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Making the Most of Every Drop

Consultation on Reforming the Water Abstraction Management System

December 2013

This document/publication is also available on our website at:

www.gov.uk/defra

Or the Welsh Government website at:

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Executive Summary

The UK Government committed to reform of the water abstraction management system in England in the Natural Environment White Paper, published in June 2011, and then set out the proposed direction, principles and process for reform in the Water White Paper, *Water for Life,* in December 2011. We are committed to introducing a reformed water abstraction management system able to promote resilient economic growth while protecting the environment.

The Welsh Government is committed to ensuring the sustainable management of water resources in Wales. This includes considering the need for any changes to the water abstraction management system in Wales. The Welsh Government will set out its detailed policy in relation to future water management in Wales in its Water Strategy.

The impacts of abstracting water directly from rivers or aquifers can be wide-ranging. It can affect the environment, including important nature conservation sites, and public access to rivers for leisure purposes. Water is vital to the economy, for example, to generate power, run industries and grow food. Access to clean, safe and secure water supplies is fundamental to society. This is why water abstraction is a licensed activity, regulated by the Environment Agency and Natural Resources Wales.

Why reform?

We already face challenges in water availability. Many catchments have no spare water that can be allocated for further abstraction due to a need to protect the environment. Managing our available water resources is likely to become more of a challenge in the future with an increasingly varied climate and increased demand for water from a growing population. The Environment Agency's Case for Change[1] shows that there are significant risks of less water being available in the future than today, and that this is unlikely to be limited to the south and east of England. As the severity of pressures on water resources may vary across England and Wales, as well as changing over time, the approach for managing them will need to be adaptive and flexible.

The current system for managing abstraction of water from rivers and aquifers was introduced in the 1960s. Most abstractors were given a licence to take a fixed volume of water, regardless of availability. The current system does not help abstractors to trade water effectively, nor does it provide an incentive for abstractors to manage water efficiently. Much of the water that is licensed is not actually used, but the regulator cannot make it available to others who may need it. The current process to change most licences that are causing damage to the environment is expensive and time consuming.

These weaknesses in the current system mean it could start to constrain economic growth and reduce the resilience of water supply; and that it does not protect the environment adequately.

[1] Case for change refresh 2013; Addendum to "The Case for Change: current and future water availability" (Dec 2013)

Tackling unsustainable abstraction

This consultation concerns the long-term reform of the abstraction management system. However, in advance of reform we must continue to tackle the problem of abstractions that are causing damage now to our rivers and groundwater.

We have intensified our work to restore sustainable abstraction to our rivers today by varying and removing abstraction licences. The Environment Agency has already changed 77 licences in England since 2008, which is currently returning around 75 billion litres of water per year to the environment. This is the equivalent to the daily average water use of a city larger than Birmingham. Similarly in Wales, 44 abstraction licences have already been changed.

The Environment Agency and Natural Resources Wales are continuing to address unsustainable abstraction, including considering where abstractions should be classed as causing serious damage. Using powers in the Water Act 2003, certain licences can be changed without compensation payments to prevent serious damage to the environment.

We have included a measure in the Water Bill currently before Parliament to change the way in which water companies are compensated when the Environment Agency or Natural Resources Wales change their licences to make their abstractions more sustainable. This change will help us address unsustainable abstraction more effectively at the same time as delivering better value for customers. We have worked closely with the Environment Agency / Natural Resources Wales and Ofwat to explore how Ofwat's Price Review methodology can incentivise water companies to switch to more sustainable abstractions. We are also working to bring currently exempt abstractors into the system, which we will be consulting on in early 2014.

Proposals for reform

The reforms proposed in this consultation would build on this action to tackle unsustainable abstraction and are designed to make the system more flexible and resilient to future pressures. We want to make sure that any new system would:

- Increase the amount of water that can be used by systematically linking access to water to water availability;
- Incentivise abstractors to manage water efficiently;
- Help abstractors to trade available water effectively, ensuring that we get the most value out of our water and do not waste water which could be used;
- Ensure we have a more effective process to review licences, striking the right balance between providing regulatory certainty for abstractors and managing environmental risk;
- Incentivise abstractors to manage risks from future pressures on water resources, increasing their own resilience and that of river catchments.

We have identified two main options for reform, which we have developed through working closely with stakeholders. We have called these “Current System Plus” and “Water Shares”.

Under **Current System Plus**, the regulator would continue to use the tools currently applied to some licences to reduce or stop abstraction to leave enough water for the environment or other abstractors when flows are low. We would refine these tools, strengthening the link between water availability and permitted abstraction to allow more water to be abstracted when more is available and improve environmental protection, particularly at very low flows. We would also make it easier for abstractors to trade water with each other, through pre-approving temporary low risk trades.

The **Water Shares** option would be a bigger change from the current system. Abstractors would have a share in the available water resource, rather than an absolute amount, encouraging abstractors to take a shared responsibility for water resources in catchments. This option would allow for pre-approval of shorter-term trading between abstractors and of a wider range of trades.

Under both options we would also:

- Improve the link between abstraction charges and usage;
- Remove time limits from licences that currently have them and instead introduce a new transparent and risk based process to review catchment conditions. This would enable the regulator to change any abstraction permission within each catchment, with notice, to protect the environment;
- Take an evolutionary and proportionate approach to implementation. We would only introduce the full package of reforms in some catchments where there are clear economic and environmental benefits to doing so.

We have also considered a number of different approaches to changing licences to make them compatible with a reformed system. The volume, price and reliability of water allocated to abstractors in a new system would take account of current licences and the actual volumes of water used, but volumes would vary according to overall water availability. We need to make sure we change licences in a way that ensures reform itself does not inadvertently lead to environmental deterioration.

Environment Agency statistics show that, on average, between 2002 and 2011 only 45% of the annual total of water licensed for abstractions in England and Wales was actually abstracted. This means that in some catchments, if all this unused water was actually abstracted, there could be significant deterioration of the environment. Reform itself increases this risk as easier trading could lead to abstractors selling their unused volumes to others who would then actually abstract them. In catchments that are already fully licensed, even if all the water is not used, no further licences can be given to new abstractors, or existing abstractors who need more water.

This is why under reform we would reduce unused volumes of water as licences are moved into a new system. We have considered a number of broad options for calculating

volumes to transition into the new system, including those that apply universally to all abstractors and those that could be tailored to catchments. We are also considering the possibility of establishing a “water reserve” to support business expansion and new entrants. This would be in catchments where there is currently unused licensed water, which if it was abstracted would not cause environmental deterioration.

Abstraction reform aims to ensure that we are making the most of every drop. We must use water in the most efficient way possible and support businesses to manage their risks from future pressures on water resources, whilst protecting the environment. This will help to support economic growth and investment in the future.

Next steps

This consultation closes on 28th March 2014. Following consultation, the UK Government will agree a preferred approach for England and the Welsh Government will agree a preferred approach for Wales. Both Governments will then as appropriate refine the proposals for reform. The UK Government aims to legislate early in the next Parliament and implement the reforms in the early 2020s.

Part I

1. Introduction

1.1 Purpose

The UK Government committed to reform of the water abstraction management system in England in the Natural Environment White Paper, published in June 2011, and then set out the proposed direction, principles and process for reform in the Water White Paper, *Water for Life*, in December 2011. We are committed to introducing a reformed water abstraction management system able to promote resilient economic growth while protecting the environment.

This means that our aims of reform are to:

- Maximise the amount of water available to abstractors;
- Promote efficient use of water through charging for actual use;
- Facilitate trade, maximising the economic value from available water and allowing new entrants to access water;
- Provide reasonable certainty for abstractors for planning their business;
- Protect water ecosystems in line with legal requirements, particularly ensuring that reform does not create risks of environmental deterioration;
- Ensure the new system is able to respond to longer-term changes in water availability.

We want to do this in a way that minimises the administrative costs whilst still achieving our aims. This is about smarter regulation that reduces the cost to businesses of dealing with the challenges of the future. We also want to make sure we move to a new system in a way that takes into account both current licensed volumes and the amount that abstractors actually take.

We do of course have a range of measures in place to ensure we continue to tackle current unsustainable abstraction in advance of abstraction reform.

The Welsh Government is committed to ensuring the sustainable management of water resources in Wales. This includes considering the need for any changes to the water abstraction management system in Wales. The Welsh Government will set out its detailed policy in relation to future water management in Wales in its Water Strategy.

The UK and Welsh Government believe, in principle, that there are benefits to having a consistent approach to the abstraction management system across the English and Welsh border.

The purpose of this consultation is to seek your views on a range of proposals for reforming the water abstraction management system in England and in Wales. Responses

will help to inform policy decisions on the nature of potential reforms. Consultation questions can be found within the relevant sections in chapters 4 and 5 and have been brought together in chapter 7.

1.2 Who has an interest

This is an open consultation to which anyone may respond. Particularly interested parties are likely to be those who currently hold an abstraction licence, those who may wish to apply for one in the future, those who advise or represent abstractors, and anyone who is concerned about the future management of our rivers and groundwater.

1.3 Impact Assessment

A consultation stage impact assessment has been prepared and can be found at Annex A of this consultation (see Box 1 below for headline results)[2]. The impact assessment sets out the range of evidence sources we have used to develop the options and assess their impacts including reviewing international best practice. To provide the underpinning evidence for the impact assessment we commissioned an innovative combined hydrological and abstractor behavioural model. This has allowed us to model catchment case studies of how reform options will impact on abstractors and the environment, working closely with stakeholders.

Box 1: Headline results from the Consultation Impact Assessment

The consultation impact assessment estimates net benefits of regulatory reform options to abstractors in England from about £100m up to about £500m over 25 years compared to retaining the current system. The most significant factor driving these benefits is reduction in water company investment costs due to more efficient use of water. This should flow through to relatively reduced water bills. In Wales, the case is more variable, with net benefits of up to £30 million in some scenarios and net costs of up to £10 million in others. This is because Wales has more water available and so benefits less from reform. These are initial estimates from an innovative and complex modelling project. Further work is needed to distinguish between the benefits of the different options and to better understand the impacts on different sectors which will be done to inform the final impact assessment.

1.4 Working with Stakeholders

We have worked closely with a range of stakeholders in developing both our evidence base and the proposals in this consultation. Our high level Abstraction Reform Advisory

[2] These figures are net present values estimated by discounting future flows of costs and benefits from 2025 to 2050 using the standard Government 3.5% discount rate.

Group, which includes representatives of our key stakeholders, has made a valuable contribution to the policy development process.

We also explored with abstractors how problems with future water availability might affect them, how they might adapt and the potential impact our proposals might have on their businesses. As a key part of developing our evidence base, stakeholders in our case study river catchments helped us to understand how abstractors might respond in catchments with different characteristics. All this information was used to help develop our models and quantify the impacts of any changes (see section 1.3 above and the Impact Assessment at Annex A).

1.5 How to respond

To submit your consultation response please complete the consultation questionnaire provided through Defra's website:

www.gov.uk/defra

This is the fastest and most cost-effective way for us to collate, analyse and summarise responses.

If you are unable to do this, we will accept responses via email to:
abstraction_reform@defra.gsi.gov.uk

If you need to submit a written response, please send it to:

Abstraction Reform Team
Area 3B
Nobel House
17 Smith Square
London
SW1P 3JR

Consultees in Wales or national organisations covering England and Wales should **also** copy their replies to Water@Wales.gsi.gov.uk or

Integrated Water Management Programme Manager
Water Branch
Welsh Government
Cathays Park
Cardiff
CF10 3NQ

Responses should be received by 28th March 2014.

1.6 How we will use the views and information you give us

Any response you send us will be seen in full by Welsh Government and Defra staff dealing with the issues which this consultation is about. It may also be seen by other Welsh Government and Defra staff to help them plan future consultations.

When this consultation ends, we will store a copy of the responses received for at least six months from the date the UK Government's consultation responses document has been published. This is so that the public can see them and copies of responses will be made available to the public on request. Also, members of the public may ask for a copy of responses under freedom of information legislation.

If you do not want your response - including your name, contact details and any other personal information – to be publicly available, please say so clearly in writing when you send your response to the consultation. Please note, if your computer automatically includes a confidentiality disclaimer; that will not count as a confidentiality request.

Please explain why you need to keep details confidential. We will take your reasons into account if someone asks for this information under freedom of information legislation. But, because of the law, we cannot promise that we will always be able to keep those details confidential.

1.7 After the consultation

We will summarise all responses and place this summary on our website at www.gov.uk/defra and the Welsh Government website at Wales.gov.uk

This summary will include a list of names of organisations that responded but not personal names, addresses or other contact details.

If you would like to be kept up to date on the development of our proposals and further opportunities to be involved, then please register your interest by emailing:

abstraction_reform@defra.gsi.gov.uk

If you have any specific questions in relation to the development of proposals and future opportunities in Wales then please email:

Water@wales.gsi.gov.uk

Large print, Braille and alternate language versions of this document are available on request.

2. Background to reforming the abstraction management system

2.1 What is water abstraction?

While most individuals and businesses use water from the public water supply, many others rely on access to untreated water abstracted directly from the environment. This water can come from surface water, such as rivers, or from groundwater, in aquifers. Abstracted water is significantly cheaper than treated public water supplies, which include the additional costs of treatment and delivery to the tap, and can provide large volumes of water where it is needed.

Overall, there are around 20,000 abstraction licences, of which around 1,100 are in Wales. Generally, an abstractor who takes more than 20 cubic metres of water a day requires a licence. Examples of abstractors include farmers who use water for irrigating crops, manufacturers and industry who use water for processing products and power generating companies who use water for cooling. Please see Annex C for detail of how much water is taken by different groups of abstractors.

2.2 What challenges are we facing?

Water is essential for people and the environment. It is vital to the economy and for health, is used to generate power, run industries and grow food. Access to clean, safe and secure water supplies is fundamental to society.

Abstraction of water from rivers can significantly affect both water flow and levels. This can have an impact on the water body and the environment it supports. For example, in rivers, the amount and type of sediment that is carried and where it is deposited can be affected, which in turn affects the amount and quality of available habitat as well as water quality. The impacts of abstraction can be wide-ranging, affecting the environment, including important nature conservation sites, public access to rivers for leisure purposes, and can have a substantial economic impact.

We already face challenges in water availability. Many catchments have no spare water that can be allocated for further abstraction due to a need to protect the environment (see Figure 1). It is vital that we address any current unsustainable abstraction. That is why over 450 abstraction licences are being investigated that may be harming nature conservation sites or the ecological health of catchments. Around 40 of these are in Wales.

Adequate supplies of water, at the right time, are critical for the economy, particularly in supporting the provision of housing and growth in a wide range of businesses, and for affordable public water supplies. 20% of electricity generation depends on abstracted freshwater to ensure the availability and affordability of electricity. A wide range of other industries rely on abstracted water, particularly the chemical, metals, paper and food &

drinks industries, with the main use being process cooling. Many farmers also rely on abstracted water for irrigation purposes.

The Environment Agency[3]'s Case for Change[4] states that at present, a quarter of water bodies in England and 7% of water bodies in Wales can no longer provide a reliable source of water for new consumptive[5] abstraction for 70% of the time. This causes difficulties for any new business to start up if they need access to water.

Some businesses are able to take their water from the public water supply if they are unable to obtain a licence to abstract water directly from a river or aquifer. However the public water supply costs significantly more than abstracted water, which could also constrain growth. The public water supply itself could also become more costly with competing demands for water and more costly solutions to find adequate supplies. This would have an impact on customer bills.

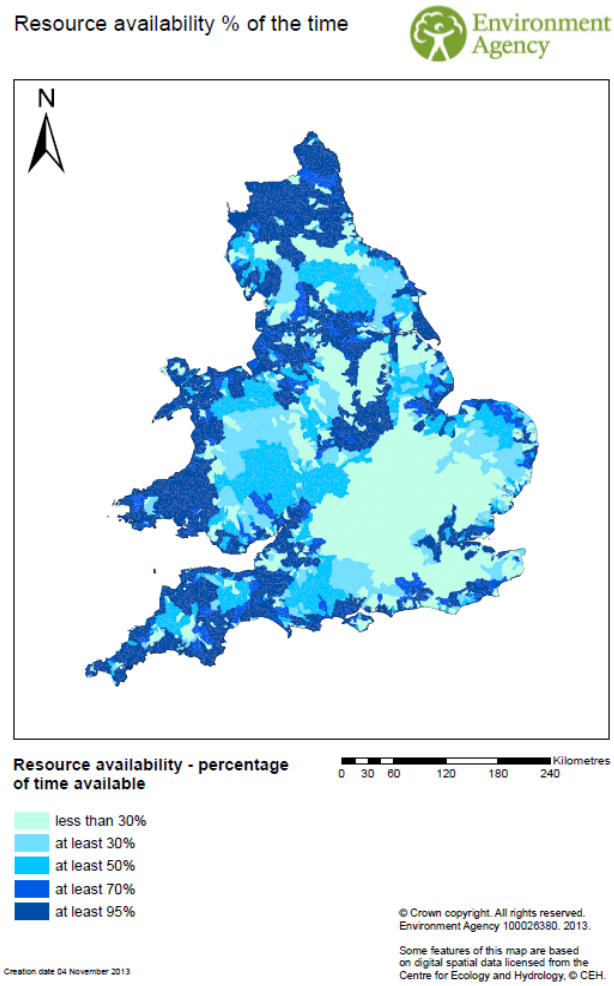

Figure 1: Water resource reliability: percentage of time water would be available for abstraction for new licences

[3] As of 1 April 2013, Environment Agency Wales, Countryside Council for Wales and Forestry Commission Wales became Natural Resources Wales.

[4] Case for change refresh 2013; Addendum to "The Case for Change: current and future water availability" (Dec 2013).

[5] Consumptive abstraction refers to water that once abstracted is not returned to the river.

Managing our available water resources efficiently and effectively is likely to become even more difficult in the future as we face substantial challenges from a changing climate and population growth (see Box 2 below).

Box 2: Case for Change

The Environment Agency developed its Case for Change: current and future water availability report in 2011 in support of the UK Government's Water White Paper. Whilst this White Paper sets out the policy direction for England, the Case for Change set out current evidence on the availability of water now and in the future across England and Wales. It includes a range of projected futures, based on different climate change, environmental and socio economic scenarios. In understanding the potential range of futures we can begin to understand the risks for future water availability. The Welsh Government has taken this evidence into account as part of their consideration for potential changes to the abstraction management system in Wales.

The analysis uses four socio-economic scenarios of possible future water demand and describes what this means for future water availability under four climate change scenarios. The socio-economic scenarios look at futures where water demand is set in the context of sustainable behaviour, local resilience, innovation and uncontrolled demand. The four climate change scenarios were selected to cover a reasonable range of scenarios from a larger set in a national assessment of changes in river flows and groundwater levels up to the 2050s. The analysis also takes into consideration different levels of environmental protection involving different assumptions on the water flow requirements for future environmental protection.

The Case for Change analysis of water availability in 2050 was updated in 2013 to include the recently developed projections for water demand relating to electricity generation. It also includes refreshed demand forecasts relating to the agriculture sector, industry and commerce sectors, and household use. The analysis now includes an additional environmental protection scenario relating to the Water Framework Directive principle of 'no deterioration'.

The refreshed 2013 case for change concludes that:

- Changing lifestyles and an increase in population could have a substantial impact on demand for water. By the 2030s, the total population of England and Wales is expected to grow by an extra 9.6 million people, rising to an extra 15 million by the 2050s. Therefore despite forecasts of reductions in per capita consumption as a result of recent demand management initiatives by water companies, overall use is likely to grow, although the range is from 28% lower to 49% higher than today in 2050.
- The climate change scenarios predominantly show decreases in natural summer flows through the UK, but range from +20% to -80%.
- Water resource availability in the future is uncertain. But the combined impacts of climate change and increases in population show there are significant risks of less water available for people, businesses, agriculture and the environment than today.
- The challenge of future water resource availability is not likely to be limited to the south and east of England. Catchments across Wales, south west and northern England are predicted to experience significant unmet demand for water under many of the scenario combinations.
- As the severity of pressures on water resources may vary across England and Wales, the approach for managing them will need to be adaptive and flexible.

2.3 Managing our water resources

The challenges we are facing, set out in section 2.2 above, create risks to our water resources and the environment that they support. We need to take these challenges seriously to avoid weakening our economy and causing irreparable damage to the environment. We need to build greater resilience to enable us to deal with the risk of increased pressure on our water supplies.

The Water White Paper, *Water for Life*, set out the UK Government's ambitions for a sustainable, resilient and customer focused water sector in England[6]. These included delivering substantial improvements in the health of our rivers through improving water quality and tackling unsustainable abstraction (see section 2.4 below). Reform of the abstraction management system is an important part of this agenda.

We want to reform our abstraction management system to ensure our available water resources are managed better for the benefit of all and to protect our rivers. We also want a new system to incentivise investment to help us meet our resource needs and increase the efficiency with which we use water. However, we know that in isolation abstraction reform is not the solution to future water resource problems. It needs to be seen in the context of the broad approach to planning for a resilient future set out in the Water White Paper.

Abstraction reform will enable us to manage the available water resource in a catchment more efficiently, and provide an incentive for abstractors to consider how they use water, its value, and the need for further investment. Alongside this, the Water Resource Management Planning system will continue to ensure water companies are planning for how they will ensure a resilient water supply for the next twenty five years and beyond. This will be reinforced by the "upstream" reform package for England set out in the Water Bill currently before Parliament. These reforms will make it easier for new businesses to enter the water sector who might offer new water sources, water efficiency goods and services or innovative ways for dealing with wastewater and sewage sludge. The Water Bill will also remove barriers to agreements between water companies for transfer of bulk supplies of water, enabling increased interconnection of water company systems which could lead to reduced pressure on water in catchments where resources are stretched.

We need to improve our understanding of future water demand and how far these different policy tools in combination are likely to lead to a position where sufficient water is available for the economy, individuals and the environment. We are therefore committed to looking at future demand for water across the whole economy to understand its likely scale and geographical distribution. Drawing on advice from the Environment Agency, the Government will take a strategic overview of the robustness of plans for the future, and whether more action is needed to enable delivery of strategic national infrastructure projects.

[6] See Annex B for an update on abstraction-related commitments from the Water White Paper.

For Wales, the Water Strategy, which is currently under development, will highlight the importance of integrated and sustainable water resource management in ensuring that the challenges we face in protecting the water environment and delivering water services in Wales are met. An abstraction management system which is flexible and fit for purpose is central to this.

The Welsh Government has taken the decision not to implement upstream reform for Wales at this time. The Welsh Government does not believe that there is currently sufficient evidence available to demonstrate whether this will deliver any benefits for Wales and what impacts this will have on their own wider policy commitments relating to infrastructure and the sustainable management of water as a natural resource across Wales.

The Welsh Government has taken a power in the Water Bill currently before Parliament to implement upstream reform in the future if evidence suggests that it will provide benefits for the environment, the economy and citizens in Wales. The Welsh Government intends to monitor the situation in England whilst at the same time considering in the context of wider Welsh Government policy what role an upstream market may have in the future.

Given the synergies of some of these reforms with the reform of the abstraction management system, there are a number of issues we need to consider carefully regarding implementation. These are discussed in chapter 6.

We are also making improvements to water quality by continuing to reduce pollution from point sources, and increasing our efforts to reduce pollution from diffuse sources, such as farms and run off from roads. The catchment approach mobilises local communities to work with regulators to investigate sources of pollution and build consensus on how to tackle them. By working on a catchment basis we are recognising the complexity of water systems and their connection to the surrounding land.

The Water Framework Directive establishes a strategic 'river basin planning' approach to managing the water environment with the overarching objective of aiming to reach good ecological status. The next round of River Basin Management Plans we are developing for 2015 will set out our revised ambitions for improving the condition of our water bodies. The Environment Agency and Natural Resources Wales' "Challenges and Choices" consultation[7] gives communities and partners the opportunity to prioritise the most significant issues for the water environment and the best ways to tackle these issues in the next round of plans. The pressures preventing our water bodies from functioning properly include over abstraction and low flow, excess nutrients, bacteria, chemicals, sediment, invasive non-native species and physical modifications.

2.4 Addressing current unsustainable abstraction

This consultation concerns the long-term reform of the abstraction management system. However, in advance of reform we must continue to tackle the problem of abstractions that are causing damage now to our rivers and groundwater. We have intensified our work to

[7] Due to close on 22nd December 2013

restore sustainable abstraction to our rivers today by varying and removing abstraction licences. The Environment Agency has already changed 77 licences in England since 2008, which is currently returning around 75 billion litres of water per year to the environment. This is the equivalent to the daily average water use of a city larger than Birmingham. Similarly, 44 licences have been changed in Wales.

The Environment Agency and Natural Resources Wales are continuing to address unsustainable abstraction, including considering where abstractions should be classed as causing serious damage. Using powers in the Water Act 2003, certain licences can be changed without compensation payments to prevent serious damage to the environment.

We have included a measure in the Water Bill currently before Parliament to change the way in which water companies are compensated when the Environment Agency or Natural Resources Wales change their licences to make their abstractions more sustainable. This change will help us address unsustainable abstraction more effectively at the same time as delivering better value for customers. We have also worked closely with the Environment Agency / Natural Resources Wales and Ofwat to explore how Ofwat's Price Review methodology can incentivise water companies to switch to more sustainable abstractions.

Taking these actions will mean that the majority of cases of unsustainable abstraction should have been tackled in advance of reform of the abstraction management system. Environmental risk will also be addressed through the process of moving licences over into the new system (see chapter 5). A key feature of our reform proposals is about ensuring abstractors are able to manage water use more flexibly and that a greater proportion of our water resources can be used without causing damage to the environment.

We are also working to bring currently exempt abstractors into the system. It is intended that all currently exempt activities that cannot be considered low risk to the water environment will be brought into the licensing system ahead of any reform of that system. This applies to about 4,500 abstractions in England and about 500 in Wales. These abstractions are mainly used for navigation purposes, dewatering of quarries or some types of irrigation. We will be consulting on this in early 2014.

Once these previously unregulated abstractors are brought within the abstraction management system, they will be subject to the same controls as other abstractors. In a reformed system, this would include reviews of abstraction permissions to protect the environment in the future (see section 4.6).

2.5 Why do we need reform?

The current system for managing abstraction of water from rivers and aquifers was set up in the 1960s when water was perceived to be more abundant than it is now and knowledge of environmental protection was much less developed. Most abstractors were given a licence to take a fixed volume of water, regardless of availability, and the system lacks the flexibility to respond to increased demand and increased pressure on our water supplies. See Box 3 for more information on the current system.

Box 3: The Current System of Abstraction Management

The current system uses daily and annual abstraction limits to control abstraction, maintain and improve environmental protection and protect the rights of downstream abstractors. Water trading is possible but uncommon and not dynamic enough to meet short term changes in demand. Most licences have no end date. They can be varied by the regulators of the system, the Environment Agency and Natural Resources Wales, but licence holders may be eligible for compensation in some circumstances. Charges are set to recover management costs and are not designed to reflect water availability.

Linking abstraction to water availability

As water availability has decreased, licences have been issued with progressively more restrictive limits to curtail abstraction. These are specified river flows or levels at which abstraction must stop, known as Hands-off Flows (HoFs). Around a quarter of licences, generally those issued more recently, include conditions which link the amount of water that can be taken to water availability. Some licences are restricted to winter or summer use only. Winter use licences are generally used to give access to winter high flows to fill reservoirs, while summer licences generally provide access to all but the lowest flows, mainly for irrigation.

Trading water within catchments

Abstraction trading is possible but not straightforward or quick. Each individual trade is subject to approval procedures by the regulator (which take around three months) and abstractors have to find willing trading partners independently. Short term trades are generally not feasible under standard procedures due to the time required for approval. Trading is currently rare.

Making licence changes to protect the environment

Water abstraction can significantly affect water flow and levels. To assess the impact that water abstraction has on the environment, the regulators check abstraction impacts against Environmental Flow Indicators (EFIs). More information can be found in *Managing Abstraction and the Water Environment*, December 2013.

Licences are changed by the regulator if they are unsustainable. Demonstrating that a licence is unsustainable (removing more water than the environment is able to cope with) requires investigation. If required, permanent licences can be amended voluntarily under section 51 of the Water Resources Act 1991 or compulsorily under section 52, with compensation paid in some cases for resulting losses. Compensation is funded by the Environmental Improvement Unit Charge (EIUC), a tax on abstractors.

New licences and licence variations have been time limited since 2001. These typically require renewal after 12 years. At the end of the time limit there is a presumption that the licence will be renewed unless the abstraction is damaging the environment, the abstractor no longer has a reasonable need for the water or is not using the water efficiently. Licences granted before 2001 are unlikely to be time limited and therefore not subject to the renewal process.

Administrative approach

The administration of this system is based on paper licences. Abstractors are informed of changes to their HoFs by phone call, text or letter. There are annual and daily limits on the volume which can be abstracted.

Abstractors are charged for the volume allowed by their licence, with the exception of spray irrigators who can opt to use a two part tariff that includes a usage component. Generally the fixed price of abstraction is low (significantly below the value of the water to the abstractor). Abstraction charges vary, for example, according to the season an abstractor is permitted to operate in and how consumptive they are (assessed using standard estimates of the consumptiveness of different sectors).

The current system applies to all abstractors wishing to take more than $20m^3$ per day.

The Case for Change[8] sets out both economic and environmental arguments about why we need reform. In summary:

- **The current system does not systematically link access to water to availability.** Only a quarter of licences, generally newer ones, have conditions to reduce or stop abstraction to leave enough water in rivers or groundwater to protect the environment or other abstractors when water availability is low. At the same time, the system generally does not allow additional water to be taken during higher flows. This is especially true for those who still have winter licences who cannot use periods of higher flows in the summer to fill reservoirs, a particular issue in the recent drought.

- **The system does not help abstractors to trade[9] available water effectively and so provide price signals to promote efficient water management.** At present there is little trading or sharing of licences due to the cost, practicalities and time taken to trade. This means there are no price signals to inform decisions about trading or investing in water efficiency as an alternative to abstraction, or infrastructure development such as reservoirs to build resilience and supply others.

- **Abstractors are not currently incentivised to manage water efficiently** because the charges for abstracting water are generally not linked to actual use and hence do not incentivise efficient water management.

- **Much of the water that is licensed is not actually used**. Environment Agency abstraction statistics show that, on average, between 2002 and 2011 only 45% of the annual total of water licensed for abstractions in England and Wales was actually abstracted, leaving 55% of licensed water unabstracted (see section 5.2 for further detail). But because abstractors are licensed to use that water, the regulator (Environment Agency or Natural Resources Wales) cannot make it available to others who may really need it.

- **The current process to change most licences that are causing damage to the environment is expensive and time consuming.** Most licences have no expiry date. To change the conditions of licences which are not time-limited the regulator has to follow a slow and expensive legal process. Some licence holders will be eligible for compensation, which is funded by abstractors. This delays resolving unsustainable abstraction. As the climate changes and flows potentially reduce or become more variable, more licences are likely to require changes, making this problem much worse and more expensive for the abstractor.

[8] The case for change – Reforming water abstraction management in England, Environment Agency (2011).

[9] Abstraction licence trading currently involves a potential seller applying for a variation to reduce their licensed volume in one location and a potential buyer applying for an increase or a new equivalent licence in a different location. Both locations have to be in water bodies that are hydrologically linked so water is flowing between them. Broadly this involves one abstractor using less water so another can take more water.

- **The system fails to incentivise abstractors to manage risks from future pressures on water resources.** Under the current system abstractors pay into a fund used to compensate licence holders if they suffer a loss when changes are made to their licences to tackle unsustainable abstraction. This approach may be able to deal slowly with the legacy of unsustainable abstraction, but it does not encourage abstractors to invest and proactively manage their own risks from increased pressures on water availability.

These weaknesses may constrain economic growth due to reduced resilience and getting sub-optimal economic value from our available water while not efficiently protecting the environment. They prevent the system adapting to a changing and uncertain climate, and make it very costly to make improvements to the environment, and hence more expensive for abstractors. These weaknesses significantly affect our ability to address the future challenges facing the sector.

Figure 2: Possible future catchment perspectives from sticking with the current system.

Part II

3. Proposals for reform – headline approaches

Working with stakeholders, and drawing on international good practice, we have developed two main options for reform. We have called these “Current System Plus” and “Water Shares”, summarised below. As with the current system, these proposals would apply to all abstractions greater than 20 cubic metres per day. We also explored a third option which we are not pursuing (see section 3.3).

The key features of the **Current System Plus** option would be:

- The Environment Agency and Natural Resources Wales would continue to use the tools currently applied to some licences to reduce or stop abstraction to leave enough water in rivers or groundwater for the environment or other abstractors when flows are low.
- We would improve these tools, strengthening the link between water availability and abstraction to allow more water to be abstracted when more is available, helping abstractors to adapt to the risks posed by increasing variability of water availability. This would also improve environmental protection, particularly at very low flows.
- Abstractors would have annual and daily limits in a similar way to now.
- We would make it easier for abstractors to trade water with each other as temporary low risk trades would be pre-approved.
- Groundwater abstraction could be varied over the long term in response to changes in availability.

The key features of the **Water Shares** option would be:

- Abstractors would have a share in the available water resource, rather than an absolute amount. This would encourage abstractors to take a shared responsibility for water resources in catchments in line with our broader catchment based approach[10].
- As currently, in each specified area within a catchment[11] the regulator would assess how much water is required to avoid environmental deterioration. The remaining volume of water would then be referred to as the “available resource”. Abstractors then hold shares of different reliabilities in this available resource.

[10] The objectives for the Catchment Based Approach are: to deliver positive and sustained outcomes for the water environment by promoting a better understanding of the environment at a local level and to encourage local collaboration and more transparent decision-making when both planning and delivering activities to improve the water environment.

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

- Abstractors would receive a water allocation for a fixed period based on the available resource at that time and the reliability and size of their share.

- For surface water abstractors this period might be a fortnight, although for most abstractors their allocation would not change except at very low flows. For most groundwater abstractors the allocation period would be at least annual[12].

- This option allows for pre-approval of shorter-term trading between abstractors and a wider range of trades.

Under both options we would also:

- Remove time limits from licences that currently have them and instead introduce a new transparent and risk based process to review catchment conditions that would enable the regulator to change any abstraction permission within each catchment (regardless of whether they have a time limit now or not), with notice, to protect the environment;
- Improve the link between abstraction charges and usage;
- Take an evolutionary and proportionate approach to implementation. We would only introduce the full package of reforms in some catchments where there are clear economic and environmental benefits to doing so.

The key difference between the two options is the proposed method for linking abstractions to water availability in surface water. There should not be a significant difference in the reliability of access to water provided by the two methods, but there are differences in the extent to which they facilitate trading. The summary tables at the start of each section here and in chapters 4 and 5 identify whether the proposed reform is the same for the two options or differs.

3.1 Proportionate and evolutionary implementation

Option	Reform proposal	Desired outcome
Current System Plus and Water Shares	Introduce the right amount of reform in catchments according to water availability and competing demands. "Enhanced" catchments would use more advanced tools to manage abstraction than "basic" catchments.	Ensure proportionate regulatory costs for abstractors and regulators. Appropriate management for the type of catchment.

For both options, we propose to initially only introduce the full package of reforms in some catchments across England and Wales where there are clear environmental and economic benefits from doing so. For the purposes of this consultation, we are calling these

[12] Note, some groundwater abstractions are very closely linked to surface water receptors and need to be regulated more dynamically.

“enhanced catchments”. Abstractors in these catchments would benefit because they would have a wider set of tools to manage their own abstractions. The ability to manage water resources at the catchment level would also be improved.

Other catchments may benefit from the full range of reforms in the future as pressures on available water increase. In the meantime, it could be unnecessarily costly and bureaucratic for both abstractors and regulators to introduce all of the reforms at once in catchments where there would be no benefits, known as “basic catchments”.

Catchments could become enhanced in two different ways depending upon the situation in each catchment. Where the level of abstraction means there is a risk of environmental deterioration, measures that more closely link abstraction to river flows or water levels would be introduced. In catchments where there are benefits from introducing pre-approved trading, we would develop rules and introduce the processes needed to apply them.

If catchment conditions change in future, the advanced tools could be introduced as necessary, switching the catchment from “basic” to “enhanced” (see Figure 3).

We have conducted an initial assessment to show the possible proportion of catchments in each category in England and Wales. We estimate that approximately 70% of catchments could be basic, and 30% enhanced on implementation in the 2020s. By 2050, approximately 50% of catchments could be enhanced. We know that catchments with a high degree of environmental sensitivity and/or where there is a demand for trading are most likely to be enhanced catchments. We will be doing further work to assess which catchments should be categorised as basic or enhanced by the time abstraction reform is implemented.

We set out in chapter 4 which of the reform proposals would apply to basic and enhanced catchments.

3.2 Hybrid options

We have developed the two distinct options of Current System Plus and Water Shares in order to compare how well each of them functions in a range of future scenarios for modelling purposes (see the Impact Assessment at Annex A for further details). However, as we indicate above in section 3.1, they could be implemented somewhat differently in different catchments depending on levels of water availability and the potential for trading. We also recognise that the right solution may involve variations on or combinations of the options. Hence this consultation seeks views on each of the elements that make up the two distinct options as described above.

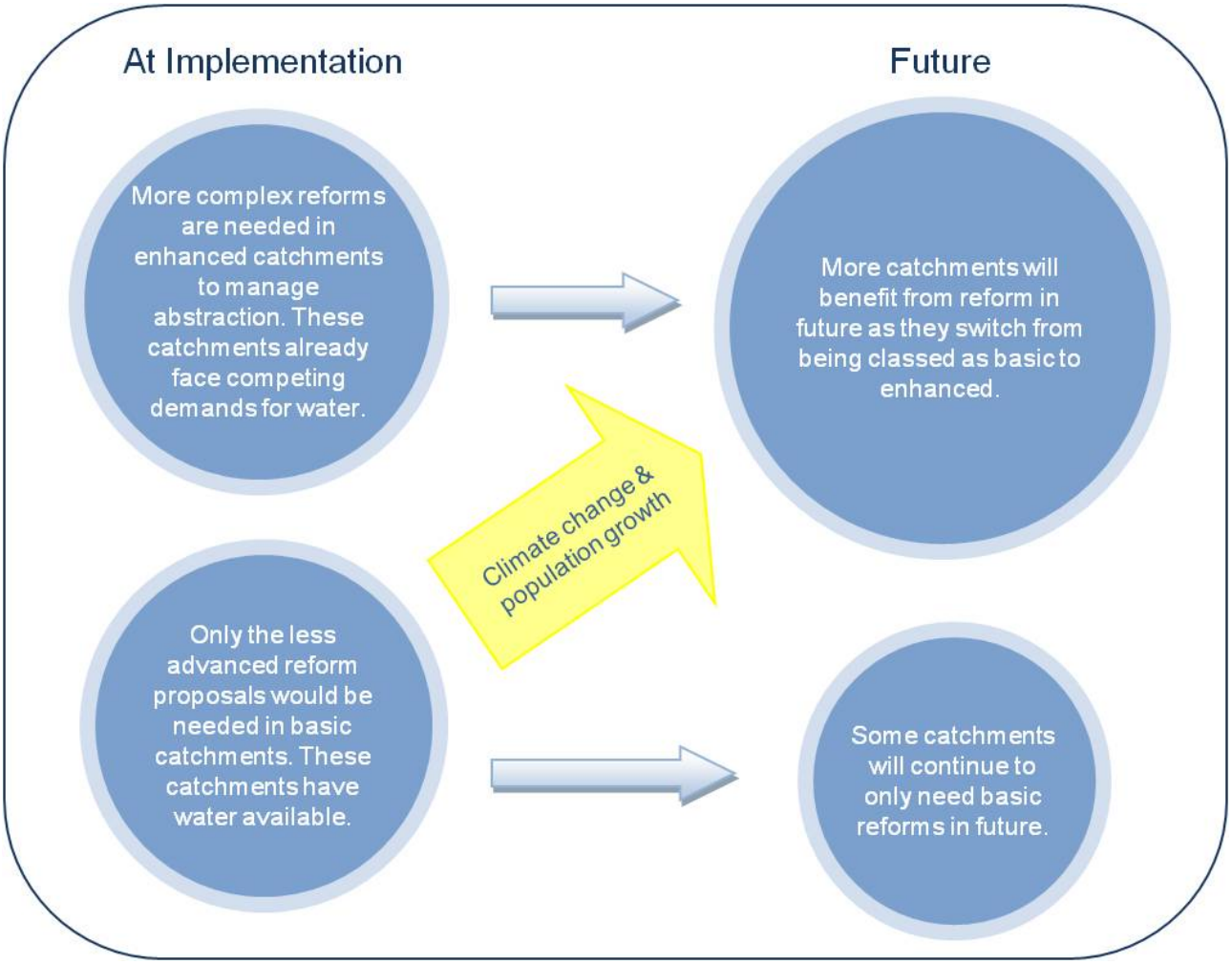

Figure 3: Basic and enhanced catchments

3.3 Alternative option

We also considered a third option, which we called **Pay as You Go**. Under the Pay as You Go option the Environment Agency or Natural Resources Wales would regularly set a price for abstracting water according to local water availability. This price, which would increase as water availability decreases and decrease as water availability increases, would aim to constrain demand and ensure environmental protection. However, this could lead to significant variability in charges for abstractors. Such unpredictability would be hard for abstractors to manage.

This approach presented significant technical issues in terms of setting prices in the context of complex systems that ensure sufficient water remains to protect the environment at the same time as ensuring water is available for other abstractors at the right time and place. Estimating the necessary prices to meet environmental requirements on a frequent basis would be very complex, risky and costly. Hence for these reasons, the pricing approach was not assessed or pursued any further.

4. Detailed proposals for reform – making the most of our water

The following two chapters set out more detail about our key proposals for reform. This chapter covers:

- Change from seasonal licences to abstraction permissions based on available water;
- Linking water allocation to availability;
- Managing discharges so their value is recognised;
- A charging system that reflects water use and reliability;
- Facilitating trading to promote efficiency and resilience; and
- Reviewing abstraction permissions to protect the environment in future.

Chapter 5 covers proposals for moving to a new system.

We have provided summary tables for each set of proposals to make clear what the proposals are, the desired outcome, which proposals would apply under which option, and whether the proposal would apply in basic and / or enhanced catchments.

More technical detail about some of these proposals can be found in Annex C.

4.1 Change from seasonal licences to abstraction permissions based on available water

Option	What we do now	Reform proposal	Desired outcome	Basic	Enhanced
Current System Plus and Water Shares	Some abstraction licences currently restrict abstraction to certain months of the year. These are known as seasonal licences.	Replace seasonal conditions with conditions linked to water availability, allowing higher flows to be abstracted irrespective of the time of year.	Ensure that water can be used or stored when it is available.	✓	✓

Currently some abstraction licences restrict abstraction to certain months. These are seasonal licences. For example, an abstractor who uses a river abstraction to fill a storage reservoir may be restricted to filling it in winter months in order to protect the river in summer when the weather is normally drier. However, summer is no guarantee of hot, dry weather and winter is no guarantee of lots of rain. Indeed, summer rainfall can cause high

river flows in excess of environmental requirements that could allow an abstractor to top up a reservoir[13].

Replace seasonal conditions with availability based conditions

To ensure that abstractors with storage can make better use of high flows in response to weather and that the environment is protected, we propose to replace all seasonal licences with abstraction permissions based on water availability. Seasonal conditions would be removed from both surface water and groundwater abstractions. However, because groundwater is generally slower to respond to changes in water availability than surface water, the majority of benefits will be for surface water abstractors.

This would ensure that water could be used when it is available, potentially increasing the overall amount of water available for use.

The Environment Agency has already begun to convert seasonal licences in response to licence holders' requests during the abnormal weather in 2012 (see Box 4 below for a case study of a farm manager in Essex who has already benefited from this). This reform would allow the regulator to convert the remaining seasonal licences to abstraction permissions linked to water availability when they are moved to the new system rather than converting them individually when requested.

Box 4: Case Study

"As a farm manager with over six thousand acres to oversee, water means business. My winter only licence is used to fill a large storage reservoir. A full reservoir means my water needs can be met for up to two years. During the dry winter of 2011 I was unable to fill my reservoir as the river was constantly low. By the spring of 2012 my reservoir was almost empty. I became so concerned that I contacted the Environment Agency to see if I could abstract beyond my licence's seasonal cut off date, the 31st March. A plan was hatched and I was able to continue abstracting when the river was high. Thankfully the river was often high over that summer, in fact it was often brim full and I was able to fill my reservoir.

My seasonal licence does not offer me water security. I am reluctant to invest in cereal crops which are more profitable but require more water security. An all-year licence that would allow me to take water during high flows, regardless of when they occur, would be much better for my business and my customers."

Summary
We are proposing to replace seasonal conditions on licences with availability based conditions. This will ensure water can be used when available at any time of year.

[13] High flows in summer can be important for water ecosystems and abstraction would still need to be controlled to maintain these benefits. The Environment Agency and Natural Resources Wales are developing and improving how they determine environmental flow requirements, including seasonal variability and high flow requirements (see Managing Abstraction and the Water Environment, December 2013 for more information).

Question

1) **What are your views on the proposal to convert seasonal licences into abstraction permissions based on water availability?**

4.2 Linking water allocation to availability

Option	What we do now	Reform proposal	Desired outcome	Basic	Enhanced
Current System Plus (Surface water)	Some abstractors currently have Hands-off Flow conditions	Allow additional abstraction at high flows Convert current Hands-off Flow conditions into graduated controls Introduce new very low flow constraints on abstraction	Improve the link between water availability and abstraction to allow more water to be abstracted when more is available and protect the environment when less is available	✓	✓ ✓ ✓
Water Shares (Surface water)	Some abstractors currently have Hands-off Flow conditions	Adjusted annual abstraction limits on existing licences are converted into shares Allocations are either on or off, depending on availability Allocations are variable depending on availability to make better use of peaks and troughs		✓ ✓	✓ ✓
Current System Plus and Water Shares (Groundwater)	Fixed volumetric limits constrain individual groundwater abstractors	Link total groundwater allocations to long term groundwater availability	Ensure that groundwater abstraction can adapt to changing groundwater availability over the long term		✓

The Environment Agency and Natural Resources Wales are responsible for deciding the maximum amount of water that may be taken by abstractors, without compromising the environment. Currently, this is done by assessing the water available for abstraction through Catchment Abstraction Management Strategies (CAMS). CAMS show how much freshwater resource is reliably available, how much the environment needs and the

amount of water that can be taken. The criteria currently used to assess the environmental needs of a river are referred to as Environmental Flow Indicators (EFIs). Whilst the methodologies for assessing environmental needs and resources will evolve and improve over time, the Current System Plus and Water Shares options will be able to work with the latest standards and approaches for calculating the water available for abstraction in future. More information can be found in *Managing Abstraction and the Water Environment*, December 2013.

We are proposing to link the amount of water that can be taken more closely with the amount that is available. This will allow more abstraction when more water is available. It will also better balance the needs of abstractors and the environment when less water is available.

4.2.1 Linking abstraction to water availability in surface water

We have tested two different approaches to linking abstraction to water availability in surface water.

i) Current System Plus

This option improves on the regulatory tools used in the current system. It introduces three new elements, described below. More information can be found in Annex C.

Allowing additional abstraction at very high flows

At times of very high flows we want to see if we can make better use of some of these peaks in river flow, providing environmental requirements are met and assuming the water is of sufficient quality. For example, in a wet year, an abstractor could take more water than their annual limit would normally allow. This is because abstraction when flows are above a certain threshold would not count towards an abstractor's annual limit. Abstraction at very high flows would still be constrained by daily limits in order to maintain environmental protection. Whilst many businesses may not have a use for this additional water immediately, some could store it in a reservoir for use at another time.

Providing flexibility for abstractors that must stop abstracting at certain flows

Some abstractors currently have a Hands-off Flow (HoF) condition on their licence that stipulates they must reduce or stop abstracting as water levels decrease. They would continue to have this condition under a reformed system. However, the conditions would be improved to provide additional flexibility for abstractors, as limitations on daily abstraction would decrease gradually rather than stopping immediately. This would reduce the likelihood of abstractors having to stop abstracting entirely. This reform would only apply to abstractors that currently have a HoF condition on their licence.

Introducing a regulatory minimum level

At the very lowest flows all abstraction would cease. With our current climate we envisage that this would only occur for short periods of time during extremely low flows. However, if the climate changes, and becomes drier, this condition could be triggered more frequently.

This condition has a clear link with drought controls, as it would only function at very low flows. We intend to do further work to explore this linkage (see section 6.4).

ii) Water Shares

This approach is based on the principle that abstractors would hold shares that provide access to a proportion of available water in a specified area within a catchment. This would encourage abstractors to take a shared responsibility for water resources in catchments in line with the broader catchment based approach[14]. We believe this would encourage abstractors to engage in the management of their catchment and better understand the risks to water availability in the catchment as a whole. This principle is similar to shares in fishing stocks in Iceland and New Zealand, introduced to avoid fixed quotas that continually need to be revised in response to changing assessments of fish stocks.

Water in rivers has different levels of reliability. For example, high flows only happen from time to time and are not available every day whereas there is nearly always a level of base flow. Because of this shares can be held in high reliability or low reliability water.

Abstractors with reservoirs will tend to only need low reliability shares because they can be flexible about when they abstract as long as they can fill their reservoir. Businesses that need to abstract a consistent volume of water throughout the year will tend to need high reliability shares.

Within the high and low reliability groups, each abstractor maintains the same share of the available water but, depending on whether it is wet or dry, that share holding could permit them to abstract more or less water. The amount of water an abstractor is permitted to take, their allocation, would be announced for a fixed period, probably a fortnight. In enhanced catchments, their allocation could vary in amount as flows vary to ensure the system responds to water availability. In basic catchments, it would be either available or not, similar to current Hands-off Flows.

Whilst Water Shares represents a more radical change than the Current System Plus option, it has the potential to enable us to better manage future changes in water availability. This is because it is fundamentally a more flexible system that reacts better to changing patterns of availability than a system where the abstraction permissions are based on fixed volumes. Water Shares would provide comparable levels of reliability to

[14] The objectives for the Catchment Based Approach are: to deliver positive and sustained outcomes for the water environment by promoting a better understanding of the environment at a local level and to encourage local collaboration and more transparent decision-making when both planning and delivering activities to improve the water environment.

the Current System Plus option. However it uses different mechanisms to do this in a way that better facilitates trading (see section 4.5).

The way that the Water Shares option would operate for surface water abstractors is explained in more detail in Annex C.

4.2.2 Linking total groundwater abstraction to long-term groundwater availability

Groundwater levels in aquifers generally react to changing weather patterns much more slowly than surface water sources, like rivers and lakes. This is because of the time it takes for rainfall to filter down through the ground before it reaches the rock in which it collects. So a less dynamic link between groundwater availability and abstraction is generally needed than for surface water abstractions.

Under both the Current System Plus and Water Shares options, groundwater stocks would be managed in the same way. Groundwater availability would be monitored over time and, if necessary, changes would be made to the total groundwater abstraction permitted by adjusting the annual abstraction volumes on all abstraction permissions in an appropriate area. For example, if the long term record of groundwater showed that levels were 5 percent lower, all groundwater abstractors would be permitted to take 95 percent of their annual volume in that area. In basic catchments groundwater abstraction limits would not be linked to water availability and would remain fixed between years. More information on how this could be managed is provided in Annex C.

Summary

We are proposing to link abstraction more closely to the amount of water available.

Current System Plus (surface water):

- Allow additional abstraction at very high flows that is not counted towards licensed volume;
- Refine Hands-off Flow conditions so limitations on daily abstraction would decrease gradually rather than stopping immediately;
- Introduce a regulatory minimum level at which all abstraction must stop;

Water Shares (surface water):

- Each abstractor is given a share in an available water source that varies depending on water availability;
- Some shares are highly reliable giving almost constant access to water;
- Other shares give low reliability and only access to water when flows are high.

Under both options, groundwater allocations would be linked to long term groundwater availability.

Questions

2) **What do you think about the different proposed approaches to linking abstraction to water availability for surface water and groundwater abstractions?**

3) **Would it be helpful if abstraction conditions required abstractors to gradually reduce their abstraction at low flows before stopping, rather than being just on or off?**

4) **Do you think the proposal to protect the environment using a regulatory minimum level at very low flows is reasonable? If not, how do you think we should protect the environment at very low flows?**

4.3 Managing discharges so their value is recognised

Option	What we do now	Reform proposal	Desired outcome	Basic	Enhanced
Current System Plus and Water Shares	Most abstractors are not formally required to return waste water back to rivers, which means that it cannot be relied on to always be there.	Where discharges are close to abstraction points, abstractors are regulated on the basis of the water they consume and do not return immediately to rivers. These abstractors would therefore be required to return a proportion of what they abstract.	Downstream abstractors are able to rely on discharges from up stream. Abstractors use water efficiently.	✓	✓

Some abstractors use all of the water they take; others only consume some of what they take, and return (discharge) the rest to rivers or the sea. For example, some sectors such as hydropower and fish farming usually return nearly all water back very close to the point of abstraction. All irrigation water, however, is taken up by crops, without any being discharged directly back to rivers.

Regulating the water quality of discharges is important because they can be a source of contaminants and lead to pollution. However, managing the volumes of returned water is important too because discharges increase river flows which can benefit the environment and provide water for others to abstract downstream. In some rivers over 60% of flows can be from discharges during the drier weeks of a typical summer. Discharges could play an increasingly important role in maintaining flow in rivers in future with changing water availability.

Water companies discharge large volumes of water from waste water treatment works. They may decide to alter how much they discharge or even stop discharging this water altogether, for example by diverting their returned water to another treatment works in a different location that has more modern treatment processes. Other abstractors could also decide to discharge less, for example, by diverting their discharge to foul sewer rather than the river directly, although some have a requirement to return a proportion of the water they take. Because discharges can be changed, this water cannot currently be relied upon to always be there. This makes this potential resource difficult to license for other abstractors to take down stream and means it can be wasted.

Closely connected abstraction and discharges

Most abstractors discharge their waste water close to the point from where they take it and shortly after it is taken. This includes abstractors who consume very little of the water they

take, for example, fish farmers and many hydropower schemes. We propose that all abstractors who discharge water close to where they take it should be required to continue to do so. This would be based on the volumes of water they had previously been abstracting and discharging. Where appropriate, we would require the abstractor to measure their discharge to demonstrate that they are doing this. See Annex C for further details on improving estimation of discharges.

Discharges at a significant distance from and/or related to a number of abstraction points

Some abstractors, mainly water companies, discharge waste water a significant distance from where they take it, possibly even in another catchment or into coastal waters. The discharges from water company treatment works include waste water collected from many abstraction locations. It also includes water from urban drainage systems, which varies significantly with local rainfall. It is therefore very difficult to link a required level of discharge to each abstraction point.

We want to develop a system that allows the water resources from discharges to be reliably allocated to other abstractors, while also supporting water quality objectives. We would need to do this in a way that avoids locking water companies into inefficient solutions or approaches that reduce their scope for innovation, for example, if a water company wishes to close a waste water treatment plant and divert discharge to a more efficient plant. We are still developing and assessing detailed proposals but value views on this general direction.

Summary

We propose that all abstractors who discharge water close to where they take it from should be required to continue to discharge a proportion of what they take to allow the reliable allocation of water to those downstream.

Some abstractors discharge waste water a significant distance from where it was abstracted, possibly even in another catchment. We intend to do further work to explore how we could develop a management system that allows the water resources from these discharges to be reliably available for other abstractors without compromising water quality objectives or reducing efficiency or innovation in water companies.

5) **What do you think of the proposal to require abstractors who discharge water close to where they take it from to continue to discharge a proportion in line with their current pattern?**

6) **How best do you think water company discharges should be regulated to provide reliable water for downstream abstraction without impacting on water quality objectives or constraining flexibility in water management?**

4.4 A charging system that reflects water use and reliability

Option	What we do now	Reform proposal	Desired outcome	Basic	Enhanced
Current System Plus and Water Shares	The majority of abstractors pay based on the size of their licence.	Expand two part tariffs to other abstractors based on a combination of permitted volume and water used.	Encourage efficient water use.	✓	✓
	Charges are adjusted according to the season abstractors can operate in.	Scale charges according to how often an abstractor is likely to be able to take water.	Encourage use of less reliable water, which is likely to have least impact on the environment.	✓	✓

Under both the Current System Plus and Water Shares options charges would be set to recover the costs of managing water resources. Different unit charges would be set nationally for England and for Wales for basic and enhanced catchments, reflecting the additional regulatory activity required in enhanced catchments. Charges would be applied to individual abstractors according to how many units they have used and how many they are permitted to use.

As with the existing system, abstractors who return more water to the environment would pay less than those who return less. We would aim in a new charging system to more accurately reflect the benefits of discharges to rivers (see Annex C for further detail). There are a number of other elements of charging that would have to be considered in a new system on which we intend to do further work.

Expand two part tariffs to other abstractors

The bills that most abstractors pay for taking water are based on the size (volume) of the licence. This does not encourage abstractors to use water efficiently, or reward those who have invested in water efficient technology. However, abstractors who take water for spray irrigation purposes may currently opt to be charged for a combination of licensed volume and water used, known as a two part tariff. To discourage waste and encourage water efficiency we are considering expanding this two part tariff to other abstractors.

Scale charges for reliability of abstraction

Currently abstractors pay less for a licence to abstract in winter (when river flows are generally higher) and more to abstract in summer (when river flows are generally lower). This is because water that is taken during higher flows generally has a much lower impact on both the environment and downstream abstractors than water taken during lower flows.

Because we are proposing to move away from seasonal licences this approach would be changed so that abstractors who can only abstract at higher flows pay less and those who can abstract at low flows pay more. This should encourage abstractors who can develop water storage reservoirs to only abstract at higher flows. This would then leave the more reliable abstraction permissions, allowing water to be taken all of the time, for abstractors who need them and are prepared to pay more, or do not have the capital or space to invest in storage.

Summary

We are proposing:

- To change abstraction charges to include an element based on water abstracted;
- To charge more for reliable access to water than for less reliable.

Questions

7) **If you are an abstractor, how would these charging proposals affect your business?**

8) **To what extent would a system that charges abstractors partly on permitted volumes and partly on actual usage (ie a two part tariff) encourage abstractors to use less water?**

4.5 Facilitating trading to promote efficiency and resilience

Option	What we do now	Reform proposal	Desired outcome	Basic	Enhanced
Current System Plus	All trades are individually approved, taking up to 4 months	To develop pre-approval for temporary trading where environmental risks are low, generally for downstream trades.	To promote more efficient use of water in catchments.		✓
Water Shares		To develop pre-approval for allocation period trading, probably 2 weeks, where environmental risks are low.	To promote more efficient use of water in catchments, including of water from reservoirs and re-use schemes.		✓
Current System Plus and Water Shares	Only licence holders can trade.	To initially restrict involvement in abstraction markets to those with a direct interest in water abstraction.	To avoid unintended effects of non-abstractors being involved in the market.	✓	✓

Previous sections of this consultation have looked at how we could increase the amount of water that can be used by linking abstraction better to flows, including discharges, whilst protecting the environment. We have also been looking at how we can make sure we actually use as much of this water as possible and get the most value from it, particularly when and where pressure on this resource is greatest. Our focus here is to make it quicker and easier to trade water so that, at times and places of particularly high demand and low availability, we are getting the most value out of our water and not wasting any that could be used.

Trading could happen in a range of different scenarios:

- A farmer is planning his annual cropping and realises he doesn't need all his water for that year, so he sells part of his annual allocation;
- A water company has invested in new resources to meet demand over the next 25 years and initially has extra water resources that they could sell when flows are low;
- A coal powered electricity generating plant is not operating for a period due to the price of coal so the operator has access to water they can sell;

- A number of farmers jointly invest in a reservoir and some of them do not need their share of water for a season, or find they can make more money selling the water than growing all their crops given the lack of available water;

- A farmer might sell their reliable access to water to an industrial abstractor to help finance a reservoir;

- A water company has invested in a pipeline to pump water further up the catchment to discharge into rivers at low flows for re-abstraction, also uses the pipeline to pump water up to sell to other abstractors.

These examples show how trading can mean we use water more efficiently and avoid it being wasted. It also shows how trading can be used to encourage investment in shared infrastructure. In some places abstractors are already beginning to explore this potential. Southern Water is working with abstractors to explore the potential for trading in the Upper Rother catchment (see Box 5) and Anglian Water is working with farmers to explore the potential for shared infrastructure in the Wissey catchment (see Box 6).

Box 5: Abstraction Trading – A New Initiative by Southern Water

Southern Water is leading a new initiative among abstractors in the Western Rother catchment in West Sussex. The project is seeking to create a water abstraction trading market, to tackle growing problems of short-term and long-term water availability.

It is looking to develop a trading market, which uses an innovative model to streamline the way trades are made, while maintaining protection for current abstractors and the natural environment. The underlying rules used in this process will be developed in conjunction with the Environment Agency.

The trading market will trial elements of the proposed abstraction management reforms, including pre-approved trades, a visible market place and information on the availability and value of water at different locations and times. These proposals have received positive interest from abstractors within the catchment to date.

Southern Water's objective is to launch a small pilot scheme in 2014 on the Western Rother River in the South Downs National Park, in partnership with local abstractors, the Arun and Rother Rivers Trust and other interested stakeholders. Southern Water will work closely with the Environment Agency who will agree the rules for pre-approved trading.

If the pilot scheme is successful, Southern Water could apply the initiative to other catchments.

Box 6: 'Sink or Swim' – a business led "collaboratory" with the University of Cambridge Programme for Sustainability Leadership

This "Collaboratory" is exploring the steps and mechanisms required for business and the public sector to cooperate to bring about novel solutions to water security. It is developing these through a 'Lighthouse Project' in the Wissey, in close collaboration with Anglian Water and other businesses. There are particular challenges of water availability in this area and the Collaboratory is using the potential benefits of increased reservoir storage as a focus. Increased storage could range from a single shared reservoir to increased numbers of individual on-farm reservoirs.

The Collaboratory is now developing new approaches to planning, funding, ownership, operation and water allocation taking into account abstraction reform options. The evaluation of financing and resilience options involves engagement with the food, farming, and retail industries, banking, engineering consultants and the property sector. The Wissey pilot is providing a valuable opportunity for the water industry and other stakeholders to develop best water resource and drought management practice for both agriculture and public water supply.

Trading is already possible under the current system but each trade requires individual approval which is cumbersome. Trades currently take up to four months to approve if advertising is required and three months if it is not. The requirement for advertising is dependent on the risk associated with the proposed trade. We want to make it easier and quicker for abstractors to trade because this will enable them to respond more quickly to changes in water availability and the needs of their businesses.

Water provides all sorts of services for people and the environment as it makes its way through catchments from its source to the sea. The natural and complex nature of catchments is what makes them so valuable; however it also presents challenges when we look to manage water to meet the needs of society and the environment. In this sense, water is unlike other commodities that can be freely traded. There will always be limitations on the sorts of trades that are possible.

The reform proposals aim to manage these limitations and to make trading simpler; however some constraints will remain. For example, in order for one abstractor to sell their access to water to another abstractor, the seller's reduced abstraction must increase availability at the point the buyer is taking water from. We refer to this as hydrological connectivity. Similarly it is important that trades do not lead to an increase in abstraction by, for example, not adequately taking into account the consumptiveness of different abstractors. Abstractors can only sell what they actually consume ie abstract and do not discharge (see Annex C on improving measurement of discharges).

i) Current System Plus

Under Current System Plus, the Environment Agency and Natural Resources Wales would publish rules setting out the types and volumes of trades abstractors can make without individual approval in each enhanced catchment. This would also mean that there would be no requirement for abstractors to demonstrate a need for water to trade.

The volume each abstractor could take would be held electronically instead of being detailed on paper licences. This would allow trades to be recorded without varying old licences and re-issuing new ones. Abstraction conditions would be simplified and made publicly available as part of a set of catchment abstraction rules. Pre-approved trading would be limited to low risk trades, for example, selling water downstream for a set period of time. Abstractors would have to contact other abstractors and negotiate prices, or potentially there could be opportunity for brokers to facilitate trades, as has happened in Australia. These would then need to be reported to the Environment Agency or Natural Resources Wales so they can be recorded.

ii) Water Shares

The key difference between the Water Shares and Current System Plus options is that the more sophisticated water management framework of Water Shares allows for pre-approval of a much greater range of trades, including shorter-term trades over the allocation period and upstream trades. Trading in a short allocation period supports the use of rivers to move water from a reservoir or re-use pipe outlet, to a downstream abstractor. This should deliver greater economic benefits.

An added benefit of this option is that abstractors have an asset similar to land that they can mortgage and effectively plan investments around. Australian irrigators who have a shares-based system value this highly.

Market development and regulation

Facilitating trading should create markets for water in different catchments, potentially even between catchments where water transfer schemes exist. This should reveal the value of water in different places and times, and harness the power of markets to promote more efficient use of this valuable resource, particularly in the case of the Water Shares option which facilitates a wider range of trading.

However the extent of likely trading is in practice uncertain. We know that the needs of different abstractors vary significantly, and whilst some already have an interest in trading, others have told us they are unlikely to participate. For some sectors, and in some catchments because of particular constraints, the level of trading, at least initially, may be very low. Short-term trading is likely to be driven by the weather and only occur significantly at times when flows are low. If markets are not very active and quite ‘thin’, then they will not be very powerful in driving behaviour due to the lack of market information. So, we would not necessarily expect a very active market at the point of

implementation, whichever reform option was taken. However there may be potential for increased facilitation of markets and we will do further work to examine possible options.[15]

We know that some stakeholders are concerned about possible distortions in the markets, including potential dominance by large abstractors, with many catchments containing one abstractor who is the largest in that catchment by some margin. However we consider that the current competition law is sufficiently robust to prevent distortions occurring as a result of market dominance.[16]

We have also heard concerns about the potential for abstraction permissions to be bought and traded by those who have no intention of using the water. To address this, we are considering at least initially constraining participation to those with a direct interest in abstracting water. This would mean limiting the holding of shares and allocated volumes to those with a justified need to abstract water or those who own land on which there is a justified need to abstract water[17]. This approach would be consistent with that taken in other sectors on the introduction of markets.

Summary

Trading under the two options for reform will be quicker and easier in enhanced catchments and only possible between those with a direct interest in water abstraction. Under both options some trades will be preapproved although Water Shares will allow pre-approval of shorter-term and a greater range of trades.

Questions

9) Would quicker and easier water trading benefit abstractors now? How beneficial do you think it would be to abstractors in the future?

10) To what extent do you see additional benefits in the wider range of trades that can happen under the Water Shares option, compared to the Current System Plus option?

11) Do you agree that participation in abstraction trading should initially be limited to those with a direct interest in abstracting water?

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[15] See Nera, 2013, A Cross-Sector and Cross-Country Review of Approaches to Transitioning to Markets; M. Young, 2012, Towards a Generic Framework for the Abstraction and Utilisation of Water in England, p.16

[16] The Competition Act 1998 prohibits abuse of a dominant market position. This mainly applies to businesses that have a large market share, usually 40% or more. Any actions perceived as dominating or distorting the market can be reported to Ofwat for investigation. Breaches of competition law can also be investigated by the Office of Fair Trading (soon to be the Competition and Markets Authority following merger with the Competition Commission).

[17] This would have to be demonstrated at the point of application for a permit to abstract but not at the point of trade.

4.6 Reviewing abstraction permissions to protect the environment in future

Option	What we do now	Reform proposal	Desired outcome	Basic	Enhanced
Current System Plus and Water Shares	The process for changing abstraction conditions applies differently depending on the type of licence held	Apply the same approach to all abstractors	Abstractors are treated equally and the risk of change is shared by all	✓	✓
	A slow and complex process is followed to individually investigate abstraction licences	Review abstraction conditions across catchments if risks are identified	Abstraction conditions can adapt to long term change to reduce environmental risk	✓	✓
	Apply time limits to all new abstraction licences.	Remove time limits; give notice of risk of change and of any specific changes to abstraction conditions	Abstractors have sufficient certainty for business planning	✓	✓
	Where there is serious environmental damage no notice will be required to make changes	No change	Changes can be made quickly in exceptional circumstances to prevent serious environmental damage	✓	✓
	Under certain circumstances abstractors can claim compensation if their licence is changed. This cost is spread across all abstractors	Compensation will not be payable for abstraction permission changes and EIUC will be phased out	Changes will be made more quickly and the burden of EIUC will be removed	✓	✓

Under the current system, the Environment Agency or Natural Resources Wales makes permanent changes to individual licences to adjust how much water is taken or, when that water is taken, to leave enough to protect the environment. This is an expensive process, including costs for compensation, which abstractors ultimately pay for as part of their abstraction charges. There is also a lot of uncertainly for abstractors during the process. Changes to licences could be required more frequently to meet environmental obligations in future, which would mean without reform the system could become even more costly for abstractors. Without reform, abstractors would need to continue paying for compensation via the Environmental Improvement Unit Charge[18] (EIUC). The cumbersome nature of this process means it can take a long time for licences to be changed, creating both risks to the environment and to our ability to meet required standards under European legislation.

In a reformed system there should be less risk that individual abstraction permissions would need to be changed. The majority of cases of unsustainable abstraction will have been tackled in advance of reform (see section 6.1); environmental risk will also be addressed through the process of moving licences over into the new system (see chapter 5); and both reform options will ensure abstractors are able to manage water use more flexibly and that a greater proportion of our water resources can be used without causing damage to the environment.

However, it may still be necessary to alter abstraction conditions in any new system in response to, for example, our changing understanding of the flows that are required to meet environmental objectives or long-term changes in water availability. The proposals below set out how we propose a reformed system should achieve this.

The process for changing abstraction conditions will apply equally to all abstractors

Currently around a quarter of licences are time limited (usually for about 12 years) and around three-quarters are not. Abstractors need to re-apply for their licence when the time limit expires and the Environment Agency or Natural Resources Wales can make changes at this point if the licence is damaging the environment; there is no continued justification of need; or if water is not being used efficiently. Non-time limited licences can be changed, but the process for doing so is more expensive and less efficient to administer. This disparity is a result of changes in abstraction licensing over time from the initial licences issued in the 1960s to the introduction of time limits in the Water Act 2003.

We propose that in a reformed system all abstraction permissions should have equal status in this regard, no matter when they were issued. This will ensure that, when the Environment Agency or Natural Resources Wales needs to change the overall amount of water taken from the environment, the impact of this change is not borne by a relatively small group of time limited abstractors but shared by all relevant abstractors. This will generally allow small changes to be made to abstraction conditions that have a modest impact on individuals but achieve significant benefits for the environment.

[18] Aside from water companies. Subject to the passage of the Water Bill currently before Parliament, Water Companies will no longer pay EIUC. Instead, their schemes to restore sustainable abstraction will be included in their business plans and funded through Ofwat's Price Review.

Abstraction conditions can be reviewed and changed in response to risk assessments based on publicly available indicators of environmental risk

Abstractors have told us that they do not like time limited licences because they can be a barrier to long-term investment[19]. On the other hand some abstractors feel that, for the duration of the time limit, it does at least provide short term security. Abstractors are clear that they require notice of change so that they have time to understand how it will affect them and are able to adapt.

The approach for changing abstraction conditions will have to strike a careful balance between providing regulatory certainty for abstractors and ensuring the right level of environmental protection. To achieve this balance, abstraction conditions should be reviewable when there is evidence of unacceptable environmental risk being caused by abstraction or risks are less than previously judged. The approach to assessment of environmental risk due to patterns of abstraction and discharge would be set out, including 'review thresholds', in publicly available catchment abstraction rule documents. The Environment Agency or Natural Resources Wales would publish and report regularly against 'review thresholds'. This process would be conducted in conjunction with stakeholders, in particular with any catchments partnerships.

Because risk assessments would be made regularly, abstractors and prospective abstractors would be able to assess and manage the likely risk of changes to abstraction permissions in a catchment.

Changes to abstraction conditions in response to environmental risk will require notice

If reviews were to be triggered and changes to abstraction permissions then required, the Environment Agency or Natural Resources Wales would give abstractors notice. The length of notice period needs to be balanced between providing abstractors adequate time to plan for the change, and minimising the amount of time that the environment is at risk of being damaged by that abstraction.

As well as balancing the need for environmental protection and business continuity the notice period should fit with the River Basin Management Planning cycle. There are several ways we could do this. One option could be to monitor environmental conditions for a six year period. If a review is triggered, a six year notice period could be given of required changes. Voluntary changes or changes in response to serious damage could be made at any time.

This approach would produce regular and well sign-posted opportunities for review that would apply to all abstractors in a catchment ensuring that if changes are needed they can be applied as widely as possible to minimise the impact on any one abstractor and provide time for adjustment. Meanwhile those in catchments where risks of review thresholds

[19] Environment Agency Consultation: Approach to time limiting, 2002

being triggered have been assessed as low, would have a clear indication that their abstraction permissions would not be subject to change.

Where there is serious damage to the environment no notice will be required to make changes

The Environment Agency or Natural Resources Wales would be able to intervene by making changes to individual abstraction limits at any time should an abstraction be causing serious damage to the environment, as is currently the case. This is necessary to ensure that, where an abstraction is causing serious damage, the Environment Agency or Natural Resources Wales are able to react quickly to avoid non-compliance with Water Framework Directive requirements. The Environment Agency and Natural Resources Wales will need to make it clear what serious damage entails in catchment review thresholds.

Compensation will not be payable for abstraction permission changes and EIUC will be phased out

Because the proposals for reform will better link abstraction to water availability than the current system, the risk of changes being needed will be lower than without reform. Currently the Environment Agency or Natural Resources Wales can change licences that do not have a time limit by a voluntary agreement with the abstractor or on a compulsory basis. Where a voluntary agreement cannot be reached, the Environment Agency or Natural Resources Wales enforces a change following legislation set out in Section 52 of the Water Resources Act 1991. Abstractors can object to the proposed licence change and may be eligible to claim compensation for any loss it will cause to their business.

Compensation is currently paid for by all abstractors through contributions to the Environmental Improvement Unit Charge (EIUC)[20]. Collection of these funds slows down the process of changing licences, exacerbating environmental risk and drawing out the period of uncertainty for business. Without reform, the requirement for compensation is likely to grow, bringing increased costs to abstractors. In addition, if individual abstractors receive compensation there is little incentive for them to take measures to address the impact of reduced water availability, such as water efficiency measures or developing water storage facilities.

To simplify and speed up the process we propose that compensation should no longer be payable for changes to abstraction permissions. Because compensation would not be required, abstractors would no longer have to pay EIUC within the new system. This would result in a cost saving for many abstractors. It would mean that abstractors would instead have to deal with the impact of any future changes to abstraction permissions on their business themselves, but this should happen less frequently than under the current system.

[20] Subject to the passage of the Water Bill currently before Parliament, Water Companies will no longer pay EIUC. Instead, their schemes to restore sustainable abstraction will be included in their business plans and funded through Ofwat's Price Review.

Summary

Under reform there would be no time limits on abstraction permissions. Instead abstraction permissions in catchments would be subject to review when publicly available review conditions are triggered. Under these circumstances, changes would be made without compensation being payable but with significant notice providing a level of certainty to abstractors. However if risks of serious damage are identified, changes could be made immediately.

Questions

12) **Do you support our proposals for a more consistent approach to making changes to abstraction conditions? If not how would you improve the proposals?**

13) **What notice periods do you think would best balance the needs of abstractors and the environment?**

14) **Do you support the proposal to remove the payment of compensation for changes to abstraction conditions and to phase out the collection of the Environmental Improvement Unit Charge through abstraction charges?**

5. Moving to a new system

The 2011 Water White Paper, "Water for Life", recognised the *'importance to abstractors of both continued access to water supplies and transparent understanding of their reliability'* and set out principles for England that will be followed when moving to a reformed system. This included:

- Taking account of current licences and actual volumes used when defining the volume, price and reliability of water abstracted from the environment;
- Not using the move to a new system to change licensed volumes to address current unsustainable abstraction;
- Ensuring that a move to a new system would not create barriers to investment, with advice from the regulators to new investors on the risks for projects that are likely to involve substantial water use at low flows.

As stated in "Water for Life", the UK Government does not intend to fund compensation for any losses individual abstractors incur in the change to a new system. This would be administratively impractical and not legally justified as the change would be designed to better protect the environment in the future. We want to make sure we minimise disruption to abstractors or to water supplies at the same time as limiting the risk of future deterioration of the environment. We must also ensure that we avoid creating perverse incentives to abstractors to use water less efficiently.

If the Welsh Government takes the decision to move from the existing system to a reformed one, it is the general intention that principles in relation to this specific policy for Wales will be in the main aligned with UK Government policy in England. The Welsh Government will set out their policy approach about the future of the abstraction management system in Wales in its Water Strategy.

This chapter sets out how we would plan to move to a new system in line with these considerations.

5.1 How might a licence change to make it compatible with the new system?

The Environment Agency and Natural Resources Wales would establish all the changes required to move licences into the new system prior to reform. This would ensure that, upon implementation, there would be minimal disruption to abstractors and that the environment would be protected to required standards. These changes would not come into effect until the day reform is implemented; until then existing systems, rules and processes would continue to operate (although we intend these to be transferred into the Environmental Permitting Regulations in England prior to reform).

We would not use the move to a new system to tackle current unsustainable abstraction. We would strengthen our approach to using mechanisms in the current system to tackle this historic legacy in advance of, and alongside, reform. If licences were changed to

protect the environment before a new system is implemented, the revised licence would be converted to the new system. There may be some currently unsustainable abstractions that would have to be moved into the new system. These abstraction permissions would continue to be addressed in line with the current system.

Many conditions on current licences such as fish protection specifications and abstraction point locations would be transferred over directly into a new system. Other requirements would be more likely to change, such as the amount of water that can be abstracted during the year. Conditions which require abstraction to reduce or stop altogether as flows and water levels drop will be taken into account as licences are converted for use in the new system.

It is our assumption that the legislation needed for reform would establish an appeals mechanism to consider whether factual errors had been made in applying the chosen approach to convert licences for use in the new system.

Abstractors that have been brought under regulation as part of the Water Act 2003, or those with licences that have been issued, or renewed after we have an agreed approach to transition, would not have any further changes made to their licences, other than to make them compatible with the new system. This is because their licensed quantities at transition will have been recently considered in terms of their actual abstraction patterns so no further adjustments should be necessary.

The main element which would change in a new system is abstraction limits. How this would change is described in the following sections.

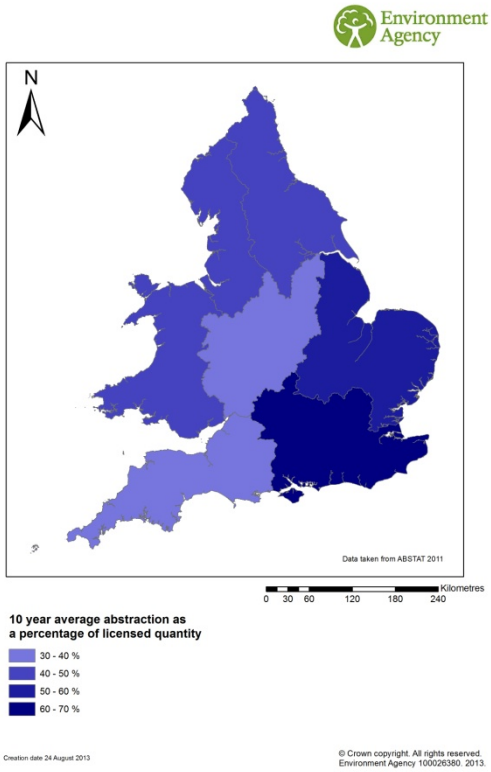
5.2 Limiting abstraction volumes to prevent deterioration of the environment and promote resilience

Option	Reform Proposal	Desired Outcome
Current System Plus and Water Shares	Reduce abstraction limits or shares considering previous use by removing access to some currently unused water	Reduce the risk of deterioration in future from abstractors activating, or trading large unused portions of historical licences

The maximum annual abstraction limit on an existing abstraction licence determines the maximum amount of water that can theoretically be abstracted during one year (subject to seasonal restrictions). Most abstractors have never abstracted their maximum annual abstraction volumes (Figure 4 and Box 7) and some have abstracted no water over recent years. The Environment Agency and Natural Resources Wales will continue to assess the

legitimacy of licences that have been unused[21] for an extended period and will continue to negotiate changes with abstractors who do not use all of the water they are permitted to take before reform. This will avoid water that is not required by abstractors being retained on licences as they move into a new system. It is likely, however, that unused volumes will remain on many licences at the time the new system is implemented.

Figure 4: Map showing the ten year average reported abstraction as a percentage of the ten year licensed quantity per Environment Agency Region and Wales.

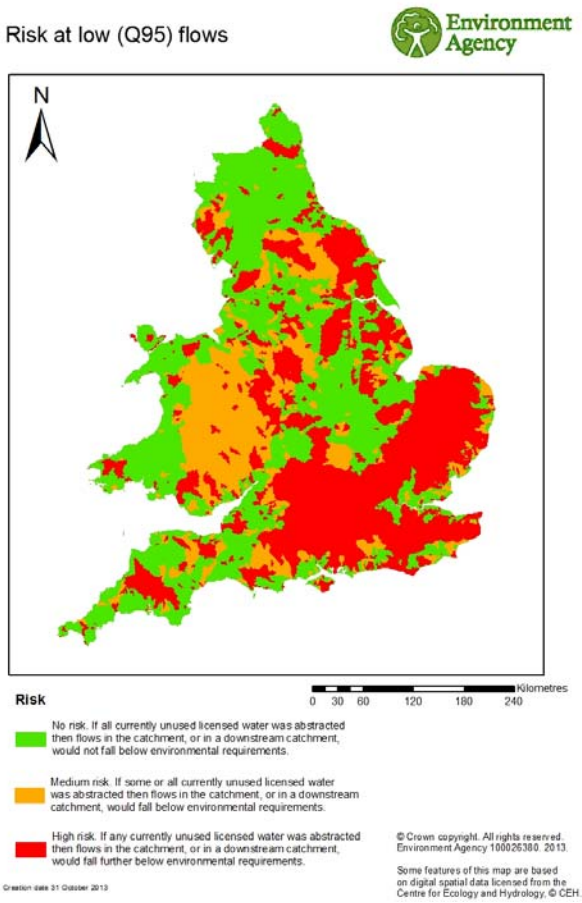


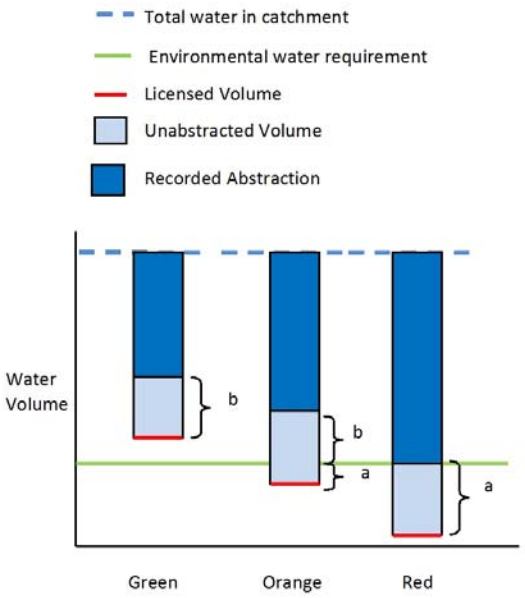
Box 7: Licensed Water Volume compared to Actual Abstracted Volumes

Environment Agency abstraction statistics show that, on average, between 2002 and 2011 only 45% of the annual total of water licensed for abstractions in England and Wales was actually abstracted, leaving 55% of licensed water unused. There was some significant variation between regions across England and Wales, with as little as 35% of the licensed volume being abstracted in the Midlands (Figure 4). There was also variation in actual use between sectors with public water supply companies in England and Wales abstracting 62% of their licensed volume. All other users abstracted, on average, just 36% of their maximum annual abstraction volumes.

We need to make sure we limit the risk of future deterioration of the environment. In some catchments (marked orange or red in Figure 5 below) there is currently a risk of deterioration if previously unused licensed water is used in future. This is because if some or all of the water licensed to be abstracted was actually taken, it would leave less water in rivers or groundwater than is needed to maintain current legally required environmental standards. However, in other catchments, there is currently plenty of water available, so there is no risk of environmental deterioration if currently unused water was taken in future (marked green in Figure 5).

[21] This means licences where no water has been abstracted.





Graphic representing the relationship between licensed volume, recorded abstraction and the amount of water required by the environment to maintain good status in a catchment for each of the three situations shown on the map.

Before moving to a new system we would seek to recover as close to the volume 'a' as reasonable in order to reduce the risk of deterioration form accessing currently unabstracted water.

Figure 5: Map showing catchments at risk of deterioration if unused water was actually abstracted at low flows (Q95[22]).

The Case for Change, as refreshed in 2013, predicted that, across most possible future behaviour and climate scenarios, increased demand for water and more variable flows in rivers would lead to a larger number of catchments where there will be insufficient water to meet the needs of abstractors and the environment.

There is an increased risk that more demand for water in the future, combined with less water being available overall could lead to less water remaining in rivers and groundwater and thus, deterioration of the environment. Realigning abstraction limits based upon actual abstraction lessens these risks by reducing the amount of unused water that can be accessed in a catchment. Clearly this is even more important given the flexible way in which the reformed systems enable water to be traded within a catchment.

The widespread existence of over-licensing also gives a false sense of security to abstractors and reduces investment in resilience. Abstractors are likely to see their unused licensed quantities as a source of future water security. However much of this so called 'paper water' could not be used without causing damage to the environment. In effect it would have to be removed from the licence at some point to protect the environment. By removing unused licensed quantities we would ensure that abstractors

[22] The flow of a river which is exceeded on average for 95% of the time. This would be typical of a low summer flow.

have a realistic view of the 'real' water that is available and can effectively plan to ensure their water security. This should ensure that adequate investment occurs to ensure resilience.

5.3 Methods of determining quantities of water to be transitioned

We have explained that some water is licensed but unused, and that, in some situations, if unused water was actually taken it could cause deterioration of the environment. We recognise that a solution to protecting the environment from deterioration by simply removing all unused quantities from licences could have far reaching consequences. In particular, there are many reasons why an abstractor may not take all of their licensed quantity each year, but they may need to get access to that water at some point to run their business. Some examples are provided below:

- Where power generation abstractions are mainly used for cooling purposes, the amount of cooling needed, and hence the amount of water abstracted is dependent on the demand from the National Grid and the viability of a particular power station to meet that demand. This demand fluctuates through the year, and could be much lighter in some years.

- Agricultural abstractors' water use is closely linked to the weather at critical times of the year; they may also have aggregated licences which allow their annual volume to be abstracted from various locations around a farm.

- Hydropower schemes are frequently licensed to take very large volumes of water when it is available, but due to fluctuations in river flow they frequently abstract less than the maximum permitted volume.

There are, however, other situations where licences include large quantities of unused water which would never be needed for routine activities. In some cases these licences were granted many decades ago. Such older licences, for instance, may have been based upon the needs of old technology and processes. Newer equipment and more efficient practices may have reduced many abstractors' use to below that which was originally licensed. The nature of businesses may also have substantially changed without these changes being reflected in licences.

We have considered a range of approaches for reducing the risk of environmental deterioration from unused licence volumes being used in future, and how to balance the needs of the environment with abstractors' needs for flexibility in supply (Table 1 below). All of the approaches seek to reduce overall permitted volumes from the current maximum licence limits to a volume that will protect against future deterioration and which will be closer to what has been used historically by abstractors (reflecting the flexible way in which abstractors have accessed water when running their businesses as discussed above).

The options can be described as using either a universal approach, applying to all abstractors, or a catchment specific approach. It is proposed that all options will base

assessments of past abstraction on a recent historical period (see Table 2 below) so there are no perverse incentives to use water inefficiently between now and implementation of reform. The precise quantity to be moved over into the new system could be calculated in a number of different ways, for example based on:

- average annual abstraction quantities;
- an average of a number of peak annual abstraction quantities or;
- a combination of annual average abstraction and annual licensed quantity.

More detail on these possible approaches can be found in Annex C.

We are not considering an approach that reflects a case by case assessment of individual abstractor's future possible needs but see section 5.4 on establishing a reserve for economic growth.

Table 1: Potential approaches for reducing risk of deterioration by removing unused volumes from licences.

	Possible approach	**Impact on abstractors**	**Impact on the environment**
1) Possible Universal Approaches	Remove some unused water from all licences in all catchments (green, orange and red areas in Figure 5) on the same basis.	Treats all abstractors the same and is relatively simple. Could free up additional water in some catchments for new abstraction. Depending on the method of calculation, abstractors with more variable annual abstractions could be negatively affected.	Will reduce much of the risk of deterioration May be over precautionary in some catchments where abstracting unused water has no impact or a limited impact today. May not reduce fully licensed abstraction enough in some catchments to ensure the environment will not deteriorate.
2) Possible risk based approaches, based on catchment specific conditions	2A) Remove some unused portions of licensed water from all abstractors in catchments that face a risk of deterioration if currently unused water were to be used in the future (orange and red areas only in Figure 5). Regulator would calculate the total quantity of unused licensed water to be removed in each catchment to eliminate risk of deterioration and allocate the volume reduction across abstractors on an agreed basis.	Allows less stringent transition rules for abstractors in lower risk catchments Depending on the method of allocation, abstractors with more variable annual abstractions could be negatively affected.	Will minimise risks of deterioration due to unused licensed volumes.

	Possible approach	Impact on abstractors	Impact on the environment
	2B) Remove some unused portions of licences from all abstractors in catchments that face a risk of deterioration only if trading has been facilitated and so the risk of unused water being used is increased. Regulator would calculate quantity to be removed to eliminate risk of deterioration in each catchment and spread the volume reduction across abstractors on an agreed basis.	Allows less stringent approach for abstractors in low risk catchments Depending on the method of calculation, abstractors with more variable annual abstractions could be negatively affected.	Will minimise risks of deterioration in catchments that could experience a high take up of abstraction trading.

When considering the potential approaches for reducing unused volumes, it is also important to consider the time period over which actual use is assessed. For example, if a decision is reached to limit licences to peak use, the length of the assessment period will affect which year or years determines peak use. Table 2 below describes some of the timescales that could be considered, each of which has inherent advantages and disadvantages. Whichever is chosen, it will be applied to historic use and will not be affected by any sudden post-consultation increases in water use.

Table 2: Possible assessment periods for considering previous use.

Examples of timescale	Advantage	Disadvantage
Last catchment planning cycle.	Latest data on abstraction is strongly considered.	May not include a dry period or other trigger for higher consumption. May disadvantage abstractors who have recently invested in efficient water use technology or processes, compared to those that have not.
A period which includes a drought for abstractors whose use is weather dependent.	Includes peak demand for some sectors, notably public water supply.	May disadvantage abstractors who have been unable to abstract during a drought due to flow constraints.
A period of up to 10 years.	Takes into account sufficient data to identify trends in use.	May not include a drought or period of water stress. May include older, less reliable data. If considering peak use, old or ineffective processes will skew the assessment.

5.4 Establishing a reserve of water

Option	Reform Proposal	Desired Outcome
Current System Plus and Water Shares	Create a reserve of water held by the regulator which could be allocated to new or expanding abstractors in a catchment.	Enable new or expanding abstractors access to water in catchments which otherwise would be fully licensed.

The previous section described how we could reduce the risk of future environmental deterioration and meet the requirements of the Water Framework Directive, by reducing licensed, but unused water. Although reform would facilitate markets in water so access could be more easily purchased, in many catchments it could still be difficult and expensive for either expanding or new abstractors to get access to new allocations of reliable water.

Many existing abstractors have asked us to take their personal circumstances into account during transition into a new system, including for example if they are planning substantial investments requiring access to significant amounts of water. Given the large number of licences currently in existence, making an assessment of individual licences on a case by case basis would be impossible within any reasonable time and cost limits. However, we would like to explore the possibility of developing a mechanism that would support future economic growth that is dependent on access to water.

In catchments where there is currently no available water, it would be possible to recover additional licensed quantities of water from existing abstractors above the level we would need to recover to avoid risks of environmental deterioration. In a similar way to reductions to avoid risks of environmental deterioration, these additional reductions would only apply to water that is currently unused.

This would create a reserve of water held by the regulator which could be allocated to new or expanding abstractors in a catchment. This could be based on detailed applications with evidence of specific new investments requiring access to a reliable supply of water from the environment. This process would help support economic development in catchments by making previously unused water available to growing businesses. Although eventually such a reserve would run out, there could still be considerable benefits from creating one at the time of reform.

This proposal needs further development in terms of considering such issues as the size of reserves required and processes for managing and allocating them. We are looking for initial responses prior to further development.

Summary of chapter 5

Adjusting abstraction limits to prevent environmental deterioration is not straight forward. We have considered a number of ways to meet our policy aims when moving to a new system, but none are without drawbacks. In light of this we have not identified a preferred option at this stage but we welcome views on the range of issues discussed in this section. In summary:

- Significant volumes of water are licensed but unused. If this water is used, for example, as a result of increased trading in a reformed system, this could cause environmental deterioration.
- We have suggested several options for addressing unused volumes to prevent risks of deterioration, including those that apply universally to all abstractors and those that could be tailored to catchments.
- We have also suggested several options for the time period over which unused volumes could be assessed.
- Some licences that will have been assessed immediately prior to transition / implementation as a result of other changes (e.g. removal of exemptions) will not include surplus water and therefore be exempt from this process.
- We are considering the creation of a reserve of water held by the regulator which could be allocated to new or expanding abstractors in a catchment.

Questions

15) Do you agree it is important to take measures when moving licences into the new system that would protect the environment from risks of deterioration?

16) Would you prefer us to consider the risks in each catchment when designing the rules for moving licences into a new system, or should we treat all abstractors in the same way regardless of water availability?

17) What would be the most effective method to calculate the new annual limits to be transferred into the new system (for example average annual, average peak or a combination of actual and licensed volumes)? And what assessment period should be used to calculate them?

18) Do you support the establishment of a water reserve to support economic growth?

6. Implementation

6.1 Timetable for implementation

Reforming the abstraction management system is a complex and challenging process. We have so far focused efforts on developing abstraction reform options and assessing their impacts, working very closely with regulators and stakeholders. Following consultation, the UK Government will agree a preferred approach for England and the Welsh Government will agree a preferred approach for Wales. Both Governments will then as appropriate refine proposals, followed by the legislative process and the development of the systems that need to be in place for reform to be a reality.

The UK Government has started to scope out a path to implementation (Figure 6) and anticipates that abstraction reform should be in progress by the early 2020s for England. However, a firm timetable cannot be set until decisions have been taken on the shape of the future system. The scale and complexity of the implementation challenge is fully recognised by both the UK and Welsh Government. The Welsh Government will set out its aspirations for timescales for any changes to the abstraction management system in Wales in its Water Strategy. In addition, the requirement for primary legislation, which is subject to space in the legislative programme, makes it difficult to be any more specific about the timetable for implementation.

The time taken to deliver reform will depend on a range of other factors, such as requirements for new systems, for piloting systems and for providing reasonable notice to abstractors.

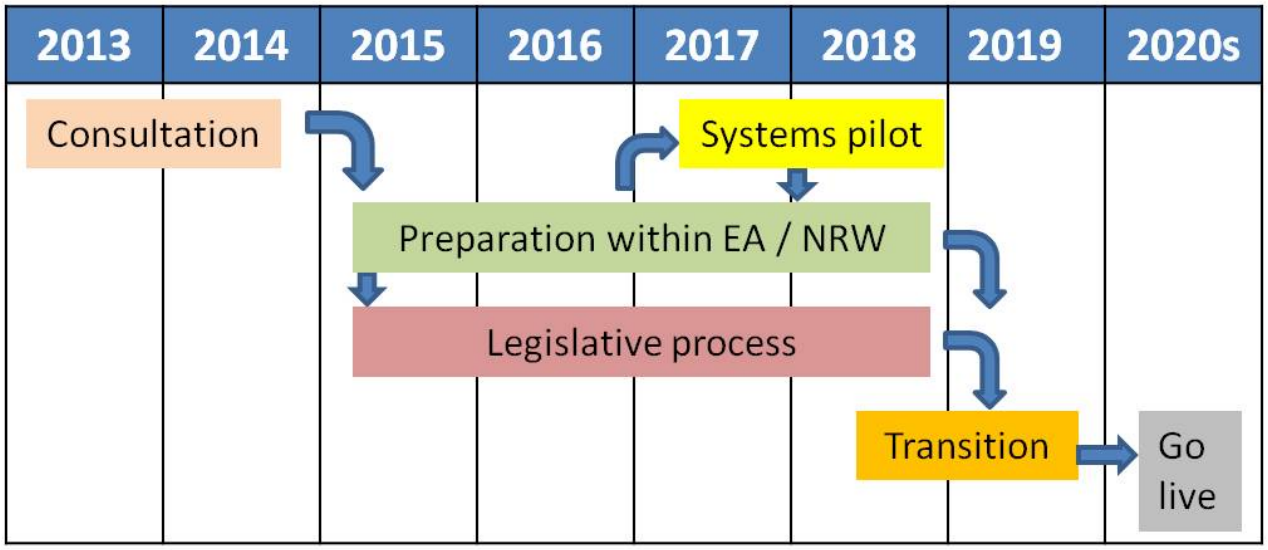
Under the current system there are a number of abstractions that are having an impact on the environment or could potentially damage the environment. The Environment Agency and Natural Resources Wales have identified these abstractions as part of the Restoring Sustainable Abstraction (RSA) Programme and are working with water companies, as part of the National Environment Programme, and with other abstractors to review as many of these abstractions as possible, prior to implementation of any broader reform to the abstraction management system. We recognise that there are likely to remain abstractions that are a risk to the environment at the point of reform. These would continue to be handled under comparable processes to the current system ie individually investigated and in some circumstances with compensation being provided to cover any losses due to changes made to conditions on the abstraction permission. We would need to consider continuing to raise the Environmental Improvement Unit Charge to fund this compensation.

As part of the UK Government's wider work on reforming the water sector, to encourage innovation and increase efficiency, and increasing competition as a way of delivering better outcomes for customers and for the environment, a number of "upstream" reforms for England have been set out in the Water Bill currently before Parliament (see section 2.3).

The UK Government has committed to ensuring that the implementation of upstream and abstraction reforms in England are carefully co-ordinated, with the timetable for expansion of upstream water resource markets and transition to a new abstraction system likely to be broadly similar. This will enable abstractors to take decisions about managing their water use with good information about how future management will operate and the role markets might play in enabling them to meet their water needs. Because the Welsh Government has taken the decision not to implement upstream reform for Wales at this time, this implementation issue does not apply in Wales.

Any changes to the abstraction licensing system in Wales will be co-ordinated with Welsh Government policy commitments relating to integrated and sustainable management of water as a natural resource across Wales.

Figure 6: Pathway to implementation



6.2 Proportionate and evolutionary implementation

As discussed in chapter 3, only some catchments across England and Wales would benefit from all of the proposed reforms immediately, known as enhanced catchments; others are likely to benefit from the full range of reforms in the future as pressures on available water increase. In the meantime, it would be unnecessarily costly and bureaucratic for both abstractors and regulators to introduce all of the reforms at once in catchments where there would be no benefits (known as basic catchments).

This means that some of the benefits of reform would only be seen in enhanced catchments. It also means that some elements of administrative systems such as rules for pre-approval of trading would only be required in enhanced catchments, reducing regulatory costs overall. Basic catchments would still have a new regulatory system with reform, but not all of the more advanced tools to regulate abstraction would be used. If catchment conditions change in future, the advanced tools could be introduced as necessary, switching the catchment from “basic” to “enhanced”.

For more detail, please see section 3.1.

We set out in chapter 4 which of the reform proposals would apply to basic and enhanced catchments.

6.3 Lead-in times for notifying changes to abstractors

We want to make sure that abstractors have adequate time to prepare for any changes that reform may bring. Whilst notice of the direction of change will be signalled as the legislative process is developed, individual abstractors will also need reasonable notice on the detail of how moving to a new system will impact them.

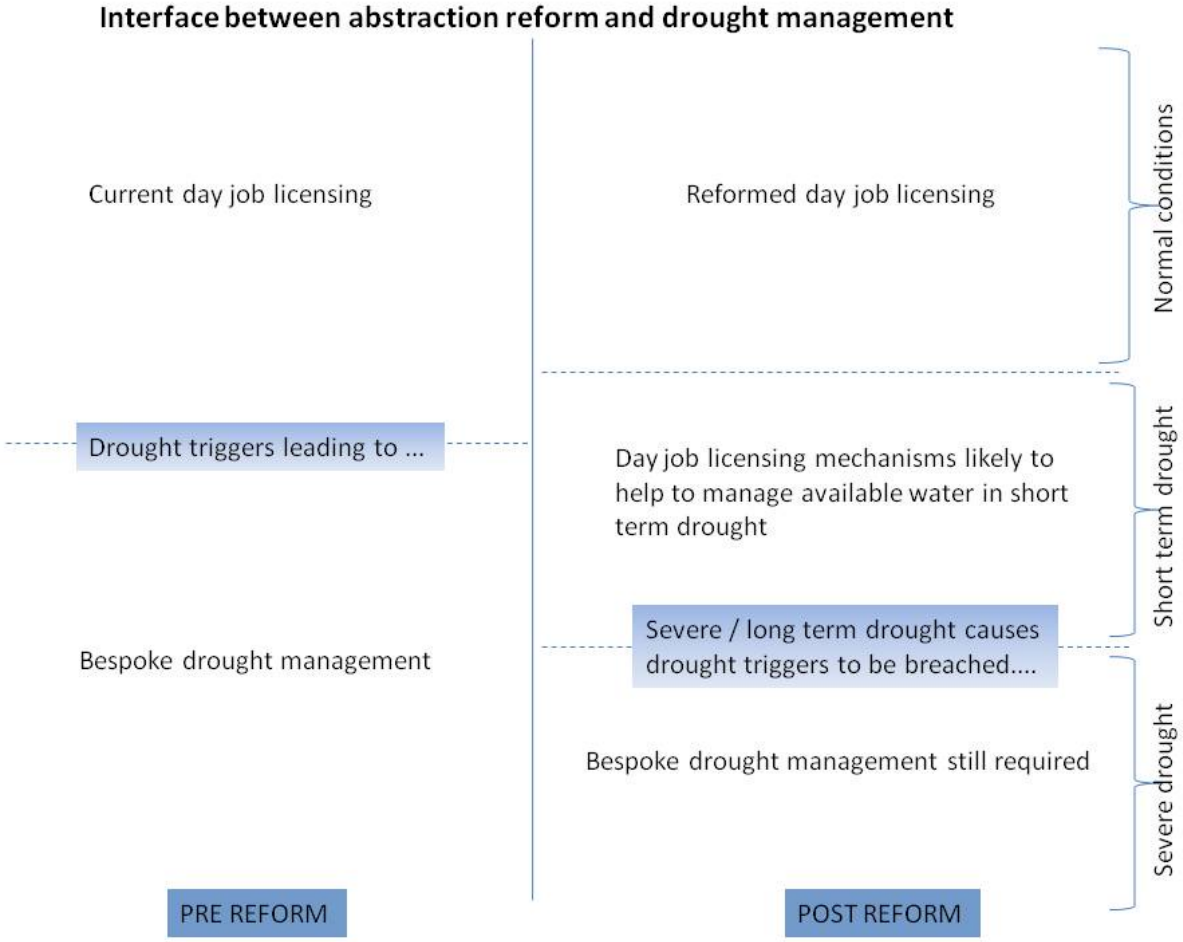
6.4 Operating a new abstraction system during a drought

As part of the current abstraction licensing system the Environment Agency and Natural Resources Wales employ a range of regulatory tools used to allocate water to abstractors during a normal (non-drought) situation. It is these tools that we are exploring in this consultation. However, during a drought, the Environment Agency, Natural Resources Wales and abstractors make decisions on whether additional action is needed. The additional regulatory tools available to help manage abstraction during a drought include temporary water use restrictions, drought orders and drought permits, emergency drought orders and spray irrigation restrictions.

Many of the reforms proposed in this consultation are designed to better link the volume of water that can be abstracted at any given time with the volume of water available at that time. This could mean that for short-term and less severe droughts, the Environment Agency and Natural Resources Wales are able to allocate enough water to abstractors and protect the environment without the need for additional drought tools. However, the UK Government is proposing to implement a basic system in all catchments and only introduce the enhanced reform proposals in the catchments that need them. This will impact how effectively different catchments are able to manage drought through normal abstraction management tools.

Depending on the effectiveness of the reform proposals in allocating water in normal and drought conditions, the requirement for additional drought management tools could occur less frequently than in the current system (Figure 7). However, in prolonged or severe droughts it is likely that additional bespoke measures to manage “emergency” allocation of water would still be required.

Figure 7: Illustration of the boundary between day to day water management and drought management before reform and how it might change after reform



We intend to carry out further work to explore how current drought management mechanisms would work alongside the proposals. If required, an additional consultation will be carried out to consider changes to drought management regulations.

7. Summary of consultation questions

1) What are your views on the proposal to convert seasonal licences into abstraction permissions based on water availability?

2) What do you think about the different proposed approaches to linking abstraction to water availability for surface water and groundwater abstractions?

3) Would it be helpful if abstraction conditions required abstractors to gradually reduce their abstraction at low flows before stopping, rather than being just on or off?

4) Do you think the proposal to protect the environment using a regulatory minimum level at very low flows is reasonable? If not, how do you think we should protect the environment at very low flows?

5) What do you think of the proposal to require abstractors who discharge water close to where they take it from to continue to discharge a proportion in line with their current pattern?

6) How best do you think water company discharges should be regulated to provide reliable water for downstream abstraction without impacting on water quality objectives or constraining flexibility in water management?

7) If you are an abstractor, how would these charging proposals affect your business?

8) To what extent would a system that charges abstractors partly on permitted volumes and partly on actual usage (ie a two part tariff) encourage abstractors to use less water?

9) Would quicker and easier water trading benefit abstractors now? How beneficial do you think it would be to abstractors in the future?

10) To what extent do you see additional benefits in the wider range of trades that can happen under the Water Shares option, compared to the Current System Plus option?

11) Do you agree that participation in abstraction trading should initially be limited to those with a direct interest in abstracting water?

12) Do you support our proposals for a more consistent approach to making changes to abstraction conditions? If not how would you improve the proposals?

13) What notice periods do you think would best balance the needs of abstractors and the environment?

14) Do you support the proposal to remove the payment of compensation for changes to abstraction conditions and to phase out the collection of the Environmental Improvement Unit Charge through abstraction charges?

15) Do you agree it is important to take measures when moving licences into the new system that would protect the environment from risks of deterioration?

16) Would you prefer us to consider the risks in each catchment when designing the rules for moving licences into a new system, or should we treat all abstractors in the same way regardless of water availability?

17) What would be the most effective method to calculate the new annual limits to be transferred into the new system (for example average annual, average peak or a combination of actual and licensed volumes)? And what assessment period should be used to calculate them?

18) Do you support the establishment of a water reserve to support economic growth?

8. Glossary

Abstraction	Removal of water from a surface or groundwater source.
Abstraction conditions	Conditions attached to an abstraction permit which can stop or reduce abstraction, for example a low flow (a Hands-off Flow), a seasonal restriction or an end date.
Abstraction licence	The authorisation granted by the Environment Agency / Natural Resources Wales to allow the removal of water from a surface or groundwater source. Licences are currently needed where more than 20 cubic metres (approximately 4,400 gallons) a day is removed. There are different types of licences, for example 'seasonal' licences.
Abstraction Management System	The management system that governs the removal of water from surface and groundwater sources.
Abstraction Permission	Under abstraction reform proposals, abstraction permissions, such as allocations and local conditions, will replace an abstraction licence. Abstraction permissions will be issued by the Environment Agency or Natural Resources Wales.
Abstraction point locations	The geographical location from where water is abstracted.
Abstractor	An individual / organisation that removes water from a surface or groundwater source, for example a farmer or energy company.
Aggregated licences	Where two or more licences are linked together to limit the abstraction carried out, also known as linked licences.
Allocation	(Water Shares option) A volume of water allocated to an abstractor for a fixed time period, for example, 2 weeks.
Allocation period	(Water Shares option) The period of time that an allocation covers.
Aquifer	A geological formation that can store and transmit groundwater in significant quantities.
Catchment	The geographical area from which rainwater and groundwater will collect and contribute to the flow of a specific river. **Basic / Enhanced catchments** – Under abstraction reform options, catchments would be classified as either basic or enhanced depending on the water scarcity and competing

	demands on each catchment.
Catchment abstraction rules	(Current System Plus) - Published rules about abstraction in a particular catchment, which would set out information about standard abstraction tools such as flow thresholds; the trading rules; and abstraction permission review conditions.
Catchment Abstraction Management Strategies (CAMS)	A document produced at a catchment level in England and Wales by the Environment Agency and Natural Resources Wales to provide a consistent and structured approach to local water resources management, recognising the reasonable needs of abstractors and the needs of the environment.
CAMS Assessment Point	A point at which the flow from the upstream catchment is assessed. CAMS = Catchment Abstraction Management Strategies
Consumptive abstraction	Abstraction where a significant proportion of abstracted water is used and is not available for return to the water source after use. For example, water used for spray irrigation is all used during the irrigation process.
Current System Plus	Abstraction reform option that aims to adapt existing management tools by using catchment flow trigger thresholds to improve access to available water.
Dewatering	The removal or draining of groundwater or surface water, for example from a construction site or quarry.
Diffuse sources (of pollution)	Pollution resulting from scattering or dispersed sources that are collectively significant but to which effects are difficult to attribute individually.
Discharge	The return of abstracted water to a surface or groundwater source after being used. Also referred to as returned water.
Downstream abstractor	An abstractor lower down in a catchment.
Drought controls	There are a number of legal mechanisms that allow more flexibility in managing water resources when there is an exceptional shortage of rain. For example, water companies can apply to the Environment Agency for a drought permit that may allow them to take water from specified sources or to modify or suspend conditions contained in their abstraction licences. A drought order is another mechanism.
Environmental Flow	An indicator of water flow levels which allow the monitoring and the prevention of environmental deterioration of rivers,

Indicators (EFIs)	and set in line with UK standards from UK Technical Advisory Group.
Environmental Improvement Unit Charge (EIUC)	A charge payable by abstractors which is used in some cases to cover the costs of compensating abstractors where their abstraction licences are compulsorily varied or revoked to reduce the risk of environmental damage caused by abstracting too much water.
Environmental Permitting Regulations (EPR)	The single environmental permitting regime created under the Pollution Prevention and Control Act 1999. Government intention is to add abstraction licences to the Environmental Permitting regime through the 2013/14 Water Bill.
Exemptions	The abstractions that can currently be made without an abstraction licence being needed.
Fixed volumetric limits	Hourly, daily and annual volumes of water that an abstraction licence must not exceed.
Flow Constraint	A condition on a licence that restricts abstraction when river flows below a specified level. For example, a Hands-off Flow condition.
Groundwater	Water that is contained in underground rocks i.e. an aquifer.
Groundwater blocks	Management units for groundwater abstraction
Groundwater recharge	The hydrological process where water moves downward from surface water to groundwater.
Hands-off Flows (HoFs)	A condition attached to an abstraction licence which states that if flow (in the river) falls below the level specified on the licence, the abstractor will be required to reduce or stop the abstraction.
Hands Off Level (HOL)	A river flow or borehole (groundwater) level below which an abstractor is required to reduce or stop abstraction.
Hydrological and abstractor behavioural model	A mathematical way to investigate how the Current System Plus and Water Shares options might perform in specific catchments taking account of the possible future properties and distribution of water in the soil and underlying rocks, and of abstractors' possible future behaviour in different scenarios.
Hydrological connectivity	The hydrological or hydro geological link between the location of the seller's abstraction and the buyer's proposed abstraction. Hydrology – study of the distribution, movement and quality

	of surface water. Hydrogeology – study of distribution and movement of groundwater in soil and rocks.
Hydropower	The production of electricity by the force of fast moving water, usually using turbines, water wheels, etc.
Impact assessment	It is both: • a continuous process to help the policy-maker fully think through and understand the consequences of possible and actual Government interventions in the public, private and third sectors; and • a tool to enable the Government to weigh and present the relevant evidence on the positive and negative effects of such interventions, including by reviewing the impact of policies after they have been implemented.
Licensed volumes	The amount of water an abstraction licence allows an abstractor to abstract i.e. from a river or aquifer.
Management Unit	(Current System Plus and Water Shares options) – Areas of catchments within which abstractions are managed in a consistent manner. Each Management Unit has an Assessment Point used as a river flow reference for abstraction management.
Ofwat	The economic regulator of the water and sewerage sectors in England and Wales.
Point sources	Pollution arising from an identifiable and localised area, structure or facility, such as a discharge pipe or landfill.
Pre-approved trading	(Current System Plus and Water Shares options) - The Environment Agency / Natural Resources Wales would develop rules setting out the types and volumes of trades that abstractors could make without individual approval for the trade.
Permanent Licences	An abstraction licence that does not have an end / expiry date.
Restoring Sustainable Abstraction (RSA) Programme	The Environment Agency / Natural Resources Wales is reviewing thousands of abstraction licences to find out whether water abstraction is causing environmental problems. Where they find licensed abstraction is a problem, they work with abstractors to find solutions. This is the Restoring Sustainable Abstraction programme.
Returned water	The return of abstracted water to a surface or groundwater source after being used. Also referred to as discharge.
Re-use scheme	A scheme where treated effluent is reused by an abstractor. In many cases a river is used as the conduit.

Review thresholds	Under abstraction reform proposals, this threshold would be a level indicating unacceptable risk to the environment being caused by abstraction.
River Basin Management Planning	A river basin is the area of land from which all surface run-off and spring water flows through a sequence of streams, lakes and rivers into the sea at a single river mouth, estuary or delta. It comprises one or more individual catchments. For each River Basin District, the Water Framework Directive requires a River Basin Management Plan to be published. These are plans that set out the environmental objectives for all the water bodies within the River Basin District and how they will be achieved. The plans will be based upon a detailed analysis of the pressures on the water bodies and an assessment of their impacts. The plans must be reviewed and updated every six years.
Regulation Minimum Level	(Current System Plus) –The water flow level at which all abstractions must cease. This will be a very low flow, for example, one that would only be triggered during extreme drought or water shortage.
Run off	The proportion of rainfall which runs off into rivers
Seasonal licences	Licences that restrict abstraction to certain times of the year.
Sediment	Natural material such as rock that is broken down by weathering and erosion and is subsequently transported in the water down a river.
Sewage sludge	Sewage sludge is a by-product of the waste water treatment process that can be used on a farm.
Short term water trades	Under abstraction reform options, a trade that takes place for a given length of time, with the permission to abstract reverting to the seller at the end of the trade.
Socio economic scenarios	A framework for exploring possible futures which take into account wider socio-economic and governance factors beyond our control. Future scenarios are used to identify risks and opportunities and help us manage the future more effectively.
Spray irrigation	Spray irrigation is a form of irrigation in which pressurised water is sprayed over plants to provide them with water. Irrigation is the process by which water is brought to dry land through artificial means such as pipes and hoses.
Surface water	This is a general term used to describe all water features such as rivers, streams, springs, ponds and lakes.

Surface Water Receptors	Surface water that may be adversely affected by contact with or by exposure to a contaminant.
The Environment Agency / Natural Resources Wales	The regulators that license water abstraction in England and Wales.
Thermal Power Generation	The process whereby water is heated, turns into steam and spins a steam turbine which drives an electrical generator to produce power.
Two part tariffs	A way of charging an abstractor for abstracting water which takes account of both the amount of water they are licensed to use and the actual amount of water they used.
Transition	The process of moving to a reformed abstraction management system.
Unit of water	A quantity of water which is not associated with imperial or metric units. Used for simple illustrative purposes.
Unsustainable abstraction	The removal of more water from the environment (i.e. rivers and aquifers) than it is able to cope with.
Unused water	Water that is authorised to be abstracted under a licence but which the abstractor does not abstract from the water source.
Upstream market	The market involving water and sewerage which does not directly involve the customer, i.e. those activities related to the abstraction or collection of water and sewerage, treatment and distribution.
Upstream reforms	Reform of services related to supplying water or treating water waste/ sewerage.
Upstream trades	Where the abstractor buying abstraction permissions is upstream from the abstractor selling the abstraction permissions.
Water body	Areas of either surface water or groundwater at which assessments are completed for action under the Water Framework Directive.
Water ecosystems	Communities of organisms that live in an area of water and are dependent on each other and on their environment.
Water Framework Directive (WFD)	European Union legislation – Water Framework Directive (2000/60/EC) – establishing a framework for improving the whole water environment.

Water reserve	Under abstraction reform proposals, a proportion of unused water would be unallocated to abstractors initially. Current and future abstractors could then apply for a portion of it to support future significant investments.
Water resource zones	The largest possible zone in which all resources, including external transfers, can be shared and hence the zones in which all customers experience the same risk of supply failure from a resource shortfall.
Water sector	Companies providing water services and sewerage services to customers in England and Wales.
Water Shares	Abstraction reform option that aims to adapt existing management tools by using Water Shares to define the available water resource held by abstractors.
Water storage reservoirs	A water storage system in which abstractors, such as farmers, could store water abstracted at times of greater water availability, i.e. in winter at high river flows, to use when water availability was more limited.

Annex A Consultation Impact Assessment

Annex B Progress report on “Water for Life” abstraction-related commitments

Annex C Additional detail on specific elements of reform