



Do we need to redefine Sustainability?

By

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Do we need to redefine Sustainability?

- Sustainability – current regulatory framework.
- Low flows – experiences in the UK.
- Current case studies
 - Darent
 - Kennet
- Look forward; – Implications for Water Resource (WR) planning

Environment

- Protecting the environment
- Safeguarding natural resources
- Using energy and water wisely
- Minimising waste
- Preventing pollution
- Responding to climate change



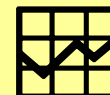
Social

- Respecting individuals
- Benefiting local communities
- Employee diversity, health and safety
- Being ethical, fair and honest
- Engaging with our stakeholders
- Protecting vulnerable customers

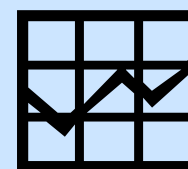
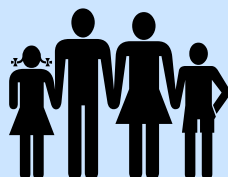


Economic

- Responsible sourcing of goods and services
- Business and operational efficiency
- Taking account of social and environmental costs
- Ethical investment
- Returns for investors



Sustainability



Sustainability



- The UK Government's Sustainability Strategy, "Securing the Future", establishes 5 guiding principles for the UK's Sustainability Policy:
 - Living within Environmental Limits
 - Ensuring a Strong Healthy and Just Society
 - Achieving a Sustainable Economy
 - Promoting Good Governance
 - Using Sound Science Responsibly

Sustainability 2



- Within these principles, the Government prioritises a focus on
 - Sustainable consumption and production.
 - Climate change and energy.
 - Natural resource protection and environmental enhancement.
 - Sustainable communities.

- Defra's water strategy supports these principles:
 - Proposes Ofwat demonstrate the same commitment.
 - Key driver for water companies current Periodic Review process.

Framework Stakeholders

- **Environment Agency-**
 - **Duty to meet requirements for Public Water Supply(Water Resources Act 19(1), 1991)**
 - **Duty to ensure abstractions are environmentally sustainable**
 - **Competent Authority for review of consents required under the Habitats Directive**
 - **Restoring Sustainable Abstraction Programme (RSAP)**
- **Natural England-** designate, monitor and protect key vulnerable habitats: eg EU (cSAC, SPA); UK (SSSI,NNR)
- **Ofwat-** funding, drivers and performance.
- **Low Flow action groups** eg Action for River Kennet
- **Other Local Stakeholder Groups**
 - **Upper Thames Protection Society**
 - **Thames Salmon Trust**
 - **Save the Windrush Campaign**

Low River Flows - Investigations

- Environment Agency (EA) led
 - Restoring Sustainable Abstraction Programme (RSAP)
 - HD, SSSI, BAP & Local drivers
 - CAMS
- HD
 - EA is the competent authority
 - Review of consents (RoC)
 - Appropriate Assessment
- Non HD
 - Investigations – company led
 - Ofwat funded
- No Statutory Requirements or methodology approach

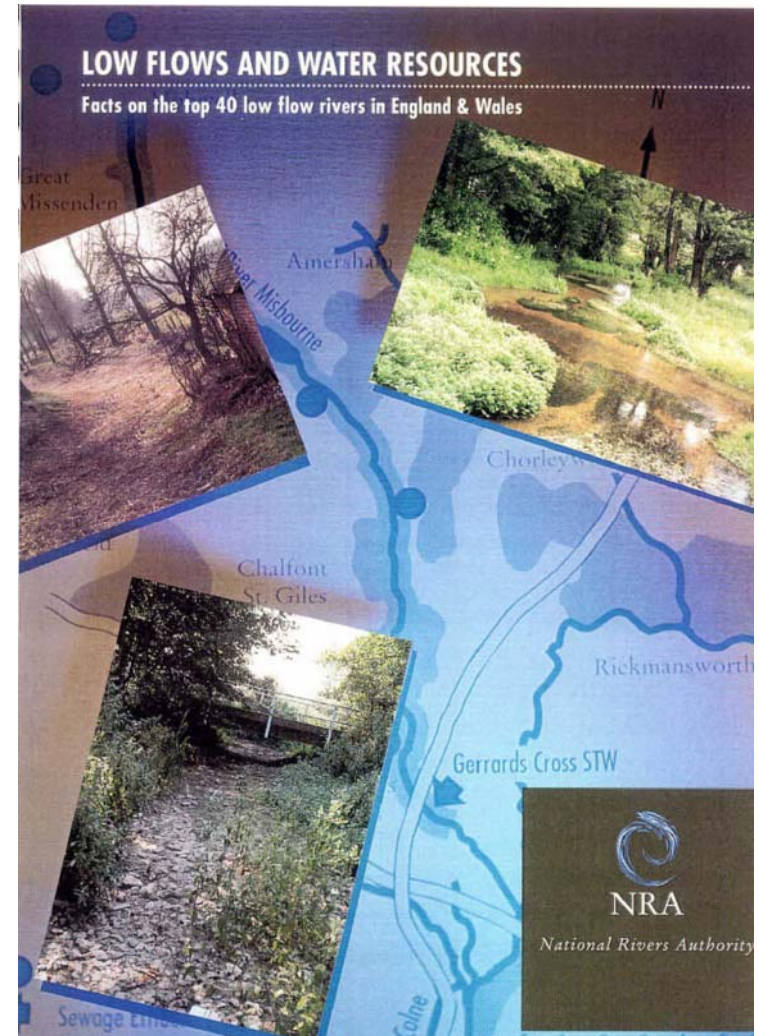
Low River Flows - Implementations

- Options appraisal required
- HD – mandatory
 - Formally – Cost / Benefit (C/B) not a determining factor
 - Implementation – Ofwat require Cost Benefit Analysis (CBA)
- WRMP
- Funding

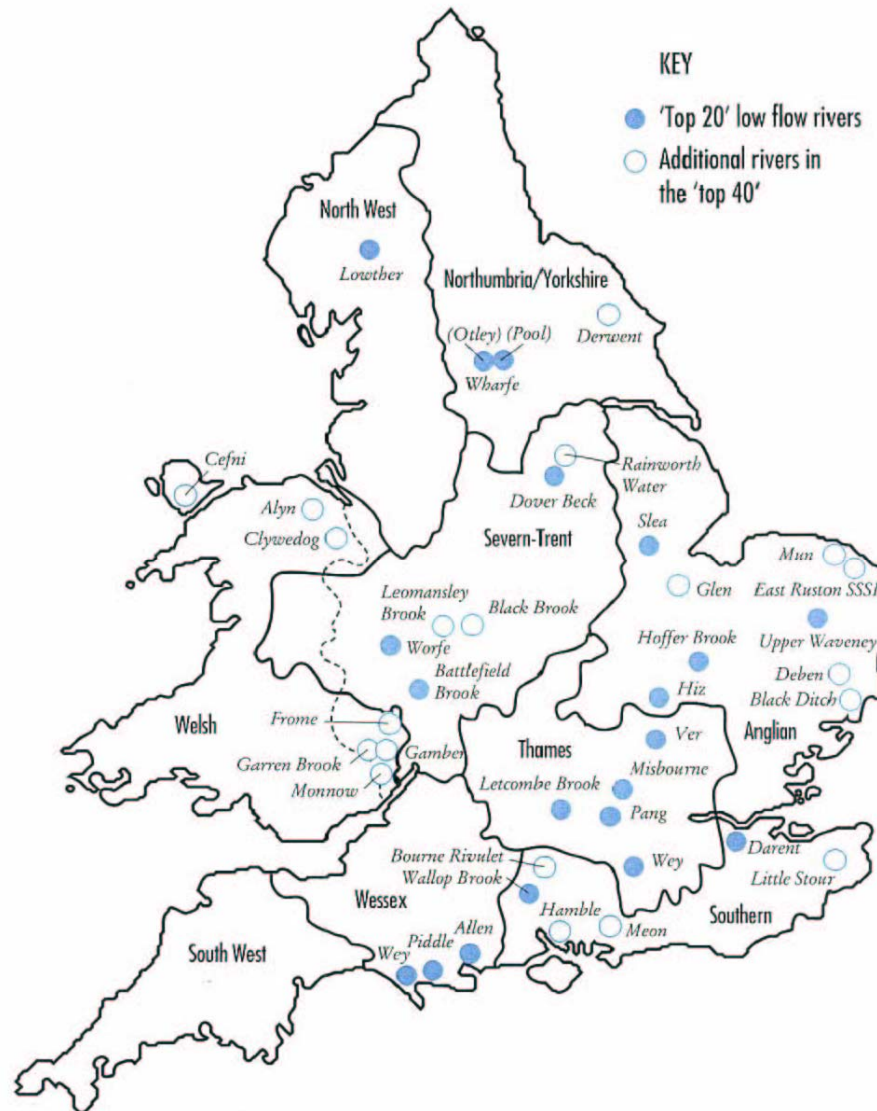
History



- Top 40 Low Flows rivers 1993
- Alleviation of Low Flows (ALF)
 - AMP2 & AMP3
- RSAP
 - AMP4 & AMP5



Locations of the Top 40 Low Flow Rivers

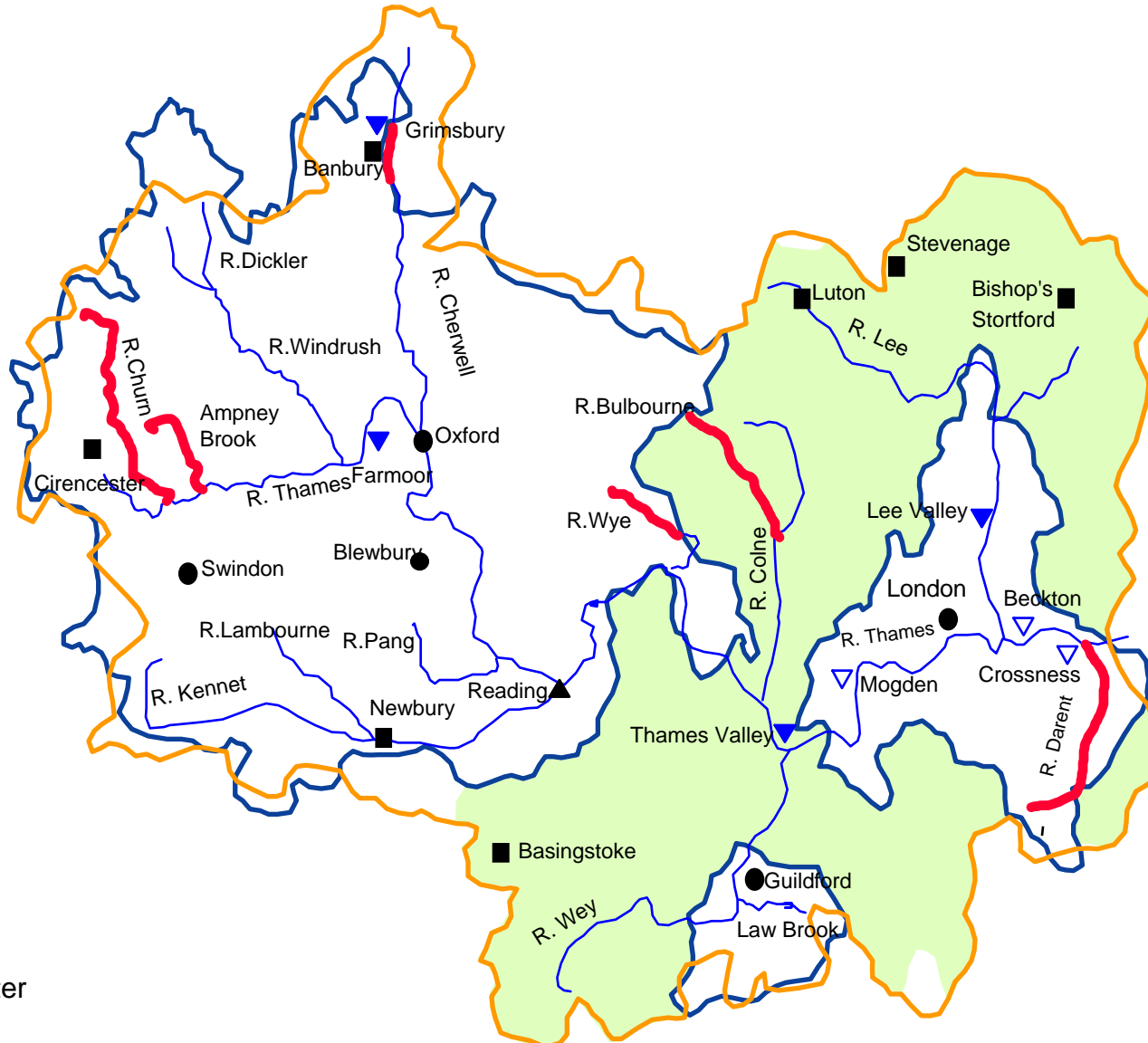


Thames Water Sustainability reductions to alleviate low flows

Licence reductions in MI/d

	Average	Peak
■ AMP2	25.1	20.0
■ AMP3	9.1	11.4
■ AMP4	60.7	60.8

Thames Catchment - Low Flows



Thames WaterAMP4 Low Flows Investigations

- River Shalbourne (completion date of 31/12/09)
- Seven Springs (31/03/09, if not earlier)
- River Pang (31/06/09)
- Sulham Brook (31/06/09)
- Blockley Spring (31/03/09)
- River Og (31/12/09)
- Oxford Watercourses (31/09/2009)
- River Cray (31/3/2010)
- Cress Brook (31/3/2009)
- Two fish screen investigations: Farmoor and Lower Thames (31/3/2008)

Case Studies



- Darent & Kennet
 - Chalk Streams
 - Historic Groundwater (GW) Abstractions
 - History of Local Action Groups
 - Vocal Angling Fraternity
 - High Profile – MP's Involved

Case Study – River Darent 1

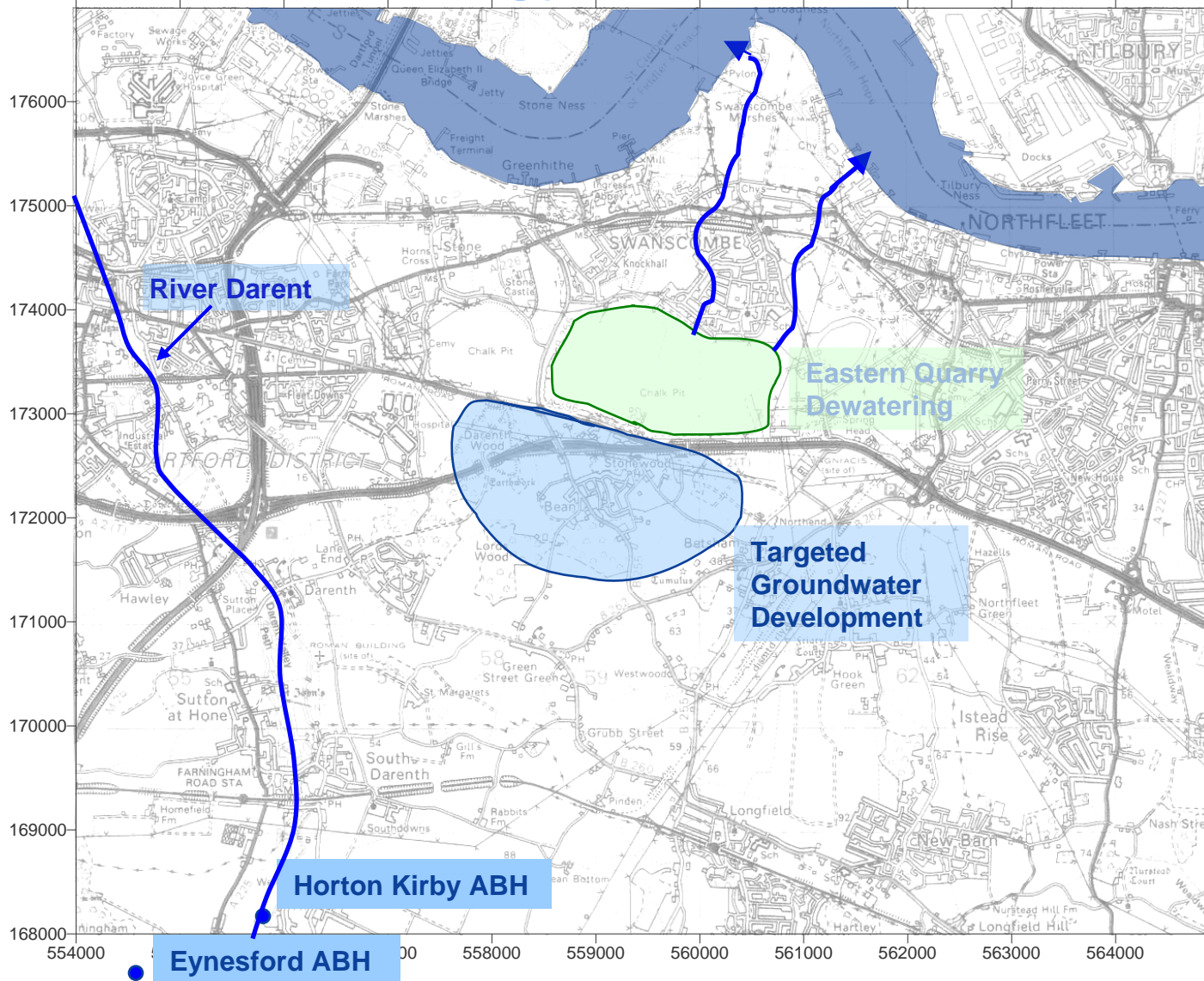
- Major droughts in early 1990's raised profile
- Phased Program -
 - Setting Objectives
 - Phase 1
 - Licence reduction
 - Network Improvements
 - Thames Water Ring Main (TWRM) Extension
 - Augmentation (small scale)

Case Study – River Darent 2



- Phase 2
 - Options Considered & Rejected
 - Further Augmentation
 - Sewage Treatment Works (STW) relocation
 - Chosen option
 - Further Licence reductions
 - New resource development

River Darent Alleviation of Low Flows: Phase 2 Strategy



Before



& After



Case Study – River Kennet

- Public Inquiry in 1995/6
- Investigation in AMP3 2000-2005
 - GW Modelling
 - Ranunculus a Key Indicator
 - Precautionary approach
- Options Appraisal in 2006/7
- Implementation
 - 2011 – 2014?
 - Funding?

Example of over-widened, slow moving channel subject to silt deposition

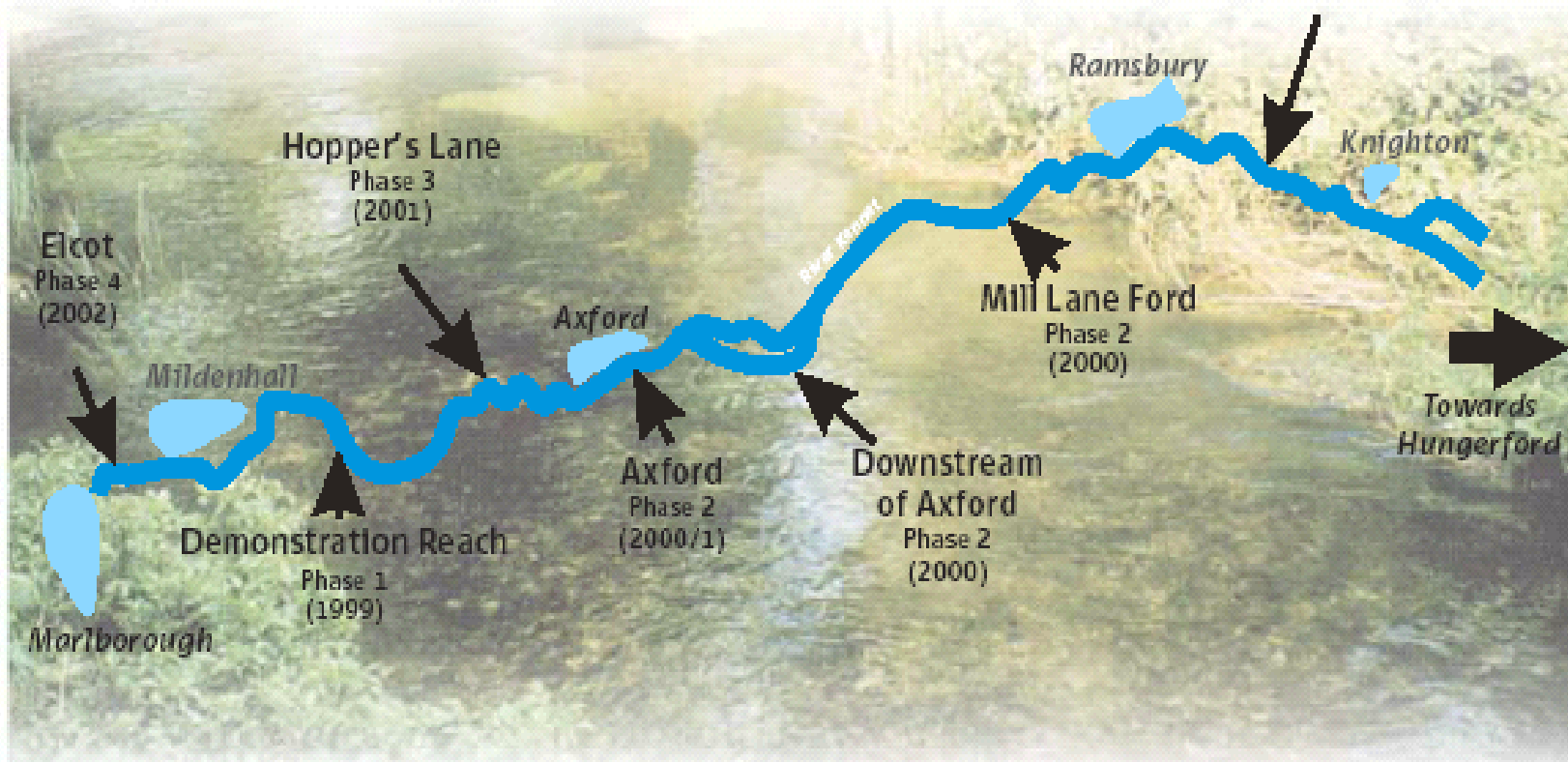


Ranunculus, or chalk stream water-crowfoot: a key species



The Upper Kennet Rehabilitation Project

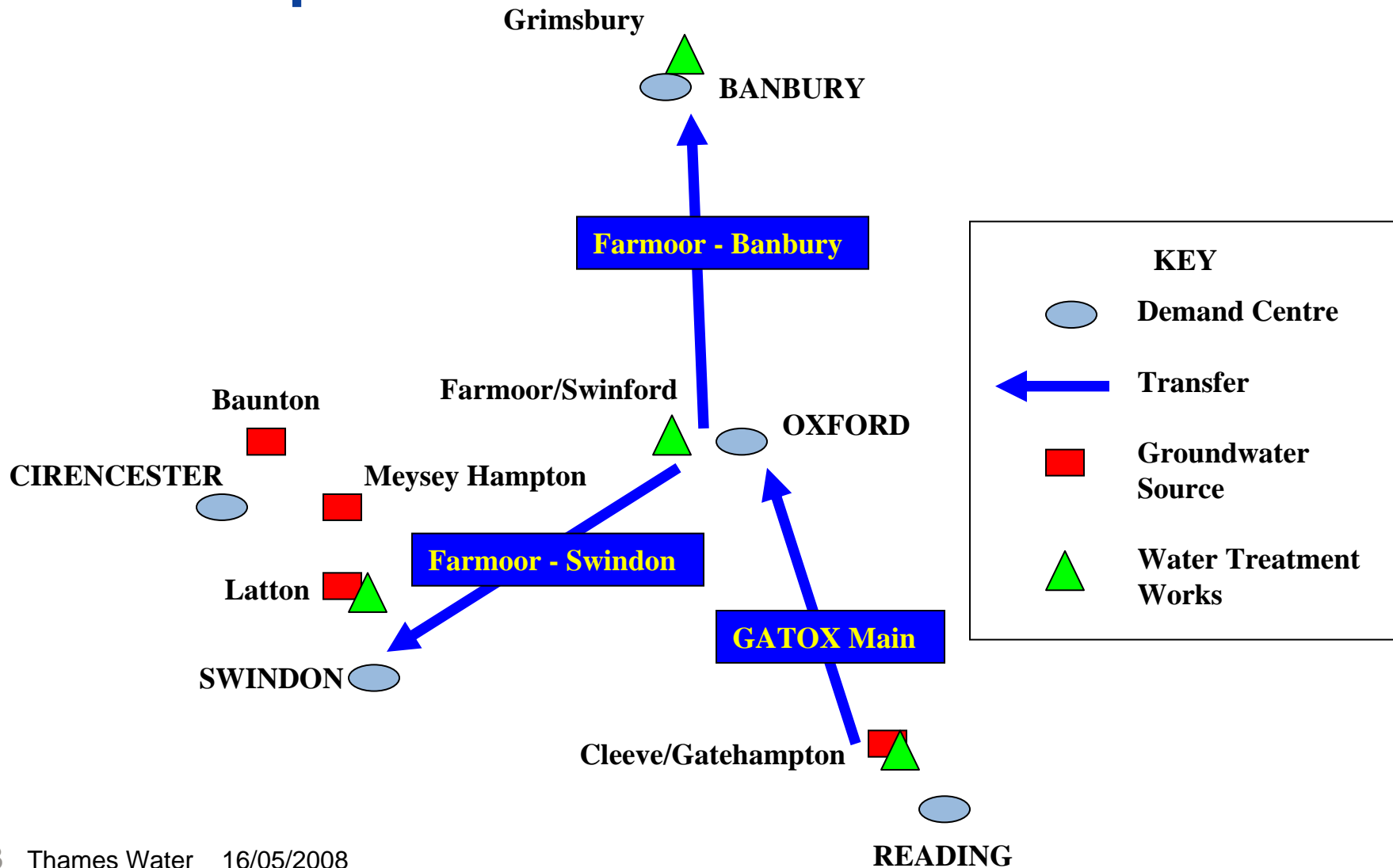
Locations of Completed Schemes over 10km Reach
(1999-2003)



ACTING CHIEF EXECUTIVE OFFICER

The project team are grateful for the support of our project partners and the local landowner.

Simplistic Overview of Current SWOX Operation



What does the future hold

■ Key Issues

- WFD
- Climate Change
- Development Pressures
 - Housing/Population Growth
 - WRSE
- Existing resources mostly exploited

Water distribution

Underground pipe network affected by changes in wetting/drying soil



Water usage

Changes in the pattern of customer demand



Water treatment

Reduced volume/lower quality of water for treatment and risk of flooding to operational sites



The impacts of climate change on our business

Wastewater to sewer

Increased flooding/surcharge



Wastewater treatment

Increased risk of inundation of operational sites



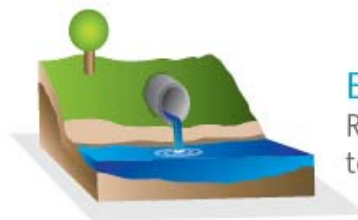
Water abstraction

Reduction in water available for abstraction



Effluent discharge

Reduced river flows in summer to dilute effluent discharges



Population Growth



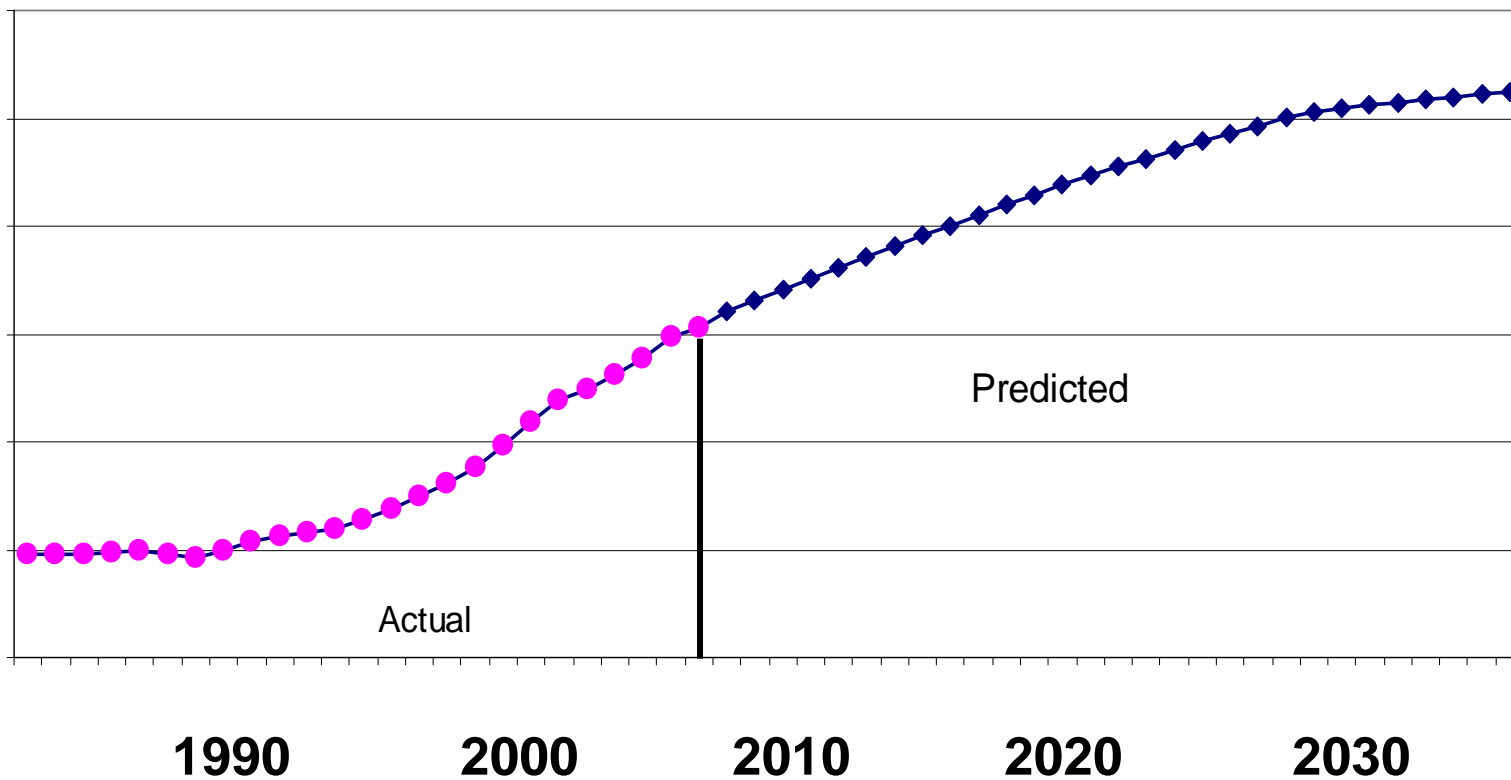
8 m

London population growth

7 m

6 m

5 m



Future Options

- Supply / Demand (S/D) Balance
 - Demand Side
 - Leakage, Metering, Water Efficiency (WE)
 - Supply Side
 - Conventional GW development (Limited options)
 - Winter Storage
 - Reservoirs
 - Artificial Recharge (AR)
 - Aquifer Storage and Recovery (ASR)
 - Effluent Reuse
 - Bulk Transfers
 - Desalination
 - River Management
 - Restoration Schemes

Key Issues

- Uncertainty
 - Bounded Uncertainty – Headroom
 - Unbounded Uncertainty
 - WFD, Future SR's
- Addressing Climate Change
 - Shifting Systems
 - Revised Objectives?

Sustainability - Conclusions

- Previous approach difficult to sustain
 - SR solutions v Carbon management
 - Easy options used – need innovative solutions
- Need more / better river management / rehabilitation
- Need sound science
 - Methodology (hydrogeology / hydroecology link)
 - WFD – investigations (?)