Anglian Water’s AMP5 Catchment Management Programme

Wensum DTC Conference – 15th July 2010

Simon Eyre
Source Protection Manager
Water Resources Management Team
Anglian Water Services
Contents of presentation

- Overview Anglian Water resources
- Abstraction in the Wensum
- Water Quality
- Water Treatment
- Catchment Management
Anglian Water

- Geographically the largest water company in England and Wales.
- 4.2 million water customers and 5.6 million wastewater customers.
- Abstraction of c.1200 ML/d
Catchments

50% of our raw water comes from groundwater and 50% is from surface water.

Groundwater:
• 226 sources, >500 boreholes

Surface water:
• 9 reservoirs and 8 direct intakes
• Direct river abstraction into the treatment works
• Pumping of water from a river into an impounding reservoir
• Natural flow from streams and storage in reservoirs
Wensum catchment

**Catchment area:** 556 km²  
**Catchment geology:** Predominantly Chalk catchment with 95% superficial deposits, mainly Boulder Clay but with sands and gravels in valley bottoms.
Wensum Abstractions (ML/a)

Wensum Catchment Annual Licence Quantities (ML)

<table>
<thead>
<tr>
<th>Source Name</th>
<th>Source</th>
<th>Ann. Licence (ML)</th>
<th>Daily Licence (ML)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costessey Pits</td>
<td>R.Wensum</td>
<td>17000</td>
<td>140</td>
</tr>
<tr>
<td>Lyng Forge and Sparham Hill</td>
<td>Chalk</td>
<td>1495</td>
<td>6</td>
</tr>
<tr>
<td>East Dereham and Hoe</td>
<td>Chalk</td>
<td>1364</td>
<td>4.1</td>
</tr>
<tr>
<td>Beetley</td>
<td>Chalk</td>
<td>1100</td>
<td>4</td>
</tr>
<tr>
<td>Foulsham and Skitfield Road</td>
<td>Chalk</td>
<td>400</td>
<td>1.5</td>
</tr>
<tr>
<td>Salle Bridge</td>
<td>Chalk</td>
<td>310</td>
<td>1.25</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>21669</strong></td>
<td><strong>156.85</strong></td>
</tr>
</tbody>
</table>
Lyng Forge Chalk groundwater source

Lyng Forge Source Protection Zones

Key

- Lyng Forge source
- SPZ1 (50 day travel time)
- SPZ2 (400 day travel time)
- SPZ3 (total catchment)

Lyng Forge source

some horses and cattle

chemical drums, broken vehicles, etc

pigs
Costessey Pits Intake
Key raw water issues

- Wensum catchment a significant arable area
- Issues with diffuse pollution common in our raw water sources, in particular nitrate and pesticides
- Key drinking water standards:
  - Nitrate - 50 mg/l as NO3
  - Individual pesticide – 0.1 ug/l
  - Total pesticide 0.5 ug/l
Diffuse pollution – river nitrate trends
Diffuse pollution – groundwater nitrate trends

Lyng Forge Nitrate Data

Date

NO$_3$ (mg/l)

No.1 No.2 Baseline Baseline + Max. Variation PCV AWS Action Limit Linear Regression (No.2)
Diffuse pollution – pesticide trends

Total Pesticides

µg/l

River Wensum
Costessey Pits
Diffuse pollution – pesticide trends

Metaldehyde

- River Wensum
- Costessey Pits

µg/l

Mar08 Apr08 May08 Jun08 Jul08 Aug08 Sep08 Oct08 Nov08 Dec08 Jan09 Feb09 Mar09 Apr09 May09 Jun09 Jul09 Aug09 Sep09 Oct09 Nov09 Dec09 Jan10 Feb10 Mar10 Apr10 May10 Jun10
Diffuse pollution – pesticide trends

Mecoprop

µg/l

River Wensum

Costessey Pits

Jan05  Mar05  May05  Jul05  Sep05  Nov05  Jan06  Mar06  May06  Jul06  Sep06  Nov06  Jan07  Mar07  May07  Jul07  Sep07  Nov07  Jan08  Mar08  May08  Jul08  Sep08  Nov08  Jan09  Mar09  May09  Jul09  Sep09  Nov09  Jan10  Mar10  May10
Diffuse pollution – pesticide trends

Chlorotoluron

- River Wensum
- Costessey Pits
Other pesticides

- In addition to metaldehyde, chlorotoluron and mecoprop:
  - Carbetamide
  - MCPA
  - Clormequat
  - Propyzamide
  - Bentazone
  - Metamitron
  - Glyphosate
  - Atrazine
  - Simazine
Drinking water treatment

- The processes used to treat the water before it is supplied to customers vary depending on the quality of the raw water.
- Surface water sources derived from rivers or reservoirs usually have variable water quality and pass through an extensive sequence of treatment processes.
- Ozone and granular activated carbon are used for pesticide reduction.
Drinking water treatment

- Ion exchange technology is used for nitrate reduction at groundwater treatment works, with GAC or UV used for pesticide reduction.

- Across the region, over 20% of our supplies are treated to reduce nitrate, with 55% treated to remove pesticides.
Priority issues - Metaldehyde

- Poor removal with current treatment processes
- Little reduction in reservoirs – long-term, low level exceedances.
- Short-term, higher exceedances observed at direct abstraction sites
- 2009 trends are different to 2008
Priority issues - Nitrate

- Increasing trend
- Original blending solution now inadequate
- Installation of ion-exchange plant in AMP4
- Finite capacity to nitrate removal
- Increased operating costs
Catchment Management

• AMP5 catchment management in Wensum catchment therefore targeted at:
  • Costessey Pits intake (Metaldehyde and Total Pesticides)
  • Lyng Forge (nitrates)
Catchment Management – why?

Other solutions are costly.

- Options:
  - close source and replace
  - blend with better quality water (if available)
  - Treat to remove/reduce pollutant

- 25 nitrate schemes in AMP4; >£80M CAPEX and significant increase in OPEX

- Typical ion exchange plant (5.6 Ml/d); CAPEX £3.7m, OPEX £55k per annum

- Treatment increases carbon footprint
Catchment Management – why now?

• Promoted by the WHO in 2001 and subsequently the Drinking Water Inspectorate as part of Drinking Water Safety Planning (DWSP)

• Defra Water Strategy (February 2008): ‘We will encourage water companies to work with farmers to tackle pollution at source’

• Commitment in the AW Strategic Direction Statement (2007); sustainable approach to management of drinking water quality
Catchment Management – why now?

- Opportunities given by DWI and Ofwat (our economic regulator) to invest in catchment management work as an important component of our forward investment plans for 2010 to 2015 (AMP5)

- Water Framework Directive Article 7: DrWPAs require catchment protection measures to avoid the deterioration of raw water quality and the installation of additional treatment

Therefore, a regulatory shift of expectation from ‘traditional’ end-of-pipe solution to catchment management
Catchment Management – Strategy

Key aspect of catchment management is to answer questions such as:

- What has caused the pollution problem?
- What land use management practices to promote and where?
- What impacts on raw water quality would different practices have?
- How soon would the impacts be seen?

And the strategic ones:

- Would we ever be able to do away with end-of-pipe solutions?
- If yes, would catchment management be cost-effective?
- And what are the risks?
Catchment Management – Strategy

- Investigations in specific catchments
- Acquisition of land use and pesticide and fertiliser application data
- Development of catchment specific nitrate and pesticide models and hazard maps
- Continued monitoring of raw water to calibrate models and inform our source risk assessments
Catchment Management – Strategy

• Liaise with stakeholders, particularly Catchment Sensitive Farming Officers, the Voluntary Initiative and the Metaldehyde Stewardship Group

• Work with the Environment Agency to exchange data and information

• Provide information and education to land-users and their advisors – working with the National Farmers Union and agronomists

• Actively look for links with other drivers, eg biodiversity in conjunction with Natural England

• Support and contribute to catchment initiatives eg Wensum DTC project
Catchment Management – Stakeholder Liaison

• Gain understanding of stakeholders’ roles, working relationships, influences and interests

• Raise awareness of pollution-induced drinking water quality compliance issues

• Build up knowledge of catchments feeding our sources, including;
  • Land use history and practices
  • Fertiliser and pesticide storage, application and disposal

• Review the effectiveness of voluntary measures and stewardship incentives

• Help to identify priorities and influence third party work
Catchment Management – Main Issues

• Planning, focussing and targeting measures
• Developing means of assessing the success of catchment work
• Engaging with the right stakeholders and maintaining communication
• Implementing catchment measures without powers of entry or enforcement
• Aligning with other catchment management initiatives
• Managing expectation of when and in what circumstances catchment management will work
To summarise ….

- Catchment management is supported by regulators and others as an alternative to continued investment in water treatment.
- Our role is to undertake hazard and pathway identification, and assess risk through stakeholder liaison, data acquisition, monitoring and scenario modelling.
- Our data and information will be shared, and will be used to help influence others’ activities to the highest risk catchments.
- We fully support the current range of voluntary initiatives, and will continue to look for opportunities for wider involvement.
- This work gives us a real opportunity to enhance our working relationship with agricultural and other stakeholders, to raise awareness among landowners of their potential impact on raw water quality, and hopefully reduce the risk to our water supplies.