



UNITED UTILITIES WATER PLC  
**Water Resources Review**

April 2013 to March 2014



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*Cover image: our water efficiency stand drew the crowds at the Whitehaven Home and Garden Festival in summer 2014*

# About this report

This report provides an update on our water resource activities for 2013/14, as measured against our 2009 Water Resources Management Plan.

It includes an overview of regional supply and demand; a summary of recent achievements; a preview of future activity and an update on our drought plans (included here for the first time this year in response to stakeholder feedback).

If you have any questions about the content of this report, we'd be happy to answer them. Please send correspondence to: [water.resources@uuplc.co.uk](mailto:water.resources@uuplc.co.uk)

# Performance at a glance

## Going the extra mile in West Cumbria

There is an urgent need to ease pressure on local water resources in West Cumbria, especially Ennerdale Water, in order to protect the unique aquatic environment.

We set up a project team in the area to develop long-term solutions to the area's water needs, and launched an intensive programme of work to mitigate the impact in the meantime. Activity has included:

- A rigorous leakage reduction campaign, which saw us exceed targets a year early, slashing leakage by an additional 1.7 MI/d since last year. Thanks to these efforts, leakage per kilometre of main in West Cumbria is now 27% lower than in the rest of the region
- Reduced abstraction from Ennerdale Water by more than 4 MI/d (compared to 2012/13)
- An intensive water efficiency campaign, with a dedicated communications officer to drive it forward. We outperformed our annual water efficiency target four times over.



## Blue sky thinking

We've delivered forward thinking initiatives which have attracted praise from across the industry, including:

- Using aerial surveys to detect leaks on our aqueducts. This approach won a Water Industry Achievement Award for the most innovative use of existing technology
- A joint top ranking from the Blueprint for Water Coalition for environmental plans within our PR14 Business Plan.

## Looking ahead

We will continue to provide a reliable water supply to our customers, while safeguarding the environment in the years ahead by:

- 2014/15** Ceasing abstraction from Ben Gill, a tributary of the River Ehen below Ennerdale Water
- 2014/15** Implementing new, more sustainable abstraction licences at several sites across the region
- Ongoing** Continuing our water efficiency and leakage management activities throughout the region
- Ongoing** Further reducing abstraction from Ennerdale Water in West Cumbria
- 2015/16** Tapping into new groundwater supplies in West Cumbria
- 2022** Delivering a sustainable, long term solution to West Cumbria's supply needs

You can find out more about our long term plans in our revised draft **Water Resources Management Plan** and our revised draft **Drought Plan**, both available at [unitedutilities.com](http://unitedutilities.com). Just use the search function to find them.

## Maintaining security of supply

We achieved our Security of Supply Index target of 100 in 2013/14 - the maximum possible.

Most of our region has a healthy water surplus and the long-term supply forecast is a positive one. In West Cumbria, however, resources are more finely balanced, requiring a dedicated programme of short and long-term activity (see above right).

## Outperforming leakage targets

In 2013/14 we outperformed our leakage targets by 11.3 MI/d, building on our strong historic performance. Leakage is at its lowest ever level.

**11.3 MI/d ahead of leakage targets**

1MI (Megalitre) = 1,000,000 litres

## Delivering a far reaching water efficiency campaign

We took a wide ranging approach to encourage customers to save water across the North West, achieving impressive results:

- Installation of more than 43,000 water meters
- Estimated savings of 3 MI/d achieved across the region
- Water efficiency targets for 2014/15 achieved 12 months ahead of time.

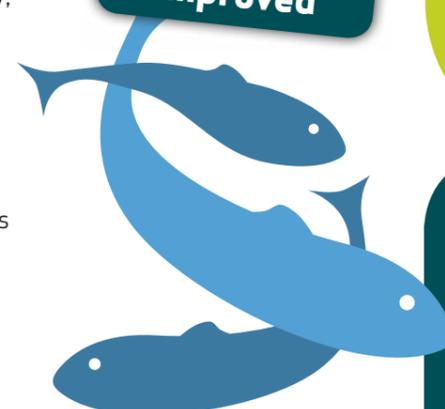


## Balancing environmental and customer needs

In 2013/14, we continued to keep our customers on tap while protecting and enhancing the environment by:

- Completing a major scheme on the River Brennard and River Whitendale to benefit salmon and trout populations, the result of ten years' work with local stakeholders and the Environment Agency. Lord Smith, chairman of the Environment Agency, has been a big advocate of the scheme
- Reducing abstraction from three environmentally sensitive sites: River Gelt, Aughtertree Springs and Ennerdale Water
- Installing new fish screens at our River Dee intakes to benefit aquatic life.

**32km of rivers improved**



## 2: Introduction



### 2.1 Purpose

In this annual review, we report on our water resource position for the 2013/14 reporting year. In compliance with the Water Industry Act 1991, the primary aim of this report is to provide an update to the 2009 Final Water Resources Management Plan by assessing actual events and performance against forecasts in our plan. It therefore meets the guidelines for the annual review set out by the Environment Agency<sup>1</sup>. It describes progress made on implementing the plan and provides commentary on the key issues, in accordance with the Environment Agency Water Resources Planning Guidelines. We are sending this Annual Review to the Secretary of State, to the Environment Agency and to Ofwat. We are also publishing it on our website.

For the first time, we have also expanded the coverage of the report to include an annual update of our Drought Plan as well as our future activities and plans that may influence water resources. We have made this change to consolidate and improve our communication following feedback from stakeholders over the past year.

<sup>1</sup> Annual review of water resources management plans guidance, June 2013, <https://www.gov.uk/government/publications/annual-review-of-water-resources-management-plans-guidance>

## 2.2 Background

The 2009 Final Water Resources Management Plan is available at [corporate.unitedutilities.com/waterresourcesplan](http://corporate.unitedutilities.com/waterresourcesplan)

The latest revised draft Water Resources Management Plan 2013 is available at [corporate.unitedutilities.com/Water-Resources-Management-Plan](http://corporate.unitedutilities.com/Water-Resources-Management-Plan)

We published our 2009 Final Water Resources Management Plan in September 2009. It presents a comprehensive statement of our water supply and demand forecasts along with our strategy to maintain supply reliability throughout the region. The plan also presents detailed information on our methodologies, policies, assumptions and key data. It covers a 25-year horizon to 2035. Section 3 covers progress this year against the plan and the main annual plan reporting requirements.

We are currently updating our next Water Resources Management Plan covering the period 2015-2040. We have reviewed customer requirements, changes in our supply system, taken into account future effects of climate change and set out our proposed plan for securing the future for water resources in the North West. Once the process is completed and the Secretary of State approves our plan, this will replace the 2009 Water Resources Management Plan. An overview of the future water resources position and our plans to meet these challenges are provided in Section 5.2.



## 2.3 Links to our other plans and activities

### 2.3.1 Our plans

Our Water Resources Management Plan is one of a number of plans that influence the provision of secure water resources for customers and the environment, and this report gives an update on:

- **Reducing abstraction from Ennerdale Water:** In accordance with the guidance<sup>2</sup>, our revised draft Water Resources Management Plan covers the period from 2015 to 2040 and details how we plan to tackle a future projected supply-deficit in the West Cumbria area driven by requirements under the EU Habitats Directive. However, we are implementing plans to give more immediate reductions in abstraction from Ennerdale Water, to further protect freshwater mussels in the river downstream. We have shared these short-term plans, which focus on 2013 to 2015, with the Environment Agency. Abstraction from Ennerdale Water has already reduced significantly. Our progress and future plans are therefore outlined in this document as a variance to the 2009 Water Resources Management Plan, which covers the 2010-2015 period.
- **Statutory Drought Plan:** Our Drought Plan outlines the actions we will pursue in the event of dry weather or drought. The plans are normally refreshed every 3½<sup>3</sup> years, unless there is material change of circumstance. They are 'operational' in that they outline how we will manage our existing systems in response to drought. New strategic interventions to reduce the impact of drought are covered in the Water Resources Management Plan. The two plans are, however, inherently linked.

<sup>2</sup> Water resources planning guideline, August 2013, section 2.4

<sup>3</sup> The Water Act 2014 gives the minister the power to amend this period.

We published a Final Drought Plan in June 2013. In discussion with Defra, we then identified a material change in circumstance relating to Ennerdale Water. We therefore consulted on changes to this plan, then published our Revised Draft Drought Plan and associated Statement of Response on 14 March 2014. We are currently awaiting direction from Defra to publish the final version. Our drought plan documents are available at [corporate.unitedutilities.com/waterresourcesplan](http://corporate.unitedutilities.com/waterresourcesplan). We briefly summarise our plans in this document within section 5.1.

- PR14 Business Plan:** Our Water Resources Management Plan links into our wider Business Plan submission to Ofwat every five years. In December 2013, we submitted our Business Plan covering the period 2015-2020. A publically available summary document is available at [corporate.unitedutilities.com/ourbusinessplan](http://corporate.unitedutilities.com/ourbusinessplan). Within this plan, we detail our future 'Outcomes' and 'Measures of Success', which we will use to track our performance. We have used this annual plan to introduce these where they relate to water resources as a way of summarising aspects of our activities. We are currently working to finalise our plans with Ofwat, and the 'Final Determination'<sup>4</sup> is expected to be in December 2014.

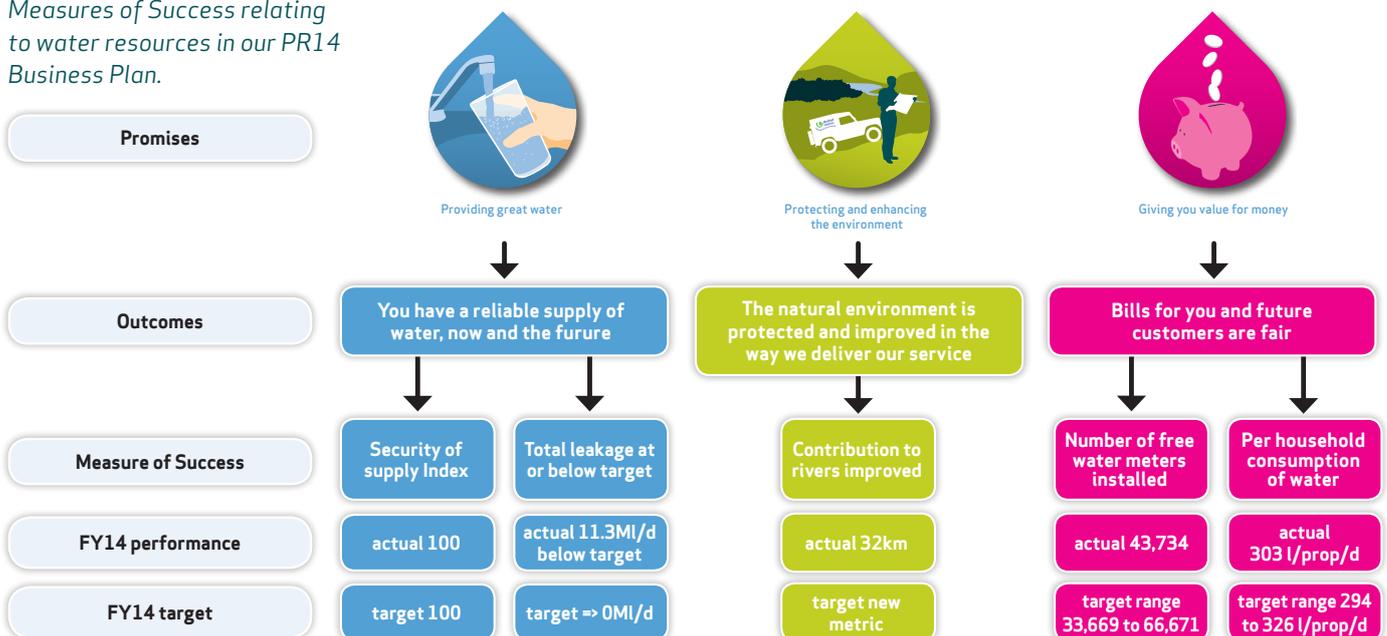


### 2.3.2 Introducing our Customer Promises, Outcomes and Measures of Success

When producing our PR14 Business Plan, we developed Customer Promises and Outcomes. Each Outcome is underpinned by Measures of Success that allow customers and stakeholders to judge our performance against key targets in future years.

Figure 1. We included a number of Promises, Outcomes and Measures of Success relating to water resources in our PR14 Business Plan.

The Measures of Success most closely related to our water resources activities are shown below:



<sup>4</sup> Setting price controls for 2015-20 – delivery plan [http://ofwat.gov.uk/pricereview/pr14/pr14publications/prs\\_web20140310pr14deliveryplan.pdf](http://ofwat.gov.uk/pricereview/pr14/pr14publications/prs_web20140310pr14deliveryplan.pdf)

### 2.3.3 Structure of the document

The table below shows the coverage of each section of this report:

Section	Coverage
Section 2	This contains the statutory annual review of our activities in 2013/14 against the 2009 Final Water Resources Management Plan. This section also includes an update on activities for 'drought preparedness'
Section 3	Provides a summary of the key water resources activities planned in 2014/15, in particular those relating to 2009 Final Water Resources Management Plan and environmental deliverables
Section 4	Gives an overview of the changes made to our revised draft Drought Plan 2014, which covers how we will manage a drought event in the future It also provides an overview of our 25-year supply-demand balance, the key challenges we face, and the solutions proposed within our revised draft Water Resources Management Plan 2014
Section 5	Concluding comments

# 3: Our water resources in 2013/14



## 3.1 Overview of 2013/14

We experienced two relatively distinct periods of weather in 2013/14; with hot, dry weather in summer 2013, but mild, wet weather in the autumn and winter. Overall, we have had a 'normal' year, and no drought powers were required.

We have made good progress with leakage control and demand management and maintained security of supply, despite significant challenges to reduce our abstraction at Ennerdale Water in West Cumbria to help protect the environment. In summary this year:

- We have maintained an extensive programme of leakage control actions and outperformed the Ofwat leakage target by 11.3 Ml/d for 2013/14. Total leakage across the region averaged 451.9 Ml/d, against a target level of 463.2 Ml/d.
- We have implemented a wide range of water efficiency measures and exceeded the water efficiency targets set by Ofwat to the extent we have now met our full five-year targets to 2015 a year early.
- We won a Water Industry Achievement Award for the "most innovative use of existing technology", using aerial surveys to detect leaks on rural large diameter pipes in West Cumbria.

- The Security of Supply Index has remained at 100 for both dry year and critical period assessments in all four of our Water Resource zones.
- We've maintained a positive supply-demand balance in West Cumbria, whilst providing significant additional flows to the River Ehen downstream of Ennerdale Water to protect the environment. We've also reduced abstraction from Ennerdale Water.
- In accordance with the 2009 plan, we have progressed with water supply-demand enhancements in West Cumbria, and environmental schemes to ensure sustainable abstraction throughout the region.
- We implemented licence changes on our Brennand and Whitendale sources a year earlier than forecast originally in our 2009 plan.

### 3.1.1 2013/14 compared to the dry year scenario

Even though the rainfall on our catchments in 2013/14 was above the long-term average, the first 6 months (April to September) were markedly different to the last 6 months (October to March). The first 6 months were mostly hot and dry, with rainfall below the long-term average and temperatures averaging just 0.8°C below those seen in 1995/96 (our reference 'dry year'). The last 6 months were mild and wet with rainfall and temperatures above the long-term average.

Table 1 below gives a comparison of temperature and rainfall against the long-term averages and 1995/96.

Distribution input is the average volume of water put into the water supply network. Regional distribution input during 2013/14 was lower than that predicted in the 2009 plan for a 'normal year' and a 'dry year' (see Table 2). This is due largely to overall customer demand being lower than forecast, and this decline continues the overall trend we have seen over the last twenty years.

	April to September	October to March	Full year (April to March)
<b>Regional rainfall (mm)</b>			
2013/14	572	1169	1,741
Long-term average	654	906	1,560
1995/96	320	571	891
<b>Average maximum daily temperatures (°C)</b>			
2013/14	18.2	10.6	14.4
Long-term average	16.0	8.5	12.3
1995/96	19.0	8.4	13.7

Table 1 Comparison of rainfall and temperatures in 2013/14 with long-term averages and 1995/96 values

	Regional Distribution Input 2013/14 (MI/d)
Actual	1,707
'Normal year' forecast in 2009 plan	1,776
'Dry year' forecast in 2009 plan	1,858

Table 2 Comparison of regional distribution input values

Figure 2 below shows the weekly regional distribution input for the last 3 years. As can be seen, average distribution input has been lower than the last 2 years; however, there are noticeable peaks during the hot, dry periods around June and July.

Environmental challenges mean that there is a focus on balancing water demand with available resources in West Cumbria and we have seen significant reductions in distribution input in this zone (Figure 3).

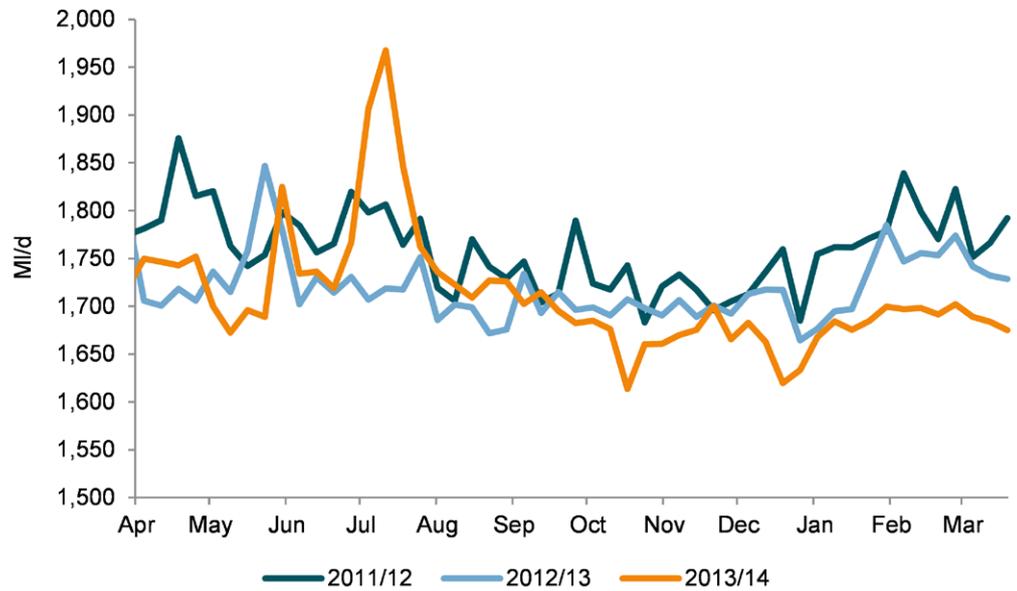


Figure 2 Weekly regional distribution input for the last 3 years

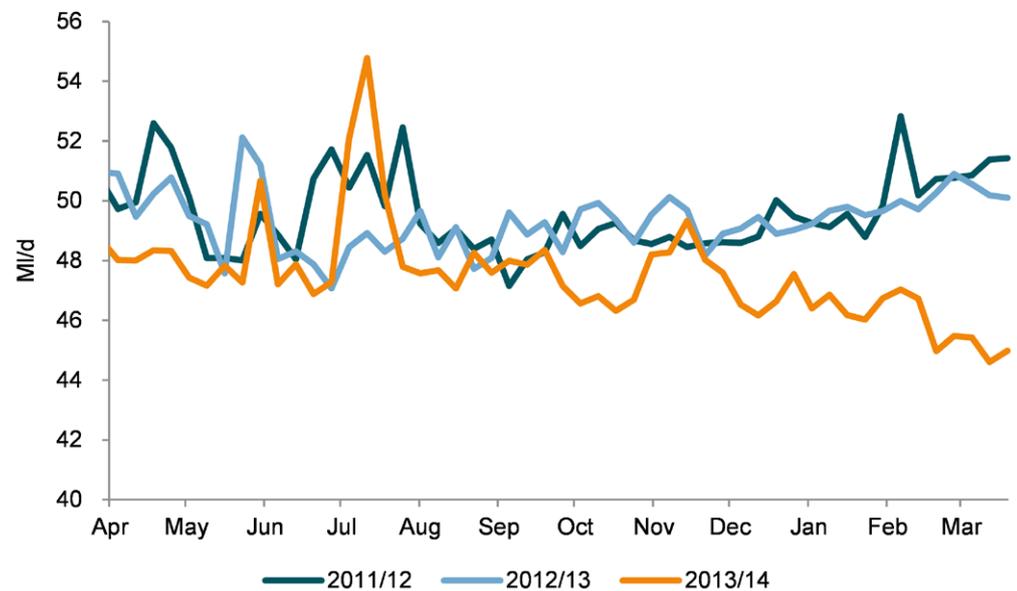


Figure 3 Weekly West Cumbria Resource Zone distribution input for the last 3 years

### 3.1.2 Water resource zones in 2013/14

A water resource zone is the largest area across which water resources can be balanced. We have four of them:

- Integrated Resource Zone
- Carlisle Resource Zone
- North Eden Resource Zone
- West Cumbria Resource Zone

There have been no changes in resource zones since 2004.

In developing our revised draft Water Resources Management Plan, we reviewed the resource zone boundaries and interconnectivity. This review concluded that our resource zone boundaries meet the requirements of the latest guidance<sup>5</sup>, so no changes to resource zone boundaries were required.

In our revised draft Water Resources Management Plan, our preferred option to tackle the forecast supply-demand deficit in the West Cumbria Resource Zone would result in interconnecting this zone with the larger Integrated Resource Zone. This would make the West Cumbria Resource Zone more resilient to extreme droughts. In our revised draft Water Resources Management Plan, we said that the most likely completion date for this scheme was 2024/25. We also said that if we are able to deliver earlier than these estimates, we will stop abstracting from Ennerdale Water before 2024/25. Further detail concerning our progress is set out in Section 5.2.2.

### 3.1.3 Outturn data for 2013/14

The majority of components of the water balance have performed close to expectations. There are some variances from the 2009 plan that do not materially impact our supply-demand balance:

- The number of metered households has been lower than forecast, particularly in the Cumbrian resource zones. Aside from being influenced by the rate of new developments, this is largely due to the different socio-economic profile and the historic low rateable values in those areas. This makes it less attractive for people to opt for a water meter. We are undertaking research to look at the different ways customers respond to the free meter option to further improve the targeting of our promotional activities.
- There are estimated to be 29,458 more people in the region than we forecast in 2009. This is because the 2009 plan was based on the Office of National Statistics 2006-based projections, which were the best available at that time. An official census was carried out in 2011, which now gives more up-to-date population estimates.
- Water consumption volumes by non-households are close to expected values in all resource zones, except for the West Cumbria Resource Zone, where non-household consumption is 4 MI/d lower than anticipated. This is consistent with the patterns seen from 2008/09 and is due to changes for 2013/14 in local economic activity resulting from the recession.
- Household consumption is over 120 MI/d lower than forecast in the 2009 plan. This is particularly the case in the Integrated Resource Zone and has been reflected in our revised draft Water Resources Management Plan.

Table 3 on page 13 presents key outturn data for each resource zone for 2013/14, including water production and consumption values, together with the values forecast for 2013/14 from the 2009 plan.

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<sup>5</sup> Water Resources Planning Guidelines (Environment Agency, 2013)

Note: numbers may not sum due to rounding.	Carlisle Resource Zone	Integrated Resource Zone	North Eden Resource Zone	West Cumbria Resource Zone	Region
<b>Key to table</b>	<b>2013/14 normal year actual data</b>				
	2013/14 dry year forecast from 2009 Final Water Resources Management Plan				
	<i>Difference</i>				
Water available for use (own water sources) (Ml/d)	<b>37</b>	<b>1,993</b>	<b>9</b>	<b>56</b>	<b>2,096</b>
	36	1,914	10	58	2,019
	1	79	(1)	(2)	77
Total population (000's)	<b>110</b>	<b>6,766</b>	<b>14</b>	<b>149</b>	<b>7,038</b>
	109	6,732	15	153	7,009
	0	34	(1)	(4)	29
Number of unmeasured households (000's)	<b>32</b>	<b>1,756</b>	<b>3</b>	<b>48</b>	<b>1,840</b>
	32	1,746	4	52	1,834
	(0)	10	(1)	(4)	6
Number of metered households (000's)	<b>15</b>	<b>998</b>	<b>2</b>	<b>15</b>	<b>1,030</b>
	20	1,000	3	19	1,042
	(5)	(2)	(1)	(4)	(12)
Per capita consumption unmeasured households (l/hd/d)	<b>142</b>	<b>140</b>	<b>155</b>	<b>156</b>	<b>141</b>
	157	153	149	154	153
	(15)	(13)	6	2	(13)
Per capita consumption metered households (l/hd/d)	<b>106</b>	<b>106</b>	<b>110</b>	<b>111</b>	<b>106</b>
	123	127	119	115	126
	(16)	(21)	(9)	(4)	(20)
Per capita consumption all households (l/hd/d)	<b>131</b>	<b>129</b>	<b>139</b>	<b>146</b>	<b>129</b>
	144	145	135	144	145
	(12)	(16)	4	2	(16)
Per household consumption all households (l/prop/d)	<b>305</b>	<b>302</b>	<b>323</b>	<b>329</b>	<b>303</b>
	281	347	260	300	345
	25	(45)	63	29	(42)
Water consumption by households (Ml/d)	<b>14</b>	<b>832</b>	<b>2</b>	<b>21</b>	<b>868</b>
	15	953	2	21	991
	(0)	(121)	(0)	(0)	(122)
Water consumption by non-households (Ml/d)	<b>7</b>	<b>343</b>	<b>1</b>	<b>10</b>	<b>361</b>
	8	346	2	14	369
	(1)	(4)	(0)	(4)	(8)
Miscellaneous water use (Ml/d)	<b>0</b>	<b>26</b>	<b>0</b>	<b>3</b>	<b>29</b>
	1	33	0	1	34
	(1)	(7)	0	2	(5)
Total leakage (Ml/d)	<b>5</b>	<b>431</b>	<b>2</b>	<b>14</b>	<b>452</b>
	5	442	2	15	463
	0	(11)	0	(1)	(11)
Distribution input (Ml/d)	<b>27</b>	<b>1,627</b>	<b>6</b>	<b>47</b>	<b>1,707</b>
	28	1,774	5	50	1,858
	(2)	(146)	0	(3)	(151)
Security of supply	<b>In balance</b>	<b>In balance</b>	<b>In balance</b>	<b>In balance</b>	<b>In balance</b>
	In balance	In balance	In balance	In balance	In balance
	No change	No change	No change	No change	No change

Table 3 Key outturn data for 2013/14 compared with dry year forecasts for 2013/14 in our 2009 Final Water Resources Management Plan

## 3.2 CHANGES IN THE DEMAND FOR WATER

The demand for water in our region has continued on a downward trend over the last twenty years. In this section, we review the demand for water and the factors that influence it.

### 3.2.1 Water efficiency initiatives during 2013/14

Water efficiency plays an important role in balancing supply and demand. We have continued with all our activities (described throughout this section), once again beating our annual targets and achieving our five-year target for 2014/15 a full year early. Our progress against the annual baseline target of 2.95 MI/d per year is shown in Figure 4.

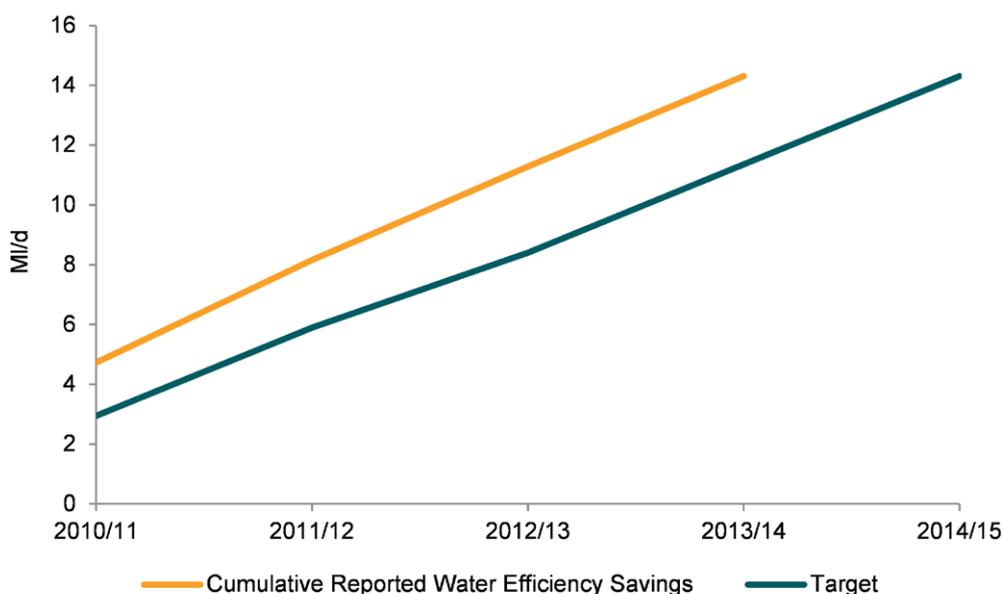


Figure 4 Cumulative water efficiency savings against the baseline regional target

### West Cumbria enhanced activity

Our 2009 Water Resources Management Plan identified an optimum programme of water supply and demand solutions for 2010 to 2015 to tackle the forecast supply-demand deficit in the West Cumbria Resource Zone. In 2013/14, we have enhanced our water efficiency promotion in West Cumbria and have achieved almost four times our annual target. Our cumulative saving is therefore significantly ahead of the target level, as shown in Figure 5 and this helps us to protect the sensitive environment at Ennerdale Water.

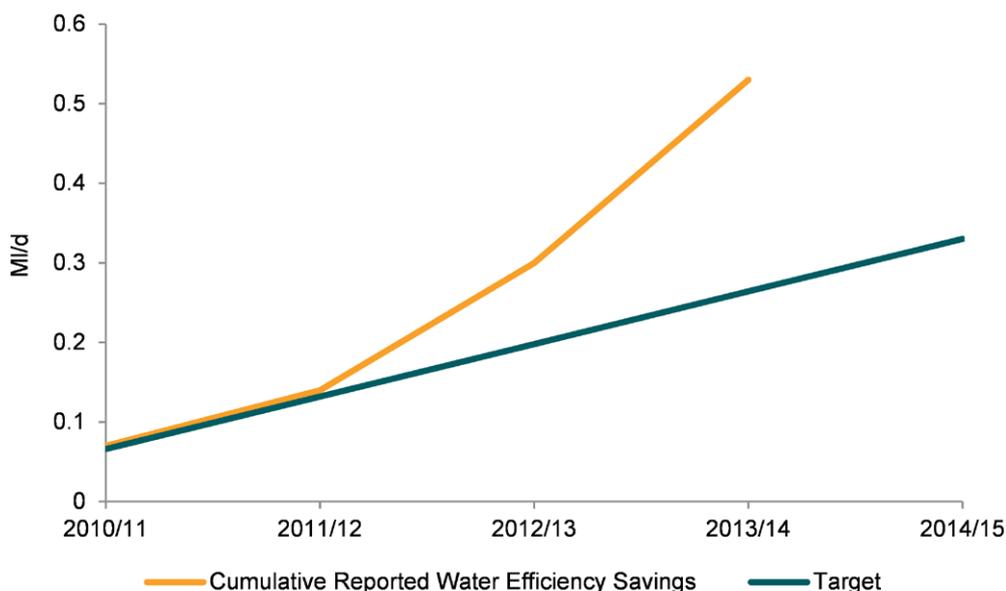


Figure 5 West Cumbria cumulative water efficiency savings

As part of these enhanced activities in West Cumbria, we held a series of give-away days at supermarkets in West Cumbria, giving away over 3,000 free water efficient showerheads, over 4000 save-a-flushes and over 6,500 handy information booklets.

Between April and August 2013, we ran a programme of give-aways using save-a-flush devices to help us understand the best way to target further promotions in future. This involved over 50 days at shopping centres, libraries, community centres and public events.

In January 2014, we appointed a specialist Communications Officer dedicated to water efficiency in West Cumbria. We have designed and launched our 'Let's get watertight' campaign in West Cumbria. Highlights of the campaign so far include:

- An advertising and sponsorship campaign on CFM, the leading commercial radio station in the area
- Use of bus adverts and billboard poster adverts
- Supermarket roadshows to give away water-saving showerheads
- A leaflet drop to all households in the area promoting 'free water savers' packs

### Education

Our education campaign continues to be popular and we have reached over 6,300 pupils in Key Stage 2 primary schools this year across the North West region. Through activities in and out of the classroom the children learn about the water cycle, water safety, thinking before you flush and using water wisely. As well as the expert teaching, each child takes away an exercise booklet highlighting the important messages, a set of water efficiency 'trump cards' and a 'toothy timer' to encourage them to turn off the tap when brushing their teeth.



Figure 6 Example ad from our "Water Tight" campaign



Figure 7 Example school material from our education programme

## Advertising

“Winter Wise”, our winter pipe protection roadshow and media campaign is undertaken annually, reaching thousands of customers. This year we continued to sponsor ITV weather in the Granada and Border television regions as this gives us an ideal way of communicating to a large numbers of customers on a daily basis.

The weather sponsorship allows us to deliver messages such as saving water, by turning the tap off when brushing your teeth, in a creative way. This is used to support the many campaigns we run to raise customer awareness, educate and change behaviour.

We have developed and produced a water efficient showerhead display unit, which allows customers to actually see and feel the difference between a regular and an efficient showerhead. We used this display during the showerhead giveaway events at supermarkets in West Cumbria (pictured below).



Figure 8 We've developed an efficient showerhead display unit and used this at our supermarket events in West Cumbria

## Regional water efficiency programme

During 2013/14, we have demonstrated our commitment to promoting water conservation by the following activities:

- Continuing to leave a pack called “A simple guide to your water meter” (including water saving information) with household customers after a meter is installed.
- Holding water efficiency events with business customers and providing their staff with water butts, shower regulators and save-a-flush devices for their homes. Events have taken place at a variety of premises including hospitals and universities.
- We have continued to maintain partnerships with external organisations to promote water conservation and to deliver water efficiency information. Examples of these partnerships include Groundwork Trust who target small to medium sized business customers, local councils, housing authorities, the Lake District National Park and the Environment Agency.
- We continue to distribute Hotel Wise cards to hotels and guesthouses around the region. The Hotel Wise cards are aimed at encouraging hotel guests to think about their water usage whilst on holiday and once they return home. Hotels around the region are able to request as many cards as they require. We also distribute copies of our business audit for commercial premises both through our website and at appropriate events.

- We have partnered with housing associations to promote water saving packs to their tenants. A free water and energy efficiency audit is offered and the appropriate water saving devices are then discussed and offered to the customer.
- We have also developed a number of partnerships to help reach customers that we may have little interaction with, other than to send them an annual bill. These partners included the Citizens Advice Bureau, Friends of the Lake District, Energy Saving Trust, Faiths 4 Change and Bolton At Home.

Our online Water Usage Calculator, which allows customers to assess where they use the most water, and offers advice on how they can reduce their overall consumption such as moving to water efficient washing machines, has proved extremely popular this year. The calculator also shows customers whether they would be better off financially by moving to a water meter.

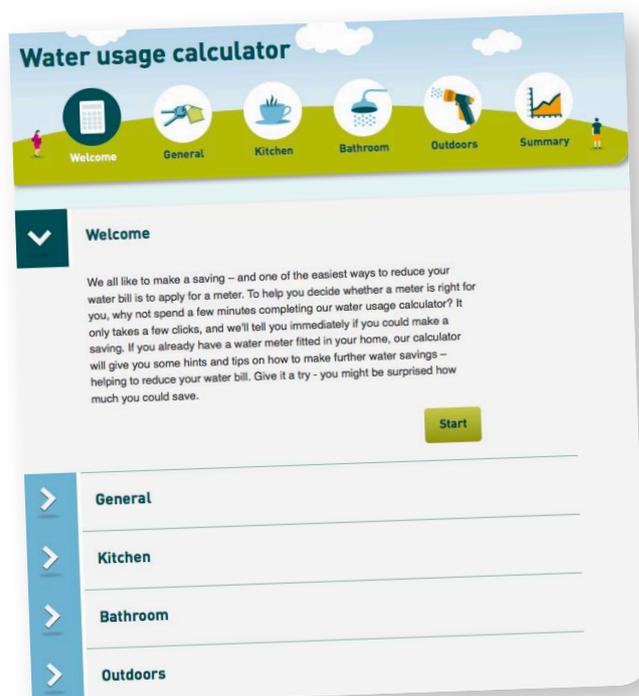


Figure 9 Interactive water use calculator available on our website

We also have an interactive “Water Efficient Home” on the website. This tool provides help and advice for customers for saving water in and around their homes. See [unitedutilities.com/WaterEfficiencyHouse](http://unitedutilities.com/WaterEfficiencyHouse).

Our “guide to using water wisely” containing a section on saving water in the home continues to be distributed. This self-complete water audit enables household customers to calculate their daily water usage. In 2013/14, we distributed over 60,500 audits in total, with an additional 61,600 audits completed using the online water calculator.

We are always looking to innovate; from new products to new adverts, we have investigated a range of different water saving approaches, considering a wide range of factors that can influence the effectiveness of such projects. Notable studies in 2013/14 include:

- Car washing research, undertaken by Liverpool John Moore's University. The research aim is to find out how much water is used during car washing, how many people actually wash their cars and how many people would be interested in using a ‘waterless’ car washing product. This showed that the opportunities for water saving in this area were relatively small, allowing us to target activities on other aspects of water efficiency (at this time) and maximise the benefits of our future programmes.
- A customer opinion survey on water saving devices. Included in the survey were a number of questions on customers’ awareness and opinion towards water efficiency. The results of this study will be used to help target future water efficiency messages and promotions.
- Testing the CombiSmart, a simple thermostatic device that accelerates the heating process by holding back water while the combi boiler heats it to the right temperature. After installing this, customers are able to reduce water wastage and energy bills.

### 3.2.2 Customer metering

There have been no changes in our metering policy during 2013/14. It is widely accepted that customers with a meter use less water than those without one. Metering is an opportunity for customer engagement, which if sustained, can be useful for promoting water efficiency. Metered customers are able to review the impact of their behaviour on their bills, and metering also gives us the opportunity to use flexible tariffs based on consumption patterns. “Paying for what you use” is a well-supported principle.

We continue to meter all new properties, and under our free meter option scheme, household customers can opt for a meter. The number of unmeasured non-households is relatively small following a programme to compulsorily meter unmeasured non-households several years ago (where practical to do so). Household customers therefore drive most of the annual growth in metering. During 2013/14, we installed meters at:

- 12,677 new households
- 43,734 households, which opted for a free meter
- 668 new non-households

Figure 10 shows the uptake under our free meter option scheme over the last nine years. The number of optants each year varies due to a wide range of factors, including water tariffs, although the number of optants each year is significant. This may in part be due to the wider economy, with peaks in the free meter option uptake during the recession when it is likely that customers who would financially benefit would have been encouraged to move to reduce household bills. This year, we have seen a slight drop in the number of optants from 2012/13. It is also worth noting that we have installed meters with automated reading technology as part of a trial in the Warrington area. We intend to roll this technology out further in future years. This technology enables greater information on consumption, which can help customers be more water efficient.

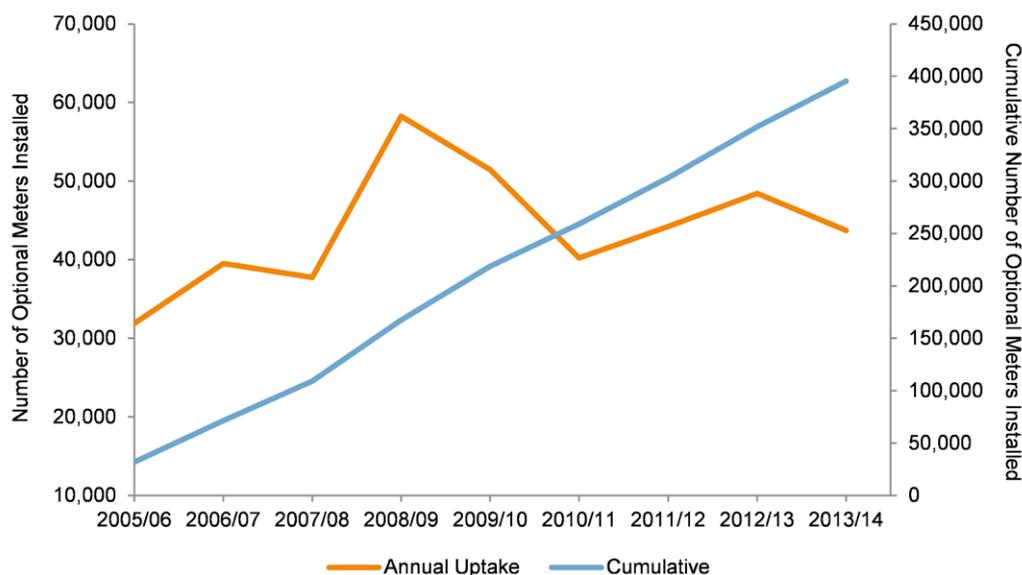


Figure 10 Free meter option uptake since 2005/06

### 3.2.3 Impact of our water efficiency programme on water consumption

The 2013/14 base service water efficiency programme saved a total of 3.02 Ml/d (excluding free meter options, and the benefit of ‘over and above’ behavioural change activities, as these are capped at 30% of the total to meet reporting requirements).

Table 4 on page 19 summaries the benefits of our water efficiency and metering activity for the year. These actions contribute to the overall change in consumption by our customers.

Water Efficiency Activity (2013/14)	Number	Estimated water saving (Ml/d)
Cistern devices distributed to customers	53,156	0.58
Water efficiency customer self-audits	160,837	1.03
Water butts distributed to customers	222	0.00*
Water Efficiency Education Programme, pupils visited	5,770	0.28
Crystal packs / water sticks distributed to customers	4,125	0.00*
Retrofit devices distributed to customers	100,591	1.47
<b>Base Service Water Efficiency Programme - Total</b>		<b>3.44</b>
<i>(after Ofwat 30% cap on behavioural change initiatives)</i>		<i>(3.02)</i>
Free meter options	43,734	1.48
West Cumbria Sustainable Level of Water Efficiency Programme - all products	18,307	0.20
West Cumbria education programme	582	0.03
<b>Total saving</b>		<b>5.15</b>

Table 4 Summary of our water efficiency programme 2013/14

\*Values are greater than zero, but the savings are small so do not show to two decimal places  
NOTE: Numbers may not sum due to rounding

Per capita consumption is a standard way of monitoring consumption, and the North West has historically had one of the lowest rates in the country. Our regional average household per capita consumption for 2013/14 is 129 l/hd/d, showing a small increase of 1 l/hd/d from the previous year. Analysis by the Meteorological Office, stemming from work for our revised draft Water Resources Management Plan 2013, indicates that this is due to the impact of the dry weather during the first six months of 2013.

Average household per capita consumption is still well below the 2009 Water Resources Management Plan forecasts (Figure 11). Table 5 on page 20 shows the average household per capita consumption for each resource zone for this reporting year compared to 2012/13:

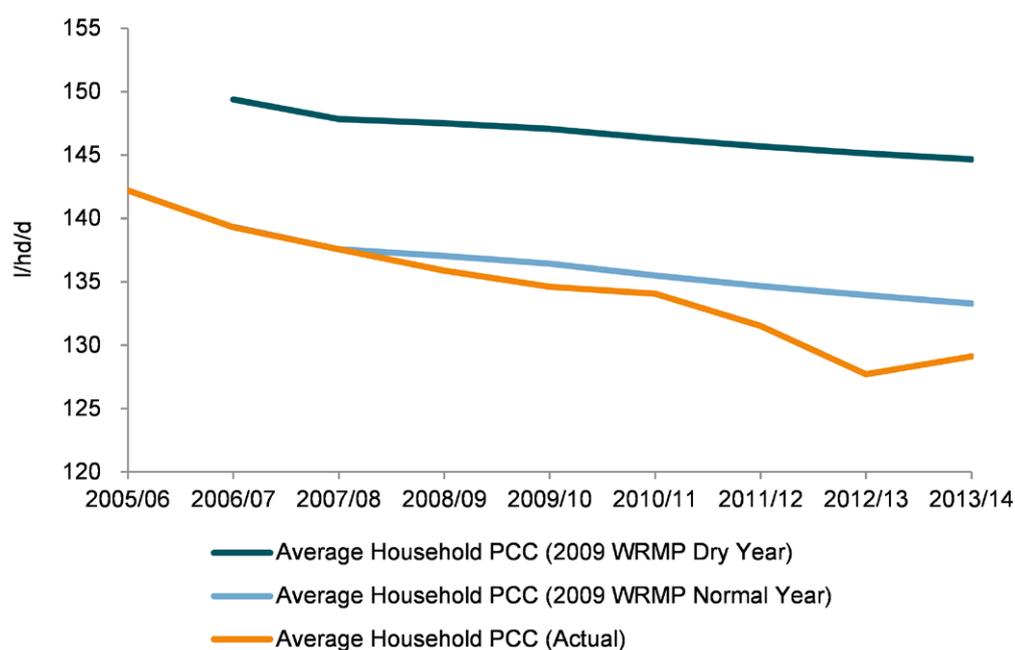


Figure 11 Average household per capita consumption (PCC) since 2005/06

Even though the weather impact can be seen on the average household per capita consumption of the Integrated Resource Zone, there have been noticeable reductions in the average household per capita consumption of the West Cumbria Resource Zone. These reductions are likely to reflect the benefits of heightened water efficiency activities in this area as described earlier.

Resource Zone	2012/13 (l/hd/d)	2013/14 (l/hd/d)	Change (l/hd/d)
Carlisle	132	131	-1
Integrated	127	129	+2
North Eden	150	139	-11
West Cumbria	151	146	-5
<b>Region</b>	<b>128</b>	<b>129</b>	<b>+1</b>

Table 5 Average per capita consumption (households) from 2012/13 to 2013/14

It is also worth noting that we consider per household consumption to be a better comparator than per capita consumption. This is due to the relative uncertainty around occupancy and population estimates that are used to calculate per capita consumption. That's the reason we chose per household consumption as one of the Measures of Success in our PR14 Business Plan submission. Per household consumption for 2013/14 was 303 l/prop/d.

### 3.2.4 Keeping leakage levels low

We continue to carry out an extensive range of leakage control activities, at significant cost, in all water resource zones. As a result, the regional level of leakage averaged 451.9 Ml/d in 2013/14. We have therefore met the Ofwat published target of 463.2 Ml/d for 2013/14. Table 6 on page 21 shows the levels of leakage in each of the four water resource zones.

Actions during 2013/14 across the region have included:

- Maintaining a high level of leak detection resource. United Utilities has employed 133 full-time equivalent detection resources and 14 full-time equivalent leakage analysts
- Maintaining average zonal night pressure at around 39 m. This was achieved by continuing to maintain and optimise 3,000 pressure management valves
- Maintaining the leakage monitoring and reporting system (Netbase) which has a number of advantages including:
  - Automated links to other corporate systems enabling regular updates of customer billing information and asset data
  - Incorporation of reservoir and water treatment production data into a single system for improved data management
  - Auto-generation of daily leakage reports to assist direction of leakage detection resources
- Continuing to provide a private supply pipe repair/replacement service for household customers. In response to customer feedback, we now offer unlimited free repairs or one free replacement supply pipe in a 12-month period, subject to conditions.

We maintained a winter action plan for leakage management following experience from the extreme winters of previous years, making us better prepared for similar events in the future. This involved increased frequency of reviewing leakage performance and set trigger levels for increasing detection resources.

District Meter Areas are the part of the water network where most of the leakage occurs, typically the pipes are under the roads or pavements near where we live and work. Figure 12 and Table 7 shows District Meter Area (DMA) leakage performance for 2013/14 against the previous two years.

	Carlisle Resource Zone	Integrated Resource Zone	North Eden Resource Zone	West Cumbria Resource Zone	Region Total
Actual total leakage 2012/13	4.7	435.2	2.1	15.4	457.4
<b>Actual total leakage 2013/14</b>	<b>5.0</b>	<b>430.9</b>	<b>2.4</b>	<b>13.6</b>	<b>451.9</b>
Change	+0.2	-4.2	+0.3	-1.7	-5.4

Table 6 Zonal leakage levels 2012/13 to 2013/14 (Ml/d)

NOTE: Numbers may not sum due to rounding

	Carlisle Resource Zone	Integrated Resource Zone	North Eden Resource Zone	West Cumbria Resource Zone	Region Total
Forecast for 2013/14 in the 2009 plan	4.8	441.9	2.0	14.5	463.2
<b>Actual total leakage 2013/14</b>	<b>5.0</b>	<b>430.9</b>	<b>2.4</b>	<b>13.6</b>	<b>451.9</b>
Variance	+0.2	-11.0	+0.4	-0.9	-11.3

Table 7 Zonal leakage levels: 2013/14 actual against 2009 Water Resources Management Plan forecast (Ml/d)

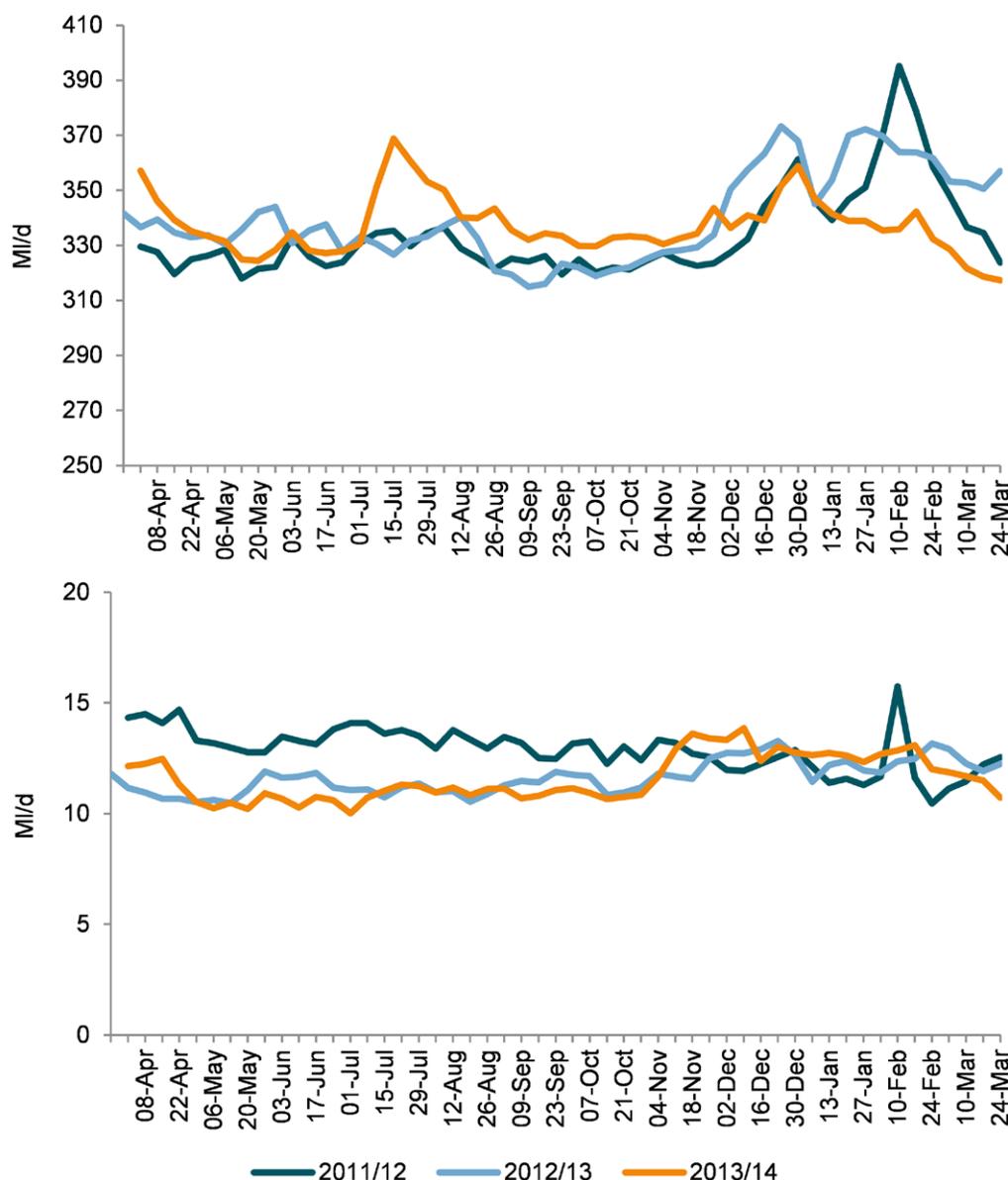


Figure 12 Regional DMA leakage 2011/12 to 2013/14

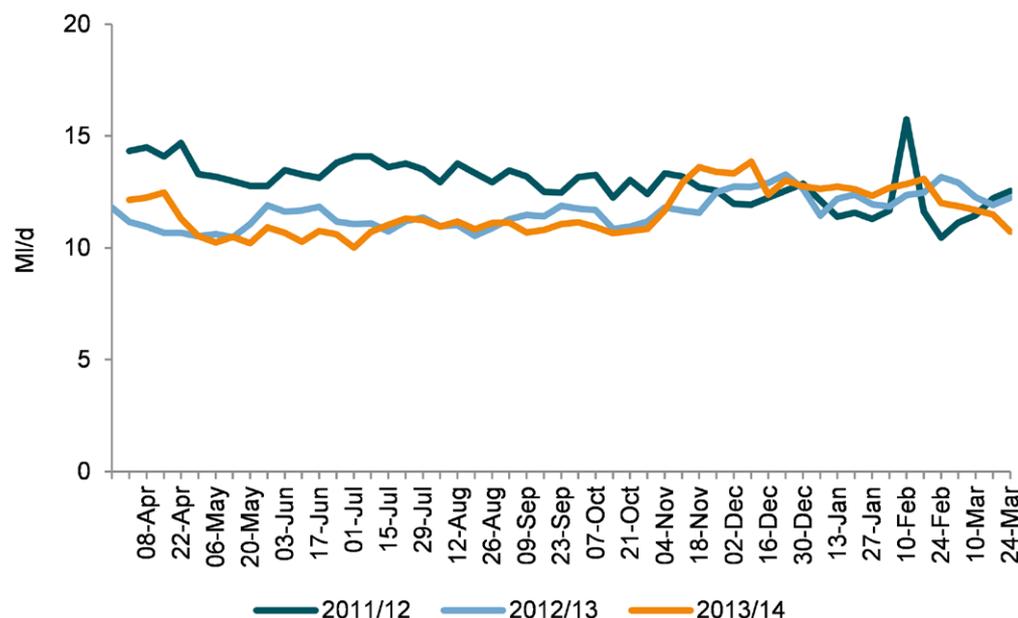


Figure 13 West Cumbria DMA leakage 2011/12 to 2013/14

We are really focused on reducing leakage in West Cumbria as far as we possibly can. Since last year, total leakage in West Cumbria has dropped by 1.7 Ml/d and, per kilometre of water main, it's now 27% lower than the regional average.

Between 2010/11 and 2012/13 we reduced DMA leakage from 13.8 Ml/d to 11.6 Ml/d. In 2013/14, we have maintained leakage in DMAs at this historically low level (Figure 13) on previous page 21. Total leakage has been driven down further this year by also targeting leakage upstream of DMAs, for example, on the trunk main system.

During 2012/13, we significantly improved our leakage data through a series of studies and initiatives to better understand the location of losses in our network. That work indicated greater upstream losses than we previously thought and as a result targeted our detection and repair resources more effectively using this data during 2013/14. It's shown real benefits and we are now at a total leakage level of 13.6 Ml/d, which is below the level we planned to be at by 2014/15.

Part of our work to tackle upstream losses was to use innovative aerial surveys in order to detect the signs of underground leaks, which we completed with APEM Ltd<sup>6</sup>. This involved an APEM aeroplane surveying an area containing around 100 km of buried mains water pipes. APEM image analysts then identified areas with potential leaks, which were then passed on to our leakage teams for further investigation and repair. This work was recognised at the Water Industry Achievement Awards 2014, when we won the award for the "most innovative use of existing technology".



Figure 14 Aerial surveys conducted by APEM to help detect leakage

Leakage is always a bigger challenge in rural and hilly areas, with smaller, more scattered communities meaning mains are longer per property served<sup>7</sup> on average (i.e. lower connection density). The pressure also needs to be higher to push the water further and over hills, causing more background seeps and weeps from joints on our pipes (which are very hard to detect), and increased volumes of water are lost when leaks and bursts do occur. Leaks are harder to spot because they are often in remote places.

As you can see in Table 8 when presented as m<sup>3</sup>/km/d there is a lower rate of leakage in West Cumbria compared to the regional average, and it is falling year on year.

DMA leakage (m <sup>3</sup> /km/d)	West Cumbria Resource Zone	Regional average	Difference
2010/11	9.42	11.25	-16%
2011/12	9.09	10.94	-17%
2012/13	8.85	11.04	-20%
2013/14	7.93	10.87	-27%

Table 8 West Cumbria DMA leakage per kilometre mains length 2010/11 to 2013/14

6 APEM is an independent environmental consultancy specialising in freshwater and marine ecology and aerial surveys

7 For example, in West Cumbria there is an average of 34 properties per km of pipe. In Manchester, there are 123.

In 2013/14 we have done targeted additional work in West Cumbria to improve our data and understanding of where losses are in this zone. This has confirmed that there was more illegal use than we previously thought, particularly focused on animal troughs. We have tackled upstream losses and have plans in place to address illegal use in 2014/15.

We have an on-going programme of demand management, including DMA leakage reduction, in West Cumbria. Actions undertaken to date include:

- Increased active leakage control by enhanced day-time activity using contract resource and our inspectors from a neighbouring area to further increase resources
- Increased activate leakage control at night and trained up a permanent night detection team
- All unmetered areas have been surveyed for leakage regularly.
- Focused on supply pipe leakage to ensure any long standing leaks were resolved and the time for repairing new leaks is optimised (either through using our contractors to repair or working with the customer to repair via their insurance company)
- There is an on-going upstream losses campaign including meter validation and service reservoir investigations as part of trunk main leakage and losses detection process.
- Commissioned an aerial survey of the Copeland Demand Monitoring Zone. Thermal images were used to identify potential leaks on trunk mains and to identify the number of troughs.
- A programme of farm visits in Allerdale to identify illegal troughs and repair leaks.
- Successfully used acoustic technology on trunk mains to locate leaks.

Our focused effort on leakage and water efficiency in West Cumbria has contributed to reductions in abstraction at Ennerdale Water. These activities, in conjunction with other activities such as reconfiguring our network to transfer additional demand from Ennerdale to Crummock Water, have led to a reduction in Ennerdale Water abstraction of over 4 Ml/d this year. The drivers and benefits of this activity are discussed in Section 3.3.

## 3.3 SUSTAINABLE ABSTRACTION

### 3.3.1 Sustainability drivers

Over the past few years, the Environment Agency has reviewed our abstraction licences to ensure they do not cause adverse environmental impact. These include reviews for:

- Water sources that fall within Special Areas of Conservation (SAC) under the European Union Habitats Directive;
- Water sources with national or local environmental drivers, identified under the Environment Agency's Restoring Sustainable Abstraction Programme;
- Heavily Modified Water Bodies (i.e. reservoirs) and rivers under the Water Framework Directive.

These reviews have resulted in the need to change abstraction licence conditions at some water sources to protect the environment. A number of these changes reduce the quantity of water we are able to abstract and therefore reduce our deployable output. We call these 'sustainability reductions.' Other changes only involve structural modifications, for example new fish screens, that do not affect supply availability.

### 3.3.2 Sustainability reductions planned for 2010-2015

To safeguard sensitive aquatic species and habitats, sustainability reductions for the period 2010-2015 were included in our 2009 Final Water Resources Management Plan. The sustainability reductions were determined by the Environment Agency following a review of our abstraction licences through the Habitats Directive Review of Consents and Restoring Sustainable Abstraction Programmes. Changes were required to our abstractions at Haweswater and Thirlmere reservoirs and Rivers Brennand and Whitendale (Integrated Zone), River Gelt (Carlisle Zone) and Ennerdale Water and Dash Beck (West Cumbria Zone).

In accordance with the regulatory guidance, changes under the European Union Water Framework Directive were not included because the outcome was too uncertain at the time of the plan's publication in 2009. Our revised draft 2014 plan includes further sustainability reductions as a result of abstraction licence changes under the Water Framework Directive covering the period after 2015.

The table below summarises the sustainability reductions and supply impact for the period of 2010-2015 consistent with our 2009 plan. An update is provided on these deliverables in the following sections.

Site	Driver	Sustainability solution	Current estimate of implementation date	Estimated sustainability reduction
<b>Integrated Resource Zone</b>				
Haweswater intakes*	Habitats Directive	Increased prescribed flows in Heltondale Beck and Cawdale Beck.	Physical changes implemented in 2009/10	18.6 MI/d
		Provision of spate flows in Heltondale Beck.	Licence changes by 31 March 2015	
		Increased prescribed flow and lower abstraction limits at Swindale Beck.*	By 30 September 2018	
Thirlmere catchment	Habitats Directive	Increased prescribed flow in Mill Gill and Helvellyn Gill. Provision of spate flows in Mill Gill and Helvellyn Gill. Provision of spate flows from Thirlmere Reservoir to St John's Beck.	Physical changes implemented in 2009/10 Licence changes by 31 March 2015	
Rivers Brennand and Whitendale	National (Site of Special Scientific Interest)	Increased prescribed flow in Rivers Brennand and Whitendale and closure of minor intakes.	Implemented in 2013	14.3 MI/d
<b>Carlisle Zone</b>				
River Gelt intakes	Habitats Directive	New prescribed flow on New Water.	Physical changes implemented in 2008	3.8 MI/d
	Habitats Directive	Increase prescribed flow on River Gelt at Hynam Bridge.	Licence changes by 31 March 2015	
<b>North Eden Zone – No sustainability reductions planned</b>				
<b>West Cumbria Zone</b>				
Quarry Hill system	Habitats Directive	Increased prescribed flows on Dash Beck.	Licence changes by 31 March 2015	0.4 MI/d
Ennerdale Water**	Habitats Directive	Increased compensation flow release from Ennerdale Water to River Ehen**	Implemented in 2012	9.0 MI/d
		Revocation of Ben Gill abstraction licence.	By 31 March 2015	

*Table 9 Sustainability changes included in 2009 Plan for completion by 31 March 2015*

\* The Environment Agency's original decision for changes to our Swindale Beck (Haweswater) abstraction licence planned for 31 March 2015 (included in our 2009 plan) have been altered following a review by the Environment Agency of environmental data. The revised implementation date is now 30 September 2018, although we aspire to deliver in advance of this date (our plans allow for project contingency given the 'flashy' nature of Swindale Beck, which may prevent in-river working during wetter periods).

\*\* The Environment Agency's original decision for increased compensation flow release from Ennerdale Water to the River Ehen, provision of spate flow releases from Ennerdale Water to the River Ehen and reductions in annual and daily licence by 31 March 2015 (included in our 2009 plan) have been altered following a review by the Environment Agency. Significantly increased compensation flow was implemented in 2012 in accordance with an Environmental Damage Regulations Notice (see Section 3.3.3). Revocation of the Ennerdale abstraction licence has been incorporated into our 2014 plan, and will be implemented once the preferred solution detailed within Section 5.2.2 is delivered to provide alternative supplies to West Cumbria. The most likely completion date for this solution, and therefore the revocation of the abstraction licence, is 31 March 2022. This is three years earlier than the 2024/25 date estimated in the revised draft Water Resources Management Plan. However, it should be noted that there are still project risks (planning and construction), some of which are outside the company's control, which may have an impact on the completion date for the project. Reductions in the Ennerdale Water annual and daily licence will be implemented in a phased approach as we implement other interim measures to reduce abstraction from this source. Diversion and loss of Ben Gill catchwater yield remains as per the 2009 Plan and is on track for completion by 31 March 2015.

We are continuing to progress all of the sustainability reductions outlined in our 2009 plan.

During 2013/2014, we implemented sustainability reductions on the Rivers Brennand and Whitendale within a Site of Special Scientific Interest and Area of Natural Beauty in Lancashire. The new abstraction licences came in to force from 1 April 2013. We have worked closely with the Environment Agency and the Brennand and Whitendale Focus Group (made up of local landowners, anglers and environmental interest groups) over the past 10 years to deliver an effective solution. The improvements reduce the amount of water abstracted and providing more flow downstream of the main river intakes, and the closure of many minor intakes to help improve the health of the river (providing an equivalent benefit of 6.9 km of improved river length). United Utilities and the Environment Agency are jointly monitoring the benefits resulting from these changes.

*Lord Smith, who is standing down as the Environment Agency chairman this year, said his proudest achievement at the Agency was to restore water to the Rivers Brennand and Whitendale - The Daily Telegraph, Friday 16 May 2014*



*Figure 15 Official opening of the Brennand & Whitendale scheme in April 2013*

In accordance with our 2009 plan, our abstraction licences will be changed on the River Gelt, Dash Beck, Heltondale and Cawdale Becks (Haweswater catchment) and on the Thirlmere Catchment in 2014/15.

However, the flow changes identified in our 2009 plan will not be implemented at Ennerdale Water as these have been superseded following new evidence on environmental damage since 2012, as described in the next section. Similarly, the Environment Agency altered its original decision for the Swindale Beck licence in the Haweswater catchment following a review during 2011 and 2012. We have agreed with the Environment Agency to implement the revised sustainability reduction, and the licence change is expected in 2018/19 instead of 2014/15. We have reflected the later delivery of these schemes in our revised draft Water Resources Management Plan and PR14 Business Plan.

### 3.3.3 Changes to our abstraction at Ennerdale Water

Freshwater mussels are a protected species under the EU Habitats Directive, and the population in the River Ehen is the largest population in England. In summer 2012, freshwater mussels in the River Ehen suffered severe stress and a small percentage died. During the time of this incident, the amount of water being released to the river from Ennerdale Water was above the legally required level. Emergency interim contingency measures were agreed (based on evidence from mussels experts) between ourselves, the Environment Agency and Natural England to increase the flow of water in the river to protect the mussels and aid their recovery.

Evidence emerged following the 2012 incident that flows in the River Ehen should be higher than originally planned under the Habitats Directive Review of Consents process. We have been adhering to Environmental Damage Regulations notices issued by the Environment Agency in December 2012 and May 2013 respectively, which provide significantly enhanced flows to the River Ehen.

At lower levels in Ennerdale Water we would not have been able to hydraulically provide this increased river compensation flow, so we installed a temporary pontoon onto the lake to get the extra water into the river by pumping. We installed the pontoon in April 2013 and removed it in November 2013; although we didn't use it operationally because the lake didn't reach low levels. We removed the pontoon following further investment to provide a less visually intrusive and lower cost way of pumping these higher flows into the river (Figure 16).



Figure 16 Temporary pontoon on Ennerdale Water (left) and work to install pumps to provide higher compensation flows without the pontoon (right)

Both the Environment Agency, Natural England and ourselves have increased the environmental monitoring programme at Ennerdale Water and the River Ehen, and regular mussel surveys indicate that since 2012:

- The majority of mussels have improved in condition
- There has been an overall improvement in the health and habitat condition of the freshwater mussels
- The recent improvement in freshwater mussel health is due to protective management actions we have taken, in particular putting assets in place to allow us to provide higher flows to the river

The freshwater mussel stress event triggered a formal reassessment of the Review of Consents decision by the Environment Agency. On 4 December 2013, the Environment Agency formally decided to revoke our abstraction licence at Ennerdale Water as soon as reasonably practical. By this time we had already modelled this in our draft Water Resources Management Plan, consulted on solutions (described in more detail within Section 5.2), included the preferred option in our Business Plan submitted to Ofwat, and shortly after we established the project team to deliver the solution. Alongside delivering the solution to allow the licence to be revoked, we are continuing to monitor the environment carefully and are working hard to reduce our abstraction as far as practical at Ennerdale Water to mitigate environmental impacts as far as possible. These interventions are described further in Section 4.



*Figure 17 Freshwater mussels; an internationally protected species*

### 3.3.4 Structural abstraction asset modifications

In 2013/14, we completed the following structural modification projects to reduce the environmental impacts of abstraction:

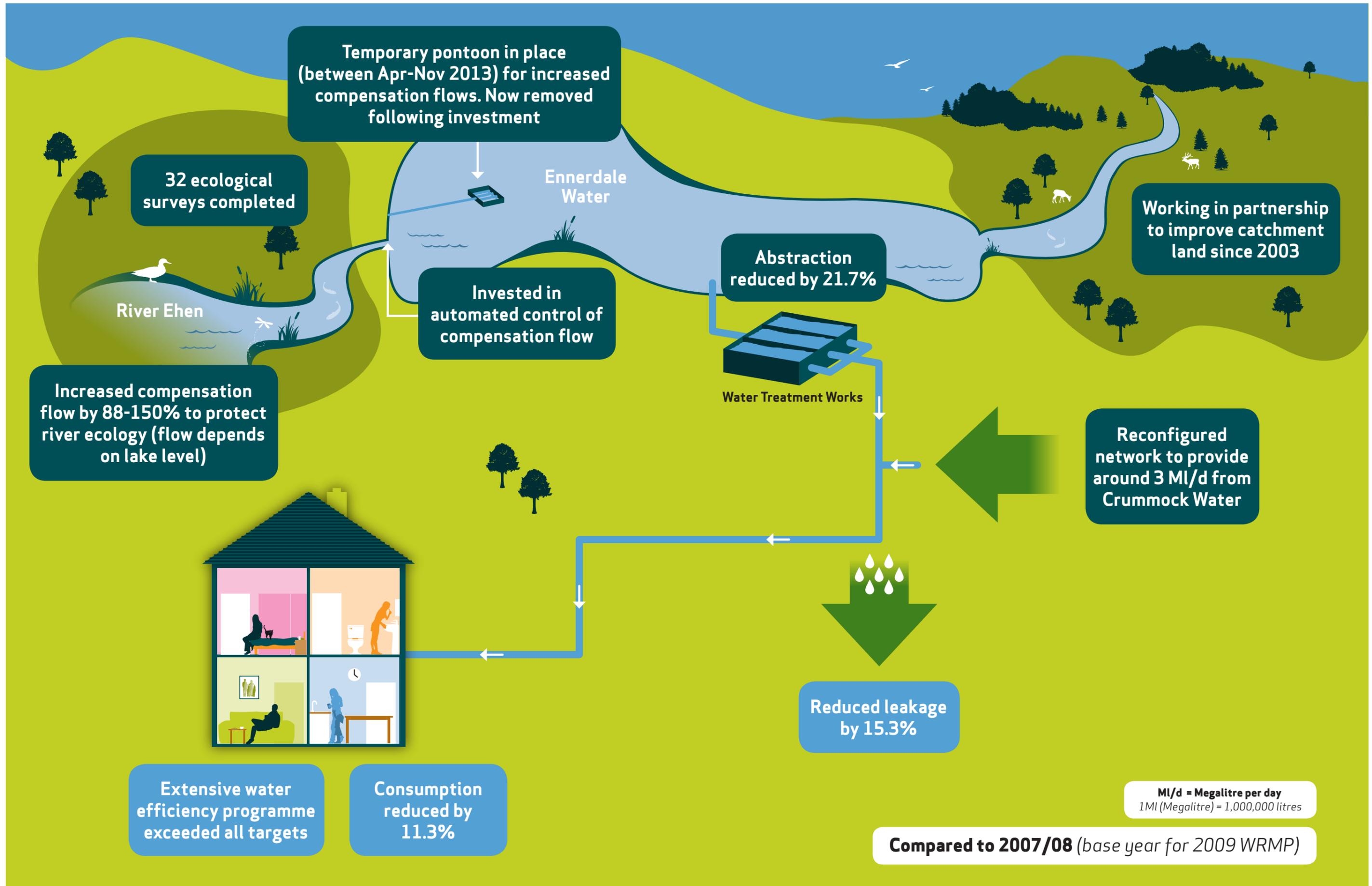
- Provision of new fencing alongside Helvellyn Gill to reduce stock access to the river, and hence improve conditions for salmon spawning in the River Derwent and Bassenthwaite Lake Special Area of Conservation
- Provision of improved fish screening on three River Dee abstraction intakes. These projects, two of which were completed in 2013/14, will ensure that the entrainment of salmon and other fish species at the intakes is significantly reduced, providing protection to the River Dee Special Area of Conservation

Together these projects have contributed to improving over 12 km of river.

### 3.3.5 Abstraction Incentive Mechanism

Although Ofwat has removed the Abstraction Incentive Mechanism (AIM) from its PR14 programme, AIM is still under development to a later implementation date (expected to be 2015). We therefore consider it is still important to report on development and progress under AIM prior to implementation. In our PR14 Business Plan and revised draft Water Resources Management Plan, we committed to reporting our AIM performance in this annual review.

### Protecting Ennerdale and the River Ehen



We have four AIM sites that we have included in our "future contribution to rivers improved" Measure of Success in our PR14 Business Plan (which supports our Outcome "the environment is improved and protected"):

- Old Water (River Gelt, Cumbria)
- Ennerdale Water (Cumbria)
- River Calder (Lancashire)
- Aughertree Springs (Cumbria)

AIM sites are in environmentally sensitive areas and abstraction at times of low river flow has the potential to cause harm. AIM measures the amount of abstraction that occurs at times of low river flows and compares this to an average baseline period (covering the period between 2007 and 2013); indicating whether current abstraction is higher or lower than the recent past. For each site, we estimate the equivalent length of downstream river that the abstraction reduction contributes to improving.

The table below shows recent average annual abstraction over the period 2007-2013 for each of the AIM sites against the abstraction for 2013/14. This shows that for three of the sites the AIM abstraction has been lower than the historic average. Overall, due to lower abstraction volumes at three of the four AIM sites in 2013/14 there is a benefit to 20.3 km of river. These three sites are within our Cumbrian zones. However, the River Calder, which is located in the Integrated Resource Zone, has shown a higher level of abstraction above threshold. The operation of this large zone is complex, so higher levels of abstraction are due to a number of factors, which result from the management of our water resource and supply system (for example, the need to balance resources across the region during dry spells).

Abstraction site	Low flow threshold (MI/d)	Historic average abstraction below threshold 2007-13 (MI/yr)	2013/14 abstraction below threshold (MI/yr)	2013/14 contribution to rivers improved (km)
Old Water	8.8	41.9	0.0	0.4
Ennerdale Water	80.0	2,200.9	392.2	17.2
River Calder	33.1	34.2	42.5	-2.5
Aughertree Spring	25.9	0.4	0.0	5.2

Table 10 Abstraction Incentive Mechanism (AIM) performance

Abstraction at Ennerdale Water has reduced significantly this year as a result of all the demand and leakage reductions and network reconfiguration. Total abstraction from Ennerdale Water is now over 4 MI/d lower on average than in 2012/13, a reduction of more than 15%.

## 3.4 CHANGES IN THE AVAILABILITY OF WATER

### 3.4.1 Sustainability reductions

As described in the previous section, we have worked this year on a number of activities to make our abstraction more sustainable. Some of these activities, when implemented, result in adjustments to the supply availability we report each year (termed 'sustainability reductions').

Early in 2013/14, we moved to new licence conditions on the Rivers Brennand and Whitendale, which have reduced the availability of water by 14.3 MI/d in the Integrated Resource Zone. This is a year earlier than specified in our 2009 plan. However, as this zone is in surplus we have been able to accommodate these changes. No further sustainability reductions have been implemented this year.

### 3.4.2 Ennerdale Water and water availability in West Cumbria

As described in the previous section, since December 2012 a notice under the Environmental Damage Regulations (EDR) has been in force at Ennerdale Water. The notice required us to release significantly higher flows (up to 95 MI/d) to the River Ehen from Ennerdale Water than the 32 MI/d requirement set in abstraction licence. The aim of the higher flows is to help

the mussel population recover. In May 2013, the EDR notice was revised to include a lower maximum compensation release rate of 80 MI/d when lake levels are close to the weir crest, which has a marginal beneficial impact on Water Available for Use.

We have revised our supply availability estimates to align to the latest EDR notice and to take into account revised base demands (that impact on the balance of risk across the zone) and other data in our water resources models. These values align to the 2013/14 supply calculations used in our revised draft Water Resources Management Plan. This is necessary because the EDR notice superseded the 2009 Water Resources Management Plan assessments. These improvements, plus the incremental impacts of climate change, result in supply availability being 1.5 MI/d lower than in the previous reporting year. We will closely monitor the West Cumbria zone to ensure that supply estimates reflect the current position given the fine balance of this zone.

### 3.4.3 Distribution and Production Developments

The only distribution and production measures included in the 2009 plan for 2013/14 comprise leakage reduction activities, as discussed in 3.2.4. We also continue to carry out investment programmes to maintain the accuracy of all flow measurements at water treatment works, aqueducts and district meter areas by installing new, primarily electromagnetic, meters.

We have reconfigured the water network in West Cumbria to allow some communities that were normally supplied by Ennerdale Water to be supplied from Crummock Water. This has allowed abstraction at Ennerdale Water to be reduced by around 3 MI/d, around 75% of the total reduction this year.

We have progressed work to supply additional water from Crummock Water to North Allerdale to offset sustainability reductions at Dash Beck (supplying the Quarry Hill area in West Cumbria) during high demand periods. This will deliver enhanced pumping capacity in the network and is due for completion in 2014/15.

### 3.4.4 Resource Developments

Our 2009 plan reviewed the need for future enhancement of water supplies. It identified that the only water resource zone with a supply deficit before 2015 is West Cumbria, and the plan identified additional groundwater supplies at South Egremont as part of the optimal plan.

We originally designed the scheme with a capacity of 6.4 MI/d to be delivered by 31 March 2015. However, now that the supply-demand picture has changed in West Cumbria, we have been working with the Environment Agency this year to pursue increased sustainable abstraction capability of 11 MI/d. This will greatly enhance the supply-demand balance in West Cumbria whilst we operate under the Environmental Damage Regulations notice at Ennerdale Water. However, this change in capacity, combined with planning constraints, has resulted in a slight delay in the implementation date to autumn-winter 2015.

## 3.5 CHANGES IN POLICY AND FORECASTING ASSUMPTIONS

### 3.5.1 Levels of service

There has been no change to our levels of service, which remain as:

- Temporary water use restrictions (often referred to as hosepipe bans, although their remit is broader than this) and drought permits/orders to augment supply no more than once in 20 years;
- Drought orders to ban non-essential water use and further augment supply no more than once in 35 years;
- No standpipes or rota cuts during a repeat of the worst drought on record.

Maintaining this level of service is supported by customer research from developing the 2009 Water Resources Management Plan, with additional research being undertaken for our revised draft Water Resources Management Plan (detailed in Section 2 of that document). Our level of service therefore remains the same as in the 2009 Water Resources Management Plan.

### 3.5.2 Outage

The outage allowance determined for the 2009 Water Resources Management Plan takes into account any asset failures, associated with source works, which would affect ability to supply customers during a drought. We calculated the actual level of outage experienced this year by considering all reported capacity restrictions during the year and assessing whether they would affect the supplies during a drought situation. Many capacity restrictions are planned activities (i.e. for routine maintenance work) and would not be progressed under drought conditions. Only those that would affect supplies during a drought are included in the level of outage reported.

Actual outages during 2013/14 have occurred at a range of source-work types including impounding reservoirs, boreholes, river intakes, raw water systems and water treatment works. Outages occur for a variety of reasons such as pollution events, poor raw water quality, asset failure necessitating emergency repairs and routine maintenance.

The level of outage experienced this year is around 5 MI/d lower than the outage allowance accounted for in our 2009 plan, and therefore causes no concern for the security of supply. Our total outage allowance was predominantly due to increased maintenance requirements at one of our larger water treatment works, which we identified during planned maintenance activities. This work is now complete.

In October 2013, we successfully undertook a major project to inspect the Haweswater Aqueduct, which runs from Cumbria to the north of Manchester. This project took many years to plan and was a significant undertaking. We carefully planned the outage to maintain the availability of water resources, with the outage period kept to a minimum. There were plans to postpone the outage had dry weather conditions been observed or forecast. Therefore, no additional allowance has been included for this activity in 2013/14.

### 3.5.3 Further changes

Detailed assessments of water source yields, climate change impacts, demand forecasts, target headroom and the economic level of leakage were all conducted for the 2009 plan. These were undertaken in accordance with the UKWIR (UK Water Industry Research) and Environment Agency best practice methods.

For the 2013 Water Resources Management Plans, several UKWIR projects were completed and new Water Resources Planning Guidelines published. Projects include climate change assessment, resource planning tools, customer behaviour and water use, water resources in the environment. We proactively participated on the steering groups to assist in developing future water resources planning techniques.

We have incorporated the latest guidance in our revised draft Water Resources Management Plan. However, for the 2013/14 Annual Review, we only consider that the West Cumbria supply availability has a material impact on the supply-demand balance. We will report against the new plan once published, following Secretary of State approval.

### 3.5.4 Climate Change

Climate change is likely to have a significant impact on supply-demand balance forecasts, but there is a large degree of uncertainty about the forecast impacts. The 2009 plan therefore identified the need for further studies, in particular to improve the understanding of the effects of climate change on source yields.

The UK Climate Impacts Programme published new climate projections "UKCP09" in June 2009, which give an enhanced UK assessment of climate change. These were too late for use in the 2009 plan, however, we have worked with UKWIR and the Environment Agency to apply these projections to our latest revised draft Water Resources Management Plan using best-practice methods.

We fully reassessed the effects of climate change on water source yields, water demand and target headroom within the new revised draft plan. It shows that while the overall effect of climate change is greater than in the 2009 plan, the additional impact on supply availability for 2013/14 is negligible. This is because the impacts of climate change are smaller at the start of the planning horizon, and do not trigger a deficit in any of our water resource zones.

## 3.6 MAKING SURE WE ARE PREPARED FOR DROUGHT

Through 2013/14, we've also progressed actions in our 2013 Final Drought Plan, which ensure we are prepared for future drought events. Section 5.1 includes further information on the status of our Drought Plan.

### 3.6.1 Environmental monitoring plans

We have reviewed the environmental monitoring plans for all our drought permit/order sites and agreed these with the Environment Agency, Natural England and Natural Resources Wales (as appropriate). These plans set out the monitoring that is required in baseline conditions (i.e. all the time) and specific monitoring for each site during and following the implementation of an actual drought permit/order.

Going forward the environmental monitoring plans will be reviewed when the environmental assessments for each drought permit/order are updated, with the exception of Ennerdale Water. We will review the environmental monitoring plan for Ennerdale Water annually, due to the continuous development of our understanding of environmental impacts at this site and because of the intensive monitoring undertaken by both the Environment Agency and ourselves.

Our Final Drought Plan 2013 sets out the timescales for review of our drought permit/order environmental assessments. In 2012/13, we commenced the review of these studies at Ullswater, Windermere, Ennerdale Water and Crummock. The Ennerdale Water review was completed in November 2013 and the other studies are on-going. We are currently preparing to commence the review of our River Lune study. Following this, the next studies<sup>8</sup> are not due for review until 2017/18. We plan to update each drought permit/order environmental assessment every 7 years, unless circumstances require an earlier update.

### 3.6.2 Drought exercise

In October 2013, we took part in a drought exercise convened by the North West region Environment Agency. This was the first Environment Agency drought exercise in the country to have water company representation present. The exercise was run by Atkins consultants and was extremely useful to enhance Environment Agency staff skills and knowledge, in particular an appreciation of water company issues. It is hoped that such exercises will be repeated biannually.

### 3.6.3 Applying for drought powers at compensation only reservoirs

Certain reservoirs, maintained only for their environmental benefit through compensation flows, have no links to abstraction for public water supply. We have reached a common understanding with the Environment Agency about responsibility for applying for drought powers should they be needed to protect the environment at these reservoirs. The Environment Agency will be responsible for applying for drought powers at the following sites should the need arise:

- Dubbs
- Borrans
- Meadley
- Hayeswater
- Swineshaw Glossop
- Hollingworth Lake
- Belmont
- Blackmoss (Upper and Lower)
- Walverden
- Bottoms
- Teggs Nose

<sup>8</sup> These studies are for the following sites: Delph, Dovestone, Jumbles, Longdendale, Rivington, Vyrnwy, Scales boreholes, and the boreholes Bowscar, Gamblesby and Tarn Wood.

## 4: Summary of work to be completed in 2014/15



We have made significant progress in 2013/14 and will continue this momentum in 2014/15. This section provides an overview of some of our key activities, although this list is not exhaustive.

To maintain the supply demand balance, we will:

- Continue extensive leakage control activities
- Continue to spread the water efficiency message, despite already having achieved our regulatory water efficiency target for 2014/15
- Continue to promote the free meter option on the website and billing leaflets
- Complete our Hayborough-Crosby project to enable sustainability reductions at Dash Beck in West Cumbria.

In 2014/15, we will be implementing a number of environmental improvements:

- Instead of installing fish screens at two remaining River Dee abstraction points, we intend to discontinue abstraction from these sites
- Provision of a higher compensation flow release from Dubbs and Borrans reservoirs to the River Gowan
- We will stop abstraction from Ben Gill, a tributary of the River Ehen that was diverted to flow into Ennerdale Water in the early 1970s. The project will see the river restored to its original course, providing an uninterrupted supply of sediment to the River Ehen for the benefit of the freshwater mussels and salmon
- In accordance with our 2009 plan, we will change our abstraction licences for the River Gelt, Dash Beck, Heltondale and Cawdale Becks in the Haweswater and Thirlmere catchments. These changes will realise the benefits of new abstraction assets we've installed over recent years to meet our Habitats Directive obligations.

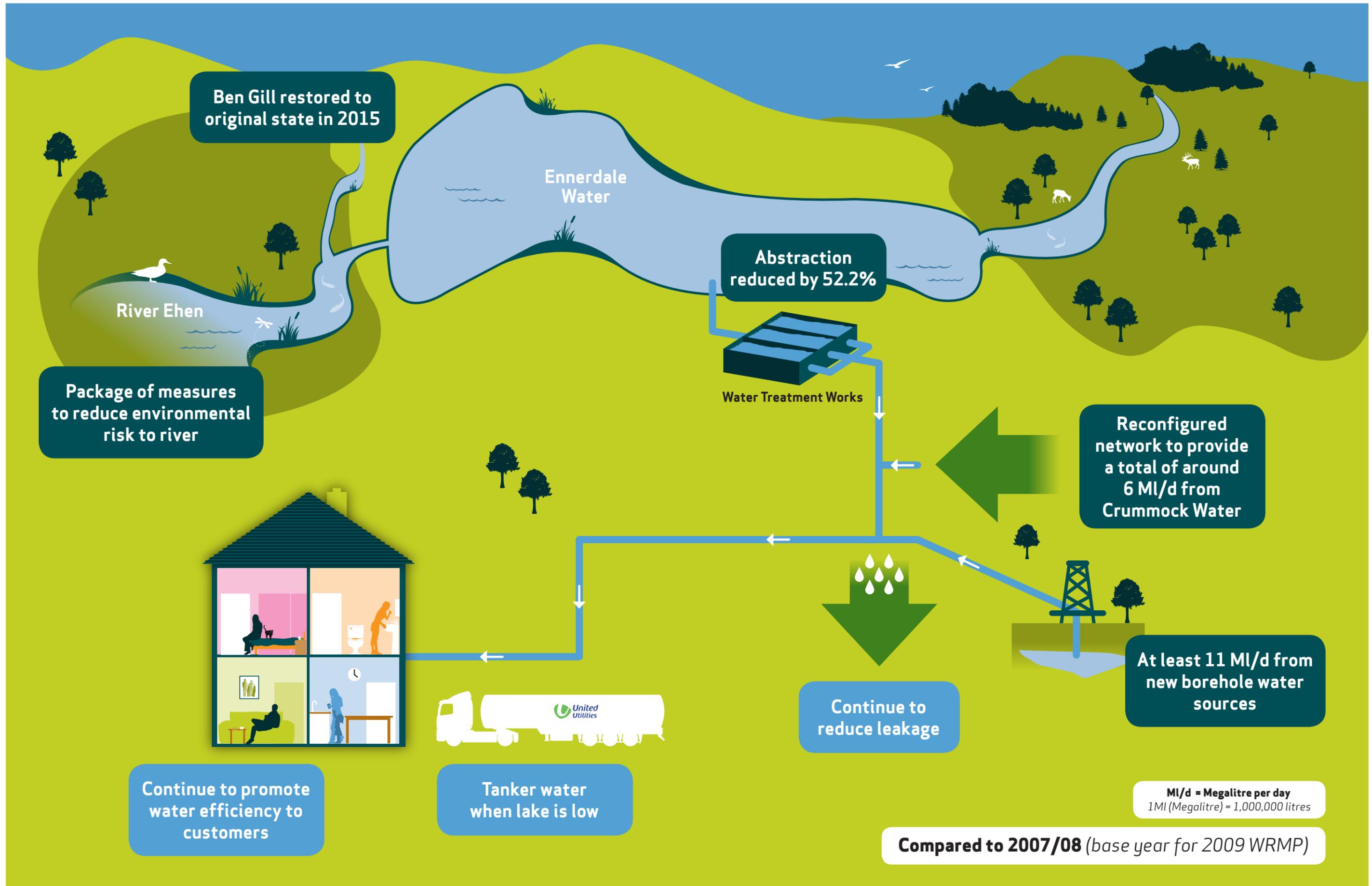
We will also deliver further reductions in abstraction from Ennerdale Water, to minimise any environmental impact until we can permanently replace of this source via a new pipeline from Thirlmere (see section 5.2):

- Continuing enhanced levels of water efficiency promotion, including:
  - Forging links with the Cumbrian Newspapers group to a search for a 'water saving family' to use as a publicity example
  - Continuing to develop the Watertight campaign, including releasing a series of humorous videos on featuring a local comedian promoting our water efficiency messages to West Cumbria
- In order to drive real changes in household consumption we need increasingly targeted campaigns in future. We are shaping these up during 2014/15 by trying out a small installation programme of meters in West Cumbria and monitoring the savings observed by different socio-demographic customer groups
- Leakage levels are currently below the 2014/15 target of 13.95 MI/d, and we will continue to seek further reductions through the year, through on-going development and application of the activities outlined in section 3.2.4
- Progressing development of the South Egremont borehole sources at an enhanced capacity of 11 MI/d as described in section 3.4.4
- Progressing a fast-track capital project to further transfer demand from Ennerdale Water to Crummock by allowing us to operate our network differently. When completed in early 2015/16, this will further reduce Ennerdale Water abstraction by around 3 MI/d
- In the event that Ennerdale Water storage drops below defined drought triggers, we'll import additional water from elsewhere in the region using our tanker fleet

We predict that the benefit of all these activities, once implemented by the end of 2015/16, will be to reduce average abstraction from Ennerdale Water to an estimated 10.5 MI/d even during dry year conditions, compared to an actual abstraction of around 22 MI/d in 2013/14. We will provide an update in our 2014/15 review on these activities, within which we will be able to provide greater detail on the level of benefit to Ennerdale Water and the River Ehen to be expected (e.g. once we have finalised our abstraction licence on the South Egremont boreholes).

We will continue to explore other measures that may reduce our environmental impact at Ennerdale, working in conjunction with the Environment Agency and other stakeholders.

### Plans to further protect West Cumbria environment until long term solution is in place



## 5: Updating our plans



### 5.1 UPDATING OUR DROUGHT PLAN

We published our first publicly available drought plan in January 2008. In accordance with timescales set by Defra, this was updated and a Draft Drought Plan 2012 published for public consultation between 22 November 2012 and 11 January 2013. Extensive public consultation was undertaken to transform this in to our Final Drought Plan 2013 including three workshops across the North West. We received 19 responses to the consultation and published a Final Drought Plan 2013 on 13 June 2013.

Following subsequent discussions with Defra, we agreed to revise the Final Drought Plan 2013 to include Ennerdale Water drought order options and associated drought triggers. An updated Draft Drought Plan 2014 was published for public consultation between 13 January and 17 February 2014 resulting in 22 consultation responses. A Revised Draft Drought Plan 2014 and associated Statement of Response were published on 14 March 2014 and we are currently awaiting direction from Defra to publish the final version.

The key changes between our Final Drought Plan 2013 and the Revised Draft Drought Plan 2014 are:

- Drought actions included for Ennerdale Water:
  - Voluntary water use restrictions will occur more often (once every 2.6 years on average) to ensure demand savings are in place before applying for a drought order at this sensitive site.
  - We will need to apply for a drought order once every 3.6 years on average to allow sufficient time for a drought order to be determined by Defra.
  - At the same time as applying for a drought order we will start tankering treated water to service reservoirs normally supplied by Ennerdale Water, to reduce further abstraction from this environmentally sensitive site. This would be approximately 24 tanker deliveries per day.
  - We would expect to implement statutory powers to restrict water use (hosepipe ban) less than 1 in 20 years in accordance with our planned level of service.
  - We would expect to implement a drought order at Ennerdale Water less than 1 in 50 years. This will allow us to draw the lake level of Ennerdale Water down below the limit specified in our abstraction licence of 1.7m below top water level. We will not seek powers to change the flow in the River Ehen (i.e. this would remain at the same level of protection offered by the Environmental Damage Regulations Notice).
  - If we do implement a drought order, we will increase the tankering of treated water to approximately 76 tanker deliveries per day.
- A drought order for Ennerdale Water in West Cumbria has been included to allow lake draw down to 2.5m below top water level (compared to the existing 1.7m hands-off level)
- Drought triggers for Ennerdale Water updated
- We have developed a package of 'compensatory measures' for the River Ehen (below Ennerdale Water) under the advice of Natural England and the Environment Agency. This provides environmental compensation for all potential impacts to the River Ehen Special Area of Conservation as a result of continued abstraction (to no later than 2025, see Section 5.2) and a drought order. These measures, focused on enabling the recruitment of more freshwater mussels and salmon, are explained in more detail within our revised draft Drought Plan.

Ennerdale Water and the River Ehen are environmentally sensitive sites and this means that we need to ask our customers in West Cumbria to reduce their water use more than customers in the rest of the North West region. We plan to stop abstracting from Ennerdale Water as soon as possible by completing the Thirlmere transfer into West Cumbria. Once complete, customers in West Cumbria will receive the benefits of being part of a very resilient integrated water supply system and we will never again need to consider drought orders at Ennerdale Water.

## 5.2 A NEW DRAFT WATER RESOURCES MANAGEMENT PLAN

We have been developing our revised draft Water Resources Management Plan 2013 over the last two years and we have now published this revised draft plan following public consultation.

### 5.2.1 Developing our plan

We updated all aspects of the plan for the 25 year planning period from 2015-40. In developing the new plan, we have:

- Prepared demand forecasts for each resource zone with updated:
  - Plans and the latest census information
  - Weather impact modelling carried out by the Metereological Office to better understand the likely impacts of a dry year
  - Climate change impacts using the latest UKWIR methods and UK Climate Projections 2009 (UKCP09)

- Reviewed leakage estimates, set water efficiency targets and developed a revised forecast of free meter uptake by customers
- Carried out a supply capability review for each resource zone using improved modelling tools to identify available water volumes after the impacts of:
  - Sustainability reductions driven by the EU Water Framework and Habitats Directives
  - Climate change using UK Climate Projections 2009 (UKCP09)
- Made an allowance for the uncertainties in our forecasts in our target headroom assessment, to ensure our plans are resilient
- Defined the future supply-demand balance of each resource zone
- Prepared an exhaustive list of options to tackle any deficit, and screened this down to a 'feasible' list. These were then assessed based on their whole-life costs (including detailed social and environmental impacts) to ensure value for money for our customers, whilst meeting our environmental obligations
- Published a Strategic Environmental Assessment and a Habitats Regulation Assessment of the proposed plan to identify any risks of adverse impacts on the environment
- Completed an extensive stakeholder and customer consultation programme to help us shape the plan

### 5.2.2 Tackling the West Cumbria deficit

Our analysis carried out for our revised draft Water Resources Management Plan indicates that there will be a surplus of supply over demand in three of our four resource zones, covering more than 97% of our customers. However, in order to meet statutory obligations under the EU Habitats Directive to protect England's largest population of freshwater mussels, the Environment Agency will revoke our licence to abstract water from Ennerdale Water. The impacts of this change will lead to a forecast supply-demand deficit of over 33 Ml/d (see Figure 18) in the West Cumbria Resource Zone.

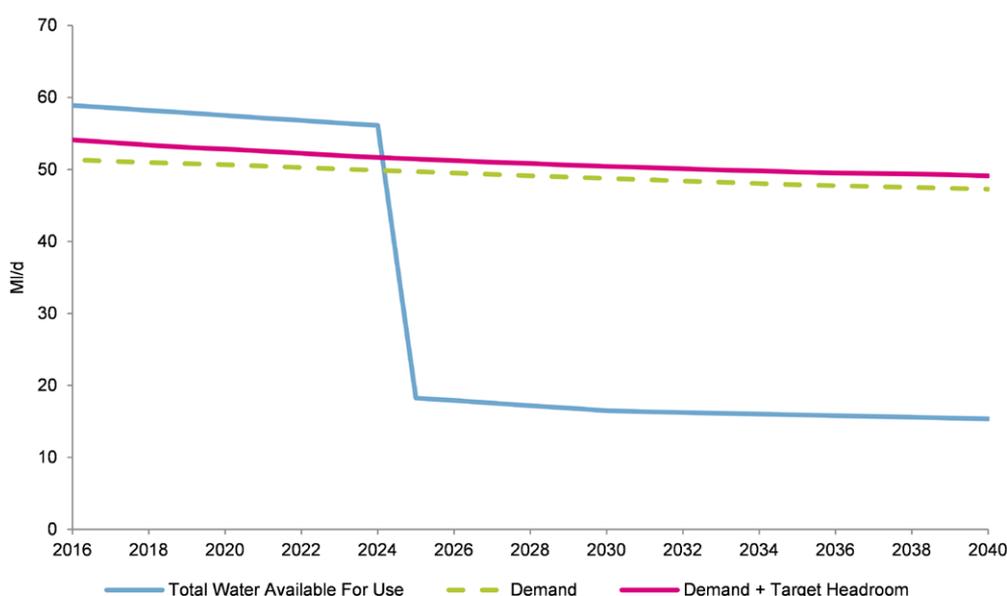


Figure 18 Supply-demand balance in the West Cumbria Resource Zone from the revised draft Water Resource Management Plan 2013

We carried out a full appraisal of all the options identified to address the deficit in the supply-demand balance of the West Cumbria Resource Zone. We established that further reductions in leakage, enhanced water efficiency and increased customer metering would not contribute significantly to reducing the deficit, and were not viable as part of the proposed scheme on cost or feasibility grounds. The result of the option appraisal identified three distinct solutions:

- Local sources
- Thirlmere transfer from our Integrated Resource Zone
- Import from Northumbrian Water's Kielder reservoir

We consulted with customers and stakeholders on these three alternative solutions for solving the deficit.

Our preferred solution to the supply-demand deficit in the West Cumbria Resource Zone is to use surplus water in our Integrated Resource Zone to supply West Cumbria from Thirlmere reservoir (depicted in Figure 19).

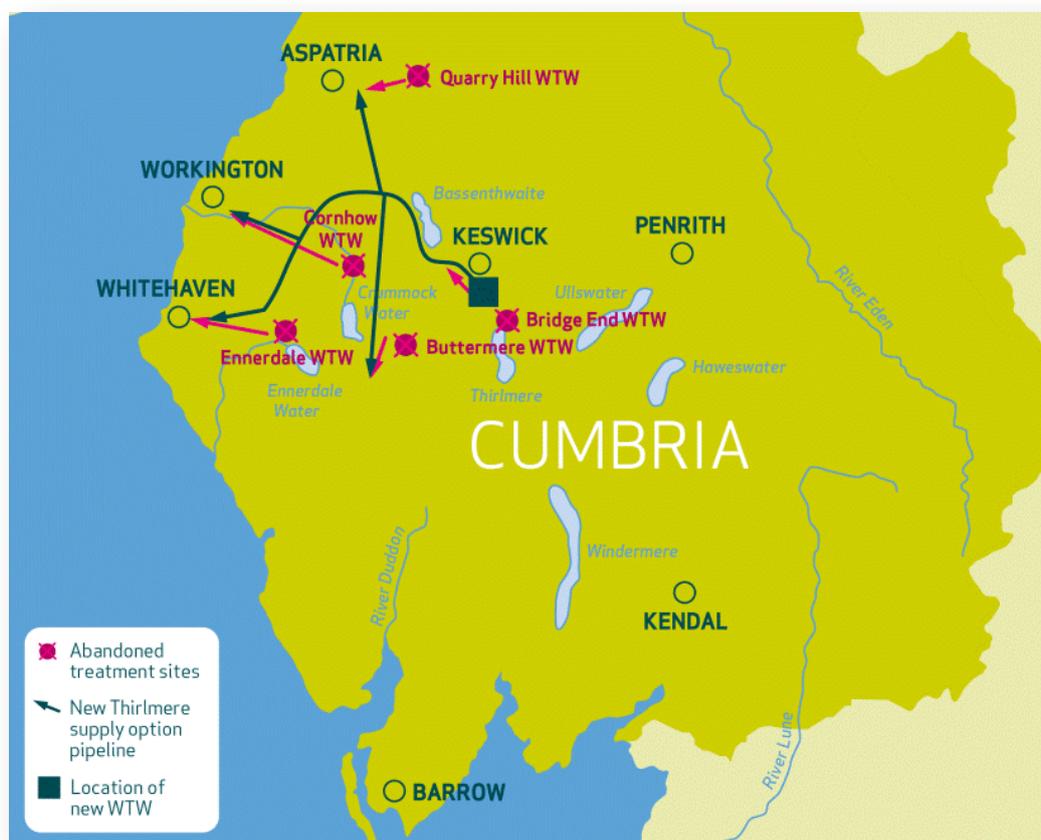


Figure 19 Map of West Cumbria showing the preferred option and abandoned source/treatment sites

Following consultation, we concluded that Thirlmere was the only feasible solution to meeting our legal obligations. Our revised draft Water Resources Management Plan demonstrates why our preferred plan delivers significant medium to long-term benefits and lower environmental risk. In the plan, we said that the most likely completion date for this scheme was 2024/25. We also said that if we are able to deliver earlier than these estimates, we will stop abstracting from Ennerdale Water before 2024/25.

We have already setup a project team to progress this solution, with a view to achieving the security of supply and environmental benefits as soon as possible subject to planning and environmental approval. The team has undertaken a review of the project schedule, in particular the timeline to a planning decision. As a result of good engagement with local communities and planning/highways officers, we are sufficiently confident that planning should be capable of being achieved in late 2016, rather than late 2018 as per the schedule developed for the revised draft Water Resources Management Plan. Consequently the most likely completion date for the project, and therefore the revocation of the abstraction licence, is 31 March 2022. This is three years earlier than the 2024/25 date estimated in the revised draft Water Resources Management Plan. However, it should be noted that there are still project risks (planning and construction), some of which are outside the company's control, which may have an impact on the completion date for the project. We intend to use this accelerated schedule as an input to our updated Business Plan submission to Ofwat on 27 June 2014.

On 2nd April 2014 we were notified that the Secretary of State has decided to exercise his power to call for an examination in public of the company's draft revised draft Water Resources Management Plan specifically for the West Cumbria resource zone. On the 16th June 2014 we received information from Defra on the scope and format of the examination and we are currently reviewing this detail. The hearing is due to commence on the 15th September 2014 and potentially run until the 10th October 2014.

## 6: Conclusions



We've made good progress delivering against our 2009 Water Resources Management Plan during 2013/14, in particular delivering outperformance on our leakage and water efficiency targets for the critical West Cumbria Resource Zone where resources are finely balanced. Our total regional leakage was also significantly lower than the Ofwat target for 2013/14, and was below the 2014/15 target level.

We've progressed a wide range of activities to maintain reliable water resources and protect the environment. We completed improved intake screening on the River Dee, increased river flows in the Rivers Brennand and Whitendale, and reduced abstraction at three of our most environmentally sensitive sources. In particular, we targeted reductions in abstraction at Ennerdale Water, and will continue to do so in 2014/15 whilst we work towards a permanent solution to allow revocation of the abstraction licence at Ennerdale Water.

We have developed new plans, both at the revised draft phase of development, covering water resources for the next 25-years, and our approach to managing the impacts of drought. These plans can be found at the links below:

Revised draft Water Resources Management Plan 2013 - [corporate.unitedutilities.com/Water-Resources-Management-Plan](http://corporate.unitedutilities.com/Water-Resources-Management-Plan)

Revised draft Drought Plan 2014 - [corporate.unitedutilities.com/waterresourcesplan](http://corporate.unitedutilities.com/waterresourcesplan)