is required that each Member State propose a list of sites indicating which natural habitat types and which species the sites host. The information would include a map of the site, its name, location and its extent. The Commission will then establish, in agreement with each Member State, a draft list of sites of Community importance drawn from the Member States' lists identifying those which host one or more priority natural habitat types or priority species.</p>	<p>The draft Drought Plan should take into account the habitats and species that have been identified under this Directive, and include provision for the preservation, protection and improvement of the quality of the environment as appropriate.</p> <p>The SEA assessment framework should incorporate sites protected for their nature conservation importance.</p>
European Union (1998) <i>Drinking Water Directive (98/83/EC)</i>	
<p>The Drinking Water Directive (DWD) concerns the quality of water intended for human consumption. The objective of the DWD is to protect the health of the consumers in the EU and to make sure the water is wholesome and clean. To do this, the DWD sets standards for 48 (microbiological and chemical) parameters that can be found in drinking water. The parameters must be monitored and tested regularly. In principle WHO guidelines for drinking water are used as a basis for the standards in the DWD. While translating the DWD into their own national legislation (transposition of the DWD), the Member States of the European Union can include additional requirements e.g. regulate additional substances that are relevant within their territory or set higher standards. However, Member States are not allowed to set lower standards as the level of protection of human health should be the same within the whole EU. Member States have to monitor the quality of the drinking water supplied to their citizens and of the water used in the food production industry. Member States report at three yearly intervals the monitoring results to the European Commission.</p> <p>Standards constitute legal limits. Sets limits for microbiological and chemical parameters in drinking water. Also gives indicator parameters.</p>	<p>The draft Drought Plan should contain objectives for drinking water quality to ensure that limits are not exceeded.</p> <p>The SEA assessment framework should include drinking water quality.</p>
European Union (1999) <i>Directive on the Landfill of Waste (99/31/EC)</i>	
<p>The Directive aims at reducing the amount of waste landfilled; promoting recycling and recovery; establishing high standards of landfill practice across the EU, and preventing the shipping of waste from one Country to another.</p> <p>The objective of the Directive is to prevent or reduce as far as possible negative effects on the environment (in particular on surface water, groundwater, soil, air and human health) from the land-filling of waste, by introducing stringent technical requirements for waste and landfills.</p> <p>The Directive requires the reduction of the amount of biodegradable municipal waste sent to landfill to 75% of the total generated in 1995 by 2006, 50% by 2009 and 35% by 2016.</p>	<p>The draft Drought Plan should take the effects on waste to landfill into account.</p> <p>The SEA assessment should consider the effects on water, soil, air, human health and waste</p>
European Union (2000) <i>EU Water Framework Directive (2000/60/EC)</i>	
<p>The purpose of this Directive is to establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater and to achieve good qualitative and</p>	<p>The draft Drought Plan needs to consider the implication of the</p>



International / European Plans and Programmes	
Purpose of the Document, including Objectives and Targets relevant to the Drought Plan and SEA	Relationships and Influences on the Drought Plan and the SEA
<p>quantitative status of all water bodies (including marine waters up to one nautical mile from shore).. The framework aims to:</p> <ul style="list-style-type: none"> - Protect any further deterioration and enhance the status of aquatic ecosystems and, with regard to their water needs, terrestrial ecosystems and wetlands directly depending on the aquatic ecosystems; - Promote sustainable water use based on a long-term protection of available water resources; - Enhance protection and improvement of the aquatic environment, inter alias, through specific measures for the progressive reduction of discharges, emissions and losses of priority substances and the cessation or phasing-out of discharges, emissions and losses of the priority hazardous substances; - Ensure the progressive reduction of pollution of groundwater and prevent its further pollution; - Contribute to mitigating the effects of floods and droughts. <p>Key targets and indicators relevant to the draft Drought Plan and SEA are:</p> <ul style="list-style-type: none"> - Achievement of good ecological status and good surface water chemical status by 2015 unless alternative objectives have been identified; - Achievement of good ecological potential and good surface water chemical status for heavily modified water bodies and artificial water bodies; - Prevention of deterioration, including of each element, from one status class to another; - Achievement of water-related objectives and standards for protected areas; - Achievement of good groundwater quantitative and chemical status by 2015; - Reversal of any significant and sustained upward trends in pollutant concentrations and prevent or limit input of pollutants to groundwater; - Achievement of water related objectives and standards for protected areas and contributes to mitigating the effects of flood and droughts. 	<p>Directive in terms of sustainable water use, protection and improvement of the aquatic environment, reducing and preventing pollution and mitigating the effects of droughts.</p> <p>The SEA assessment framework should include water quality, water resources, sustainable water use, and biodiversity.</p>
European Union (2001) Directive on the Assessment of the Effects of Certain Plans and Programmes on the Environment (SEA Directive) (2001/42/EC)	
<p>The objective of the SEA Directive is “to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view of contributing towards sustainable development”.</p> <p>Throughout the course of the development of the plan, policy or programme, the aim of SEA is to identify the potential impact of options proposed in the plan in terms of their environmental, economic and social effects. If any adverse effects are identified, these options can then be avoided or proposals modified to manage or mitigate adverse effects.</p>	<p>Driver for SEA. Need to ensure all topics identified in the SEA Directive are considered within the scope of the assessment. Need to ensure that the subsequent Environmental Report meets the requirements of Annex I of the SEA Directive.</p>
European Union (2001) National Emissions Ceiling Directive 2001/81/EC	
<p>The Directive sets upper limits for each Member State for the total emissions in 2010 of the four pollutants responsible for acidification, eutrophication and ground-level ozone pollution (sulphur dioxide, nitrogen oxides, volatile organic compounds and ammonia). The UK 2010 ceilings for each of these pollutants were 585 kilotonnes, 1,167 kilotonnes, 1,200 kilotonnes and 297 kilotonnes, respectively.</p>	<p>Consider the need for air quality to be included in the SEA framework.</p>

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This is being revised through the Thematic Strategy on Air Pollution and emissions ceilings for the four compounds and particulate matter (PM2.5) up to 2020 are anticipated.	
European Union (2002) The Environment Noise Directive (Directive 2002/49/EC)	
<p>The END aims to “define a common approach intended to avoid, prevent or reduce on a prioritised basis the harmful effects, including annoyance, due to the exposure to environmental noise”. For that purpose several actions are to be progressively implemented. It furthermore aims at providing a basis for developing EU measures to reduce noise emitted by major sources, in particular road and rail vehicles and infrastructure, aircraft, outdoor and industrial equipment and mobile machinery.</p> <p>The underlying principles of the Directive are similar to those underpinning other overarching environment policies (such as air or waste), i.e.:</p> <ul style="list-style-type: none"> - Monitoring the environmental problem; by requiring competent authorities in Member States to draw up “strategic noise maps” for major roads, railways, airports and agglomerations, using harmonised noise indicators Lden (day-evening-night equivalent level) and Lnight (night equivalent level). These maps will be used to assess the number of people annoyed and sleep-disturbed respectively throughout Europe. - Informing and consulting the public about noise exposure, its effects, and the measures considered to address noise, in line with the principles of the Aarhus Convention. - Addressing local noise issues by requiring competent authorities to draw up action plans to reduce noise where necessary and maintain environmental noise quality where it is good. The directive does not set any limit value, nor does it prescribe the measures to be used in the action plans, which remain at the discretion of the competent authorities. - Developing a long-term EU strategy, which includes objectives to reduce the number of people affected by noise in the longer term, and provides a framework for developing existing Community policy on noise reduction from source. With this respect, the Commission has made a declaration concerning the provisions laid down in article 1.2 with regard to the preparation of legislation relating to sources of noise. <p>It is important to note, however, that the present Directive does not set binding limit values, nor does it prescribe the measures to be included in the action plans thus leaving those issues at the discretion of the competent authorities.</p> <p>The long-term exposure indicators supersede those in the 1999 World Health Organisation (WHO) Guidelines for Community Noise, which are now in the process of being updated in line with the Directive.</p>	<p>The draft Drought Plan will need to have regard to the requirements of the END.</p> <p>The SEA assessment framework should include for the protection against excessive noise.</p>
European Union (2002) Directive 2002/91/EC on the Energy Performance of Buildings	
<p>The European Union Energy Performance of Buildings Directive was published in the Official Journal on the 4th January 2003. The overall objective of the Directive is to <i>promote the improvement of energy performance of buildings within the Community taking into account outdoor climate and local conditions as well as indoor climate requirements and cost effectiveness.</i></p> <p>The Directive highlights how the residential and tertiary sectors, the majority of which are based in buildings, accounts for 40% of EU energy consumption.</p>	<p>The SEA should highlight any opportunities for new buildings associated with the draft Drought Plan to contribute to improved energy performance.</p>
European Commission (2004), Environmental Liability Directive (2004/35/EC)	
<p>The Directive establishes a framework for environmental liability based on the “polluter pays” principle, with a view to preventing and remedying environmental damage.</p>	<p>The SEA should take account of the need to ensure that proposals</p>

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Purpose of the Document, including Objectives and Targets relevant to the Drought Plan and SEA	Relationships and Influences on the Drought Plan and the SEA
	in the draft Drought Plan avoids causing direct or indirect damage to the aquatic environment or contamination of land that creates a significant risk to human health.
European Union (2005) Thematic Strategy on Air Pollution	
This strategy supplements current legislation. It sets out objectives for air pollution and proposes measures for achieving them by 2020.	The draft Drought Plan should be in accordance with the requirements of the strategy. The SEA should take into account the need to improve air quality.
European Union (2006), Animal health requirements for aquaculture animals and products thereof, and on the prevention and control of certain diseases in aquatic animals (2006/88/EC)	
The Directive establishes: <ul style="list-style-type: none"> • Animal health requirements for the placing on the market, importation and transit of aquaculture animals and their products; • Minimum measures to prevent diseases in aquaculture animals; • Minimum measures to be taken in response to suspected or established cases of certain diseases in aquatic animals. 	The SEA should take account of the need to maintain or enhance the quality of habitats and biodiversity.
European Commission (2006), Fresh Water Fish Directive (2006/44/EC)	
The Directive seeks to protect those fresh water bodies identified by Member States as waters suitable for sustaining fish populations. For those waters, it sets physical and chemical water quality objectives for salmonid waters and cyprinid waters. The Directive is designed to protect and improve the quality of rivers and lakes to encourage healthy fish populations.	The SEA should take account of the need to promote the protection of river and lake water quality in order to maintain and develop suitable environments that will sustain fresh water fish populations.
European Union (2006) Directive 2006/118EC on the protection of groundwater against pollution and deterioration	
This Directive establishes specific measures as provided for in Article 17(1) and (2) of Directive 2000/60/EC (Water Framework Directive) in order to prevent and control groundwater pollution. This Directive is designed to prevent and combat groundwater pollution.	The SEA should take account of the need to maintain, protect and improve water quality across the draft Drought Plan area.
European Union (2006) The Bathing Waters Directives 2006 2006/7/EC	
The Bathing Waters Directive applies to surface waters that can be used for bathing except for swimming pools and spa pools, confined waters subject to treatment or used for therapeutic purposes and confined waters artificially separated from surface water and groundwater. The Directive is intended to: <ul style="list-style-type: none"> • Be based on scientific knowledge on protecting health and the environment, as well as environmental management experience, • Provide better and earlier information of citizens about quality of their bathing waters, including logos, • Move from simple sampling and monitoring of bathing waters to bathing quality management, and • Be integrated into all other EU measures protecting the quality of all our waters (rivers, lakes, ground waters and coastal waters) through the Water Framework Directive. <p>Two main parameters for analysis (intestinal enterococci and escherichia coli) are defined, instead of nineteen in the previous Directive. These parameters will be used to monitor and assess the quality of bathing waters and to classify them. Other parameters could be taken into account, such as the presence of cyanobacteria or microalgae.</p>	The draft Drought Plan will need to comply with set limits. The SEA assessment should include a guide question relating to the effects of options on the water quality at designated bathing waters.

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<p>Member States must monitor the bathing waters every year. The monitoring calendar should provide for at least four samples to be taken per season (except where the season is very short or where there are special geographic constraints). The sampling interval should not be longer than one month. Upon the monitoring results gathered in four years, Member States should assess the bathing waters at the end of every season. A shorter period may be acceptable in some cases.</p> <p>The waters are classified according to their level of quality: poor, sufficient, good or excellent, linked to clear numerical quality standards for bacteriological quality. The category "sufficient" is the minimum quality threshold that all Member States should attain by the end of the 2015 season at the latest. Where water is classified as "poor", Member States should take certain management measures, e.g. banning bathing or posting a notice advising against it, providing information to the public, and suitable corrective measures.</p>	
European Union (2006) Sustainable Development Strategy	
<p>This document sets out a single coherent strategy outlining how the EU will meet long-standing commitments to sustainable development. This document presents a renewed version of the 2001 EU Sustainable Development Strategy (SDS). The aim of the SDS is to identify and develop actions to enable the EU to achieve continuous improvement of quality of life both for current and for future generations, through the creation of sustainable communities able to manage and use resources efficiently, and to tap the ecological and social innovation potential of the economy, ensuring prosperity, environmental protection and social cohesion.</p> <p>The key objectives of the strategy are:</p> <ul style="list-style-type: none"> - Environmental protection; - Social equity and cohesion; - Economic prosperity; and - Meeting our international responsibilities. <p>The following key challenge areas include a number of targets in achieving their respective objectives:</p> <ul style="list-style-type: none"> - Climate Change and clean energy; - Sustainable Transport; - Sustainable consumption and production; - Conservation and management of natural resources; - Public Health; - Social inclusion, demography and migration; - Global poverty and sustainable development challenges. <p>The strategy was reviewed by the European Commission in 2009 (<i>Mainstreaming sustainable development into EU policies: 2009 Review of the European Union Strategy for Sustainable Development</i>), which underlined that the EU has mainstreamed sustainable development into a broad range of its policies in recent years, but that efforts still need to be intensified to address unsustainable trends such as energy consumption.</p>	<p>The draft Drought Plan should reflect all of the aims and targets set out in the Sustainable Development Strategy.</p> <p>The SEA assessment framework should reflect the core and supporting principles of the strategy including climate change, sustainable transport, public health, social inclusion and poverty.</p>
European Union (2006) Mining Waste Directive (2006/21/EC)	

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<p>The Directive aims to prevent or reduce as far as possible any adverse effects on the environment, and any resultant risks to human health, brought about as a result of the management of waste from the extractive industries. The Directive covers the management of waste resulting directly from prospecting, extraction, treatment and storage of mineral resources and from quarrying. Operators are required to use Best Available Techniques in the management of waste facilities and the prevention of major accidents.</p>	<p>The draft Drought Plan should have regard to the aim to avoid adverse effects from extractive waste.</p> <p>The SEA assessment framework should include consideration of waste.</p>
European Union (2007) Floods Directive 2007/60/EC	
<p>The Floods Directive requires Member States to assess if all water courses and coast lines are at risk from flooding, to map the flood extent and assets and humans at risk in these areas and to take adequate and coordinated measures to reduce this flood risk.</p> <p>Member States are required to carry out a preliminary assessment by 2011 to identify the river basins and associated coastal areas at risk of flooding.</p>	<p>The draft Drought Plan should take account of the flood risk management plans as they become available through the life of the plan.</p> <p>The SEA assessment framework should include flood risk.</p>
European Union (2007) The Eel Directive 2007/1100/EC	
<p>The Eel Directive establishes measures for the recovery of the stock of European eel and requires member states to produce Eel management plans for each catchment.</p>	<p>The draft Drought Plan should ensure that there are no adverse impacts on eel as a result of water resource management measures.</p>
European Union (2008) Environmental Quality Standards Directive 2008/105/EC	
<p>The Directive aims to control the concentration of certain substances which pose a risk to the aquatic environment. The 33 'priority substances' addressed by the Directive are defined by the Water Framework Directive (2000/60/EC), including cadmium, lead, mercury, nickel, benzene and polyaromatic hydrocarbons.</p> <p>The Directive sets thresholds of concentration that must not be exceeded, with limits to average values over a year to ensure long-term water quality and maximum allowable concentrations to limit short term pollution peaks. Member States must comply with the water quality standards and record an inventory of emissions and discharges of all substances in the Directive.</p>	<p>The assessment framework should include assessment criteria relating to water quality.</p>
European Union (2008) Marine Strategy Framework Directive 2008/56/EC	
<p>The Directive sets out a framework for an ecosystem-based approach to the management of human activities which supports the sustainable use of marine goods and services. The overarching goal of the Directive is to achieve 'Good Environmental Status' (GES) by 2020 across Europe's marine environment. The Directive establishes four European Marine Regions, based on geographical and environmental criteria. The North East Atlantic Marine Region is divided into four subregions, with UK waters lying in two of these (the Greater North Sea and the Celtic Seas).</p> <p>Each Member State is required to develop a marine strategy for their waters, in coordination with other countries within the same marine region or subregion. Marine strategies must be implemented to protect and conserve the marine environment, prevent its deterioration, and, where practicable, restore marine ecosystems in areas where they have been adversely affected. The marine strategies must contain:</p> <ul style="list-style-type: none"> • An initial assessment of the current environmental status of that Member State's marine waters; 	<p>The assessment framework should incorporate assessment criteria relating to the quality of the marine environment.</p>

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<ul style="list-style-type: none"> • A determination of what Good Environmental Status means for those waters; • Targets and indicators designed to show whether a Member State is achieving GES; • A monitoring programme to measure progress towards GES; • A programme of measures designed to achieve or maintain GES. <p>The Directive also requires Marine Protected Areas (MPAs) to be established to support the achievement of GES.</p>	
European Union (2008) EU Air Quality Directive (2008/50/EC) and previous directives (96/62/EC; 99/30/EC; 2000/69/EC & 2002/3/EC)	
<p>The Directive:</p> <ul style="list-style-type: none"> - defines and establishes objectives for ambient air quality to avoid, prevent or reduce harmful effects on human health and the environment as a whole; - assesses the ambient air quality in Member States using common methods and criteria; - obtains information on ambient air quality in order to help combat air pollution and nuisance and to monitor long-term trends and improvements resulting from national and Community measures; - ensures that such information on ambient air quality is made available to the public; - seeks to maintain air quality where it is good and improving it in other cases; and - promotes increased cooperation between the Member States in reducing air pollution. 	<p>The draft Drought Plan should contribute towards achieving air quality standards set out in the Directive.</p> <p>Consider the need for air quality to be included in the SEA framework.</p>
European Union (2008) Directive on Waste (Directive 75/442/EEC, 2006/12/EC 2008/98/EC as amended)	
<p>The essential objective of all provisions relating to waste management should be the protection of human health and the environment against harmful effects caused by the collection, transport, treatment, storage and tipping of waste. Some key objectives include:</p> <ul style="list-style-type: none"> - The recovery of waste and the use of recovered materials as raw materials should be encouraged; - Member States should, in addition to taking responsible action to ensure the disposal and recovery of waste, take measures to restrict the production of waste; - It is important for the Community as a whole to become self-sufficient in waste disposal and desirable for Member States individually to aim at such self-sufficiency; - Waste management plans should be drawn up in the Member States; - Movements of waste should be reduced; - Ensure a high level of protection and effective control; - Subject to certain conditions, and provided that they comply with environmental protection requirements, some establishments which process their waste themselves or carry out waste recovery may be exempted from permit requirements; - That proportion of the costs not covered by the proceeds of treating the waste must be defrayed in accordance with the 'polluter pays' principle. 	<p>The draft Drought Plan should seek to ensure the protection of human health and the environment in relation to waste management.</p> <p>The SEA assessment should include objectives on the protection of human health and the environment.</p>

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Purpose of the Document, including Objectives and Targets relevant to the Drought Plan and SEA	Relationships and Influences on the Drought Plan and the SEA
European Union (2009) <i>EU Directive on the Conservation of Wild Birds (09/147/EC)</i> (codified version of Council Directive 79/409/EEC as amended)	
<p>The Directive provides a framework for the conservation and management of, and human interactions with, wild birds in Europe. The main provisions of the Directive include:</p> <ul style="list-style-type: none"> • The maintenance of the populations of all wild bird species across their natural range (Article 2) with the encouragement of various activities to that end (Article 3). • The identification and classification of Special Protection Areas (SPAs) for rare or vulnerable species listed in Annex I of the Directive, as well as for all regularly occurring migratory species, paying particular attention to the protection of wetlands of international importance (Article 4). (Together with Special Areas of Conservation designated under the Habitats Directive, SPAs form a network of European protected areas known as Natura 2000). • The establishment of a general scheme of protection for all wild birds (Article 5). • Restrictions on the sale and keeping of wild birds (Article 6). • Specification of the conditions under which hunting and falconry can be undertaken (Article 7). (Huntable species are listed on Annex II of the Directive). • Prohibition of large-scale non-selective means of bird killing (Article 8). • Procedures under which Member States may derogate from the provisions of Articles 5-8 (Article 9) — that is, the conditions under which permission may be given for otherwise prohibited activities. • Encouragement of certain forms of relevant research (Article 10 and Annex V). • Requirements to ensure that introduction of non-native birds do not threatened other biodiversity (Article 11). 	<p>The draft Drought Plan should seek to protect and enhance biodiversity, particularly designated sites.</p> <p>The SEA assessment framework should include objectives, indicators and targets that cover biodiversity.</p>
European Union (2009) <i>Renewable Energy Directive (2009/28/EC)</i>	
<p>This Directive establishes a common framework for the use of energy from renewable sources in order to limit greenhouse gas emissions and to promote cleaner transport. It encourages energy efficiency, energy consumption from renewable sources and the improvement of energy supply.</p> <p>The Member States are to establish national action plans which set the share of energy from renewable sources consumed in transport, as well as in the production of electricity and heating, for 2020. These action plans must take into account the effects of other energy efficiency measures on final energy consumption (the higher the reduction in energy consumption, the less energy from renewable sources will be required to meet the target). These plans will also establish procedures for the reform of planning and pricing schemes and access to electricity networks, promoting energy from renewable sources.</p> <p>Each Member State has a target calculated according to the share of energy from renewable sources in its gross final consumption for 2020. The UK is required to source 15 per cent of energy needs from renewable sources, including biomass, hydro, wind and solar power by 2020. From 1 January 2017, biofuels and bioliquids share in emissions savings should be increased to 50%.</p>	<p>The draft Drought Plan should seek to contribute towards increasing the proportion of energy from renewable energy sources.</p> <p>The SEA assessment framework should include consideration of use of energy from renewable energy sources.</p>
European Union (2010) <i>Industrial Emissions Directive (integrated pollution prevention and control) 2010/75/EU</i>	
<p>This Directive brings together the IPPC Directive (2008/1/EC) and six other Directives on titanium dioxide, VOCs and waste incineration, with the aim of reducing pollutant emissions. It covers industries with high polluting potential such as energy, production and processing of metals, minerals, chemicals, waste management and rearing of animals.</p>	<p>The assessment framework should include criteria that ensure the protection of the environment</p>

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It defines the obligations to be met by industrial activities with a major pollution potential. This includes establishing a permit procedure, requirements for Best Available Techniques (BAT) and setting out requirements for discharges.	through the prevention of pollution.
European Union (2010) Energy 2020 - A Strategy for Competitive, Sustainable and Secure Energy	
<p>EU energy and climate goals have been incorporated into the Europe 2020 Strategy for smart, sustainable and inclusive growth. The energy strategy includes five priorities for Europe:</p> <ol style="list-style-type: none"> 1. Achieving an energy-efficient Europe; 2. Building a truly pan-European integrated energy market; 3. Empowering consumers and achieving the highest level of safety and security; 4. Extending Europe's leadership in energy technology and innovation; 5. Strengthening the external dimension of the EU energy market. <p>Energy 2020 is part of Resource-Efficient Europe, one of the seven key initiatives of Europe 2020.</p>	The assessment framework should include criteria relating to energy where appropriate
European Union (2010) Europe 2020 : A strategy for smart, sustainable and inclusive growth	
<p>Europe 2020 is the EU's ten-year growth strategy. It aims to change the EU's growth model and create the conditions for growth that is smarter, more sustainable and more inclusive. It contains seven 'flagship initiatives' to provide a framework for innovation, the digital economy, employment, youth, industrial policy, poverty, and resource efficiency.</p> <p>There are also five key target areas for the EU to achieve by 2020:</p> <ol style="list-style-type: none"> 1. Employment: 75% of the 20-64 year-olds to be employed. 2. R&D: 3% of the EU's GDP to be invested in R&D. 3. Climate change and energy sustainability: greenhouse gas emissions 20% (or even 30%, if the conditions are right) lower than 1990; 20% of energy from renewable; 20% increase in energy efficiency. 4. Education: reducing the rates of early school leaving below 10%; at least 40% of 30-34-year-olds completing third level education. 5. Fighting poverty and social exclusion: at least 20 million fewer people in or at risk of poverty and social exclusion. 	The assessment framework should include criteria relating to employment, R&D, climate change and poverty where relevant.
European Union (2011) EU Biodiversity Strategy to 2020 – towards implementation	
<p>The European Commission has adopted an ambitious new strategy to halt the loss of biodiversity and ecosystem services in the EU by 2020.</p> <p>The strategy provides a framework for action over the next decade and covers the following key areas:</p> <ul style="list-style-type: none"> • Conserving and restoring nature; • Maintaining and enhancing ecosystems and their services; • Ensuring the sustainability of agriculture, forestry and fisheries; • Combating invasive alien species; 	<p>The draft Drought Plan should seek to protect and enhance biodiversity, particularly designated sites.</p> <p>The SEA assessment framework should include objectives, indicators and targets that cover biodiversity.</p>

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<ul style="list-style-type: none"> Addressing the global biodiversity crisis. 	
EU Directives on Environmental Impact Assessment (Codified Directive 2011/92/EU and Revised Directive 2014/52/EU)	
<p>The Directive, as enacted in 1985, amended, codified in 2011 and revised in 2014, sets out procedural requirements for certain development proposals to undergo an Environmental Impact Assessment (EIA) before being granted consent through the town and country planning or other consenting regimes. The UK Government is obliged to transpose the Revised EIA Directive by May 2017.</p>	<p>The SEA should recognise that certain development proposals require an EIA to be undertaken, resulting in the identification of any likely significant environmental effects and associated mitigation measures.</p>
European Union 2012 Energy Efficiency Directive (2012/27/EU)	
<p>The Directive establishes a set of binding measures to help the EU reach its 20% energy efficiency target by 2020. Under the Directive, all EU countries are required to use energy more efficiently at all stages of the energy chain from its production to final consumption.</p> <p>Specific measures relate to:</p> <ul style="list-style-type: none"> energy distributors achieving 1.5% energy savings per year through energy efficiency measures; improving the efficiency of heating systems, installing double glazed windows or insulating roofs; purchasing energy efficient buildings, products and services, and performing energy efficient renovations; access to data on consumption; large companies to audit energy consumption (implemented in the UK through the Energy Savings Opportunity Scheme Regulations 2014); national incentives for SMEs to undergo energy audits; and monitoring efficiency levels in new energy generation capacities. 	<p>The draft Drought Plan should seek to contribute towards targets for energy efficiency.</p> <p>The SEA assessment framework should include consideration of energy consumption and efficiency.</p>
European Union (2014) Seventh Environmental Action Programme to 2020 'Living well, within the limits of our planet'	
<p>The seventh Environmental Action Programme defines environmental priority objectives to be achieved by the EU up to 2020. As part of the programme, the EU aims to protect natural capital; promote resource-efficient and low-carbon growth; and safeguard health and wellbeing linked to pollutants, chemicals and climate change. The nine objectives and actions set out in the programme are:</p> <ul style="list-style-type: none"> to protect, conserve and enhance the Union's natural capital; to turn the Union into a resource-efficient, green, and competitive low-carbon economy; to safeguard the Union's citizens from environment-related pressures and risks to health and wellbeing; to maximise the benefits of the Union's environment legislation by improving implementation; to increase knowledge about the environment and widen the evidence base for policy; 	<p>The assessment framework should, where relevant, reflect the objectives of the programme.</p>

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<ul style="list-style-type: none"> • to secure investment for environment and climate policy and account for the environmental costs of any societal activities; • to better integrate environmental concerns into other policy areas and ensure coherence when creating new policy; • to make the Union's cities more sustainable; and • to help the Union address international environmental and climate challenges more effectively. 	
European Union (2015) Invasive Alien Species Regulation (1143/2014/EU)	
<p>This Regulation seeks to address the problem of invasive alien species in a comprehensive manner so as to protect native biodiversity and ecosystem services, as well as to minimize and mitigate the human health or economic impacts that these species can have.</p>	<p>The SEA assessment framework should include guide questions relating to invasive species.</p>

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Purpose of the Document, including Objectives and Targets relevant to the Water Resources Management Plan and SEA	Relationships and Influences on the Drought Plan and the SEA
Canal and River Trust (2015) Water Resources Strategy	
<p>The Strategy sets out the Canal and River Trust's overarching vision and work plan for the next five years for how it intends to manage water resources across the inland waterway network that it manages. The strategy is focused on delivering long-term security of water supply for the Canal & River Trust to achieve its vision of living waterways that transform places and enrich lives.</p>	<p>The draft drought plan should take into consideration the potential impact on the supply of water to the inland waterway network within the Welsh Water area.</p> <p>The SEA should consider the effects of the draft Drought Plan on the long term supply of water to the canal network.</p>
DCLG (2014) National Planning Policy for Waste	
<p>Sets out detailed waste planning policies for local authorities. States that planning authorities need to:</p> <ul style="list-style-type: none"> • Need to use a proportionate evidence base in preparing Local Plans • Identify sufficient opportunities to meet the identifies needs of their area for the management of waste streams <p>Identifying suitable sites and areas for waste facilities.</p>	<p>The draft Drought Plan may need to consider the potential impact of proposals on waste generation and on waste management facilities in the draft Drought Plan area.</p> <p>The SEA should consider the effects of the draft Drought Plan on waste generation and management capacity.</p>
DECC (2010) CRC Energy Efficiency Scheme	
<p>The CRC Energy Efficiency Scheme is a Government backed legislative carbon emissions trading scheme and covers large business and public sector organisations in the UK. RC was intended to have a significant impact on reducing UK carbon emissions, offering the potential to save money through energy efficiency. It was designed to drive changes in behaviour and infrastructure, generate corporate awareness of the detrimental impacts of carbon emissions, and improve energy management practice. The Government announced in March 2016 that the scheme will be abolished from the end of the 2018/2019 compliance year.</p>	<p>The draft Drought Plan should seek to help contribute towards achieving carbon reduction.</p> <p>The SEA assessment should cover topics that will help to ensure that carbon emissions are reduced.</p>
DECC (2011) National Policy Statements for Energy Infrastructure	
<p>The energy National Policy Statements (NPSs) set out national policy against which proposals for major energy projects will be assessed and decided on by the Infrastructure Planning Commission. The following six NPSs have been designated:</p> <ul style="list-style-type: none"> - Overarching NPS for Energy (EN1); - Fossil Fuel Electricity Generating Infrastructure NPS (EN2); - Renewable Energy Infrastructure NPS (EN3) ; - Gas Supply Infrastructure & Gas and Oil Pipelines NPS (EN4); - Electricity Networks Infrastructure NPS (EN5); - Nuclear Power Generation NPS (EN6). <p>The Overarching NPS for Energy sets out that the purpose of the NPSs is to develop a clear, long-term policy framework which facilitates investment in the necessary new infrastructure (by the private sector) and in energy efficiency. The NPS highlights that the construction, operation and decommissioning of this infrastructure can lead to increased demand for water, involve discharges to water and cause adverse ecological effects resulting from physical modifications to the water environment. The NPSs expect applicants to undertake an assessment of the existing status of, and impacts of the proposed project on, water quality, water resources and physical characteristics of the water environment.</p> <p>One site is identified in the Welsh Water area (Wylfa, Anglesey) as being potentially suitable for the deployment of a new nuclear power station alongside further sites outside the Welsh Water including Oldbury in South Gloucestershire.</p>	<p>The draft Drought Plan may need to consider the potential impact of major energy proposals on water resources in the Welsh Water area. This may include the potential development of nuclear power stations at Wylfa and Oldbury.</p> <p>The SEA should consider the cumulative effects of the draft Drought Plan and any major energy proposals which may affect water resources in the Welsh Water area.</p>

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The NPSs reiterate and are underpinned by the target to cut greenhouse gas emissions by at least 80 per cent by 2050, compared to 1990 levels.	
Defra (2005) Making Space for Water: Taking forward a new Government strategy for flood and coastal erosion risk management in England (first Government response to 2004 consultation)	
<p>The programme seeks to embed flood and coastal erosion risk management across a range of Government policies, including planning, urban and rural development, agriculture, transport, nature conservation and conservation of the historic environment.</p> <p>Objectives:</p> <ul style="list-style-type: none"> - To reduce the threat of flooding to people and their property, and - To deliver the greatest environmental, social and economic benefit, consistent with the Government's sustainable development principles. <p>Targets:</p> <p>No formal targets or indicators.</p>	<p>The draft Drought Plan may have some linkages with this strategy.</p> <p>The SEA should seek to ensure that coastal erosion in the area is not adversely affected by the implementation of the draft Drought Plan.</p>
Defra (2011) Shoreline Management Plan Guidance	
<p>This is guidance for the second generation of Shoreline Management Plans and includes updates to guidance first published in 2006. A shoreline management plan (SMP) is a coastal defence management tool. It is a large-scale assessment of the risks associated with coastal processes and helps to reduce these risks to people and the developed, historic and natural environment. This guidance document sets out Defra's and the Welsh Government's strategy for managing flooding and coastal erosion.</p> <p>The guidance includes the following objectives:</p> <ul style="list-style-type: none"> - set out the risks from flooding and erosion to people and the developed, historic and natural environment within the SMP area; - identify opportunities to maintain and improve the environment by managing the risks from floods and coastal erosion; - identify the preferred policies for managing risks from floods and erosion over the next century; - identify the consequences of putting the preferred policies into practice; - set out procedures for monitoring how effective these policies are; - inform others so that future land use, planning and development of the shoreline takes account of the risks and the preferred policies; - discourage inappropriate development in areas where the flood and erosion risks are high; and - meet international and national nature conservation legislation and aim to achieve the biodiversity objectives. 	<p>The draft Drought Plan should take into account its effects on areas with a SMP.</p> <p>The SEA assessment should take into account the effects of the options on the coast where relevant.</p>
Defra (2011) Biodiversity 2020: A strategy for England's wildlife and ecosystem services	
<p>This new biodiversity strategy for England provides a comprehensive picture of how we are implementing our international and EU commitments. It sets out the strategic direction for biodiversity policy for the next decade on land (including rivers and lakes) and at sea.</p> <p>The strategy sets 20 targets across 5 strategic goals:</p> <ul style="list-style-type: none"> - Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society; - Reduce the direct pressures on biodiversity and promote sustainable use; - Improve status of biodiversity by safeguarding ecosystems, species and genetic diversity; - Enhance the benefits to all from biodiversity and ecosystem services; and <p>Enhance implementation through participatory planning, knowledge management and capacity building.</p>	<p>The draft Drought Plan should contribute towards meeting the targets and objectives within the strategy.</p> <p>The SEA should include objectives to improve status of biodiversity and enhance benefits of biodiversity and its ecosystem services, and reduce pressures on ecosystems.</p>
Defra (2007) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland	

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<p>The Air Quality Strategy sets out air quality objectives and policy options to further improve air quality in the UK to benefit public health, quality of life and help to protect our environment. The strategy sets out objectives relating to particles, nitrogen dioxide, ozone, sulphur dioxide, polycyclic aromatic hydrocarbons, benzene, 1,3- butadiene, carbon monoxide, lead, nitrogen oxides and sulphur dioxide.</p>	<p>The draft Drought Plan should take account of air quality objectives in the strategy.</p> <p>The SEA should include guide questions relating to the effects of options on human health and the environment.</p>
Defra, Scottish Government, Welsh Government (2015) <i>The Great Britain Invasive Non-native Species Strategy</i>	
<p>The strategy sets out key aims and actions for addressing the threats posed by invasive non-native species, including the prevention of invasive species arriving in Britain, early detection and monitoring, eradication and control. It also aims to:</p> <ul style="list-style-type: none"> • get people to work better together, including the government, stakeholders, land managers and the general public; and • improve co-ordination and co-operation on issues at a European and international level. <p>- The strategy covers the period 2015 to 2020.</p>	<p>The draft Drought Plan should seek to avoid the spread of invasive species.</p> <p>The SEA should consider the effects of the draft Drought Plan on biodiversity.</p>
Defra (2010) <i>Making Space for Nature: A Review of England's Wildlife Sites and Ecological Network</i>	
<p>The report answers two questions: Do England's wildlife sites comprise a coherent and resilient ecological network? If not, what needs to be done? The report considers why these questions are important in the context of past, current and future pressures on the environment, and describe what ecological networks are and the benefits they bring. It goes on to consider the strengths and weaknesses of our current wildlife sites, before setting out a prioritised set of ecological solutions to improve the network. Finally, the report sets out 24 recommendations for practical action to Make Space for Nature and achieve a coherent and resilient ecological network.</p> <p>We propose that the overall aim for England's ecological network should be to achieve a natural environment where, compared to the situation in 2000, biodiversity is enhanced with the diversity, functioning and resilience of ecosystems re-established in a network for nature that can sustain these levels into the future, even given continuing environmental change and human pressures.</p>	<p>The draft Drought Plan should seek to preserve the ecological network.</p> <p>The SEA framework should consider the ecological network in its objectives/guidance questions.</p>
Defra (2012) <i>National Policy Statement for Waste Water</i>	
<p>This National Policy Statement (NPS) sets out Government policy for the provision of major waste water infrastructure. It will be used by the Infrastructure Planning Commission (IPC) to guide its decision making on development consent applications for waste water developments that fall within the definition of Nationally Significant Infrastructure Project (NSIP) as defined in the Planning Act 2008. As well as considering the general need for new waste water infrastructure, this NPS covers two NSIPs which have been assessed as required to meet this need although these do not fall within the Welsh Water or neighbouring areas and are therefore unlikely to influence, or be influenced by, the draft Drought Plan.</p>	<p>The draft Drought Plan should consider any unforeseen NSIP proposals that come forward prior to adoption which may affect water resources in the Welsh Water area.</p> <p>The SEA should consider the cumulative effects of the draft Drought Plan and any unforeseen NSIP proposals that come forward which may affect water resources in the Welsh Water area.</p>
Environment Agency (2008) <i>Better Sea Trout and Salmon Fisheries: Our Strategy for 2008-2021</i>	
<p>The strategy has the goal of more sea trout and more salmon in more rivers bringing more benefit. This goal is to be brought about through achieving three broad targets:</p> <ol style="list-style-type: none"> 1 Self-sustaining sea trout and salmon in abundance in more rivers; 2 Economic and social benefits optimised for sea trout and salmon fisheries; 3 Widespread and positive partnerships, producing benefits. <p>There are twelve more detailed targets lying below these broad goals which relate to salmon and fisheries. These could be relevant to monitoring the effects of the draft Drought Plan.</p>	<p>The draft Drought Plan should take the strategy into account where the option may have an effect on salmon and trout, e.g. where an option may involve inserting or removing a barrier to fish.</p> <p>The SEA should include a guide question in relation to the effects of options on recreation (i.e. recreational angling) and also appropriate targets in monitoring proposals.</p>

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Environment Agency (2016) <i>Creating a Better Place: Our Ambition to 2020</i>	
<p>This document includes the EA's vision, principles and purpose, and sets out its objectives to create a cleaner healthier environment which benefits people and the economy, a nation better protected against natural threats and hazards, and its commitment to work in partnership. The key objectives for 2016 to 2020 are:</p> <ul style="list-style-type: none"> - a cleaner, healthier environment which benefits people and the economy; - a nation better protected against natural threats and hazards, with strong response and recovery capabilities; and - higher visibility, stronger partnerships and local choices. 	<p>The SEA and draft Drought Plan should consider the EA's priorities.</p>
Environment Agency (2011) National Flood and Coastal Erosion Risk Management Strategy for England	
<p>This strategy describes what needs to be done by all organisations involved in flood and coastal erosion risk management. These include local authorities, internal drainage boards, water and sewerage companies, highways authorities, and the Environment Agency. They all act to reduce the risk of flooding and coastal erosion, and manage its consequences.</p> <p>The strategy sets out a statutory framework that will help communities, the public sector and other organisations to work together to manage flood and coastal erosion risk. It will support local decision-making and engagement in FCERM, making sure that risks are managed in a co-ordinated way across catchments and along each stretch of coast. This includes the development of local flood risk management strategies by lead local flood authorities, as well as our strategic overview of all sources of flooding and coastal erosion</p>	<p>The draft Drought Plan should seek to ensure that activities don't result in additional risk of flooding or coastal erosion.</p> <p>The SEA framework should consider flooding and coastal erosion.</p>
Environment Agency (undated) <i>Restoring Sustainable Abstraction Programme</i>	
<p>EA note that there is evidence to suggest that unsustainable abstraction of groundwater and surface water could be contributing to environmental damage of rivers and wetlands in England and Wales, including sites of national and international conservation importance. In May 1997, at the Government's Water Summit, a commitment was made to reverse the damage caused by past decisions. EA investigates where over-abstraction has occurred and work with local people to restore sustainable supplies.</p>	<p>The draft Drought Plan will need to consider the implications of changes to abstraction strategies.</p> <p>The SEA should include a guide question relating to water resources.</p>
Environment Agency (2013) <i>Areas of Water Stress: Final Classification</i>	
<p>The report is the Environment Agency's formal advice on which areas in England are of serious water stress.</p>	<p>The draft Drought Plan should seek to ensure appropriate measures are in place to address the requirements of water stressed areas.</p> <p>The SEA assessment framework should consider the effects of the draft Drought Plan on water resources and the associated socio-economic and environmental receptors.</p>
Environment Agency (various) <i>Drought Plans</i>	
<p>Drought Plans prepared by the EA:</p> <ul style="list-style-type: none"> - outline how the EA will manage water resources during a drought and defines their role and responsibilities; - aim to reconcile the competing interests of the environment, the need for public water supply and other abstractions; - show what additional environmental monitoring the EA will carry out; - provide a framework for liaison with water companies, awareness campaigns and determination of drought permits; 	<p>The draft Drought Plan should, where appropriate, take into account and accord with the provisions contained within the EA Drought Plans listed.</p>

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<p>- range from high-level activities where they co-ordinate drought management over England and Wales to a local level where they outline specific operational activities.</p> <p>Those plans particularly relevant to the Welsh Water area include the Head Office Drought Plan (covering England and Wales), Drought Plans for Wales and the Midlands as well as area plans for south east, south west and north Wales and the west Midlands.</p>	
The Historic Environment Group (2018) Historic Environment and Climate Change Sector Adaption Plan	
<p>The sector adaptation plan (SAP) is a high-level, strategic document intended to identify climate change risks, opportunities and adaptation needs for the historic environment. Its aim is to stimulate action through strategies, programmes and partnerships.</p>	<p>The draft Drought plan should seek to reduce its contribution to climate change and aim to assist in the protection of the historic environment within the operational area.</p> <p>The SEA assessment framework should consider the effects of the draft Drought Plan on climate change and associated effects on the historic environment.</p>
HM Government (1975) Salmon and Freshwater Fisheries Act	
<p>The act encompasses fishing regulation, as well as illegal obstruction of migratory pathways and prohibited modes of destroying fish. The act allows the salmon to maintain an environmentally stable population and support the fishing industry.</p>	<p>The SEA and draft Drought Plan should consider the protection of Salmon and freshwater fish.</p>
HM Government (1975) Reservoirs Act	
<p>The Reservoirs Act 1975 provides a legal framework to ensure the safety against failure of large raised reservoirs.</p> <p>The Reservoirs Act 1975 applies to reservoirs that hold at least 25,000 cubic metres of water above natural ground level.</p> <p>Safety legislation for reservoirs in the United Kingdom was introduced in 1930 after several reservoir disasters had resulted in loss of life. This law was superseded by the Reservoirs Act 1975.</p> <p>Under the Reservoirs Act 1975 reservoir owners (undertakers) have ultimate responsibility for the safety of their reservoirs.</p> <p>Reservoir owners must appoint a panel engineer (a specialist civil engineer who is qualified and experienced in reservoir safety) to supervise the design and construction of the reservoir, to continuously supervise the reservoir when built (supervising engineer) and to carry out periodic inspections (inspecting engineer).</p>	<p>The draft Drought Plan should consider reservoirs.</p>
HM Government (1981) Wildlife and Countryside Act	
<p>The Act makes it an offence (with exceptions) to;</p> <ul style="list-style-type: none"> - Intentionally kill, injure or take any wild bird or their eggs or nests; - Intentionally kill, injure, or take, possess, or trade in any wild animal listed in Schedule 5; - Prohibits interference with places used for shelter or protection, or intentionally disturbing animals; and - Pick, uproot, trade in, or possess (for the purposes of trade) and wild plant listed in Schedule 8. <p>The Act also provides for the notification of Sites of Special Scientific Interest (SSSI) and require surveying authorities to maintain up to date definitive maps and statements, for the purpose of clarifying public rights of way.</p>	<p>The draft Drought Plan must ensure full compliance with the Act.</p> <p>The SEA should ensure a positive contribution to the wildlife within the operational area.</p>
HM Government (1991) Water Resources Act	
<p>The Water Resources Act applies to England and Wales and established the National Rivers Authority (now the Environment Agency) to regulate water pollution, water resources, flood defence, fisheries and navigation. The Act covers water abstraction and impounding and discharges to surface and ground waters and coastal waters.</p>	<p>The draft Drought Plan must ensure full compliance with the Act</p>

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HM Government (1994) UK Biodiversity Action Plan (BAP)	
<p>The aim of the action plan is to conserve and enhance biological diversity in the UK and to contribute to the conservation of national and global biodiversity and include the follow aims to maintain and, where practicable, to enhance:</p> <ul style="list-style-type: none"> - The overall populations and natural ranges of native species and the quality and range of wildlife habitats and ecosystems; - Internationally and nationally important and threatened species, habitats and ecosystems; - Species, habitats and natural and managed ecosystems that are characteristic of Kent; - The biodiversity of natural and semi-natural habitats, where this has diminished over 3 recent decades, and - Public awareness of, and involvement in, conserving biodiversity. 	<p>Ensure that draft Drought Plan and SEA encourage conservation and offer protection to areas and species of high conservation importance as identified in this action plan.</p>
HM Government (2000) Countryside and Rights of Way Act 2000	
<p>This act extends the public's ability to enjoy the countryside and safeguards landowners and occupiers. The Act creates a new statutory right of access to open county and registered common land, modernise the right of way system, give greater protection to Sites of Special Scientific Interest (SSSIs), provide greater protection arrangements for Areas of Outstanding Natural Beauty (AONBs) and strengthen wildlife enforcement legislation.</p>	<p>The SEA must make sure that the Act is supported and that public rights of way and access to the countryside are maintained and where possible enhanced.</p>
HM Government (2003) Water Act 2003	
<p>The four broad aims of the Act are:</p> <ul style="list-style-type: none"> - the sustainable use of water resources; - strengthening the voice of consumers; - a measured increase in competition; and - the promotion of water conservation. <p>It amends the Water Industry Act 1991 so that water companies:</p> <ul style="list-style-type: none"> - are given a duty to prepare and publicise drought plans; - are placed under a duty to agree and publicise water resource management plans; and - are placed under an enforceable duty to further water conservation. <p>As part of the Act the Water Services Regulation Authority (Ofwat) became the economic regulator of the water and sewage industry in England and Wales.</p>	<p>The draft Drought Plan needs to be prepared in accordance with the requirements of the Act.</p> <p>The SEA must ensure that the full obligations are met in terms of the environmental implications to abstraction and discharges.</p>
HM Government (2005) UK Sustainable Development Strategy	
<p>The strategy for sustainable development aims to enable all people throughout the world to satisfy their basic needs and enjoy a better quality of life without compromising the quality of life of future generations.</p> <p>This is implemented with 4 key priorities:</p> <ul style="list-style-type: none"> - Sustainable consumption and production; - Climate change; - Natural resource protection; <p>Sustainable communities.</p>	<p>The draft Drought Plan and SEA must consider and implement the key priorities and objectives of the strategy</p>
HM Government (2006) Natural Environment and Rural Communities Act 2006	
<p>An act to make provision about bodies concerned with the natural environment and rural communities to make provision in connection with wildlife sites of special scientific interest. National Parks and the Broads; to amend the law relating to rights of way to make provision as to the inland Waterways Amenity Advisory Council; to provide for flexible administrative arrangements in</p>	<p>The draft Drought Plan and SEA should have regard to protected wildlife sites and species and rights of way.</p>

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connection with functions relating to the environment and rural affairs and certain other functions; and connected purposes.	
HM Government (2006) <i>Climate Change and Sustainable Energy Act 2006</i>	
The Act was enacted after the publication of the UK Climate Change Programme (2006). It places an obligation on the government to report to Parliament on greenhouse gas emissions in the UK and action taken by Government to reduce these emissions.	The draft Drought Plan should take into account carbon emissions associated with the measures. The SEA could include an objective/guide question in the assessment framework to reduce greenhouse gas/carbon dioxide emissions. Consider whether the monitoring arrangements can be utilised to monitor the effects of the draft Drought Plan.
HM Government (2008) <i>Climate Change Act 2008</i>	
This Act aims: <ul style="list-style-type: none"> - to improve carbon management and help the transition towards a low carbon economy in the UK; and - to demonstrate strong UK leadership internationally, signalling that the UK is committed to taking its share of responsibility for reducing global emissions in the context of developing negotiations on a post-2012 global agreement at Copenhagen next year. <p>The Act seeks greenhouse gas emission reductions through action in the UK and abroad of at least 80 per cent by 2050, and reductions in CO₂ emissions of at least 26 per cent by 2020, against a 1990 baseline. The 2020 target will be reviewed soon after Royal Assent to reflect the move to all greenhouse gases and the increase in the 2050 target to 80 per cent.</p> <p>Further the Act provides for a carbon budgeting system which caps emissions over five year periods, with three budgets set at a time, to set out our trajectory to 2050. The first three carbon budgets will run from 2008-12, 2013-17 and 2018-22, and must be set by 1 June 2009.</p>	The draft Drought Plan should take into account carbon emissions associated with the measures. The SEA could include an objective/guide question in the assessment framework to reduce greenhouse gas/carbon dioxide emissions. Consider whether the monitoring arrangements can be utilised to monitor the effects of the draft Drought Plan.
HM Government (2009) <i>Marine and Coastal Access Act 2009</i>	
The Marine and Coastal Access Act sets out a number of measures including the establishment of Marine Conservation Zones (MCZs) and Marine Spatial Plans. It also includes amendments to the Salmon and Freshwater Fisheries Act, 1975.	The draft Drought Plan should take into account its effects on coastal areas. The SEA assessment should take into account the effects of the actions on the coast where relevant.
HM Government (2009) <i>The Eels (England and Wales) Regulations 2009 (as amended 2011)</i>	
These regulations were introduced in 2009 and amended in 2011. They afford powers to the Environment Agency to implement measures for the recovery of European eel stocks and have important implications for operators of abstractions and discharges.	The SEA and draft Drought Plan should have regard to Eel populations.
HM Government (2010) <i>Flood and Water Management Act 2010</i>	
The Flood and Water Management Act 2010 aims to provide better, more sustainable management of flood risk for people, homes and businesses, help safeguard community groups from unaffordable rises in surface water drainage charges and protect water supplies to the consumer. The Act will also implement recommendations made by Sir Michael Pitt in his review of the 2007 floods. This will include giving water companies new powers to better control non-essential domestic uses of water during periods of water shortage. The Act places a number of statutory duties on water companies including: <ul style="list-style-type: none"> - a duty to act consistently with the National Strategy; and 	The draft Drought Plan should be in conformity with the Act. The SEA should include objectives relating to flooding and water use.

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<p>- a duty to have regard to the content of the Local Flood Risk Management Strategies.</p> <p>Does not contain any targets.</p>	
HM Government (2010) The Water Use (Temporary Bans Order) Order 2010	
<p>The Water Use (Temporary Bans Order) Order 2010 allows for temporary restrictions on customers use of the water supply for a range of non-essential reasons including watering a garden with a hosepipe, cleaning a private vehicle with a hosepipe and filling a pond.</p> <p>The water company can decide whether certain activities are exempt from the Temporary Use Ban in light of the local water resource situation and then working with householders and businesses in the community to save water with the minimum of inconvenience.</p>	<p>The draft Drought Plan should be in accordance with the Order.</p> <p>The SEA should include an objective relating to water use.</p>
HM Government (2011) UK Marine Policy Statement	
<p>The Marine Policy Statement (MPS) sets out the framework for preparing Marine Plans and taking decisions affecting the marine environment, supporting the delivery of the following high level marine objectives:</p> <ul style="list-style-type: none"> - Achieving a sustainable marine economy; - Ensuring a strong, healthy and just society; - Living within environmental limits; - Promoting good governance; - Using sound science responsibly. <p>Does not contain any targets.</p>	<p>The draft Drought Plan should take into account its effects on coastal areas.</p> <p>The SEA assessment should take into account the effects of the actions on the coast/marine environment where relevant.</p>
HM Government (2014) Water Act 2014	
<p><i>The purpose of the Act was to make provision about the water industry; about compensation for modification of licences to abstract water; about main river maps; about records of waterworks; for the regulation of the water environment; about the provision of flood insurance for household premises; about internal drainage boards; about Regional Flood and Coastal Committees; and for connected purposes.</i></p>	<p>draft Drought Plan should ensure that future water management is resilient, efficient and customer focused</p>
HM Government (2015) Infrastructure Act 2015	
<p>The Infrastructure Act (inter alia) gives environmental authorities new powers to require landowners to take action on invasive non-native species or permit others to enter the land and carry out those operations.</p>	<p>The SEA assessment framework should include guide questions relating to invasive species.</p>
HM Government (2016) Environmental Permitting (England and Wales) Regulations 2016 (as amended 2018)	
<p>Provides a system for environmental permits and exemptions for industrial activities, mobile plant, waste operations, mining waste operations, water discharge activities, groundwater activities and radioactive substances activities. It also sets out the powers, functions and duties of the regulators.</p>	<p>The draft Drought Plan should accord with these Regulations.</p>
HM Government (2017) Conservation of Habitats & Species Regulations 2017	
<p>The Conservation of Habitats and Species Regulations 2017 consolidate the Conservation of Habitats and Species Regulations 2010 with subsequent amendments. The Regulations transpose Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive) into national law.</p> <p>The Regulations provide for the designation and protection of 'European sites', the protection of 'European protected species', and the adaptation of planning and other controls for the protection of European Sites.</p> <p>Under the Regulations, competent authorities i.e. any Minister, government department, public body, or person holding public office, have a general duty, in the exercise of any of their functions, to have regard to the EC Habitats Directive.</p>	<p>The draft Drought Plan must ensure full compliance with the Regulations.</p> <p>The SEA should take into account the effects of the actions on biodiversity.</p>

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HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment	
<p>This report outlines the following aims that the UK Government hopes to achieve in the next 25 years:</p> <ol style="list-style-type: none"> 1. Clean air. 2. Clean and plentiful water. 3. Thriving plants and wildlife. 4. A reduced risk of harm from environmental hazards such as flooding and drought. 5. Using resources from nature more sustainably and efficiently. 6. Enhanced beauty, heritage and engagement with the natural environment. 7. Mitigating and adapting to climate change. 8. Minimising waste. 9. Managing exposure to chemicals. 10. Enhancing biosecurity. 	<p>The draft Drought Plan must ensure consideration of the relevant measures concerning water and drought.</p> <p>The SEA should take into account the effects of the actions on the natural environment through the range of SEA objectives covering biodiversity, soil, water, air and material assets.</p>
HM Government (2018) The Water Supply Regulations 2018	
<p>These regulations address the quality of water supplied by water undertakers, who supply areas mainly or wholly in Wales. The new Regulations implement Directive 98/83/EC on the quality of water intended for human consumption.</p> <p>Under these Regulations, water undertakers are required to identify the areas that are to be water supply zones on an annual basis. A water supply zone cannot exceed 100,000 in terms of population before the beginning of each year of the supply.</p> <p>The standards of wholesomeness are set out, in respect of water for human consumption, be that through drinking, washing, food preparation or cooking and food production. In order to qualify as wholesome, the water cannot contain any:</p> <ul style="list-style-type: none"> - micro-organism, other than those listed in the full text of Schedule 1 to the Regulations, or parasite; or - substances, other than those listed in the full text of Schedule 1 to the Regulations. 	<p>The draft Drought Plan must ensure full compliance with the Regulations.</p> <p>The SEA should take into account the effects of the measures on drinking water quality.</p>
HM Treasury (2016) National Infrastructure Delivery Plan	
<p>This document is the Government's updated National Infrastructure Delivery Plan. It sets out the plan to 2021 and beyond and takes a targeted approach to infrastructure investment and delivery across different sectors. It contains major commitments to improve the UK's transport, energy, communications, waste, water, housing and flood and coastal erosion, as well as steps to attract new private sector investment. It includes reference to the production of Water Resources Management Plans and the Ofwat price review.</p>	<p>The draft Drought Plan will be produced as indicated in the Delivery Plan.</p>
Ministry of Housing, Communities and Local Government (MHCLG) (2018) National Planning Policy Framework	
<p>The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these are expected to be applied. The National Planning Policy Framework constitutes guidance for local planning authorities and decision-takers both in drawing up plans and as a material consideration in determining applications.</p> <p>At the heart of the NPPF is a presumption in favour of sustainable development, which should be seen as a golden thread running through both plan-making and decision-taking.</p> <p>The NPPF requires that the planning system should be genuinely plan-led and that plans should:</p> <ol style="list-style-type: none"> a) be prepared with the objective of contributing to the achievement of sustainable development; b) be prepared positively, in a way that is aspirational but deliverable; 	<p>The draft Drought Plan should take into consideration the policies set out in the NPPF insofar as they relate to the area covered by the draft Drought Plan.</p>

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<p>c) be shaped by early, proportionate and effective engagement between planmakers and communities, local organisations, businesses, infrastructure providers and operators and statutory consultees;</p> <p>d) contain policies that are clearly written and unambiguous, so it is evident how a decision maker should react to development proposals;</p> <p>e) be accessible through the use of digital tools to assist public involvement and policy presentation; and</p> <p>f) serve a clear purpose, avoiding unnecessary duplication of policies that apply to a particular area (including policies in this Framework, where relevant).</p>	
Natural Resources Wales (2017) Drought Plan	
The Drought Plan sets out the measures that Natural Resources Wales will take to identify, monitor and manage activities in the build-up to, during and following a drought.	The draft Drought Plan should be prepared in accordance with the Natural Resources Wales Drought Plan.
Natural Resources Wales (2017) Water Company Drought Plan Technical Guideline	
The Water Company Drought Plan Technical Guideline been produced to help water undertakers identify how they intend to manage a drought. It is designed to help water undertakers write a plan that complies with all the relevant statutory requirements and Welsh Government policy. If water undertakers decide to take a different approach to those in the guidelines it should clearly demonstrated they are still fulfilling their obligations. The technical guideline, consulted with the Welsh Government, the Environment Agency, Ofwat, Natural England, and water undertakers, identifies the importance of engaging with Natural Resources Wales as early as possible to avoid unnecessary delays later in the process.	The draft Drought Plan should be prepared in accordance with the requirements of the technical guide.
Ofwat (2008) Water Supply and Demand Policy	
Summarised the key areas of water supply and demand, focusing on water efficiency, leakage, metering, and climate change.	<p>The draft Drought Plan should ensure it balances demand and supply issues.</p> <p>The SEA framework should ensure that consideration is given to the socio-economic and environmental impact of any demand and supply policies.</p>
Ofwat (2016) Water 2020	
<p>This document sets out Ofwat’s decisions on the design of its water and wastewater services regulatory framework in England and Wales. The approach aims to deliver the following benefits:</p> <ul style="list-style-type: none"> • Greater customer engagement and understanding • A sustainable investment model and a fair balance of risk and reward • Choice where possible, and ensuring markets are effective for customers • A focus on the long-term, targeted and risk-based <p>Support for sustainable improvements in the environment</p>	<p>The draft Drought Plan should take account of the regulatory framework.</p> <p>The SEA assessment should include criteria relating to the provision of water to customers and environmental protection.</p>
Ofwat (2017) Resilience in the Round	
<p>The report identifies that the water sector has historically invested in options which enhance capacity, especially operational capacity and that whilst additional capacity has an important role in delivering resilience against some threats, companies should start looking at a wider set of factors in order to deliver “smarter” options for the future, including:</p> <ul style="list-style-type: none"> • Addressing multiple threats through a single intervention. For example, enhancing network connectivity to reduce the number of customers reliant a single source of supply. This type 	The draft Drought Plan should consider its approach to resilience in the round.

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<p>of approach can provide water supply resilience to multiple threats such as outages, drought and contamination.</p> <ul style="list-style-type: none"> Recognising that any intervention will have its own embedded vulnerabilities to future threats. Understanding the vulnerabilities of option types will be critical to planning respective roles in delivering the planned level of resilience. For example, water transfers between areas of surplus and deficit can be a good options but might be vulnerable to wider scale drought impacts and/or contamination. 	
JNCC and Defra (2012) UK Post-2010 Biodiversity Framework	
<p>The framework sets out UK priorities for work on the Convention on Biological Diversity, and follows on from the 1994 UK Biodiversity Action Plan. It sets out a vision that, 'by 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people'. The goals and activities to meet this aim are grouped under the categories of International / European context; facilitating and contributing to common country approaches and solutions; evidence provision; and reporting.</p>	<p>The draft Drought Plan should support the protection and enhancement of biodiversity.</p> <p>The SEA assessment should include criteria relating to the protection of species and habitats.</p>
Countryside Council for Wales (2001) Register of Landscapes of Historic Interest	
<p>Cadw, the Countryside Council for Wales (CCW) and the International Council on Monuments and Sites (ICOMOS UK), has compiled a Register of Landscape of Historic Interest in Wales. The register identifies 58 landscapes of outstanding or special historic interest, which are considered to be the best examples of different types of historic landscapes in Wales.</p> <p>The Register provides information to decision makers and landscape managers, to help ensure that the historic character of the landscape is sustained, and that where change is contemplated, it is well-informed. It is accompanied by a good practice guide, which explains how the Register should be used in assessing the effect of major developments on the historic landscape.</p> <p>A guide to good practice on using the register was published in 2007 and remains in use.</p>	<p>The draft Drought Plan should be developed with consideration of landscapes of historic interest.</p> <p>The SEA should include assessment criteria relating to protection and enhancement of the landscapes and seascapes, including those with historic interest features.</p>
Valuing Our Environment Partnership (2010) Valuing the Welsh Historic Environment	
<p>This document is a review and does not contain objectives or targets as such. It can be assumed however that the protection and enhancement of the historic environment is a key objective.</p> <p>It showed that in 2010 the historic environment contributes approximately £840 million to Wales's gross value added, some £1.8 billion in respect of output and supports 30,000 full time equivalent jobs.</p>	<p>The draft Drought Plan should consider effects of options on historic environment assets.</p> <p>The SEA should include a guide question relating to protecting and enhancing the historic environment.</p>
Waterwise (2017) Water Efficiency Strategy for the UK	
<p>The document sets out a strategy for achieving the vision of a water efficient UK. It suggests policy, regulatory and practical actions that can help in the process of achieving water efficiency.</p>	<p>The draft Drought plan should take into account its possible impacts on water efficiency and aim to improve water efficiency.</p> <p>The SEA objectives should reflect the need improve water efficiency.</p>
Welsh Government (1998) Technical Advice Note 14: Coastal Planning	
<p>TAN 14 seeks to protect the coastline in relation to development, landscape, biodiversity and recreation</p>	<p>The draft Drought Plan should take into account its effects on coastal areas.</p> <p>The SEA assessment should take into account the effects of the options on the coast where relevant.</p>
Welsh Government (2006) Environment Strategy for Wales	

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<p>The Environment Strategy for Wales sets out the challenges and vision for Wales up to 2026. It covers themes under climate change; resource use; biodiversity, landscapes and seascapes; local environment; and environmental hazards. The priorities identified in the Strategy are to</p> <ul style="list-style-type: none"> - minimise greenhouse gas emissions and adapt to the impacts of climate change; - conserve and enhance biodiversity; - monitor and regulate known and emerging environmental hazards; - tackle unsustainable practices, like waste production and disposal; and <p>conserve and enhance land and sea, built environment, natural resources and heritage, developing and using them in a sustainable and equitable way and for the long term benefit of the people of Wales.</p>	<p>The draft Drought Plan should aim to contribute to the Environment Strategy for Wales.</p> <p>The SEA assessment should include effects of options on biodiversity, marine, flood and water management, the historic environment, people and the environment and environmental quality.</p>
Welsh Government (2008) <i>One Wales One Planet: The Sustainable Development Scheme for Wales</i>	
<p>One Wales One Planet seeks to build on the two previous Sustainable Development Schemes. It sets out proposals to promote sustainable development, how the Welsh Government will make sustainable development a reality for people in Wales, and the benefits that people will see from this, particularly in less well-off communities.</p> <p>The strategy states that the Welsh Government is committed to working in partnership with others and notes that businesses can:</p> <ul style="list-style-type: none"> - Develop resource efficiency within the organisation and through supply chains, improving productivity and competitiveness; - Reduce waste; - Develop environmental and sustainability policies and targets; - Monitor performance and resource use and report publicly on them; - Engage with the workforce in both adopting sustainable practices and encouraging employees to become sustainable champions in their own communities; - Engage with and support local communities. 	<p>The draft Drought Plan should consider effects of options on sustainable development in Wales.</p> <p>The SEA should include guide questions relating to improving resource efficiency, reducing waste, monitoring and public reporting, encouraging sustainable practices among the workforce and engaging with and supporting local communities. The SEA should include proposals for monitoring the effects of the draft Drought Plan on the environment and sustainability and could utilise targets that arise from this document.</p>
Welsh Government (2008) <i>People, Places, Futures: The Wales Spatial Plan 2008 Update</i>	
<p>The <i>Wales Spatial Plan</i> provides the context and direction of travel for local development plans and the work of local service boards. The 2008 update brings the <i>Wales Spatial Plan</i> into line with <i>One Wales</i>, and gives status to the area work which has developed since 2006. The key themes of the update (and the <i>Wales Spatial Plan</i> before it) are set out below:</p> <p>Building Sustainable Communities</p> <p>Our future depends on the vitality of our communities as attractive places to live and work. We need to reduce inequalities between communities whilst retaining their character and distinctiveness.</p> <p>Promoting a Sustainable Economy</p> <p>We need an innovative, high value-added economy for Wales which utilises and develops the skills and knowledge of our people; an economy which both creates wealth and promotes the spreading of that prosperity throughout Wales; an economy which adds to the quality of life as well as the standard of living and the working environment.</p> <p>Valuing our Environment</p> <p>The quality of our natural environment has an intrinsic value as a life support system, but also promotes wellbeing for living and working and contributes to our economic objectives. Safeguarding and protecting our natural and historic assets, and enhancing resilience to address the challenges of climate change, will enable us to attract people to our communities and provide the wellbeing and quality of life to encourage them to stay and preserve the foundations for the future.</p> <p>Achieving Sustainable Accessibility</p> <p>We will develop access in ways that protect the environment, encourage economic activity, widen employment opportunities, ensure quality services and integrate the social, environmental and economic benefits that travel can have.</p>	<p>The draft Drought Plan should have regard to the key themes of the <i>Wales Spatial Plan Update</i>.</p> <p>The SEA objectives should cover the key themes set out in the <i>Wales Spatial Plan Update</i>.</p>

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Respecting Distinctiveness	
A cohesive identity which sustains and celebrates what is distinctive about Wales, in an open and outward-looking way, is central to promoting Wales to the World, as well as to our future economic competitiveness and social and environmental wellbeing.	
Welsh Government (2008-2015) Welsh Rural Development Programme 2014-2020	
<p>The Programme was adopted by the European Commission in May 2015. It is a 7 year investment programme supporting a wide range of activities which contribute to the following objectives:</p> <ul style="list-style-type: none"> • fostering the competitiveness of agriculture; • ensuring the sustainable management of natural resources, and climate action; • achieving a balanced territorial development of rural economies and communities, including the creation and maintenance of employment. 	<p>The draft Drought Plan should consider the effect of options on rural areas.</p> <p>The SEA assessment should note where options will have significant effects on rural areas.</p>
Welsh Government (2009) Technical Advice Note 5: Nature Conservation and Planning	
<p>Technical Advice Note 5 sets out how the planning system should contribute to protecting and enhancing biodiversity and geological conservation. It stipulates that the planning system should:</p> <ul style="list-style-type: none"> - work to achieve nature conservation objectives through a partnership between local planning authorities, Countryside Council for Wales (CCW), the Environment Agency Wales, voluntary organisations, developers, landowners and other key stakeholders; - integrate nature conservation into all planning decisions looking for development to deliver social, economic and environmental objectives together over time; - ensure that the UK's international and national obligations for site, species and habitat protection are fully met in all planning decisions; - look for development to provide a net benefit for biodiversity conservation with no significant loss of habitats or populations of species, locally or nationally; - help to ensure that development does not damage, or restrict access to, or the study of, geological sites and features or impede the evolution of natural processes and systems especially on rivers and the coast; and - plan to accommodate and reduce the effects of climate change by encouraging development that will reduce damaging emissions and energy consumption and that help habitats and species to respond to climate change. 	<p>The draft Drought Plan should seek to protect and enhance biodiversity and geodiversity.</p> <p>SEA objectives should reflect the need to conserve and, where possible, enhance, biodiversity and geodiversity.</p>
Welsh Government (2010) Climate Change Strategy for Wales	
<p>The Climate Change Strategy for Wales and associated action plan sets out the Welsh Government's policy intentions in relation to climate change and expands on the commitments set out in One Wales.</p> <p>The strategy re-iterates the One Wales commitments to 3 per cent annual carbon reductions and sets out, that by 2020, the Welsh Government expect to see:</p> <ul style="list-style-type: none"> - Businesses have reduced energy costs and emissions; - Employees actively engaged in reducing emissions from their workplaces; - Consumers demanding low carbon goods and services and concerned about sustainability performance of businesses; - Growth of social enterprises and community businesses providing low carbon goods and services locally; <p>Core businesses operating, and people employed, in businesses that provide low carbon goods and services.</p>	<p>The draft Drought Plan should incorporate climate change mitigation and adaptation measures, e.g. reducing carbon emissions.</p> <p>The SEA should include a guide question relating to mitigation and adaptation to climate change.</p>
Welsh Government (2010) National Transport Plan	
<p>The Plan sets out five strategic transport priorities for the next 5 years:</p> <ul style="list-style-type: none"> - Reducing greenhouse gas emissions and other environmental impacts; - Integrating local transport; 	<p>The draft Drought Plan should consider any transport-related implications arising from the options</p>

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<ul style="list-style-type: none"> - Improving access between key settlements and sites; - Enhancing international connectivity; - Increasing safety and security. 	<p>and seek to reflect the transport hierarchy where possible.</p> <p>The SEA assessment should include an objective on improving and/or integrating transport and reducing greenhouse gases.</p>
Welsh Government (2010) <i>Towards Zero Waste, One Wales: One Planet – Overarching Waste Strategy Document for Wales</i>	
<p>Towards Zero Waste is the overarching waste strategy for Wales. The key outcomes that the Strategy aims to achieve are:</p> <ul style="list-style-type: none"> - a sustainable environment in which we reduce the impact of waste in Wales to within our environmental limits by 2050; - a Fair and Just Society, in which citizens can achieve their full human potential and contribute to the wellbeing of Wales through actions on waste prevention, reuse and recycling; - a Prosperous Society With a sustainable, resource efficient economy. <p>The strategy sets out a long-term aim of zero waste by 2050 and a medium term aim of achieving a high recycling society by 2025. This is supported by a range of recycling and other waste management targets including in relation to commercial and industrial waste.</p>	<p>The draft Drought Plan should promote waste reduction, reuse and recycling ahead of landfill disposal.</p> <p>SEA objectives should reflect aspirations of the Strategy.</p>
Welsh Government (2010) <i>The Biodiversity Framework for Wales</i>	
<p>This document sets out to provide a delivery mechanism for a number of biodiversity related Outcomes set out in the Wales Environment Strategy. It defines the importance of biodiversity, describing the current situation in Wales. It considers policy and legislative drivers at a European, British and Welsh scale and sets out the roles and responsibilities of the groups and bodies responsible for halting and ultimately reversing the loss of biodiversity in Wales.</p>	<p>This document highlights a number of bodies with whom DCWW may need to work to ensure development of the draft Drought Plan contributes to protecting and enhancing biodiversity.</p>
Welsh Government (2011) <i>Welsh Government Policy Statement: Preparing for a Changing Climate</i>	
<p>This Policy Statement sets out how the Welsh Government will implement relevant provisions of the Climate Change Act 2008. It provides technical advice on how to assess climate risks and how to develop adaptation plans and in this context Welsh Water is identified as a key reporting authority.</p>	<p>The draft Drought Plan should incorporate climate change mitigation and adaptation measures where appropriate.</p> <p>The SEA should include a guide question relating to mitigation and adaptation to climate change. Monitoring recommendations in the SEA should reflect the 3 per cent year on year emission reduction target set by the Welsh Government.</p>
Welsh Government (2011) <i>National Strategy for Flood and Coastal Erosion Risk Management in Wales</i>	
<p>The Strategy sets out the Welsh Government's policies on flood and coastal erosion risk management, and establishes a delivery framework up to 2017.</p> <p>The Strategy sets four overarching objectives for managing flood and coastal erosion risk in Wales:</p> <ul style="list-style-type: none"> • reducing the consequences for individuals, communities, businesses and the environment from flooding and coastal erosion; • raising awareness of and engaging people on flood and coastal erosion risk; • providing an effective and sustained response to flood and coastal erosion events; and • prioritising investment in the most at risk communities. 	<p>The draft Drought Plan should contribute to the reduction in coastal erosion where possible.</p> <p>The SEA should include an objective/guide question relating to flooding.</p>
Welsh Government (2012) <i>Energy Wales: A Low Carbon Transition</i>	

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<p>Energy Wales and the supporting delivery plan set out what the Welsh Government intends to do to drive the change to a sustainable, low carbon economy for Wales. The Welsh Government commits to:</p> <ul style="list-style-type: none"> Engage and support businesses that help to achieve Wales's low carbon ambition; Ensure that regulatory processes are as simplified and efficient as they can be and provide businesses with clarity and stability; Engage the UK Government to ensure that there is a credible framework for capital investment to support the transition to a low carbon economy; Support vital energy intensive industries in the transition to a low carbon economy; Pursue energy efficiency; Focus on low carbon sources of energy generation and approaches which will help to deliver lower overall emissions; and Assist the most vulnerable in Welsh society and work to ensure that costs of reform do not fall disproportionately on poor households. <p>The delivery plan also sets out key delivery themes around low carbon energy, Anglesey Energy Island, energy efficiency and distributed energy generation.</p>	<p>The draft Drought Plan should seek to incorporate low carbon energy and energy efficiency.</p> <p>The SEA should include a guide question relating to climate change mitigation.</p>
Welsh Government (2012) <i>Historic Environment Strategy for Wales</i>	
<p>This strategy summarises the areas which the Welsh Government will prioritise for action, and aims to protect Wales' heritage whilst encouraging public access, enjoyment and participation. The Strategy sets out the role of the historic environment in delivering tangible social, economic and environmental benefits for Welsh communities. It also aims to further develop the economic role of heritage in Wales and maximise educational, training and leisure opportunities.</p>	<p>The draft Drought Plan should protect and enhance the historic environment.</p> <p>The SA should include assessment criteria relating to protection and enhancement of the historic environment.</p>
Welsh Government (2013) <i>Partnership for Growth: The Welsh Government Strategy for Tourism 2013 – 2020</i>	
<p>The strategy identifies the priorities to deliver a prosperous and competitive tourism industry in Wales.</p> <p>It sets out how Welsh tourism will be promoted and communicated more effectively and how investment will be directed to improve quality and choice for the consumer.</p>	<p>The draft Drought Plan could take account of the benefits that tourism can bring to Wales.</p> <p>The SEA should include assessment criteria relating the importance of tourism and/or recreation.</p>
Welsh Government (2015) <i>Water Strategy for Wales</i>	
<p>This Strategy sets out our long-term policy direction in relation to water. The aim is to ensure we have a more integrated and sustainable approach to managing our water and associated services in Wales. This Strategy has been developed within this context and will contribute to the implementation of our wider natural resource management policy.</p> <p>A more integrated approach to the way water resources in Wales are managed will help to promote the coordinated management of water, land and related resources. This in turn will enable us to maximise economic and social benefits, including tackling poverty in an equitable way while protecting vital ecosystems and the environment. The Strategy aims ensure the long-term needs of a sustainable and resilient environment and that there are sufficient, reliable water resources and waste water services available in Wales. This approach will also drive green growth by providing an essential resource for businesses, as well as providing new opportunities for employment.</p>	<p>The draft Drought Plan will have a key role in contributing to the wider objectives of the Strategy.</p> <p>The SEA should include objectives/guide questions relating to sustainable resource use.</p>
Welsh Government (2015) <i>Well-being of Future Generations (Wales) Act 2015</i>	
<p>The Act includes 7 goals that all public bodies should work towards:</p> <ul style="list-style-type: none"> A prosperous Wales A resilient Wales A healthier Wales 	<p>The draft Drought Plan should consider how it can contribute to the seven well-being goals set out in the Act.</p>

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<ul style="list-style-type: none"> • A more equal Wales • A Wales of cohesive communities • A Wales of vibrant culture and thriving Welsh Language • A globally responsible Wales <p>The Act establishes a statutory Future Generations Commissioner for Wales, whose role is to act as a guardian for the interests of future generations in Wales, and to support the public bodies listed in the Act to work towards achieving the well-being goals.</p> <p>The Act also establishes Public Services Boards (PSBs) for each local authority area in Wales. Each PSB must improve the economic, social, environmental and cultural well-being of its area by working to achieve the well-being goals.</p>	<p>The SEA Framework should reflect the seven well-being goals.</p>
Welsh Government (2015) Nature Recovery Plan for Wales	
<p>The Nature Recovery Plan for Wales is aimed at addressing the underlying causes of biodiversity loss by:</p> <ul style="list-style-type: none"> • putting nature at the heart of decision-making • increasing the resilience of the natural environment • taking specific action for habitats and species. <p>It sets out how Wales will deliver the commitments of the UN Convention on Biological Diversity and the EU Biodiversity Strategy to halt the decline in Wales' biodiversity by 2020 and then reverse that decline.</p> <p>The objectives of the plan are to:</p> <ul style="list-style-type: none"> • Engage and support participation and understanding to embed biodiversity throughout decision making at all levels. • Safeguard species and habitats of principal importance and improve their management • Increase the resilience of the natural environment by restoring degraded habitats and habitat creation • Tackle key pressures on species and habitats • Improve our evidence, understanding and monitoring • Put in place a framework of governance and support for delivery 	<p>The draft Drought Plan should seek to protect and enhance biodiversity.</p> <p>SEA objectives should reflect the need to conserve and, where possible, enhance biodiversity.</p>
Welsh Government (2016) Technical Advice Note 12: Design	
<p>Technical Advice Note 12 sets out the Welsh Government's land use planning policy in respect of promoting sustainability through good design. It advocates a holistic approach to design that considers:</p> <p>Movement - promoting sustainable means of travel;</p> <p>Access- ensuring access for all;</p> <p>Character - sustaining or enhancing local character, promoting legible development, promoting a successful relationship between public and private space, promoting quality, choice and variety, promoting innovative design;</p> <p>Community safety - ensuring attractive, safe public spaces and security through natural surveillance;</p> <p>Environmental sustainability - achieving efficient use and protection of natural resources, enhancing biodiversity and designing for change.</p>	<p>The draft Drought Plan should promote good design in the development if any new facilities are required as part of plan measure.</p> <p>SEA objectives should include the promotion of good design.</p>
Welsh Government (2016) Planning Policy Wales (Edition 10)	
<p>Planning Policy Wales sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes and procedural advice given in circulars. It sets out key policy objectives for Local Development Plans (LDPs) in Wales which reflect the sustainable development agenda.</p>	<p>Measures recommended in the draft Drought Plan will need to confirm to LDPs.</p> <p>The SEA objectives should reflect the Welsh Government's commitments to sustainable development.</p>

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Welsh Government (2016) <i>Historic Environment (Wales) Act 2016</i>	
The Act improves the existing systems for the protection and sustainable management of the Welsh historic environment. It also gives more effective protection to listed buildings and scheduled monuments and enhances existing mechanisms for the sustainable management of the historic environment. The Act also creates new measures that enables authorities to halt works if protected buildings or monuments are under threat from unauthorised activities and to take action against those who have damaged or destroyed monuments.	The draft Drought Plan should have regard to the requirements of the Act. The SEA assessment should include criteria relating to the protection of the historic environment.
Welsh Government (2016) <i>The Environment (Wales) Act 2016</i>	
The overarching aims of the Act are to enable Wales' resources to be managed in a more proactive, sustainable and joined-up way and to establish the legislative framework necessary to tackle climate change. Some of the specific provisions in the Act include: <ul style="list-style-type: none"> • Helping to plan and manage Wales' natural resources at a national and local level, through a State of Natural Resources Report, a National Natural Resources Policy and area statements. • Providing Natural Resources Wales (NRW) with a general purpose that aligns fully with the statutory principles for the sustainable management of natural resources. • Providing NRW with powers to undertake land management agreements and experimental schemes. • Providing public authorities with a reshaped requirement to seek to maintain and enhance biodiversity and promote resilience of ecosystems. • Placing statutory emission reduction targets and carbon budgeting to support their delivery. • Enabling improvements to the existing scheme for single use carrier bags. • Providing the Welsh Ministers with powers to take action to achieve higher levels of recycling for business waste, food waste treatment and energy recovery. • Clarifying the law for a number of existing environmental regulatory regimes including marine licensing, shellfisheries management, land drainage and flood risk management. 	The draft Drought Plan should enhance biodiversity, promote resilience in ecosystems and maintain and enhance biodiversity The SEA framework should include consideration of resilience in ecosystems and the maintenance and enhancement of biodiversity and resource use.
Natural Resources Wales (2016) <i>The State of Natural Resources Report (SoNaRR)</i>	
The report sets out the states of Wales' natural resources. It assesses the extent to which natural resources in Wales are being sustainably managed, and recommends a proactive approach to building resilience. The report identifies risks and threats and opportunities for integrated solutions that provide multiple benefits (social, cultural, environmental and economic).	The draft Drought Plan should have regard to opportunities to address risks and threats identified in the report and identify integrated solutions. The SEA should have regard to the risks, threats and opportunities identified in the report and the extent to which opportunities for integrated solutions can be incorporated in the draft Drought Plan.
Welsh Government (2016) <i>Guiding Principles for Developing Water Resources Management Plans</i>	
The Guiding Principles set out the Welsh Government's expectations in terms of the role and content of WRMPs. The link is also made with recent legislation (including the Environment (Wales) Act and the Well-being of Future Generations (Wales) Act 2015. The process for preparing WRMPs is also set out in the document.	The draft drought Plan should be cognisant of the Guiding Principles for WRMPs.
Welsh Government (2017) <i>Draft Welsh National Marine Plan</i>	

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<p>This draft plan sets out how the Welsh Government will achieve sustainable development in the Welsh marine area through the sustainable management of marine natural resources. It covers both Welsh inshore and offshore waters and sets out the following vision, which will be achieved through the plan's objectives and policies:</p> <ul style="list-style-type: none"> • During the 20 year view taken by the plan, Welsh seas are clean, healthy, safe, productive and biologically diverse: <ul style="list-style-type: none"> • Through an ecosystem approach, our seas are healthy and resilient and support a sustainable and thriving economy. • Through access to and enjoyment of the marine environment, health and wellbeing are improving. • Through Blue Growth more jobs and wealth are being created which is helping coastal communities become more resilient, prosperous and equitable with a vibrant culture. • Through the responsible deployment of low carbon technologies, the Welsh marine area is making a strong contribution to energy security and climate change emissions targets 	<p>The draft Drought Plan should take into account its effects on coastal areas.</p> <p>The SEA assessment should take into account the effects of the actions on the coast/marine environment where relevant.</p>
Welsh Government (2017) Guiding Principles for Developing Water Undertaker Drought Plans 2020	
<p>The Guiding Principles set out the Welsh Government's expectations in terms of the role and content of drought plans. The link is also made with recent legislation (including the Environment (Wales) Act 2016 and the Well-being of Future Generations (Wales) Act 2015). The process for preparing and consulting on drought plans is also set out in the document.</p>	<p>The draft Drought Plan will need to have regard to the Guiding Principles as a key over-arching document.</p>
Welsh Government (2017) Natural Resources Policy	
<p>The policy supports the Environment (Wales) Act 2016, which places a duty on Welsh ministers to prepare, publish and implement a statutory National Natural Resource Policy (NNRP). With regards to water and flooding, the policy includes a commitment to supporting the use of innovative approaches to water quantity and drought planning which might involve new technological applications to access smaller water bodies and create a more dispersed supply network. It also commits to Reform the abstraction licencing system to ensure that we have robust and resilient water resources.</p>	<p>The draft Drought Plan should have regard to the priority areas of the policy statement.</p> <p>The SA should include assessment criteria relating to protection and enhancement of the environment, flooding and designated sites.</p>
Welsh Government (2017) The Drought Plan (Wales) Direction 2017	
<p>The Drought Plan (Wales) Direction 2017 specifies the following additional matters to be addressed in drought plans:</p> <ul style="list-style-type: none"> • The management structure that the water undertaker will put in place during a drought and an explanation of how the management structure will manage, communicate and make decisions during a drought • The magnitude and duration of droughts for which the drought plan has been tested • The permits and approvals that the water undertaker expects to need in order to implement the drought management measures • The discussions that have occurred between the water undertaker and the bodies responsible for granting those permits and approvals and the arrangements for discussions with those bodies during the onset, duration and abatement of all droughts covered by the drought plan • The measures that may be needed to mitigate any adverse effect on the environment resulting from the implementation of a drought management measure • The permits and approvals that the water undertake expects to need in order to implement those mitigation measures; and • The compensation that may need to be made as a result of the implementation of a drought management measure. 	<p>The draft Drought Plan will need to be prepared in accordance with the Direction.</p>



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Water Company (various) Drought Plans	
<p>Drought Plans set out the steps that each water company will take through the stages of developing drought, drought, severe drought and recovery from drought to ensure their supply of water resources. Drought Plans must be produced by all water companies to fulfil their requirements under the Water Act 2003. Those neighbouring Drought Plans relevant to the draft Drought Plan are:</p> <ul style="list-style-type: none"> - Dee Valley Water Drought Plan; - Albion Water Draft Drought Plan; - Severn Trent Water Drought Plan; - United Utilities Drought Plan; and - Thames Water. 	<p>The draft Drought Plan should take account of emerging neighbouring plans where appropriate.</p>
Water Company (various) Water Resources Management Plans	
<p>Water companies in England and Wales, are required to prepare, maintain and publish a WRMP under the Water Industry Act 1991, updated by the provisions in section 37A-D of the Water Act 2003 and the Water Act 2014 and the Environment (Wales) Act 2016. The plan must set out how a water company intends to maintain the balance between supply and demand for water over a minimum of a 25 year period. This is complemented by a water company drought plan, which sets out the short-term operational steps a company will take as a drought progresses.</p> <p>Those neighbouring Water Resource Management Plans relevant to the draft Drought Plan are:</p> <ul style="list-style-type: none"> - Dee Valley; - Severn Trent Water - United Utilities - Bristol Water - Thames Water. 	<p>The draft Drought Plan will need to be in accordance with neighbouring WRMPs and take into account those triggers and supply and demand side options which are relevant to the Welsh Water area.</p> <p>The SEA should include an objective/guide question relating to water resources.</p>
Dŵr Cymru Welsh Water (2007) Our Sustainable Future	
<p>Our Sustainable Future sets out Welsh Water's long term strategy which comprises the following dimensions:</p> <ul style="list-style-type: none"> - Protecting public health; - Safeguarding the environment; - Responding to climate change; - Meeting customer's expectations; - Looking after our assets; - Financing the business; - Employer of choice; and - Affordability and value for money <p>The document identifies a range of priorities and targets under these themes including, for example:</p> <ul style="list-style-type: none"> - Undertaking, where appropriate, improvements to the quality of discharges to meet the requirements of the Habitats Directive; - Improving preliminary treatment at 15 key wastewater treatment works; - Reducing total carbon footprint by 25 per cent; - Renewing 220km of sewers; - Providing robust infrastructure to enable the economic growth of Wales. 	<p>The draft Drought Plan should seek to support the delivery of Our Sustainable Future.</p> <p>The objectives and guide questions that comprise the SEA Framework should, where appropriate, reflect the priorities set out in this strategy.</p>
Dŵr Cymru Welsh Water (2017) Making time for nature: Dŵr Cymru Welsh Water's plan for maintaining and enhancing biodiversity	
<p>The plan highlights what Welsh Water is doing across its business to support nature and biodiversity. It also outlines additional actions Welsh Water intend to take by 2019.</p>	<p>The draft Drought Plan should seek to protect and enhance biodiversity.</p>

Regional Plans and Programmes	
Purpose of the Document, including Objectives and Targets relevant to the Water Resources Management Plan and SEA	Relationships and Influences on the Drought Plan and the SEA
<p>The plan sets out a series of 30 commitments for supporting biodiversity and nature that are to be delivered by 2019, with some ongoing into the future.</p> <p>It is a statutory plan published under section 6 of the Environment (Wales) Act 2016.</p>	<p>SEA objectives should reflect the need to conserve and, where possible, enhance biodiversity.</p>
Dŵr Cymru Welsh Water (2018) Welsh Water 2050	
<p>Welsh Water 2050 identifies the significant trends that will face Welsh Water over the next 30 years and how it will impact the company and their customers. Opportunities and challenges related to the trends have been identified within the document and the company's strategic responses to respond to these challenges have been set out.</p> <p>The document is set within the policy context of the Welsh Government's Wellbeing of Future Generations Act (Wales) 2015 and Environment Act (Wales) 2015.</p>	<p>The draft Drought plan should consider the challenges and strategic responses set out within Welsh Water 2050.</p> <p>The SEA objectives should consider the future trends and challenges.</p>
Natural Resources Wales (2015) (Various) River Basin Management Plans	
<p>Natural Resources Wales as the responsible authority for river basin planning in Wales. The plans are a requirement of the Water Framework Directive (WFD) (2000/60/EC).</p> <p>The plans describe the pressures facing the water environment and set objectives for rivers, lakes, estuaries, coastal and ground waters to cover the period 2015-2021. They outline the priority actions ('Measures') that are needed to improve the environment, the benefits those actions could achieve and who is best placed to deliver them. The measures seek to address the significant water management issues.</p> <p>Relevant River Basin Management Plans managed by Natural Resources Wales are set out below:</p> <ul style="list-style-type: none"> • Dee River Basin Management Plan • Western Wales River Basin Management Plan <p>In addition, the Severn River Basin Management plan also falls within part of the Welsh Water area however is managed by the Environment Agency.</p>	<p>The draft Drought Plan should consider how it can contribute to the priority actions set out in the river basin management plans.</p> <p>The SEA objectives should reflect the need to manage water resources in a sustainable manner.</p>

Sub-regional/ Local Plans and Programmes	
Purpose of the Document, including Objectives and Targets relevant to the Water Resources Management Plan and SEA	Relationships and Influences on the Drought Plan and the SEA
Area of Outstanding Natural Beauty Management Units (various) AONB Management Plans	
<p>The following AONBs are present in the Welsh Water area:</p> <ul style="list-style-type: none"> - Anglesey; - Clwydian Range; - Gower; - Llyn; - Wye Valley. <p>The management plans for AONBs contain actions to ensure the protection and enhancement of the landscape.</p>	<p>Draft Drought Plan Measures within AONBs should be consistent with the management plan.</p> <p>The SEA assessment framework should consider the effects of options on landscapes, including designated landscapes.</p>
Defra (Various) Eel Management Plans	
<p>Eel management plans describe the current status of Eel populations across river basin districts and assesses compliance with targets set out in EU Council Regs 110/2207.</p> <p>Relevant Eel Management Plans are set out below:</p> <ul style="list-style-type: none"> - Eel Management Plan for Western Wales River Basin District - Eel Management Plan for Severn River Basin District; - Eel Management Plan for Dee River Basin District. 	<p>The draft Drought Plan should take Eel management plans into account.</p>
Environment Agency (various) Catchment Flood Management Plans	
<p>Catchment Flood Management Plans (CFMPs) give an overview of the flood risk across each river catchment. They recommend ways of managing those risks now and over the next 50-100 years. CFMPs consider all types of inland flooding, from rivers, ground water, surface water and tidal flooding, but not flooding directly from the sea, (coastal flooding), which is covered in Shoreline Management Plans. They also take into account the likely impacts of climate change, the effects of how we use and manage the land, and how areas could be developed to meet our present day needs without compromising the ability of future generations to meet their own needs.</p> <p>Those CFMPs present in the Welsh Water area are:</p> <ul style="list-style-type: none"> - Wye and Usk; - Eastern Valleys; - Taff and Ely; - Ogmere to Tawe (including Thaw and Cadoxton); - Loughor to Taf; - Pembrokeshire and Ceredigion Rivers; - North West Wales; - Conwy and Clwyd; - River Dee. 	<p>The draft Drought Plan should take CFMPs into account.</p> <p>The SEA should include a guide question relating to flood risk.</p>
Environment Agency (various) River Basin Management Plans	
<p>River Basin Management Plans (RBMPs) set out how the water environment will be managed and provide a framework for more detailed decisions to be made. RBMPs set out a more integrated approach to river basin management based on the following principles:</p> <ul style="list-style-type: none"> - Integrate and streamline plans and processes; - Set out a clear, transparent and accessible process of analysis and decision-making; - Focus at the river basin district level; - Work in partnership with other regulators; - Encourage active involvement of a broad cross-section of stakeholders; - Make use of the alternative objectives to deliver sustainable development; 	<p>The draft Drought Plan should reflect the broad objectives of these plans.</p> <p>The SEA objectives should reflect the need to manage water resources on a catchment basis in a sustainable manner.</p>

Sub-regional/ Local Plans and Programmes	
Purpose of the Document, including Objectives and Targets relevant to the Water Resources Management Plan and SEA	Relationships and Influences on the Drought Plan and the SEA
<ul style="list-style-type: none"> - Use Better Regulation principles and consider the cost-effectiveness of the full range of possible measures; - Seek to be even handed across different sectors of society and sectors of industry; - Seek to be even handed and transparent in the management of uncertainty; - Develop methodologies and refine analyses as more information becomes available. <p>RBMPs in the Welsh Water area are Severn, Western Wales and Dee.</p>	
Environment Agency, Natural Resources Wales and Natural Scotland (2016) River Basin District Flood Risk Management Plans	
Flood risk management plans (FRMP) explain the risk of flooding from rivers, the sea, surface water, groundwater and reservoirs, and set out how risk management authorities will work with communities to manage flood risk over the next six years.	<p>The draft Drought Plan should take FRMPs into account.</p> <p>The SEA should include a guide question relating to flood risk.</p>
Environment Agency (undated) Wye Waterway Plan 2011-2016	
<p>The plan's vision is to develop and promote appropriate navigation and recreational activities for all waterway users on the River Wye, while protecting, maintaining and enhancing the unique conservation status of the waterway. The plans core objectives are to:</p> <ul style="list-style-type: none"> - improve and promote access and information to all users; - improve and maintain the river infrastructure, facilities and services for all users; - Contribute to enhanced biodiversity, heritage and landscape value in the waterway corridor; - Increase recreational use of the waterway. <p>No specific targets are set.</p>	<p>Draft Drought Plan measures in the Wye catchment should be consistent with the aims of the Wye Waterway Plan.</p> <p>The SEA assessment should consider the effects of options on recreational use of waterways.</p>
Environment Agency (various) Salmon Action Plans	
<p>Salmon action plans have been produced for the following river catchments in Wales;</p> <ul style="list-style-type: none"> - Cleddau; - Clwyd; - Conwy; - Dee; - Dwyfor; - River Dyfi; - Dysynni; - Glaslyn and Dwyryd; - Mawddach; - Nevern; - Ogmore; - Ogwen; - Rheidol; - Taf; - Taff and Ely; - Tawe; - Teifi; - River Usk; - River Wye. <p>The aim of the action plans is to ensure the objectives set out in the National Salmon Strategy are met. They set out what needs to be done to support and restore salmon populations.</p> <p>Individual targets are set out in each action plan</p>	<p>The draft Drought Plan should consider the effect of options on salmon populations.</p> <p>The SEA assessment framework should include a guide question relating to the effects of options on fish.</p>
Local Biodiversity Action Plans (LBAPs), including Species and Habitats Action Plans (various)	

Sub-regional/ Local Plans and Programmes	
Purpose of the Document, including Objectives and Targets relevant to the Water Resources Management Plan and SEA	Relationships and Influences on the Drought Plan and the SEA
<p>27 LBAPs in Wales and one for Herefordshire.</p> <p>Each Local Biodiversity Action Plan works on the basis of partnership to identify local priorities and to determine the contribution they can make to the delivery of the national Species and Habitat Action Plan targets. They include targets for increasing and enhancing biodiversity.</p> <p>Species Action Plans set objectives with regard specific species and set out proposed actions and targets along with which agency will be responsible for carrying them out.</p> <p>Habitat Action Plans sets objectives with regard specific UK habitats and sets out proposed actions targets along with which agency will be responsible for carrying them out.</p>	<p>Draft Drought Plan measures should take into account LBAP objectives.</p> <p>The SEA assessment should consider effects of options on biodiversity and outline enhancement and mitigation opportunities where these are identified.</p>
Local Geodiversity Action Plans (LGAPs) (Various)	
<p>Local Geodiversity Action Plans (LGAPs) set out actions to conserve and enhance the geodiversity of a particular area. In general they aim to:</p> <ul style="list-style-type: none"> • identify, conserve and enhance the best sites that represent the geological history of an area in a scientific, educational, recreational and cultural setting, • promote geological sites and make geo-conservation relevant to people, • provide a local geodiversity audit (an audit of sites and skills) and influence local planning policy. <p>The following areas are within the Welsh Water area and have Local Geodiversity Action Plans:</p> <ul style="list-style-type: none"> • Anglesey • Clwydian Range AONB 	<p>The draft Drought Plan should seek to protect and enhance geodiversity.</p> <p>SEA objectives should reflect the need to conserve and, where possible, enhance geodiversity.</p>
Local Planning Authority (various) Land Use Plans	
<p>The Welsh Water area covers a large number of Local Planning Authorities. These have been identified as:</p> <ul style="list-style-type: none"> - Conwy; - Blaenau Gwent; - Brecon Beacons National Park; - Bridgend - Caerphilly; - Cardiff; - Carmarthenshire; - Ceredigion; - Denbighshire; - Flintshire; - Gwynedd; - Herefordshire; - Merthyr Tydfil; - Monmouthshire; - Neath Port Talbot; - Newport; - Pembrokeshire; - Pembrokeshire Coast National Park; - Powys; - Rhondda Cynon Taff; - Snowdonia National Park; - Swansea; 	<p>Draft Drought Plan measures should be consistent with the Land Use Plans of those local authorities that will be affected by the option.</p>

Sub-regional/ Local Plans and Programmes	
Purpose of the Document, including Objectives and Targets relevant to the Water Resources Management Plan and SEA	Relationships and Influences on the Drought Plan and the SEA
<ul style="list-style-type: none"> - Torfaen; - Vale of Glamorgan; - Wrexham; - Ynys Mon. <p>The main objectives of the existing and emerging Land Use Plans in these areas are related to the sustainable development of the area.</p>	
National Park Management Plans (various)	
<p>The following National Parks are present in the Welsh Water area:</p> <ul style="list-style-type: none"> - Snowdonia; - Brecon Beacons; - Pembrokeshire Coast. <p>The management plans for National Parks contain actions to ensure the protection and enhancement of the landscape and natural environment of these areas.</p>	<p>Draft Drought Plan measures within the National Parks should be consistent with the respective management plan.</p> <p>The SEA assessment framework should consider the effects of options on landscapes and the natural environment, including designated areas.</p>
Natural Resources Wales (Various) Catchment Abstraction Management (Licencing) Strategies (CAMS)	
<p>Catchment Abstraction Management Strategies (CAMS) to assess how much water is available for abstraction, and where. Therefore, highlighting where water abstraction licences can be granted.</p> <p>A water abstraction licence is required to remove more than 20 cubic metres (4,400 gallons) of water per day from a river or stream, reservoir, lake or pond, canal or spring. The strategies aim to meet the water needs of the environment and to allow water users to sustainably exploit any surplus.</p> <p>The strategies were updated in 2014 to use an improved method and which meets the requirements of the EU Water Framework Directive 2000/60/EC by applying a better understanding of how much water the environment needs. Within the Welsh Water area the following Catchment Abstraction Management Strategies (CAMS) are in place:</p> <ul style="list-style-type: none"> • River Wye CAMS • Thaw and Cadoxton CAMS • The Teifi and North Ceredigion CAMS • The Cleddau and Pembrokeshire Coastal Rivers CAMS • The Carmarthen Bay CAMS • The Swansea Bay CAMS • Anglesey Catchment CAMS • Clwyd Catchment CAMS • Conwy Catchment CAMS • River Dee CAMS • Llŷn and Eryri CAMS • Meirionnydd CAMS • River Usk CAMS • South East Valleys CAMS 	<p>The draft drought plan should take the CAMS into account.</p> <p>The SEA assessment should consider the effects of options on the availability and sustainability of water supply.</p>
Public Services Boards (PSBs) (Various) PSB Assessments and Local Well-being Plans	
<p>The purpose of Public Services Boards (PSBs) is to improve the economic, social, environmental and cultural well-being in its area by strengthening joint working across all public services in Wales.</p> <p>The Well-being of Future Generations (Wales) Act 2015 establishes statutory PSBs which will replace the voluntary Local Service Boards in each local authority area. Each board will:</p> <ul style="list-style-type: none"> • assess the state of economic, social, environmental and cultural well-being in its area • set objectives that are designed to maximise the PSBs contribution to the well-being goals. <p>Each PSB must prepare and publish a plan setting out its objectives and the steps it will take to meet them. This is called a Local Well-being Plan. It must say:</p> <ul style="list-style-type: none"> • why the PSB feels their objectives will contribute within their local area to achieving the well being goals 	<p>The draft Drought Plan should consider how it can contribute to the seven well-being goals set out in the Well-being of future generations (Wales) Act (2015).</p> <p>The SEA Framework should reflect the seven well-being goals.</p>

Sub-regional/ Local Plans and Programmes	
Purpose of the Document, including Objectives and Targets relevant to the Water Resources Management Plan and SEA	Relationships and Influences on the Drought Plan and the SEA
<ul style="list-style-type: none"> • how it has had regard to the assessment of Local Well-being in setting its objectives and steps to take. <p>Each PSB will carry out an annual review of their plan showing their progress. When producing their assessments of local well-being and Local Well-being plan, PSBs must consult widely. The following PSB areas are within the Welsh Water area:</p> <ul style="list-style-type: none"> • Anglesey and Gwynedd PSB • Bridgend PSB • Blaenau Gwent PSB • Caerphilly PSB • Cardiff PSB • Carmarthenshire PSB • Ceredigion PSB • Conwy and Denbighshire PSB • Cwm Taf PSB • Flintshire PSB • Powys PSB • Neath Port Talbot PSB • Monmouthshire PSB • Newport PSB • Pembrokeshire PSB • Swansea PSB • Torfaen PSB • Vale of Glamorgan PSB • Wrexham PSB 	
Shore Line Management Plans (various)	
<p>Shore Line Management Plans are prepared in England and Wales. They are developed by Coastal Groups with members drawn from local authorities and other stakeholders. They identify the most sustainable approach to managing the flood and coastal risks to the coastline in the short term (up to 20 years), medium term (20 to 50 years) and long term (50 to 100 years).</p> <p>Relevant plans include:</p> <ul style="list-style-type: none"> • North West England and North Wales Shoreline Management Plan • Severn Estuary Shoreline Management Plan Review • Lavernock Point to St Ann's Head Shoreline Management Plan • West of Wales Shoreline Management Plan 	<p>Draft Drought Plan measures should take into account the policies and actions of the SMP.</p> <p>Where appropriate, the SEA should consider the cumulative effect of SMP policies and actions and draft Drought Plan measures.</p>



Appendix D

Criteria for Assessing Significance



Objective	Key Questions	Effect	Description	Illustrative Guidance
1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity.	<i>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar, SSSIs and priority habitats and species)?</i>	++	Significant Positive	N/a. No draft Drought Plan measure is anticipated to have significant positive impacts against this objective.
	<i>Will the draft Drought Plan measure protect and enhance non-designated sites and local biodiversity?</i>	+	Positive	N/a. No draft Drought Plan measure is anticipated to have positive impacts against this objective.
	<i>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</i>	0	Neutral	Draft Drought Plan measure would not have any effects on European or national designated sites and/or any species (including both designated and non-designated species).
	<i>Will the draft Drought Plan measure affect the condition of ecosystems (including their connectivity, structure and functioning)?</i>	-	Negative	Draft Drought Plan measure would have minor residual impact on national designated sites and/or protected sites (e.g. short term decrease in population of designated species). These impacts could not be effectively avoided but could be effectively compensated for. Draft Drought Plan measure would have minor short-term negative effects on non-designated conservation sites and species (e.g. – through decreases in flows/water quality, or some loss of habitat leading to temporary loss of ecosystem structure, function and/or connectivity).
	<i>Will the draft Drought Plan measure enhance the adaptability of ecosystems?</i>	--	Significant Negative	Draft Drought Plan measure would have a negative and sustained effect on European or national designated sites and/or protected species (e.g. – prevents reaching all conservation objectives on site, long term decrease in populations of designated species). These impacts could not reasonably be compensated for. Draft Drought Plan measure would have significant negative effects on local biodiversity (e.g. – through decreases in flows/water quality, or considerable loss of habitat leading to long term loss of ecosystem structure, function and/or connectivity, or the transfer of non-native species).
	<i>Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?</i>	?	Uncertain	From the level of information available the impact that the option would have on this objective is uncertain
2. To ensure the	<i>Will additional land be required for the development</i>	++	Significant Positive	No draft Drought Plan measure is expected to have a significant positive effect on achieving this objective.

Objective	Key Questions	Effect	Description	Illustrative Guidance
appropriate and efficient use of land and protect and enhance soil quality and geodiversity.	<p><i>or implementation of the draft Drought Plan measure or will the option require below ground works leading to land sterilisation?</i></p> <p><i>Will the draft Drought Plan measure utilise previously developed land?</i></p> <p><i>Will the draft Drought Plan measure minimise the loss of best and most versatile agricultural land?</i></p> <p><i>Will the draft Drought Plan measure affect upland (peat-dominated) and other wetland soils?</i></p> <p><i>Will the draft Drought Plan measure protect and enhance protected sites designated for their geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest?</i></p>	+	Positive	The draft Drought Plan measure would be located on a brownfield site and would have no effect on soils or existing land uses. The draft Drought Plan measure would result in the remediation of contaminated land.
		0	Neutral	The draought Drought Plan measure would have no effect on soils or land use.
		-	Negative	The draft Drought Plan measure would be located on a greenfield site and/or would result in a minor loss of best and most versatile agricultural land and/or or would be in conflict with existing land uses.
		--	Significant Negative	The draft Drought Plan measure would be located on a brownfield site and result in a major loss of best and most versatile agricultural land. The option would result in land contamination.
		?	Uncertain	From the level of information available the effect that the draft Drought Plan Measures would have on this objective is uncertain.
3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water	<p><i>Will the draft Drought Plan measure lead to a change in river flows, wetted width or river level?</i></p> <p><i>Will the draft Drought Plan measure affect surface water quality and quantity?</i></p> <p><i>Will the draft Drought Plan measure lead to changes in groundwater quality, quantity and recharge?</i></p>	++	Significant Positive	N/a. No draft Drought Plan measure is anticipated to have significant positive impacts against this objective.
		+	Positive	Draft Drought Plan measure is a demand management measure, not requiring abstraction of water to achieve yield.
		0	Neutral	Draft Drought Plan measure would have no discernible impact on river flows or on water quality or quantity in designated nature sites. Draft Drought Plan measure will not impact on groundwater quality or quantity. Draft Drought Plan measure has no impact on achievement of good ecological potential/status of a waterbody.
		-	Negative	Draft Drought Plan measure would lead to minor decreases in river flows. Water quality and quantity in designated nature conservation sites may be impacted by the measure (e.g. – prevents reaching one of the conservation objectives on site, short term decrease in population of designated species). These impacts could not be effectively avoided but could be effectively compensated for. Draft Drought Plan measure would lead to minor decreases in groundwater quality or quantity.

Objective	Key Questions	Effect	Description	Illustrative Guidance
Framework Directive	<p><i>Will the draft Drought Plan measure lead to the deterioration of Water Framework Directive (WFD) waterbody status (or potential) from, inter alia, changes in fluvial geomorphology?</i></p> <p><i>Will the draft Drought Plan measure jeopardise the achievement of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Water Framework Directive (WFD)?</i></p>	--	Significant Negative	<p>Draft Drought Plan measure would lead to major decreases in river flows. Water quality and quantity in designated nature conservation sites may be impacted by the measure (e.g. g. – prevents reaching all conservation objectives on site, long term decrease in populations of designated species). These impacts could not reasonably be compensated for</p> <p>Draft Drought Plan measure would lead to major decreases in groundwater quality or quantity.</p> <p>Draft Drought Plan measure results in a decrease in ecological potential/status of a waterbody</p>
		?	Uncertain	From the level of information available the impact that the option would have on this objective is uncertain
4. To limit the causes and potential consequences of climate change and to adapt to future changes	<p><i>Will the draft Drought Plan measure reduce or minimise greenhouse gas emissions?</i></p> <p><i>Will the draft Drought Plan measure reduce vulnerability to the effects of climate change by appropriate adaptation?</i></p> <p><i>Will the draft Drought Plan measure increase environmental resilience to the effects of climate change including to impacts on water quality?</i></p>	++	Significant Positive	N/a. No draft Drought Plan measure anticipated to have significant positive impact against this objective.
		+	Positive	<p>Draft Drought Plan measure will lead to a sustained decrease in greenhouse gas emissions (e.g. leakage reduction measures and demand management measures leading to long term reductions in energy and greenhouse gas emissions associated with water supply).</p> <p>Draft Drought Plan measure will increase resilience/decrease vulnerability to climate change in the wider environment (e.g. reduction in water demand).</p>
		0	Neutral	Draft Drought Plan measure would have no discernible impact on greenhouse gas emissions, nor does the measure increase resilience/decrease vulnerability to climate change in the wider environment.
		-	Negative	Draft Drought Plan measure will leads to a minor increase in greenhouse gas emissions (e.g. pumping small volumes of water (<2Ml/d) over short distances). draft Drought Plan measure does not increase resilience/decrease vulnerability to climate change in the wider environment.
		--	Significant Negative	Draft Drought Plan measure will leads to a major increase in greenhouse gas emissions (e.g. pumping large volumes of water (>2 Ml/d) over long distances). draft Drought Plan measure does not increase resilience/decrease vulnerability to climate change in the wider environment.

Objective	Key Questions	Effect	Description	Illustrative Guidance
	<i>Will the draft Drought Plan measure reduce or minimise air pollutant emissions?</i>	?	Uncertain	From the level of information available the impact that the option would have on this objective is uncertain
5. To protect and enhance human health with special regard to vulnerable groups in society	<i>Will the draft Drought Plan measure ensure continuity of clean drinking water supply within statutory standards supply at times of drought?</i>	++	Significant Positive	Draft Drought Plan measure leads to major yield (>5 Ml/d) of drinking water at times of drought and will ensure that surface water quality is maintained within statutory standards. Draft Drought Plan measure has a strong and sustained positive effect on the health of local communities and sensitive social groups
	<i>Will the draft Drought Plan measure affect the affordability of clean drinking water?</i>	+	Positive	Draft Drought Plan measure leads to minor yield (<5 Ml/d) of drinking water at times of drought and will ensure that surface water quality is maintained within statutory standards. Draft Drought Plan measure has a temporary positive effect on the health of local communities and sensitive social groups
	<i>Will the draft Drought Plan measure adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise levels)?</i>	0	Neutral	N/a. No draft Drought Plan measure is anticipated to have a neutral impact against this objective.
	<i>Will the draft Drought Plan measures affect human health or the health of any vulnerable groups?</i>	-	Negative	Draft Drought Plan measure results in deterioration in surface water quality, has a temporary effect on health (e.g. noise and dust).
	<i>Will the Drought Plan measure affect public access to, or enjoyment of, local green/blue space?</i>	--	Significant Negative	Draft Drought Plan measure results in deterioration in surface water quality, long term adverse effect on health (e.g. noise and dust).
	<i>Will the Drought Plan measure impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?</i>	?	Uncertain	From the level of information available the impact that the option would have on this objective is uncertain
6. To maintain and enhance the economic	<i>Will the draft Drought Plan measure ensure sufficient</i>	++	Significant Positive	Draft Drought Plan measure leads to major yield (>5 Ml/d) of drinking water at times of drought and draft Drought Plan measure is located in water resource zone where seasonal (summer) tourist influx drives sustained high levels of demand (all water resource zones with a coast except SEWCUS, where no seasonal peak in demand is observed).

Objective	Key Questions	Effect	Description	Illustrative Guidance
and social needs of the local community	<i>water is available for people and visitors to maintain economic activity in times of drought?</i>			Draft Drought Plan measures would generate significant employment opportunities and lead to substantial investment in local supply chains fostering economic growth. Draft Drought Plan measure will have no impact on opportunities for recreation at times of drought.
	<i>Will the draft Drought Plan measures affect local or regional economies?</i>	+	Positive	Draft Drought Plan measure leads to major yield (>5 Ml/d) of drinking water at times of drought but is located in water resource zone where there is no seasonal (summer) tourist influx. Draft Drought Plan measure would generate limited and temporary employment opportunities and small-scale investment Draft Drought Plan measure will have no impact on opportunities for recreation at times of drought.
	<i>Will the draft Drought Plan measure affect opportunities for recreation at times of drought?</i>	0	Neutral	Draft Drought Plan measure leads to minor yield (<5 Ml/d) of drinking water at times of drought.
		-	Negative	Draft Drought Plan measure is anticipated to have a minor impact on recreation (e.g. deterioration in Water Framework Directive chemical quality classification may result from option and/or option may impact on informal recreational activities such as walking or bird watching).
		--	Significant Negative	Draft Drought Plan measure is anticipated to have a major impact on recreation (e.g. deterioration in Water Framework Directive chemical quality classification may result from option and option may impact on formal recreational activities such as canoeing and pleasure craft, angling)
		?	Uncertain	From the level of information available the impact that the option would have on this objective is uncertain
7. To promote the wise use of resources	<i>Will the draft Drought Plan measure seek to minimise the demand for additional raw materials?</i>	++	Significant Positive	N/a. No draft Drought Plan measure is anticipated to have a significant positive impact against this objective.
	<i>Will the draft Drought Plan measure seek to minimise energy consumption?</i>	+	Positive	Draft Drought Plan measure will use existing infrastructure to realise yield (e.g. relaxation of abstraction licence conditions).
	<i>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</i>	0	Neutral	Draft Drought Plan measure will largely use existing infrastructure, and only requires minor additional materials to realise yield (e.g. leakage repairs, lowering of pumps at existing abstraction site).
	<i>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</i>	-	Negative	Draft Drought Plan measure requires additional infrastructure. Amount of additional materials is not expected to be significant (e.g. temporary treatment, pumping and < 5km of pipeline).
	<i>Will the draft Drought Plan measure encourage sustainable design or use of sustainable materials?</i>	--	Significant Negative	Draft Drought Plan measure requires significant amounts of additional infrastructure (e.g. temporary treatment, pumping and > 5km of pipeline). Due to length of pipeline, energy consumption is expected to be significant.
		?	Uncertain	From the level of information available the impact that the option would have on this objective is uncertain

Objective	Key Questions	Effect	Description	Illustrative Guidance
8. To conserve and enhance the cultural, historic and industrial heritage resource.	<p><i>Will the draft Drought Plan measure conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</i></p> <p><i>Will the draft Drought Plan measure avoid or minimise damage to archaeologically important sites?</i></p> <p><i>Will the draft Drought Plan measure avoid damage to important wetland areas with potential for palaeoenvironmental deposits?</i></p>	++	Significant Positive	N/a. No draft Drought Plan measure is anticipated to have significant positive impacts against this objective.
		+	Positive	N/a. No draft Drought Plan measure is anticipated to have positive impacts against this objective.
		0	Neutral	Draft Drought Plan measure would have no effect on cultural heritage assets or archaeological sites/remains.
		-	Negative	Draft Drought Plan measure would result in the loss of significance of undesignated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected. Draft Drought Plan measure would result in limited damage to known, undesignated archaeological sites/remains or geologically important sites with a consequent loss of significance only partly mitigated by archaeological investigation.
		--	Significant Negative	Draft Drought Plan measure would diminish the significance of designated heritage assets and/or their setting such as: <ul style="list-style-type: none"> Demolition or further deterioration in the condition of designated heritage assets especially those identified in the Historic England Buildings/Monuments at Risk Register; Loss of public access to important heritage assets and lack of appropriate interpretation. There would be major damage to known, designated archaeological sites/remains or geologically important sites with a consequent loss of significance only partly mitigated by archaeological investigation.
		?	Uncertain	From the level of information available the impact that the measure would have on this objective is uncertain
9. To protect and enhance landscape and seascape character and other protected features	<p><i>Will the draft Drought Plan measure avoid adverse effects on, and enhance where possible, the special qualities of protected/designated landscapes (including woodlands) or seascapes such as National Parks or AONBs?</i></p> <p><i>Will the draft Drought Plan measure help to protect and improve non-designated</i></p>	++	Significant Positive	N/a. No draft Drought Plan measure is anticipated to have significant positive impacts against this objective.
		+	Positive	N/a. No draft Drought Plan measure is anticipated to have positive impacts against this objective.
		0	Neutral	Draft Drought Plan measure would not result in any new above-ground infrastructure.
		-	Negative	Draft Drought Plan measure would result in new above ground infrastructure that has a minor negative effect on the local landscape, townscape or seascape. Draft Drought Plan measure would cause minor short term negative effects on geological conservation sites/important geological features.

Objective	Key Questions	Effect	Description	Illustrative Guidance
	<i>areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness?</i>	--	Significant Negative	Draft Drought Plan measure would result in new above ground infrastructure that has a major negative effect on the local landscape, townscape or seascape.. The option would have a negative effect on designated landscape or feature (i.e. significant visually intrusive infrastructure) whose effects could not be reasonably mitigated.
		?	Uncertain	From the level of information available the impact that the option would have on this objective is uncertain



Appendix E

Assessment Matrices



Demand-side Measures

DM1 Leakage Reduction

Option Summary

This option involves increasing leakage reduction activity to reduce losses from the water supply network during a drought. Two types of leakage reduction would be undertaken:

- **Active Leakage Control** – this would involve increasing the number of leakage technicians within each WRZ where this option is implemented. Increasing the number of leakage technicians would enable leaks to be located and fixed more promptly than is the case with fewer resources.
- **Pressure Management** – Pressure management involves proactively managing pressure within the distribution network to reduce leakage.

The scale of the works depends on the size of the WRZ and the level of leakage within each zone. It is also dependent on the effectiveness of the works to locate and fix leakage.

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity.</p>	<p>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs and priority habitats and species)?</p> <p>Will the draft Drought Plan measure protect and enhance non-designated sites and local biodiversity?</p> <p>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</p>	<p>0/?</p>	<p>0</p>	<p>Effects of Construction</p> <p>Construction activity associated with leakage reduction is not expected to have any significant impacts on biodiversity, priority habitats or protected species. Leakage repairs could be located across the WRZ, and some may therefore be located within (or in close proximity to) designated and protected habitats. However, the process of fixing a leak usually involves excavation, fixing the leak, and making the ground good within a few hours. Repairs are likely to be focussed where the distribution network is most dense and pipes are usually located under roads or tracks/footpaths. Repairs will be made in ground that has previously been disturbed. Assuming best practice construction techniques, it is considered that this option will have a neutral effect on this objective, although as the location of construction activity is unknown, some uncertainty remains.</p> <p>Effects of Operation</p> <p>This option would help to reduce demand on the water distribution network and would therefore help to conserve water resources in the environment as a drought progresses (e.g. helping to conserve reservoir levels). There is, therefore, potential for some very minor biodiversity benefits to arise from the implementation of this</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	<p>Will the draft Drought Plan measure affect the condition of ecosystems (including their connectivity, structure and functioning)?</p> <p>Will the draft Drought Plan measure enhance the adaptability of ecosystems?</p> <p>Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?</p>			<p>option. However, it is recognised that the water resources that are conserved through this option may ultimately be utilised at a later date if the drought were to continue.</p> <p>Overall, a neutral effect has been determined against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>As noted above.</p>
<p>2. To ensure the appropriate and efficient use of land and protect and enhance soil quality and geodiversity.</p>	<p>Will additional land be required for the development or implementation of the option or will the option require below ground works leading to land sterilisation?</p> <p>Will the draft Drought Plan utilise previously developed land?</p> <p>Will the draft Drought Plan measure minimise the loss of best and most versatile agricultural land?</p> <p>Will the draft Drought Plan measure affect upland (peat-dominated) and other wetland soils?</p> <p>Will the draft Drought Plan measure protect and enhance protected sites designated for their geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest?</p>	0	0	<p>Effects of Construction</p> <p>Construction activity would take place on existing infrastructure and would not require additional land take. It is conceivable that works may be required in areas of wetland or upland soils; however, as the work would take place on the existing network, it would be located on previously disturbed ground.</p> <p>Overall, the options has been assessed as having a neutral effect on this objective.</p> <p>Effects of Operation</p> <p>There would be no operational effect on upland or wetland soils. The option would help to conserve water resources in the environment and could therefore contributed to the protection of upland and wetland soils in proximity of water supply abstractions; however, the effect against this objective is considered to be negligible.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water Framework Directive</p>	<p>Will the draft Drought Plan measure lead to a change in river flows, wetted width or river level?</p> <p>Will the draft Drought Plan measure affect surface water quality and quantity?</p> <p>Will the draft Drought Plan measure lead to changes in groundwater quality, quantity and recharge?</p> <p>Will the draft Drought Plan measure lead to the deterioration of Water Framework Directive (WFD) waterbody status (or potential) from, inter alia, changes in fluvial geomorphology?</p> <p>Will the draft Drought Plan measure jeopardise the achievement of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Water Framework Directive (WFD)?</p>	0	+	<p>Effects of Construction</p> <p>The water environment is unlikely to be affected by the process of fixing a leak, thus there would be no effect on ground or surface water.</p> <p>Effects of Operation</p> <p>Operation of this option would result in less water being lost due to leakage and therefore lower demand for water abstraction which would benefit the water environment. A minor positive effect has therefore been identified against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>
<p>4. To limit the causes and potential consequences of climate change and to adapt to future changes</p>	<p>Will the draft Drought Plan measure reduce or minimise greenhouse gas emissions?</p> <p>Will the draft Drought Plan measure reduce vulnerability to the effects of climate change by appropriate adaptation?</p> <p>Will the draft Drought Plan measure increase environmental resilience to the effects of climate change including to impacts on water quality?</p> <p>Will the draft Drought Plan measure reduce or minimise air pollutant emissions?</p>	-/?	+/?	<p>Effects of Construction</p> <p>There would be some carbon emissions as a result of fixing leaks, although these would be limited to that embodied in replacement pipes/equipment (such as PMVs) and vehicle movements to find and fix the leak. The scale of carbon emissions associated with this option have not been determined at present; however, it is possible to conclude that carbon emissions are likely to be greater in zones where leakage reduction yields most water.</p> <p>Overall, the effects of the option against this objective are uncertain, but are likely to be negative.</p> <p>Effects of Operation</p> <p>Energy requirements and carbon emission have not been quantified by Welsh Water for any options at this stage and therefore a qualitative assessment has been made.</p> <p>The option is considered likely to result in a decrease in energy use associated with the treatment and pumping of water once leaks are fixed. The effects of this option against this objective are, however, uncertain, but may be positive, especially in zones where relatively more energy is used in the treatment and distribution of water.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>UKCP18 climate change scenarios anticipate longer, hotter summers and, in turn, increases in both the frequency and duration of droughts. This option would reduce water demand during drought and as such is considered to contribute towards climate change adaptation.</p> <p>Overall, a minor positive effect has been determined against this objective, although some uncertainty remains.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty As noted above.</p>
<p>5. To protect and enhance human health with special regard to vulnerable groups in society</p>	<p>Will the draft Drought Plan measure ensure continuity of clean drinking water supply within statutory standards supply at times of drought?</p> <p>Will the draft Drought Plan measure affect the affordability of clean drinking water?</p> <p>Will the draft Drought Plan measure adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise levels)?</p> <p>Will the draft Drought Plan measures affect human health or the health of any vulnerable groups?</p> <p>Will the Drought Plan measure affect public access to, or enjoyment of, local green/blue space?</p> <p>Will the Drought Plan measure impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?</p>	<p>0</p>	<p>+</p>	<p>Effects of Construction</p> <p>The repair of leaks may result in short term and temporary adverse impacts on the road network (e.g. as a result of increased vehicle movements, road closures/diversions etc). Vehicle movements and the operation of plant associated with leak detection and repair may affect local air quality and generate noise/vibration disturbance. There may also be disruption to supply. However, these impacts would be localised, temporary and of short duration and therefore, the effects on human health would be limited and generally not significant.</p> <p>Overall, the effects against this objective have been assessed as neutral.</p> <p>Effects of Operation</p> <p>The yield of this option will help ensure continuity of supply of safe and secure drinking water, whilst the option will not result in adverse effects on health during operation (no noise, nuisance or disruption expected).</p> <p>The effect of the option against this objective is dependant on the exact yield, which varies by resource zone. Given that the option results in a reduction in water lost from the distribution network, a positive effect is determined against this objective.</p> <p>Mitigation None</p> <p>Assumptions None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>Uncertainty</p> <p>None</p>
<p>6. To maintain and enhance the economic and social needs of the local community</p>	<p>Will the draft Drought Plan measure ensure sufficient water is available for people and visitors to maintain economic activity in times of drought?</p> <p>Will the draft Drought Plan measures affect local or regional economies?</p> <p>Will the draft Drought Plan measure affect opportunities for recreation at times of drought?</p>	<p>0</p>	<p>0/?</p>	<p>Effects of Construction</p> <p>The construction phase of this option will have no effect on the availability of water for people and visitors to maintain economic activity in times of drought.</p> <p>Some short term employment opportunities and supply chain investment may arise from the implementation of this option; however, any such benefits would likely be very minor and no effects on local or regional economies are anticipated n.</p> <p>No effects on recreational opportunities are expected to result from the implementation of this option.</p> <p>Overall, the option has been assessed as having a neutral effect on this objective.</p> <p>Effects of Operation</p> <p>The effect of the option against this objective is dependant on the yield, which varies by resource zone.</p> <p>The option will reduce demand and therefore help to maintain economic activity during periods of drought. However, in most circumstances the yield will be within the threshold for a neutral effect against this objective.</p> <p>No effects on recreational activities are anticipated.</p> <p>Overall, the option has been assessed as having a neutral effect on this objective, although some uncertainty remains.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				As noted above.
7. To promote the wise use of resources	<p>Will the draft Drought Plan measure seek to minimise the demand for additional raw materials?</p> <p>Will the draft Drought Plan measure seek to minimise energy consumption?</p> <p>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</p> <p>Will the draft Drought Plan measure encourage sustainable design or use of sustainable materials?</p>	-/?	+/?	<p>Effects of Construction</p> <p>There would be some energy and materials consumed in the management and reduction of leakage. The scale of resource use associated with this option has not been determined at present; however, it is possible to conclude that resource use is likely to be greater in zones where leakage reduction yields most water.</p> <p>Overall, the effects of the option against this objective are uncertain, but are likely to be negative.</p> <p>Effects of Operation</p> <p>Energy and resource use requirements have not been quantified by Welsh Water for any options at this stage and therefore a qualitative assessment has been made.</p> <p>The option is considered likely to result in a decrease in energy use associated with the treatment and pumping of water once leaks are fixed. The effects of this option against this objective are uncertain, but may be positive, especially in zones where relatively more energy is used in the treatment and distribution of water.</p> <p>Overall, a minor positive effect has been determined against this objective, although some uncertainty remains.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>As noted above.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>8. To conserve and enhance the cultural, historic and industrial heritage resource.</p>	<p>Will the draft Drought Plan measure conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</p> <p>Will the draft Drought Plan measure avoid or minimise damage to archaeologically important sites?</p> <p>Will the draft Drought Plan measure avoid damage to important wetland areas with potential for paleoenvironmental deposits?</p>	0	0	<p>Effects of Construction</p> <p>Pipelines targeted for repair could be within, or in close proximity to, heritage assets including, for example, scheduled monuments and listed buildings. In consequence, there is the potential for both direct (e.g. loss of, or damage to, an asset) and indirect (e.g. effects on the settings of assets) impacts on cultural heritage including archaeological remains during the implementation phase of this option. However, construction sites would have been previously disturbed during the initial installation of the pipelines and it is expected that site-specific mitigation measures would manage any adverse impacts in this regard. In consequence, significant effects are not expected.</p> <p>Overall, the option has been assessed as having a neutral effect on this objective.</p> <p>Effects of Operation</p> <p>Following the completion of repairs, excavated land would be reinstated and no further effects on cultural heritage would be anticipated.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>
<p>9. To protect and enhance landscape and seascape character and other protected features</p>	<p>Is it likely that the draft Drought Plan measure will have significant visual impacts?</p> <p>Will the draft Drought Plan measure avoid adverse effects on, and enhance where possible, the special qualities of protected/designated landscapes (including woodlands) or seascapes such as National Parks or AONBs?</p> <p>Will the draft Drought Plan measure help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g.</p>	0	0	<p>Effects of Construction</p> <p>Construction activity associated with fixing leaks would not have any noticeable effects on the landscape whilst visual impacts would be negligible. Works may involve the presence of a vehicle and barriers in a location for a few hours but would be temporary. Many water pipes are laid within the public highway where such vehicles and operations are commonplace.</p> <p>Effects of Operation</p> <p>Reducing leakage would not affect Welsh landscapes, landscape character or visual amenity.</p> <p>Mitigation</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	woodlands) and avoid the loss of landscape features and local distinctiveness?			Assumptions None Uncertainty None
Summary	<p>Effects of Construction</p> <p>During the construction/implementation phase, uncertain/minor negative effects are determined against two objectives: Objective 4 (climate change) and Objective 7 (resource use). Resource, energy and carbon emissions associated with this option have not been quantified and would vary by resource zone. However, it is considered that as an unquantified level of resources, energy and carbon will be consumed/emitted, the effects against these two objectives are likely to be negative.</p> <p>Effects of Operation</p> <p>During operation, minor positive effects are determined against Objective 3 (water) and Objective 5 (human health) as this option will reduce leakage from the water supply network, helping to protect water resources and secure drinking water supplies in a time of drought. Minor positive effects have also been determined against Objective 4 (climate change) and Objective 7 (resource use). This reflects the fact that, whilst resource use, energy and carbon emissions associated with this option have not been quantified and would vary by resource zone, the option is likely to contribute towards a minor reduction in energy use and carbon emissions associated with the treatment and distribution of water, although some uncertainty remains. Further, the option will support climate change adaptation.</p> <p>Neutral effects are recorded against all other objectives.</p> <p>Mitigation</p> <p>None identified.</p>			

DM2 Water Efficiency

Option Summary

This option involves an increased level of water efficiency messaging to customers. This would involve the distribution of simple retrofit devices (e.g. cistern devices, showerheads etc) and water efficiency information to household and businesses within the water resource zones targeted. The implementation of this option would be accompanied by a media campaign.

No construction would arise from the implementation of this option.

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity.</p>	<p>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs and priority habitats and species)?</p> <p>Will the draft Drought Plan measure protect and enhance non-designated sites and local biodiversity?</p> <p>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</p> <p>Will the draft Drought Plan measure affect the condition of ecosystems (including their connectivity, structure and functioning)?</p> <p>Will the draft Drought Plan measure enhance the adaptability of ecosystems?</p> <p>Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?</p>	0	0	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>This option would help to reduce demand on the water distribution network and would therefore help to conserve water resources in the environment as a drought progresses (e.g. helping to conserve reservoir levels). There is, therefore, potential for some very minor biodiversity benefits to arise from the implementation of this option. However, it is recognised that the water resources that are conserved through this option may ultimately be utilised at a later date if the drought were to continue.</p> <p>Overall, a neutral effect has been determined against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>2. To ensure the appropriate and efficient use of land and protect and enhance soil quality and geodiversity.</p>	<p>Will additional land be required for the development or implementation of the option or will the option require below ground works leading to land sterilisation?</p> <p>Will the draft Drought Plan utilise previously developed land?</p> <p>Will the draft Drought Plan measure minimise the loss of best and most versatile agricultural land?</p> <p>Will the draft Drought Plan measure affect upland (peat-dominated) and other wetland soils?</p> <p>Will the draft Drought Plan measure protect and enhance protected sites designated for their geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest?</p>	0	0	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>There would be no operational effect on upland or wetland soils. The option would help to conserve water resources in the environment and could therefore contributed to the protection of upland and wetland soils in proximity of water supply abstractions; however, the effect against this objective is considered to be negligible.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>
<p>3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water Framework Directive</p>	<p>Will the draft Drought Plan measure lead to a change in river flows, wetted width or river level?</p> <p>Will the draft Drought Plan measure affect surface water quality and quantity?</p> <p>Will the draft Drought Plan measure lead to changes in groundwater quality, quantity and recharge?</p> <p>Will the draft Drought Plan measure lead to the deterioration of Water Framework Directive (WFD) waterbody status (or potential) from, inter alia, changes in fluvial geomorphology?</p> <p>Will the draft Drought Plan measure jeopardise the achievement of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Water Framework Directive (WFD)?</p>	0	+	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>Operation of this option would result in a reduction in water demand and therefore lower demand for water abstraction, which would benefit the water environment. This has been assessed as having a minor positive against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>4. To limit the causes and potential consequences of climate change and to adapt to future changes</p>	<p>Will the draft Drought Plan measure reduce or minimise greenhouse gas emissions?</p> <p>Will the draft Drought Plan measure reduce vulnerability to the effects of climate change by appropriate adaptation?</p> <p>Will the draft Drought Plan measure increase environmental resilience to the effects of climate change including to impacts on water quality?</p> <p>Will the draft Drought Plan measure reduce or minimise air pollutant emissions?</p>	0	+/?	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>Energy requirements and carbon emission have not been quantified by Welsh Water for any options at this stage and therefore a qualitative assessment has been made.</p> <p>The option is considered likely to result in a decrease in energy use associated with the treatment and pumping of water. The effects of this option against this objective are, however, uncertain, but may be positive, especially in zones where relatively more energy is used in the treatment and distribution of water.</p> <p>There would be embodied carbon in water efficient devices and their distribution would generate greenhouse gas emissions; however, any effects in this regard are likely to be negligible.</p> <p>UKCP18 climate change scenarios anticipate longer, hotter summers and, in turn, increases in both the frequency and duration of droughts. This option would reduce water demand during drought and as such is considered to contribute towards climate change adaptation.</p> <p>Overall, a minor positive effect has been determined against this objective, although some uncertainty remains.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>As noted above.</p>
<p>5. To protect and enhance human health with special regard to vulnerable groups in society</p>	<p>Will the draft Drought Plan measure ensure continuity of clean drinking water supply within statutory standards supply at times of drought?</p> <p>Will the draft Drought Plan measure affect the affordability of clean drinking water?</p>	0	+	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	<p>Will the draft Drought Plan measure adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise levels)?</p> <p>Will the draft Drought Plan measures affect human health or the health of any vulnerable groups?</p> <p>Will the Drought Plan measure affect public access to, or enjoyment of, local green/blue space?</p> <p>Will the Drought Plan measure impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?</p>			<p>The use of water efficiency measures and devices will help ensure continuity of supply of safe and secure drinking water, whilst the option will not result in adverse effects on health during operation.</p> <p>The effect of the option against this objective is dependant on the yield, which varies by resource zone. Given that the option results in a reduction in water demand a positive effect is determined against this objective.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty None</p>
6. To maintain and enhance the economic and social needs of the local community	<p>Will the draft Drought Plan measure ensure sufficient water is available for people and visitors to maintain economic activity in times of drought?</p> <p>Will the draft Drought Plan measures affect local or regional economies?</p> <p>Will the draft Drought Plan measure affect opportunities for recreation at times of drought?</p>	0	0/?	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>The effect of the option against this objective is dependant on the yield, which varies by resource zone.</p> <p>The option will reduce demand and therefore help to maintain economic activity during periods of drought. However, in most circumstances the yield will be within the threshold for a neutral effect against this objective.</p> <p>No effects on recreational activities are anticipated.</p> <p>There may be some employment and supply chain benefits associated with this option (for example, related to the purchase of water efficient devices); however, any effects in this regard are likely to be negligible.</p> <p>Overall, the option has been assessed as having a neutral effect on this objective, although some uncertainty remains.</p> <p>Mitigation None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>As noted above.</p>
<p>7. To promote the wise use of resources</p>	<p>Will the draft Drought Plan measure seek to minimise the demand for additional raw materials?</p> <p>Will the draft Drought Plan measure seek to minimise energy consumption?</p> <p>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</p> <p>Will the draft Drought Plan measure encourage sustainable design or use of sustainable materials?</p>	0	+/?	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>Energy and resource use requirements have not been quantified by Welsh Water for any options at this stage and therefore a qualitative assessment has been made.</p> <p>The option is considered likely to result in a decrease in energy use associated with the treatment and pumping of water. The effects of this option against this objective are uncertain, but may be positive, especially in zones where relatively more energy is used in the treatment and distribution of water.</p> <p>There would be resource use associated with the manufacturing and distribution of water efficient devices; however, any effects in this regard are likely to be negligible.</p> <p>Overall, a minor positive effect has been determined against this objective, although some uncertainty remains.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>As noted above.</p>
<p>8. To conserve and enhance the cultural, historic and industrial heritage resource.</p>	<p>Will the draft Drought Plan measure conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</p>	0	0	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	<p>Will the draft Drought Plan measure avoid or minimise damage to archaeologically important sites?</p> <p>Will the draft Drought Plan measure avoid damage to important wetland areas with potential for paleoenvironmental deposits?</p>			<p>Effects of Operation</p> <p>The operation of this option would have no effects on cultural heritage assets.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>
9. To protect and enhance landscape and seascape character and other protected features	<p>Is it likely that the draft Drought Plan measure will have significant visual impacts?</p> <p>Will the draft Drought Plan measure avoid adverse effects on, and enhance where possible, the special qualities of protected/designated landscapes (including woodlands) or seascapes such as National Parks or AONBs?</p> <p>Will the draft Drought Plan measure help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness?</p>	0	0	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>The operation of this option would not have any effects landscape or visual amenity.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>
Summary	<p>Effects of Construction</p> <p>No construction activity will result from this option and a neutral effect has therefore been determined against all of the objectives.</p> <p>Effects of Operation</p> <p>During operation, minor positive effects are determined against Objective 3 (water) and Objective 5 (human health) as this option will reduce the demand for water, helping to protect water resources and secure drinking water supplies in a time of drought. Minor positive effects have also been determined against Objective 4 (climate change) and Objective 7 (resource use). This reflects the fact that, whilst resource, energy and carbon emissions associated with this option have not been quantified and would vary by resource zone, the option is likely to contribute towards a minor reduction in energy use and carbon emissions associated with the treatment and distribution of water, although some uncertainty remains. The option would also support climate change adaptation.</p> <p>Neutral effects are recorded against all other objectives.</p>			

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	Mitigation None identified.			

DM3 Temporary Use Bans

Option Summary

This option involves the implementation of temporary use bans on customers. Temporary use bans include restrictions on the use of hosepipes. The implementation of this option would be accompanied by a media campaign.

No construction would arise from the implementation of this option.

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity.</p>	<p>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs and priority habitats and species)?</p> <p>Will the draft Drought Plan measure protect and enhance non-designated sites and local biodiversity?</p> <p>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</p> <p>Will the draft Drought Plan measure affect the condition of ecosystems (including their connectivity, structure and functioning)?</p> <p>Will the draft Drought Plan measure enhance the adaptability of ecosystems?</p> <p>Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?</p>	<p>0</p>	<p>0</p>	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>This option would help to reduce demand on the water distribution network and would therefore help to conserve water resources in the environment as a drought progresses (e.g. helping to conserve reservoir levels). There is, therefore, potential for some very minor biodiversity benefits to arise from the implementation of this option. However, it is recognised that the water resources that are conserved through this option may ultimately be utilised at a later date if the drought were to continue.</p> <p>Overall, a neutral effect has been determined against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>2. To ensure the appropriate and efficient use of land and protect and enhance soil quality and geodiversity.</p>	<p>Will additional land be required for the development or implementation of the option or will the option require below ground works leading to land sterilisation?</p> <p>Will the draft Drought Plan utilise previously developed land?</p> <p>Will the draft Drought Plan measure minimise the loss of best and most versatile agricultural land?</p> <p>Will the draft Drought Plan measure affect upland (peat-dominated) and other wetland soils?</p> <p>Will the draft Drought Plan measure protect and enhance protected sites designated for their geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest?</p>	0	0	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>There would be no operational effect on upland or wetland soils. The option would help to conserve water resources in the environment and could therefore contributed to the protection of upland and wetland soils in proximity of water supply abstractions; however, the effect against this objective is considered to be negligible.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>
<p>3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water Framework Directive</p>	<p>Will the draft Drought Plan measure lead to a change in river flows, wetted width or river level?</p> <p>Will the draft Drought Plan measure affect surface water quality and quantity?</p> <p>Will the draft Drought Plan measure lead to changes in groundwater quality, quantity and recharge?</p> <p>Will the draft Drought Plan measure lead to the deterioration of Water Framework Directive (WFD) waterbody status (or potential) from, inter alia, changes in fluvial geomorphology?</p> <p>Will the draft Drought Plan measure jeopardise the achievement of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Water Framework Directive (WFD)?</p>	0	+	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>Operation of this option would result in a reduction in water demand (up to circa 5% in any WRZ) and therefore lower demand for water abstraction, which would benefit the water environment. This has been assessed as having a minor positive against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>4. To limit the causes and potential consequences of climate change and to adapt to future changes</p>	<p>Will the draft Drought Plan measure reduce or minimise greenhouse gas emissions?</p> <p>Will the draft Drought Plan measure reduce vulnerability to the effects of climate change by appropriate adaptation?</p> <p>Will the draft Drought Plan measure increase environmental resilience to the effects of climate change including to impacts on water quality?</p> <p>Will the draft Drought Plan measure reduce or minimise air pollutant emissions?</p>	0	+/?	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>Energy requirements and carbon emission have not been quantified by Welsh Water for any options at this stage and therefore a qualitative assessment has been made.</p> <p>The option is considered likely to result in a decrease in energy use associated with the treatment and pumping of water. The effects of this option against this objective are, however, uncertain, but may be positive, especially in zones where relatively more energy is used in the treatment and distribution of water.</p> <p>UKCP18 climate change scenarios anticipate longer, hotter summers and, in turn, increases in both the frequency and duration of droughts. This option would reduce water demand during drought and as such is considered to contribute towards climate change adaptation.</p> <p>Overall, a minor positive effect has been determined against this objective, although some uncertainty remains.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>As noted above.</p>
<p>5. To protect and enhance human health with special regard to vulnerable groups in society</p>	<p>Will the draft Drought Plan measure ensure continuity of clean drinking water supply within statutory standards supply at times of drought?</p> <p>Will the draft Drought Plan measure affect the affordability of clean drinking water?</p> <p>Will the draft Drought Plan measure adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise levels)?</p>	0	+	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>The implementation of temporary use restrictions will help ensure continuity of supply of safe and secure drinking water, whilst the option will not result in adverse effects on health during operation.</p> <p>The effect of the option against this objective is dependant on the yield, which varies by resource zone (though there would be up to a circa 5% reduction in demand in a</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	<p>Will the draft Drought Plan measures affect human health or the health of any vulnerable groups?</p> <p>Will the Drought Plan measure affect public access to, or enjoyment of, local green/blue space?</p> <p>Will the Drought Plan measure impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?</p>			<p>given WRZ). Given that the option results in a reduction in water demand a positive effect is determined against this objective.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty None</p>
<p>6. To maintain and enhance the economic and social needs of the local community</p>	<p>Will the draft Drought Plan measure ensure sufficient water is available for people and visitors to maintain economic activity in times of drought?</p> <p>Will the draft Drought Plan measures affect local or regional economies?</p> <p>Will the draft Drought Plan measure affect opportunities for recreation at times of drought?</p>	<p>0</p>	<p>0/?</p>	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>The effect of the option against this objective is dependant on the yield, which varies by resource zone (though there would be up to a circa 5% reduction in demand in a given WRZ).</p> <p>The option will reduce demand and therefore help to maintain economic activity during periods of drought. However, in most circumstances the yield will be within the threshold for a neutral effect against this objective.</p> <p>The option may affect opportunities for recreational activities such as gardening or the enjoyment of water (e.g. the use of paddling pools etc.). Garden watering and the use of paddling pools etc. would not be restricted but voluntary requests for restraint would reduce their use. Any adverse impacts in this regard would be short term and temporary and associated effects are likely to be negligible, though some uncertainty remains.</p> <p>Overall, the option has been assessed as having a neutral effect on this objective, although some uncertainty remains.</p> <p>Mitigation None</p> <p>Assumptions</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				None Uncertainty As noted above.
7. To promote the wise use of resources	<p>Will the draft Drought Plan measure seek to minimise the demand for additional raw materials?</p> <p>Will the draft Drought Plan measure seek to minimise energy consumption?</p> <p>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</p> <p>Will the draft Drought Plan measure encourage sustainable design or use of sustainable materials?</p>	0	+/?	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>Energy and resource use requirements have not been quantified by Welsh Water for any options at this stage and therefore a qualitative assessment has been made.</p> <p>The option is considered likely to result in a decrease in energy use associated with the treatment and pumping of water. The effects of this option against this objective are uncertain, but may be positive, especially in zones where relatively more energy is used in the treatment and distribution of water.</p> <p>Overall, a minor positive effect has been determined against this objective, although some uncertainty remains.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>As noted above.</p>
8. To conserve and enhance the cultural, historic and industrial heritage resource.	<p>Will the draft Drought Plan measure conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</p> <p>Will the draft Drought Plan measure avoid or minimise damage to archaeologically important sites?</p>	0	0	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>The operation of this option would have no effects on cultural heritage assets.</p> <p>Mitigation</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	Will the draft Drought Plan measure avoid damage to important wetland areas with potential for paleoenvironmental deposits?			Assumptions None Uncertainty None
9. To protect and enhance landscape and seascape character and other protected features	<p>Is it likely that the draft Drought Plan measure will have significant visual impacts?</p> <p>Will the draft Drought Plan measure avoid adverse effects on, and enhance where possible, the special qualities of protected/designated landscapes (including woodlands) or seascapes such as National Parks or AONBs?</p> <p>Will the draft Drought Plan measure help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness?</p>	0	0	Effects of Construction There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective. Effects of Operation The operation of this option would not have any effects landscape or visual amenity. Mitigation None Assumptions None Uncertainty None
Summary	Effects of Construction No construction activity will result from this option and a neutral effect has therefore been determined against all of the objectives. Effects of Operation During operation, minor positive effects are determined against Objective 3 (water) and Objective 5 (human health) as this option will reduce the demand for water, helping to protect water resources and secure drinking water supplies in a time of drought. Minor positive effects have also been determined against Objective 4 (climate change) and Objective 7 (resource use). This reflects the fact that, whilst resource, energy and carbon emissions associated with this option have not been quantified and would vary by resource zone, the option is likely to contribute towards a minor reduction in energy use and carbon emissions associated with the treatment and distribution of water, although some uncertainty remains. The option would also support climate change adaptation. Neutral effects are recorded against all other objectives. Mitigation None identified.			



DM4 Non Essential Use Bans (NEUBs)

Option Summary

This option involves the implementation of NEUBs on customers under the Drought Direction 2011. NEUBs include restrictions on, for example, the cleaning of non-domestic premises, filtering or maintaining ponds and non-domestic swimming pools and operating mechanical vehicle washers. NEUBs would be imposed extremely infrequently with a 1 in 100 year drought return period or even rarer event being needed to trigger them.

No construction would arise from the 23mplementation of this option.

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity.</p>	<p>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs and priority habitats and species)?</p> <p>Will the draft Drought Plan measure protect and enhance non-designated sites and local biodiversity?</p> <p>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</p> <p>Will the draft Drought Plan measure affect the condition of ecosystems (including their connectivity, structure and functioning)?</p> <p>Will the draft Drought Plan measure enhance the adaptability of ecosystems?</p> <p>Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?</p>	<p>0</p>	<p>0</p>	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>This option would help to reduce demand on the water distribution network and would therefore help to conserve water resources in the environment as a drought progresses (e.g. helping to conserve reservoir levels). There is, therefore, potential for some very minor biodiversity benefits to arise from the implementation of this option. However, it is recognised that the water resources that are conserved through this option may ultimately be utilised at a later date if the drought were to continue.</p> <p>Overall, a neutral effect has been determined against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>2. To ensure the appropriate and efficient use of land and protect and enhance soil quality and geodiversity.</p>	<p>Will additional land be required for the development or implementation of the option or will the option require below ground works leading to land sterilisation?</p> <p>Will the draft Drought Plan utilise previously developed land?</p> <p>Will the draft Drought Plan measure minimise the loss of best and most versatile agricultural land?</p> <p>Will the draft Drought Plan measure affect upland (peat-dominated) and other wetland soils?</p> <p>Will the draft Drought Plan measure protect and enhance protected sites designated for their geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest?</p>	0	0	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>There would be no operational effect on upland or wetland soils. The option would help to conserve water resources in the environment and could therefore contributed to the protection of upland and wetland soils in proximity of water supply abstractions; however, the effect against this objective is considered to be negligible.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>
<p>3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water Framework Directive</p>	<p>Will the draft Drought Plan measure lead to a change in river flows, wetted width or river level?</p> <p>Will the draft Drought Plan measure affect surface water quality and quantity?</p> <p>Will the draft Drought Plan measure lead to changes in groundwater quality, quantity and recharge?</p> <p>Will the draft Drought Plan measure lead to the deterioration of Water Framework Directive (WFD) waterbody status (or potential) from, inter alia, changes in fluvial geomorphology?</p> <p>Will the draft Drought Plan measure jeopardise the achievement of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Water Framework Directive (WFD)?</p>	0	+	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>Operation of this option would result in a reduction in water demand (in the order of 10% for each resource zone, including savings associated with Option DM3) and therefore lower demand for water abstraction, which would benefit the water environment. This has been assessed as having a minor positive against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>4. To limit the causes and potential consequences of climate change and to adapt to future changes</p>	<p>Will the draft Drought Plan measure reduce or minimise greenhouse gas emissions?</p> <p>Will the draft Drought Plan measure reduce vulnerability to the effects of climate change by appropriate adaptation?</p> <p>Will the draft Drought Plan measure increase environmental resilience to the effects of climate change including to impacts on water quality?</p> <p>Will the draft Drought Plan measure reduce or minimise air pollutant emissions?</p>	0	+/?	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>Energy requirements and carbon emission have not been quantified by Welsh Water for any options at this stage and therefore a qualitative assessment has been made.</p> <p>The option is considered likely to result in a decrease in energy use associated with the treatment and pumping of water. The effects of this option against this objective are, however, uncertain, but may be positive, especially in zones where relatively more energy is used in the treatment and distribution of water.</p> <p>UKCP18 climate change scenarios anticipate longer, hotter summers and, in turn, increases in both the frequency and duration of droughts. This option would reduce water demand during drought and as such is considered to contribute towards climate change adaptation.</p> <p>Overall, a minor positive effect has been determined against this objective, although some uncertainty remains.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>As noted above.</p>
<p>5. To protect and enhance human health with special regard to vulnerable groups in society</p>	<p>Will the draft Drought Plan measure ensure continuity of clean drinking water supply within statutory standards supply at times of drought?</p> <p>Will the draft Drought Plan measure affect the affordability of clean drinking water?</p> <p>Will the draft Drought Plan measure adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise levels)?</p>	0	+	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>The implementation of non essential use restrictions will help ensure continuity of supply of safe and secure drinking water. The option may temporarily affect opportunities for recreation such as swimming; however, any effects in this regard are likely to be negligible.</p> <p>The effect of the option against this objective is dependant on the yield, which varies by resource zone (though there would be up to a 10% reduction in demand for each</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	<p>Will the draft Drought Plan measures affect human health or the health of any vulnerable groups?</p> <p>Will the Drought Plan measure affect public access to, or enjoyment of, local green/blue space?</p> <p>Will the Drought Plan measure impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?</p>			<p>resource zone, including savings associated with Option DM3). Given that the option results in a reduction in water demand a positive effect is determined against this objective.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty None</p>
<p>6. To maintain and enhance the economic and social needs of the local community</p>	<p>Will the draft Drought Plan measure ensure sufficient water is available for people and visitors to maintain economic activity in times of drought?</p> <p>Will the draft Drought Plan measures affect local or regional economies?</p> <p>Will the draft Drought Plan measure affect opportunities for recreation at times of drought?</p>	<p>0</p>	<p>0/?</p>	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>The effect of the option against this objective is dependant on the yield, which varies by resource zone (though there would be up to a 10% reduction in demand for each resource zone, including savings associated with Option DM3).</p> <p>The option will reduce demand and therefore help to maintain economic activity during periods of drought. However, in most circumstances the yield will be within the threshold for a neutral effect against this objective.</p> <p>The option may affect opportunities for recreational activities such as swimming as well as the operation of some business uses. However, any adverse impacts in this regard would be short term and temporary and associated effects are likely to be negligible, though some uncertainty remains.</p> <p>Overall, the option has been assessed as having a neutral effect on this objective, although some uncertainty remains.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				As noted above.
7. To promote the wise use of resources	<p>Will the draft Drought Plan measure seek to minimise the demand for additional raw materials?</p> <p>Will the draft Drought Plan measure seek to minimise energy consumption?</p> <p>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</p> <p>Will the draft Drought Plan measure encourage sustainable design or use of sustainable materials?</p>	0	+/?	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>Energy and resource use requirements have not been quantified by Welsh Water for any options at this stage and therefore a qualitative assessment has been made.</p> <p>The option is considered likely to result in a decrease in energy use associated with the treatment and pumping of water. The effects of this option against this objective are uncertain, but may be positive, especially in zones where relatively more energy is used in the treatment and distribution of water.</p> <p>Overall, a minor positive effect has been determined against this objective, although some uncertainty remains.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>As noted above.</p>
8. To conserve and enhance the cultural, historic and industrial heritage resource.	<p>Will the draft Drought Plan measure conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</p> <p>Will the draft Drought Plan measure avoid or minimise damage to archaeologically important sites?</p> <p>Will the draft Drought Plan measure avoid damage to important wetland areas with potential for paleoenvironmental deposits?</p>	0	0	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>The operation of this option would have no effects on cultural heritage assets.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				Uncertainty None
9. To protect and enhance landscape and seascape character and other protected features	<p>Is it likely that the draft Drought Plan measure will have significant visual impacts?</p> <p>Will the draft Drought Plan measure avoid adverse effects on, and enhance where possible, the special qualities of protected/designated landscapes (including woodlands) or seascapes such as National Parks or AONBs?</p> <p>Will the draft Drought Plan measure help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness?</p>	0	0	Effects of Construction There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective. Effects of Operation The operation of this option would not have any effects landscape or visual amenity. Mitigation None Assumptions None Uncertainty None
Summary	Effects of Construction No construction activity will result from this option and a neutral effect has therefore been determined against all of the objectives. Effects of Operation During operation, minor positive effects are determined against Objective 3 (water) and Objective 5 (human health) as this option will reduce the demand for water, helping to protect water resources and secure drinking water supplies in a time of drought. Minor positive effects have also been determined against Objective 4 (climate change) and Objective 7 (resource use). This reflects the fact that, whilst resource, energy and carbon emissions associated with this option have not been quantified and would vary by resource zone, the option is likely to contribute towards a minor reduction in energy use and carbon emissions associated with the treatment and distribution of water, although some uncertainty remains. The option would also support climate change adaptation. Neutral effects are recorded against all other objectives. Mitigation None identified.			

DM5 Extreme Measures

Option Summary

This option would involve water rationing through the use of widespread enhanced pressure management or localised use of standpipes. Such measures would only be employed in very exceptional circumstances under emergency drought order.

No construction would arise from the implementation of this option.

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity.</p>	<p>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs and priority habitats and species)?</p> <p>Will the draft Drought Plan measure protect and enhance non-designated sites and local biodiversity?</p> <p>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</p> <p>Will the draft Drought Plan measure affect the condition of ecosystems (including their connectivity, structure and functioning)?</p> <p>Will the draft Drought Plan measure enhance the adaptability of ecosystems?</p> <p>Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?</p>	<p>0</p>	<p>0</p>	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>This option would help to manage the demand on the water distribution network during extreme drought conditions and would therefore help to conserve water resources in the environment as a drought progresses (e.g. helping to conserve reservoir levels). There is, therefore, potential for some very minor biodiversity benefits to arise from the implementation of this option. However, it is recognised that the water resources that are conserved through this option may ultimately be utilised at a later date if the drought were to continue and it is likely that water resources would already be significantly affected at the point the measure was implemented.</p> <p>Overall, a neutral effect has been determined against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>2. To ensure the appropriate and efficient use of land and protect and enhance soil quality and geodiversity.</p>	<p>Will additional land be required for the development or implementation of the option or will the option require below ground works leading to land sterilisation?</p> <p>Will the draft Drought Plan utilise previously developed land?</p> <p>Will the draft Drought Plan measure minimise the loss of best and most versatile agricultural land?</p> <p>Will the draft Drought Plan measure affect upland (peat-dominated) and other wetland soils?</p> <p>Will the draft Drought Plan measure protect and enhance protected sites designated for their geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest?</p>	0	0	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>There would be no operational effect on upland or wetland soils. The option would help to conserve water resources in the environment and could therefore contributed to the protection of upland and wetland soils in proximity of water supply abstractions; however, the effect against this objective is considered to be negligible. Further, the likelihood of the measure being implemented is very low and it is likely that water resources would already be significantly affected at the point the measure was implemented.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>
<p>3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water Framework Directive</p>	<p>Will the draft Drought Plan measure lead to a change in river flows, wetted width or river level?</p> <p>Will the draft Drought Plan measure affect surface water quality and quantity?</p> <p>Will the draft Drought Plan measure lead to changes in groundwater quality, quantity and recharge?</p> <p>Will the draft Drought Plan measure lead to the deterioration of Water Framework Directive (WFD) waterbody status (or potential) from, inter alia, changes in fluvial geomorphology?</p> <p>Will the draft Drought Plan measure jeopardise the achievement of good surface water status or of good ecological potential and good surface</p>	0	+/?	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>Operation of this option would manage water demand which could benefit the water environment, although the likelihood of the measure being implemented is very low and, further, it is likely that water resources would already be significantly affected at the point the measure was implemented.</p> <p>Overall, the option has been assessed as having a minor positive against this objective, though some uncertainty remains reflecting the likelihood of the measure being implemented.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	water chemical status by the date laid down by the Water Framework Directive (WFD)?			None Uncertainty As noted above.
4. To limit the causes and potential consequences of climate change and to adapt to future changes	<p>Will the draft Drought Plan measure reduce or minimise greenhouse gas emissions?</p> <p>Will the draft Drought Plan measure reduce vulnerability to the effects of climate change by appropriate adaptation?</p> <p>Will the draft Drought Plan measure increase environmental resilience to the effects of climate change including to impacts on water quality?</p> <p>Will the draft Drought Plan measure reduce or minimise air pollutant emissions?</p>	0	+/?	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>Energy requirements and carbon emission have not been quantified by Welsh Water for any options at this stage and therefore a qualitative assessment has been made.</p> <p>The option is considered likely to result in a decrease in energy use associated with the treatment and pumping of water. The effects of this option against this objective are, however, uncertain, but may be positive, especially in zones where relatively more energy is used in the treatment and distribution of water.</p> <p>UKCP18 climate change scenarios anticipate longer, hotter summers and, in turn, increases in both the frequency and duration of droughts. This option would manage water demand during drought and as such is considered to contribute towards climate change adaptation. However, it is recognised that the likelihood of the measure being implemented is very low.</p> <p>Overall, a minor positive effect has been determined against this objective, although some uncertainty remains.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>As noted/ above.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>5. To protect and enhance human health with special regard to vulnerable groups in society</p>	<p>Will the draft Drought Plan measure ensure continuity of clean drinking water supply within statutory standards supply at times of drought?</p> <p>Will the draft Drought Plan measure affect the affordability of clean drinking water?</p> <p>Will the draft Drought Plan measure adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise levels)?</p> <p>Will the draft Drought Plan measures affect human health or the health of any vulnerable groups?</p> <p>Will the Drought Plan measure affect public access to, or enjoyment of, local green/blue space?</p> <p>Will the Drought Plan measure impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?</p>	0	+/-/?	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>The implementation of extreme measures will help to ensure that there is water available during extreme drought conditions. However, water rationing through widespread enhanced pressure management or localised use of standpipes could have temporary adverse effects on human health due to disruption to water supplies (though this would be necessary to ensure that some supply is maintained in emergency conditions) and impacts on opportunities for recreation (e.g. swimming). There is also the potential for water rationing to cause stress and anxiety which could affect human health.</p> <p>On balance, the measure has been assessed as having a mixed minor positive and minor negative effect on this objective, although some uncertainty remains reflecting the likelihood of the measure being implemented.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>As noted above.</p>
<p>6. To maintain and enhance the economic and social needs of the local community</p>	<p>Will the draft Drought Plan measure ensure sufficient water is available for people and visitors to maintain economic activity in times of drought?</p> <p>Will the draft Drought Plan measures affect local or regional economies?</p> <p>Will the draft Drought Plan measure affect opportunities for recreation at times of drought?</p>	0	0/?	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>Water rationing through widespread enhanced pressure management or localised use of standpipes could have temporary impacts on opportunities for recreation (e.g. swimming). Further, such measures could temporarily affect the operation of some business uses. However, this option would only be employed in very exceptional circumstances under emergency drought order and by managing the demand for water during drought could help to maintain wider economic activity.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>On balance, the option has been assessed as having a neutral effect on this objective, although some uncertainty remains reflecting the likelihood of the measure being implemented.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty As noted above.</p>
7. To promote the wise use of resources	<p>Will the draft Drought Plan measure seek to minimise the demand for additional raw materials?</p> <p>Will the draft Drought Plan measure seek to minimise energy consumption?</p> <p>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</p> <p>Will the draft Drought Plan measure encourage sustainable design or use of sustainable materials?</p>	0	+/?	<p>Effects of Construction There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation Energy and resource use requirements have not been quantified by Welsh Water for any options at this stage and therefore a qualitative assessment has been made. The option is considered likely to result in a decrease in energy use associated with the treatment and pumping of water. The effects of this option against this objective are uncertain, but may be positive, especially in zones where relatively more energy is used in the treatment and distribution of water.</p> <p>Overall, a minor positive effect has been determined against this objective, although some uncertainty remains.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty As noted above.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
8. To conserve and enhance the cultural, historic and industrial heritage resource.	<p>Will the draft Drought Plan measure conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</p> <p>Will the draft Drought Plan measure avoid or minimise damage to archaeologically important sites?</p> <p>Will the draft Drought Plan measure avoid damage to important wetland areas with potential for paleoenvironmental deposits?</p>	0	0	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>The operation of this option would have no effects on cultural heritage assets.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>
9. To protect and enhance landscape and seascape character and other protected features	<p>Is it likely that the draft Drought Plan measure will have significant visual impacts?</p> <p>Will the draft Drought Plan measure avoid adverse effects on, and enhance where possible, the special qualities of protected/designated landscapes (including woodlands) or seascapes such as National Parks or AONBs?</p> <p>Will the draft Drought Plan measure help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness?</p>	0	0	<p>Effects of Construction</p> <p>There is no construction activity associated with this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>The operation of this option would not have any effects landscape or visual amenity.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
Summary	<p>Effects of Construction</p> <p>No construction activity will result from this option and a neutral effect has therefore been determined against all of the objectives.</p> <p>Effects of Operation</p> <p>During operation, minor positive effects are determined against Objective 3 (water) as this option will manage the demand for water during periods of extreme drought. Minor positive effects have also been determined against Objective 4 (climate change) and Objective 7 (resource use). This reflects the fact that, whilst resource, energy and carbon emissions associated with this option have not been quantified and would vary by resource zone, the option is likely to contribute towards a minor reduction in energy use and carbon emissions associated with the treatment and distribution of water, although some uncertainty remains. The option would also support climate change adaptation.</p> <p>The implementation of extreme measures will help to ensure that there is water available during extreme drought conditions. However, water rationing could have temporary adverse effects on human health due to disruption to water supplies (though this would be necessary to ensure that some supply is maintained in emergency conditions) and impacts on opportunities for recreation (e.g. swimming). There is also the potential for water rationing to cause stress and anxiety which could affect human health. On balance, the option has been assessed as having a mixed minor positive and minor negative effect on Objective 5 (human health), although some uncertainty remains reflecting the likelihood of the measure being implemented.</p> <p>Neutral effects are recorded against all other objectives.</p> <p>Mitigation</p> <p>None identified.</p>			

Supply-side Measures

8001-2 Removal of Llyn Cwellyn 10 MI/d abstraction limit

Option Summary

Llyn Cwellyn is a reservoir in North Wales which supplies drinking water as part of the North Eryri Ynys Mon WRZ.

The option (drought order) involves the relaxation of the low lake level abstraction rate at Llyn Cwellyn. When lake levels have fallen below 0.8m below spillway and the daily abstraction rate has reduced to 10MI/d in the current licence conditions, the drought option proposes to operate the abstraction at a daily rate of 12MI/d. The lake level at which abstraction ceases would be maintained as per the current licence conditions of 2.6m below spillway during the period 16 September to 15 November and 2.0m below spillway at all other times. Compensation releases would be maintained as per the current licence conditions of 11.4MI/d when lake level is between 0.8m and 2.6m below spillway. Freshet releases would not be impacted by the drought option.

The drought order may remain in force for a period of up to six months, and they can be extended for up to a further six months. However, the period of implementation for this drought order **would only** be May to October, as confirmed **in with NRW** and by water resources modelling carried out by Welsh Water.

The option would require a small amount of additional infrastructure. Abstraction from Llyn Cwellyn that is more than 2.0m below the spillway is below the gravity-draw off and pumping is required to transfer water from the lake to the existing intakes in the dam wall, and also to pump water from the lake into the Afon Gwyrfa (for compensation releases). This is expected to be a few tens of metres of pipe from the lake to the intakes and spillway, with associated pumps and a power supply (assumed to be from generators).

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity.</p>	<p>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs and priority habitats and species)?</p> <p>Will the draft Drought Plan measure protect and enhance non-designated sites and local biodiversity?</p>	-	0	<p>Effects of Construction</p> <p>This option would require the implementation of temporary infrastructure (mobile pumping and a pipeline) to enable water to be taken from Llyn Cwellyn from below the existing intake levels. Mobile pumping would maintain discharge to the river (the necessary compensation flow) and enable water to be pumped for treatment at Cwellyn WTW.</p> <p>Llyn Cwellyn and the Afon Gwyrfa are designated as a SSSI and SAC, Afon Gwyrfa a Llyn Cwellyn SAC/SSSI, for their geological and biological features. Features of interest are running and standing water, aquatic plant assemblage and numerous notable species. It is also considered to be one of the best examples in the UK of an oligo trophic to mesotrophic river with submerged beds of aquatic plants. Notable species include macrophytes (floating waterplantain), invertebrates (white-clawed</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	<p>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</p> <p>Will the draft Drought Plan measure affect the condition of ecosystems (including their connectivity, structure and functioning)?</p> <p>Will the draft Drought Plan measure enhance the adaptability of ecosystems?</p> <p>Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?</p>			<p>crayfish), benthic macroinvertebrate communities, fish and mammals (otter and water voles).</p> <p>There is the potential for some disturbance to associated habitats and species of the SSSI and SAC as well as local biodiversity interests due to, for example, construction noise. However, disruption to habitat connectivity is considered unlikely due to the pipeline being only a few tens of metres in length. Furthermore, any impacts would be short term in nature and, assuming good construction practice (such as the use of sediment traps) is followed, will not result in significant and long term effects on these designated sites (e.g. no above ground permanent infrastructure will result). It is assumed that wherever possible, Welsh Water will locate temporary pumping infrastructure and pipeline on existing areas of hardstanding (roads, parking areas, tracks etc.).</p> <p>Due to the potential for temporary effects arising from disturbance, a minor negative effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>The EAR has concluded that implementation of this option is likely to have a negligible effect on biodiversity features including the Afon Gwyrfa a Llyn Cwellyn SAC/SSSI. This conclusion is due to the following factors:</p> <ul style="list-style-type: none"> • the changes to river flow following initial onset of environmental drought is not anticipated to significantly alter habitat availability and quality for white-clawed crayfish; • the negligible hydrological impact is not anticipated to reduce the availability of habitats or lead to exposure of benthic macroinvertebrate habitats; • changes to velocity, depth, wetted width may restrict the access of migratory fish to spawning tributaries or to dry spawning gravels. However, reductions in flow are short term and are not anticipated to significantly alter habitat and availability for the resident fish community; • otter are not expected to be significantly impacted by the drought order implementation, as habitat availability and quality for otter is not anticipated to be significantly altered; • the negligible hydrological impact is not anticipated to change the status of invasive flora and fauna; • negligible impacts are predicted on the woodland areas (National Forest Inventory) downstream of Llyn Cwellyn

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>A neutral has been therefore been determined against this objective.</p> <p>Mitigation</p> <p>Best practice construction techniques (such as the use of sediment traps) should be used to minimise or avoid the effects of construction on the designated sites.</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>
<p>2. To ensure the appropriate and efficient use of land and protect and enhance soil quality and geodiversity.</p>	<p>Will additional land be required for the development or implementation of the option or will the option require below ground works leading to land sterilisation?</p> <p>Will the draft Drought Plan utilise previously developed land?</p> <p>Will the draft Drought Plan measure minimise the loss of best and most versatile agricultural land?</p> <p>Will the draft Drought Plan measure affect upland (peat-dominated) and other wetland soils?</p> <p>Will the draft Drought Plan measure protect and enhance protected sites designated for their geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest?</p>	<p>0</p>	<p>0</p>	<p>Effects of Construction</p> <p>Construction works associated with this option are not expected to result in any effects on upland or wetland soils. Temporary (above ground) infrastructure will not require excavation.</p> <p>Overall, a neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>This option could result in more rapid drawdown of levels in the Llyn Cwellyn than under current licensed conditions. Conceivably, this could lead to drying out of wetland soils adjacent to the lake. However, it is noted that the reservoir could be drawn down to these levels under current licensed operation and therefore it is considered that there will be no additional effects on wetland/marginal soils around the reservoir.</p> <p>The compensation flow would be maintained throughout operation. Compensation releases would be maintained as per the current licence conditions of 11.4MI/d. This would ensure that flows in the Afon Gwyrfae are maintained below the reservoir. This would not be a change from the operation without the option in place and therefore no effects on wetland soils marginal to the Afon Gwyrfae are anticipated.</p> <p>Overall, a neutral effect is determined against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				Uncertainty None
3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water Framework Directive	<p>Will the draft Drought Plan measure lead to a change in river flows, wetted width or river level?</p> <p>Will the draft Drought Plan measure affect surface water quality and quantity?</p> <p>Will the draft Drought Plan measure lead to changes in groundwater quality, quantity and recharge?</p> <p>Will the draft Drought Plan measure lead to the deterioration of Water Framework Directive (WFD) waterbody status (or potential) from, inter alia, changes in fluvial geomorphology?</p> <p>Will the draft Drought Plan measure jeopardise the achievement of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Water Framework Directive (WFD)?</p>	0	0	Effects of Construction Construction activity associated with this option will not lead to a change in river flows, surface water or groundwater quantity. No effects on water quality would be expected from construction, assuming that best practice construction techniques are followed (e.g. the use of sediment traps). No effects on WFD status of water bodies are expected to result from construction. Overall, a neutral effect has been determined against this objective. Effects of Operation Llyn Cwellyn (WFD water body GB31034002) is a natural glacial moraine lake with managed water levels and controlled outflows in the upper catchment of the Afon Gwyrfa (GB110065054190, downstream of Cwellyn). The ecological status classification of Llyn Cwellyn is moderate whilst for Afon Gwyrfa is good (WFD Cycle 2 classification). The EAR has concluded that operation of this option will have a negligible hydrological impact on Llyn Cwellyn and Afon Gwyrfa. The increase in the duration of the low flow period in the Afon Gwyrfa is estimated at 3.3%, depending on reservoir abstraction rate and is assessed as negligible Given that there is no adverse hydrological impact associated with the option, effects on geomorphology and water quality are equally assessed as negligible. Similarly, there would be no flow pressures or water quality pressures that would pose an increased risk to any water-dependent environmental features within the vicinity of Llyn Cwellyn and Afon Gwyrfa. Overall, a neutral effect has therefore been determined against this objective. Mitigation Best practice construction techniques (such as the use of sediment traps) should be used to minimise or avoid the effects of construction on water quality. Hydrological monitoring has been recommended in the EAR during the development of drought conditions and implementation of the option, in order to monitor the

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>adherence (or otherwise) of the river system to that expected from the assessment presented in the EAR.</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>
<p>4. To limit the causes and potential consequences of climate change and to adapt to future changes</p>	<p>Will the draft Drought Plan measure reduce or minimise greenhouse gas emissions?</p> <p>Will the draft Drought Plan measure reduce vulnerability to the effects of climate change by appropriate adaptation?</p> <p>Will the draft Drought Plan measure increase environmental resilience to the effects of climate change including to impacts on water quality?</p> <p>Will the draft Drought Plan measure reduce or minimise air pollutant emissions?</p>	<p>0</p>	<p>+/-</p>	<p>Effects of Construction</p> <p>The construction of this option will require the movement of plant and materials (e.g. pumps, pipes etc) to site, which will require fuel and result in carbon emissions. There would also be carbon embodied within the plant and temporary infrastructure. However, given that the option will require temporary infrastructure, it is possible that these materials could be hired or used from existing Welsh Water/sub-contractor stores and could subsequently be used elsewhere once the temporary infrastructure has been removed from site. This would lessen the effect of carbon embodied in materials. The construction of this option is not expected to contribute to climate change adaptation.</p> <p>For this reason and because the equipment required is small scale in nature, a neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>Operational energy requirements and associated carbon emissions have not been quantified by Welsh Water for any options at this stage and therefore a qualitative assessment has been made based on the infrastructure required to implement this option.</p> <p>The option involves a proposed temporary relaxation of the low lake level abstraction rate at Llyn Cwellyn. When lake levels have fallen below 0.8m below spillway and the daily abstraction rate has reduced to 10MI/d in the current licence conditions, the option proposes to operate the abstraction at a daily rate of 12MI/d. The lake level at which abstraction ceases would be maintained as per the current licence conditions. Compensation releases would be maintained as per the current licence conditions of 11.4MI/d when lake level is between 0.8m and 2.6m below spillway.</p> <p>Pumping against a relatively small head, up to 23.4 MI/d, would need be required to maintain compensation flows and for public water supply purposes. This would require power (assumed to be from diesel generators) and result in carbon emissions.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>UKCP18 climate change scenarios anticipate longer, hotter summers and, in turn, increases in both the frequency and duration of droughts. This option would provide Welsh Water with additional capacity to manage drought conditions and as such is considered to contribute towards climate change adaptation.</p> <p>Overall, this option has been assessed as having a mixed minor positive and minor negative effect on this objective.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty None</p>
<p>5. To protect and enhance human health with special regard to vulnerable groups in society</p>	<p>Will the draft Drought Plan measure ensure continuity of clean drinking water supply within statutory standards supply at times of drought?</p> <p>Will the draft Drought Plan measure affect the affordability of clean drinking water?</p> <p>Will the draft Drought Plan measure adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise levels)?</p> <p>Will the draft Drought Plan measures affect human health or the health of any vulnerable groups?</p> <p>Will the Drought Plan measure affect public access to, or enjoyment of, local green/blue space?</p> <p>Will the Drought Plan measure impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?</p>	0	+	<p>Effects of Construction</p> <p>The construction of this option would have no effect on continuity of clean drinking water supply at time of drought, nor would it affect surface water quality (assuming use of best practice construction techniques as outlined under Objective 3).</p> <p>The construction of this option may result in some disturbance to local residents. Noise and vibration may result from the transport of pumps, pipeline and generators to site where the option would be implemented. However, the site is in a rural location with a small number of residential properties (approximately 10) near the area of the works. Given the scale of this option, location of new infrastructure (on the dam wall), and the temporary nature of any health impacts, a neutral effect is recorded against this objective.</p> <p>Effects of Operation</p> <p>No significant noise or disturbance impacts are expected from the operation of this option. For those living, working or visiting the area, there is the potential for noise disturbance through the operation of generators. However, the number of people living within the area is small (about 10 properties within proximity of Llyn Cwellyn and the transfer route). Although noise levels local to generators would be elevated, wider effects are considered negligible.</p> <p>The operation of this option will provide a gain in deployable output of 2MI/d within the NEYM resource zone, which will help to ensure that water supply is maintained during periods of drought. Those living, working or visiting the area are unlikely to be directly disturbed by the scheme.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>Overall, this option has been assessed as having a minor positive effect on this objective.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty None</p>
<p>6. To maintain and enhance the economic and social needs of the local community</p>	<p>Will the draft Drought Plan measure ensure sufficient water is available for people and visitors to maintain economic activity in times of drought?</p> <p>Will the draft Drought Plan measures affect local or regional economies?</p> <p>Will the draft Drought Plan measure affect opportunities for recreation at times of drought?</p>	0	0	<p>Effects of Construction</p> <p>Construction of this option will have no effect on the availability of water for people and visitors to maintain economic activity in times of drought. Whilst there may be some economic benefits associated with construction (e.g. spend in the local supply chain), any effects in this regard would be negligible, commensurate with the scale of construction works.</p> <p>This option would be located within Snowdonia National Park, an area that provides opportunities for outdoor recreation activities. No disruption to footpaths and access from the construction of temporary above ground infrastructure is anticipated. For this reason, no effects on opportunities for recreation activities during the construction phase are anticipated.</p> <p>Overall, a neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>This option will provide an additional yield of 2 Ml/d which, although contributing to meeting the water needs of homes, businesses and visitors to this area and helping to maintain economic activity during times of drought, does not exceed the yield threshold in the definitions of significance and a neutral effect has been determined against this objective.</p> <p>Llyn Cwellyn lies within Snowdonia National Park. The area east of Llyn Cwellyn has been highlighted as a key amenity area. Recreation activities include angling, canoeing, windsurfing and walking. There is potential for the lake level to lower at a faster rate and to lower levels than without the option present. This may increase shoreline exposure, and impact recreational access. However, the EAR has concluded that effects on recreational activities will be negligible as lake drawdown and shoreline exposure in times of drought will be temporary in nature.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>During operation, Welsh Water would continue to ensure that compensation release requirements are met.</p> <p>Overall a neutral effect is determined against this objective.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty None</p>
<p>7. To promote the wise use of resources</p>	<p>Will the draft Drought Plan measure seek to minimise the demand for additional raw materials?</p> <p>Will the draft Drought Plan measure seek to minimise energy consumption?</p> <p>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</p> <p>Will the draft Drought Plan measure encourage sustainable design or use of sustainable materials?</p>	<p>0</p>	<p>-</p>	<p>Effects of Construction</p> <p>The construction of this option will require temporary infrastructure and the movement of plant and materials (e.g. pumps, pipes etc) to site, which will require fuel. However, it is possible that these materials could be hired or used from existing Welsh Water/contractor stores and could subsequently be used elsewhere once the temporary infrastructure has been removed from site.</p> <p>For this reason and because the equipment required is small scale in nature, a neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>The option involves a proposed temporary relaxation of the low lake level abstraction rate at Llyn Cwellyn. When lake levels have fallen below 0.8m below spillway and the daily abstraction rate has reduced to 10MI/d in the current licence conditions, the option proposes to operate the abstraction at a daily rate of 12MI/d. The lake level at which abstraction ceases would be maintained as per the current licence conditions. Compensation releases would be maintained as per the current licence conditions of 11.4MI/d when lake level is between 0.8m and 2.6m below spillway.</p> <p>Although pumping against a relatively small head, up to 23.4 MI/d would need to be pumped to maintain compensation flows and for public water supply purposes. This would require power (assumed to be from diesel generators).</p> <p>Overall, a minor negative effect has been determined against this objective.</p> <p>Mitigation None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				Assumptions None Uncertainty None
8. To conserve and enhance the cultural, historic and industrial heritage resource.	<p>Will the draft Drought Plan measure conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</p> <p>Will the draft Drought Plan measure avoid or minimise damage to archaeologically important sites?</p> <p>Will the draft Drought Plan measure avoid damage to important wetland areas with potential for paleoenvironmental deposits?</p>	0	0	Effects of Construction There are three Grade II listed buildings near the Llyn Cwellyn and several more along the course of the Afon Gwyrfa. There are also four scheduled monuments in the vicinity of the Afon Gwyrfa. However, reflecting the scale of works and their temporary nature, construction of the option is unlikely to have an impact on heritage features or sites (assuming use of best practice construction techniques). Overall, given the scale of this option and location of new infrastructure (on the dam wall) a neutral effect is recorded against this objective. Effects of Operation The operation of this option is not anticipated to have a detrimental effect on heritage assets as these contain no water dependant features and any effects on setting would be temporary and reversible. The EAR has also concluded that the option will not affect heritage features or sites. A neutral effect is therefore anticipated against this objective. Mitigation None Assumptions None Uncertainty None
9. To protect and enhance landscape and seascape character and other protected features	<p>Is it likely that the draft Drought Plan measure will have significant visual impacts?</p> <p>Will the draft Drought Plan measure avoid adverse effects on, and enhance where possible, the special qualities of</p>	-	-	Effects of Construction Llyn Cwellyn and the upper reaches of the Afon Gwyrfa lie within Snowdonia National Park. Construction works associated with this option could temporarily affect the special qualities of the National Park and the visual amenity of nearby receptors including visitors. However, although located in a sensitive landscape, due

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	<p>protected/designated landscapes (including woodlands) or seascapes such as National Parks or AONBs?</p> <p>Will the draft Drought Plan measure help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness?</p>			<p>to the small scale and localised nature of works proposed, a minor negative effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>The EAR has indicated that the operation of this option may lower lake levels at a faster rate, and increase shoreline exposure. River flows, width, depths and velocities would be reduced. The degree of shoreline exposure and reduction in river flows directly affects landscape and visual amenity value. However, this will only be temporary and will be ameliorated once the drought has passed. The EAR concluded that the option will not affect landscape features or sites.</p> <p>The option will not result in changes to compensation releases and therefore no landscape effects are expected downstream.</p> <p>New above-ground infrastructure would be required for this option, which would consist of a maximum of a few tens of metres of pipeline (likely to be less than this) against the existing dam wall. Pumps and generators would also be required, which would be visible to the public.</p> <p>Overall, due to the presence of above ground infrastructure during operation in the National Park, a minor negative effect is determined against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>
Summary	<p>Effects of Construction</p> <p>During construction, a minor negative effect has been determined against Objective 1 (biodiversity) due to the potential effects on habitat connectivity and disturbance of locating a small amount of new infrastructure in designated sites (Afon Gwyrfaï a Llyn Cwellyn SAC/SSSI). Minor negative effects have also been determined against Objective 9 (landscape) due to the presence of new above ground infrastructure within Snowdonia National Park. The anticipated effects against all other objectives are neutral.</p> <p>Effects of Operation</p> <p>A minor positive effect is determined against Objective 5 (human health) and Objective 4 (climate change) due to yield of this option, which will help to ensure continuity of supply during times of drought. Minor negative effects are determined against Objectives 4 (climate change) and 7 (resources) as the option will require energy (and result in carbon emissions) to enable the abstraction of water from the lake for public water supply and compensation releases. A minor negative effect is also determined against Objective 9 (landscape) due to presence of above ground infrastructure in Snowdonia National Park. Neutral effects are determined against all other objectives as the option will not result in lake levels being drawn down below those allowed under existing licence.</p>			

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	Mitigation The EAR recommends that best practice construction techniques (such as the use of sediment traps) should be used to minimise or avoid the effects of construction on water quality and designated sites. Hydrological monitoring has also been recommended during the development of drought conditions and implementation of the option, in order to monitor the adherence (or otherwise) of the river system to that expected from the assessment presented in the EAR.			

8001-3 Reduction of Alaw Compensation Water

Option Summary

Llyn Alaw is a reservoir in North Wales which supplies drinking water to parts of Gwynedd and Anglesey, as part of the North Eryri Ynys Mon WRZ. It lies in the northern part of the island of Anglesey, near Llanfachraeth.

If granted, this option would involve a reduction in the statutory compensation release from Alaw Reservoir to the Afon Alaw of 1.5MI/d, from 3.2MI/d to 1.7 MI/d. This will conserve the longevity of reservoir storage for use in direct supply during a drought and improve the probability of reservoir winter refill. The drought permit scheme will influence the downstream Afon Alaw from the outflow at Alaw Reservoir to the tidal limit.

Drought permits may remain in force for a period of up to six months, and they can be extended for up to a further six months. However, the period of implementation for this drought permit **would only** be July to December, as confirmed **with NRW and** by water resources modelling carried out by Welsh Water.

No additional infrastructure would be required to enable this option to be implemented.

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity.</p>	<p>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs and priority habitats and species)?</p> <p>Will the draft Drought Plan measure protect and enhance non-designated sites and local biodiversity?</p> <p>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</p> <p>Will the draft Drought Plan measure affect the condition of ecosystems (including their connectivity, structure and functioning)?</p> <p>Will the draft Drought Plan measure enhance the adaptability of ecosystems?</p>	<p>0</p>	<p>--/?</p>	<p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of this option, no effects on biodiversity from construction would occur. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>Afon Alaw is not a designated river. Llyn Alaw itself, however, is designated as a SSSI whilst Beddmanarch-Cymyran SSSI is about 6.8 km downstream of Llyn Alaw. There are no SACs or SPAs near Llyn Alaw.</p> <p>Alaw Reservoir supports flow in the downstream Afon Alaw. The Afon Alaw stretches 8.6 km from the impoundment to the tidal limit at Llanfachraeth. Reducing the compensation flow would result in comparatively more water being retained in Llyn Alaw. The reduction in compensation flow rate from 3.2MI/d to 1.7MI/d represents a 47% reduction in summer low and extreme low flows in the upper Afon Alaw immediately below the reservoir.</p> <p>Maintaining water levels in the SSSI designated reservoir could protect biodiversity in the reservoir. However, any effect would only be short term as ultimately the water will be abstracted. In this regard, the EAR has concluded that impacts on this SSSI would be negligible. The EAR has also concluded that Beddmanarch Cymyran SSSI, which is formed by estuary habitats below the tidal limit, is outside of the reach</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?			<p>of the hydrological impacts of this option and will not be adversely affected during operation.</p> <p>The EAR has identified that the operation of the option could potentially have major adverse impacts on a number of species as a result of reduced river levels, including brook, river and sea lamprey (due to loss of spawning and juvenile habitat) and Atlantic salmon and brown and sea trout (due to delays and potential cessation of adult and smolt migrations and reductions in spawning and juvenile survival as a result of habitat loss). Other moderate impacts are also identified in respect of these species as well as European eel, macroinvertebrates, macrophytes and phytobenthos communities. However, the likelihood of major adverse impacts occurring and their exact magnitude is uncertain as it depends on the exact timing/duration of the option's implementation, existing flow conditions and the fish species affected.</p> <p>Due to the potential for major impacts on lamprey, Atlantic salmon and brown trout in particular, this option has been assessed (on a precautionary basis) as having a significant negative effect on this objective, although some uncertainty remains.</p> <p>Mitigation</p> <p>There are several mitigation measures that are appropriate. These are detailed in the EAR and include, inter alia, monitoring/surveys, targeted installation of woody debris features to provide fish with the habitat required to support feeding and development (growth), gravel washing of spawning areas and deployment of aeration equipment.</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>There remains uncertainty with regard to the exact timing/duration of the option's implementation and the scale/magnitude of effects on species including lamprey, brown trout and Atlantic salmon.</p>
2. To ensure the appropriate and efficient use of land and protect and enhance soil quality and geodiversity.	<p>Will additional land be required for the development or implementation of the option or will the option require below ground works leading to land sterilisation?</p> <p>Will the draft Drought Plan utilise previously developed land?</p>	0	0	<p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of the option, no effects from construction would occur. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>This option would result in reduced water levels in Afon Alaw. Conceivably, this could lead to drying out of wetland soils adjacent to the river. However, there are no</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	<p>Will the draft Drought Plan measure minimise the loss of best and most versatile agricultural land?</p> <p>Will the draft Drought Plan measure affect upland (peat-dominated) and other wetland soils?</p> <p>Will the draft Drought Plan measure protect and enhance protected sites designated for their geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest?</p>			<p>designated wetland sites or upland soils near the river and therefore the anticipated effect would be neutral.</p> <p>Overall, a neutral effect is determined against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>
<p>3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water Framework Directive</p>	<p>Will the draft Drought Plan measure lead to a change in river flows, wetted width or river level?</p> <p>Will the draft Drought Plan measure affect surface water quality and quantity?</p> <p>Will the draft Drought Plan measure lead to changes in groundwater quality, quantity and recharge?</p> <p>Will the draft Drought Plan measure lead to the deterioration of Water Framework Directive (WFD) waterbody status (or potential) from, inter alia, changes in fluvial geomorphology?</p> <p>Will the draft Drought Plan measure jeopardise the achievement of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Water Framework Directive (WFD)?</p>	0	-	<p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of this option, no effects from construction on water quality or quantity would occur. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>Llyn Alaw (WFD water body GB31032538) and Afon Alaw (WFD water body GB110102058981) constitute heavily modified waterbodies due to the abstraction from the reservoir. These water bodies have an ecological status classification of moderate (WFD Cycle 2 classification).</p> <p>The EAR has concluded that reduction of compensation flow would have a major impact on water quantity (47% reduction in summer low and extreme low flows) and major risk water quality (minor risk to ammonia, moderate for dissolved oxygen and major risk to soluble reactive phosphorous) in the Afon Alaw during July to December (the period of option implementation).</p> <p>These hydrological impacts are assessed as leading to moderate impacts on geomorphology during July to December. The impact on increased siltation is likely to be minor, due to the low concentration of suspended sediment in transport during a drought. Further, the river is adapted to larger bedload and any siltation that does occur will be removed when normal flow resumes, siltation is not expected to increase around the normal natural low flow conditions. The option will affect wetted widths and depths, especially in shallow locations, however much of the lower part of the reach is managed with steep banks. Impacts on wetted width and depth in the shallow locations is expected to be moderate.</p> <p>Water levels in Llyn Alaw would be temporarily higher than without the option during a drought period. However these benefits are considered negligible and temporary in</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>nature as the level of the reservoir would continue to decline (albeit as a reduced rate) as a drought progresses. For these reasons, the overall anticipated effect on Llyn Alaw is neutral.</p> <p>Overall, this option has been assessed as having a minor negative effect on this objective.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty None</p>
<p>4. To limit the causes and potential consequences of climate change and to adapt to future changes</p>	<p>Will the draft Drought Plan measure reduce or minimise greenhouse gas emissions?</p> <p>Will the draft Drought Plan measure reduce vulnerability to the effects of climate change by appropriate adaptation?</p> <p>Will the draft Drought Plan measure increase environmental resilience to the effects of climate change including to impacts on water quality?</p> <p>Will the draft Drought Plan measure reduce or minimise air pollutant emissions?</p>	<p>0</p>	<p>+</p>	<p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of the option, no effects from construction would occur. A neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>Operational energy requirements and associated carbon emissions have not been quantified by Welsh Water for any options at this stage and therefore a qualitative assessment has been made based on the infrastructure required to implement this option.</p> <p>This option does not require any changes to infrastructure or pumping rates. Water would be treated at the existing Alaw WTW. Energy would be required to pump and treat the water through the existing works (with associated carbon emissions); however, no further energy consumption would arise from new infrastructure.</p> <p>UKCP18 climate change scenarios anticipate longer, hotter summers and, in turn, increases in both the frequency and duration of droughts. This option would provide Welsh Water with additional capacity to manage drought conditions and as such is considered to contribute towards climate change adaptation.</p> <p>Overall, this option has been assessed as having a minor positive effect on this objective.</p> <p>Mitigation None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				Assumptions None Uncertainty None
5. To protect and enhance human health with special regard to vulnerable groups in society	Will the draft Drought Plan measure ensure continuity of clean drinking water supply within statutory standards supply at times of drought? Will the draft Drought Plan measure affect the affordability of clean drinking water? Will the draft Drought Plan measure adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise levels)? Will the draft Drought Plan measures affect human health or the health of any vulnerable groups? Will the Drought Plan measure affect public access to, or enjoyment of, local green/blue space? Will the Drought Plan measure impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?	0	+	Effects of Construction There is no construction required and therefore no effects are expected on water quality or clean drinking water supply. There would be no direct disturbance to local residents therefore a neutral effect is identified. Effects of Operation The operation of this option will provide a gain in deployable output of 1.5Ml/d within the NEYM resource zone, which will help to ensure that water supply is maintained during periods of drought. Those living, working or visiting the area are unlikely to be directly disturbed by the scheme. Overall, this option has been assessed as having a minor positive effect on this objective. Mitigation None Assumptions None Uncertainty None
6. To maintain and enhance the economic and social needs of the local community	Will the draft Drought Plan measure ensure sufficient water is available for people and visitors to maintain economic activity in times of drought? Will the draft Drought Plan measures affect local or regional economies?	0	0	Effects of Construction As there is no construction associated with this option, there will be no effect on the availability of water for people and visitors to maintain economic activity in times of drought. Further, it is not anticipated that the option would generate any economic benefits (e.g. job creation or investment in supply chains). Effects of Operation

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	Will the draft Drought Plan measure affect opportunities for recreation at times of drought?			<p>This option will provide an additional yield of 1.5 MI/d. This would help to meet the water supply needs of homes, businesses and visitors in the area during periods of drought, supporting the local and regional economy, although, consistent with the definitions of significance used in the assessment, positive effects in this regard are predicted to be negligible.</p> <p>The EAR has identified that the implementation of the option would reduce the wetted width and depth in the Afon Alaw which may influence water-dependent activities such as angling and canoeing. However, water levels will be naturally low in times of drought and the impacts will be temporary in nature and will be ameliorated once the drought has passed. Therefore, the effect on recreational opportunities is anticipated to be negligible.</p> <p>Overall, the option has been assessed as having a neutral effect on this objective.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty None</p>
7. To promote the wise use of resources	<p>Will the draft Drought Plan measure seek to minimise the demand for additional raw materials?</p> <p>Will the draft Drought Plan measure seek to minimise energy consumption?</p> <p>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</p> <p>Will the draft Drought Plan measure encourage sustainable design or use of sustainable materials?</p>	0	0	<p>Effects of Construction As no additional infrastructure is required for the implementation of the option, no effects from construction would occur. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation Operation of the option will require no additional energy use or resources, over and above those currently used to treat water at Alaw WTW. A neutral effect is therefore anticipated against this objective.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				None
8. To conserve and enhance the cultural, historic and industrial heritage resource.	<p>Will the draft Drought Plan measure conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</p> <p>Will the draft Drought Plan measure avoid or minimise damage to archaeologically important sites?</p> <p>Will the draft Drought Plan measure avoid damage to important wetland areas with potential for paleoenvironmental deposits?</p>	0	0	<p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of the option, no effects on heritage assets from construction would occur. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>There are a small number of scheduled monuments in the vicinity of the Afon Alaw (Bedd Branwen Round Cairn, Tregwehelydd Standing Stone and Newlands Fish Weir). There are also ten Grade II listed buildings along the course of the Afon Alaw. However, a reduction in the flow of the Afon Alaw as a result of the option is not anticipated to have a detrimental effect on heritage assets as these contain no water dependant features and any effects on setting would be temporary and reversible. A neutral effect is therefore anticipated against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>
9. To protect and enhance landscape and seascape character and other protected features	<p>Is it likely that the draft Drought Plan measure will have significant visual impacts?</p> <p>Will the draft Drought Plan measure avoid adverse effects on, and enhance where possible, the special qualities of protected/designated landscapes (including woodlands) or seascapes such as National Parks or AONBs?</p>	0	0	<p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of the option, no effects from construction would occur. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>The EAR has concluded that flows in the Afon Alaw during a drought will be low such that further reduction in flows due to the operation of this option would not result in a</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	Will the draft Drought Plan measure help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness?			<p>further loss of aesthetic value. As the river is not part of a protected or designated area for landscape, the anticipated effect from this option on Afon Alaw is neutral.</p> <p>The water level in the reservoir would be maintained over a longer period than without the operation of the option, which could help maintain the beauty of this area, which attracts visitors for activities such as bird watching and walking. However, due to the short term nature of implementation, this effect is anticipated to be neutral. Overall, a neutral effect is determined against this objective.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty None</p>
Summary	<p>Effects of Construction</p> <p>The option does not involve the construction of any additional infrastructure and as such, no effects are anticipated.</p> <p>Effects of Operation</p> <p>The option will provide an additional water yield of 1.5 Ml/d to the wider area and therefore a minor positive effect has been determined against Objective 5 (human health). A minor positive effect has also been determined against Objective 4 (climate change) as the option will reduce vulnerability to the effects of climate change through appropriate adaptation.</p> <p>A significant negative effect has been identified (on a precautionary) in respect of Objective 1 (biodiversity). This is due to the potential for the operation of the option to have major impacts on lamprey, Atlantic salmon and brown trout in the Afon Alaw downstream of the reservoir, although some uncertainty remains. The option has also been assessed as having a negative effect on Objective 3 (water quality and quantity) as the option will lead to a reduction in flows in the Afon Alaw which could have a minor impact on water quality of the river. The anticipated effects against all other objectives are neutral.</p> <p>Mitigation</p> <p>With regard to adverse effects on biodiversity, there are several mitigation measures that are appropriate. These are detailed in the EAR and include, inter alia, monitoring/surveys, targeted installation of woody debris features to provide fish with the habitat required to support feeding and development (growth), gravel washing of spawning areas and deployment of aeration equipment.</p>			

8001-4 Reduction of Ffynnon Llugwy Compensation Water

Option Summary

Ffynnon Llugwy is a reservoir in North Wales which supplies drinking water to Bangor and Eastern Anglesey, as part of the North Eryri Ynys Môn WRZ. It lies on the upper Afon Llugwy, a tributary of the River Conwy, in the county of Gwynedd between Carnedd Llewelyn and Clyn Cowlyd in the northern part of Snowdonia National Park.

If granted, this drought permit would involve a reduction in the compensation flow release from Ffynnon Llugwy to the Afon Llugwy from 4.5MI/d to 2.5MI/d. This will conserve the longevity of reservoir storage for use in direct supply during a drought and improve the probability of reservoir winter refill. The drought permit will influence the downstream Afon Llugwy as far as the Llyn Cowlyd stream capture leat, and potentially further downstream depending on the abstraction and compensation arrangements at the leat.

The period of implementation for this drought permit **would only** be July to **December**, as confirmed **with NRW and** by water resources modelling carried out by Welsh Water. It would be removed sooner if water resources have returned to adequate levels to safeguard future water supplies, as agreed with Natural Resources Wales.

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity.</p>	<p>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs and priority habitats and species)?</p> <p>Will the draft Drought Plan measure protect and enhance non-designated sites and local biodiversity?</p> <p>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</p> <p>Will the draft Drought Plan measure affect the condition of ecosystems (including their connectivity, structure and functioning)?</p> <p>Will the draft Drought Plan measure enhance the adaptability of ecosystems?</p> <p>Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?</p>	<p>0</p>	<p>--/?</p>	<p>Effects of Construction</p> <p>Ffynnon Llugwy Reservoir was constructed in 1930. The 8m high earth embankment with a concrete core holds back a maximum usable storage of 2,078MI with a surface area of 16ha (at top water level) at an altitude of 550m. The 2.26km² catchment draining into the reservoir has high rainfall on a steep mountain landscape.</p> <p>The option would require no additional construction to take place to the existing reservoir and no effects on biodiversity are predicted. In consequence, a neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>The hydrological impacts associated with a reduction in compensation discharge will include reduction in river flows of up to 44% with a corresponding reduction in wetted width and depth during the summer/autumn period for the Afon Llugwy.</p> <p>The Afon partially lies within the wider Eryri SAC/SSSI, with a stretch of the river designated as the Afon Alugwy SSSI as it flows into Betws-y-Coed. The EAR completed for this option has concluded that implementation of the drought permit would not result in likely significant effects on any designated features of the Eryri SAC or the Afon Llugwy SSSI, although it highlights that there is the potential for minor impacts on the Afon Llugwy SSSI (associated with effects on bryophyte features due to reduced river flows and reduction in humidity affecting the biodiversity of gorge woodlands). The EAR has, however, identified the potential for moderate impacts on aquatic habitats associated with the Eryri SSSI.</p>

Objective	Key Questions	Relationship	Commentary
			<p>Hydrological impacts within the Eryri SSSI boundary are likely to have short term, reversible moderate adverse impacts on macrophyte communities (including lichens and bryophytes) and macroinvertebrate communities as well as phytobenthos. Whilst the EAR highlights that there is no data available to determine the importance of the River Llugwy flora and fauna in relation to the SSSI assemblages, there is potential for the river to support rare species.</p> <p>The EAR has identified that this option may have adverse impacts on fish within the Afon Llugwy due to reduced flows and related changes to water quality. In this regard, the potential for reductions in spawning and juvenile survival due to habitat loss is identified as a major impact for Atlantic Salmon and Brown Trout. However, the likelihood of this impact occurring and its exact magnitude is uncertain as it depends on the exact timing/duration of the option's implementation, existing flow conditions and the fish species affected; the EAR also notes that there is an absence of reliable data in this regard.</p> <p>Due to the potential for major impacts on Atlantic Salmon and Brown Trout in particular and for the potential for moderate impacts on aquatic habitats associated with the Eryri SSSI, this option has been assessed (on a precautionary basis) as having a significant negative effect on this objective, although some uncertainty remains.</p> <p>Mitigation There are several mitigation measures that are appropriate, depending on the fish species being protected. The approaches include habitat enhancement, the removal of barriers to migration to enable recolonization and the gradual reduction of compensation flow.</p> <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • There is no data available to determine the importance of the River Llugwy flora and fauna in relation to the SSSI assemblages. • There remains uncertainty with regard to the timing/duration of the option's implementation and the scale/magnitude of effects on species including Brown Trout and Atlantic Salmon.

Objective	Key Questions	Relationship		Commentary
<p>2. To ensure the appropriate and efficient use of land and protect and enhance soil quality and geodiversity.</p>	<p>Will additional land be required for the development or implementation of the option or will the option require below ground works leading to land sterilisation?</p> <p>Will the draft Drought Plan utilise previously developed land?</p> <p>Will the draft Drought Plan measure minimise the loss of best and most versatile agricultural land?</p> <p>Will the draft Drought Plan measure affect upland (peat-dominated) and other wetland soils?</p> <p>Will the draft Drought Plan measure protect and enhance protected sites designated for their geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest?</p>	0	0	<p>Effects of Construction</p> <p>The option requires no construction and therefore its implementation is not expected to result in any effects on land use or upland or wetland soils.</p> <p>Effects of Operation</p> <p>The operation of this option could result in more rapid drawdown of lake levels than under current licensed conditions. Conceivably, this could lead to drying out of wetland soils adjacent to the lake. However, it is noted that the lake could be drawn down to these levels under current licensed operation and therefore it is considered that there will be no additional effects on wetland/marginal soils around the lake.</p> <p>Although a compensation flow would be maintained throughout operation, this would be reduced from 4.5Ml/d to 2.5Ml/d. This would ensure that flows in the Afon Llugwy are maintained at some level; however, the flows could be reduced by up to 44% of the existing levels in low flows, causing a reduction in wetted area. This could affect wetland soils marginal to the Afon Llugwy.</p> <p>Overall, a neutral effect is determined against this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None
<p>3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water Framework Directive</p>	<p>Will the draft Drought Plan measure lead to a change in river flows, wetted width or river level?</p> <p>Will the draft Drought Plan measure affect surface water quality and quantity?</p> <p>Will the draft Drought Plan measure lead to changes in groundwater quality, quantity and recharge?</p> <p>Will the draft Drought Plan measure lead to the deterioration of Water Framework Directive (WFD) waterbody status (or potential) from, inter alia, changes in fluvial geomorphology?</p>	0	-	<p>Effects of Construction</p> <p>The option requires no construction and therefore will not lead to a change in river flows, surface water or groundwater quantity.</p> <p>For the same reason, no effects on water quality or on WFD status are expected.</p> <p>Effects of Operation</p> <p>The operation of this option would reduce flows in both the upper and central part of the reach of the Afon Llugwy by up to 44%. In winter, it is anticipated that the option would reduce low and moderate winter flows by less, with a significant contribution from flow accretion, given the topography, soil hydrography and rainfall pattern of the intervening catchment area.</p> <p>The Ffynnon Llugwy Reservoir and the Afon Llugwy are currently assessed as having a moderate overall status (2018 C2 interim Classification). While the option will ensure that compensation flows exist, these will be lower than under the current</p>

Objective	Key Questions	Relationship		Commentary
	<p>Will the draft Drought Plan measure jeopardise the achievement of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Water Framework Directive (WFD)?</p>			<p>operational regime. The EAR notes that “<i>there is a risk of short-term deterioration in status of the phytobenthos component of the ‘Llugwy - Nant gwryd to Ffynnon Llugwy’ waterbody due to the drought permit. Impacts of drought permit implementation on the phytobenthos communities of the impacted reaches have been summarised as minor adverse, short-term, temporary and reversible. Consequently, the phytobenthos component of the ‘Llugwy - Nant gwryd to Ffynnon Llugwy’ waterbody is considered to be at minor (uncertain) risk of short-term deterioration. The risk of short term deterioration in status of the ‘Llugwy - Conwy to Nant gwryd’ waterbody is deemed negligible</i>”. For these reasons, a possible effect on WFD status is anticipated. Overall, a minor negative effect has therefore been determined against this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • It is assumed that flow in the upper Afon Llugwy during times of low flow would be the controlled release of compensation water from Ffynnon Llugwy Reservoir. <p>Uncertainty</p> <ul style="list-style-type: none"> • None
<p>4. To limit the causes and potential consequences of climate change and to adapt to future changes</p>	<p>Will the draft Drought Plan measure reduce or minimise greenhouse gas emissions?</p> <p>Will the draft Drought Plan measure reduce vulnerability to the effects of climate change by appropriate adaptation?</p> <p>Will the draft Drought Plan measure increase environmental resilience to the effects of climate change including to impacts on water quality?</p> <p>Will the draft Drought Plan measure reduce or minimise air pollutant emissions?</p>	<p>0</p>	<p>+</p>	<p>Effects of Construction</p> <p>The implementation of this option will not require any construction, therefore a neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>Operational energy requirements and associated carbon emissions have not been quantified by Welsh Water for any options at this stage and therefore a qualitative assessment has been made based on the infrastructure required to implement this option.</p> <p>This option will involve a change to the release rate from the reservoir, which is assumed to be by gravity and penstock arrangement. Water would be treated through existing treatment works and infrastructure. Energy required for treatment and distribution would therefore be unchanged from current operation and no additional emissions of greenhouse gases are anticipated.</p> <p>UKCP18 climate change scenarios anticipate longer, hotter summers and, in turn, increases in both the frequency and duration of droughts. This option would provide Welsh Water with additional capacity to manage drought conditions and as such is considered to contribute towards climate change adaptation.</p>

Objective	Key Questions	Relationship		Commentary
				<p>Overall, this option has been assessed as having a minor positive effect on this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None
<p>5. To protect and enhance human health with special regard to vulnerable groups in society</p>	<p>Will the draft Drought Plan measure ensure continuity of clean drinking water supply within statutory standards supply at times of drought?</p> <p>Will the draft Drought Plan measure affect the affordability of clean drinking water?</p> <p>Will the draft Drought Plan measure adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise levels)?</p> <p>Will the draft Drought Plan measures affect human health or the health of any vulnerable groups?</p> <p>Will the Drought Plan measure affect public access to, or enjoyment of, local green/blue space?</p> <p>Will the Drought Plan measure impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?</p>	0	+	<p>Effects of Construction</p> <p>There is no construction required and therefore no effects are expected on water quality or clean drinking water supply. There would be no direct disturbance to local residents therefore a neutral effect is identified.</p> <p>Effects of Operation</p> <p>The operation of this option will provide a gain in deployable output of 2Ml/d within the NEYM resource zone, which will help to ensure that water supply is maintained during periods of drought. Those living, working or visiting the area are unlikely to be directly disturbed by the scheme.</p> <p>Overall, this option has been assessed as having a minor positive effect on this objective. .</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None

Objective	Key Questions	Relationship		Commentary
<p>6. To maintain and enhance the economic and social needs of the local community</p>	<p>Will the draft Drought Plan measure ensure sufficient water is available for people and visitors to maintain economic activity in times of drought?</p> <p>Will the draft Drought Plan measures affect local or regional economies?</p> <p>Will the draft Drought Plan measure affect opportunities for recreation at times of drought?</p>	0	0	<p>Effects of Construction</p> <p>As there is no construction associated with this option, there will be no effect on the availability of water for people and visitors to maintain economic activity in times of drought. Further, it is not anticipated that the option would generate any economic benefits (e.g. job creation or investment in supply chains).</p> <p>Effects of Operation</p> <p>This option will provide an additional yield of 2 Ml/d at Ffynnon Llugwy Reservoir. This would help to meet the water supply needs of homes, businesses and visitors in the area during periods of drought, supporting the local and regional economy, although, consistent with the definitions of significance used in the assessment, positive effects in this regard are predicted to be negligible.</p> <p>The operation of the option will reduce compensation flows by a similar amount downstream. Approximately 1.4km downstream of Ffynnon Llugwy Reservoir, the Afon Llugwy is diverted by a stream capture system into the Llyn Cowlyd which transfers water to Llyn Cowlyd Reservoir for hydropower generation. The reduction in flows could in theory affect the availability of water for use under the hydropower generation licence, although any impacts in this regard would be temporary and negligible.</p> <p>Ffynnon Llugwy Reservoir lies within Snowdonia National Park and there is therefore the potential for the operation of this option to temporarily impact on recreational opportunities within and around the lake, and downstream. Recreational activities in the area include angling, rock climbing and fell walking. Ffynnon Llugwy is noted as a game fishery and the Afon Llugwy holds wild trout populations.</p> <p>Any reduction in wetted width and depth as a result of this option may influence the angling resource on the Afon Llugwy. However, it is noted that water levels will be naturally low in times of drought and impacts will be temporary in nature. This option seeks to maintain the volume of water within the lake. Any recreational activities occurring on the lake are unlikely to have any effect from the reduced compensation.</p> <p>Overall, this option has been assessed as having a neutral effect on this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> The hydropower licence holder may be able to claim compensation through the Water Resources Act 1991. Discussions will be held with the licence holder prior to the application for a drought order. <p>Assumptions</p> <ul style="list-style-type: none"> None

Objective	Key Questions	Relationship		Commentary
				<p>Uncertainty</p> <ul style="list-style-type: none"> None
<p>7. To promote the wise use of resources</p>	<p>Will the draft Drought Plan measure seek to minimise the demand for additional raw materials?</p> <p>Will the draft Drought Plan measure seek to minimise energy consumption?</p> <p>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</p> <p>Will the draft Drought Plan measure encourage sustainable design or use of sustainable materials?</p>	<p>0</p>	<p>0</p>	<p>Effects of Construction</p> <p>This option will not require the use of raw materials as it will make use of existing infrastructure. A neutral effect has therefore been identified against this objective.</p> <p>Effects of Operation</p> <p>During operation, this option will not require any additional energy consumption or use of any additional materials. As such, a neutral effect has been determined against this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> None <p>Assumptions</p> <ul style="list-style-type: none"> None <p>Uncertainty</p> <ul style="list-style-type: none"> None
<p>8. To conserve and enhance the cultural, historic and industrial heritage resource.</p>	<p>Will the draft Drought Plan measure conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</p> <p>Will the draft Drought Plan measure avoid or minimise damage to archaeologically important sites?</p> <p>Will the draft Drought Plan measure avoid damage to important wetland areas with potential for paleoenvironmental deposits?</p>	<p>0</p>	<p>0</p>	<p>Effects of Construction</p> <p>This option will not require the construction of new infrastructure and as such, a neutral effect has been identified against this objective.</p> <p>Effects of Operation</p> <p>There are a number of Grade II listed buildings along the course of the Afon Llugwy, the majority of which are milestones associated with the A5 road that follows the course of the river in this area.</p> <p>The option will reduce flows within Reach 1 Afon Llugwy (Ffynnon Llugwy Reservoir Outflow to Llyn Cowlyd take-off weir/leat) and 2 (Afon Llugwy (Llyn Cowlyd take-off weir/leat to Capel Curig, upstream of the Nant Gwryd confluence) by up to 44%.</p> <p>There are four Grade II listed buildings along this stretch of the Afon Llugwy and a cluster of four Grade II listed buildings in Capel Curig including Hen Bont Bridge. The</p>

Objective	Key Questions	Relationship		Commentary
				<p>Grade II* listed Church of St Curing is also within Capel Curig (although the church does not have views to/from the river). There is the potential for reduced flows to affect the settings of these assets, particularly where they experience views to/from the Afon Llugwy; however, any effects in this regard would be temporary and reversible and in consequence, be negligible.</p> <p>Flows within Reach 3 (Afon Llugwy (Capel Curig to the Afon Conwy confluence to at Betws-y-Coed) are anticipated to be reduced by up to 14%, therefore any effects on historic assets along this reach are considered to be negligible.</p> <p>Overall, this option has been assessed as having a neutral effect on this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None
<p>9. To protect and enhance landscape and seascape character and other protected features</p>	<p>Is it likely that the draft Drought Plan measure will have significant visual impacts?</p> <p>Will the draft Drought Plan measure avoid adverse effects on, and enhance where possible, the special qualities of protected/designated landscapes (including woodlands) or seascapes such as National Parks or AONBs?</p> <p>Will the draft Drought Plan measure help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness?</p>	0	-	<p>Effects of Construction</p> <p>This option would be sited within Snowdonia National Park, an area designated for its landscape character and beauty. However, no construction would be required and therefore no landscape or visual impacts are predicted.</p> <p>Overall, a neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>This option would result in Afon Llugwy exhibiting visually lower flows than under current conditions. While a reduction of flows by approximately 44% would be noticeable, during drought conditions when this option is in operation, lower flows within the Afon Llugwy would already be observed.</p> <p>The reduction of the compensation release will affect the landscape and visual amenity value within Reaches 1 and 2 by reducing flows by up to 44%. There are no public rights of way with views of the Afon Llugwy in close proximity to the watercourse, however, the right to roam (The Countryside and Rights of Way Act 2000) applies to the land in the study area. The reduction in compensation release will only be is both temporary and reversible.</p> <p>Whilst landscape and visual impacts associated with the operation of this option would be temporary and reversible, due to the location of the Afon Llugwy within the</p>

Objective	Key Questions	Relationship		Commentary
				<p>Snowdonia National Park, the option has been assessed as having a minor negative effect against this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None
<p>Summary</p>	<p>Effects of Construction</p> <p>The option does not involve the construction of any infrastructure and as such no effects are anticipated.</p> <p>Effects of Operation</p> <p>A significant negative effect (with some uncertainty) has been identified against objective 1 (biodiversity) reflecting a significant adverse impact on fish and an impact upon the conservation objectives of the Eryri and Afon Llugway SSSIs. The reduction in flow of 2Ml/d has also been identified as having a minor adverse effect for objective 3 (water) and objective 9 (landscape). The gain in deployable water output has led to the identification of a minor positive effect for objective 5 (human health) and the role of the option in improving drought resilience has also led to the identification of a minor positive against objective 4 (climate change).</p> <p>Mitigation</p> <p>There are several mitigation measures that are appropriate to address the effect on biodiversity, depending on the fish species being protected. The approaches include habitat enhancement, the removal of barriers to migration to enable recolonization and the gradual reduction of compensation flow.</p> <p>The hydro power licence holder may be able to claim compensation through the Water Resources Act 1991. Discussions will be held with the licence holder prior to the application for a drought order</p>			

8001-5 Reduction of Cefni Reservoir Compensation Water

Option Summary

Cefni Reservoir is a reservoir in North Wales which supplies drinking water as part of the North Eryri Ynys Mon WRZ. It lies in the centre of the Isle of Anglesey.

The option involves a proposed reduction in the statutory compensation release from Cefni Reservoir to the Afon Cefni of 0.9Ml/d, from 1.8Ml/d to 0.9Ml/d. Drought permits may remain in force for a period of up to six months, and they can be extended for up to a further six months. The period of implementation for this drought permit **would only** be July to December, as confirmed **with NRW and** by water resources modelling carried out by Welsh Water.

The option would make use of existing infrastructure and would not require construction of new infrastructure.

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity.</p>	<p>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs and priority habitats and species)?</p> <p>Will the draft Drought Plan measure protect and enhance non-designated sites and local biodiversity?</p> <p>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</p> <p>Will the draft Drought Plan measure affect the condition of ecosystems (including their connectivity, structure and functioning)?</p> <p>Will the draft Drought Plan measure enhance the adaptability of ecosystems?</p> <p>Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?</p>	<p>0</p>	<p>--/?</p>	<p>Effects of Construction</p> <p>The option would not require additional infrastructure and no effects on biodiversity from construction would occur. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>The Malltraeth Marsh SSSI is located approximately 500m from the Afon Cefni upstream of the tidal limit at Pentre Berw within the extensive flood plain area. The Marsh is especially important for its breeding bird community of lowland damp grassland, as a threatened habitat of wet meadows and for the botanical interest of its ditches and watercourses. Maintenance of low flows in the ditches is therefore important.</p> <p>The EAR has concluded that the operation of this option is likely to have minor, short term negative effects on this SSSI associated with the decrease in flows in the watercourse passing through the site. Impacts on pillwort, <i>Pilularia globulifera</i> and the macrophyte community associated with the SSSI, meanwhile, are expected to be minor during summer/autumn and negligible in winter. The EAR recommends that these species are monitored.</p> <p>The Afon Cefni flows through Dingle Local Nature Reserve (LNR) and forms Llyn Pwmp where the river is impounded by a weir. The EAR identifies that the implementation of this option is likely to have a major adverse impact on the fish community of the LNR during summer / autumn, including in respect of brook, river and sea lamprey (due to loss of spawning and juvenile habitat as a result of reduced river levels) and brown/sea trout and Atlantic salmon (due to loss of spawning and</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>juvenile habitats as well as delays and potential cessation of adult and smolt migrations associated with reduced flows).</p> <p>Due to the potential impacts on the Dingle LNR and fish species in particular, this option has been assessed (on a precautionary basis) as having a significant negative effect on this objective, although some uncertainty remains.</p> <p>Mitigation</p> <p>There are several mitigation measures that are appropriate. These are detailed in the EAR and include, inter alia, monitoring/surveys, targeted installation of woody debris features to provide fish with the habitat required to support feeding and development (growth), gravel washing of spawning areas and deployment of aeration equipment.</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>There remains uncertainty with regard to the exact timing/duration of the option's implementation and the scale/magnitude of effects on species including lamprey, brown trout and Atlantic salmon.</p>
<p>2. To ensure the appropriate and efficient use of land and protect and enhance soil quality and geodiversity.</p>	<p>Will additional land be required for the development or implementation of the option or will the option require below ground works leading to land sterilisation?</p> <p>Will the draft Drought Plan utilise previously developed land?</p> <p>Will the draft Drought Plan measure minimise the loss of best and most versatile agricultural land?</p> <p>Will the draft Drought Plan measure affect upland (peat-dominated) and other wetland soils?</p> <p>Will the draft Drought Plan measure protect and enhance protected sites designated for their</p>	0	-	<p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of this option, no effects from construction on land use, geology or soils would occur. A neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>This option would result in reduced water levels in Afon Cefni. According to the EAR, reductions of up to 50% in river flows with corresponding reductions in wetted depths/wetted widths (potential marginal habitats), during the period July to December are anticipated. Conceivably, this could lead to drying out of wetland soils adjacent to the river including those of the Malltraeth Marsh SSSI which contains 'wet' meadows, ditches and watercourses.</p> <p>For this reason, a minor negative effect is determined against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest?			None Uncertainty None
3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water Framework Directive	<p>Will the draft Drought Plan measure lead to a change in river flows, wetted width or river level?</p> <p>Will the draft Drought Plan measure affect surface water quality and quantity?</p> <p>Will the draft Drought Plan measure lead to changes in groundwater quality, quantity and recharge?</p> <p>Will the draft Drought Plan measure lead to the deterioration of Water Framework Directive (WFD) waterbody status (or potential) from, inter alia, changes in fluvial geomorphology?</p> <p>Will the draft Drought Plan measure jeopardise the achievement of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Water Framework Directive (WFD)?</p>	0	-	<p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of this option, no effects from construction on water quality or quality would occur. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>Cefni Reservoir and Afon Cefni have an ecological status classification of moderate (WFD Cycle 2 classification).</p> <p>The EAR has concluded that a reduction of compensation flow would reduce flows in the Afon Cefni with corresponding reductions in wetted depths/wetted widths during the summer and autumn period, particularly between the reservoir outflow and Llangefni Industrial Estate (hydrological reach 1) where flows could be reduced by up to 50%. Impacts are also predicted on water quality of the Afon Cefni (minor risk to dissolved oxygen and ammonia and moderate risk to soluble reactive phosphorous concentrations to support good or high status for fish and macroinvertebrates).</p> <p>Potential effects are anticipated on the Afon Cefni for effluent dilution from Llangefni WwTW into the Afon Cefni from approximately 4km downstream of the reservoir outflow. The current WFD status of the Afon Cefni could be affected beyond the point of effluent discharge from the Llangefni WwTW. The EAR highlights, however, that this would be temporary during the short-term implementation of the option (summer and autumn months). The EAR recommends that river flows and quality are monitored.</p> <p>The impact on Cefni Reservoir would be a marginal, temporary increase in levels/storage, relative to the position without the option, due to the reduced compensation flow. However, this benefit is considered negligible as the level of the reservoir would continue to decline (albeit as a reduced rate) as a drought progresses. The anticipated effect on Cefni Reservoir is therefore neutral.</p> <p>Due to the reduction in flows and potential impacts on water quality in the Afon Cefni, this option has been assessed as having a negative effect on this objective.</p> <p>Mitigation</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>None, though river flows and quality monitoring is recommended in the EAR.</p> <p>Assumptions None</p> <p>Uncertainty None</p>
<p>4. To limit the causes and potential consequences of climate change and to adapt to future changes</p>	<p>Will the draft Drought Plan measure reduce or minimise greenhouse gas emissions?</p> <p>Will the draft Drought Plan measure reduce vulnerability to the effects of climate change by appropriate adaptation?</p> <p>Will the draft Drought Plan measure increase environmental resilience to the effects of climate change including to impacts on water quality?</p> <p>Will the draft Drought Plan measure reduce or minimise air pollutant emissions?</p>	<p>0</p>	<p>+</p>	<p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of the option, no effects from construction would occur. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>This option involves the reduction in compensation flows released from the Cefni Reservoir to Afon Cefni. Water would be treated and distributed using existing infrastructure and energy consumed during the treatment process (and associated greenhouse gas emissions) are not considered to be significant compared to day to day operation of the WTW. No further energy consumption would arise from new infrastructure.</p> <p>UKCP18 climate change scenarios anticipate longer, hotter summers and, in turn, increases in both the frequency and duration of droughts. This option would provide Welsh Water with additional capacity to manage drought conditions and as such is considered to contribute towards climate change adaptation.</p> <p>Overall, this option has been assessed as having a minor positive effect on this objective.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>5. To protect and enhance human health with special regard to vulnerable groups in society</p>	<p>Will the draft Drought Plan measure ensure continuity of clean drinking water supply within statutory standards supply at times of drought?</p> <p>Will the draft Drought Plan measure affect the affordability of clean drinking water?</p> <p>Will the draft Drought Plan measure adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise levels)?</p> <p>Will the draft Drought Plan measures affect human health or the health of any vulnerable groups?</p> <p>Will the Drought Plan measure affect public access to, or enjoyment of, local green/blue space?</p> <p>Will the Drought Plan measure impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?</p>	0	+	<p>Effects of Construction</p> <p>There is no construction required for this option and therefore no effects are expected on water quality or clean drinking water supply. There would be no direct disturbance to local residents therefore a neutral effect on this objective is identified.</p> <p>Effects of Operation</p> <p>This option involves a decrease in statutory compensation release from Cefni Reservoir to the Afon Cefni of 0.9MI/d to conserve the longevity of reservoir storage for use in direct supply during a drought. The operation of this option will provide a gain in deployable output of 0.9MI/d within the NEYM resource zone, which will help to ensure that water supply is maintained during periods of drought. Those living, working or visiting the area are unlikely to be directly disturbed by the scheme.</p> <p>Llangefni WwTW discharges treated wastewater to the Afon Cefni. The EAR identified the reduction of the dilution and dispersion of this discharge in the Afon Cefni during operation of the option. The EAR highlights, however, that this would be temporary during the short-term implementation of the option (summer and autumn months). It is considered unlikely that this would result in changes to water quality such that statutory standards would be exceeded.</p> <p>Overall, this option has been assessed as having a minor positive effect on this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>
<p>6. To maintain and enhance the economic and social needs of the local community</p>	<p>Will the draft Drought Plan measure ensure sufficient water is available for people and visitors to maintain economic activity in times of drought?</p> <p>Will the draft Drought Plan measures affect local or regional economies?</p>	0	0	<p>Effects of Construction</p> <p>As there is no construction associated with this option, there will be no effect on the availability of water for people and visitors to maintain economic activity in times of drought. Further, it is not anticipated that the option would generate any economic benefits (e.g. job creation or investment in supply chains).</p> <p>Effects of Operation</p> <p>This option involves a decrease in statutory compensation release from Cefni Reservoir to the Afon Cefni of 0.9MI/d to conserve the longevity of reservoir storage</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	Will the draft Drought Plan measure affect opportunities for recreation at times of drought?			<p>for use in direct supply during a drought. This will help to meet the water supply needs of people and visitors to the area in times of drought; however, in accordance with the definitions of significance, the yield of the option is not considered significant.</p> <p>The Afon Cefni provides recreational opportunities, especially for walkers, bikers, anglers and boaters. The area also includes a Sustrans cycle route important for leisure and recreation in the area. The EAR has concluded that operation of the option will result in a significant reduction in surface water baseflow, wetted width and wetted depth which may influence water-dependent activities such as angling and canoeing. However, water levels will be naturally low in times of drought and the impacts will be temporary in nature. In consequence, the effect on recreational opportunities is anticipated to be negligible.</p> <p>Overall, the option has been assessed as having a neutral effect on this objective.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty None</p>
7. To promote the wise use of resources	<p>Will the draft Drought Plan measure seek to minimise the demand for additional raw materials?</p> <p>Will the draft Drought Plan measure seek to minimise energy consumption?</p> <p>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</p> <p>Will the draft Drought Plan measure encourage sustainable design or use of sustainable materials?</p>	0	0	<p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of the option, no effects from construction would occur. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>Under this option, water would be treated and distributed using existing infrastructure. Energy consumed during the treatment process is not considered to be significant compared to day to day operation of the WTW and no additional resources or infrastructure are required for implementation of the option. Overall, the option has therefore been assessed as having a neutral effect on this objective.</p> <p>Mitigation None</p> <p>Assumptions</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				None Uncertainty None
8. To conserve and enhance the cultural, historic and industrial heritage resource.	<p>Will the draft Drought Plan measure conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</p> <p>Will the draft Drought Plan measure avoid or minimise damage to archaeologically important sites?</p> <p>Will the draft Drought Plan measure avoid damage to important wetland areas with potential for paleoenvironmental deposits?</p>	0	0	<p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of the option, no effects from construction on heritage assets would occur. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>There are a number of Grade II listed buildings along the course of the Afon Cefni. There is also a scheduled monument in the vicinity of the Afon Cefni (Mynwent Y Llwyn pre-historic mound). A reduction in the flow of the Afon Cefni as a result of the operation of the option is not anticipated to have a detrimental effect on heritage assets as these contain no water dependant features and any effects on setting would be temporary and reversible. A neutral effect is therefore anticipated against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>
9. To protect and enhance landscape and seascape character and other protected features	<p>Is it likely that the draft Drought Plan measure will have significant visual impacts?</p> <p>Will the draft Drought Plan measure avoid adverse effects on, and enhance where possible, the special qualities of protected/designated landscapes (including woodlands) or seascapes such as National Parks or AONBs?</p>	0	0	<p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of the option, no landscape/visual effects from construction would occur. A neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>The EAR has concluded that the operation of this option would result in a reduction in flow in the Afon Cefni immediately downstream of the Cefni reservoir outfall and by a lesser proportion downstream of the Llangefni industrial estate. Flows during a drought will be low such that further reduction in flows due to the option would not</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	Will the draft Drought Plan measure help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness?			<p>result in a further loss of aesthetic value. No new structures will be built above-ground. The option is therefore not expected to affect landscape features or sites, and will not have significant visual impacts.</p> <p>On this basis, a neutral effect has been determined against this objective.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty None</p>
Summary	<p>Effects of Construction</p> <p>This option does not involve the construction of any additional infrastructure and as such no effects are anticipated.</p> <p>Effects of Operation</p> <p>This option will provide an additional water yield of 0.9 Ml/d to the wider area which has been assessed as having a minor positive effect on Objective 4 (climate change), as the option will reduce the vulnerability to the effects of climate change through appropriate adaptation, and Objective 5 (human health), as the option would help to secure drinking water supplies during periods of drought.</p> <p>A significant negative effect has been identified (on a precautionary basis) in respect of Objective 1 (biodiversity). This is due to the potential impacts of the option's operation on the Dingle LNR and fish species in particular, although some uncertainty remains. A minor negative effect, meanwhile, has been identified in respect of Objective 2 (soils) and Objective 3 (water) as the option will lead to a reduction in flows and wetted depth/width and is likely to impact on the water quality of the Afon Cefni. The anticipated effects against all other objectives are neutral.</p> <p>Mitigation</p> <p>With regard to adverse effects on biodiversity, there are several mitigation measures that are appropriate. These are detailed in the EAR and include, inter alia, monitoring/surveys, targeted installation of woody debris features to provide fish with the habitat required to support feeding and development (growth), gravel washing of spawning areas and deployment of aeration equipment.</p>			

8012-2 Reduction of the regulation release from Aled Isaf and modification of the Hands Off Flow value at Bryn Aled

Option Summary

The Llyn Aled and Aled Isaf reservoirs are located in the county of Conwy, North Wales, to the south-west of the Clwyd Coastal Water Resource Zone (WRZ).

This option involves a proposed reduction of 2MI/d in the regulation release rate from Aled Isaf Reservoir whenever abstraction is taking place and residual flow at Bryn Aled is below 29.5MI/d. This would conserve the longevity of total reservoir storage for regulation releases to the Afon Aled for abstraction at the Bryn Aled intake.

Drought actions and any future application for a drought permit would be managed by the Aled and Clwyd Consultative Group which would be convened under the terms of the Section 20 Operating Agreement with NRW.

Drought permits can be granted for a period of up to six months, and they can be extended for up to a further six months. However, the period of implementation for this drought order **would only** be September to January, as confirmed **with NRW and** by water resources modelling carried out by Welsh Water. "

Construction required for this option is not specified in the EAR. It is assumed however that no additional construction of infrastructure would be required, as outflows of the reservoirs and intakes at Bryn Aled are already in place. This option simply alters the operation of these.

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity.</p>	<p>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs and priority habitats and species)?</p> <p>Will the draft Drought Plan measure protect and enhance non-designated sites and local biodiversity?</p> <p>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</p> <p>Will the draft Drought Plan measure affect the condition of ecosystems (including their connectivity, structure and functioning)?</p>	0	-	<p>Effects of Construction</p> <p>No construction is required for this option. A neutral effect has therefore been determined.</p> <p>Effects of Operation</p> <p>The Afon Aled flows into the Coed Nant-y-Merddyn-Uchaf Site of Special Scientific Interest (SSSI), Mnydd Hiraethog SSSI and Coed Llys Aled SSSI.</p> <p>The HRA states "<i>The ultimate downstream receptor for this option is the Liverpool Bay / Bae Lerpwl SPA, which covers the offshore areas at Rhyl. However, the operation of the option will have no notable effects on flows from the confluence of the Afon Aled and the larger Afon Elwy, and hydrological changes would be essentially undetectable at the site boundary; in addition, the features of this site will not be particularly sensitive or exposed to any effects associated with changes in freshwater flows from the Afon Elwy. On this basis no significant effects will occur.</i>"</p> <p>The Coed Llys Aled SSSI and Coed Nant-Y-Merddyn-Ucaf SSSI have been designated for the area of mixed deciduous woodland developed on the steep valley sides of the Afon Aled and / or Afon Hyrdd. These woodland sites represent one of the best examples in Clwyd of a woodland-type occurring mainly in Scotland, Wales and Northern England at medium altitudes and under medium rainfall conditions.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	<p>Will the draft Drought Plan measure enhance the adaptability of ecosystems?</p> <p>Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?</p>			<p>The Mynydd Hiraethog SSSI has been designated for a number of habitats and species including: sub-montane heather heath, acidic blanket bog, natural oligotrophic lakes and a diverse upland bird assemblage.</p> <p>The proposed reduction in the required regulation release rate from Aled Isaf Reservoir to the Afon Aled has the potential to influence flows and wetted width / depth in the Afon Aled and impact the downgradient receptors Coed Llys Aled SSSI, Coed Nant-Y-Merddyn-Ucaf SSSI and Mynydd Hiraethog SSSI and habitat availability.</p> <p>The impacts of the option on designated sites has been assessed in the EAR which states that</p> <ul style="list-style-type: none"> • Although the Coed Llys Aled SSSI is adjacent to the Afon Aled the designated features of the site do not rely on specific water levels in the river and there is no hydrological connectivity between the waterbodies and the surrounding SSSI. It therefore concludes that implementation of the option would have negligible impacts on the designated features of the SSSI; • The woodland habitat present in the Coed Nant-y-Merddyn-Uchaf SSSI is not dependent on the Afon Aled and therefore not susceptible to impacts arising from the implementation of the option. Impacts to the designated features of the SSSI are assessed as negligible; • Although there are several bird species that could utilise open water or the reservoir margins none of these species rely on specific water levels for any life cycle stage and so a minor fluctuation would have no impact. The notable bryophytes at the site are typically associated with base rich wet flushes and fens so are susceptible to changes in water level but are not dependent on the Afon Aled or reservoirs. Impacts to the designated features of the SSSI are therefore assessed as negligible. <p>On this basis impacts on designated sites are anticipated to be neutral.</p> <p>The hydrological impact of the option on the two Aled catchment reservoirs and three downstream Afon Aled reaches has been considered in the EAR. This indicates that there is a minor beneficial impact of the option on the reservoirs, and the impact on the three river reaches ranges from minor to moderate (September) and from negligible to minor (October - January).</p> <p>Community / notable species assessment in the AER indicates that implementation of the option will result in negligible to minor impacts on the macrophyte community, minor impacts on the macroinvertebrate community, negligible to minor (Atlantic salmon and brown/sea trout, Bullhead, lamprey, European eel and other species) to moderate (Atlantic salmon and brown/sea trout, European eel and lamprey) impacts on fish community and negligible to minor impacts on phytobenthos community.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>Overall, a minor negative effect is determined against this objective in recognition of the anticipated minor to moderate impacts on community / notable species in the Afon Aled.</p> <p>Mitigation</p> <p>Monitoring of the fish community in the Afon Aled is recommended in the EAR. Mitigation measures identified in the EAR include:</p> <ul style="list-style-type: none"> • Temporary reduction or cessation of the terms of the option; • Fish distress monitoring with triggers and response plan; • Protection of 'spate flows'; • Reduce fish predation; • temporary physical in-river works such as channel narrowing or provision of refugia; • use other sources of water to provide compensation flows within surface water courses to temporarily mitigate the impact of the option; • Provision of alternative water supplies. <p>Assumptions None</p> <p>Uncertainty None</p>
<p>2. To ensure the appropriate and efficient use of land and protect and enhance soil quality and geodiversity.</p>	<p>Will additional land be required for the development or implementation of the option or will the option require below ground works leading to land sterilisation?</p> <p>Will the draft Drought Plan utilise previously developed land?</p> <p>Will the draft Drought Plan measure minimise the loss of best and most versatile agricultural land?</p> <p>Will the draft Drought Plan measure affect upland (peat-dominated) and other wetland soils?</p> <p>Will the draft Drought Plan measure protect and enhance protected sites designated for their</p>	0	0	<p>Effects of Construction</p> <p>No construction is required for this option. A neutral effect has therefore been determined.</p> <p>Effects of Operation</p> <p>The Soilscape viewer (http://www.landis.org.uk/soilscapes/) shows that soils in the valley of the Afon Aled comprise very acid loamy upland soils with a wet peaty surface near the outflow, freely draining acid loamy soils over rock about 0.5 km downstream of the outflow and freely draining slightly acid loamy soils about 6 km downstream of the outflow.</p> <p>The proposed reduction in the required regulation release rate from Aled Isaf Reservoir to the Afon Aled has the potential to influence flows and wetted width / depth in the Afon Aled. Impact is likely to be more severe in shallower sections of the river channel. Impacts on wetted width / wetted depth are assessed in the EAR as minor for summer and negligible to minor in the winter.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest?			<p>In the absence of any designated wetland sites or upland soils near Afon Aled (except for localised area upland soils near the outflow) a neutral effect has been determined against this objective.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty None</p>
<p>3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water Framework Directive</p>	<p>Will the draft Drought Plan measure lead to a change in river flows, wetted width or river level?</p> <p>Will the draft Drought Plan measure affect surface water quality and quantity?</p> <p>Will the draft Drought Plan measure lead to changes in groundwater quality, quantity and recharge?</p> <p>Will the draft Drought Plan measure lead to the deterioration of Water Framework Directive (WFD) waterbody status (or potential) from, inter alia, changes in fluvial geomorphology?</p> <p>Will the draft Drought Plan measure jeopardise the achievement of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Water Framework Directive (WFD)?</p>	0	-	<p>Effects of Construction</p> <p>No construction is required for this option. A neutral effect has therefore been determined.</p> <p>Effects of Operation</p> <p>Afon Aled (waterbodies GB110066054930 Aled - above Deunant and GB110066059770 Aled - Elwy to Deunant) is a heavily modified water body with an ecological status of 'good' (WFD Cycle 2 classification).</p> <p>The proposed reduction in the required regulation release rate from Aled Isaf Reservoir to the Afon Aled has the potential to influence flows and water quality in the Afon Aled and impact on the WFD status of the local waterbodies.</p> <p>The hydrological impact of the option on the two Aled catchment reservoirs and three downstream Afon Aled reaches has been considered in the EAR. This indicates that:</p> <ul style="list-style-type: none"> • There is a marginal increase in levels / storage in Llyn Aled, relative to the position without the option. This is considered as a small beneficial impact; • The impact on the three river reaches ranges from minor to moderate (reduction in flows of up to 15% and 19% as Q_{99}, respectively) in the summer; • The impact on the three river reaches ranges from negligible to minor (reduction in flows of up to 9% to 17% as Q_{99}, respectively) in the winter. <p>The WFD status assessment in the EAR concluded that:</p> <ul style="list-style-type: none"> • The option will result in a negligible risk of short-term deterioration in status of the macrophyte and phytobenthos component of the WFD waterbody

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>Aled - above Deunant. The WFD waterbody Aled - Elwy to Deunant will be at minor risk of short term deterioration;</p> <ul style="list-style-type: none"> • There is a minor risk of short-term deterioration in status of the macroinvertebrate component of the WFD waterbody Aled - above Deunant. In addition, there is a minor risk of short term deterioration of the macroinvertebrate component of the WFD waterbody Elwy to Deunant. • The fish component of the WFD waterbody Aled - Elwy to Deunant is considered to be at moderate risk of short-term deterioration. <p>Assessment of risk of water quality deterioration as a result of the option has been undertaken in the EAR. The risk of water quality deterioration linked to total ammonia and dissolved oxygen is assessed as low for Reach 1 and Reach 3 and assumed low for Reach 2. The risk of water quality deterioration linked to soluble reactive phosphorus concentration is assessed as low for Reach 1, medium for Reach 3 and assumed medium for Reach 2.</p> <p>Implementation of the option may increase deposition of fine grained sediment, especially in areas of pooling, whether natural or behind weirs. The risk is assessed in the EAR as negligible for all the reaches during summer and winter, as there are no areas of natural pooling or weirs within the channel. Furthermore, the high gradients and upland nature of the reaches will allow finer grained material to be transported during a drought. Therefore impacts on geomorphology are anticipated to be negligible.</p> <p>A minor negative effect has been determined against this objective in recognition of the predicted impacts on Afon Aled (negligible to moderate impacts on river flows. low to medium risk of water quality deterioration and negligible to moderate risk of short term deterioration in WFD status).</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>4. To limit the causes and potential consequences of climate change and to adapt to future changes</p>	<p>Will the draft Drought Plan measure reduce or minimise greenhouse gas emissions?</p> <p>Will the draft Drought Plan measure reduce vulnerability to the effects of climate change by appropriate adaptation?</p> <p>Will the draft Drought Plan measure increase environmental resilience to the effects of climate change including to impacts on water quality?</p> <p>Will the draft Drought Plan measure reduce or minimise air pollutant emissions?</p>	0	+	<p>Effects of Construction</p> <p>No construction is required for this option. A neutral effect has therefore been determined.</p> <p>Effects of Operation</p> <p>Energy requirements and carbon emission have not been quantified by Welsh Water for any options at this stage and therefore a qualitative assessment has been made based on the infrastructure required to implement this option.</p> <p>This option will involve altering the release from Aled Isaf, which is gravity fed, and therefore requires no energy consumption. The abstraction pumping at Bryn Aled may also be altered during operation, but this would not require any additional energy consumption compared to current operation.</p> <p>UKCP18 climate change scenarios anticipate longer hotter summers and in turn and in both the frequency and duration of droughts. This option would provide Welsh Water with additional capacity to manage drought conditions and as such is considered to contribute towards climate change adaptation.</p> <p>A minor positive effect (in recognition of the role of the option in improving drought resilience) has been determined against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>
<p>5. To protect and enhance human health with special regard to vulnerable groups in society</p>	<p>Will the draft Drought Plan measure ensure continuity of clean drinking water supply within statutory standards supply at times of drought?</p> <p>Will the draft Drought Plan measure affect the affordability of clean drinking water?</p> <p>Will the draft Drought Plan measure adversely affect human health by resulting in increased</p>	0	+	<p>Effects of Construction</p> <p>No construction is required for this option. A neutral effect has therefore been determined.</p> <p>Effects of Operation</p> <p>This option will provide a further 2 Ml/d of drinking water, which will help to meet the water needs of society.</p> <p>A minor positive effect has been determined against this objective, recognising the gain in deployable water output.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	<p>nuisance and disruption (e.g. as a result of increased noise levels)?</p> <p>Will the draft Drought Plan measures affect human health or the health of any vulnerable groups?</p> <p>Will the Drought Plan measure affect public access to, or enjoyment of, local green/blue space?</p> <p>Will the Drought Plan measure impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?</p>			<p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>
<p>6. To maintain and enhance the economic and social needs of the local community</p>	<p>Will the draft Drought Plan measure ensure sufficient water is available for people and visitors to maintain economic activity in times of drought?</p> <p>Will the draft Drought Plan measures affect local or regional economies?</p> <p>Will the draft Drought Plan measure affect opportunities for recreation at times of drought?</p>	<p>0</p>	<p>0/-</p>	<p>Effects of Construction</p> <p>No construction is required for this option. A neutral effect has therefore been determined.</p> <p>Effects of Operation</p> <p>This option will provide an additional yield of 2 Ml/d, which will help to meet the needs of homes, businesses and visitors to this area, helping to support the local and regional economy. This is assessed as a neutral effect according to the definitions of significance used in this assessment.</p> <p>The upper catchment of Afon Aled lies within the Mynydd Hiraethog area and its upland moorland with steep valleys. The open moorlands and lakes are attractive to walking enthusiasts. Land use within the less fertile upper reaches of Afon Aled is predominantly mixed livestock with dairy farming in the lower reaches. Moderate access is provided by footpath and road to the reservoir. Llyn Aled and Aled Isaf reservoirs are popular locations for recreational fishing.</p> <p>The impact on river flows in the Afon Aled as assessed in the EAR ranges from minor to moderate in the summer (reduction in flows of up to 15% and 19% as Q99, respectively) and from negligible to minor in the winter (reduction in flows of up to 9% to 17% as Q99, respectively). Impacts on wetted width / wetted depth in the Afon Aled channel are assessed in the AER as minor for summer and winter in Reach 1, minor in summer and negligible in winter in Reach 2 and minor in summer and winter in Reach 3 (it is noted that the location of the shallower sections of channel are unknown). Changes to water levels and wetted width in the Afon Aled directly affect fishing and visual amenity value, although this will only be temporary and will improve once the drought has passed. The hydrological impact on Llyn Aled and</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>Aled Isaf reservoirs has been assessed as minor beneficial, and as such no impact on recreational fishing in Llyn Aled and Aled Isaf is anticipated.</p> <p>A neutral to minor negative effect (in recognition of the impact on Afon Aled's fishing use and visual amenity value associated with reduced flows and wetted with / depth) has been determined against this objective, but recognises the uncertainty in extent and significance of this.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty Limited data available to assess impacts of reduced flows and wetted width / depth on recreational activities.</p>
7. To promote the wise use of resources	<p>Will the draft Drought Plan measure seek to minimise the demand for additional raw materials?</p> <p>Will the draft Drought Plan measure seek to minimise energy consumption?</p> <p>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</p> <p>Will the draft Drought Plan measure encourage sustainable design or use of sustainable materials?</p>	0	0	<p>Effects of Construction No construction is required for this option. A neutral effect has therefore been determined.</p> <p>Effects of Operation This option will involve altering the release from Aled Isaf, which is gravity fed, and therefore requires no energy consumption. The abstraction pumping at Bryn Aled may also be altered during operation, but this would not require any additional energy consumption compared to current operation. No additional resources are required to operate this option, as all infrastructure is already in place.</p> <p>A neutral effect has therefore been determined against this objective.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>8. To conserve and enhance the cultural, historic and industrial heritage resource.</p>	<p>Will the draft Drought Plan measure conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</p> <p>Will the draft Drought Plan measure avoid or minimise damage to archaeologically important sites?</p> <p>Will the draft Drought Plan measure avoid damage to important wetland areas with potential for paleoenvironmental deposits?</p>	0	0	<p>Effects of Construction</p> <p>No construction is required for this option. A neutral effect has therefore been determined.</p> <p>Effects of Operation</p> <p>There are a small number of heritage features along Afon Aled. These include Grade II Listed Buildings Church of St Sannan, Lychgate at the Church of St Sannan and road bridges Pont Nant Mostyn and Pont-yr-Aled.</p> <p>The impact on river flows in the Afon Aled as assessed in the EAR ranges from minor to moderate in the summer (reduction in flows of up to 15% and 19% as Q99, respectively) and from negligible to minor in the winter (reduction in flows of up to 9% to 17% as Q99, respectively). However there are no water dependant features in the heritage sites closest to Afon Aled and therefore no material impact on heritage features are anticipated.</p> <p>A neutral effect is therefore anticipated against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>
<p>9. To protect and enhance landscape and seascape character and other protected features</p>	<p>Is it likely that the draft Drought Plan measure will have significant visual impacts?</p> <p>Will the draft Drought Plan measure avoid adverse effects on, and enhance where possible, the special qualities of protected/designated landscapes (including woodlands) or seascapes such as National Parks or AONBs?</p> <p>Will the draft Drought Plan measure help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g.</p>	0	0/-	<p>Effects of Construction</p> <p>No construction is required for this option. A neutral effect has therefore been determined.</p> <p>Effects of Operation</p> <p>The study area is located in the Conwy Uplands Cultural landscape area and the Mynydd Hiraethog Cultural landscape area.</p> <p>The option does not require new above ground infrastructure. The impact on river flows in the Afon Aled as assessed in the EAR ranges from minor to moderate in the summer (reduction in flows of up to 15% and 19% as Q99, respectively) and from negligible to minor in the winter (reduction in flows of up to 9% to 17% as Q99, respectively). Changes to water levels and wetted width in the Afon Aled may be visible by those living, working or involved in recreational activities but the extent of this is unknown. However, flows during drought conditions will naturally be low. The hydrological impact on Llyn Aled and Aled Isaf reservoirs has been assessed as</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	woodlands) and avoid the loss of landscape features and local distinctiveness?			<p>minor beneficial, and as such no impact on landscape features in Llyn Aled and Aled Isaf is anticipated. Therefore, impacts on landscape features are assessed in the EAR as negligible although based on limited data.</p> <p>A neutral / minor negative effect has been determined against this objective due to the potential visual change in Afon Aled flows (which may be noticeable by those living, working or involved in recreational activities), but recognises the uncertainty in extent and significance of this.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty Extent of change in Afon Aled wetted width.</p>
Summary	<p>Effects of Construction No construction is required for this option. A neutral effect has therefore been determined against all objectives.</p> <p>Effects of Operation Minor positive effects are determined against objective 5 (human health) due to yield of this option, which will help to meet the water needs of residents, businesses and visitors to the area. A minor positive effect (in recognition of the role of the option in improving drought resilience) has been determined against objective 4 (climate change). A minor negative effect is determined against objective 1 (biodiversity) in recognition of the anticipated minor to moderate impacts on community / notable species in the Afon Aled.</p> <p>Minor negative effects are determined against objective 3 (water) due to the ecological effects of decreased flows in Afon Aled. Neutral to minor negative effects are determined for objective 6 (economy) and objective 9 (landscape) due to impacts on visual amenity and fishing amenity of the Afon Aled. The neutral element of this effect recognises the uncertainty of the extent and significance this change in flows will have. The anticipated effects against all other objectives are neutral.</p> <p>Mitigation None</p>			

8012-4 Relaxation of the annual licences on Afon Aled and the Plas Uchaf and Dolwen reservoirs

Option Summary

The drought permit involves a relaxing the annual licence conditions on the Bryn Aled intake and Plas Uchaf and Dolwen Reservoir abstraction, to enable Welsh Water to abstract from the Aled catchment at high demands of up to the daily licensed maximum rates, to meet higher than usual demands in drought conditions.

Drought permits can be granted for a period of up to six months, and they can be extended for up to a further six months. However, the period of implementation for this drought order would only be November to March, as confirmed with NRW and by water resources modelling carried out by Welsh Water.

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity.</p>	<p>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs and priority habitats and species)?</p> <p>Will the draft Drought Plan measure protect and enhance non-designated sites and local biodiversity?</p> <p>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</p> <p>Will the draft Drought Plan measure affect the condition of ecosystems (including their connectivity, structure and functioning)?</p> <p>Will the draft Drought Plan measure enhance the adaptability of ecosystems?</p> <p>Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?</p>	<p>0</p>	<p>+/--/?</p>	<p>Effects of Construction</p> <p>The option would require no additional construction to take place to the existing reservoir and no effects on biodiversity are predicted. In consequence, a neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>The operation of this option involves relaxing the annual licence conditions on the Bryn Aled intake and Plas Uchaf and Dolwen Reservoir abstraction which would result in a decrease in water levels in the Llyn Aled, Aled Isaf, Dolwen and Plas Uchaf reservoirs by the end of the year ranging from 23-71%. The continued regulation releases to support downstream abstractions during low flow periods would increase flows in Reach 1 (downstream of Aled Isaf Reservoir) and Reach 2 (downstream of Afon Deunant). Continued abstraction from Bryn Aled intake could reduce flows in Reach 3 (downstream of Bryn Aled) by up to 43.4%. Flows in Reach 4 (downstream of Dolwen Reservoir) and Reach 5 (downstream of Plas Uchaf Reservoir) would be unaffected.</p> <p>The HRA notes that “<i>The ultimate downstream receptor for this option is the Liverpool Bay / Bae Lerpwl SPA, which covers the offshore areas at Rhyl. However, the operation of the option will have no notable effects on flows from the confluence of the Afon Aled and the larger Afon Elwy, and hydrological changes would be undetectable at the site boundary; in addition, the features of this sites will not be particularly sensitive or exposed to any effects associated with changes in flows from the Afon Elwy.</i>”</p> <p>The EAR completed for this option has concluded that implementation of the drought permit would not result in likely significant effects on any designated features of the Mynydd Hiraethog SSSI or the Coed Nant y Merddyn uchaf SSSI.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>Within the affected reservoirs the EAR has identified the potential for a major adverse effects on macrophytes as a result of reduced habitat suitability due to reduced water level and the encroachment of terrestrial or marginal vegetation into areas of shoreline exposed by reduced water levels. Moderate effects are identified for macroinvertebrates, brown trout, rainbow trout and coarse fish populations.</p> <p>The EAR has identified minor positive effects in Reach 1 for fish species, macroinvertebrates and macroinvertebrates associated with the anticipated increase in flows. A minor adverse impact is identified for Atlantic Salmon/Sea Trout as a result of a reduced water quality. The reduction in flow in Reach 3 is identified as having a moderate adverse impact on Atlantic Salmon/Sea Trout, Bullhead and other fish species. Minor benefits are anticipated for macroinvertebrates, macrophytes, and phytobenthos within Reach 4. No effect on any species are identified for Reach 5. However, the likelihood of these impacts occurring and their exact magnitude is dependent on the timing/duration of the option's implementation and the extent of any habitat affected.</p> <p>Due to the potential for major impacts on macrophytes within the affected reservoirs, moderate impacts on fish species in Reach 3 along with the potential for minor beneficial effects on a range of species within the affected reaches, this option has been assessed (on a precautionary basis) as having a mixed minor positive / significant negative effect on this objective, although some uncertainty remains.</p> <p>Mitigation</p> <p>There are several mitigation measures that are appropriate, depending on the fish species being protected. The approaches include the temporary reduction or cessation of this option and temporary measures to reduce fish predation.</p> <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • There remains uncertainty with regard to the timing/duration of the option's implementation and the scale/magnitude of effects on species.

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>2. To ensure the appropriate and efficient use of land and protect and enhance soil quality and geodiversity.</p>	<p>Will additional land be required for the development or implementation of the option or will the option require below ground works leading to land sterilisation?</p> <p>Will the draft Drought Plan utilise previously developed land?</p> <p>Will the draft Drought Plan measure minimise the loss of best and most versatile agricultural land?</p> <p>Will the draft Drought Plan measure affect upland (peat-dominated) and other wetland soils?</p> <p>Will the draft Drought Plan measure protect and enhance protected sites designated for their geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest?</p>	0	0	<p>Effects of Construction</p> <p>The option requires no construction and therefore its implementation is not expected to result in any effects on land use or upland or wetland soils.</p> <p>Effects of Operation</p> <p>The operation of this option would maintain flows downstream of the affected reservoirs in Reaches 1, 2, 4 and 5. Consequently, no effect is anticipated. Flows within Reach 3 (downstream of Bryn Aled) will be reduced with a consequent reduction in wetted width and depth. Conceivably, this could lead to drying out of wetland soils adjacent to the river. However, there are no designated wetland sites or upland soils near the river and consequently a neutral effect has been identified.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None
<p>3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water Framework Directive</p>	<p>Will the draft Drought Plan measure lead to a change in river flows, wetted width or river level?</p> <p>Will the draft Drought Plan measure affect surface water quality and quantity?</p> <p>Will the draft Drought Plan measure lead to changes in groundwater quality, quantity and recharge?</p> <p>Will the draft Drought Plan measure lead to the deterioration of Water Framework Directive (WFD) waterbody status (or potential) from, inter alia, changes in fluvial geomorphology?</p> <p>Will the draft Drought Plan measure jeopardise the achievement of good surface water status or of good ecological potential and good surface</p>	0	--	<p>Effects of Construction</p> <p>The option requires no construction and therefore will not lead to a change in river flows, surface water or groundwater quantity.</p> <p>For the same reason, no effects on water quality or on WFD status are expected.</p> <p>Effects of Operation</p> <p>The operation of this option involves relaxing the annual licence conditions on the Bryn Aled intake and Plas Uchaf and Dolwen Reservoir abstraction which would result in a decrease in water levels in the Llyn Aled, Aled Isaf, Dolwen and Plas Uchaf reservoirs by the end of the year ranging from 23-71%. The continued regulation releases to support downstream abstractions during low flow periods would increase flows in Reach 1 (downstream of Aled Isaf Reservoir) and Reach 2 (downstream of Afon Deunant). Continued abstraction from Bryn Aled intake could reduce flows in Reach 3 (downstream of Bryn Aled) by up to 43.4%. Flows in Reach 4 (downstream of Dolwen Reservoir) and Reach 5 (downstream of Plas Uchaf Reservoir) would be unaffected.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	water chemical status by the date laid down by the Water Framework Directive (WFD)?			<p>The EAR identifies a moderate risk to water quality for the four affected reservoirs as a result of the risk to levels of dissolved oxygen. A minor risk to dissolved oxygen has also been identified for Reach 2 (downstream of Afon Deunant).</p> <p>The EAR has concluded that there is a minor to moderate impact on flows in the Afon Aled as a result of implementing the drought permit. Impacts on the Aled Isaf, Llyn Aled, Dolwen Reservoir and Plas Uchaf Reservoir have been assessed as major. These hydrological impacts are assessed as leading to major impacts on the physical environment of the river, including water quality.</p> <p>Overall, a significant negative effect has been identified for this option.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None
4. To limit the causes and potential consequences of climate change and to adapt to future changes	<p>Will the draft Drought Plan measure reduce or minimise greenhouse gas emissions?</p> <p>Will the draft Drought Plan measure reduce vulnerability to the effects of climate change by appropriate adaptation?</p> <p>Will the draft Drought Plan measure increase environmental resilience to the effects of climate change including to impacts on water quality?</p> <p>Will the draft Drought Plan measure reduce or minimise air pollutant emissions?</p>	0	+	<p>Effects of Construction</p> <p>The implementation of this option will not require any construction, therefore a neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>Operational energy requirements and associated carbon emissions have not been quantified by Welsh Water for any options at this stage and therefore a qualitative assessment has been made based on the infrastructure required to implement this option.</p> <p>This option will involve a change to the release rate from the reservoirs, which is assumed to be by gravity and penstock arrangement. Water would be treated through existing treatment works and infrastructure. Energy required for treatment and distribution would therefore be unchanged from current operation and no additional emissions of greenhouse gases are anticipated.</p> <p>UKCP18 climate change scenarios anticipate longer, hotter summers and, in turn, increases in both the frequency and duration of droughts. This option would provide Welsh Water with additional capacity to manage drought conditions and as such is considered to contribute towards climate change adaptation.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>Overall, this option has been assessed as having a minor positive effect on this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None
<p>5. To protect and enhance human health with special regard to vulnerable groups in society</p>	<p>Will the draft Drought Plan measure ensure continuity of clean drinking water supply within statutory standards supply at times of drought?</p> <p>Will the draft Drought Plan measure affect the affordability of clean drinking water?</p> <p>Will the draft Drought Plan measure adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise levels)?</p> <p>Will the draft Drought Plan measures affect human health or the health of any vulnerable groups?</p> <p>Will the Drought Plan measure affect public access to, or enjoyment of, local green/blue space?</p> <p>Will the Drought Plan measure impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?</p>	0	+	<p>Effects of Construction</p> <p>The implementation of this option will not require any construction, therefore a neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>The operation of this option will provide a gain in deployable output of 5MI/d within the Clwyd Coastal resource zone, which will help to ensure that water supply is maintained during periods of drought. Those living, working or visiting the area are unlikely to be directly disturbed by the scheme. Consistent with the definitions of significance, this option has been assessed as a minor effect; however, it is noted that the yield of this option (5 MI/d) is at the limit value for a minor effect.</p> <p>Overall, this option has been assessed as having a minor positive effect on this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
6. To maintain and enhance the economic and social needs of the local community	<p>Will the draft Drought Plan measure ensure sufficient water is available for people and visitors to maintain economic activity in times of drought?</p> <p>Will the draft Drought Plan measures affect local or regional economies?</p> <p>Will the draft Drought Plan measure affect opportunities for recreation at times of drought?</p>	0	+	<p>Effects of Construction</p> <p>As there is no construction associated with this option, there will be no effect on the availability of water for people and visitors to maintain economic activity in times of drought. Further, it is not anticipated that the option would generate any economic benefits (e.g. job creation or investment in supply chains).</p> <p>Effects of Operation</p> <p>This option will provide an additional yield of 5 Ml/d of deployable output. This would help to meet the water supply needs of homes, businesses and visitors in the area during periods of drought, supporting the local and regional economy and in accordance with the definitions of significance a minor positive effect is anticipated.</p> <p>Impacts on recreational activities including angling, canoeing, walking resulting from changes in the flow rates of the affected reaches or the water levels within the affected reservoirs are not anticipated over those from the natural drought conditions.</p> <p>Overall, this option has been assessed as having a minor positive effect on this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None
7. To promote the wise use of resources	<p>Will the draft Drought Plan measure seek to minimise the demand for additional raw materials?</p> <p>Will the draft Drought Plan measure seek to minimise energy consumption?</p> <p>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</p>	0	0	<p>Effects of Construction</p> <p>This option will not require the use of raw materials as it will make use of existing infrastructure. A neutral effect has therefore been identified against this objective.</p> <p>Effects of Operation</p> <p>During operation, this option will not require any additional energy consumption or use of any additional materials. As such, a neutral effect has been determined against this objective.</p> <p>Mitigation</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	Will the draft Drought Plan measure encourage sustainable design or use of sustainable materials?			<ul style="list-style-type: none"> None Assumptions <ul style="list-style-type: none"> None Uncertainty <ul style="list-style-type: none"> None
8. To conserve and enhance the cultural, historic and industrial heritage resource.	<p>Will the draft Drought Plan measure conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</p> <p>Will the draft Drought Plan measure avoid or minimise damage to archaeologically important sites?</p> <p>Will the draft Drought Plan measure avoid damage to important wetland areas with potential for paleoenvironmental deposits?</p>	0	0	<p>Effects of Construction</p> <p>This option does not involve a construction phase, therefore a neutral effect has been assigned.</p> <p>Effects of Operation</p> <p>No effects on historic assets are anticipated within Reach 1 and Reach 2, where flows would be maintained by the operation of this option. Nor are effects anticipated within Reaches 4 and 5, where flows are unaffected. Reduction in the water level of the four affected lakes would not be anticipated to have an adverse effect on any nearby historic assets.</p> <p>The reduction in flow in Reach 3 could potentially affect the Pont-y-Gwyddel bridge, a Grade II listed building; however, any effect in this regard would be temporary and reversible and in consequence, is considered to be negligible.</p> <p>Overall, this option has been assessed as having a neutral effect on this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> None <p>Assumptions</p> <ul style="list-style-type: none"> None <p>Uncertainty</p> <ul style="list-style-type: none"> None

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>9. To protect and enhance landscape and seascape character and other protected features</p>	<p>Is it likely that the draft Drought Plan measure will have significant visual impacts?</p> <p>Will the draft Drought Plan measure avoid adverse effects on, and enhance where possible, the special qualities of protected/designated landscapes (including woodlands) or seascapes such as National Parks or AONBs?</p> <p>Will the draft Drought Plan measure help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness?</p>	0	0	<p>Effects of Construction</p> <p>No construction would be required and therefore no landscape or visual impacts are predicted.</p> <p>Overall, a neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>Whilst the reduction in water levels within the affected reservoirs could affect the visual aesthetic of the local landscape, the water levels would already be low as a result of drought conditions and any landscape and visual impacts associated with the operation of this option would be temporary and reversible.</p> <p>Overall, a neutral effect has been identified for this option.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None
<p>Summary</p>	<p>Effects of Construction</p> <p>The option does not involve the construction of any infrastructure and as such no effects are anticipated.</p> <p>Effects of Operation</p> <p>A mixed minor positive / significant negative effect (with some uncertainty) has been identified against objective 1 (biodiversity) reflecting a significant adverse impact macrophytes within the four affected reservoirs and the potential for beneficial effects on a range of species within the affected reaches. The reduction in flow has been assessed as having a significant negative adverse effect for objective 3 (water) as a result of the effects on water quantity and quality. The role of the option in improving drought resilience has led to the identification of a minor positive against objective 4 (climate change). The gain in deployable water output has led to a minor positive effect for objective 5 (human health) and for objective 6 (community).</p> <p>Mitigation</p> <p>There are several mitigation measures that are appropriate, depending on the fish species being protected. The approaches include the temporary reduction or cessation of this option and temporary measures to reduce fish predation.</p>			

8012-5 Relaxation of the Llanerch boreholes annual licence

Option Summary

The drought permit involves a change in the abstraction licence at Llanerch through a temporary cessation of the annual abstraction rate condition. The maximum daily abstraction rate of 13.64MI/d would still be applicable. The average daily abstraction that would be permissible within 12 months would be raised by 4.3MI/d from 9.34MI/d to 13.64MI/d. This would provide a modest increase in water resource during a drought and increase the security of supply in the Clwyd Coastal WRZ by assisting post-drought winter refill of the Aled Reservoirs, by reducing demand from that resource.

Drought permits may remain in force for a period of up to six months, and they can be extended for up to a further six months. However, the period of implementation for this drought permit **would only** be December to March, as confirmed **with NRW and** by water resources modelling carried out by Welsh Water.

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity.</p>	<p>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs and priority habitats and species)?</p> <p>Will the draft Drought Plan measure protect and enhance non-designated sites and local biodiversity?</p> <p>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</p> <p>Will the draft Drought Plan measure affect the condition of ecosystems (including their connectivity, structure and functioning)?</p> <p>Will the draft Drought Plan measure enhance the adaptability of ecosystems?</p> <p>Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?</p>	<p>0</p>	<p>-/?</p>	<p>Effects of Construction</p> <p>No construction is required for this option. A neutral has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>The HRA identifies that the Llanerch boreholes are adjacent to the River Clwyd, which flows to the Liverpool Bay / Bae Lerpwl SPA at Rhyl. The operation of the proposed drought permit will affect local groundwater levels, thus influencing the Afon Clwyd and other watercourses in connectivity through the superficial deposits by reduction of baseflow. However, the drought permit would not alter the licence conditions under which the Clwyd Augmentation Scheme operates and the option will have negligible hydrological effects at the boundary of the SPA. In addition, the features of this site will not be particularly sensitive or exposed to any effects associated with changes in flows from the Afon Clwyd and significant effects on the SPA are not anticipated.</p> <p>Elwy Valley Woodlands and Llwyn are designated SSSI and SAC. Interest features include Alluvial forests. Elwy Valley Woodlands are located approximately 3km to the south west of the Llanerch boreholes, within the catchment of Afon Elwy, and Llwyn is located approximately 7km upstream of the Llanerch boreholes. Effects on these designated sites are not expected.</p> <p>While there are no designated sites that will be affected by the change in abstraction the EAR identifies that there are a number of species that could be affected if the option is shown to have actual impacts on water levels, velocity and/or wetted depth/width in Nant Padrig (Hydrological Reach 2). These include moderate and minor effects on fish community (Atlantic salmon, sea trout, brown trout, Lamprey,</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>Bullhead), River Jelly Lichen and macrophyte, macroinvertebrate and Phytobenthos communities, in addition to a major adverse impact on risk to WFD waterbody fish status. These impacts arise due to loss of habitat and reduced water quality.</p> <p>The period of implementation for this drought order would be December to March, however, the likelihood of impacts occurring and their exact magnitude is dependent on the timing/duration of the option's implementation and the extent of any habitat affected.</p> <p>A minor negative effect has been determined against this objective during operation with some uncertainty. This recognises the potential effects on river species, but acknowledges that these would be temporary. There is uncertainty relating to hydrological impacts on Nant Padrig (Hydrological Reach 2).</p> <p>Mitigation</p> <ul style="list-style-type: none"> • There are several mitigation measures that are appropriate. These are detailed in the EAR and include, inter alia, targeted installation of woody debris features to provide fish with the habitat required to support feeding and development (growth), gravel washing of spawning areas, deployment of aeration equipment. • Additional measures identified in the EAR include removal and relocation of concentrated abundances of fish deemed to be stranded/at risk, provision of physical deterrents to deter piscivorous birds, and modification of impacted fish passes to ensure passage is maintained during key migration periods. • Post drought mitigation measures are also identified in the EAR, including in-stream measures and removal of silt to benefit macroinvertebrates. <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • There is uncertainty relating to hydrological impacts on Nant Padrig (Hydrological Reach 2) which could then have effects on fish species.
<p>2. To ensure the appropriate and efficient use of land and protect and enhance soil quality and geodiversity.</p>	<p>Will additional land be required for the development or implementation of the option or will the option require below ground works leading to land sterilisation?</p> <p>Will the draft Drought Plan utilise previously developed land?</p>	0	0	<p>Effects of Construction</p> <p>No construction is required for this option. A neutral has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>This option could result in greater drawdown of the river levels during higher flow conditions than under current licensed conditions. Conceivably, this could lead to drying out of wetland soils adjacent to the Afton Clwyd. However the Clwyd</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	<p>Will the draft Drought Plan measure minimise the loss of best and most versatile agricultural land?</p> <p>Will the draft Drought Plan measure affect upland (peat-dominated) and other wetland soils?</p> <p>Will the draft Drought Plan measure protect and enhance protected sites designated for their geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest?</p>			<p>Augmentation Scheme involves topping up river flows by the volume of water abstracted at Llannerch Boreholes when flows are low. This would act to maintain flows in the Afon Clwyd, ensuring that soils in proximity to the Afon Clwyd will be unaffected by this option. The Clwyd Augmentation scheme may also help to maintain flows during low flow conditions.</p> <p>A neutral effect has therefore been determined against this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None
<p>3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water Framework Directive</p>	<p>Will the draft Drought Plan measure lead to a change in river flows, wetted width or river level?</p> <p>Will the draft Drought Plan measure affect surface water quality and quantity?</p> <p>Will the draft Drought Plan measure lead to changes in groundwater quality, quantity and recharge?</p> <p>Will the draft Drought Plan measure lead to the deterioration of Water Framework Directive (WFD) waterbody status (or potential) from, inter alia, changes in fluvial geomorphology?</p> <p>Will the draft Drought Plan measure jeopardise the achievement of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Water Framework Directive (WFD)?</p>	0	-/?	<p>Effects of Construction</p> <p>No construction is required for this option and therefore will not lead to a change in river flows, surface water or groundwater quantity. For the same reason, no effects on water quality or on WFD status are expected.</p> <p>A neutral has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>The impacted reaches for the Llannerch boreholes option are located in WFD waterbody GB110066059960 (Afon Clywd, Tidal limit to Hesbin) which is designated as Heavily Modified Water Body. The ecological status classification of this water body is moderate (WFD Cycle 2 classification). The Afon Clywd is joined by two tributaries, Nant Padrig and Afon Bach.</p> <p>This option would result in Afon Clwyd (Hydrological Reaches 1 and 3), lower reaches of the Nant Padrig (Hydrological Reach 2) and Afon Wheeler (Hydrological Reach 4) exhibiting visually lower flows than under current conditions due to reduced river baseflows. The EAR concluded that operation of this option will have a negligible hydrological impact on Reaches 1, 3 and 4 (up to 5.5% reduction in low flows). Impacts on Reach 2 are predicted to be a major (86% reduction in low flows), but uncertain, due to the high degree of uncertainty in the flow statistics. However, water levels will be naturally low in times of drought and impacts will be temporary in nature. The Clwyd Augmentation scheme may also help to maintain flows during low flow conditions.</p> <p>Due to the major (uncertain) hydrological impact on Reach 2, the EAR concluded that impact on geomorphology would also be moderate (uncertain). The reach is</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>unmanaged, and a potential decrease in flow could impact the wetted width of the channel and habitat availability. During drought conditions, bedload and suspended sediment transport will decrease, and due to the lack of management in the reach e.g. weirs, there is a decreased chance of ponding and sediment build-up.</p> <p>Minor (ammonia and dissolved oxygen) and moderate (soluble reactive phosphorous concentrations) impacts are expected on water quality of the Reaches 1, 3 and 4. Given the severity of the hydrological impact in Reach 2, the risk to ammonia and dissolved oxygen is expected to be moderate, and major for soluble reactive phosphorous concentrations, but there is uncertainty.</p> <p>Changes in the dilution and dispersion of consented discharges (Trefnant and Aberwheeler sewage treatment works (STW)) in the Afon Clwyd during operation of the option are not considered significant due to the size and location of these discharges.</p> <p>A minor negative effect has been determined against this objective with some uncertainty relating to hydrological impacts on Nant Padrig (Hydrological Reach 2).</p> <p>Mitigation</p> <ul style="list-style-type: none"> None, though flows and quality monitoring in Afon Clwyd (Hydrological Reaches 1 and 3), lower reaches of the Nant Padrig (Hydrological Reach 2) and Afon Wheeler (Hydrological Reach 4) is recommended in the EAR. <p>Assumptions</p> <ul style="list-style-type: none"> None <p>Uncertainty</p> <ul style="list-style-type: none"> Hydrological impacts on Hydrological Reach 2 (Nant Padrig) are expected to be major (86% reduction in low flows), but uncertain, due to the high degree of uncertainty in the flow statistics.
<p>4. To limit the causes and potential consequences of climate change and to adapt to future changes</p>	<p>Will the draft Drought Plan measure reduce or minimise greenhouse gas emissions?</p> <p>Will the draft Drought Plan measure reduce vulnerability to the effects of climate change by appropriate adaptation?</p> <p>Will the draft Drought Plan measure increase environmental resilience to the effects of climate change including to impacts on water quality?</p>	0	+/-	<p>Effects of Construction</p> <p>No construction is required for this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>Energy requirements and carbon emission have not been quantified by Welsh Water for any options at this stage and therefore a qualitative assessment has been made based on the infrastructure required to implement this option.</p> <p>The relaxation of the annual licence would increase abstraction compared to the existing annual licence restrictions. This would result in additional energy requirements and associated greenhouse gas emissions to abstract, transfer and</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	Will the draft Drought Plan measure reduce or minimise air pollutant emissions?			<p>treat water at Glascoed water treatment works (WTW). There is also likely to be an increase in the number of days when the Clwyd Augmentation Scheme is operational.</p> <p>UKCP18 climate change scenarios anticipate longer, hotter summers and, in turn, increases in both the frequency and duration of droughts. This option would provide Welsh Water with additional capacity to manage drought conditions and as such is considered to contribute towards climate change adaptation.</p> <p>A mixed minor negative and minor positive effect has been determined against this objective. This is in recognition of the possible additional energy consumption and associated carbon emissions during operation, in addition to the contribution to climate change adaptation.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None
5. To protect and enhance human health with special regard to vulnerable groups in society	<p>Will the draft Drought Plan measure ensure continuity of clean drinking water supply within statutory standards supply at times of drought?</p> <p>Will the draft Drought Plan measure affect the affordability of clean drinking water?</p> <p>Will the draft Drought Plan measure adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise levels)?</p> <p>Will the draft Drought Plan measures affect human health or the health of any vulnerable groups?</p> <p>Will the Drought Plan measure affect public access to, or enjoyment of, local green/blue space?</p>	0	+	<p>Effects of Construction</p> <p>No construction is required for this option. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>This option will provide a benefit of 1Ml/d, which will contribute to maintaining water supplies during periods of drought.</p> <p>The option would also increase the security of supply in the Clwyd Coastal WRZ by assisting the post-drought winter refill of the Aled Reservoirs by reducing demand from that resource. Those living, working or visiting the area are unlikely to be directly disturbed by the scheme.</p> <p>A minor positive effect has therefore been assessed against this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	Will the Drought Plan measure impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?			Uncertainty <ul style="list-style-type: none"> None
6. To maintain and enhance the economic and social needs of the local community	<p>Will the draft Drought Plan measure ensure sufficient water is available for people and visitors to maintain economic activity in times of drought?</p> <p>Will the draft Drought Plan measures affect local or regional economies?</p> <p>Will the draft Drought Plan measure affect opportunities for recreation at times of drought?</p>	0	0	Effects of Construction No construction is required for this option. A neutral has therefore been determined against this objective. Effects of Operation This option will provide a potential additional yield of 1 Ml/d. This would help to meet the water supply needs of homes, businesses and visitors in the area during periods of drought, supporting the local and regional economy, although, consistent with the definitions of significance used in the assessment, positive effects in this regard are predicted to be negligible. This option would be located east of Snowdonia National Park. The area presents year-round attractions for walking, riding and several other recreational pursuits. Canoeing is concentrated around the town of St Asaph due to the easier navigable and lower waters. Any possible reduction in wetted width and depth may influence water-dependent activities such as canoeing. The EAR identified that this option would result in visually lower flows. The negligible hydrological impacts associated with Reaches 1, 3 and 4 are not expected to impact upon recreational activities. Reach 2, which is likely to have a major but uncertain hydrological impact, comprises 300m of Nant Padrig which offers little recreational use. The popular walking route the Clwydian Way passes over the Nant Padrig although this is upstream of the limits of Reach 2. Therefore this option is unlikely to affect recreational activities. Overall, this option has been assessed as having a neutral effect on this objective Mitigation <ul style="list-style-type: none"> None Assumptions <ul style="list-style-type: none"> None Uncertainty <ul style="list-style-type: none"> None

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
7. To promote the wise use of resources	<p>Will the draft Drought Plan measure seek to minimise the demand for additional raw materials?</p> <p>Will the draft Drought Plan measure seek to minimise energy consumption?</p> <p>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</p> <p>Will the draft Drought Plan measure encourage sustainable design or use of sustainable materials?</p>	0	-	<p>Effects of Construction</p> <p>This option will not require the new raw materials as it will make use of existing infrastructure. In accordance with the definitions of significance, this has been assessed as a neutral negative effect against this objective.</p> <p>Effects of Operation</p> <p>During operation this option will require some additional energy use to operate the Clwyd Augmentation over an extended period. The additional energy use has not been quantified however, is not considered to be significant and for this reason, a minor negative effect has been determined against this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None
8. To conserve and enhance the cultural, historic and industrial heritage resource.	<p>Will the draft Drought Plan measure conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</p> <p>Will the draft Drought Plan measure avoid or minimise damage to archaeologically important sites?</p> <p>Will the draft Drought Plan measure avoid damage to important wetland areas with potential for paleoenvironmental deposits?</p>	0	0	<p>Effects of Construction</p> <p>No construction is required for this option. A neutral has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>The closest heritage features or sites along the course of Afon Clwyd include three Grade II listed buildings: Pont Llannerch (late 18th Century bridge), Pont-y-cambwll (16th Century bridge) and Pont Ruffydd (18th Century bridge). Operation of the option is not anticipated to have a detrimental effect on heritage assets as these contain no water dependant features.</p> <p>There is the potential for reduced flows to affect the settings of these assets, particularly where they experience views to/from the Afon Clwyd, Nant Padrig and Afon Wheeler; however, any effects in this regard would be temporary and reversible and in consequence, be negligible.</p> <p>A neutral effect is therefore anticipated against this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<ul style="list-style-type: none"> None Uncertainty <ul style="list-style-type: none"> None
9. To protect and enhance landscape and seascape character and other protected features	<p>Is it likely that the draft Drought Plan measure will have significant visual impacts?</p> <p>Will the draft Drought Plan measure avoid adverse effects on, and enhance where possible, the special qualities of protected/designated landscapes (including woodlands) or seascapes such as National Parks or AONBs?</p> <p>Will the draft Drought Plan measure help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness?</p>	0	0/?	<p>Effects of Construction</p> <p>No construction is required for this option. A neutral has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>Llannerch Boreholes are located in the Vale of Clwyd, to the east of Snowdonia National Park and to the west of an Area of Outstanding Natural Beauty called the Clwydian Range.</p> <p>This option would result in visually lower flows than current conditions due to reduced river baseflows, with negligible effects in Reaches 1, 3 and 4 and a potentially major but uncertain effect in Reach 2. While a reduction of flows would be noticeable to the majority of residents and visitors to the area, during drought conditions when the option is in operation, lower flows would already be observed. The Clwyd Augmentation scheme may also help to maintain flows during low flow conditions.</p> <p>No new structures will be built above-ground as a result of this option.</p> <p>The landscape and visual impacts associated with the operation of this option would be dependent on the timing of implementation. Any effects would be temporary and reversible. For these reasons, this option has been assessed as having a neutral effect against this objective although some uncertainty remains regarding impacts on flows in Hydrological Reach 2 (Nant Padrig).</p> <p>Mitigation</p> <ul style="list-style-type: none"> None <p>Assumptions</p> <ul style="list-style-type: none"> None <p>Uncertainty</p> <ul style="list-style-type: none"> Uncertainty relating to timing of implementation of the option. Hydrological impacts on Hydrological Reach 2 (Nant Padrig) are predicted to be a major (86% reduction in low flows), but uncertain, due to the high degree of uncertainty in the flow statistics.
Summary	Effects of Construction			

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	<p>The option does not involve the construction of any additional infrastructure and as such no effects are anticipated.</p> <p>Effects of Operation</p> <p>A minor negative effect with some uncertainty has been determined against objective 1 (biodiversity) due to impacts on biodiversity from loss of habitat and reduced water quality. The reduction in water levels associated with operation is expected to have a minor negative effect for objective 3 (water), with some uncertainty relating to hydrological impacts on Nant Padrig (Hydrological Reach 2). A minor negative effect has also been determined against objective 7 (resource use) in recognition of the possible additional energy consumption during operation.</p> <p>The increased carbon emissions and the climate change adaptation benefits of the option have been identified as a mixed minor negative and minor positive effect for objective 4 (climate change). This option will provide an additional water yield of 1 Ml/d to the wider area. A minor positive effect has been determined against objective 5 (human health) as the option will help meet the water needs of the local community and increase the security of supply in the Clwyd Coastal WRZ.</p> <p>The anticipated effects against all other objectives are neutral, although some uncertainty remains for objective 9 (landscape) due to the uncertainty in the impacts on flows/water levels in Hydrological Reach 2 (Nant Padrig).</p> <p>Mitigation</p> <ul style="list-style-type: none"> • There are several mitigation measures that are appropriate to address the effect on biodiversity, particularly for fish species. The approaches include targeted installation of woody debris features, gravel washing of spawning areas, and deployment of aeration equipment. In addition, the removal and relocation of fish, provision of physical deterrents to deter piscivorous birds, and modification of impacted fish passes to ensure passage is maintained may be undertaken. • The EAR recommends monitoring of flows and water quality monitoring in the Afon Clwyd (Hydrological Reaches 1 and 3), lower reaches of the Nant Padrig (Hydrological Reach 2) and Afon Wheeler (Hydrological Reach 4). The monitoring of species (fish, macroinvertebrates and macrophytes) in Hydrological Reach 2 is also recommended. 			

8012-6 Pumped (Winter) Refill from Aled Isaf to Llyn Aled

Option Summary

Under the drought permit water from Aled Isaf Reservoir would be pumped up to Llyn Aled Reservoir to support refill. Such usage is not authorised by the existing abstraction licence and a drought permit would be required. Daily pumping rates have not been specified at this stage and so the assessment is based on an assumed transfer rate of 19.5Ml/d.

Drought actions and any future application for a drought permit would be managed by the Aled Consultative Group which would be convened under the terms of the Section 20 Operating Agreement with NRW. The drought permit is most likely to occur during the autumn and winter period and **would** not to extend outside the period November to February. This has been confirmed by Welsh Water’s water resources modelling and understanding of operating the assets.

This option is linked to Option 8012-4, where the dead storage in Llyn Aled is accessed. Llyn Aled has a small catchment so would take an extended period of time to refill; this option utilises the more rapid refill of Aled Isaf to support the refill of Llyn Aled through pumping of water from Aled Isaf back up to Llyn Aled. It is assumed however that temporary pumping equipment and overground pipeline will be required to actively transfer water storage against the topographic gradient for approximately 1km from Aled Isaf to Llyn Aled.

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity.</p>	<p>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs and priority habitats and species)?</p> <p>Will the draft Drought Plan measure protect and enhance non-designated sites and local biodiversity?</p> <p>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</p> <p>Will the draft Drought Plan measure affect the condition of ecosystems (including their connectivity, structure and functioning)?</p> <p>Will the draft Drought Plan measure enhance the adaptability of ecosystems?</p>	-	-/?	<p>Effects of Construction</p> <p>Aled Isaf, where pumping infrastructure would be required near the shoreline, is not itself a designated site. Surrounding its shoreline and extending to the shoreline of Llyn Aled to the south is the Mynydd Hiraethog SSSI. The SSSI is designated for heathland and blanket mire habitats and associated bird, lichen and insect species. The SSSI is not designated for water flow or other aquatic reasons. Construction effects can be minimised by routing the pipeline along an access road which travels directly between the two reservoirs, which are 1km apart. It is also assumed that pumping infrastructure could also be sited on hardstanding areas next to the access road on Aled Isaf, and existing outflow structures could be utilised on Llyn Aled.</p> <p>It is considered that effects on the surrounding SSSI can be mitigated by routing the pipeline along roadway and the use of best practice construction techniques. However, the immediate proximity of any infrastructure to the sensitive features of the Mynydd Hiraethog SSSI means that the potential for a negative effect cannot be ruled out and consequently a minor negative effect is identified.</p> <p>Effects of Operation</p> <p>The HRA states “<i>The ultimate downstream receptor for this option is the Liverpool Bay / Bae Lerpwl SPA, which covers the offshore areas at Rhyl. However, the operation of the option will have no notable effects on flows from the confluence of</i></p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?			<p><i>the Afon Aled and the larger Afon Elwy, and hydrological changes would be undetectable at the site boundary; in addition, the features of this sites will not be particularly sensitive or exposed to any effects associated with changes in flows from the Afon Elwy. On this basis no significant effects will occur."</i></p> <p>The EAR completed for this option has concluded that implementation of the drought permit would not result in likely significant effects on any designated features of the Coed Lllys-Aled SSSI, Coed Nant-y-Merddyn-Uchaf SSSI, or the Mnydd Hiraethog SSSI. This is because the designated features of these sites are not dependent on the Afon Aled. Nonetheless the EAR notes that the assessment has been made on a precautionary basis in the absence of any reliable data and that the collection of baseline data may provide the basis for a revised conclusion.</p> <p>The EAR identifies a moderate adverse effect for Reach 1 (Afon Aled, Aled Isaf to Afon Deunant confluence) on spawning and juvenile survival for salmon, trout and lamprey species fish habitats, although the effect is uncertain due to lack of information on fish stocks. Minor effects for these species are identified for Reach 2 (Afon Aled (Afon Deunant confluence to Bryn Aled intake)) and Reach 3 (Afon Aled (Bryn Aled intake to Afon Elwy confluence)). The likelihood of these impacts occurring and its exact magnitude is uncertain as it depends on the exact timing/duration of the option's implementation, existing flow conditions and the fish species affected.</p> <p>Due to the potential for moderate impacts on fish within the affected reaches, this option has been assessed (on a precautionary basis) as having a minor negative effect on this objective, although some uncertainty remains.</p> <p>Mitigation There are several mitigation measures that are appropriate, depending on the fish species being protected. The approaches include the temporary reduction or cessation of this option and temporary measures to reduce fish predation.</p> <p>Assumptions</p> <ul style="list-style-type: none"> • It is assumed that temporary pumping/generators and associated pipework would be located away from sensitive receptors including following the local access road and on hardstanding ground where required. • It is assumed that best practice construction techniques are followed to minimise impacts on ecological habitats and water quality. <p>Uncertainty</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<ul style="list-style-type: none"> Lack of baseline data with regards to effects on sites of importance for nature conservation. Routing of the pipeline.
2. To ensure the appropriate and efficient use of land and protect and enhance soil quality and geodiversity.	<p>Will additional land be required for the development or implementation of the option or will the option require below ground works leading to land sterilisation?</p> <p>Will the draft Drought Plan utilise previously developed land?</p> <p>Will the draft Drought Plan measure minimise the loss of best and most versatile agricultural land?</p> <p>Will the draft Drought Plan measure affect upland (peat-dominated) and other wetland soils?</p> <p>Will the draft Drought Plan measure protect and enhance protected sites designated for their geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest?</p>	0	0	<p>Effects of Construction</p> <p>Temporary pumps and pipelines will need to be constructed in order to transfer water from the Aled Isaf Reservoir to the Llyn Aled Reservoir as part of the implementation of this drought permit. As the pipeline is above ground, and no excavation required, no effects to the soils of the surrounding SSSI are expected during construction. Pumping equipment can also be installed on hard standing areas.</p> <p>As such a neutral effect has been identified for this objective at the construction stage.</p> <p>Effects of Operation</p> <p>No impacts to soils are expected from operation of the pipeline or pumping infrastructure. This option shortens the duration of the effects of a drought by speeding up refill, but it does not improve on baseline conditions. As such, a neutral effect has been identified.</p> <p>Mitigation</p> <ul style="list-style-type: none"> None <p>Assumptions</p> <ul style="list-style-type: none"> None <p>Uncertainty</p> <ul style="list-style-type: none"> None
3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water Framework Directive	<p>Will the draft Drought Plan measure lead to a change in river flows, wetted width or river level?</p> <p>Will the draft Drought Plan measure affect surface water quality and quantity?</p> <p>Will the draft Drought Plan measure lead to changes in groundwater quality, quantity and recharge?</p>	0	-	<p>Effects of Construction</p> <p>Temporary pumps and pipelines will need to be constructed in order to transfer water from the Aled Isaf Reservoir to the Llyn Aled Reservoir as part of the implementation of this drought permit.</p> <p>Construction is not anticipated to lead to a change in river flows, surface water or groundwater quantity. No effects on water quality would be expected from construction activities, assuming that best practice construction techniques are followed (e.g. the use of sediment traps). No effects on WFD status are expected to result from construction. Therefore, a neutral effect has been identified.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	<p>Will the draft Drought Plan measure lead to the deterioration of Water Framework Directive (WFD) waterbody status (or potential) from, inter alia, changes in fluvial geomorphology?</p> <p>Will the draft Drought Plan measure jeopardise the achievement of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Water Framework Directive (WFD)?</p>			<p>Effects of Operation</p> <p>The operation of this option has been identified by the EAR as having a minor beneficial effect on the Llyn Aled Reservoir as a result of reducing the anticipated drought period and a negligible impact on the Aled Isaf Reservoir. Effects on flows within Reach 1 have been identified as moderate adverse. Whilst this option will reduce the period for which the Llyn Aled is empty or at low flows, this only improves the situation against the Drought Plan scenario, rather than a benefit to the baseline scenario. Effects on Reach 2 and Reach 3 being minor adverse.</p> <p>A low risk to water quality linked to dissolved oxygen and ammonia has been identified for Reaches 1, 2 and 3. No effects on water quality have been identified for the Llyn Aled and Aled Isaf reservoirs.</p> <p>Overall, a minor adverse impact has been identified for this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • That best practice construction techniques are followed. <p>Uncertainty</p> <ul style="list-style-type: none"> • None
<p>4. To limit the causes and potential consequences of climate change and to adapt to future changes</p>	<p>Will the draft Drought Plan measure reduce or minimise greenhouse gas emissions?</p> <p>Will the draft Drought Plan measure reduce vulnerability to the effects of climate change by appropriate adaptation?</p> <p>Will the draft Drought Plan measure increase environmental resilience to the effects of climate change including to impacts on water quality?</p> <p>Will the draft Drought Plan measure reduce or minimise air pollutant emissions?</p>	-	--	<p>Effects of Construction</p> <p>The implementation of this option will require the movement of plant and materials (for example pumps and approximately 1km of pipeline) to site, which will require fuel and result in carbon emissions. There would also be carbon embodied within the plant and infrastructure. As the equipment is temporary it may be possible to rent (and reuse) equipment to cut down raw materials used in construction.</p> <p>Overall a minor negative effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>Energy requirements and associated greenhouse gas emissions have not been quantified by Welsh Water for any options at this stage and therefore a qualitative assessment has been made based on the infrastructure required to implement this option. Nonetheless, it is anticipated that the energy required to pump the required volume of water against the gradient for approximately 1km will be considerable, with</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>the associated greenhouse gas emissions from the pump generators giving rise to a significant negative effect.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • The total amount of water that will be pumped
<p>5. To protect and enhance human health with special regard to vulnerable groups in society</p>	<p>Will the draft Drought Plan measure ensure continuity of clean drinking water supply within statutory standards supply at times of drought?</p> <p>Will the draft Drought Plan measure affect the affordability of clean drinking water?</p> <p>Will the draft Drought Plan measure adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise levels)?</p> <p>Will the draft Drought Plan measures affect human health or the health of any vulnerable groups?</p> <p>Will the Drought Plan measure affect public access to, or enjoyment of, local green/blue space?</p> <p>Will the Drought Plan measure impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?</p>	<p>0</p>	<p>0</p>	<p>Effects of Construction</p> <p>The siting of mobile pumps, diesel generator and abstraction and transfer pipes would have no effect on continuity of clean drinking water supply at time of drought, nor would it affect surface water quality (assuming use of best practice construction techniques are applied).</p> <p>Noise and vibration may result from bringing pumps, pipeline and generators to site. However, it is noted that the site is in an extremely rural location with no residential properties in the immediate vicinity of the site, or directly on roads that would be used for access.</p> <p>Overall, a neutral effect has been identified for this objective.</p> <p>Effects of Operation</p> <p>This option will not provide any additional deployable output. There is the potential for noise disturbance through the operation of generators. However, the extremely rural location of the site, with no residential properties in the immediate vicinity, such effects are considered to be negligible.</p> <p>Overall, a neutral effect has been identified for this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<ul style="list-style-type: none"> None
<p>6. To maintain and enhance the economic and social needs of the local community</p>	<p>Will the draft Drought Plan measure ensure sufficient water is available for people and visitors to maintain economic activity in times of drought?</p> <p>Will the draft Drought Plan measures affect local or regional economies?</p> <p>Will the draft Drought Plan measure affect opportunities for recreation at times of drought?</p>	<p>0</p>	<p>0</p>	<p>Effects of Construction</p> <p>The construction phase of this option will have no effect on the availability of water for people and visitors to maintain economic activity in times of drought.</p> <p>No conceivable effects on the local or regional economy are anticipated as a result of the construction of this option. This option would be located in an area that provides opportunities for outdoor recreation activities, for example fishing at Llyn Aled and Aled Isaf. Although there may be local disruption to footpaths and access from the siting of infrastructure, footpath/road diversions will be possible.</p> <p>Overall, a neutral effect has been identified for this objective.</p> <p>Effects of Operation</p> <p>This option will provide an no additional water yield, nor does it improve the water levels beyond baseline conditions. Therefore this option is considered to have a neutral effect on community use of the local resources.</p> <p>Overall, a neutral effect has been identified for this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> None <p>Assumptions</p> <ul style="list-style-type: none"> None <p>Uncertainty</p> <ul style="list-style-type: none"> None

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
7. To promote the wise use of resources	<p>Will the draft Drought Plan measure seek to minimise the demand for additional raw materials?</p> <p>Will the draft Drought Plan measure seek to minimise energy consumption?</p> <p>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</p> <p>Will the draft Drought Plan measure encourage sustainable design or use of sustainable materials?</p>	-	--	<p>Effects of Construction</p> <p>This option will require the movement of plant and materials (e.g. pumps, pipes etc) to site, which will consume fuel. There would also be materials within the new infrastructure (plastics and metals). In accordance with the definitions of significance, this has been assessed as a minor negative effect against this objective. However, there is the potential to mitigate such effects through the rental and reuse of the equipment used on site.</p> <p>Effects of Operation</p> <p>The anticipated energy required to pump the required volume of water against the gradient for approximately 1km will be considerable, with the associated use of non-renewable fossil fuels from the pump generators giving rise to a significant negative effect.</p> <p>Mitigation</p> <ul style="list-style-type: none"> The rental or re-use of onsite equipment. <p>Assumptions</p> <ul style="list-style-type: none"> None <p>Uncertainty</p> <ul style="list-style-type: none"> The total amount of water that will be pumped
8. To conserve and enhance the cultural, historic and industrial heritage resource.	<p>Will the draft Drought Plan measure conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</p> <p>Will the draft Drought Plan measure avoid or minimise damage to archaeologically important sites?</p> <p>Will the draft Drought Plan measure avoid damage to important wetland areas with potential for paleoenvironmental deposits?</p>	0	0	<p>Effects of Construction</p> <p>The closest historic assets are approximately 1.8km from any construction activity and as such a neutral effect is anticipated.</p> <p>Effects of Operation</p> <p>The closest historic assets are approximately 1.8km from the reservoirs and as such a neutral effect is anticipated.</p> <p>Mitigation</p> <ul style="list-style-type: none"> None <p>Assumptions</p> <ul style="list-style-type: none"> None <p>Uncertainty</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<ul style="list-style-type: none"> None
9. To protect and enhance landscape and seascape character and other protected features	<p>Is it likely that the draft Drought Plan measure will have significant visual impacts?</p> <p>Will the draft Drought Plan measure avoid adverse effects on, and enhance where possible, the special qualities of protected/designated landscapes (including woodlands) or seascapes such as National Parks or AONBs?</p> <p>Will the draft Drought Plan measure help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness?</p>	-	-	<p>Effects of Construction</p> <p>Temporary pumping infrastructure would be constructed next to the Aled Isaf shoreline. Visual disruption through lorry traffic and construction works will occur in a very rural and exposed setting, although it is not designated for landscape quality. It may be possible to mitigate impacts by locating temporary infrastructure close to existing features (e.g. walls, buildings, vegetation). Due to visual intrusion in a non-landscape designated area a minor negative effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>The operation of this option would not improve the visual drawdown above that of baseline conditions.</p> <p>The additional pumping infrastructure and pipeline required for this option will also cause some visual intrusion. However, this can be kept minimal if infrastructure is incorporated next to or in existing structures, e.g. on a roadside, and the area is not designated for landscape quality. A minor negative effect has been determined against this objective due to the visual above ground infrastructure.</p> <p>Mitigation</p> <ul style="list-style-type: none"> Incorporate infrastructure nearby existing buildings where possible. <p>Assumptions</p> <ul style="list-style-type: none"> None <p>Uncertainty</p> <ul style="list-style-type: none"> Pipeline routing

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
Summary	<p>Effects of Construction</p> <p>Due to the immediate proximity of any infrastructure to the sensitive features of the Mynydd Hiraethog SSSI a minor negative effect has been identified for objective 1 (biodiversity). The use of plant and materials during the construction stage has led to the identification of a minor negative for both objective 4 (climate change) and objective 7 (material resources). Due to visual intrusion in a non-landscape designated area a minor negative effect has been determined against objective 9 (landscape).</p> <p>Effects of Operation</p> <p>The routing of the pipeline could cause connectivity issues in the Mynydd Hiraethod SSSI and consequently a minor negative objective has been identified for objective 1 (biodiversity). The reduction in flow has also been identified as having a minor adverse effect for objective 3 (water). A significant negative effect has been identified for both objective 4 (climate change) and objective 7 (material resources) due to the amount of energy required to pump a substantial amount of water against the gradient for 1km. Due to visual intrusion in a non-landscape designated area a minor negative effect has been determined against objective 9 (landscape).</p> <p>Mitigation</p> <p>There are several mitigation measures that are appropriate, depending on the fish species being protected. The approaches include the temporary reduction or cessation of this option and temporary measures to reduce fish predation.</p> <p>Infrastructure should be incorporated nearby existing buildings where possible to minimise the visual impact.</p> <p>Equipment could be rented or re-used to minimise the use of material resources.</p>			

8021-1 Tankering raw water from Dysynni

Option Summary

The Afon Dysynni is located in Welsh Water’s Tywyn / Aberdyfi Water Resource Zone (WRZ) which covers the small coastal area around the towns of Tywyn and Aberdyfi, supplying approximately 5000 people from two small river abstractions situated on the Afon Fathew and the Nant Braich-y-Rhiw. Welsh Water does not currently abstract any water from the Afon Dysynni.

The option would authorise a temporary daily abstraction of up to 1Ml/d from a temporary intake on the Afon Dysynni in the Pont y Garth area. Drought permits may remain in force for a period of up to six months, and they can be extended for up to a further six months. The gain in DO is 1Ml/d.

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity.</p>	<p>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs and priority habitats and species)?</p> <p>Will the draft Drought Plan measure protect and enhance non-designated sites and local biodiversity?</p> <p>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</p> <p>Will the draft Drought Plan measure affect the condition of ecosystems (including their connectivity, structure and functioning)?</p> <p>Will the draft Drought Plan measure enhance the adaptability of ecosystems?</p> <p>Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?</p>	<p>0</p>	<p>0</p>	<p>Effects of Construction</p> <p>The option requires the construction of temporary intake structure at Pont y Garth and area of hardstanding for tanker access. The water abstracted will be transferred by water tankers to Penybont water treatment works (WTW) where an inlet facility will be required. Construction activities including excavation will be required.</p> <p>The Afon Dysynni flows into the Broadwater SSSI, approximately 400 m downstream of the abstraction. Broadwater SSSI is a coastal habitat of considerable ecological interest that features saltmarsh, shingle spit, mudflats, pools, reedbeds and ditches. The site supports a number of locally uncommon species such as Wild Celery, Sharp Sea Rush, Yellow Horned Poppy and Little Terns.</p> <p>In addition to the Broadwater SSSI, the Lleyn Peninsula and the Sarnau SAC is another downstream receptor of the Afon Dysynni. The SAC is designated as it supports a number of features including sandbanks, estuaries, coastal lagoons, reefs, and shallow inlets. The site is also important for a number of species such as Bottlenose Dolphin, Otter and Grey Seal.</p> <p>The temporary intake structure, hardstanding area and Pen y Bont WTW lie outside nationally or internationally ecologically designated sites. It is 600m to the Craig yr Aderyn SPA and SSSI. This SPA rises from sea level to 250m and comprises of rock crags, acid grassland, heath and bracken. The site is a traditional breeding and roosting site for Chough, which are present throughout the year. The construction of the temporary intake structure and hardstanding has the potential to disturb the Craig yr Aderyn SPA and SSSI. However, the HRA notes that “chough are generally tolerant of activities away from their nests and foraging areas, and any construction would be over 600m from the edge of the SPA” and concludes no significant effects will occur.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>It is not expected that construction works would cause pollution of the Afon Dysynni and cause harm to the downstream receptors Broadwater SSSI or the Lleyn Peninsula and the Sarnau SAC.</p> <p>Overall, the effects on construction are considered neutral against this objective.</p> <p>Effects of Operation</p> <p>The temporary pumped abstraction has the potential to influence flows in the Afon Dysynni and impact the downgradient receptors Broadwater SSSI and the Lleyn Peninsula and the Sarnau SAC. The EAR concluded that the proposed temporary abstraction will have negligible hydrological impacts on the flow regime in the Afon Dysynni (up to 1.7% reduction in flows). The negligible hydrological impact is not anticipated to reduce the availability of habitats or lead to exposure of benthic macroinvertebrate and macrophyte habitats or impact on fish or bird species.</p> <p>The negligible hydrological impact of the option is not anticipated to cause any deterioration of the designation and qualifying species in the Craig yr Aderyn SSSI/SPA which is an important habitat for Chough. The negligible hydrological impact and distance downstream of the Broadwater SSSI, is not anticipated to cause any deterioration to the designated features (tidal lagoon which is a coastal habitat) of this site.</p> <p>There is potential for disturbance from the tankering to affect the SPA and SSSI, given that the road along which the water tankers are likely to be routed forms a boundary to a rocky outcrop which is designated as Craig yr Aderyn (Bird's Rock) SPA and SSSI. However, these are not considered to be of a frequency and duration to affect the designated features.</p> <p>Overall, a neutral effect is determined against this objective.</p> <p>Mitigation</p> <p>Given the proximity of the proposed works to a European site, this option is likely to be subject to the HRA process at the project stage. If this is the case, prior to construction, avoidance and mitigation measures during construction would be developed and then implemented in order to address the specific needs of the proposals and the features of interest of the European site.</p> <p>Assumptions</p> <p>It is assumed that temporary intake structure and hardstanding area would be located away from sensitive receptors.</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>2. To ensure the appropriate and efficient use of land and protect and enhance soil quality and geodiversity.</p>	<p>Will additional land be required for the development or implementation of the option or will the option require below ground works leading to land sterilisation?</p> <p>Will the draft Drought Plan utilise previously developed land?</p> <p>Will the draft Drought Plan measure minimise the loss of best and most versatile agricultural land?</p> <p>Will the draft Drought Plan measure affect upland (peat-dominated) and other wetland soils?</p> <p>Will the draft Drought Plan measure protect and enhance protected sites designated for their geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest?</p>	-	0	<p>Effects of Construction</p> <p>Construction works may affect wetland soils due to the potential need for excavation works associated with the creation of hardstanding for tanker access. The exact location of infrastructure is not currently known.</p> <p>The Soilscape viewer (http://www.landis.org.uk/soilscales/) shows that soils in the valley of the Afon Dysynni at Pont y Garth are 'Loamy and clayey floodplain soils with naturally high groundwater' (permeable soils in low lying areas often affected by high groundwater that has drained from the surrounding landscape). Soils downstream of the abstraction point are described as naturally wet fenland peat soils. Excavation and the creation of hardstanding near the abstraction point are likely to affect a small area wet soils.</p> <p>For this reason a minor negative effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>The temporary pumped abstraction has the potential to influence flows and wetted width / wetted depth of the Afon Dysynni and impact the downgradient receptors Broadwater SSSI and the Lleyn Peninsula and the Sarnau SAC. Fenland peat soils downstream of the abstraction point may also be affected.</p> <p>The EAR concluded that the temporary abstraction will have negligible hydrological impacts on the flow regime in the Afon Dysynni (up to 1.7% reduction in flows) with negligible impacts on wetted width / wetted depth of river channel. Therefore it is considered that the proposed abstraction will have negligible effects on marginal fenland peat soils along the Afon Dysynni.</p> <p>For this reason, the option has been assessed as having a neutral effect against this objective</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water Framework Directive</p>	<p>Will the draft Drought Plan measure lead to a change in river flows, wetted width or river level?</p> <p>Will the draft Drought Plan measure affect surface water quality and quantity?</p> <p>Will the draft Drought Plan measure lead to changes in groundwater quality, quantity and recharge?</p> <p>Will the draft Drought Plan measure lead to the deterioration of Water Framework Directive (WFD) waterbody status (or potential) from, inter alia, changes in fluvial geomorphology?</p> <p>Will the draft Drought Plan measure jeopardise the achievement of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Water Framework Directive (WFD)?</p>	0	0	<p>Effects of Construction</p> <p>The option requires the construction of temporary intake structure at Pont y Garth and area of hardstanding for tanker access. The water abstracted will be transferred by water tankers to Penybont water treatment works (WTW) where an inlet facility will be required. Construction activities including excavation will be required.</p> <p>Construction works will not lead to a change in river flows, surface water or groundwater quantity. Some localised disturbance of sediment may result from the construction of the temporary intake. However, negligible effects on water quality would be expected from construction activities and no effects on WFD status are expected, assuming that best practice construction techniques are followed (e.g. the use of sediment traps).</p> <p>A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>Afon Dysynni (WFD water body GB110064048440) is a heavily modified water body with an ecological status of 'moderate' (WFD Cycle 2 classification).</p> <p>The temporary pumped abstraction has the potential to influence flows in the Afon Dysynni. However the EAR concluded that the proposed temporary abstraction will have negligible hydrological impacts on the flow regime in the Afon Dysynni (up to 1.7% reduction in flows).</p> <p>Given that there is no adverse hydrological impact associated with the option, effects on geomorphology and water quality are equally assessed as negligible. Similarly, there would be no flow pressures or water quality pressures that would pose an increased risk to any water-dependent environmental features within the vicinity of Afon Dysynni. No effects on WFD status are therefore anticipated.</p> <p>A neutral effect has therefore been determined against this objective.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty None</p>
<p>4. To limit the causes and potential consequences of</p>	<p>Will the draft Drought Plan measure reduce or minimise greenhouse gas emissions?</p>	-	+/-	<p>Effects of Construction</p> <p>The implementation of this option will require the movement of plant and materials (e.g. pumps, temporary intake infrastructure) to site, which will require fuel and result</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>climate change and to adapt to future changes</p>	<p>Will the draft Drought Plan measure reduce vulnerability to the effects of climate change by appropriate adaptation?</p> <p>Will the draft Drought Plan measure increase environmental resilience to the effects of climate change including to impacts on water quality?</p> <p>Will the draft Drought Plan measure reduce or minimise air pollutant emissions?</p>			<p>in carbon emissions. There would also be carbon embodied within the temporary infrastructure. However, given that the option will require temporary infrastructure, it is possible that these materials could be hired or used from existing Welsh Water/contractor stores and could subsequently be used elsewhere once the temporary infrastructure has been removed from site. This would lessen the effect of carbon embodied in materials.</p> <p>Given the need for new intake structure and the inlet works at Penybont WTW a minor negative effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>Energy requirements and carbon emission have not been quantified by Welsh Water for any options at this stage and therefore a qualitative assessment has been made based on the infrastructure required to implement this option.</p> <p>This option will involve the abstraction of up to 1.0 Ml/d from Afon Dysynni at Pont y Garth and tankering to Pen y Bont WTW, a distance estimated to be approximately 6 km. This will consume fuel and result in carbon emissions. Transferring water over this distance could require up to an estimated 34 tanker movements per day, assuming 30m³ capacity which would generate vehicle emissions, including CO₂ and a negative effect has therefore been determined against this objective.</p> <p>UKCP18 climate change scenarios anticipate longer hotter summers and in turn and in both the frequency and duration of droughts. This option would provide Welsh Water with additional capacity to manage drought conditions and as such is considered to contribute towards climate change adaptation.</p> <p>A mixed negative effect (in recognition of the additional energy consumption and carbon emissions associated with the proposed abstraction of 1.0 Ml/d and tankering over a distance of 6 km) and minor positive effect (in recognition of the role of the option in improving drought resilience) has been determined against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>It is assumed that the water abstracted from Afon Dysynni at Pont y Garth will be transferred by water tankers to Penybont WTW over a distance of approximately 6 km.</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>5. To protect and enhance human health with special regard to vulnerable groups in society</p>	<p>Will the draft Drought Plan measure ensure continuity of clean drinking water supply within statutory standards supply at times of drought?</p> <p>Will the draft Drought Plan measure affect the affordability of clean drinking water?</p> <p>Will the draft Drought Plan measure adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise levels)?</p> <p>Will the draft Drought Plan measures affect human health or the health of any vulnerable groups?</p> <p>Will the Drought Plan measure affect public access to, or enjoyment of, local green/blue space?</p> <p>Will the Drought Plan measure impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?</p>	-	+	<p>Effects of Construction</p> <p>The construction of the temporary intake structure at Pont y Garth and inlet at Penybont WTW would have no effect on continuity of clean drinking water supply at time of drought, nor would it affect surface water quality assuming use of best practice construction techniques.</p> <p>The supporting work for the construction phase may result in some disturbance to local residents. Noise and vibration may result from bringing pumps, and generators to site. However, the site is in a rural location with a small number of residential properties local to the site.</p> <p>For this reason a minor negative effect is considered against this objective.</p> <p>Effects of Operation</p> <p>This option will provide up to a further 1.0 Ml/d of drinking water, which will help to meet the water needs of society.</p> <p>It is noted that for those living, working or visiting the area, there is the potential for noise disturbance from tanker movements (estimated at up to approximately 34 per day). However, the site is in a rural location with a small number of residential properties the effect is considered to be negligible.</p> <p>A minor positive effect has been determined against this objective, recognising the gain in deployable water output.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>6. To maintain and enhance the economic and social needs of the local community</p>	<p>Will the draft Drought Plan measure ensure sufficient water is available for people and visitors to maintain economic activity in times of drought?</p> <p>Will the draft Drought Plan measures affect local or regional economies?</p> <p>Will the draft Drought Plan measure affect opportunities for recreation at times of drought?</p>	0	0	<p>Effects of Construction</p> <p>Construction of this option will have no effect on the availability of water for people and visitors to maintain economic activity in times of drought and no effects are anticipated on the local or regional economy.</p> <p>This option is located within Snowdonia National Park, an area that provides opportunities for outdoor recreation activities. Although there may be local disruption to footpaths and access from the siting of temporary above ground infrastructure, footpath/road diversions should be possible. No effects on opportunities for recreation activities are therefore anticipated.</p> <p>For this reason, a neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>This option will provide an additional yield of 1.0 Ml/d, which will help to meet the needs of homes, businesses and visitors to this area, helping to support the local and regional economy. This is assessed as a neutral effect according to the definitions of significance used in this assessment.</p> <p>The Afon Dysynni is within Snowdonia National Park and there is therefore the potential for the operation of this option to impact on recreational opportunities (such as angling, canoeing and walking) downstream of the abstraction. The EAR concluded that the proposed temporary abstraction will have negligible hydrological impacts on the flow regime and wetted with/depth in the Afon Dysynni (up to 1.7% reduction in flows). Furthermore, the option would be implemented during a period when water levels would be low. For these reasons, no effects on recreational activities are anticipated.</p> <p>A neutral effect has therefore been determined against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
7. To promote the wise use of resources	<p>Will the draft Drought Plan measure seek to minimise the demand for additional raw materials?</p> <p>Will the draft Drought Plan measure seek to minimise energy consumption?</p> <p>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</p> <p>Will the draft Drought Plan measure encourage sustainable design or use of sustainable materials?</p>	-	-	<p>Effects of Construction</p> <p>The construction phase of the option will require the movement of plant and materials (e.g. g. hardcore for creating hardstanding, materials for the temporary intakes) to site, which will consume fuel. There would also be materials within the new infrastructure (plastics and metals). In accordance with the definitions of significance, this has been assessed as a minor negative effect against this objective.</p> <p>It is acknowledged, however, that it may be possible to hire equipment or use existing Welsh Water pumps, generators and/or pipes and could subsequently be used elsewhere once the temporary infrastructure has been removed from site.</p> <p>The siting of the infrastructure required for this option will have no effect on reuse and recycling of waste, nor will the option encourage sustainable design or the use of sustainable materials.</p> <p>Effects of Operation</p> <p>During operation this option will require tankering of up to 1.0 MI/d from Pont y Garth to the inlet at Penybont WTW over a distance of approximately 6km. Due to the transfer distance and the number of tanker movements (estimated to be up to 34 per day), a minor negative effect has been determined against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>It is assumed that the water abstracted from Afon Dysynni at Pont y Garth will be transferred by water tankers to Penybont WTW over a distance of approximately 6 km.</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>8. To conserve and enhance the cultural, historic and industrial heritage resource.</p>	<p>Will the draft Drought Plan measure conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</p> <p>Will the draft Drought Plan measure avoid or minimise damage to archaeologically important sites?</p> <p>Will the draft Drought Plan measure avoid damage to important wetland areas with potential for paleoenvironmental deposits?</p>	<p>0</p>	<p>0</p>	<p>Effects of Construction</p> <p>New above-ground infrastructure (intake structure and hardstanding) will be required for this option, although temporary in nature. Construction activities such as excavation may be required.</p> <p>The exact location of infrastructure is not currently known. The distance between the abstraction point (Pont y Garth) and Penybont WTW is estimated to be approximately 6 km. It is assumed that wherever possible, Welsh Water will seek to route temporary pipelines and site temporary pumping infrastructure on existing areas of hardstanding (roads, parking areas, tracks etc) in preference to new excavations. There are several heritage features along Afon Dysynni. The closest include Domen Ddreiniog Ancient Monument (medieval remains of a motte and the Grade II Listed Buildings within the Peniarth Estate (Gate piers at the W driveway, Brewery/Laundry, The Clock House and Service yard range of buildings).</p> <p>It is assumed that temporary infrastructure would be located away from heritage features. Any impacts would be short term in nature and, assuming good practice is followed, will not result in significant and long term effects (e.g. no above ground permanent infrastructure proposed).</p> <p>A neutral effect is therefore anticipated against this objective.</p> <p>Effects of Operation</p> <p>During operation of the option, the new temporary above-ground infrastructure described would be in place. There are a number heritage features along Afon Dysynni as detailed above. Given the negligible hydrological impacts on the Afon Dysynni, no material impact on heritage features are anticipated.</p> <p>A neutral effect is therefore anticipated against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>It is assumed that temporary infrastructure (intake structure and hardstanding) would be located away from heritage features.</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>9. To protect and enhance landscape and seascape character and other protected features</p>	<p>Is it likely that the draft Drought Plan measure will have significant visual impacts?</p> <p>Will the draft Drought Plan measure avoid adverse effects on, and enhance where possible, the special qualities of protected/designated landscapes (including woodlands) or seascapes such as National Parks or AONBs?</p> <p>Will the draft Drought Plan measure help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness?</p>	-	-	<p>Effects of Construction</p> <p>Afon Dysynni and the site of the intake structure and temporary hardstanding are located within Snowdonia National Park. The Park has striking views with notable features including stone walls, clusters of Scots Pine and the Craig yr Aderyn (Bird's Rock).</p> <p>New above-ground infrastructure (intake structure and hardstanding) will be required for this option, although temporary in nature.</p> <p>Whilst the new above ground infrastructure will be located in a designated landscape, due to its temporary nature and relatively small scale, a minor negative effect has been determined against this objective..</p> <p>Effects of Operation</p> <p>During operation of the option, the new temporary above-ground infrastructure described would be in place. Furthermore, minor effects on landscape and views arising from the tanker movements (estimated at 34 per day) are anticipated. For the same reasons as stated above, a minor negative effect has been determined against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
Summary	<p>Effects of Construction</p> <p>Minor negative effects have been determined against objective 9 (landscape), as this option would require implementation of temporary and localised infrastructure within a designated landscape. Minor negative effects are determined against objective 2 (soils) due to potential disruption to soils from constructing temporary infrastructure. Minor negative effects are determined against objective 4 (climate change) and objective 7 (resource use) due to the resources consumed (and carbon emitted) when transporting infrastructure to site and materials (and embodied carbon) in temporary infrastructure (intake). Minor negative effects have been determined against objective 5 (human health) due to potential for disturbance during implementation. Uncertain effects are determined against objective 1 (biodiversity) as the effects of this option on designated sites are not known. The anticipated effects against all other objectives are neutral.</p> <p>Effects of Operation</p> <p>Minor negative effects are determined against objective 9 (landscape), due to the presence new (but temporary and small scale) infrastructure in Snowdonia National Park. A minor negative effect has been determined against objective 7 (resource use) due to energy consumption associated with the tankering of abstracted water over a distance of 6 km. A mixed minor negative effect (in recognition of the additional energy consumption and carbon emissions associated with the proposed abstraction) and minor positive effect (in recognition of the role of the option in improving drought resilience) has been determined against objective 4 (climate change). Minor positive effects are determined against objective 5 (human health) due to yield of this option, which will help to meet the water needs of residents, businesses and visitors to the area. The anticipated effects against all other objectives are neutral.</p> <p>Mitigation</p> <p>None</p>			

8033-2 Reduce compensation water releases from Llyn Bodlyn

Option Summary

Welsh Water hold a licence to abstract water at Llyn Bodlyn, which includes the following conditions:

- 980 million litres (Ml) authorised to be abstracted per annum;
- an abstraction rate not exceeding 3.0Ml/d, with provision to increase to 3.5 Ml/d on any 14 days during the year; and
- discharge of compensation water (equivalent to a continuous daily release) of 2.18Ml/d to the Afon Ysgethin (a requirement of the Barmouth Local Board Act 1891).

The abstraction for potable supply is made directly from the reservoir and piped 5km by gravity to the local water treatment works (WTW) at Eithyn Fynydd for treatment and distribution. Abstraction under gravity can be achieved to a maximum drawdown level of 3.2m below reservoir spillway crest level. Compensation releases are controlled through a notched weir system. At high reservoir levels (above the spillway crest level) excess water spills from the reservoir to the Afon Ysgethin down a 3m wide spillway channel.

This option involves a reduction in the compensation release from Llyn Bodlyn to the Afon Ysgethin from 2.18Ml/d to 1.18Ml/d. This would conserve the reservoir storage for use in direct supply during a drought and improve the probability of reservoir winter refill. The option scheme will potentially influence the downstream Afon Ysgethin.

Drought permits can be granted for a period of up to six months, and they can be extended for up to a further six months. However, the period of implementation for this drought order **would only** be July to October, as **confirmed with NRW and** by water resources modelling carried out by Welsh Water.

No new infrastructure would be required for this option.

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity.</p>	<p>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs and priority habitats and species)?</p> <p>Will the draft Drought Plan measure protect and enhance non-designated sites and local biodiversity?</p> <p>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</p> <p>Will the draft Drought Plan measure affect the condition of ecosystems (including their connectivity, structure and functioning)?</p> <p>Will the draft Drought Plan measure enhance the adaptability of ecosystems?</p> <p>Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?</p>	<p>0</p>	<p>--/?</p>	<p>Llyn Bodlyn Reservoir is not located within European or nationally designated site for nature conservation, although is located within Snowdonia National Park. Approximately 2km of the lower Afon Ysgethin flows through the Coedydd Derw a Safleoedd Ystlumod Merion SAC (Meirionnydd Oakwoods and Bat Sites SAC). Interest features of this SAC include water courses of plain to montane levels and alluvial forests and bog woodland, however these features only occur in one of the SAC units (Glaslyn) which is not located near Llyn Bodlyn. The SAC unit downstream of Llyn Bodlyn is Unit 12, Coed Cors y Gedol, which is designated for oak woodland and not for any aquatic features or bog woodland and is also designated as a SSSI. It is one of the best examples of a woodland type for which West Wales is an important centre and contains some rare plant species.</p> <p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of the option, no effects from construction would occur.</p> <p>Effects of Operation</p> <p>The hydrological impacts associated with a reduction in compensation discharge will include reduction in river flows of up to 46% with a corresponding reduction in wetted width and depth during the summer/autumn period for the Afon Ysgethin.</p> <p>The Ysgethin flows to the Pen Llyn a`r Sarnau/ Lley Peninsula and the Sarnau SAC via the Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods and Bat Sites SAC. The option will result in reductions of up to 16% in river flows in Reach 2 (i.e. to the tidal limit) with corresponding reductions in wetted depths/wetted widths (potential marginal habitats) during the summer and autumn period.</p> <p>None of the principal water resource sensitive interest features of the Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods and Bat Sites SAC are present in the Afon Ysgethin or the Coed-y-Gadol woodlands, although the some of the 'typical species' associated with the woodland features may have a small sensitivity to changes in splash zones and so effects are possible but unlikely.</p> <p>The EAR for this option has also identified "major to moderate aquatic ecology impacts including on fish, macroinvertebrates, macrophytes, as well as minor impacts for phytobenthos". The effects on fish are related to the reduction in spawning and juvenile survival due to habitat loss, arising from reduced flows, and which could affect salmon and brown trout although there is some residual uncertainty as it depends on the exact timing/duration of the option's implementation, existing flow conditions and the fish species affected.</p>

Objective	Key Questions	Relationship		Commentary
				<p>Overall, taking into account the objective and guide questions, this option has been assessed as having a significant/uncertain effect on biodiversity.</p> <p>Mitigation</p> <ul style="list-style-type: none"> There are several mitigation measures that are appropriate, depending on the fish species being protected. The approaches include habitat enhancement, the removal of barriers to migration to enable recolonization and the gradual reduction of compensation flow. <p>Assumptions</p> <ul style="list-style-type: none"> None <p>Uncertainty</p> <ul style="list-style-type: none"> None
<p>2. To ensure the appropriate and efficient use of land and protect and enhance soil quality and geodiversity.</p>	<p>Will additional land be required for the development or implementation of the option or will the option require below ground works leading to land sterilisation?</p> <p>Will the draft Drought Plan utilise previously developed land?</p> <p>Will the draft Drought Plan measure minimise the loss of best and most versatile agricultural land?</p> <p>Will the draft Drought Plan measure affect upland (peat-dominated) and other wetland soils?</p> <p>Will the draft Drought Plan measure protect and enhance protected sites designated for their geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest?</p>	0	0	<p>Effects of Construction</p> <p>The option requires no construction and therefore implementation is not expected to result in any effects on upland or wetland soils.</p> <p>Effects of Operation</p> <p>This option would result in reduced water levels in Afon Ysgethin. Conceivably, this could lead to drying out of soils adjacent to the river (which could already be affected during an extended period of low rainfall). The lower reaches of the Afon Ysgethin are an incised channel with a steep gradient (1 in 13). The steep gradient of this reach and the narrow boulder/cobble-bed river channel produce a cascade-pool effect, reducing the wetted depth sensitivity of the watercourse during episodes of low flow. In the absence of any designated wetland sites or upland soils near the river a neutral effect has been determined.</p> <p>Mitigation</p> <ul style="list-style-type: none"> None <p>Assumptions</p> <ul style="list-style-type: none"> None <p>Uncertainty</p> <ul style="list-style-type: none"> None

Objective	Key Questions	Relationship		Commentary
<p>3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water Framework Directive</p>	<p>Will the draft Drought Plan measure lead to a change in river flows, wetted width or river level?</p> <p>Will the draft Drought Plan measure affect surface water quality and quantity?</p> <p>Will the draft Drought Plan measure lead to changes in groundwater quality, quantity and recharge?</p> <p>Will the draft Drought Plan measure lead to the deterioration of Water Framework Directive (WFD) waterbody status (or potential) from, inter alia, changes in fluvial geomorphology?</p> <p>Will the draft Drought Plan measure jeopardise the achievement of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Water Framework Directive (WFD)?</p>	0	--	<p>Effects of Construction</p> <p>The option requires no construction and therefore will not lead to a change in river flows, surface water or groundwater quantity. For the same reason, no effects on water quality or on WFD status are expected.</p> <p>Effects of Operation</p> <p>This option would lead to a 46% reduction of flows in Afon Ysgethin downstream of Llyn Bodlyn. The Afon Ysgethin is a heavily modified waterbody due to the impoundment and abstraction from the reservoir. The ecological quality of the Llyn Boyn Reservoir is 'moderate' and the Afon Ysgethin is also 'Moderate'. Reduction of compensation flow would impact on water quality and quantity in the river and could cause some deterioration of the ecological quality or slow down improvement to 'good potential'. These effects could be mitigated to some extent by re-stocking following a drought. However, due to the major reduction in flow in the Afon Ysgethin, a significant negative effect has been determined against this objective.</p> <p>Water levels in Llyn Bodlyn would be temporarily higher than without the option during a drought period. However these benefits are considered negligible and temporary in nature as the level of the reservoir would continue to decline (albeit as a reduced rate) as a drought progresses. Overall, a significant negative effect has been determined against this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None
<p>4. To limit the causes and potential consequences of climate change and to adapt to future changes</p>	<p>Will the draft Drought Plan measure reduce or minimise greenhouse gas emissions?</p> <p>Will the draft Drought Plan measure reduce vulnerability to the effects of climate change by appropriate adaptation?</p> <p>Will the draft Drought Plan measure increase environmental resilience to the effects of climate change including to impacts on water quality?</p>	0	+	<p>Effects of Construction</p> <p>The implementation of this option will not require any construction, therefore a neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>Energy requirements and carbon emission have not been quantified by Welsh Water for any options at this stage and therefore a qualitative assessment has been made based on the infrastructure required to implement this option.</p> <p>UKCP18 climate change scenarios anticipate longer hotter summers and in turn and in both the frequency and duration of droughts. This option would provide Welsh</p>

Objective	Key Questions	Relationship		Commentary
	<p>Will the draft Drought Plan measure reduce or minimise air pollutant emissions?</p>			<p>Water with additional capacity to manage drought conditions and as such is considered to contribute towards climate change adaptation.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None
<p>5. To protect and enhance human health with special regard to vulnerable groups in society</p>	<p>Will the draft Drought Plan measure ensure continuity of clean drinking water supply within statutory standards supply at times of drought?</p> <p>Will the draft Drought Plan measure affect the affordability of clean drinking water?</p> <p>Will the draft Drought Plan measure adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise levels)?</p> <p>Will the draft Drought Plan measures affect human health or the health of any vulnerable groups?</p> <p>Will the Drought Plan measure affect public access to, or enjoyment of, local green/blue space?</p> <p>Will the Drought Plan measure impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?</p>	<p>0</p>	<p>+</p>	<p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of the option, no effects from construction would occur.</p> <p>Effects of Operation</p> <p>This option will provide a further 1 Ml/d of drinking water, which will help to meet the water needs of society. A minor positive effect is therefore determined against this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None

Objective	Key Questions	Relationship		Commentary
<p>6. To maintain and enhance the economic and social needs of the local community</p>	<p>Will the draft Drought Plan measure ensure sufficient water is available for people and visitors to maintain economic activity in times of drought?</p> <p>Will the draft Drought Plan measures affect local or regional economies?</p> <p>Will the draft Drought Plan measure affect opportunities for recreation at times of drought?</p>	0	0	<p>Effects of Construction As there is no construction there will be no effect on the availability of water for people and visitors to maintain economic activity in times of drought.</p> <p>Effects of Operation This option will provide an additional yield of 1 Ml/d, which although helping to meet the needs of homes, businesses and visitors to this area it is less than the yield stated in the definitions of significance for a minor positive effect against this objective.</p> <p>The EAR identifies that any reduction in wetted width and depth may influence water-dependent activities such as angling and canoeing. However, water levels will already be naturally low in times of drought and will already have curtailed these recreational activities prior to the drought order implementation. Any impacts will be temporary in nature and will be ameliorated once the drought has passed. As such, a negligible effect has been identified.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None
<p>7. To promote the wise use of resources</p>	<p>Will the draft Drought Plan measure seek to minimise the demand for additional raw materials?</p> <p>Will the draft Drought Plan measure seek to minimise energy consumption?</p> <p>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</p> <p>Will the draft Drought Plan measure encourage sustainable design or use of sustainable materials?</p>	0	0	<p>Effects of Construction This option will not require the new raw materials as it will make use of existing Infrastructure therefore a neutral effect has been identified against this objective.</p> <p>Effects of Operation During operation this option will require no additional energy use or resources required, over and above those currently used to treat water from Llyn Bodlyn reservoir; a neutral effect is therefore anticipated against this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None

Objective	Key Questions	Relationship		Commentary
				<p>Uncertainty</p> <ul style="list-style-type: none"> None
<p>8. To conserve and enhance the cultural, historic and industrial heritage resource.</p>	<p>Will the draft Drought Plan measure conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</p> <p>Will the draft Drought Plan measure avoid or minimise damage to archaeologically important sites?</p> <p>Will the draft Drought Plan measure avoid damage to important wetland areas with potential for paleoenvironmental deposits?</p>	0	0	<p>Effects of Construction</p> <p>This option will not require the construction of new infrastructure and as such a neutral effect has been identified against this objective.</p> <p>Effects of Operation</p> <p>The Grade II listed Pont Fadog is Roadbridge on the original Medieval drovers' route from Bwlch y Rhiwgr to Bontddu and Dolgellau and crosses the Afon Ysgethin east of Tal-y-Bont. Pont Schethin bridge is approximately half way along Reach 1 and is a Scheduled Ancient Monument. The up 14% reduction in flow within Reach 2 is not considered sufficient to effect the heritage assets within Reach 2.</p> <p>Whilst there is the potential for reduced flows to affect the settings of these assets, particularly where they experience views to/from the Afon Ysgethin; any effects in this regard would be temporary and reversible and in consequence, be negligible.</p> <p>Mitigation</p> <ul style="list-style-type: none"> None <p>Assumptions</p> <ul style="list-style-type: none"> None <p>Uncertainty</p> <ul style="list-style-type: none"> None
<p>9. To protect and enhance landscape and seascape character and other protected features</p>	<p>Is it likely that the draft Drought Plan measure will have significant visual impacts?</p> <p>Will the draft Drought Plan measure avoid adverse effects on, and enhance where possible, the special qualities of protected/designated landscapes (including woodlands) or seascapes such as National Parks or AONBs?</p>	0	-	<p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of the option, no effects from construction would occur.</p> <p>Effects of Operation</p> <p>Llyn Bodlyn and the Afon Ysgethin lie within the Meirionnydd area, a mountainous area with deep valleys, wide estuaries and extensive sandy beaches. The site lies within the Snowdonia National Park and is of high overall landscape and visual amenity value. A review of the hydrological implications of implementing the option at</p>

Objective	Key Questions	Relationship		Commentary
	<p>Will the draft Drought Plan measure help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness?</p>			<p>this site has identified that both Llyn Bodlyn and the Afon Ysgethin will be affected. Reduction in water levels directly affects the landscape and visual amenity value of the site, although this will only be temporary and will be ameliorated once the drought has passed.</p> <p>The water level in the reservoir would be maintained over a longer period than without the operation of the option, which would help maintain the beauty of the national park, which attracts visitors for activities such as walking. Due to the short-term nature, this effect is anticipated to be negligible.</p> <p>Overall, a minor negative effect has been determined against this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None
<p>Summary</p>	<p>Effects of Construction</p> <p>The option does not involve the construction of any infrastructure and as such no effects are anticipated.</p> <p>Effects of Operation</p> <p>A significant negative effect (with some uncertainty) has been identified against objective 1 (biodiversity) as a result of an anticipated significant adverse impact on fish in particular brown trout, and a lesser effect on macroinvertebrates, macrophytes and phytobenthos. A significant negative has also been identified for objective 3 (water) and a result of the potential effects of the option on the WFD status of the affected water bodies. The reduction in flow has also been identified as having a minor adverse effect on objective 9 (landscape). The gain in deployable water output has led to the identification of a minor positive effect for objective 5 (human health) and the role of the option in improving drought resilience has also led to the identification of a minor positive against objective 4 (climate change).</p> <p>Mitigation</p> <p>There are several mitigation measures that are appropriate to address the effect on biodiversity, depending on the fish species being protected. The approaches include habitat enhancement, the removal of barriers to migration to enable recolonization and the gradual reduction of compensation flow.</p>			

8034-1 Afon Dwyfor Drought Permit

Option Summary

The drought permit involves a temporary increase of 1Ml/d in the daily abstraction rate at the Garndolbenmaen intake, without a corresponding increase in the daily regulation release rate from Llyn Cwmystradllyn when flow at Dolbenmaen weir is below the seasonal flow constraint limit.

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity.</p>	<p>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs and priority habitats and species)?</p> <p>Will the draft Drought Plan measure protect and enhance non-designated sites and local biodiversity?</p> <p>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</p> <p>Will the draft Drought Plan measure affect the condition of ecosystems (including their connectivity, structure and functioning)?</p> <p>Will the draft Drought Plan measure enhance the adaptability of ecosystems?</p> <p>Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?</p>	<p>0</p>	<p>0</p>	<p>Effects of Construction</p> <p>The option would require no additional construction to take place to the existing reservoir and no effects on biodiversity are predicted. In consequence, a neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>The EAR has identified that the operation of this option will have no hydrological effect on Reach 1 (Llyn Cwmystradllyn Outflow to Afon Ddu confluence), Reach 2 (Afon Ddu confluence to Afon Dwyfor confluence) and Reach 3 (Afon Henwy confluence to Garndolbenmaen intake), with a negligible effect identified for Reach 4 (Garndolbenmaen intake to tidal limit). As a result, the operation of this option is not anticipated to have an effect on any sites of importance for nature conservation or protected species.</p> <p>Overall, this option has been assessed as having a neutral effect on this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>2. To ensure the appropriate and efficient use of land and protect and enhance soil quality and geodiversity.</p>	<p>Will additional land be required for the development or implementation of the option or will the option require below ground works leading to land sterilisation?</p> <p>Will the draft Drought Plan utilise previously developed land?</p> <p>Will the draft Drought Plan measure minimise the loss of best and most versatile agricultural land?</p> <p>Will the draft Drought Plan measure affect upland (peat-dominated) and other wetland soils?</p> <p>Will the draft Drought Plan measure protect and enhance protected sites designated for their geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest?</p>	<p>0</p>	<p>0</p>	<p>Effects of Construction</p> <p>The option requires no construction and therefore its implementation is not expected to result in any effects on land use or upland or wetland soils.</p> <p>Effects of Operation</p> <p>The EAR has identified that the operation of this option will have no hydrological effect on Reach 1 (Llyn Cwmystradllyn Outflow to Afon Ddu confluence), Reach 2 (Afon Ddu confluence to Afon Dwyfor confluence) and Reach 3 (Afon Henwy confluence to Garndolbenmaen intake), with a negligible effect identified for Reach 4 (Garndolbenmaen intake to tidal limit). As a result, the operation of this option is not anticipated to have an effect on land use or soils.</p> <p>Overall, this option has been assessed as having a neutral effect on this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water Framework Directive</p>	<p>Will the draft Drought Plan measure lead to a change in river flows, wetted width or river level?</p> <p>Will the draft Drought Plan measure affect surface water quality and quantity?</p> <p>Will the draft Drought Plan measure lead to changes in groundwater quality, quantity and recharge?</p> <p>Will the draft Drought Plan measure lead to the deterioration of Water Framework Directive (WFD) waterbody status (or potential) from, inter alia, changes in fluvial geomorphology?</p> <p>Will the draft Drought Plan measure jeopardise the achievement of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Water Framework Directive (WFD)?</p>	0	0	<p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of the option, no effects from construction would occur. A neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>The EAR has identified that the operation of this option will have no hydrological effect on Reach 1 (Llyn Cwmystradllyn Outflow to Afon Ddu confluence), Reach 2 (Afon Ddu confluence to Afon Dwyfor confluence) and Reach 3 (Afon Henwy confluence to Garndolbenmaen intake), with a negligible effect identified for Reach 4 (Garndolbenmaen intake to tidal limit). As a result, the operation of this option is not anticipated to have an effect on water quality or the objectives of the Water Framework Directive.</p> <p>Overall, this option has been assessed as having a neutral effect on this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>4. To limit the causes and potential consequences of climate change and to adapt to future changes</p>	<p>Will the draft Drought Plan measure reduce or minimise greenhouse gas emissions?</p> <p>Will the draft Drought Plan measure reduce vulnerability to the effects of climate change by appropriate adaptation?</p> <p>Will the draft Drought Plan measure increase environmental resilience to the effects of climate change including to impacts on water quality?</p> <p>Will the draft Drought Plan measure reduce or minimise air pollutant emissions?</p>	<p>0</p>	<p>+</p>	<p>Effects of Construction</p> <p>The implementation of this option will not require any construction, therefore a neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>This option does not require any changes to infrastructure or pumping. Water would be treated at existing WTWs. Energy would be required to treat the water at the existing works with associated greenhouse gas emissions; however, no further energy consumption would arise from new infrastructure.</p> <p>UKCP18 climate change scenarios anticipate longer, hotter summers and, in turn, increases in both the frequency and duration of droughts. This option would provide Welsh Water with additional capacity to manage drought conditions and as such is considered to contribute towards climate change adaptation.</p> <p>Overall, this option has been assessed as having a minor positive effect on this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>5. To protect and enhance human health with special regard to vulnerable groups in society</p>	<p>Will the draft Drought Plan measure ensure continuity of clean drinking water supply within statutory standards supply at times of drought?</p> <p>Will the draft Drought Plan measure affect the affordability of clean drinking water?</p> <p>Will the draft Drought Plan measure adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise levels)?</p> <p>Will the draft Drought Plan measures affect human health or the health of any vulnerable groups?</p> <p>Will the Drought Plan measure affect public access to, or enjoyment of, local green/blue space?</p> <p>Will the Drought Plan measure impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?</p>	<p>0</p>	<p>+</p>	<p>Effects of Construction</p> <p>There is no construction required and therefore no effects are expected on water quality or clean drinking water supply. There would be no direct disturbance to local residents. Therefore a neutral effect is identified.</p> <p>Effects of Operation</p> <p>The operation of this option will provide a gain in deployable output of 1Ml/d, which will help to ensure that water supply is maintained during periods of drought. Those living, working or visiting the area are unlikely to be directly disturbed by the scheme.</p> <p>Overall, this option has been assessed as having a positive effect on this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>6. To maintain and enhance the economic and social needs of the local community</p>	<p>Will the draft Drought Plan measure ensure sufficient water is available for people and visitors to maintain economic activity in times of drought?</p> <p>Will the draft Drought Plan measures affect local or regional economies?</p> <p>Will the draft Drought Plan measure affect opportunities for recreation at times of drought?</p>	<p>0</p>	<p>0</p>	<p>Effects of Construction</p> <p>As there is no construction associated with this option, there will be no effect on the availability of water for people and visitors to maintain economic activity in times of drought. Further, it is not anticipated that the option would generate any economic benefits (e.g. job creation or investment in supply chains).</p> <p>Effects of Operation</p> <p>This option will provide an additional yield of 1 MI/d, which although helping to meet the needs of homes, businesses and visitors to this area it is less than the yield stated in the definitions of significance for a minor positive effect against this objective.</p> <p>Recreational activities in the area include walking, climbing, angling and fishing, however as the operation of the option is anticipated to have a negligible effect on the hydrology, no effect is anticipated.</p> <p>Overall, this option has been assessed as having a neutral effect on this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>7. To promote the wise use of resources</p>	<p>Will the draft Drought Plan measure seek to minimise the demand for additional raw materials?</p> <p>Will the draft Drought Plan measure seek to minimise energy consumption?</p> <p>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</p> <p>Will the draft Drought Plan measure encourage sustainable design or use of sustainable materials?</p>	<p>0</p>	<p>0</p>	<p>Effects of Construction</p> <p>This option will not require the use of raw materials as it will make use of existing infrastructure. A neutral effect has therefore been identified against this objective.</p> <p>Effects of Operation</p> <p>During operation, this option will not require any additional energy consumption or use of any additional materials. As such, a neutral effect has been determined against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>8. To conserve and enhance the cultural, historic and industrial heritage resource.</p>	<p>Will the draft Drought Plan measure conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</p> <p>Will the draft Drought Plan measure avoid or minimise damage to archaeologically important sites?</p> <p>Will the draft Drought Plan measure avoid damage to important wetland areas with potential for paleoenvironmental deposits?</p>	<p>0</p>	<p>0</p>	<p>Effects of Construction</p> <p>This option will not require the construction of new infrastructure and as such, a neutral effect has been identified against this objective.</p> <p>Effects of Operation</p> <p>The EAR has identified that the operation of this option will have no hydrological effect on Reach 1 (Llyn Cwmystradlyn Outflow to Afon Ddu confluence), Reach 2 (Afon Ddu confluence to Afon Dwyfor confluence) and Reach 3 (Afon Henwy confluence to Garndolbenmaen intake), with a negligible effect identified for Reach 4 (Garndolbenmaen intake to tidal limit). As a result, the operation of this option is not anticipated to have an effect on any historic assets.</p> <p>Overall, this option has been assessed as having a neutral effect on this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>9. To protect and enhance landscape and seascape character and other protected features</p>	<p>Is it likely that the draft Drought Plan measure will have significant visual impacts?</p> <p>Will the draft Drought Plan measure avoid adverse effects on, and enhance where possible, the special qualities of protected/designated landscapes (including woodlands) or seascapes such as National Parks or AONBs?</p> <p>Will the draft Drought Plan measure help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness?</p>	<p>0</p>	<p>0</p>	<p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of the option, no effects from construction would occur. A neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>The EAR has identified that the operation of this option will have no hydrological effect on Reach 1 (Llyn Cwmystradllyn Outflow to Afon Ddu confluence), Reach 2 (Afon Ddu confluence to Afon Dwyfor confluence) and Reach 3 (Afon Henwy confluence to Garndolbenmaen intake), with a negligible effect identified for Reach 4 (Garndolbenmaen intake to tidal limit). As a result, the operation of this option is not anticipated to have an effect on the landscape.</p> <p>Overall, this option has been assessed as having a neutral effect on this objective.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty None</p>
<p>Summary</p>	<p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of the option, no effects from construction would occur.</p> <p>Effects of Operation</p> <p>The EAR has identified that the operation of this option will have no hydrological effect on Reach 1 (Llyn Cwmystradllyn Outflow to Afon Ddu confluence), Reach 2 (Afon Ddu confluence to Afon Dwyfor confluence) and Reach 3 (Afon Henwy confluence to Garndolbenmaen intake), with a negligible effect identified for Reach 4 (Garndolbenmaen intake to tidal limit). As a result a neutral effect has been identified for objective 1 (biodiversity), objective 2 (soils), objective 3 (water), objective 6 (community), objective 7 (material assets), objective 8 (cultural heritage) and objective 9 (landscape).</p> <p>The role of the option in improving drought resilience has also led to the identification of a minor positive against objective 4 (climate change).and the gain in deployable water output has led to the identification of a minor positive effect for objective 5 (human health).</p> <p>Mitigation None</p>			

8109-1 Reduction in compensation water releases from Llwynon Reservoir

Option Summary

Llwynon Reservoir sits as the furthest downstream of the three Taf Fawr Reservoirs, with Cantref and Beacons Reservoirs feeding into Llwynon from upstream. Together, they form a major water supply for the SEWCUS (Llwynon, Sluvad, Court Farm) water resource zone, providing 34,100 MI potable supply per year. The potable supply is transferred, via gravity alone, directly to Llwynon WTW. The reservoirs release into the Afon Taf Fawr, flowing into the River Taff after its confluence with Afon Taf Fechan. DCWW also hold a second abstraction licence for Llwynon Reservoir, to release a further 18.2 MI/day into the Afon Taf Fawr for non-consumptive use in the fisheries immediately downstream of the reservoir impoundment. The non-consumptiveness also means it effectively acts as a compensation release for the Afon Fawr and River Taff.

Drought orders may remain in force for a period of up to six months, and they can be extended for up to a further six months. However, the period of implementation for this drought order is restricted to September to November, as confirmed with NRW and by water resources modelling carried out by Welsh Water.

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity.</p>	<p>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs and priority habitats and species)?</p> <p>Will the draft Drought Plan measure protect and enhance non-designated sites and local biodiversity?</p> <p>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</p> <p>Will the draft Drought Plan measure affect the condition of ecosystems (including their connectivity, structure and functioning)?</p> <p>Will the draft Drought Plan measure enhance the adaptability of ecosystems?</p> <p>Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?</p>	0	--/?	<p>Effects of Construction</p> <p>The option would require no additional construction to take place no effects on biodiversity are predicted. In consequence, a neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>The hydrological impacts associated with a reduction in the non-consumptive fisheries abstraction from Llwynon Reservoir will include an up to 50% reduction in low flows in Reach 1 (Llwynon Reservoir outflow to the confluence with Taf Fechan), up 16% in Reach 2 (confluence with Taf Fechan to the confluence with Afon Taf Bargoed) and 11% in Reach 3 (confluence with Afon Taf Bargoed to the confluence with Afon Cynon).</p> <p>The option is not within any national or international sites of importance for nature conservation; however, would reduce flows into the Afon Taf Fawr which ultimately flows to the Severn Estuary SAC / SPA / Ramsar sites at Cardiff Bay via the Afon Taf. However, the effects of this option are unlikely to be measurable at the estuary and on this basis no significant effects will occur.</p> <p>The EAR competed for this option gave consideration to the potential effects on the Daren Fach, Penmoelallt, Cwm Taf Fechan Woodlands and Cwm Glo a Glydyryrs SSSIs, concluding that implementation of the drought permit would not result in likely significant effects on the designated features of any of the four sites.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>The EAR has identified that this option may have major adverse impacts on fish within Reach 1 (Llwynon Reservoir outflow to the confluence with Taf Fechan) due to reduced flows and related changes to water quality. In this regard, the potential for reductions in spawning and juvenile survival due to habitat loss is identified as a major impact for Atlantic Salmon, Brown Trout and Bullhead. However, the likelihood of this impact occurring and its exact magnitude is uncertain as it depends on the exact timing/duration of the option's implementation, existing flow conditions and the fish species affected; the EAR also notes that there is an absence of reliable data in this regard. No major impacts have been identified for fish species within the subsequent affected reaches as the operational effect of the option on flows is reduced.</p> <p>Due to the potential for major impacts on Atlantic Salmon, Sea / Brown Trout and Bullhead, this option has been assessed as having a significant negative effect on this objective, although some uncertainty remains.</p> <p>Mitigation</p> <p>There are several mitigation measures that are appropriate, depending on the fish species being protected. The approaches include the temporary reduction or cessation of this option and temporary measures to reduce fish predation.</p> <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <p>There is absence of reliable data for fish species.</p> <p>There remains uncertainty with regard to the timing/duration of the option's implementation and the scale/magnitude of effects on species including Brown Trout and Atlantic Salmon.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>2. To ensure the appropriate and efficient use of land and protect and enhance soil quality and geodiversity.</p>	<p>Will additional land be required for the development or implementation of the option or will the option require below ground works leading to land sterilisation?</p> <p>Will the draft Drought Plan utilise previously developed land?</p> <p>Will the draft Drought Plan measure minimise the loss of best and most versatile agricultural land?</p> <p>Will the draft Drought Plan measure affect upland (peat-dominated) and other wetland soils?</p> <p>Will the draft Drought Plan measure protect and enhance protected sites designated for their geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest?</p>	<p>0</p>	<p>0</p>	<p>Effects of Construction</p> <p>The option requires no construction and therefore its implementation is not expected to result in any effects on land use or upland or wetland soils.</p> <p>Effects of Operation</p> <p>The operation of this option is anticipated to reduce flows in Reach 1 (Llwynon Reservoir outflow to the confluence with Taf Fechan) in particular, which will decrease the wetted perimeter, exposing more bankside soils. No areas along the reach have been identified specifically for being wetland or upland bogs which would directly be impacted by these reduced flows.</p> <p>Overall, a neutral effect is determined against this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water Framework Directive</p>	<p>Will the draft Drought Plan measure lead to a change in river flows, wetted width or river level?</p> <p>Will the draft Drought Plan measure affect surface water quality and quantity?</p> <p>Will the draft Drought Plan measure lead to changes in groundwater quality, quantity and recharge?</p> <p>Will the draft Drought Plan measure lead to the deterioration of Water Framework Directive (WFD) waterbody status (or potential) from, inter alia, changes in fluvial geomorphology?</p> <p>Will the draft Drought Plan measure jeopardise the achievement of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Water Framework Directive (WFD)?</p>	<p>0</p>	<p>-</p>	<p>Effects of Construction</p> <p>The option requires no construction and therefore will not lead to a change in river flows, surface water or groundwater quantity.</p> <p>For the same reason, no effects on water quality or on WFD status are expected.</p> <p>Effects of Operation</p> <p>The hydrological impacts associated with a reduction in the non-consumptive fisheries abstraction from Llwynon Reservoir will include an up to 50% reduction in low flows in Reach 1 (Llwynon Reservoir outflow to the confluence with Taf Fechan), up 16% in Reach 2 (confluence with Taf Fechan to the confluence with Afon Taf Bargoed) and 11% in Reach 3 (confluence with Afon Taf Bargoed to the confluence with Afon Cynon).</p> <p>The affected reaches of the Afon Taff are currently assessed as having a moderate overall status (2018 C2 interim Classification). While the option will ensure that compensation flows exist, these will be lower than under the current operational regime. The EAR notes a potential minor negative effect on the WFD status of the river for both macrohytes and fish within Reach 3. For these reasons, a minor negative effect has therefore been determined against this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None. <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>4. To limit the causes and potential consequences of climate change and to adapt to future changes</p>	<p>Will the draft Drought Plan measure reduce or minimise greenhouse gas emissions?</p> <p>Will the draft Drought Plan measure reduce vulnerability to the effects of climate change by appropriate adaptation?</p> <p>Will the draft Drought Plan measure increase environmental resilience to the effects of climate change including to impacts on water quality?</p> <p>Will the draft Drought Plan measure reduce or minimise air pollutant emissions?</p>	<p>0</p>	<p>+</p>	<p>Effects of Construction</p> <p>The implementation of this option will not require any construction, therefore a neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>Operational energy requirements and associated carbon emissions have not been quantified by Welsh Water for any options at this stage and therefore a qualitative assessment has been made based on the infrastructure required to implement this option.</p> <p>This option will transfer an additional 9.1 MI/d from Llwynon Reservoir to the Llwynon WTW and on to the supply network. This transfer is solely gravity driven, and there is no extra capacity or power required at the WTW to cope with the additional water transferred. As this option will not require additional energy it is not anticipated to lead to an increase in greenhouse gas emissions.</p> <p>UKCP18 climate change scenarios anticipate longer, hotter summers and, in turn, increases in both the frequency and duration of droughts. This option would provide Welsh Water with additional capacity to manage drought conditions and as such is considered to contribute towards climate change adaptation.</p> <p>Overall, this option has been assessed as having a minor positive effect on this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>5. To protect and enhance human health with special regard to vulnerable groups in society</p>	<p>Will the draft Drought Plan measure ensure continuity of clean drinking water supply within statutory standards supply at times of drought?</p> <p>Will the draft Drought Plan measure affect the affordability of clean drinking water?</p> <p>Will the draft Drought Plan measure adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise levels)?</p> <p>Will the draft Drought Plan measures affect human health or the health of any vulnerable groups?</p> <p>Will the Drought Plan measure affect public access to, or enjoyment of, local green/blue space?</p> <p>Will the Drought Plan measure impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?</p>	<p>0</p>	<p>++</p>	<p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of the option, no effects from construction would occur.</p> <p>Effects of Operation</p> <p>The operation of this option will provide a gain in deployable output of 9.1Ml/d, which will help to ensure that water supply is maintained during periods of drought. Those living, working or visiting the area are unlikely to be directly disturbed by the scheme.</p> <p>Overall, this option has been assessed as having a significant positive effect on this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>6. To maintain and enhance the economic and social needs of the local community</p>	<p>Will the draft Drought Plan measure ensure sufficient water is available for people and visitors to maintain economic activity in times of drought?</p> <p>Will the draft Drought Plan measures affect local or regional economies?</p> <p>Will the draft Drought Plan measure affect opportunities for recreation at times of drought?</p>	<p>0</p>	<p>+</p>	<p>Effects of Construction</p> <p>As there is no construction associated with this option, there will be no effect on the availability of water for people and visitors to maintain economic activity in times of drought. Further, it is not anticipated that the option would generate any economic benefits (e.g. job creation or investment in supply chains).</p> <p>Effects of Operation</p> <p>This option will provide an additional yield of 9.1MI/d. This would help to meet the water supply needs of homes, businesses and visitors in the area during periods of drought, supporting the local and regional economy. This water resource zone, although containing the Brecon Beacons National Park, does not exhibit the same water demand patterns that are exhibited in other water resource zones due to the seasonal tourist influx.</p> <p>It is possible reduced flows in the river reaches would affect other recreational activities such as fishing, but the extent of these effects is identified within the EAR as negligible. Effects would be of short duration occurring during the autumn.</p> <p>Overall, this option has been assessed as having a minor positive effect on this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
7. To promote the wise use of resources	<p>Will the draft Drought Plan measure seek to minimise the demand for additional raw materials?</p> <p>Will the draft Drought Plan measure seek to minimise energy consumption?</p> <p>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</p> <p>Will the draft Drought Plan measure encourage sustainable design or use of sustainable materials?</p>	0	0	<p>Effects of Construction</p> <p>This option will not require the use of raw materials as it will make use of existing infrastructure. A neutral effect has therefore been identified against this objective.</p> <p>Effects of Operation</p> <p>During operation, this option will not require any additional energy consumption or use of any additional materials. As such, a neutral effect has been determined against this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>8. To conserve and enhance the cultural, historic and industrial heritage resource.</p>	<p>Will the draft Drought Plan measure conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</p> <p>Will the draft Drought Plan measure avoid or minimise damage to archaeologically important sites?</p> <p>Will the draft Drought Plan measure avoid damage to important wetland areas with potential for paleoenvironmental deposits?</p>	<p>0</p>	<p>0</p>	<p>Effects of Construction</p> <p>This option will not require the construction of new infrastructure and as such, a neutral effect has been identified against this objective.</p> <p>Effects of Operation</p> <p>The operation of this option will lead to an up to 50% reduction in low flows in Reach 1 (Llwynon Reservoir outflow to the confluence with Taf Fechan). Two notable historic assets along this stretch of the Afrom Taff are the Llwynon Reservoir Dam, which is itself a Grade II listed building and the Pont-y-Cafnau Viaduct, a Grade II* listed ironwork bridge over the Afon Taff. There is the potential for reduced flows to affect the settings of these assets, particularly where they experience views to/from the Afon Taff; however, any effects in this regard would be temporary and reversible and in consequence, be negligible.</p> <p>Flows within Reach 2 (confluence with Taf Fechan to the confluence with Afon Taf Bargoed) and Reach 3 (confluence with Afon Taf Bargoed to the confluence with Afon Cynon) are anticipated to be reduced by up to 16% and 11% respectively. Therefore any effects on historic assets along these reaches are considered to be negligible.</p> <p>Overall, this option has been assessed as having a neutral effect on this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>9. To protect and enhance landscape and seascape character and other protected features</p>	<p>Is it likely that the draft Drought Plan measure will have significant visual impacts?</p> <p>Will the draft Drought Plan measure avoid adverse effects on, and enhance where possible, the special qualities of protected/designated landscapes (including woodlands) or seascapes such as National Parks or AONBs?</p> <p>Will the draft Drought Plan measure help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness?</p>	<p>0</p>	<p>0</p>	<p>Effects of Construction</p> <p>This option will not require the construction of new infrastructure and as such, a neutral effect has been identified against this objective.</p> <p>Effects of Operation</p> <p>Llwynon Reservoir and the Afon Taf Fawr to the Afon Taf Fechan are within the Brecon Beacons National Park. No new infrastructure is required and therefore no visual effect will result. However, flows in the Afon Taf Fawr will be significantly reduced, which would be noticeable in an area designated for its visual landscape and with many footpaths along the river. The water level in the Llwynon Reservoir would be maintained over a longer period than without the operation of the option, which would help maintain the aesthetic value of the lake. Due to the short term nature, this effect is considered negligible.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None
<p>Summary</p>	<p>Effects of Construction</p> <p>The option does not involve the construction of any infrastructure and as such no effects are anticipated.</p> <p>Effects of Operation</p> <p>A significant negative effect (with uncertainty) has been identified against objective 1 (biodiversity) due to the potential for major impacts on fish species including brown trout and bullhead. The reduction in flow of up to 50% has been identified as having a minor adverse effect objective 3 (water). The gain in deployable water output has led to the identification of a significant positive effect for objective 5 (human health) and a minor positive for objective 6 (community). The role of the option in improving drought resilience has led to the identification of a minor positive against objective 4 (climate change).</p> <p>Mitigation</p> <p>There are several mitigation measures that are appropriate, depending on the fish species being protected. The approaches include the temporary reduction or cessation of this option and temporary measures to reduce fish predation.</p>			

8112-1 Emergency abstraction from the River Rhondda at Treherbert

Option Summary

The drought permit involves a new, unsupported emergency river abstraction of 1Ml/d from the Afon Rhondda Fawr adjacent to Treherbert to support raw water supply to the raw water storage reservoir at Tynywaun WTW. To enable the abstraction, a low, temporary weir constructed of sandbags, would be required across the Afon Rhondda Fawr. A modest volume of water would be available from this drought permit scheme during a drought, and there is benefit to supply locally through provision of an immediate additional water resource to an existing WTW.

Drought permits may remain in force for a period of up to six months, and they can be extended for up to a further six months. However, the period of implementation for this drought permit **would only** be to September to November, as confirmed **with NRW and** by water resources modelling carried out by Welsh Water.

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity.</p>	<p>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs and priority habitats and species)?</p> <p>Will the draft Drought Plan measure protect and enhance non-designated sites and local biodiversity?</p> <p>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</p> <p>Will the draft Drought Plan measure affect the condition of ecosystems (including their connectivity, structure and functioning)?</p> <p>Will the draft Drought Plan measure enhance the adaptability of ecosystems?</p>	<p>--/?</p>	<p>--/?</p>	<p>Effects of Construction</p> <p>This option involves the construction of a temporary impoundment. Although not affecting a designated site, this option has the potential to affect habitat connectivity by forming a barrier in the river to migration of fish and other species.</p> <p>The temporary intake, pumping facilities and pipe work would be located in an urbanised area outside of any designated sites. The option would require less than 1km of temporary pipe work for a connection to the WTW. It is assumed that a pipeline would be routed along existing roads wherever possible, however it may be necessary to excavate open ground through which the pipeline would be laid. There are no statutory designations on the land through which the pipeline would be routed.</p> <p>The construction of the pipeline could lead to some disturbance to local biodiversity (e.g. linear sections of bare ground would result from construction activity). It is considered that disturbance from construction could be mitigated to some extent by the use of best practice techniques (e.g. appropriate lighting, sediment traps etc), but not avoided completely</p> <p>The EAR has identified that this option may have adverse impacts on fish within the Afon Rhonda Fawr due to reduced flows and the construction of the infrastructure associated with the option. Within Reach 1 (Headwaters to new intake (Treherbert)) and Reach 2 (New intake (Treherbert-Afon Rhondda Fach confluence)) major adverse effects are identified for the adult migration of both Atlantic Salmon and Brown / Sea Trout. Within Reach 2, a major adverse effect is also identified on other</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?			<p>fish species. However, the likelihood of this impact occurring and its exact magnitude is uncertain as it depends on the exact timing/duration of the option's implementation, existing flow conditions and the fish species affected; the EAR also notes that there is an absence of reliable data in this regard.</p> <p>The effects identified by the EAR may arise during the construction and operational phases of this option.</p> <p>For these reasons a significant negative effect is determined against this objective, although some uncertainty remains.</p> <p>Effects of Operation</p> <p>This option would reduce flows in the Afon Rhondda Fawr which ultimately flows to the Severn Estuary SAC/SPA/Ramsar sites at Cardiff Bay via the Afon Taf. However, the effects of this option are unlikely to be measurable at the estuary and on this basis no significant effects will occur on the SAC/SPA/Ramsar sites.</p> <p>As described above, the EAR has identified the potential for significant negative on fish species as a result of the operation of this option. For these reasons a significant negative effect taking into consideration the remaining uncertainty has been determined against this objective.</p> <p>Mitigation</p> <p>There are several mitigation measures that are appropriate, depending on the fish species being protected. The approaches include habitat enhancement, the removal of barriers to migration to enable recolonization and the gradual reduction of compensation flow.</p> <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <p>There is absence of reliable data on fish species.</p> <p>There remains uncertainty with regard to the timing/duration of the option's implementation and the scale/magnitude of effects on species including Brown Trout and Atlantic Salmon.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>2. To ensure the appropriate and efficient use of land and protect and enhance soil quality and geodiversity.</p>	<p>Will additional land be required for the development or implementation of the option or will the option require below ground works leading to land sterilisation?</p> <p>Will the draft Drought Plan utilise previously developed land?</p> <p>Will the draft Drought Plan measure minimise the loss of best and most versatile agricultural land?</p> <p>Will the draft Drought Plan measure affect upland (peat-dominated) and other wetland soils?</p> <p>Will the draft Drought Plan measure protect and enhance protected sites designated for their geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest?</p>	0	0	<p>Effects of Construction</p> <p>The option requires the siting of above-ground infrastructure. The temporary intake, pumping facilities and pipe work would be located in an urbanised area. Disruption to soils would therefore be negligible during construction. It is assumed that any pumping infrastructure would be placed on existing hardstanding areas to negate any impacts on soils.</p> <p>A neutral effect during construction is therefore expected, reflecting the relatively short overland pipeline length and siting of infrastructure on hardstanding areas.</p> <p>Effects of Operation</p> <p>This option would result in reduced water levels in the Afon Rhondda Fawr and reduced flow velocity in its headwaters. Conceivably, this could lead to drying out of wetland soils adjacent to the river in the downstream reach. However, there are no designated wetland sites or upland soils near the river. A neutral effect has therefore been determined against this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • That pumping infrastructure would be placed on hardstanding. <p>Uncertainty</p> <ul style="list-style-type: none"> • None
<p>3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water Framework Directive</p>	<p>Will the draft Drought Plan measure lead to a change in river flows, wetted width or river level?</p> <p>Will the draft Drought Plan measure affect surface water quality and quantity?</p> <p>Will the draft Drought Plan measure lead to changes in groundwater quality, quantity and recharge?</p> <p>Will the draft Drought Plan measure lead to the deterioration of Water Framework Directive (WFD) waterbody status (or potential) from, inter alia, changes in fluvial geomorphology?</p>	-	-/?	<p>Effects of Construction</p> <p>The option requires the siting of above-ground infrastructure (pumps, generators and pipeline). Construction of this temporary infrastructure will not lead to a change in river flows, surface water or groundwater quantity. Construction will also involve the creation of a temporary weir using sand bags. It is likely that some disturbance to in-river sediments (and potentially pollutants within the sediments) will occur as a result of installing the temporary weir and, as this is in river, it is likely that these effects could be mitigated but not completely avoided</p> <p>Overall, a minor negative effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>The EAR identifies that the operation of this option would lead to reduction of up to 40% within Reach 2 (New intake (Treherbert-Afon Rhondda Fach confluence)) and a</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	<p>Will the draft Drought Plan measure jeopardise the achievement of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Water Framework Directive (WFD)?</p>			<p>negligible effect on flows into the other reaches.</p> <p>The EAR identifies a low risk to water quality in Reach 1 (Headwaters to new intake (Treherbert)). A low to high has been identified Reach 2 linked to soluble reactive phosphorus. There is no data available for Reach 3 and as such the risk remains unquantified.</p> <p>Negligible impacts on macrophytes and macroinvertebrates are identified for Reach 1 and 3. Moderate impacts on macrophytes and macroinvertebrates are identified for Reach 2, however the overall risk to WFD waterbody macroinvertebrate status is considered minor.</p> <p>Overall, a minor negative effect has been identified for this option.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • Unquantified risk to water quality in Reach 3.
<p>4. To limit the causes and potential consequences of climate change and to adapt to future changes</p>	<p>Will the draft Drought Plan measure reduce or minimise greenhouse gas emissions?</p> <p>Will the draft Drought Plan measure reduce vulnerability to the effects of climate change by appropriate adaptation?</p> <p>Will the draft Drought Plan measure increase environmental resilience to the effects of climate change including to impacts on water quality?</p> <p>Will the draft Drought Plan measure reduce or minimise air pollutant emissions?</p>	-	+/-	<p>Effects of Construction</p> <p>The implementation of this option will require the movement of plant and materials (for example pumps and < 1km of pipeline) to site, which will require fuel and result in greenhouse gas emissions. There would also be carbon embodied within the plant and infrastructure. As the equipment is temporary it may be possible to rent (and reuse) equipment to cut down raw materials used in construction.</p> <p>Overall a minor negative effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>Operational energy requirements and associated carbon emissions have not been quantified by Welsh Water for any options at this stage and therefore a qualitative assessment has been made based on the infrastructure required to implement this option.</p> <p>Up to 1 Ml/d may have to be pumped over a relatively short distance and against a moderate gradient, with resultant energy requirements. A minor negative effect has</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>been determined against this objective in recognition of the additional energy consumption (and greenhouse gas emissions) during operation due to the relatively short distance, which has prevented this from becoming a significant negative effect.</p> <p>UKCP18 climate change scenarios anticipate longer, hotter summers and, in turn, increases in both the frequency and duration of droughts. This option would provide Welsh Water with additional capacity to manage drought conditions and as such is considered to contribute towards climate change adaptation.</p> <p>Overall a mixed minor positive / minor negative effect has been determined against this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • The total amount of water that will be pumped
<p>5. To protect and enhance human health with special regard to vulnerable groups in society</p>	<p>Will the draft Drought Plan measure ensure continuity of clean drinking water supply within statutory standards supply at times of drought?</p> <p>Will the draft Drought Plan measure affect the affordability of clean drinking water?</p> <p>Will the draft Drought Plan measure adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise levels)?</p> <p>Will the draft Drought Plan measures affect human health or the health of any vulnerable groups?</p> <p>Will the Drought Plan measure affect public access to, or enjoyment of, local green/blue space?</p>	-/?	+	<p>Effects of Construction</p> <p>The construction of a connecting pipeline would have no effect on continuity of clean drinking water supply at time of drought, nor would it affect surface water quality. The construction work for this option may result in some disturbance to local residents. The effect would be dependent on the route of the pipeline.</p> <p>Noise and vibration may result from bringing pumps, pipeline and temporary treatment infrastructure to site. For this reason a minor negative effect is recorded during construction, with uncertainty remaining over the route of the pipeline.</p> <p>Effects of Operation</p> <p>This option will provide a further 1 Ml/d of drinking water, which will help to meet the water needs of society. Those living, working or visiting the area are unlikely to be directly disturbed by the scheme.</p> <p>Overall, operation this option has been assessed as having a significant positive effect on this objective.</p> <p>Mitigation</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	Will the Drought Plan measure impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?			<ul style="list-style-type: none"> None <p>Assumptions</p> <ul style="list-style-type: none"> None <p>Uncertainty</p> <ul style="list-style-type: none"> The route of the pipeline
6. To maintain and enhance the economic and social needs of the local community	<p>Will the draft Drought Plan measure ensure sufficient water is available for people and visitors to maintain economic activity in times of drought?</p> <p>Will the draft Drought Plan measures affect local or regional economies?</p> <p>Will the draft Drought Plan measure affect opportunities for recreation at times of drought?</p>	0	0	<p>Effects of Construction</p> <p>The construction of this option will have no effect on the availability of water for people and visitors to maintain economic activity in times of drought. Further, it is not anticipated that the option would generate any economic benefits (e.g. job creation or investment in supply chains).</p> <p>Overall, construction of this option has been assessed as having a neutral effect on this objective.</p> <p>Effects of Operation</p> <p>This option will provide a potential additional yield of 1M/d, which will help to meet the needs of homes, businesses and visitors to this area although, consistent with the definitions of significance used in the assessment, positive effects in this regard are predicted to be negligible.</p> <p>There is the potential for effects on downstream recreational activities on the affected waterways (e.g. angling, cycling, walking). For example, the Afon Rhondda Fawr also provides stocked and natural population of brown trout for angling. But these would be short term in nature and would not be affected once the drought has passed. No operational effects on recreational opportunities are anticipated at Llandegfedd reservoir during operation.</p> <p>Overall, operation this option has been assessed as having a neutral effect on this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> None <p>Assumptions</p> <ul style="list-style-type: none"> None

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>Uncertainty</p> <ul style="list-style-type: none"> None
<p>7. To promote the wise use of resources</p>	<p>Will the draft Drought Plan measure seek to minimise the demand for additional raw materials?</p> <p>Will the draft Drought Plan measure seek to minimise energy consumption?</p> <p>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</p> <p>Will the draft Drought Plan measure encourage sustainable design or use of sustainable materials?</p>	-	-	<p>Effects of Construction</p> <p>This option will require the movement of plant and materials (e.g. pumps, pipes etc) to site, which will consume fuel. There would also be materials within the new infrastructure (plastics and metals). In accordance with the definitions of significance, this has been assessed as a minor negative effect against this objective. However, there is the potential to mitigate such effects through the rental and reuse of the equipment used on site.</p> <p>Effects of Operation</p> <p>During operation, this option requires energy use for pumping. This has not been quantified, however the distance being assumed <1km and moderate uphill gradient mean that the power required is not expected to be significant. During operation, the option will not require any extra raw materials.</p> <p>Overall, operation this option has been assessed as having a minor negative effect on this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> The rental or re-use of onsite equipment. <p>Assumptions</p> <ul style="list-style-type: none"> None <p>Uncertainty</p> <ul style="list-style-type: none"> The total amount of water that will be pumped

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>8. To conserve and enhance the cultural, historic and industrial heritage resource.</p>	<p>Will the draft Drought Plan measure conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</p> <p>Will the draft Drought Plan measure avoid or minimise damage to archaeologically important sites?</p> <p>Will the draft Drought Plan measure avoid damage to important wetland areas with potential for paleoenvironmental deposits?</p>	0	0	<p>Effects of Construction</p> <p>There are 2 Grade II and 1 Grade II* (Tynewydd Farm House) buildings within Tynewydd. In the absence of knowing the precise routing of any pipeline associated with this option, it is possible that the option may affect the setting of these buildings, however, any effects in this regard would be temporary and reversible and in consequence, be negligible.</p> <p>Effects of Operation</p> <p>As noted above, there are 2 Grade II and 1 Grade II* (Tynewydd Farm House) buildings within Tynewydd. In the absence of knowing the precise routing of any pipeline associated with this option, it is possible that the option may affect the setting of these buildings, however, any effects in this regard would be temporary and reversible and in consequence, be negligible.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None
<p>9. To protect and enhance landscape and seascape character and other protected features</p>	<p>Is it likely that the draft Drought Plan measure will have significant visual impacts?</p> <p>Will the draft Drought Plan measure avoid adverse effects on, and enhance where possible, the special qualities of protected/designated landscapes (including woodlands) or seascapes such as National Parks or AONBs?</p> <p>Will the draft Drought Plan measure help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness?</p>	-	-	<p>Effects of Construction</p> <p>This option is not cited in any designated or protected areas. Nonetheless, the construction of the pipeline, pumps and outflow points will cause some visual disruption through lorry traffic and construction works in a small urban setting. Visual intrusion would therefore be expected from the implementation of the pump and pipeline. Due to the absence of landscape designation of the site, a minor negative effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>This option would result in a reduction of wetted width and wetted depth of the Afon Rhondda Fawr downstream of the intake, which could be visible to local residents of the valley. The pumping infrastructure will also cause some visual intrusion. However, the absence of landscape designation or protection of the site limits the significance of this visual intrusion. A minor negative effect has been determined against this objective due to the visual above ground infrastructure.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None
Summary	<p>Effects of Construction</p> <p>The construction of the scheme is anticipated to have a significant adverse effect on fish species and as such a significant negative effect has been identified for objective 1 (biodiversity), with some uncertainty remaining. It is likely that some disturbance to in-river sediments will occur as a result of installing the temporary weir therefore a minor negative effect has been identified for objective 3 (water). The use of plant and materials during the construction stage has led to the identification of a minor negative for both objective 4 (climate change) and objective 7 (material resources). Noise and vibration may result from bringing pumps, pipeline and temporary treatment infrastructure to site so a minor negative effect has been identified for objective 5 (human health). Due to visual intrusion in a non-landscape designated area a minor negative effect has been determined against objective 9 (landscape).</p> <p>Effects of Operation</p> <p>The EAR has identified that a number of fish species are known to be present within the Afon Rhondda Fawr, which would likely be impacted by the implementation of this drought permit and consequently a minor negative objective has been identified for objective 1 (biodiversity). The reduction in flow has also been identified as having a minor adverse effect for objective 3 (water). A mixed minor positive / negative effect has been identified for objective 4 (climate change) as the option would assist in adapting to climate change through providing enhanced drought resistance, but would also increase energy use. A minor negative has been identified for objective 7 (material resources) due to the amount of energy required to pump water against the gradient. The gain in deployable water output has led to the identification of a minor positive effect for objective 5 (human health). Due to visual intrusion in a non-landscape designated area a minor negative effect has been determined against objective 9 (landscape).</p> <p>Mitigation</p> <p>Equipment could be rented or re-used to minimise the use of material resources.</p>			

8116-3 Utilise the Dead Storage in Talybont Reservoir

Option Summary

Talybont impounding reservoir is located in the Brecon Beacons National Park in mid Wales, in the headwaters of the Nant Caerfanell stream which is a tributary of the River Usk. The reservoir is within SEWCUS Water Resource Zone (WRZ). The compensation flow release from Talybont Reservoir sustains flow in the Nant Caerfanell. This provides a substantial proportion of the flow in the downstream river during low flow periods. The reservoir is supplemented by an abstraction on the Nant Clydach, which is connected through a gravity fed pipe.

DCWW hold a licence to abstract up to 26,555 Ml of water from Talybont Reservoir per annum. The licence is subject to a maximum daily abstraction rate and seasonal compensation flow requirements. The abstraction for potable supply is made directly from the reservoir and piped by gravity to Talybont (WTW) for treatment before going into public supply.

The option involves pumped abstraction of 30Ml/d from the dead storage zone for up to 30 days. The option may be required in severe drawdown conditions when storage approaches the dead storage zone in Talybont Reservoir.

The option could be required at any time of the year, although inspection of historic reservoir storage records indicates that storage generally reaches its lowest levels during the early autumn period (September to October). This option **would only** be implemented during the period September to November inclusive, as confirmed **with NRW and** by Water resources modelling undertaken by Welsh Water.

It is assumed that a reduction of 50% in the statutory compensation flow release to the Nant Caerfanell (as permitted in the abstraction licence relating to the compensation flow control line) is already in place prior to the option being implemented.

Construction required for this option is not specified in the EAR. To enable abstraction of 'dead storage' the installation of temporary pumps and pipelines is assumed to be required. It is also assumed that compensation requirements will be fed from the dead storage during the operation.

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity.</p>	<p>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs and priority habitats and species)?</p>	-	0/-	<p>Effects of Construction</p> <p>The construction of this option will require temporary infrastructure and the movement of plant and materials to site (e.g. pumps and pipes within Talybont Reservoir etc).</p> <p>Talybont Reservoir is designated as a Local Nature Reserve (LNR) (previously designated as Site of Special Scientific Interest (SSSI)) due to the presence of a number of important notable species. The Nant Caerfanell is designated as part of the River Usk (Tributaries) SSSI, as well as being designated as part of the River Usk Special Area of Conservation (SAC). The River Usk and the majority of the</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	<p>Will the draft Drought Plan measure protect and enhance non-designated sites and local biodiversity?</p> <p>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</p> <p>Will the draft Drought Plan measure affect the condition of ecosystems (including their connectivity, structure and functioning)?</p> <p>Will the draft Drought Plan measure enhance the adaptability of ecosystems?</p> <p>Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?</p>			<p>upper Usk tributaries support aquatic plant communities typical of moderately nutrient rich waters</p> <p>Due to the disturbance of wildlife in the reservoir from construction work, but acknowledging the relatively small scale of works, the effect of construction of the option on this objective is considered minor negative.</p> <p>Effects of Operation</p> <p>The proposed increased abstraction from Talybont Reservoir has the potential to influence water levels in the reservoir, river flows and wetted width / depth in the Nant Caerfanell and Nant Clydach and impact the downgradient receptors SSSI /SAC / LNR and habitat availability.</p> <p>The hydrological impacts of this option (further discussed in objective 3) has been assessed in the EAR as minor (September to December) for water levels in Talybont Reservoir, minor (September to December) for flows in the Nant Caerfanell and no impact for flows in the Nant Clydach. Furthermore implementation of the option is not anticipated to result in any changes to minimum wetted widths or depths of the Nant Caerfanell or Nant Clydach. Impacts on the flow regime in the River Usk are likely to be indiscernible.</p> <p>During operation the water level in Talybont Reservoir LNR will be drawn down below levels normally experienced (reduction of up to 24% in the minimum water level and a 3% increase in the duration (13 days) for which reservoir storage is below top water level). The hydrological effect of the option on the reservoir was assessed in the EAR as minor and not requiring further assessment.</p> <p>The dead storage usually serves as an area for sediment to settle and as a retreat for fish during low reservoir levels. It was assumed that abstraction from dead storage is likely to result in disturbed sediment. This option would be implemented during the period September to November inclusive. However, if operation occurred when the water temperature were higher and dissolved oxygen levels likely to fall, this could affect species living in the reservoir.</p> <p>The HRA concludes <i>“the effects of this on the Usk SAC will be nominal and not significant.”</i></p> <p>The EAR concludes that there will be no likely effects on SAC/SSSI features, including Atlantic salmon, bird and bat species, and associated flying insects, over and above those due to natural drought conditions.</p> <p>A neutral (in recognition of no impacts on SAC/SSSI features) to minor negative effects (due to the potential effects on biodiversity within Talybont Reservoir LNR) has been determined against this objective.</p> <p>Mitigation</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>Assumptions None</p> <p>Uncertainty None</p>
<p>2. To ensure the appropriate and efficient use of land and protect and enhance soil quality and geodiversity.</p>	<p>Will additional land be required for the development or implementation of the option or will the option require below ground works leading to land sterilisation?</p> <p>Will the draft Drought Plan utilise previously developed land?</p> <p>Will the draft Drought Plan measure minimise the loss of best and most versatile agricultural land?</p> <p>Will the draft Drought Plan measure affect upland (peat-dominated) and other wetland soils?</p> <p>Will the draft Drought Plan measure protect and enhance protected sites designated for their geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest?</p>	0	0	<p>Effects of Construction</p> <p>The construction of this option will require temporary infrastructure and the movement of plant and materials to site (e.g. pumps and pipes within Talybont Reservoir etc). Disruption to soils is not expected from construction activities. A neutral effect during construction is therefore expected against this objective.</p> <p>Effects of Operation</p> <p>During operation of this option, pumps and pipelines will be placed in Talybont Reservoir. The infrastructure is not expected to affect soils.</p> <p>The proposed increased abstraction from Talybont Reservoir has the potential to influence water levels/flows and wetted width / depth in the Talybont Reservoir, Nant Caerfanell and Nant Clydach. Impact is likely to be more severe in shallower sections of the river channel.</p> <p>The Soilscape viewer (http://www.landis.org.uk/soilscales/) shows that soils around the reservoir and in the valley of the Nant Caerfanell downstream of the reservoir comprise freely draining slightly acid loamy soils and about 2 km downstream of the reservoir comprise freely draining floodplain soils (grassland and wet carr woodlands in old river meanders).</p> <p>The hydrological impacts of this option (further discussed in objective 3) has been assessed in the EAR as minor (September to November) for water levels in Talybont Reservoir, minor (September to November) for flows in the Nant Caerfanell and no impact for flows in the Nant Clydach. Furthermore implementation of the option is not anticipated to result in any changes to minimum wetted widths or depths of the Nant Caerfanell or Nant Clydach. Impacts on the flow regime in the River Usk are likely to be indiscernible. Therefore it is considered that the option will have a neutral effect on marginal soils in Talybont Reservoir, Nant Caerfanell and Nant Clydach.</p> <p>A neutral effect has been determined against this objective.</p> <p>Mitigation None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>
<p>3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water Framework Directive</p>	<p>Will the draft Drought Plan measure lead to a change in river flows, wetted width or river level?</p> <p>Will the draft Drought Plan measure affect surface water quality and quantity?</p> <p>Will the draft Drought Plan measure lead to changes in groundwater quality, quantity and recharge?</p> <p>Will the draft Drought Plan measure lead to the deterioration of Water Framework Directive (WFD) waterbody status (or potential) from, inter alia, changes in fluvial geomorphology?</p> <p>Will the draft Drought Plan measure jeopardise the achievement of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Water Framework Directive (WFD)?</p>	<p>0</p>	<p>-</p>	<p>Effects of Construction</p> <p>The construction of this option will require temporary infrastructure and the movement of plant and materials to site (e.g. pumps and pipes within Talybont Reservoir etc).</p> <p>Construction will not lead to a change in river flows, surface water or groundwater quantity. Effects on water quality from construction activities would be expected to be minor, assuming that best practice construction techniques are followed. No effects on WFD status are expected to result from construction.</p> <p>A neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>Talybont Reservoir (waterbody GB30940365) and Nant Caerfanell (waterbody GB109056033000 Caerfanell - source to confluence with River Usk) have an ecological status of 'moderate' (WFD Cycle 2 classification).</p> <p>The proposed increased abstraction from Talybont Reservoir has the potential to influence water levels/flows and water quality in Talybont Reservoir, Nant Caerfanell and impact on the WFD status of the local waterbodies.</p> <p>The hydrological impacts of the option have been assessed in the EAR as:</p> <ul style="list-style-type: none"> • Minor for water levels in Talybont Reservoir during the period from September to November inclusive (reduction of up to 24% in the minimum water level in Talybont Reservoir, and a 3% increase in the duration (13 days) for which reservoir storage is below top water level); • Minor for river flows in the Nant Caerfanell during the period from September to November inclusive (up to 3% increase in the duration (13 days) of reservoir drawdown period before overflows recommence (period of compensation flow only); • No impact for river flows in the Nant Clydach; • Furthermore implementation of the option is not anticipated to result in any changes to minimum wetted widths or depths of the Nant Caerfanell or Nant Clydach;

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<ul style="list-style-type: none"> No impacts to the River Usk are likely; the small 3% increase in the duration of the period for which Talybont Reservoir is not spilling to the downstream catchment is unlikely to have any discernible effects on the flow regime in the River Usk. <p>Given that there is no adverse hydrological impact associated with the option, effects on geomorphology and water quality are equally assessed in the EAR as negligible. Similarly, the EAR concludes there would be no flow pressures or water quality pressures that would pose an increased risk to any water-dependent environmental features within the vicinity of Talybont Reservoir. No effects on WFD status are anticipated.</p> <p>It is assumed that abstraction from dead storage is likely to result in disturbed sediment. This option would only be implemented during the period September to November inclusive. However, if operation occurred when water temperature was likely to be higher, dissolved oxygen levels would fall. It is assumed that during operation of the option the compensation water to Nant Caerfanell would be drawn from dead storage. It is likely that the water quality of the compensation flow would deteriorate with the progressive operation of the option as the ratio between sediment and water increases. However as operation of the option is unlikely to be during the summer and is limited to a maximum period of 30 days, impacts on water quality are anticipated to be negligible/minor.</p> <p>A minor negative effect has been determined against this objective in recognition of the anticipated minor hydrological impacts on Talybont Reservoir and Nant Caerfanell.</p> <p>Mitigation None, hydrological monitoring is recommended in the EAR (Talybont Reservoir storage volumes and abstraction volumes, flow in the Nant Caerfanell downstream of Talybont Reservoir and the Nant Clydach confluence, residual flows in the Nant Clydach downstream of the intake and river flow at Llandetty gauging station on the River Usk).</p> <p>Assumptions None</p> <p>Uncertainty None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>4. To limit the causes and potential consequences of climate change and to adapt to future changes</p>	<p>Will the draft Drought Plan measure reduce or minimise greenhouse gas emissions?</p> <p>Will the draft Drought Plan measure reduce vulnerability to the effects of climate change by appropriate adaptation?</p> <p>Will the draft Drought Plan measure increase environmental resilience to the effects of climate change including to impacts on water quality?</p> <p>Will the draft Drought Plan measure reduce or minimise air pollutant emissions?</p>	0	+/-	<p>Effects of Construction</p> <p>The construction of this option will require temporary infrastructure and the movement of plant and materials to site (e.g. pumps and pipes within Talybont Reservoir etc) which will require fuel and result in carbon emissions. There would also be carbon embodied within the infrastructure.</p> <p>However, given that the option will require temporary infrastructure, it is possible that these materials could be hired or used from existing Welsh Water/sub-contractor stores and could subsequently be used elsewhere once the temporary infrastructure has been removed from site. This would lessen the effect of carbon embodied in materials. The construction of this option is not expected to contribute to climate change adaptation.</p> <p>For this reason and because the equipment required is small scale in nature, a neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>Energy requirements and carbon emission have not been quantified by Welsh Water for any options at this stage and therefore a qualitative assessment has been made based on the infrastructure required to implement this option.</p> <p>The option involves pumped abstraction of 30MI/d from the dead storage zone for up to 30 days and therefore requires additional energy consumption which require fuel and result in carbon emissions. Although pumping will be temporary, given the large quantity of water pumped, significant amounts of energy are likely to be required for the pumping. Additional energy will also be required to treat the water to drinking water standards.</p> <p>UKCP18 climate change scenarios anticipate longer hotter summers and in turn and in both the frequency and duration of droughts. This option would provide Welsh Water with additional capacity to manage drought conditions and as such is considered to contribute towards climate change adaptation.</p> <p>A significant negative effect (in recognition of additional energy consumption and carbon emissions associated with the operation of the option) and minor positive effect (in recognition of the role of the option in improving drought resilience) has been determined against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>Uncertainty</p> <p>None</p>
<p>5. To protect and enhance human health with special regard to vulnerable groups in society</p>	<p>Will the draft Drought Plan measure ensure continuity of clean drinking water supply within statutory standards supply at times of drought?</p> <p>Will the draft Drought Plan measure affect the affordability of clean drinking water?</p> <p>Will the draft Drought Plan measure adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise levels)?</p> <p>Will the draft Drought Plan measures affect human health or the health of any vulnerable groups?</p> <p>Will the Drought Plan measure affect public access to, or enjoyment of, local green/blue space?</p> <p>Will the Drought Plan measure impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?</p>	<p>0</p>	<p>++</p>	<p>Effects of Construction</p> <p>The siting of pumps and pipelines would have no effect on continuity of clean drinking water supply at time of drought, nor would it affect surface water quality (assuming the use of best practice construction techniques).</p> <p>Noise and vibration may result from bringing pumps, pipeline and generators to site. However, the site is located in a rural area and the effect would be local and only temporary in nature.</p> <p>A neutral effect has been determined against this objective,</p> <p>Effects of Operation</p> <p>This option will provide a gain in deployable output of 30MI/d for up to 30 days within the SEWCUS WRZ, which will help to meet the water needs of society. This is assessed as a significant positive effect according to the definitions of significance used in this assessment.</p> <p>For those living, working or visiting the area, there is the potential for noise disturbance through the operation of generators. However the reservoir is located in a rural area with a small number of people living or working within the area (about 3 properties and the Talybont WTW within proximity of the reservoir). Although noise levels local to generators would be elevated, wider effects are considered negligible.</p> <p>A significant positive effect has been determined against this objective, recognising the gain in deployable water output.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>EAR states that the gain in deployable output provided by implementation of the option is to be updated with 2020 figure when available.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>6. To maintain and enhance the economic and social needs of the local community</p>	<p>Will the draft Drought Plan measure ensure sufficient water is available for people and visitors to maintain economic activity in times of drought?</p> <p>Will the draft Drought Plan measures affect local or regional economies?</p> <p>Will the draft Drought Plan measure affect opportunities for recreation at times of drought?</p>	0	+	<p>Effects of Construction</p> <p>Construction of this option will have no effect on the availability of water for people and visitors to maintain economic activity in times of drought. Whilst there may be some economic benefits associated with construction (e.g. spend in the local supply chain), any effects in this regard would be negligible, commensurate with the scale of construction works.</p> <p>Although recreational opportunities for visitors to Talybont Reservoir might be affected during construction of the temporary infrastructure, the affected area would be small and alternative parts of the reservoir will remain accessible.</p> <p>A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>This option will provide a major yield (30MI/d for up to 30 days) at times of drought which will help to meet the needs of homes, businesses and visitors to this area, helping to support the local and regional economy. The option is located in a water resource zone where there is no seasonal (summer) tourist influx. This is assessed as a minor positive effect according to the definitions of significance used in this assessment.</p> <p>The Talybont Reservoir, River Usk, and riparian land is used for a range of recreational activities including canoeing, fishing, walking, cycling, picnicking and bird watching. Any reduction in compensation releases may influence water-dependant activities due to changes in flow.</p> <p>The hydrological impacts of this option (further discussed in objective 3) has been assessed in the EAR as minor (September to December) for water levels in Talybont Reservoir, minor (September to December) for flows in the Nant Caerfanell and no impact for flows in the Nant Clydach. Furthermore implementation of the option is not anticipated to result in any changes to minimum wetted widths or depths of the Nant Caerfanell or Nant Clydach. Impacts on the flow regime in the River Usk are likely to be indiscernible. Due to the minor hydrological effects on in Talybont Reservoir and Nant Caerfanell a minor negative effect on water-dependant recreational activities and visual amenity value is anticipated. However, water levels will be naturally low in times of drought in the Talybont Reservoir and Nant Caerfanell and impacts will be temporary in nature.</p> <p>Overall a minor positive effect has been determined against this objective in recognition of the gain in deployable output.</p> <p>Mitigation</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>EAR states that the gain in deployable output provided by implementation of the option is to be updated with 2020 figure when available</p>
<p>7. To promote the wise use of resources</p>	<p>Will the draft Drought Plan measure seek to minimise the demand for additional raw materials?</p> <p>Will the draft Drought Plan measure seek to minimise energy consumption?</p> <p>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</p> <p>Will the draft Drought Plan measure encourage sustainable design or use of sustainable materials?</p>	-	--	<p>Effects of Construction</p> <p>The construction of this option will require temporary infrastructure and the movement of plant and materials to site (e.g. pumps and pipes within Talybont Reservoir etc). In accordance with the definitions of significance, this has been assessed as a minor negative effect against this objective. However, given that the option will require temporary infrastructure, it is possible that these materials could be hired or used from existing Welsh Water/sub-contractor stores and could subsequently be used elsewhere once the temporary infrastructure has been removed from site.</p> <p>The siting of the infrastructure required for this option will have no effect on reuse and recycling of waste, nor does the Drought Plan indicate the option will encourage sustainable design or the use of sustainable materials.</p> <p>For these reasons a minor negative effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>The option involves pumped abstraction of 30MI/d from the dead storage zone for up to 30 days and therefore requires additional energy consumption (assumed to be from diesel generators). The exact requirement of energy for pumping has not been quantified, however the large volume mean that the power required could be significant although temporary. During operation, the option will not require any extra raw materials.</p> <p>For these reasons, operating this option has been assessed as having significant negative effect on this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>None</p> <p>Uncertainty</p> <p>None</p>
<p>8. To conserve and enhance the cultural, historic and industrial heritage resource.</p>	<p>Will the draft Drought Plan measure conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</p> <p>Will the draft Drought Plan measure avoid or minimise damage to archaeologically important sites?</p> <p>Will the draft Drought Plan measure avoid damage to important wetland areas with potential for paleoenvironmental deposits?</p>	<p>0</p>	<p>0</p>	<p>Effects of Construction</p> <p>There are several heritage features/sites along Nant Caerfanell and Nant Clydach Afon Dysynni. The closest include Grade II Listed Buildings Quarryworkers Cottages at Aberclydach, Aber Bridge in Nant Clydach and Former Talybont Railway Station, Talybont Aqueduct (Monmouthshire and Brecon Canal) in Nant Caerfanell. There are no heritage features/sites near Talybont Reservoir.</p> <p>However, reflecting the scale of works and their temporary nature, construction of the option is unlikely to have an impact on heritage features or sites (assuming use of best practice construction techniques).</p> <p>Overall, given the scale and temporary nature of this option and location of new infrastructure (near the reservoir) a neutral effect is recorded against this objective.</p> <p>Effects of Operation</p> <p>The operation of this option is not anticipated to have a detrimental effect on heritage assets as these contain no water dependant features and any effects on setting would be temporary and reversible. The EAR has also concluded that the option will not affect heritage features or sites.</p> <p>A neutral effect is therefore anticipated against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>9. To protect and enhance landscape and seascape character and other protected features</p>	<p>Is it likely that the draft Drought Plan measure will have significant visual impacts?</p> <p>Will the draft Drought Plan measure avoid adverse effects on, and enhance where possible, the special qualities of protected/designated landscapes (including woodlands) or seascapes such as National Parks or AONBs?</p> <p>Will the draft Drought Plan measure help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness?</p>	-	-	<p>Effects of Construction</p> <p>This option is located within the Brecon Beacons National Park. The installation of the pipeline and pumps will cause some visual disruption through lorry traffic and construction works inside the National Park.</p> <p>Due to the relatively small scale of works required, a minor negative effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>This option would result in a reduction of water levels in Talybont Reservoir LNR (reduction of up to 24% in the minimum water level in Talybont Reservoir, and a 3% increase in the duration (13 days) for which reservoir storage is below top water level), which would be visible to visitors of the National Park. The pipeline and pumps will also cause some visual intrusion.</p> <p>A minor negative effect has been determined against this objective recognising the limited duration of the effect.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>Extent of change in Afon Aled wetted width.</p>
<p>Summary</p>	<p>Effects of Construction</p> <p>A minor negative effect has been determined against objective 1 (biodiversity) due to the disturbance of wildlife in the reservoir from construction work, but reflecting the relatively small scale of works. Minor negative effects are anticipated for objective 7 (resources) because of the materials required. There are minor negative effects on objective 9 (landscape). This is because the construction of the pumps and pipeline will cause some visual disruption through lorry traffic and construction works in a National Park setting. A neutral effect has been determined against all other objectives during construction.</p> <p>Effects of Operation</p> <p>Significant negative effects have been determined against objective 7 (resources) due to the potentially large volumes of water (up to 30 Ml/d) to be pumped from the dead storage to the abstraction level resulting in energy use and carbon emissions. A significant negative effect (in recognition of additional energy consumption and carbon emissions associated with the option) and minor positive effect (in recognition of the role of the option in improving drought resilience) has been determined against objective 4 (climate change). Minor negative effects have been determined against objective 3 (water) in recognition of the anticipated minor hydrological impacts on Talybont Reservoir and Nant Caerfanell and objective 9 (landscape) owing to the reduction in water level in the reservoir within the Talybont LNR which would be visible to visitors of the National Park. A neutral (in recognition of no impacts on SAC/SSSI features) to minor negative effects (due to the potential effects on biodiversity within Talybont Reservoir LNR) has been determined against objective 1 (biodiversity).</p>			

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	<p>Objective 5 (human health) scores significant positive, as the option will provide up to 30 MI/d of drinking water, which will help to meet the water needs of society towards the end of a drought period. A minor positive effect has been determined against objective 6 (economy) in recognition of the gain in deployable output. The anticipated effects against all other objectives are neutral.</p> <p>Mitigation None</p>			

8119-1 Compensation Water Reduction of 50% at Pontsticill Reservoir

Option Summary

The drought permit involves a proposed reduction in the statutory compensation release from Pontsticill Reservoir to the Taf Fechan by 9.1MI/d, from 19.1MI/d to 10MI/d. This will conserve the longevity of reservoir storage for use in direct supply during a drought and improve the probability of reservoir winter refill.

Drought orders may remain in force for a period of up to six months, and they can be extended for up to a further six months. However, the period of implementation for this drought order would only be September to November, as confirmed with NRW and by water resources modelling carried out by Welsh Water.

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity.</p>	<p>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs and priority habitats and species)?</p> <p>Will the draft Drought Plan measure protect and enhance non-designated sites and local biodiversity?</p> <p>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</p> <p>Will the draft Drought Plan measure affect the condition of ecosystems (including their connectivity, structure and functioning)?</p> <p>Will the draft Drought Plan measure enhance the adaptability of ecosystems?</p>	0	--/?	<p>Effects of Construction</p> <p>The option would require no additional construction to take and no effects on biodiversity are predicted. In consequence, a neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>The hydrological impacts associated with a reduction in compensation discharge will include a reduction in river flows of up to 48% with a corresponding reduction in wetted width and depth during the summer/autumn period for Reach 1 (Pontsticill Reservoir outflow – Taf Fawr confluence). This reduces to up to 16% in Reach 2 (Taf Fechan confluence to Afon Bargod Taf confluence) and to 11% in Reach 3 (Afon Bargod Taf confluence to Afon Cynon confluence).</p> <p>This option would reduce flows in the Afon Taf Fechan which ultimately flows to the Severn Estuary SAC / SPA / Ramsar sites at Cardiff Bay via the Afon Taf. However, the effects of this option are unlikely to be measurable at the estuary.</p> <p>The Cwm Taf Fechan Woodlands SSSI comprises 2.5 km of the Taff Fechnan with steep valley sides of Carboniferous limestone. Although the mixed woodland on base-rich soils associated with rocky slopes and other terrestrial features within this SSSI are not considered to be highly water dependent²⁰⁵, the bryophyte community may be impacted by implementation of the drought permit and is therefore taken forward for assessment. The EAR notes that:</p>

²⁰⁵ LIFE Natura 2000 Programme for Wales (2014) Identification of Aquatic (Highly Water Dependent) Natura 2000 Features

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?			<p><i>“Surveys undertaken in 2011 and 2012 along the Afon Taf Fechan and River Taff identified presence of the beck pocket-moss at four of five sections in the Afon Taf Fechan (Reach 1), sometimes in moderate quantity. It was also recorded in small quantities at two sites on the main River Taff. Microscopic examination is needed to separate this species from other submerged Fissidens species, of which the usually smaller green pocket moss Fissidens viridulus is also present in the system. This makes it difficult to assess their relative frequencies; beck pocket moss Fissidens rufulus seems to be the more frequent of the two on the River Taff.”</i></p> <p>The EAR identifies that a minor adverse effect is anticipated on <i>Fissidens rufulus</i> within Reach 2 and Reach 3, a feature for which the Cwm Taf Fechan Woodlands SSSI is designated.</p> <p>The EAR has also identified that this option may have adverse impacts on fish within the Afon Taff due to reduced flows and related changes to water quality. In this regard, the potential for reductions in spawning and juvenile survival due to habitat loss is identified as a major impact for Atlantic Salmon and Brown Trout alongside other fish species including Minnow and Perch. Major adverse effects for Bullhead are also identified. However, the likelihood of this impact occurring and its exact magnitude is uncertain as it depends on the exact timing/duration of the option’s implementation, existing flow conditions and the fish species affected.</p> <p>Due to the potential for major impacts on Atlantic Salmon, Brown Trout and Bullhead in particular, this option has been assessed (on a precautionary basis) as having a significant negative effect on this objective, although some uncertainty remains.</p> <p>Mitigation</p> <p>The EAR proposes a range of monitoring measures to be implemented that would allow for the identification of appropriate mitigation in consultation with NRW.</p> <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <p>There remains uncertainty with regard to the timing/duration of the option’s implementation and the scale/magnitude of effects on species including Brown Trout, Bullhead and Atlantic Salmon.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>2. To ensure the appropriate and efficient use of land and protect and enhance soil quality and geodiversity.</p>	<p>Will additional land be required for the development or implementation of the option or will the option require below ground works leading to land sterilisation?</p> <p>Will the draft Drought Plan utilise previously developed land?</p> <p>Will the draft Drought Plan measure minimise the loss of best and most versatile agricultural land?</p> <p>Will the draft Drought Plan measure affect upland (peat-dominated) and other wetland soils?</p> <p>Will the draft Drought Plan measure protect and enhance protected sites designated for their geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest?</p>	0	0	<p>Effects of Construction</p> <p>The option requires no construction and therefore its implementation is not expected to result in any effects on land use or upland or wetland soils.</p> <p>Effects of Operation</p> <p>The operation of this option would result in reduced water levels in Afon Taf Fechan, and to a lesser extent in the River Taf down to the confluence with the Afon Cynon. Conceivably, this could lead to drying out of wetland soils adjacent to the river. However, there are no designated wetland sites or upland soils near the river. The reach of the Afon Taf Fechan downstream of Pontsticill Reservoir is steep and in a steep-sided valley with a limited floodplain or alluvium deposits, and therefore it is assumed that the river is not bordered by extensive bogs. The valley of the Taf continues being steep-sided and is, in addition, heavily urbanised. A neutral effect has therefore been determined.</p> <p>The water level in Pontsticill Reservoir would be temporarily slightly higher than without the operation of the option, which would help maintaining wetland soils adjacent to the reservoir. Due to the short term nature of this benefit, this effect is anticipated to be neutral.</p> <p>Overall, a neutral effect is determined against this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • Due to the gradient of the river it is assumed that it is not bordered by bogs. <p>Uncertainty</p> <ul style="list-style-type: none"> • None
<p>3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water Framework Directive</p>	<p>Will the draft Drought Plan measure lead to a change in river flows, wetted width or river level?</p> <p>Will the draft Drought Plan measure affect surface water quality and quantity?</p> <p>Will the draft Drought Plan measure lead to changes in groundwater quality, quantity and recharge?</p>	0	-	<p>Effects of Construction</p> <p>The option requires no construction and therefore will not lead to a change in river flows, surface water or groundwater quantity. For the same reason, no effects on water quality or on WFD status are expected.</p> <p>Effects of Operation</p> <p>The hydrological impacts associated with a reduction in compensation discharge will include a reduction in river flows of up to 48% with a corresponding reduction in wetted width and depth during the summer/autumn period for Reach 1 (Pontsticill Reservoir outflow – Taf Fawr confluence). This reduces to up to 16% in Reach 2 (Taf</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	<p>Will the draft Drought Plan measure lead to the deterioration of Water Framework Directive (WFD) waterbody status (or potential) from, inter alia, changes in fluvial geomorphology?</p> <p>Will the draft Drought Plan measure jeopardise the achievement of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Water Framework Directive (WFD)?</p>			<p>Fechan confluence to Afon Bargod Taf confluence) and to 11% in Reach 3 (Afon Bargod Taf confluence to Afon Cynon confluence).</p> <p>The Afon Taf Fechan is a heavily modified waterbody due to the impoundment and abstraction from the reservoir. The ecological quality is 'moderate potential' (2018 C2 interim Classification). Reduction of compensation flow would impact on water quality and quantity in the river and could cause some deterioration of the ecological quality or slow down improvement to 'good potential'. These effects could be mitigated to some extent by re-stocking following a drought. The EAR identified a 'medium' risk to the water quality in Reach 1 and Reach 2 during the period September – November inclusive.</p> <p>Water levels in Pontsticill Reservoir would be temporarily higher than without the option during a drought period. However these benefits are considered negligible and temporary in nature as the level of the reservoir would continue to decline (albeit as a reduced rate) as a drought progresses.</p> <p>Overall, a minor negative effect has been determined against this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> Re-stocking after drought. <p>Assumptions</p> <ul style="list-style-type: none"> None <p>Uncertainty</p> <ul style="list-style-type: none"> None
<p>4. To limit the causes and potential consequences of climate change and to adapt to future changes</p>	<p>Will the draft Drought Plan measure reduce or minimise greenhouse gas emissions?</p> <p>Will the draft Drought Plan measure reduce vulnerability to the effects of climate change by appropriate adaptation?</p> <p>Will the draft Drought Plan measure increase environmental resilience to the effects of climate change including to impacts on water quality?</p> <p>Will the draft Drought Plan measure reduce or minimise air pollutant emissions?</p>	0	+	<p>Effects of Construction</p> <p>The implementation of this option will not require any construction, therefore a neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>Operational energy requirements and associated carbon emissions have not been quantified by Welsh Water for any options at this stage and therefore a qualitative assessment has been made based on the infrastructure required to implement this option.</p> <p>The operation of this option does not require any changes to infrastructure or pumping. Water would be treated at existing WTWs. Energy would be required to pump and treat the water through the existing works (with associated greenhouse</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>gas emissions); however, no further energy consumption would arise from new infrastructure.</p> <p>UKCP18 climate change scenarios anticipate longer, hotter summers and, in turn, increases in both the frequency and duration of droughts. This option would provide Welsh Water with additional capacity to manage drought conditions and as such is considered to contribute towards climate change adaptation.</p> <p>Overall, this option has been assessed as having a minor positive effect on this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None
<p>5. To protect and enhance human health with special regard to vulnerable groups in society</p>	<p>Will the draft Drought Plan measure ensure continuity of clean drinking water supply within statutory standards supply at times of drought?</p> <p>Will the draft Drought Plan measure affect the affordability of clean drinking water?</p> <p>Will the draft Drought Plan measure adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise levels)?</p> <p>Will the draft Drought Plan measures affect human health or the health of any vulnerable groups?</p> <p>Will the Drought Plan measure affect public access to, or enjoyment of, local green/blue space?</p>	<p>0</p>	<p>++</p>	<p>Effects of Construction</p> <p>There is no construction required and therefore no effects are expected on water quality or clean drinking water supply. There would be no direct disturbance to local residents therefore a neutral effect is identified.</p> <p>Effects of Operation</p> <p>This option will provide a further 9.1Ml/d of drinking water, which will help to ensure that water supply is maintained during periods of drought. Those living, working or visiting the area are unlikely to be directly disturbed by the scheme.</p> <p>Overall, this option has been assessed as having a significant positive effect on this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	Will the Drought Plan measure impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?			<ul style="list-style-type: none"> None
6. To maintain and enhance the economic and social needs of the local community	<p>Will the draft Drought Plan measure ensure sufficient water is available for people and visitors to maintain economic activity in times of drought?</p> <p>Will the draft Drought Plan measures affect local or regional economies?</p> <p>Will the draft Drought Plan measure affect opportunities for recreation at times of drought?</p>	0	+	<p>Effects of Construction</p> <p>As there is no construction associated with this option, there will be no effect on the availability of water for people and visitors to maintain economic activity in times of drought. Further, it is not anticipated that the option would generate any economic benefits (e.g. job creation or investment in supply chains).</p> <p>Effects of Operation</p> <p>This option will provide an additional yield of 9.1 Ml/d. This would help to meet the water supply needs of homes, businesses and visitors in the area during periods of drought, supporting the local and regional economy, although, consistent with the definitions of significance used in the assessment, positive effects in this regard are predicted to be negligible.</p> <p>The Afon Taf Fechan and river Taff are part of a picturesque region which attracts visitors and provides opportunities for hiking, cycling, canoeing and fishing. The Taf Fechan, River Taff and Pontsticill Reservoir forms part of the landscape with the Brecon Beacons National Park. The EAR has identified that the hydrological impacts of the option are not expected to materially impact the amenity value of the area for walkers. In addition, the reduction in flows as a result of the operation of this option is not anticipated to adversely affect fishing and canoeing due to the low flows that would already be present as a result of drought conditions.</p> <p>Overall, this option has been assessed as having a minor positive effect on this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> None <p>Assumptions</p> <ul style="list-style-type: none"> None <p>Uncertainty</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<ul style="list-style-type: none"> None
7. To promote the wise use of resources	<p>Will the draft Drought Plan measure seek to minimise the demand for additional raw materials?</p> <p>Will the draft Drought Plan measure seek to minimise energy consumption?</p> <p>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</p> <p>Will the draft Drought Plan measure encourage sustainable design or use of sustainable materials?</p>	0	0	<p>Effects of Construction</p> <p>This option will not require the use of raw materials as it will make use of existing infrastructure. A neutral effect has therefore been identified against this objective.</p> <p>Effects of Operation</p> <p>During operation, this option will not require any additional energy consumption or use of any additional materials. As such, a neutral effect has been determined against this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> None <p>Assumptions</p> <ul style="list-style-type: none"> None <p>Uncertainty</p> <ul style="list-style-type: none"> None
8. To conserve and enhance the cultural, historic and industrial heritage resource.	<p>Will the draft Drought Plan measure conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</p> <p>Will the draft Drought Plan measure avoid or minimise damage to archaeologically important sites?</p> <p>Will the draft Drought Plan measure avoid damage to important wetland areas with potential for paleoenvironmental deposits?</p>	0	0	<p>Effects of Construction</p> <p>This option will not require the construction of new infrastructure and as such a neutral effect has been identified against this objective.</p> <p>Effects of Operation</p> <p>There are four Grade II listed buildings associated with Pontsticill Reservoir and water treatment works. Three Grade II and one Grade II* listed bridges cross the Taff Fechnan. The operation of this option will reduce flow by up to 48% with a corresponding reduction in wetted width and depth for Reach 1 (Pontsticill Reservoir outflow – Taf Fawr confluence).</p> <p>There is the potential for reduced flows to affect the settings of these assets, particularly where they experience views to/from the Taff Fechnan; however, any</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>effects in this regard would be temporary and reversible and in consequence, be negligible.</p> <p>Flows within Reach 2 (Taf Fechan confluence to Afon Bargod Taf confluence) and Reach 3 (Afon Bargod Taf confluence to Afon Cynon confluence) are anticipated to be reduced by up to 16% and 11% respectively, therefore any effects on historic assets along these reaches are considered to be negligible.</p> <p>Overall, this option has been assessed as having a neutral effect on this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None
<p>9. To protect and enhance landscape and seascape character and other protected features</p>	<p>Is it likely that the draft Drought Plan measure will have significant visual impacts?</p> <p>Will the draft Drought Plan measure avoid adverse effects on, and enhance where possible, the special qualities of protected/designated landscapes (including woodlands) or seascapes such as National Parks or AONBs?</p> <p>Will the draft Drought Plan measure help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness?</p>	<p style="text-align: center;">0</p>	<p style="text-align: center;">0</p>	<p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of the option, no effects from construction would occur.</p> <p>Effects of Operation</p> <p>The Upper and Lower Neuadd Reservoirs, Pontsticill Reservoir and part of the Afon Taf Fechan lie within Brecon Beacons National Park. All are within wooded valleys and are noted as part of a picturesque region, which attracts visitors. Several footpaths, including the Taff trail, run close to the reservoir banks and on both banks for most of the Afon Taf Fechan. Downstream of the confluence with the Afon Taf Fawr in Merthyr Tydfil the area is characterised by urban and industrial development. The Taff trail continues from Merthyr Tydfil along the River Taff to Cardiff. A national cycle route also follows the River Taff from Merthyr Tydfil. The EAR has identified that the reduction in flows as a result of the operation of this option would have a negligible effect on the landscape.</p> <p>The water level in the reservoir would be maintained over a longer period than without the operation of the option, which would help maintain the beauty of the national park, which attracts visitors for activities such as walking. Due to the short term nature, this effect is anticipated to be negligible.</p> <p>Overall, a neutral effect has been determined against this objective.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None
Summary	<p>Effects of Construction</p> <p>The option does not involve the construction of any infrastructure and as such no effects are anticipated.</p> <p>Effects of Operation</p> <p>A significant negative effect (with some uncertainty) has been identified against objective 1 (biodiversity) due to the potential for major impacts on Atlantic Salmon, Brown Trout and Bullhead in particular. The reduction in flow of up to 48% has been identified as having a minor adverse effect against objective 3 (water). The role of the option in improving drought resilience has also led to the identification of a minor positive against objective 4 (climate change). The gain in deployable water output has led to the identification of a significant positive effect for objective 5 (human health) and a minor positive for objective 6 (community).</p> <p>Mitigation</p> <p>There are several mitigation measures that are appropriate, depending on the fish species being protected. The approaches include the temporary reduction or cessation of this option and temporary measures to reduce fish predation.</p> <p>Potential re-stocking of rivers following drought conditions.</p>			

8201-3 Relax the maintained requirement below the Nantgaredig intake on the River Tywi

Option Summary

This drought order involves a change in the abstraction conditions at the Nantgaredig intake to relax the requirement to maintain the downstream flow at an instantaneous daily minimum of 136MI/d. Instead, the downstream flow requirement of 136MI/d would be temporarily assessed as a 7-day rolling average, with the daily instantaneous minimum flow requirement temporarily reduced to 116MI/d. This would enable Welsh Water to more efficiently target a rolling average downstream flow of 136MI/d, whilst reducing the need to over-release at times of very low flow due to the time of travel between the reservoir and the downstream abstraction intake (24 hours or more) and the difficulties of predicting the next day's gauged flows.

Drought orders may remain in force for a period of up to six months, and they can be extended for up to a further six months. However, the period of implementation for this drought order **would only** be September to November, as confirmed by water resources modelling carried out by Welsh Water.

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity.</p>	<p>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs and priority habitats and species)?</p> <p>Will the draft Drought Plan measure protect and enhance non-designated sites and local biodiversity?</p> <p>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</p> <p>Will the draft Drought Plan measure affect the condition of ecosystems (including their connectivity, structure and functioning)?</p> <p>Will the draft Drought Plan measure enhance the adaptability of ecosystems?</p> <p>Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?</p>	<p>0</p>	<p>--/?</p>	<p>Effects of Construction</p> <p>The option would make use of existing infrastructure and would not require construction of new infrastructure.</p> <p>Effects of Operation</p> <p>The Afon Tywi is a component of the Afon Tywi SSSI/SAC and is adjacent Bishops Pond SSSI. The Afon Tywi flows into the Carmethan Bay & Estuaries SAC.</p> <p>The HRA screening notes that <i>"This option will have significant effects on the Afon Tywi/ River Tywi SAC as a result of its operation. Total flow upstream of the Nantgaredig intake is equal to the natural flow plus the controlled releases from the Llyn Brienne Reservoir. Downstream of the abstraction point, the natural flow component of the total flow upstream will remain, plus the regulation release at times when no abstraction is being made. The potential hydrological impact due to the implementation of the option stretches for a distance of 5.7km from the Nantgaredig intake to the tidal limit of the Afon Tywi. The downstream limit is however not clearly defined, as there is no physical barrier to limit the extent of tidal propagation upstream in the river."</i></p> <p>The HRA Appropriate Assessment for this option assesses the effects of the scheme against the conservation objectives, favourable condition targets and current status of the SAC. As the timing of the drought order avoids spawning and migration of key species (Sea lamprey, River lamprey, Twait shad, Bullhead and Allis shad) and is unlikely to result in changes in river hydraulics beyond those observed from the normal variations resulting from the consented abstraction during low flows, following more detailed assessment, no adverse effects on features (habitats and species) are identified.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>The EAR completed for this option concluded that implementation of the drought permit would not result in any effects on the Bishops Pond SSSI. However, it notes a potential adverse effect on the Afon Tywi SSSI as a result of effects on water crowfoot.</p> <p>The EAR identifies negligible impacts for all species assessed in Reaches 1-3. However, potential minor impacts for fish species (brown trout, atlantic salmon), macrophytes, water crowfoot and macroinvertebrates have been identified for Reach 4. Such effect would be short term and reversible.</p> <p>Overall, taking into account the potential for adverse effects on the Afon Tywi SSSI and effects on species, this option has been assessed as having a potentially significant negative effect (with some uncertainty) on this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • The downstream limit to the impact is uncertain, as there is no physical barrier to limit the extent of tidal propagation upstream in the river
<p>2. To ensure the appropriate and efficient use of land and protect and enhance soil quality and geodiversity.</p>	<p>Will additional land be required for the development or implementation of the option or will the option require below ground works leading to land sterilisation?</p> <p>Will the draft Drought Plan utilise previously developed land?</p> <p>Will the draft Drought Plan measure minimise the loss of best and most versatile agricultural land?</p> <p>Will the draft Drought Plan measure affect upland (peat-dominated) and other wetland soils?</p>	0	0	<p>Effects of Construction</p> <p>The option requires no construction and therefore its implementation is not expected to result in any effects on land use or upland or wetland soils.</p> <p>Effects of Operation</p> <p>The operation of this option will maintain the flows of water directly from the Llyn Brienne reservoir and at the Nantgaredig intake along lower Tywi. It is noted that the drawdown conditions of the current licence will be maintained and therefore it is considered that there will be no additional effects on wetland and/or marginal soils around the existing abstraction points.</p> <p>Overall, a neutral effect is determined against this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	Will the draft Drought Plan measure protect and enhance protected sites designated for their geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest?			Assumptions <ul style="list-style-type: none"> None Uncertainty <ul style="list-style-type: none"> None
3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water Framework Directive	<p>Will the draft Drought Plan measure lead to a change in river flows, wetted width or river level?</p> <p>Will the draft Drought Plan measure affect surface water quality and quantity?</p> <p>Will the draft Drought Plan measure lead to changes in groundwater quality, quantity and recharge?</p> <p>Will the draft Drought Plan measure lead to the deterioration of Water Framework Directive (WFD) waterbody status (or potential) from, inter alia, changes in fluvial geomorphology?</p> <p>Will the draft Drought Plan measure jeopardise the achievement of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Water Framework Directive (WFD)?</p>	0	-	Effects of Construction <p>The option requires no construction and therefore will not lead to a change in river flows, surface water or groundwater quantity.</p> <p>For the same reason, no effects on water quality or on WFD status are expected.</p> Effects of Operation <p>The reductions in flows for Reach 1 (Afon Tywi from Llyn Brianne Reservoir outflow to the confluence with Afon Bran) are up to 5.9%, for Reach 2 (Afon Tywi from the Afon Bran confluence to Llandeilo Bridge) up to 5.6% and for Reach 3 (Afon Tywi from Llandeilo Bridge to the Nantgaredig intake) up to 4.9%. The EAR notes that these reductions will have a negligible effect.</p> <p>Within Reach 4 operation of this option (Afon Tywi from the Nantgaredig intake to the tidal limit) would lead to a reduction in extreme low flows of up to 14.7% on occasional days in the period from September to November inclusive.</p> <p>The EAR identifies a low risk to water quality in both Reach 4 linked to soluble reactive phosphorus and also total ammonia concentration and dissolved oxygen saturation.</p> <p>Negligible impacts on macrophytes and macroinvertebrates are identified for Reaches 1, 2 and 3. Minor negative impacts on macrophytes and macroinvertebrates are identified for Reach 2 and in turn the overall risk to WFD waterbody macroinvertebrate status is considered minor.</p> <p>Overall, a minor negative effect has been identified for this option.</p> Mitigation <ul style="list-style-type: none"> None Assumptions <ul style="list-style-type: none"> None

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>Uncertainty</p> <ul style="list-style-type: none"> None
<p>4. To limit the causes and potential consequences of climate change and to adapt to future changes</p>	<p>Will the draft Drought Plan measure reduce or minimise greenhouse gas emissions?</p> <p>Will the draft Drought Plan measure reduce vulnerability to the effects of climate change by appropriate adaptation?</p> <p>Will the draft Drought Plan measure increase environmental resilience to the effects of climate change including to impacts on water quality?</p> <p>Will the draft Drought Plan measure reduce or minimise air pollutant emissions?</p>	<p>0</p>	<p>+</p>	<p>Effects of Construction</p> <p>The implementation of this option will not require any construction, therefore a neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>The option involves the removal of the maintained flow requirement (of 136Ml/d) below the Nantgaredig intake on the River Tywi. The implementation of the option will not have an effect on the abstraction of potable water to the WTW and hence no change in the energy consumption.</p> <p>UKCP18 climate change scenarios anticipate longer, hotter summers and, in turn, increases in both the frequency and duration of droughts. This option would provide Welsh Water with additional capacity to manage drought conditions and as such is considered to contribute towards climate change adaptation.</p> <p>Overall, this option has been assessed as having a minor positive effect on this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> None <p>Assumptions</p> <ul style="list-style-type: none"> None <p>Uncertainty</p> <ul style="list-style-type: none"> None

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>5. To protect and enhance human health with special regard to vulnerable groups in society</p>	<p>Will the draft Drought Plan measure ensure continuity of clean drinking water supply within statutory standards supply at times of drought?</p> <p>Will the draft Drought Plan measure affect the affordability of clean drinking water?</p> <p>Will the draft Drought Plan measure adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise levels)?</p> <p>Will the draft Drought Plan measures affect human health or the health of any vulnerable groups?</p> <p>Will the Drought Plan measure affect public access to, or enjoyment of, local green/blue space?</p> <p>Will the Drought Plan measure impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?</p>	0	++	<p>Effects of Construction</p> <p>There is no construction required and therefore no effects are expected on water quality or clean drinking water supply. There would be no direct disturbance to local residents therefore a neutral effect is identified.</p> <p>Effects of Operation</p> <p>The operation of this option will provide a gain in deployable output of 14MI/d, which will help to ensure that water supply is maintained during periods of drought. Those living, working or visiting the area are unlikely to be directly disturbed by the scheme.</p> <p>Overall, this option has been assessed as having a minor positive effect on this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None
<p>6. To maintain and enhance the economic and social needs of the local community</p>	<p>Will the draft Drought Plan measure ensure sufficient water is available for people and visitors to maintain economic activity in times of drought?</p> <p>Will the draft Drought Plan measures affect local or regional economies?</p> <p>Will the draft Drought Plan measure affect opportunities for recreation at times of drought?</p>	0	++	<p>Effects of Construction</p> <p>As there is no construction associated with this option, there will be no effect on the availability of water for people and visitors to maintain economic activity in times of drought. Further, it is not anticipated that the option would generate any economic benefits (e.g. job creation or investment in supply chains).</p> <p>Effects of Operation</p> <p>The removal of the maintained flow requirement will allow Welsh Water to continue the abstraction at Nantgaredig intake at lower flows than without the option. This would help to meet the water supply needs of homes, businesses and visitors in the area during periods of drought, supporting the local and regional economy.</p> <p>The EAR states that the catchment attracts numerous recreational interests including angling, tourism, bird watching/nature study, canoeing and pony trekking. The Tywi is recognised as the premier sea trout river in England and Wales but is also important for salmon and brown trout. Any reduction in wetted width and depth may</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>affect the aquatic ecology and negatively impact on the mentioned recreational activities, however, water levels will be naturally low in times of drought and impacts will be temporary in nature.</p> <p>Overall, this option has been assessed as having a significant negative effect on this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None
7. To promote the wise use of resources	<p>Will the draft Drought Plan measure seek to minimise the demand for additional raw materials?</p> <p>Will the draft Drought Plan measure seek to minimise energy consumption?</p> <p>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</p> <p>Will the draft Drought Plan measure encourage sustainable design or use of sustainable materials?</p>	0	0	<p>Effects of Construction</p> <p>This option will not require the use of raw materials as it will make use of existing infrastructure. A neutral effect has therefore been identified against this objective.</p> <p>Effects of Operation</p> <p>This option involves removal of maintained flow requirement below the Nantgaredig intake, and flows below the intake would return to normal natural flows. The abstraction for potable water at this intake point will remain unchanged and therefore no changes will take place on the current energy consumption as a result of the implementation of the option. No extra resources are required for implementation of the option. As such, a neutral effect has been determined against this objective.</p> <p>.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>8. To conserve and enhance the cultural, historic and industrial heritage resource.</p>	<p>Will the draft Drought Plan measure conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</p> <p>Will the draft Drought Plan measure avoid or minimise damage to archaeologically important sites?</p> <p>Will the draft Drought Plan measure avoid damage to important wetland areas with potential for paleoenvironmental deposits?</p>	<p>0</p>	<p>0</p>	<p>Effects of Construction</p> <p>The option would make use of existing infrastructure and would not require construction of new infrastructure.</p> <p>Effects of Operation</p> <p>Flows within the Afon Tywi are anticipated to be reduced by up to 14.7%, therefore any effects on historic assets by the operation of this option are considered to be negligible.</p> <p>Overall, this option has been assessed as having a neutral effect on this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None
<p>9. To protect and enhance landscape and seascape character and other protected features</p>	<p>Is it likely that the draft Drought Plan measure will have significant visual impacts?</p> <p>Will the draft Drought Plan measure avoid adverse effects on, and enhance where possible, the special qualities of protected/designated landscapes (including woodlands) or seascapes such as National Parks or AONBs?</p> <p>Will the draft Drought Plan measure help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness?</p>	<p>0</p>	<p>0</p>	<p>Effects of Construction</p> <p>The option would make use of existing infrastructure and would not require construction of new infrastructure.</p> <p>Effects of Operation</p> <p>The option would result in a change in flow immediately downstream of the Nantgaredig intake, along the full extent of the Reach 1. Flows below the intake will return to natural low flows. No new structures will be built above-ground as a result of this option. There are no designated landscapes or townscapes that will be negatively affected along the hydrological extent of the option.</p> <p>Overall, this option has been assessed as having a neutral effect on this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<ul style="list-style-type: none"> None <p>Uncertainty</p> <ul style="list-style-type: none"> None
Summary	<p>Effects of Construction</p> <p>The option does not involve the construction of any infrastructure and as such no effects are anticipated.</p> <p>Effects of Operation</p> <p>A significant negative effect (with some uncertainty) has been identified against objective 1 (biodiversity) as a result of potential impacts on juvenile Lamprey within the Afon Tywi SAC and Water Crowfoot within the Afon Tywi SSSI. The reduction in flow has been identified as having a minor adverse effect for objective 3 (water). A minor positive effect has been identified for objective 4 (climate change) as the option would assist in adapting to climate change. The gain in deployable water output has led to the identification of a significant positive effect for objective 5 (human health) and on objective 6 (economy). Neutral effects were identified for the remaining objectives for the option.</p> <p>Mitigation</p> <ul style="list-style-type: none"> None 			

8202-1 Increase the Llechryd abstraction from 19 MI/d to 21 MI/d and obtain variation of annual licence amounts

Option Summary

Llechryd WTW is located in the south-west of the Mid and South Ceredigion WRZ. It is fed by an abstraction from the nearby Afon Teifi. The intake for the WTW is about 4.4km upstream of the tidal limit.

The option involves a proposed increase in the daily abstraction rate at the Llechryd intake, whereby the licence condition relating to the abstraction rate in any 24 hour period would be increased by 2MI/d, from 19MI/d to 21MI/d. This would also require amendment of the hourly abstraction rate condition. The option would increase the unsupported river abstraction from the Afon Teifi. Drought orders may remain in force for a period of up to six months, and they can be extended for up to a further six months. There is an all year period of implementation for this drought order, however implementation is likely to occur in the summer period, as confirmed by water resources modelling carried out by Welsh Water.

No additional infrastructure would be required to enable this option to be implemented.

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity.</p>	<p>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs and priority habitats and species)?</p> <p>Will the draft Drought Plan measure protect and enhance non-designated sites and local biodiversity?</p> <p>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</p> <p>Will the draft Drought Plan measure affect the condition of ecosystems (including their connectivity, structure and functioning)?</p> <p>Will the draft Drought Plan measure enhance the adaptability of ecosystems?</p>	<p>0</p>	<p>-/?</p>	<p>Effects of Construction</p> <p>The option would not require additional infrastructure and no effects on biodiversity from construction would occur. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>The main Afon Teifi and its tributaries are part of the designated Afon Teifi SAC which has a concurrent boundary with the Afon Teifi SSSI. The estuary is part of the Cardigan Bay SAC. The section of the Afon Teifi affected by this option also encompasses the Teifi Estuary Woodlands & Marshes SSSI and the Coedmor NNR.</p> <p>The Afon Teifi SAC/SSSI is designated for aquatic ecological features including a number of different habitats and species such as bullhead; river, brook and sea lamprey; otter; and Atlantic salmon, which will be sensitive to flow and level changes. Teifi Woodland & Marshes SSSI, meanwhile, is noted for extensive areas of fresh water-salt water marshland (lower reaches), unvegetated mudflats, rich feeding grounds for birds (upper reaches) and rare estuarine/terrestrial mire habitat and ancient woodland habitat (middle reaches). Coedmor NNR is designated for its ancient oak woodland.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?			<p>The HRA notes that the effects on the Afon Teifi/ River Teifi SAC as a result of its operation “are likely to be marginal based on the hydrological assessment.”</p> <p>The EAR states that the proposed increased abstraction associated with this option will have negligible hydrological impacts on the Afon Teifi (reduction in flows of less than 1.8%) and, consequently, it concludes that there would be negligible impacts on the designated sites outlined above as well as on fish, mammals and macrophytes communities.</p> <p>Overall, a minor negative effect (with uncertainty) is determined against this objective reflecting the HRA.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty None</p>
2. To ensure the appropriate and efficient use of land and protect and enhance soil quality and geodiversity.	<p>Will additional land be required for the development or implementation of the option or will the option require below ground works leading to land sterilisation?</p> <p>Will the draft Drought Plan utilise previously developed land?</p> <p>Will the draft Drought Plan measure minimise the loss of best and most versatile agricultural land?</p> <p>Will the draft Drought Plan measure affect upland (peat-dominated) and other wetland soils?</p> <p>Will the draft Drought Plan measure protect and enhance protected sites designated for their</p>	0	0	<p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of this option, no effects from construction on land use, geology or soils would occur. A neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>This option would result in reduced water levels in the 4.4km section of Afon Teifi downstream of the Llechryd WTW intake. Conceivably, this could lead to drying out of wetland soils adjacent to the river. However, the EAR has concluded that the reduction in water level would be negligible (less than 1.8% reduction in river flows).</p> <p>Overall, a neutral effect is determined against this objective.</p> <p>Mitigation None</p> <p>Assumptions None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest?			<p>Uncertainty</p> <p>None</p>
<p>3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water Framework Directive</p>	<p>Will the draft Drought Plan measure lead to a change in river flows, wetted width or river level?</p> <p>Will the draft Drought Plan measure affect surface water quality and quantity?</p> <p>Will the draft Drought Plan measure lead to changes in groundwater quality, quantity and recharge?</p> <p>Will the draft Drought Plan measure lead to the deterioration of Water Framework Directive (WFD) waterbody status (or potential) from, inter alia, changes in fluvial geomorphology?</p> <p>Will the draft Drought Plan measure jeopardise the achievement of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Water Framework Directive (WFD)?</p>	<p>0</p>	<p>0</p>	<p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of this option, no effects from construction on water quality or quantity would occur. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>The Afon Teifi is a major river in Wales, with its source in the Cambrian Mountains. The ecological status of Afon Teifi is 'moderate' (WFD Cycle 2 classification).</p> <p>Flow in the Afon Teifi is unsupported by upstream releases, and the surface water abstraction results in a removal of a proportion of the downstream flow. During a drought, river flows would be low and the proposed increase in abstraction rate under this option would further reduce river flow downstream of the intake. However, the EAR identifies that the proposed increased abstraction will reduce flows by less than 1.8% in the 4.4km section of Afon Teifi downstream of the Llechryd WTW intake and concludes that this will have negligible hydrological impacts on the river.</p> <p>Given that there is no adverse hydrological impact on Afon Teifi associated with the option, effects on geomorphology and water quality are equally assessed as negligible. Similarly, there would be no flow pressures or water quality pressures that would pose an increased risk to any water-dependent environmental features within the vicinity of Llechryd intake.</p> <p>Overall, a neutral effect has been determined against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>4. To limit the causes and potential consequences of climate change and to adapt to future changes</p>	<p>Will the draft Drought Plan measure reduce or minimise greenhouse gas emissions?</p> <p>Will the draft Drought Plan measure reduce vulnerability to the effects of climate change by appropriate adaptation?</p> <p>Will the draft Drought Plan measure increase environmental resilience to the effects of climate change including to impacts on water quality?</p> <p>Will the draft Drought Plan measure reduce or minimise air pollutant emissions?</p>	<p>0</p>	<p>+</p>	<p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of the option, no effects from construction would occur. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>This option does not require any changes to infrastructure or pumping. Water would be treated at the existing Llechryd WTW. Energy would be required to pump and treat the water through the existing works (with associated carbon emissions); however, no further energy consumption would arise from new infrastructure.</p> <p>UKCP18 climate change scenarios anticipate longer, hotter summers and, in turn, increases in both the frequency and duration of droughts. This option would provide Welsh Water with additional capacity to manage drought conditions and as such is considered to contribute towards climate change adaptation.</p> <p>Overall, this option has been assessed as having a minor positive effect on this objective.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty None</p>
<p>5. To protect and enhance human health with special regard to vulnerable groups in society</p>	<p>Will the draft Drought Plan measure ensure continuity of clean drinking water supply within statutory standards supply at times of drought?</p> <p>Will the draft Drought Plan measure affect the affordability of clean drinking water?</p> <p>Will the draft Drought Plan measure adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise levels)?</p>	<p>0</p>	<p>+</p>	<p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of the option, no health effects from construction would occur.</p> <p>Effects of Operation</p> <p>This option will provide a further 2 Ml/d of drinking water, which will help to meet the water needs of society and ensure continuity of clean drinking water supply at times of drought. No noise or disturbance is expected from the operation of this option.</p> <p>A minor positive effect is therefore determined against this objective, in accordance with the definitions of significance.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	<p>Will the draft Drought Plan measures affect human health or the health of any vulnerable groups?</p> <p>Will the Drought Plan measure affect public access to, or enjoyment of, local green/blue space?</p> <p>Will the Drought Plan measure impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?</p>			<p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>
<p>6. To maintain and enhance the economic and social needs of the local community</p>	<p>Will the draft Drought Plan measure ensure sufficient water is available for people and visitors to maintain economic activity in times of drought?</p> <p>Will the draft Drought Plan measures affect local or regional economies?</p> <p>Will the draft Drought Plan measure affect opportunities for recreation at times of drought?</p>	0	0	<p>Effects of Construction</p> <p>As there is no construction associated with this option, there will be no effect on the availability of water for people and visitors to maintain economic activity in times of drought. Further, it is not anticipated that the option would generate any economic benefits (e.g. job creation or investment in supply chains).</p> <p>Effects of Operation</p> <p>This option will provide an additional yield of 2 Ml/d. This will help to meet the water supply needs of people and visitors to the area in times of drought; however, in accordance with the definitions of significance, the yield of the option is not considered significant.</p> <p>The Teifi catchment supports a nationally important salmon and sea trout (sewin) fishery, which includes one of the few remaining coracle fisheries in the UK. Angling and tourism are increasingly important sources of income to the area, with visitors being attracted by the high quality of the landscape and countryside. Any reduction in wetted width and depth of the Afon Teifi may influence the water-dependent activities such as angling and canoeing. However, water levels will be naturally low in times of drought and impacts will be temporary in nature. Furthermore, the EAR has concluded that the proposed increased abstraction will have negligible hydrological impacts on the Afon Teifi.</p> <p>Overall, a neutral effect is determined against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				None Uncertainty None
7. To promote the wise use of resources	<p>Will the draft Drought Plan measure seek to minimise the demand for additional raw materials?</p> <p>Will the draft Drought Plan measure seek to minimise energy consumption?</p> <p>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</p> <p>Will the draft Drought Plan measure encourage sustainable design or use of sustainable materials?</p>	0	0	<p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of the option, no effects from construction would occur. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>During operation, this option will not require additional energy use or resources over and above those currently used to treat water at Llechryd WTW. In consequence, a neutral effect is anticipated against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>
8. To conserve and enhance the cultural, historic and industrial heritage resource.	<p>Will the draft Drought Plan measure conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</p> <p>Will the draft Drought Plan measure avoid or minimise damage to archaeologically important sites?</p>	0	0	<p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of the option, no effects from construction on heritage assets would occur. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>There are a number of Grade II listed buildings and scheduled monuments in the vicinity of the Afon Teifi. The closest features include Llechryd Bridge, Castle Malgwyn Bridge, Gates, Lodge and Hotel, Cilgerran Castle and Coedmore Country House. Given the negligible hydrological impacts on Afon Teifi associated with this option, the EAR concludes that no material impact on heritage features are anticipated. A neutral effect is therefore anticipated against this objective.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	Will the draft Drought Plan measure avoid damage to important wetland areas with potential for paleoenvironmental deposits?			Mitigation None Assumptions None Uncertainty None
9. To protect and enhance landscape and seascape character and other protected features	<p>Is it likely that the draft Drought Plan measure will have significant visual impacts?</p> <p>Will the draft Drought Plan measure avoid adverse effects on, and enhance where possible, the special qualities of protected/designated landscapes (including woodlands) or seascapes such as National Parks or AONBs?</p> <p>Will the draft Drought Plan measure help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness?</p>	0	0	Effects of Construction As no additional infrastructure is required for the implementation of the option, no landscape/visual effects from construction would occur. A neutral effect has been determined against this objective. Effects of Operation The EAR study area covers five areas of cultural landscape: Teifi valley historic landscape, Lowland landscape, Teifi Valley (Pembrokeshire) and Crymych. Given the negligible hydrological impacts of the option on the Afon Teifi, the EAR concludes that there will be no material impact on landscape or visual amenity. A neutral effect is therefore anticipated against this objective. Mitigation None Assumptions None Uncertainty None
Summary	Effects of Construction This option does not involve the construction of any additional infrastructure and as such no effects are anticipated. Effects of Operation A minor negative effect (with some uncertainty) has been identified against objective 1 (biodiversity) as a result of potential impacts on the Afon Teifi/ River Teifi SAC. The gain in deployable output has led to the identification of a minor positive effect for Objective 5 (human health) and the role of the option in improving drought resilience has also led to the identification of a minor positive against Objective 4 (climate change). Neutral effects are determined against all other objectives which principally reflects the fact that the option is anticipated to have a negligible impact on river flows in the Afon Teifi. Mitigation			

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	None			

8203-2 Pumped abstraction from Nantymoch (a HEP reservoir operated by Statkraft) into the raw water main between Llyn Llygad Rheidol Reservoir and Bontgoch WTW

Option Summary

Nantymoch is a reservoir in West Wales which forms part of the Cwm Rheidol hydroelectric power (HEP) scheme and the headwaters of the reservoir include the Afon Hengwm, as part of the North Ceredigion WRZ. Downstream, the reservoir flows into the Afon Rheidol, and continues on to Dinas Reservoir, located east of Aberystwyth. The EAR states that details of existing operating arrangements are currently not known, although it is understood that up to 160Ml/d may be released from Nantymoch Reservoir to drive a 13MW hydro-electric plant as the water passes downstream via the Afon Rheidol to Dinas Reservoir.

The option involves a temporary pumped abstraction from Nantymoch Reservoir, of up to 5Ml/d, to be transferred into the raw water main between Llyn Llygad Rheidol Reservoir and Bontgoch water treatment works (WTW), to support demands in the North Ceredigion WRZ. Drought permits may remain in force for a period of up to six months, and they can be extended for up to a further six months.

To enable this option to be implemented, pumping would be required to abstract the water and to transfer to the raw water main between Llyn Llygad Rheidol Reservoir and Bontgoch WTW. The exact nature and location of temporary infrastructure is not known at present; however, it is likely to require above ground pumps and generator(s) and pipelines. The distance between the abstraction point (at the foot of Nantymoch Reservoir) and the raw water main (located just south of the dam itself over which the pipeline would be laid) is estimated to be approximately 400m.

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity.</p>	<p>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs and priority habitats and species)?</p> <p>Will the draft Drought Plan measure protect and enhance non-designated sites and local biodiversity?</p> <p>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</p>	0	0	<p>Effects of Construction</p> <p>This option requires the siting of temporary, above-ground infrastructure (pumps and generators) to enable water to be taken from Nantymoch Reservoir. Mobile pumping would maintain water for the hydro-power scheme and also enable water to be pumped for treatment at Bontgoch WTW. Construction activities such as excavation may be required.</p> <p>Afon Rheidol, approximately 6 km downstream of Nantymoch Reservoir, is within Rheidol Woods and Gorge SAC which is concurrent with the area of SSSI. The Coed Rheidol NNR comprises about 173 hectares of the SAC/SSSI. The site's interest features are not dependent on the flow in the Afon Rheidol, designated as an example of western acidic oak woodland.</p> <p>Any temporary infrastructure required for this option will not be located within these designated sites. Associated construction impacts (e.g. noise and habitat disturbance) would be very small in scale, short term in nature and, assuming good practice is followed, will not result in significant and long term effects on local biodiversity. It is assumed that, wherever possible, Welsh Water will seek to route</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	<p>Will the draft Drought Plan measure affect the condition of ecosystems (including their connectivity, structure and functioning)?</p> <p>Will the draft Drought Plan measure enhance the adaptability of ecosystems?</p> <p>Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?</p>			<p>temporary pipelines and site temporary pumping infrastructure on existing areas of hardstanding (roads, parking areas, tracks etc).</p> <p>No effects on the ecological quality of habitats are anticipated to result from construction activity due to changes in groundwater/river water quantity or quality during the construction phase, assuming that best practice construction techniques are followed (e.g. the use of sediment traps).</p> <p>Overall, a neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>The temporary pumped abstraction has the potential to influence water levels in Nantymoch Reservoir and flows in the downstream Afon Rheidol. The HRA notes <i>"The Rheidol passes through the Coedydd a Cheunant Rheidol/ Rheidol Woods and Gorge SAC, although the features of this site are not sensitive to water resource permissions or flows within the river. The negotiated abstraction would fall within the range of Statkraft's existing abstraction regime and it is likely that the diversion of this amount for public water supply would make no difference to the reservoir performance or the highly artificial flow regime of the Rheidol. The ultimate downstream receptor is the West Wales Marine / Gorllewin Cymru Forol SCI at Aberystwyth, although operational effects will not be measurable at this distance downstream."</i></p> <p>The reservoir is stocked with varieties of trout which could be affected by changing water levels. However, the EAR has concluded that the proposed temporary abstraction will have negligible hydrological impacts on water levels in the reservoir (reduction in approximately 3.6% of the total storage capacity) and downstream flow regime in the Afon Rheidol (no reduction in flows assuming the statutory compensation flow from Nantymoch reservoir would continue in drought conditions). Furthermore, the negligible hydrological impacts associated with the option's implementation is not anticipated to reduce the availability of habitats and/or change the composition of the fish, macrophyte, phytobenthos and macroinvertebrate communities and otters.</p> <p>It is noted that there may be noise/vibration from mobile pumping and generators. However, it would be possible to mitigate the effects of this by locating equipment away from sensitive habitats/species if necessary.</p> <p>Overall, a neutral effect is determined against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>It is assumed that temporary pumping/generators (where required) would be located away from sensitive receptors and temporary pipelines would be routed along roads where possible.</p> <p>Uncertainty None</p>
<p>2. To ensure the appropriate and efficient use of land and protect and enhance soil quality and geodiversity.</p>	<p>Will additional land be required for the development or implementation of the option or will the option require below ground works leading to land sterilisation?</p> <p>Will the draft Drought Plan utilise previously developed land?</p> <p>Will the draft Drought Plan measure minimise the loss of best and most versatile agricultural land?</p> <p>Will the draft Drought Plan measure affect upland (peat-dominated) and other wetland soils?</p> <p>Will the draft Drought Plan measure protect and enhance protected sites designated for their geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest?</p>	0	0	<p>Effects of Construction</p> <p>This option requires the siting of temporary, above-ground infrastructure (pumps and generators) to enable water to be taken from Nantymoch Reservoir. Construction activities such as excavation may be required.</p> <p>The Soilscape viewer (http://www.landis.org.uk/soilscales/) shows that soils in the area around the reservoir and in the downstream Afon Rheidol are very acid loamy upland soils with a wet peaty surface. Construction may therefore affect these upland/wetland soils due to the potential need for the creation of hardstanding. The exact location of infrastructure is not currently known, although it is assumed that existing hardstanding on which to locate infrastructure will be sought in preference to new excavations. Given this assumption, and the small scale and temporary nature of the works, a neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>The EAR has concluded that the proposed temporary abstraction will have negligible hydrological impacts on water levels in the reservoir (reduction in approximately 3.6% of the total storage capacity) and downstream flow regime in the Afon Rheidol (no reduction in flows assuming the statutory compensation flow from Nantymoch reservoir would continue in drought conditions). Therefore it is considered that there will be no additional effects on wetland/marginal soils around the lake and the Afon Rheidol.</p> <p>Overall, a neutral effect has been determined for this objective.</p> <p>Mitigation None</p> <p>Assumptions</p> <p>The exact location of infrastructure is not currently known and it is assumed that existing hardstanding on which to locate infrastructure will be sought in preference to new excavations.</p> <p>Uncertainty The exact location of infrastructure is not currently known.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water Framework Directive</p>	<p>Will the draft Drought Plan measure lead to a change in river flows, wetted width or river level?</p> <p>Will the draft Drought Plan measure affect surface water quality and quantity?</p> <p>Will the draft Drought Plan measure lead to changes in groundwater quality, quantity and recharge?</p> <p>Will the draft Drought Plan measure lead to the deterioration of Water Framework Directive (WFD) waterbody status (or potential) from, inter alia, changes in fluvial geomorphology?</p> <p>Will the draft Drought Plan measure jeopardise the achievement of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Water Framework Directive (WFD)?</p>	0	0	<p>Effects of Construction</p> <p>This option requires the siting of temporary, above-ground infrastructure (pumps and generators) to enable water to be taken from Nantymoch Reservoir. Construction activities such as the creation of hardstanding may be required.</p> <p>Construction activities will not lead to a change in river flows, surface water or groundwater quantity. No effects on water quality or WFD status would be expected from construction activities, assuming that best practice construction techniques are followed (e.g. the use of sediment traps). A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>Nantymoch Reservoir and Afon Rheidol are heavily modified water bodies with ecological status of 'moderate' (WFD Cycle 2 classification). The flow regime of the Afon Rheidol is heavily influenced by operation of the Cwm Rheidol HEP scheme.</p> <p>The temporary pumped abstraction has the potential to influence water levels in Nantymoch Reservoir and flows in the downstream Afon Rheidol. However, the EAR has concluded that the proposed temporary abstraction will have negligible hydrological impacts on water levels in the reservoir (reduction in approximately 3.6% of the total storage capacity) and downstream flow regime in the Afon Rheidol (no reduction in flows assuming the statutory compensation flow from Nantymoch reservoir would continue in drought conditions).</p> <p>Given that there is no adverse hydrological impact associated with the option, effects on geomorphology and water quality are equally assessed as negligible. Similarly, there would be no flow pressures or water quality pressures that would pose an increased risk to any water-dependent environmental features within the vicinity of the Nantymoch intake. No effects on WFD status are therefore anticipated.</p> <p>Overall, a neutral effect has been determined against this objective.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>4. To limit the causes and potential consequences of climate change and to adapt to future changes</p>	<p>Will the draft Drought Plan measure reduce or minimise greenhouse gas emissions?</p> <p>Will the draft Drought Plan measure reduce vulnerability to the effects of climate change by appropriate adaptation?</p> <p>Will the draft Drought Plan measure increase environmental resilience to the effects of climate change including to impacts on water quality?</p> <p>Will the draft Drought Plan measure reduce or minimise air pollutant emissions?</p>	-	+/-	<p>Effects of Construction</p> <p>The construction of this option will require the movement of plant and materials (e.g. pumps, pipes etc) to site, which will require fuel and result in carbon emissions. It is assumed approximately 400m of pipeline would be required to implement this option (with embodied carbon). There would also be carbon embodied within the temporary infrastructure. However, it is possible that these materials could be hired or used from existing Welsh Water/contractor stores and could subsequently be used elsewhere once the temporary infrastructure has been removed from site. This would lessen the effect of carbon embodied in materials.</p> <p>Overall, a minor negative effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>Energy requirements and carbon emissions have not been quantified by Welsh Water for any options at this stage and therefore a qualitative assessment has been made based on the infrastructure required to implement this option.</p> <p>OS mapping indicates that the land in the south of the reservoir is topographically very similar to the estimated connection point to the water main, therefore pumping is likely to be required. 5Ml/d will be pumped from the Nantymoch Reservoir to a raw water main between Llyn Llygad Rheidol Reservoir and Bontgoch WTW, a distance estimated to be approximately 400m. Pumping will require energy (in this case, in the form of generators) which require fuel and result in carbon emissions. It is assumed that pumping will only be required to abstract water from the reservoir.</p> <p>UKCP18 climate change scenarios anticipate longer, hotter summers and, in turn, increases in both the frequency and duration of droughts. This option would provide Welsh Water with additional capacity to manage drought conditions and as such is considered to contribute towards climate change adaptation.</p> <p>Overall, this option has been assessed as having a mixed minor positive and minor negative effect on this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>It is assumed that the distance from abstraction to the raw water main is approximately 400m.</p> <p>Uncertainty</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				None
<p>5. To protect and enhance human health with special regard to vulnerable groups in society</p>	<p>Will the draft Drought Plan measure ensure continuity of clean drinking water supply within statutory standards supply at times of drought?</p> <p>Will the draft Drought Plan measure affect the affordability of clean drinking water?</p> <p>Will the draft Drought Plan measure adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise levels)?</p> <p>Will the draft Drought Plan measures affect human health or the health of any vulnerable groups?</p> <p>Will the Drought Plan measure affect public access to, or enjoyment of, local green/blue space?</p> <p>Will the Drought Plan measure impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?</p>	0	+	<p>Effects of Construction</p> <p>The siting of mobile pumps, diesel generator and abstraction and transfer pipes would have no effect on continuity of clean drinking water supply at times of drought, nor would it affect surface water quality assuming the use of best practice construction techniques.</p> <p>The supporting work for the construction phase may result in some disturbance to local residents associated with noise and vibration from bringing pumps, pipeline and generators to site. However, the site is in a rural location with very few likely sensitive receptors present.</p> <p>Given the scale of this option, location of new infrastructure, and the temporary nature of any health impacts, a neutral effect is recorded against this objective.</p> <p>Effects of Operation</p> <p>This option will provide a further 5 Ml/d of drinking water, which will help to ensure that water supply is maintained during periods of drought.</p> <p>It is noted that for those people visiting the area, there is the potential for noise disturbance through the operation of generators. However, the number of receptors that could be affected is very small and any impacts would be small scale and temporary.</p> <p>Overall, a positive effect has been determined against this objective, although it is noted that the yield of this option (5 Ml/d) is at the limit value for a minor effect.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>6. To maintain and enhance the economic and social needs of the local community</p>	<p>Will the draft Drought Plan measure ensure sufficient water is available for people and visitors to maintain economic activity in times of drought?</p> <p>Will the draft Drought Plan measures affect local or regional economies?</p> <p>Will the draft Drought Plan measure affect opportunities for recreation at times of drought?</p>	0	+	<p>Effects of Construction</p> <p>The construction of this option will have no effect on the availability of water for people and visitors to maintain economic activity in times of drought. Whilst there may be some economic benefits associated with construction (e.g. spend in the local supply chain), any effects in this regard would be negligible, commensurate with the scale of construction works.</p> <p>This option is located within the Southern Cambrian mountains, an area that provides opportunities for outdoor recreation activities. Although there may be local disruption to footpaths and access from the siting of temporary above ground infrastructure, footpath/road diversions should be possible. No effects on opportunities for recreation activities are therefore anticipated.</p> <p>For this reason, a neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>This option will provide an additional yield of 5 Ml/d, which will help to meet the water supply needs of homes, businesses and visitors to this area during periods of drought and support the local and regional economy.</p> <p>Nantymoch Reservoir lies within the Southern Cambrian mountains and there is therefore the potential for the operation of this option to impact on recreational opportunities (such as angling) within and around the reservoir, and downstream. However, the EAR has concluded that the proposed temporary abstraction will have negligible hydrological impacts on water levels in the reservoir (reduction in approximately 3.6% of the total storage capacity) and downstream flow regime in the Afon Rheidol (no reduction in flows assuming the statutory compensation flow from Nantymoch reservoir would continue in drought conditions). For these reasons, no effects on recreational activities (e.g. walking, birdwatching or angling etc) within, around or downstream of the reservoir and the downstream Afon Rheidol are anticipated.</p> <p>Overall, a minor positive effect has been determined against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
7. To promote the wise use of resources	<p>Will the draft Drought Plan measure seek to minimise the demand for additional raw materials?</p> <p>Will the draft Drought Plan measure seek to minimise energy consumption?</p> <p>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</p> <p>Will the draft Drought Plan measure encourage sustainable design or use of sustainable materials?</p>	-	-	<p>Effects of Construction</p> <p>The construction phase of the option will require the movement of plant and materials (e.g. pumps, pipes etc) to site, which will consume fuel. There would also be materials within the new infrastructure including pipeline (plastics and metals). It is acknowledged, however, that it may be possible to hire equipment or use existing Welsh Water pumps, generators and/or pipes.</p> <p>The siting of the infrastructure required for this option will have no effect on reuse and recycling of waste, nor will the option encourage sustainable design or the use of sustainable materials.</p> <p>Overall, this option has been assessed as having a minor negative effect on this objective.</p> <p>Effects of Operation</p> <p>Operation of the option will require additional pumping (with power assumed to be provided by generators) for the abstraction of up to 5 Ml/d and transfer over a distance of approximately 400m. Due to the estimated length of pipeline, the energy consumption is expected to be moderate and so a minor negative effect has been determined against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>It is assumed that the distance from abstraction to the raw water main is approximately 400m.</p> <p>Uncertainty</p> <p>None</p>
8. To conserve and enhance the cultural, historic and industrial heritage resource.	<p>Will the draft Drought Plan measure conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</p> <p>Will the draft Drought Plan measure avoid or minimise damage to archaeologically important sites?</p>	0	0	<p>Effects of Construction</p> <p>New above-ground infrastructure will be required for this option, although this will be temporary in nature. This includes pumps, generators and above ground transfer pipelines. Construction activities such as excavation may be required. The exact location of infrastructure (and, therefore, construction works) is not currently known, although it is assumed that wherever possible, Welsh Water will seek to route temporary pipelines and site temporary pumping infrastructure on existing areas of hardstanding (roads, parking areas, tracks etc) in preference to new excavations.</p> <p>Heritage features in this area include Cairn 400m N of Lle'r Neuaddau (prehistoric burial cairn) and Round Barrow 290m SSW of Nant-y-Moch. It is assumed that the</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	<p>Will the draft Drought Plan measure avoid damage to important wetland areas with potential for paleoenvironmental deposits?</p>			<p>temporary infrastructure associated with this option (and works) would be located away from heritage features. Any impacts on the setting of features associated with construction activity would be short term in nature and, assuming good practice is followed, will not result in significant and long term effects (e.g. no above ground permanent infrastructure proposed).</p> <p>Overall, a neutral effect is anticipated against this objective.</p> <p>Effects of Operation</p> <p>There are a number of scheduled monuments in the vicinity of Nantymoch Reservoir and downstream Afon Rheidol. The closest features include prehistoric round barrows, Craig y Dullfan ring cairn, Stone Circle and Round Cairns Hirnant, Cairn Circle 400m SW of Lle'r Neuaddau, Garn Lwyd Round Cairn & Standing Stone and Dinas SW of Aber-Peithnant. Given the negligible hydrological impacts on Nantymoch Reservoir and downstream Afon Rheidol (as described above), no effect on the settings of these heritage features is anticipated.</p> <p>Overall, a neutral effect is anticipated against this objective.</p> <p>Mitigation</p> <p>None</p> <p>Assumptions</p> <p>It is assumed that temporary infrastructure (pumps, generators, pipelines, etc.) would be located away from heritage features and temporary pipelines would be routed along roads where possible.</p> <p>Uncertainty</p> <p>None</p>
<p>9. To protect and enhance landscape and seascape character and other protected features</p>	<p>Is it likely that the draft Drought Plan measure will have significant visual impacts?</p> <p>Will the draft Drought Plan measure avoid adverse effects on, and enhance where possible, the special qualities of protected/designated landscapes (including woodlands) or seascapes such as National Parks or AONBs?</p> <p>Will the draft Drought Plan measure help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g.</p>	<p>0</p>	<p>0/-</p>	<p>Effects of Construction</p> <p>Llyn Llygad Rheidol Reservoir and the downstream Nant-y-Llyn provide flow to the Afon Hengwm which then flows into Nantymoch Reservoir. These are located approximately 2km to the east of the Nantymoch Reservoir and within Upland Ceredigion, which is designated as Landscape of Outstanding Historic Interest. This landscape site includes high, open moorland which is characterised by prehistoric funerary and ritual monuments, occasional upland farms, lead mines and large numbers of deserted medieval settlements.</p> <p>Construction activity associated with this option would be very minor and short term in nature. In consequence, any effects on landscape and visual amenity are likely to be negligible.</p> <p>Effects of Operation</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	woodlands) and avoid the loss of landscape features and local distinctiveness?			<p>New above-ground infrastructure will be required for this option, although this will be temporary in nature. This includes above ground transfer pipelines approximately 400m in length. It is assumed that the above ground pipelines would be constructed using plastic (Medium or High Density Polyethylene), which is typically coloured bright blue for water supply purposes, and where routed alongside roads, would require the necessary signage and traffic cones to meet health and safety requirements. Nantymoch Reservoir lies within the Southern Cambrian mountains and there is the potential for the above ground infrastructure to temporarily affect local landscape character and the visual amenity of recreational receptors in this area.</p> <p>The EAR has concluded that the proposed temporary abstraction will have negligible hydrological impacts on water levels in the reservoir (reduction in approximately 3.6% of the total storage capacity) and downstream flow regime in the Afon Rheidol (no reduction in flows assuming the statutory compensation flow from Nantymoch reservoir would continue in drought conditions). For these reasons, it is considered that the abstraction effects on water level in the reservoir or downstream flow regime in the Afon Rheidol are unlikely to be noticeable.</p> <p>Overall, this option has been assessed as having a neutral/minor negative effect on this objective.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty None</p>
Summary	<p>Effects of Construction</p> <p>During construction there would likely be minor negative effects in respect of Objective 4 (climate change) and Objective 7 (resource use) due to the materials required for the option (and the carbon embodied therein) and use of fuel. The anticipated effects against all other objectives are neutral.</p> <p>Effects of Operation</p> <p>Positive effects are determined against Objective 5 (human health) and Objective 6 (economy) due to the yield of this option, which will help to meet the water needs of residents, businesses and visitors during periods of drought, although it is noted that the yield of this option (5 Ml/d) is at the limit value for a minor effect. A minor positive effect has also been identified in respect of Objective 4 (climate change).</p> <p>Minor negative effects have been identified in respect of Objective 7 (resource use) and Objective 4 (climate change) due to the energy required during operation (for the pumping of water) and associated carbon emissions. A neutral/minor negative effect, meanwhile, has been determined against Objective 9 (landscape) due to the need</p>			

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	<p>for above-ground infrastructure including pipeline, though recognising that any impacts would be short term and temporary. The anticipated operational effects against all other objectives are neutral.</p> <p>Mitigation None</p>			

8206-2 Reduce the Compensation release from Preseli Reservoir by 50%

Option Summary

Preseli Reservoir is a reservoir in South Wales which supplies drinking water as part of the Pembrokeshire WRZ.

The option involves a proposed reduction in the statutory compensation release from Preseli Reservoir (also known as Rosebush Reservoir) to the Afon Syfynwy from 1.82Ml/d to 0.91Ml/d. This will conserve the longevity of reservoir storage for use in direct supply during a drought, and improve the probability of reservoir refill during the winter. Drought orders may remain in force for a period of up to six months, and they can be extended for up to a further six months. However, the period of implementation for this drought order would only be August to November, as confirmed with NRW and by water resources modelling carried out by Welsh Water.

The option would make use of existing infrastructure and would not require construction of new infrastructure.

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity.</p>	<p>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs and priority habitats and species)?</p> <p>Will the draft Drought Plan measure protect and enhance non-designated sites and local biodiversity?</p> <p>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</p> <p>Will the draft Drought Plan measure affect the condition of ecosystems (including their connectivity, structure and functioning)?</p> <p>Will the draft Drought Plan measure enhance the adaptability of ecosystems?</p>	0	--/?	<p>Effects of Construction</p> <p>The option would require no additional construction to take place and no effects on biodiversity are predicted. In consequence, a neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>The Afon Syfynwy is a major tributary of the Eastern Cleddau River, rising in the Preseli Hills and flowing through two reservoirs, Rosebush (also known as Preseli) and Llys-y-Fran. Downstream of Rosebush Reservoir, the Afon Syfynwy is located within the Eastern Cleddau Rivers SAC and Eastern Cleddau SSSI. The Eastern Cleddau River is of special interest primarily for important populations of bullhead, river lamprey and brook lamprey. It is also of special interest for sea lamprey.</p> <p>The option would result in up to a 50% reduction in low flows in the Afon Syfynwy at any time of year, with significant reductions in wetted width / wetted depth which could affect bullhead. The HRA screened in the potential effects of the option on river lamprey and bullhead; however, the appropriate assessment stage of the HRA concluded no adverse effects for either species due to the absence of species within surveyed stretches of the river.</p> <p>The EAR has identified that the operation of the option could potentially have major adverse impacts on brown and sea trout due to delays and potential cessation of adult and smolt migrations and reductions in spawning and juvenile survival as a</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?			<p>result of habitat loss. Other moderate impacts are also identified in respect of this species as well as macroinvertebrates, macrophytes and phytobenthos communities. However, the likelihood of major adverse impacts occurring and their exact magnitude is uncertain as it depends on the exact timing/duration of the option's implementation, existing flow conditions and the fish species affected.</p> <p>Reducing the compensation flow results in comparatively more water being retained in Rosebush Reservoir. Maintaining water levels may protect biodiversity in the reservoir; however, any effect would only be short term as ultimately the water will be abstracted and was therefore not included in the assessment of effects.</p> <p>The impacts of the option on Llys-y-Fran Reservoir would be a decrease in storage of up to 166ML, equating to around 2.1% drop in minimum water level and 2.9% increase in duration of drawdown period below top water level. The EAR concludes that the impacts on the Llys-y-Fran Reservoir are negligible.</p> <p>Due to the potential for major impacts on brown trout in particular, this option has been assessed (on a precautionary basis) as having a significant negative effect on this objective, although some uncertainty remains.</p> <p>Mitigation</p> <p>There are several mitigation measures that are appropriate. These are detailed in the EAR and include, inter alia, monitoring/surveys, targeted installation of woody debris features to provide fish with the habitat required to support feeding and development (growth), gravel washing of spawning areas and deployment of aeration equipment.</p> <p>Assumptions</p> <p>None</p> <p>Uncertainty</p> <p>None</p>
2. To ensure the appropriate and efficient use of land and protect and enhance soil quality and geodiversity.	<p>Will additional land be required for the development or implementation of the option or will the option require below ground works leading to land sterilisation?</p> <p>Will the draft Drought Plan utilise previously developed land?</p>	0	0	<p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of the option, no effects from construction would occur. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>This option would result in reduced water levels in Afon Syfynwy. Conceivably, this could lead to drying out of wetland soils adjacent to the river. However, there are no designated wetland sites or upland soils near the river and therefore the anticipated effect would be neutral.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	<p>Will the draft Drought Plan measure minimise the loss of best and most versatile agricultural land?</p> <p>Will the draft Drought Plan measure affect upland (peat-dominated) and other wetland soils?</p> <p>Will the draft Drought Plan measure protect and enhance protected sites designated for their geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest?</p>			<p>Overall, a neutral effect is determined against this objective.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty None</p>
<p>3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water Framework Directive</p>	<p>Will the draft Drought Plan measure lead to a change in river flows, wetted width or river level?</p> <p>Will the draft Drought Plan measure affect surface water quality and quantity?</p> <p>Will the draft Drought Plan measure lead to changes in groundwater quality, quantity and recharge?</p> <p>Will the draft Drought Plan measure lead to the deterioration of Water Framework Directive (WFD) waterbody status (or potential) from, inter alia, changes in fluvial geomorphology?</p> <p>Will the draft Drought Plan measure jeopardise the achievement of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Water Framework Directive (WFD)?</p>	0	-	<p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of this option, no effects from construction on water quality or quantity would occur. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation</p> <p>Preseli Reservoir and Afon Syfynwy have an ecological status classification of moderate (WFD Cycle 2 classification). The Afon Syfynwy is a heavily modified waterbody both in terms of flow and morphology due to the impoundment and abstraction from the reservoir.</p> <p>The EAR has concluded that implementation of the option would reduce low flows in the Afon Syfynwy at any time of year up to 50%, with significant reductions in wetted width / wetted depth. Minor impacts are predicted on water quality of the Afon Syfynwy (moderate risk to soluble reactive phosphorous concentrations to support good or high status for fish and macroinvertebrates). Changes in the dilution and dispersion of consented discharges (Preseli water treatment works and Rosebush sewage treatment works) in the Afon Syfynwy during operation of the option are not considered significant. Minor impacts are predicted on the geomorphology of the Afon Syfynwy (sediment and wetted width change).</p> <p>The impact on the Rosebush Reservoir would be an increase in storage of up to 166MI (over 25% of capacity) with corresponding increase in minimum water level. This has been assessed in the EAR as a minor beneficial impact for up to 6 months during drought permit operation in the summer/autumn period.</p> <p>The impact on Llys-y-Fran Reservoir would be a decrease in storage of up to 166MI, equating to around 2.1% drop in minimum water level and 2.9% increase in duration</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>of drawdown period below top water level. This has been assessed in the EAR as a negligible impact.</p> <p>Due to the reduction in flows and potential impacts on water quality in the Afon Syfynwy, a minor negative effect has been determined against this objective.</p> <p>Mitigation Flows and quality monitoring in the Afon Syfynwy is recommended.</p> <p>Assumptions None</p> <p>Uncertainty None</p>
<p>4. To limit the causes and potential consequences of climate change and to adapt to future changes</p>	<p>Will the draft Drought Plan measure reduce or minimise greenhouse gas emissions?</p> <p>Will the draft Drought Plan measure reduce vulnerability to the effects of climate change by appropriate adaptation?</p> <p>Will the draft Drought Plan measure increase environmental resilience to the effects of climate change including to impacts on water quality?</p> <p>Will the draft Drought Plan measure reduce or minimise air pollutant emissions?</p>	<p>0</p>	<p>+</p>	<p>Effects of Construction</p> <p>As no additional infrastructure is required for the implementation of the option, no effects from construction would occur. A neutral effect has been determined against this objective.</p> <p>Effects of Operation</p> <p>The option involves the reduction in compensation flows released from the Rosebush Reservoir to Afon Syfynwy during low flow periods. Water would be treated and distributed using existing infrastructure. Energy consumed during the treatment process (and associated greenhouse gas emissions) are not considered to be significant compared to the day to day operation of the WTW and no further energy consumption would arise from new infrastructure.</p> <p>UKCP18 climate change scenarios anticipate longer, hotter summers and, in turn, increases in both the frequency and duration of droughts. This option would provide Welsh Water with additional capacity to manage drought conditions and as such is considered to contribute towards climate change adaptation.</p> <p>Overall, this option has been assessed as having a minor positive effect on this objective.</p> <p>Mitigation None</p> <p>Assumptions None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				Uncertainty None
5. To protect and enhance human health with special regard to vulnerable groups in society	<p>Will the draft Drought Plan measure ensure continuity of clean drinking water supply within statutory standards supply at times of drought?</p> <p>Will the draft Drought Plan measure affect the affordability of clean drinking water?</p> <p>Will the draft Drought Plan measure adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise levels)?</p> <p>Will the draft Drought Plan measures affect human health or the health of any vulnerable groups?</p> <p>Will the Drought Plan measure affect public access to, or enjoyment of, local green/blue space?</p> <p>Will the Drought Plan measure impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?</p>	0	+	Effects of Construction As no additional infrastructure is required for the implementation of the option, no health effects from construction would occur. A neutral effect has been determined against this objective. Effects of Operation The operation of this option will provide a gain in deployable output of 0.91MI/d within the Pembrokeshire resource zone, which will help to ensure that water supply is maintained during periods of drought. Those living, working or visiting the area are unlikely to be directly disturbed by the scheme. Overall, this option has been assessed as having a minor positive effect on this objective. Mitigation None Assumptions None Uncertainty None
6. To maintain and enhance the economic and social needs of the local community	<p>Will the draft Drought Plan measure ensure sufficient water is available for people and visitors to maintain economic activity in times of drought?</p> <p>Will the draft Drought Plan measures affect local or regional economies?</p>	0	0	Effects of Construction As there is no construction associated with this option, there will be no effect on the availability of water for people and visitors to maintain economic activity in times of drought. Further, it is not anticipated that the option would generate any economic benefits (e.g. job creation or investment in supply chains). Effects of Operation

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	Will the draft Drought Plan measure affect opportunities for recreation at times of drought?			<p>This option involves a decrease in statutory compensation release from Rosebush Reservoir to the Afon Syfynwy of 0.91Ml/d to conserve the longevity of reservoir storage for use in direct supply during a drought. This will help to meet the water supply needs of people and visitors to the area in times of drought; however, in accordance with the definitions of significance, the effect of the yield of the option is assessed as negligible.</p> <p>Llys-y-Fran Reservoir is located in Llys-y-Fran Country Park and is a popular area for walkers and sailing; any reduction in wetted width and depth may influence water-dependent activities. However, it is not expected that the Afon Syfynwy on the reach between Preseli and Llys-Y-Fran Reservoirs will have any water dependant activities occurring on it. The EAR concludes that water levels will be naturally low in times of drought and impacts will be temporary in nature and ameliorated once the drought has passed. Therefore the effect on recreational opportunities is anticipated to be negligible.</p> <p>On this basis, a neutral effect is determined against this objective.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty Unknown if Afon Syfynwy supports any water dependent activities on the reach between Preseli and Llys-Y-Fran Reservoirs.</p>
7. To promote the wise use of resources	<p>Will the draft Drought Plan measure seek to minimise the demand for additional raw materials?</p> <p>Will the draft Drought Plan measure seek to minimise energy consumption?</p> <p>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</p> <p>Will the draft Drought Plan measure encourage sustainable design or use of sustainable materials?</p>	0	0	<p>Effects of Construction As no additional infrastructure is required for the implementation of the option, no effects from construction would occur. A neutral effect has therefore been determined against this objective.</p> <p>Effects of Operation Operation of the option will require no additional energy use or resources, over and above those currently used to treat water. A neutral effect is therefore anticipated against this objective.</p> <p>Mitigation None</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				Assumptions None Uncertainty None
8. To conserve and enhance the cultural, historic and industrial heritage resource.	<p>Will the draft Drought Plan measure conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</p> <p>Will the draft Drought Plan measure avoid or minimise damage to archaeologically important sites?</p> <p>Will the draft Drought Plan measure avoid damage to important wetland areas with potential for paleoenvironmental deposits?</p>	0	0	Effects of Construction As no additional infrastructure is required for the implementation of the option, no effects on heritage assets from construction would occur. A neutral effect has therefore been determined against this objective. Effects of Operation There are two Grade II Listed Buildings (Budloy farmhouse and Farthings Hook Bridge) and a number of Scheduled Monuments (Budloy standing stone, Dyffryn stone circle, iron age defended enclosure, Velindre Pillar-Cross, Castell Hendre and Bernards well mountain- huts, enclosures and field systems) in the vicinity of Afon Syfynwy and Rosebush and Llys-Y-Fran Reservoirs. However, a reduction in the flow of the Afon Syfynwy as a result of the option is not anticipated to have a detrimental effect on heritage assets as these contain no water dependant features and any effects on setting would be temporary and reversible. A neutral effect is therefore anticipated against this objective. Mitigation None Assumptions None Uncertainty None
9. To protect and enhance landscape and seascape character and other protected features	<p>Is it likely that the draft Drought Plan measure will have significant visual impacts?</p> <p>Will the draft Drought Plan measure avoid adverse effects on, and enhance where possible, the special qualities of protected/designated landscapes (including</p>	0	-	Effects of Construction As no additional infrastructure is required for the implementation of the option, no effects from construction would occur. A neutral effect has therefore been determined against this objective. Effects of Operation

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	<p>woodlands) or seascapes such as National Parks or AONBs?</p> <p>Will the draft Drought Plan measure help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness?</p>			<p>Rosbush Reservoir and Afon Syfynwy are located in the Pembrokeshire Coast National Park. A footpath follows part of the Afon Syfynwy and continues around Llys-y-Fran Reservoir. A national cycle route also crosses the area.</p> <p>The EAR has concluded that the operation of this option would significantly reduce flows in the Afon Syfynwy which would result in temporary reductions in wetted width and wetted depth below those normally observed. This is assessed as having a minor impact on visual amenity due to the location of nearby footpath and national cycle route and reflecting the National Park status of the area. No new structures will be built above-ground. The option is not expected to affect other landscape features or sites.</p> <p>On this basis, a minor negative effect has been determined against this objective.</p> <p>Mitigation None</p> <p>Assumptions None</p> <p>Uncertainty None</p>
Summary	<p>Effects of Construction</p> <p>The option does not involve the construction of any additional infrastructure and as such, no effects are anticipated.</p> <p>Effects of Operation</p> <p>The operation of this option will provide an additional water yield of 0.91 Ml/d to the wider area and therefore a minor positive effect has been determined against Objective 5 (human health). A minor positive effect has also been identified in respect of Objective 4 (climate change) as the option will reduce vulnerability to the effects of climate change through appropriate adaptation.</p> <p>A significant negative effect has been determined against Objective 1 (biodiversity). This is principally due to the potential for likely significant effects on brown trout, although some uncertainty remains. The option has also been assessed as having a minor negative effect on Objective 3 (water quality and quantity) as the option will lead to a reduction in flows in the Afon Syfynwy which could have a minor impact on water quality of the river. A minor negative effect was also identified with respect to Objective 9 (landscape) due to impact on visual amenity associated with reduced flows in the National Park.</p> <p>The anticipated effects against all other objectives are neutral.</p> <p>Mitigation</p> <p>With regard to adverse effects on biodiversity, there are several mitigation measures that are appropriate. These are detailed in the EAR and include, inter alia, monitoring/surveys, targeted installation of woody debris features to provide fish with the habitat required to support feeding and development (growth), gravel washing of spawning areas and deployment of aeration equipment.</p>			



8206-7 Use of freshet bank for public water supply - Llysyfran - (Pembs)

Option Summary

In accordance with the Llys-y-Fran Reservoir Section 158 operating agreement, a total of 995MI of the storage volume within Llys-y-Fran Reservoir is allocated to the freshet bank, to be released for fisheries management purposes at the direction of Natural Resources Wales (NRW). The drought order involves using 385MI (approximately 40%) of this volume of storage for public water supply, so that only a limited number (three) of freshet releases could take place during the period of implementation.

Drought orders may remain in force for a period of up to six months, and they can be extended for up to a further six months. However, the period of implementation for this drought order would only be August to November.

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>1. To protect and enhance biodiversity, key habitats and species ecological functions, capacity and habitat connectivity.</p>	<p>Will the draft Drought Plan measure protect and enhance where possible the most important sites for nature conservation (e.g. internationally or nationally designated conservation sites such as SACs, SPAs, Ramsar and SSSIs and priority habitats and species)?</p> <p>Will the draft Drought Plan measure protect and enhance non-designated sites and local biodiversity?</p> <p>Will the draft Drought Plan measure lead to a change in the ecological quality of habitats due to changes in water quality and/or quantity?</p> <p>Will the draft Drought Plan measure affect the condition of ecosystems (including their connectivity, structure and functioning)?</p> <p>Will the draft Drought Plan measure enhance the adaptability of ecosystems?</p> <p>Will the draft Drought Plan measure limit, reduce or increase the risk of spread of Non-Native Species (INNS)?</p>	0	0	<p>Effects of Construction</p> <p>The option would make use of existing infrastructure and would not require construction of new infrastructure.</p> <p>Effects of Operation</p> <p>Operation of the option involves retaining part of the freshet bank volume within the reservoir for public supply, rather than releasing it to the downstream watercourse. This has the potential to reduce flows in the Afon Syfynwy downstream of Llys-y-Fran Reservoir outfall and its continuation as the Eastern Cleddau. The Afonydd Cleddau / Cleddau Rivers SAC / Eastern Cleddau Rivers SSSI is designated for <i>Ranunculus</i> community habitat, <i>Potamogeton berchtoldii</i> x <i>P. polygonifolius</i> and a range of important fish species, which are sensitive to flow and level changes in the Afon Syfynwy and Eastern Cleddau.</p> <p>The HRA identifies that effects are not anticipated on the SAC, other than limiting the number of freshet releases that could take place whilst the option is being implemented. However as up to three freshet releases could still be made, any impacts on flows and associated effects on biodiversity are expected to be negligible. These releases would be for fisheries management purposes. The EAR completed for this option concluded that implementation would result in negligible effects on species, including fish, macrophytes, mammals, phytobenthos and macroinvertebrate.</p> <p>For these reasons, a neutral effect has been determined against this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<ul style="list-style-type: none"> None <p>Uncertainty</p> <ul style="list-style-type: none"> The total number of freshet releases made during operation is not yet certain.
<p>2. To ensure the appropriate and efficient use of land and protect and enhance soil quality and geodiversity.</p>	<p>Will additional land be required for the development or implementation of the option or will the option require below ground works leading to land sterilisation?</p> <p>Will the draft Drought Plan utilise previously developed land?</p> <p>Will the draft Drought Plan measure minimise the loss of best and most versatile agricultural land?</p> <p>Will the draft Drought Plan measure affect upland (peat-dominated) and other wetland soils?</p> <p>Will the draft Drought Plan measure protect and enhance protected sites designated for their geological interest (GCR sites, SSSI and RIGS) and features of wider geodiversity interest?</p>	0	0	<p>Effects of Construction</p> <p>The option requires no construction and therefore its implementation is not expected to result in any effects on land use or upland or wetland soils.</p> <p>Effects of Operation</p> <p>Retaining part of the freshet bank volume within the reservoir rather than releasing it to the downstream watercourse has the potential to reduce flows and levels in the Afon Syfynwy and Eastern Cleddau. However as up to three freshet releases could still be made, any impacts on wetted area and soils are expected to be negligible.</p> <p>Active raised bogs are present as a qualifying feature within the Afonydd Cleddau / Cleddau Rivers SAC. The EAR specifies that the option would have no adverse effects on active raised bog as this would not be exposed to effects from operation.</p> <p>Overall, a neutral effect has been determined against this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> None <p>Assumptions</p> <ul style="list-style-type: none"> None <p>Uncertainty</p> <ul style="list-style-type: none"> None
<p>3. To protect and enhance water quantity and the quality of surface, groundwater, estuarine and coastal water and help achieve the objectives of the Water Framework Directive</p>	<p>Will the draft Drought Plan measure lead to a change in river flows, wetted width or river level?</p> <p>Will the draft Drought Plan measure affect surface water quality and quantity?</p> <p>Will the draft Drought Plan measure lead to changes in groundwater quality, quantity and recharge?</p>	0	0	<p>Effects of Construction</p> <p>The option requires no construction and therefore will not lead to a change in river flows, surface water or groundwater quantity.</p> <p>For the same reason, no effects on water quality or on WFD status are expected.</p> <p>Effects of Operation</p> <p>Operation of this option would involve retaining part of the freshet bank volume within the reservoir for public supply, rather than releasing it to the downstream watercourse. This would conserve the longevity of reservoir storage and improve the</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	<p>Will the draft Drought Plan measure lead to the deterioration of Water Framework Directive (WFD) waterbody status (or potential) from, inter alia, changes in fluvial geomorphology?</p> <p>Will the draft Drought Plan measure jeopardise the achievement of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Water Framework Directive (WFD)?</p>			<p>probability of reservoir winter refill, but would also influence flows in the Afon Syfynwy and Eastern Cleddau until the tidal limit.</p> <p>The hydrological impact of the option has been considered in the EAR, which identified a negligible impact on river flows in the Afon Syfynwy (Reach 1) and Eastern Cleddau (Reach 2 and 3) during October to December, as up to three freshet releases to the downstream watercourse could still be made.</p> <p>No effects on water quality were identified in the EAR.</p> <p>A neutral effect has been identified for this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • The total number of freshet releases made during operation is not yet certain.
<p>4. To limit the causes and potential consequences of climate change and to adapt to future changes</p>	<p>Will the draft Drought Plan measure reduce or minimise greenhouse gas emissions?</p> <p>Will the draft Drought Plan measure reduce vulnerability to the effects of climate change by appropriate adaptation?</p> <p>Will the draft Drought Plan measure increase environmental resilience to the effects of climate change including to impacts on water quality?</p> <p>Will the draft Drought Plan measure reduce or minimise air pollutant emissions?</p>	<p>0</p>	<p>+</p>	<p>Effects of Construction</p> <p>The option would make use of existing infrastructure and would not require construction of new infrastructure.</p> <p>Effects of Operation</p> <p>Energy requirements and carbon emission have not been quantified by Welsh Water for any options at this stage, and therefore a qualitative assessment has been made based on the infrastructure required to implement this option.</p> <p>The option involves retaining part of the freshet bank volume within the reservoir for public supply, and limiting the number of freshet releases during implementation. The energy and infrastructure required would therefore be unchanged from current operation and no additional emissions of greenhouse gases are anticipated.</p> <p>UKCP18 climate change scenarios anticipate longer, hotter summers and, in turn, increases in both the frequency and duration of droughts. This option would provide Welsh Water with additional storage to manage drought conditions and as such is considered to contribute towards climate change adaptation.</p> <p>Overall, this option has been assessed as having a minor positive effect on this objective.</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
				<p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None
<p>5. To protect and enhance human health with special regard to vulnerable groups in society</p>	<p>Will the draft Drought Plan measure ensure continuity of clean drinking water supply within statutory standards supply at times of drought?</p> <p>Will the draft Drought Plan measure affect the affordability of clean drinking water?</p> <p>Will the draft Drought Plan measure adversely affect human health by resulting in increased nuisance and disruption (e.g. as a result of increased noise levels)?</p> <p>Will the draft Drought Plan measures affect human health or the health of any vulnerable groups?</p> <p>Will the Drought Plan measure affect public access to, or enjoyment of, local green/blue space?</p> <p>Will the Drought Plan measure impact on physical health and mental well-being by affecting opportunities for informal outdoor recreation?</p>	<p>0</p>	<p>+</p>	<p>Effects of Construction</p> <p>There is no construction required and therefore no effects are expected on water quality or clean drinking water supply. There would be no direct disturbance to local residents therefore a neutral effect is identified.</p> <p>Effects of Operation</p> <p>Operation of the option involves limiting the number of freshet releases that can take place during implementation, and using 425MI of the freshet bank for storage of public water supply. This will conserve the longevity of reservoir storage and improve the probability of reservoir winter refill, and will help to ensure that water supply is maintained during periods of drought. Those living, working or visiting the area are unlikely to be directly disturbed by the scheme.</p> <p>Overall, a minor positive effect has been identified.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
<p>6. To maintain and enhance the economic and social needs of the local community</p>	<p>Will the draft Drought Plan measure ensure sufficient water is available for people and visitors to maintain economic activity in times of drought?</p> <p>Will the draft Drought Plan measures affect local or regional economies?</p> <p>Will the draft Drought Plan measure affect opportunities for recreation at times of drought?</p>	0	0	<p>Effects of Construction</p> <p>As there is no construction associated with this option, there will be no effect on the availability of water for people and visitors to maintain economic activity in times of drought. Further, it is not anticipated that the option would generate any economic benefits (e.g. job creation or investment in supply chains).</p> <p>Effects of Operation</p> <p>During implementation, the option will increase storage for public water supply by 425Ml. This would help to meet the water supply needs of homes, businesses and visitors in the area during periods of drought, supporting the local and regional economy, although, consistent with the definitions of significance used in the assessment, positive effects in this regard are expected to be negligible.</p> <p>The Afon Syfynwy and Eastern Cleddau provide numerous recreational opportunities including angling, canoeing, kayaking, walking, cycling and bird watching, however the EAR identifies that any effects would be negligible.</p> <p>A neutral effect has been identified against this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None
<p>7. To promote the wise use of resources</p>	<p>Will the draft Drought Plan measure seek to minimise the demand for additional raw materials?</p> <p>Will the draft Drought Plan measure seek to minimise energy consumption?</p> <p>Will the draft Drought Plan measure encourage the reuse and recycling of waste?</p>	0	0	<p>Effects of Construction</p> <p>This option will not require the use of raw materials as it will make use of existing infrastructure. A neutral effect has therefore been identified against this objective.</p> <p>Effects of Operation</p> <p>During operation, this option will not require any additional energy consumption or use of any additional materials. As such, a neutral effect has been determined against this objective.</p> <p>Mitigation</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	Will the draft Drought Plan measure encourage sustainable design or use of sustainable materials?			<ul style="list-style-type: none"> None Assumptions <ul style="list-style-type: none"> None Uncertainty <ul style="list-style-type: none"> None
8. To conserve and enhance the cultural, historic and industrial heritage resource.	<p>Will the draft Drought Plan measure conserve or enhance the historic environment, including heritage assets such as historic buildings, conservation areas, features, places and spaces, and their settings?</p> <p>Will the draft Drought Plan measure avoid or minimise damage to archaeologically important sites?</p> <p>Will the draft Drought Plan measure avoid damage to important wetland areas with potential for paleoenvironmental deposits?</p>	0	0	<p>Effects of Construction</p> <p>This option will not require the construction of new infrastructure and as such, a neutral effect has been identified against this objective.</p> <p>Effects of Operation</p> <p>There are a number of historic assets along the course of the Afon Syfynwy and Eastern Cleddau. These include Scheduled Ancient Monuments (including Llawhaden Bridge (also a Grade II* listed building), Walton Mill Rath, Knock Rath, Drim Camp and Gelly Earthworks), four Grade II listed bridges, and additional listed buildings including churches, farmhouses and Grade I Llawhaden Castle.</p> <p>As the impacts on flow during operation have been identified as negligible, effects on heritage assets are not anticipated.</p> <p>A neutral effect against this objective has therefore been determined.</p> <p>Mitigation</p> <ul style="list-style-type: none"> None <p>Assumptions</p> <ul style="list-style-type: none"> None <p>Uncertainty</p> <ul style="list-style-type: none"> None
9. To protect and enhance landscape and seascape character and other protected features	<p>Is it likely that the draft Drought Plan measure will have significant visual impacts?</p> <p>Will the draft Drought Plan measure avoid adverse effects on, and enhance where possible, the special qualities of</p>	0	0	<p>Effects of Construction</p> <p>The Canaston intake in Reach 3 lies at the edge of the Pembrokeshire Coast National Park. The option would make use of existing infrastructure and would not require construction of new infrastructure, resulting in a neutral effect.</p> <p>Effects of Operation</p>

Objective	Key Questions	Relationship		Commentary
		Construction	Operation	
	<p>protected/designated landscapes (including woodlands) or seascapes such as National Parks or AONBs?</p> <p>Will the draft Drought Plan measure help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness?</p>			<p>The Pembrokeshire Coast National lies less than 500m downstream of the zone of hydrological influence. The Afon Syfnwy and Eastern Cleddau (Reach 2) are characterised by irregular meanders in a very shallow v-shaped valley. Tree cover is dense and is characterised by semi-continuous to continuous tree cover. Eastern Cleddau (Reach 3) is very short and is surrounded by floodplains, with limited tree cover.</p> <p>The EAR identifies that as the flow and water level impacts are assessed as negligible in Reach 3, effects on landscape and visual amenity are not anticipated.</p> <p>No new structures will be built above-ground as a result of this option.</p> <p>This option has been assessed as having a neutral effect against this objective.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None <p>Assumptions</p> <ul style="list-style-type: none"> • None <p>Uncertainty</p> <ul style="list-style-type: none"> • None.
Summary	<p>Effects of Construction</p> <p>The option does not involve the construction of any infrastructure and as such no effects are anticipated.</p> <p>Effects of Operation</p> <p>The role of the option in improving drought resilience has led to the identification of a minor positive effect against objective 4 (climate change). The increase in storage of public water supply has also led to the identification of a minor positive effect for objective 5 (human health).</p> <p>Effects were identified as neutral for all other objectives.</p> <p>Mitigation</p> <ul style="list-style-type: none"> • None. 			

wood.

