

south east water

# River Ouse

Protecting our  
water resources

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# Introduction

**Our drinking water resources in the River Ouse catchment are being compromised by increasing levels of metaldehyde and turbidity.**

**This leaflet explains the investigations we have carried out to identify the cause, our recommended approach to dealing with the problem, and our proposals for the future.**



South East Water provides top quality drinking water to 2.2 million people in the south east of England within a supply area of 5700 km<sup>2</sup>. Through a network of more than 14,780 kilometres of pipelines, we deliver 526 million litres of water every day to our customers.

## Introduction

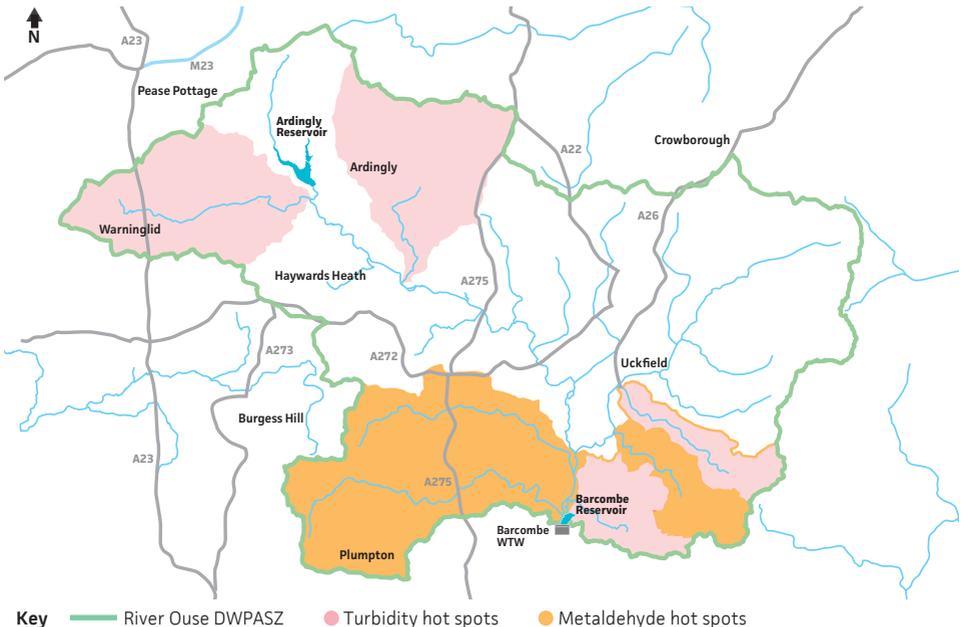
**Over 70 per cent of the water we supply comes from groundwater resources, the remainder comes from surface water sources and bulk supplies from neighbouring water companies.**

Our water treatment works at Barcombe is strategically important. It supplies water to more than 300,000 households and businesses across Sussex. The major towns served by the Barcombe works are Uckfield, Haywards Heath and East Grinstead, as well as a significant rural area spanning both West and East Sussex.

## Drinking Water Protected Area Safeguard Zone

The Environment Agency identifies Safeguard Zones for Drinking Water Protected Areas 'at risk' of not meeting Water Framework Directive drinking water objectives. Safeguard Zones are non-statutory areas where land use and management practices may affect the quality of raw water.

### River Ouse Drinking Water Protected Area Safeguard Zone (DWPASZ)

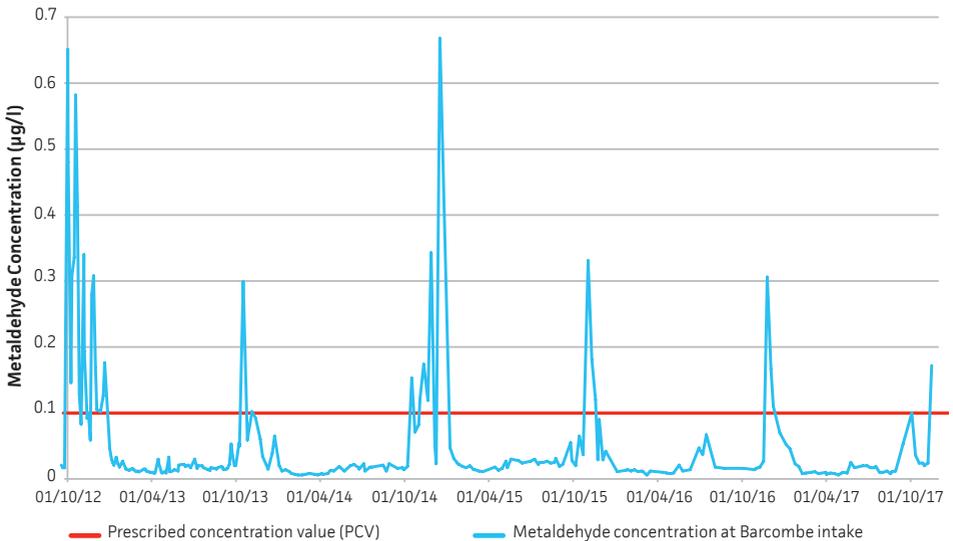


## Metaldehyde

Metaldehyde is a selective pesticide used by farmers and gardeners to control slugs and snails in a wide variety of crops. Technically it is known as a 'molluscicide' and its action is very specific to slugs and snails. It is sold under a variety of brand names in pellet form.

Pellets applied to crops and plants find their way into drains and water courses either directly during application, or as a result of run off during heavy rainfall. Levels of metaldehyde have been detected in trace concentrations in the rivers or reservoirs used for drinking water.

### Metaldehyde concentration at Barcombe intake (October 2012 – October 2017)



PCV is the maximum legally permitted level in drinking water as regulated by the Drinking Water Inspectorate.

As the graph shows, since 2012 the raw water we abstract from the River Ouse has become adversely affected by high levels of metaldehyde.

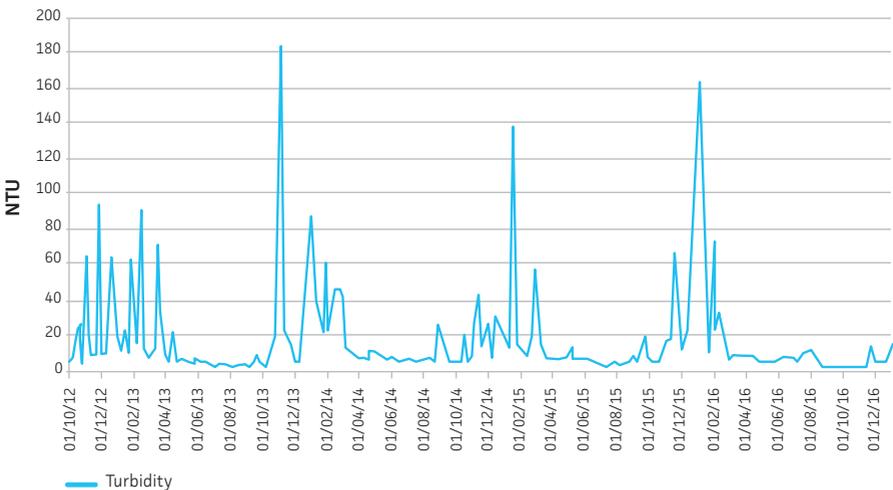
## Turbidity

Turbidity is a measure of the degree to which the water loses its transparency due to the presence of suspended particulates. The more total suspended solids in the water, the murkier it seems and the higher the turbidity.

Increased turbidity poses a problem for water companies as it requires additional use of flocculation chemicals to remove it at the treatment works. It can also increase the rate of filter backwashing and increase sludge and waste handling, thus requiring additional investment over time.

The most significant levels of turbidity are likely to occur in autumn/winter due to: periods of heavy rainfall causing surface water run off (e.g. from fields and roads) and higher river flows; when fields are ploughed for winter crops; and when fields are poached or damaged by livestock, including horses.

Turbidity levels at the Barcombe Mills Water Treatment Works intake (October 2012 – October 2016)



As the graph shows, since 2012 the raw water we abstract from the River Ouse has become adversely affected by high levels of turbidity.

# Our investigations

**Our investigations found significant levels of metaldehyde and turbidity in the River Ouse catchment contributing to a deterioration of drinking water quality.**



*Our investigations were carried out under the National Environment Programme. This is a programme of environmental improvement schemes to ensure we meet European Directives, national targets and environmental obligations. One of the requirements of the programme is to consider whether it is cost beneficial to develop catchment management measures before proposing an increase in drinking water treatment.*

## Our investigations

**We carried out extensive investigations in the catchment area to identify the possible sources of metaldehyde and turbidity and their pathways to water, with the aim of finding a solution. These investigations included:**

- *characterising the catchment*
- *land use surveys*
- *walkover surveys*
- *studying aerial photographs*
- *metaldehyde and turbidity modelling*
- *catchment monitoring*
- *stakeholder engagement*
- *cover crop trials*

The River Ouse is the second largest river in Sussex, draining a catchment of approximately 430 km<sup>2</sup> to the point where it breaches the chalk escarpment of the South Downs at Lewes, before flowing to the English Channel at Newhaven.

The rural land uses can be broadly summarised as woodland, heathland and pasture in the High Weald to the north of the catchment, moving to arable and pasture in the Low Weald further south. This changing landscape influences the predominant farm types, which include arable, dairy, beef and sheep.

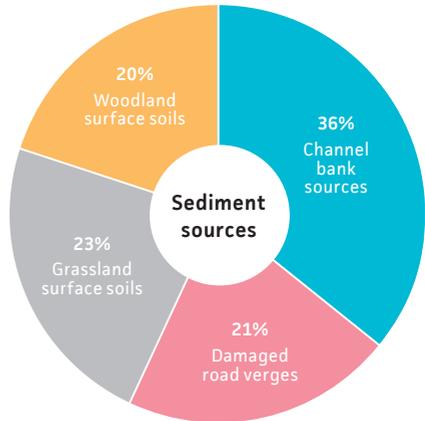
## Sediment sources

Many catchments are experiencing pressures arising from excess loadings of sediment delivered to rivers from a variety of sources.

Reliable information on catchment sediment sources is required for assisting the design and implementation of catchment management strategies. We commissioned RSK ADAS Ltd to undertake a source tracing study to investigate the provenance of fine-grained bed sediment in the Bevern Stream and Cockhaise Brook tributaries of the River Ouse.

The pie chart shows the results of these investigations and the main contributing source types collected from the Cockhaise Brook outlet.

The study also found that fine sediment from damaged road verges and grassland soils were the main contributing factors in the Bevern Stream. River channel and river bank erosion combined with grassland surface soils were the most significant sources in the Cockhaise Brook.



### Maize crop trials

Ongoing monitoring and catchment studies have identified maize as a high-risk crop. Maize is a relatively high-input crop and is generally harvested late in the year. This often leaves bare, compacted soils over the winter months which can lead to high levels of soil erosion, and run-off or leaching of nutrients and pesticides.

In 2015, we began a series of maize field trials in collaboration with the Farming and Wildlife Advisory Group. Two host farms were identified and recruited. The demonstration plots included different tillage techniques, cover crop seed mixes and methods of crop establishment.



The effectiveness of the trials was measured using pioneering techniques, such as porous pots to measure nitrate loss, soil sampling and analysis to measure soil health and plant tissue analysis to measure fodder value for livestock feed.

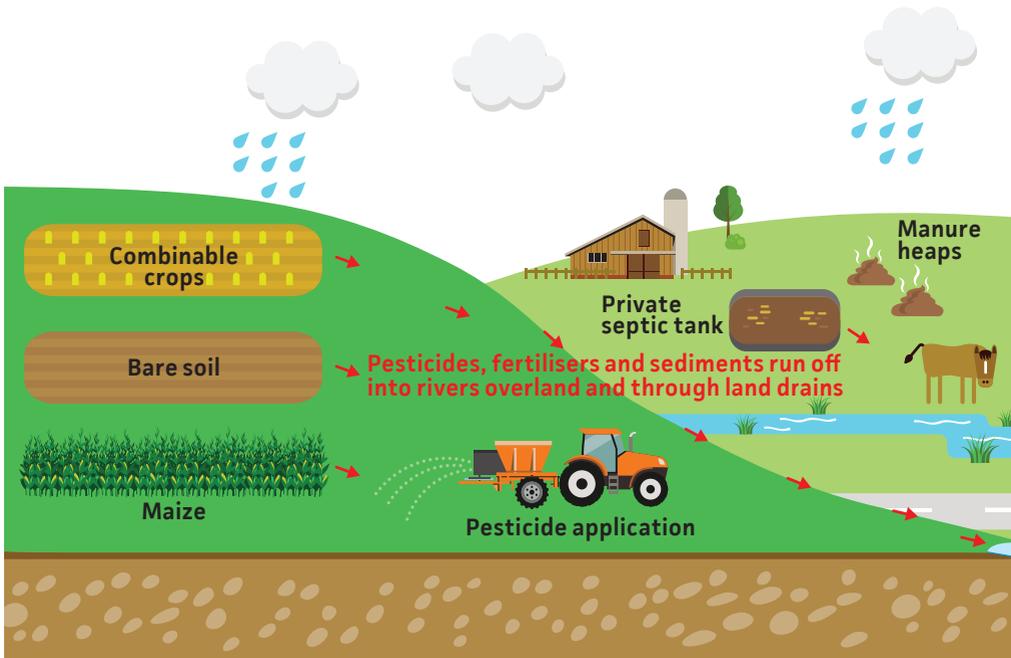
We have run a series of well-attended farm workshops to promote best practice maize production.



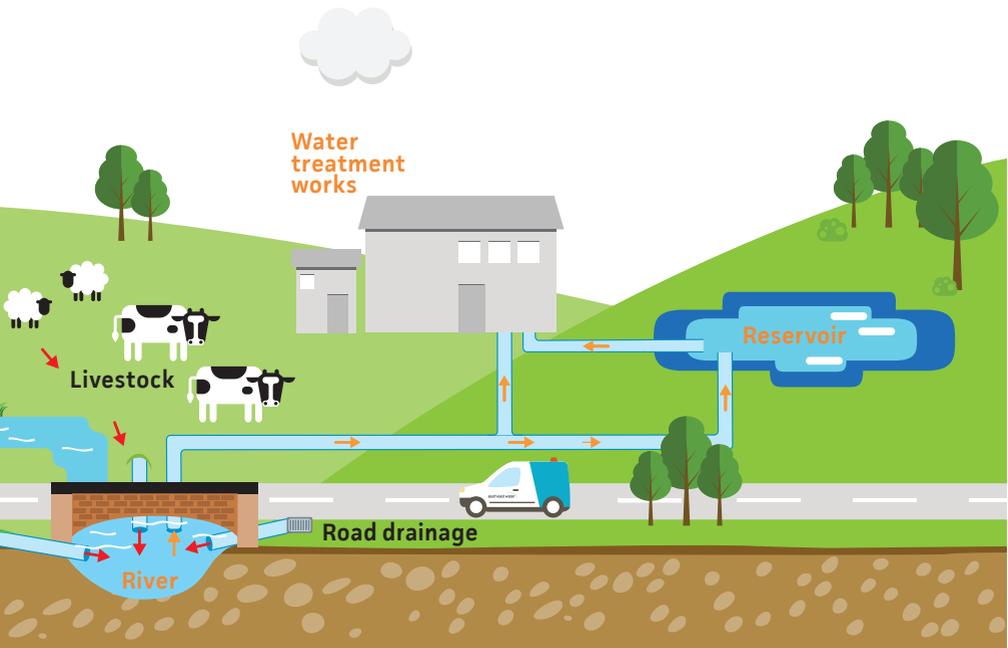
Catchment management demonstration workshop

## Source Pathway Receptor

Our Source-Pathway-Receptor model identifies the sources of pollutants, how the pollutants reach the surface water in the catchment and how the River Ouse flows to Barcombe Water Treatment Works.



- **Source** – pesticides applied to the land, soil erosion, river bank erosion, livestock, horses, manure heaps, waste water discharges
- **Pathway** – surface water runoff into streams and ditches across the catchment
- **Receptor** – contaminated surface water abstracted at the water treatment works



# Our preferred solution

**We believe a catchment management approach will not only provide a preferable alternative to increasing water treatment processes, but also deliver considerable benefits to farmers, landowners and the environment.**



## Our preferred solution

Our investigations identified that if nothing is done to reduce levels of metaldehyde and turbidity in the River Ouse catchment, concentrations may continue to rise. Clearly a 'do nothing' approach is unacceptable and may lead to increased water treatment processes in future years. Some degree of intervention is required to prevent further deterioration of water quality in the River Ouse and to avoid the need for increased water treatment.



Working with farmers is key to developing our catchment management solution

### Catchment management

Our preferred approach to improving the water quality situation is a long-term catchment management programme. From 2017 to 2020 we will do this by:

- *continuing to monitor water quality levels at Barcombe Water Treatment Works abstraction point and across the River Ouse catchment*
- *analysing monitoring data to identify hot spots and prioritise our resources into high risk areas*
- *seeking to support farmers in achieving their objectives for food production and promoting land management practices that reduce soil erosion and pesticide losses to the environment*
- *engaging with key stakeholders in the catchment to form partnerships and drive forward our catchment management programme*

## Complementing our vision and strategy

*Our vision is to be the water company people want to be supplied by and want to work for. In forming our plans for 2020 to 2025, we consulted more than 13,000 customers to ensure we are working towards their priorities for the future. As a result, we know what our customers expect – a reliable supply of high quality drinking water that is considered good value for money.*

*Our catchment management approach complements our corporate vision by influencing decisions made by landowners to prevent pollution from entering raw water sources.*

*From our 2017 customer engagement groups, catchment management came in the top three activities that our customers said we should be delivering.*

We will roll out a capital grants scheme to enable farmers to bid for part-funding to mitigate diffuse pollution. This could involve installation of biobeds or biofilters, improved pesticide handling areas or in-field measures such as buffer strips, sediment traps, constructed wetlands or managing field corners. The scheme will provide specifically tailored mitigation measures for local requirements.

Current treatment options capable of removing up to 90 per cent of metaldehyde levels from the raw water are costly. The estimated cost of building a metaldehyde removal plant at Barcombe Water Treatment Works along with high operational costs makes this technology economically unviable and environmentally unsustainable.

## Catchment Sensitive Farming

During our investigations we partnered with Catchment Sensitive Farming to help us develop our catchment management solution. Catchment Sensitive Farming is a voluntary brand, which is recognised and trusted by farmers, and is:

- *proven to have a positive effect upon farming attitudes via direct farmer engagement, especially through long term engagement and support*
- *can also help to link farmers and land managers to other services and advice sources, including agricultural environmental schemes*



By working in partnership with Catchment Sensitive Farming we are engaging more effectively with the local agricultural community. This helps to raise awareness, explain the water quality issues, and seeks mutually beneficial solutions. Our engagement through Catchment Sensitive Farming included newsletters, individual one to one farm visits and hosting agricultural workshops. We will continue to work with Catchment Sensitive Farming to help reduce nitrate inputs and to seek new and innovative ways to measure success as we move forward.



# Our future plans

Local farmers and landowners have told us they are concerned about the effect they may be having on the environment and are keen to work with us to reduce their impact.



## Our future plans

**We will continue to talk to and raise awareness about the concerns of metaldehyde and turbidity levels with all our key stakeholders: Catchment Sensitive Farming, Environment Agency, Natural England, the local agricultural community, agronomists and private land owners. We will also continue to monitor water quality levels across the catchment.**

We understand that farmers face numerous challenges including increased productivity and changing environmental conditions. Our catchment management solution offers a mutually beneficial approach by improving soil health and crop yield, whilst protecting the local environment.

### Support and incentives

Our Catchment Officers will continue to deliver targeted and practical advice on a one-to-one basis and through training events and workshops. In some areas we have able to support Catchment Officer advice with a range of free services. These include:

- *one-to-one confidential on farm advice*
- *specialist reports with recommendations tailored towards the farm business*
- *workshops and events providing up-to-date guidance and advice*
- *soil husbandry and nutrient planning advice (including standard soil sampling)*
- *calibration of fertiliser applicators, slug pellet machinery and pesticide sprayers*

### Capital Grant Scheme

In addition to the support services listed above, we have developed a Capital Grant Scheme to aid infrastructure improvements. Working with local farmers and growers we will continually appraise our Grant Scheme to determine what we should incentivise now, and how we prioritise and implement solutions in the future. Future capital grant support could include and assist with:

- *enhanced maize management*
- *minimum tillage or zero tillage crop establishment techniques*
- *establishing cover crops over winter*
- *introducing grass into an arable crop rotation*
- *replacing arable land with pasture*

## Continuation of crop trials

As the maize crop trials have proven to help reduce soil erosion and nitrate leaching, we are continuing to fund the trial and working with the Farming and Wildlife Advisory Group to provide further information about the benefits of enhanced maize management in:

- *helping to prevent nitrate leaching*
- *keeping soil covered over winter*
- *improving soil structure and providing organic matter*
- *suppressing weeds*



Example of cover crop mix

## Working with natural processes

We recognise there are opportunities to enhance catchment resilience to flooding and drought by working with natural processes to store and slow water in the landscape. Measures that aim to slow down surface water flows and increase percolation rates to soils can also have a positive effect on water quality. Measures may include:

- *planting new hedgerows or restoring lost hedgerows*
- *planting woodland buffers alongside watercourses*
- *buffer strips in arable fields*
- *creating sediment traps, wetlands and ponds*

We are committed to working with stakeholders to understand where and how these measures can best be targeted and implemented, and their benefits assessed.

## Timescales

Our catchment management programme has been designed as a long-term strategy. Some immediate improvements in land use and management may result in quick impacts on water quality and help to minimise seasonal metaldehyde and turbidity peaks, particularly if the improvements are near rapid flow pathways in the catchment. However, due to the size and scale of the catchment, we have identified a number of high priority areas to begin pilot trials in order to test the effectiveness of these measures.

So far, our work in the River Ouse has evolved around catchment investigations and pilot trials of catchment measures. We will move to a programme of catchment management delivery in 2020 (the start of our Asset Management Plan 7). From 2020 we will be in a position to deliver on the ground improvements for water quality and the environment.



Our catchment management programme is a long-term solution to ensure future generations continue to have a supply of high quality drinking water.

## Get involved

**If you would like to get involved, please contact our Catchment Management Team to find out more. Contact details are on the back cover.**



Our Catchment Management Team

## Find out more

**South East Water**

Catchment Management Team



[catchment@southeastwater.co.uk](mailto:catchment@southeastwater.co.uk)



South East Water  
Rocfort Road  
Snodland  
ME6 5AH