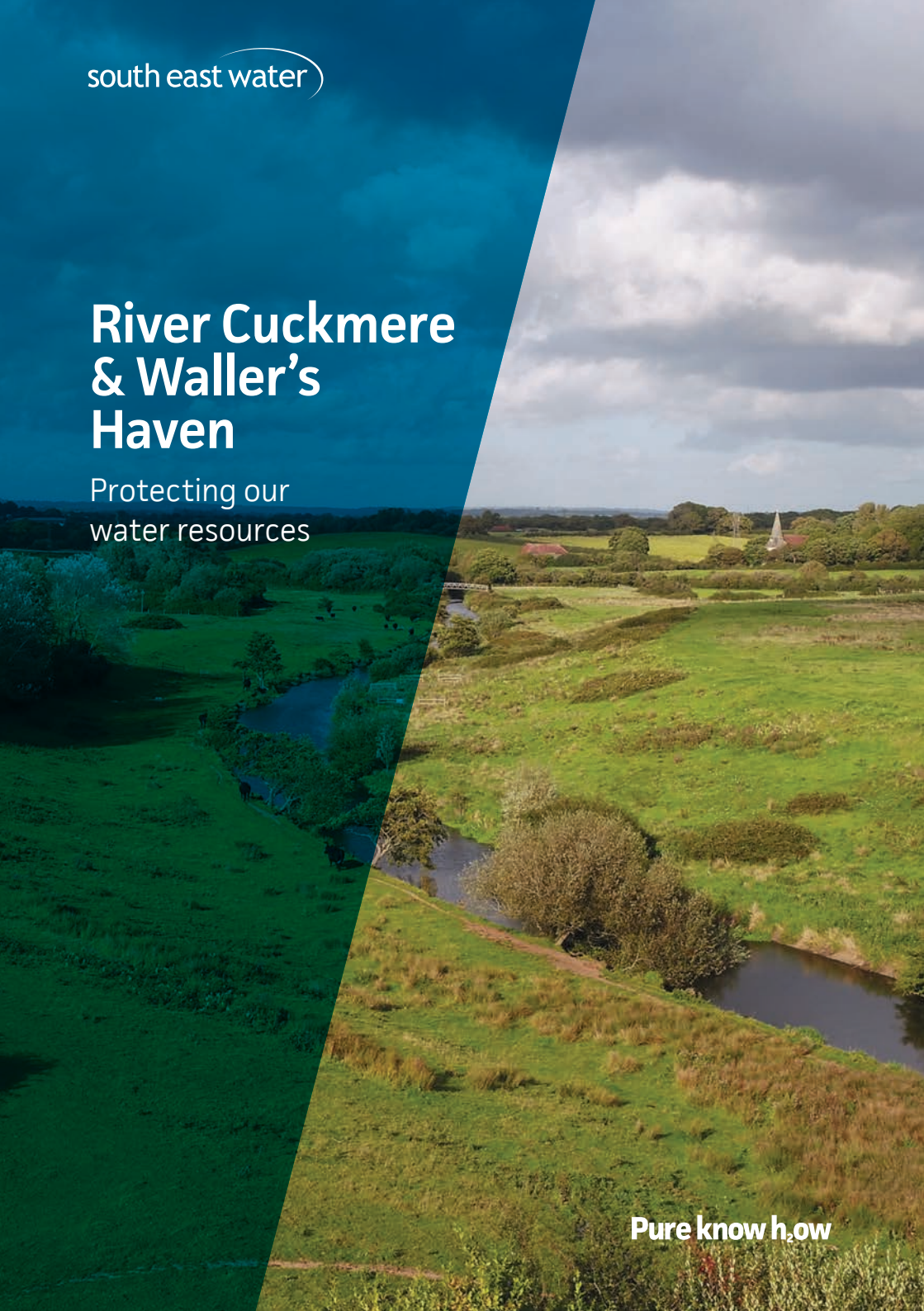
south east water

River Cuckmere & Waller's Haven

Protecting our water resources



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Introduction

Our drinking water resources in the River Cuckmere and Waller's Haven catchment are being compromised by increasing levels of metaldehyde.

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.

Photo courtesy of Johns Associates

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 km². Through a network of more than 9,000 miles of pipelines, we deliver 517 million litres of water every day to our customers.

Introduction

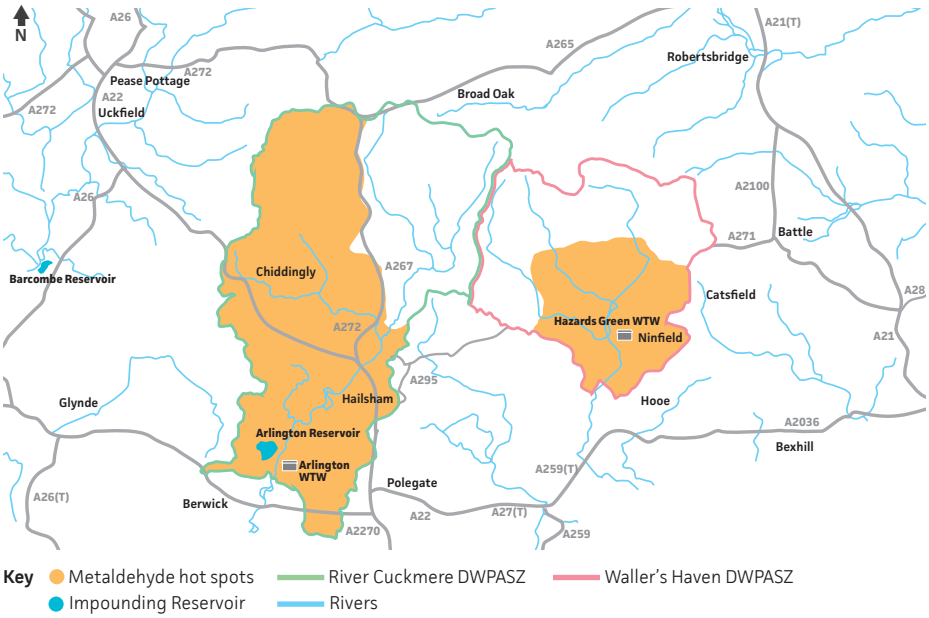
Over 70 per cent of the water we supply comes from groundwater resources, the remainder comes from surface water sources and bulk supplies from neighbouring water companies.

Our water treatment works at Arlington and Hazards Green are strategically important. They supply water to around 145,700 households and businesses across East Sussex. The major towns served by these works are Hailsham, Heathfield, Maynards Green, Asburnham, Bexhill and Sidley, as well as significant rural areas in 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 Cuckmere and Waller's Haven Drinking Water Protected Area Safeguard Zones

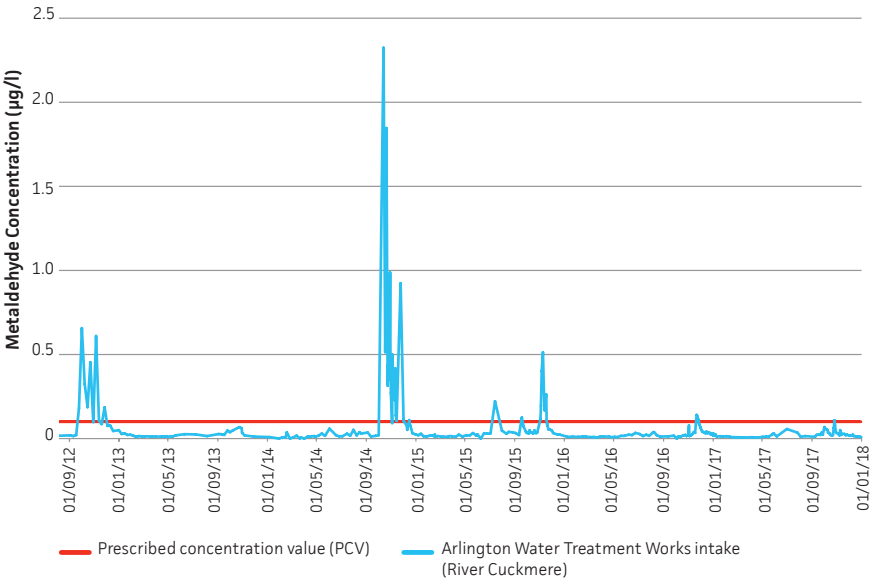


Metaldehyde

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.

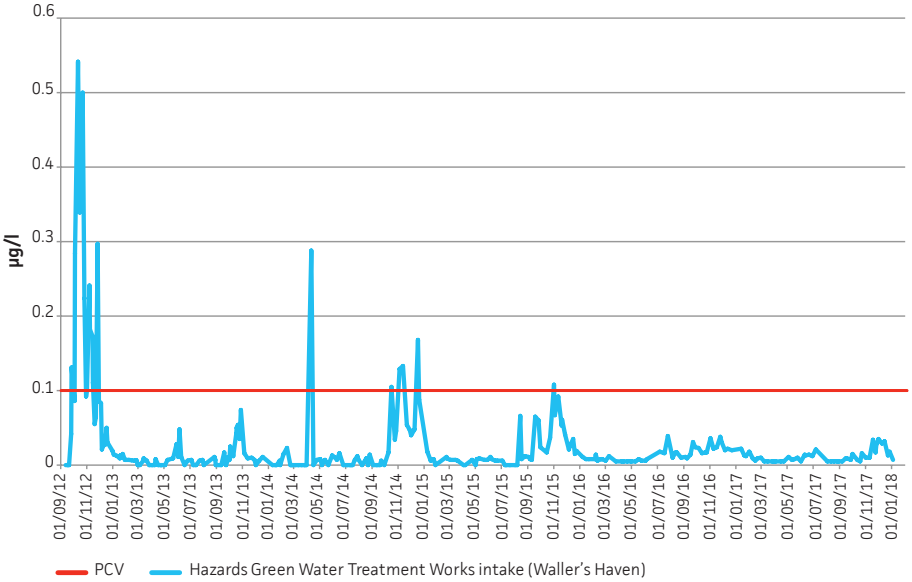
The metaldehyde in pellets applied to crops and plants find their way into drains and water courses either directly during application, or as a result of run off during heavy rainfall. Levels of metaldehyde have been detected in trace concentrations in the rivers or reservoirs used for drinking water.

Metaldehyde concentration at Arlington intake (September 2012 – January 2018)



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

Metaldehyde concentration at Hazards Green intake (September 2012 – January 2018)



As the graphs show, since 2012 the raw water we abstract from the River Cuckmere and Waller's Haven has become adversely affected by high levels of metaldehyde.

Peak concentrations of metaldehyde occur in the autumn months which coincides with the application of slug pellets to protect newly sown winter cereals and winter oil seed rape.

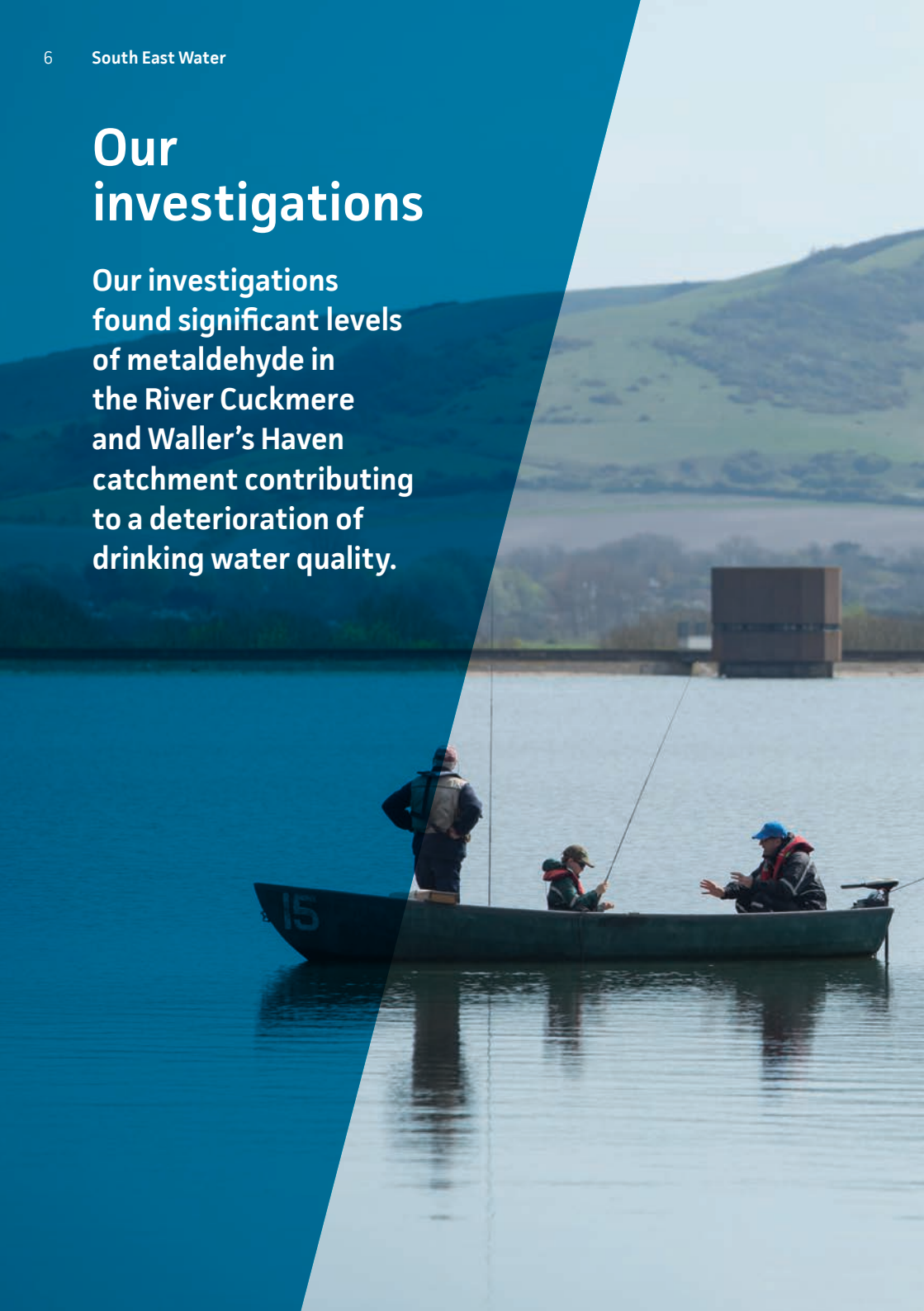
The treatment of pesticides is dependent upon their physical and chemical properties. The characteristics of metaldehyde mean that it is not effectively removed by adsorption onto activated carbon – the normal treatment for removing any pesticides that may be present in raw water. In addition, the relatively simple structure of metaldehyde means it cannot be broken down by other water treatment processes using chlorine or ozone.

It is therefore a very difficult compound to remove even using existing advanced water treatment processes. Further research is being carried out into other treatment methods, however the current options are expensive and environmentally unsustainable.

In order to comply with drinking water standards, different sources of water are blended to reduce metaldehyde levels.

Our investigations

Our investigations found significant levels of metaldehyde in the River Cuckmere and Waller's Haven 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 and studies in the catchment areas to identify the possible sources of metaldehyde and its pathway to water, with the aim of finding a solution. These investigations included:

- *characterising the catchment*
- *metaldehyde modelling*
- *land use surveys*
- *catchment monitoring*
- *catchment walkover surveys*
- *desktop study*
- *analysis of baseline data on soils*
- *geology and topography*
- *stakeholder engagement*
- *studying aerial photographs*

The River Cuckmere and Waller's Haven drain a combined catchment of approximately 170 square kilometres of mixed farming and woodlands. Their tributaries rise in the north of the catchments in the High Weald, an area of sandstone scarps, rolling hills, grazing meadows and ancient woodlands. From there the rivers flow southward into more intensively farmed lowland areas where winter cereals and oil seed rape crops are grown.

Waller's Haven downstream of Boreham Bridge

Metaldehyde sources and pathways to water

The outcomes of our investigations and studies to help us understand the sources and pathways of metaldehyde are described in the table below.

Catchment	Substance	Investigation outcomes
River Cuckmere	Metaldehyde	Metaldehyde continues to be a significant risk affecting the raw water storage reservoir at Arlington. Legacy metaldehyde may be persistent in Arlington Reservoir and therefore any additional concentrations added via the raw water abstraction may put the water treatment works at risk. The majority of metaldehyde peaks in the river have occurred between the months of September and December which corresponds with the main period when metaldehyde is applied to arable fields. Catchment measures will be most effective by targeting arable parcels in high risk areas of the catchment (see map on page 3).
Wallers Haven	Metaldehyde	Drinking water supplied from the Wallers Haven catchment continues to be at risk of metaldehyde pollution. There are a number of one-off high monitoring results, whilst the average result remains much lower than historically. The majority of metaldehyde spikes in the river above the drinking water standard occurred between September and December, which corresponds with metaldehyde applications to arable fields.

The most likely pathways for metaldehyde to enter water courses, are following heavy rainfall which causes leaching through the soil and losses via surface run off. Loses can also occur via a stray pellet falling from machinery, or the residue from pellet spreading equipment that gets washed away into farm drains.

Some farming methods can present an increased risk of metaldehyde pollution. The most significant risks occur when pellets are applied to land that slopes towards a watercourse or on to heavy clay soils that are under-drained.

Working with the farming community

The approach we are taking to address the issue of metaldehyde is to focus on practical interventions. We work directly with farmers, land managers and agronomists to raise awareness of the issue, and to explain the challenge metaldehyde presents to us.

Farmers and agronomists have been instrumental in helping us think through the best ways to tackle the issue. Our farmer led focus groups helped us to identify a package of incentives and services that could be offered to land managers in the River Cuckmere and Wallers Haven catchments.

In 2015/16 we set up a series of field trials which demonstrated that the alternative pesticide, ferric phosphate, works equally well when compared to metaldehyde in controlling slug damage to vulnerable crops. Ferric phosphate has no negative impacts in water and does not require costly water treatment.

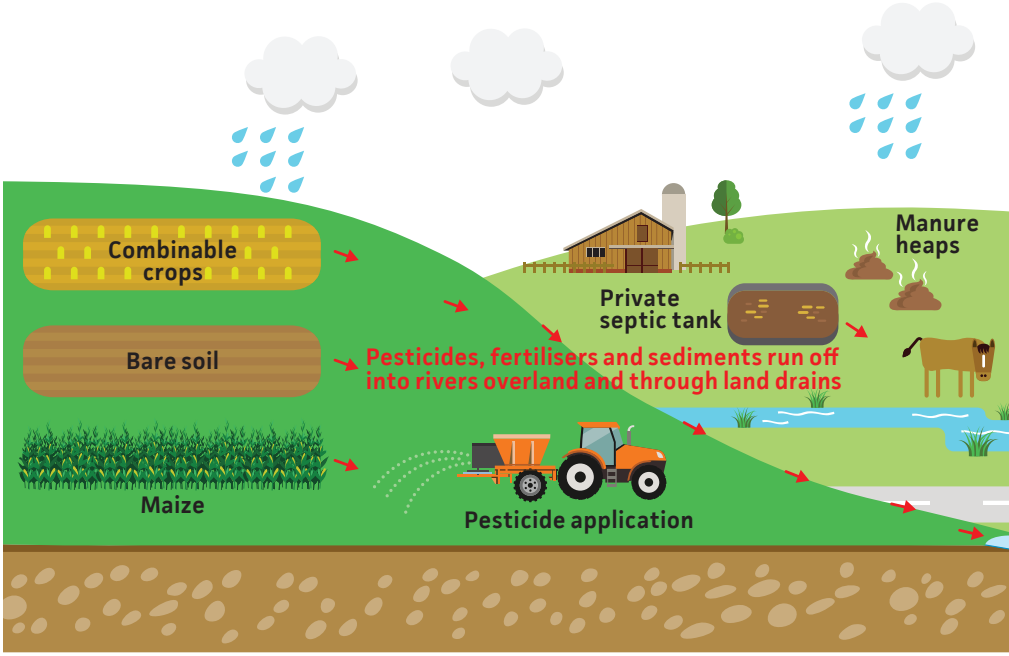
To encourage farmers to reduce their use of metaldehyde, we are offering a number of support options which include:

- *payment incentives to stop using metaldehyde – these have proven popular amongst eligible farmers with a good uptake*
- *promotional events and newsletters about alternative slug control methods, including ferric phosphate and integrated pest management*
- *engaging with agronomists and farmers to help them understand the key factors that raise the risk of metaldehdye entering water courses – e.g. slope, soil, geology and proximity of arable fields to water courses*
- *regular updates on metaldehyde levels in surface waters, so that farmers can see where progress is being made*

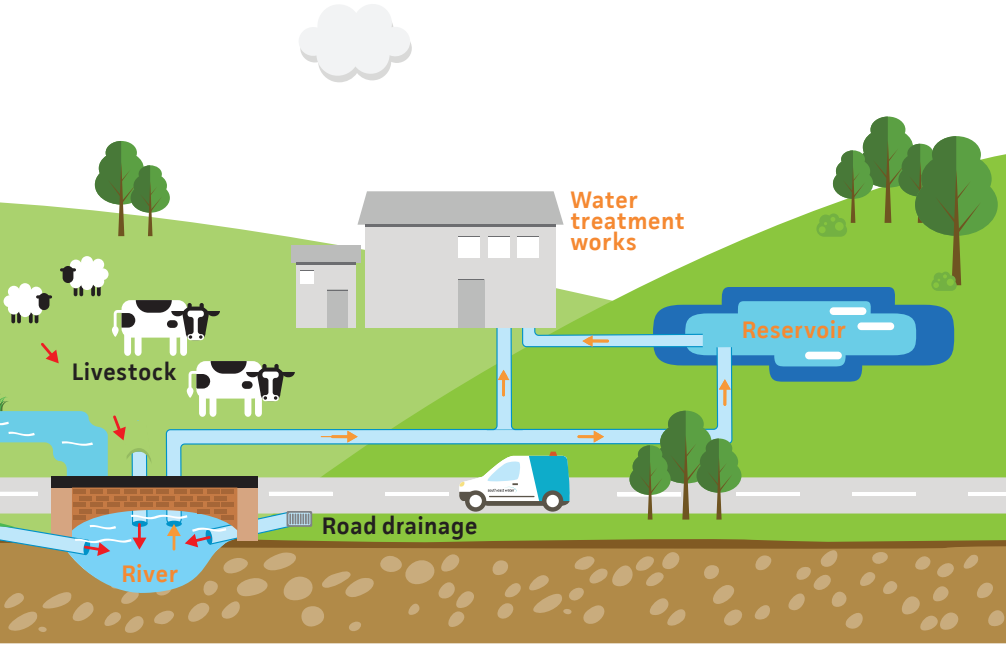
Best practice demonstration for correctly applying metaldehyde

Source Pathway Receptor

Our Source-Pathway-Receptor model identifies the sources of metaldehyde and pollutants, how pollutants reach the surface water in the catchment, and how water abstracted from the River Cuckmere and Waller's Haven flows to Arlington and Hazards Green 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 provide an alternative to expensive water treatment processes, and also deliver considerable benefits to the environment.

Photo courtesy of Johns Associates

Our preferred solution

Our investigations identified that if nothing is done to reduce levels of metaldehyde in the River Cuckmere and Waller's Haven 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 to avoid the need for costly increased water treatment.

Catchment management demonstration workshop

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 Arlington and Hazards Green Water Treatment Works abstraction points and across the River Cuckmere and Waller's Haven 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 2015 to 2020, we consulted more than 8,000 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.

In the future 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 Arlington and Hazards Green 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 government funded project, which is recognised and trusted by farmers, and:

- *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 includes newsletters, individual one to one farm visits and hosting agricultural workshops. We will continue to work with Catchment Sensitive Farming to help reduce metaldehyde levels and to seek new and innovative ways to measure success as we move forward.

A clear solution for farmers
CATCHMENT SENSITIVE FARMING

NATURAL ENGLAND

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 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 are 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

We have developed and trialled a Capital Grant Scheme in the River Ouse catchment to aid infrastructure improvements. In future, this Scheme will be rolled out to the River Cuckmere and Waller's Haven catchment areas. 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 crop 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*

Sustainable farming practices

We will continue to support and work with farmers in looking to develop sustainable farming practices and methods of reducing the environmental impact on water resources. One such method which has been successfully trialled is the use of cover crops, which has been shown to:

- *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 peaks, particularly if the improvements are near rapid flow pathways in the catchment.

So far, our work in the River Cuckmere and Waller's Haven has evolved around catchment investigations, monitoring water quality and researching the challenges around its deterioration. 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

south east water

Find out more

South East Water
Catchment Management Team

catchment@southeastwater.co.uk

South East Water
Rocfort Road
Snodland
ME6 5AH

NEP/CWH/0918-1

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