

9th Annual UK Groundwater Forum Conference

Natural History Museum 13 May 2008



THREE VALLEYS WATER

Groundwater Aspects of the Three Valleys WRMP

Rob Sage

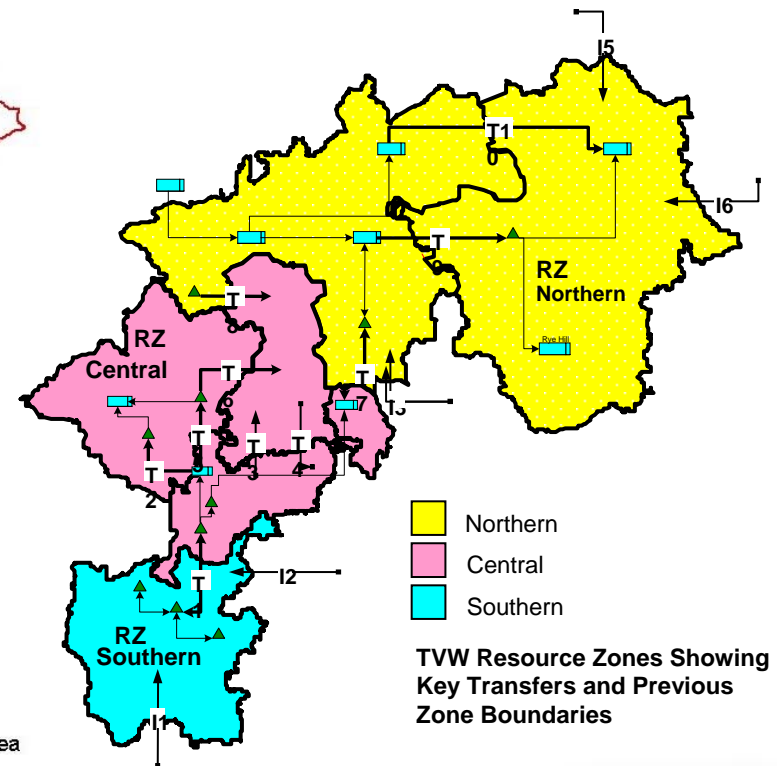
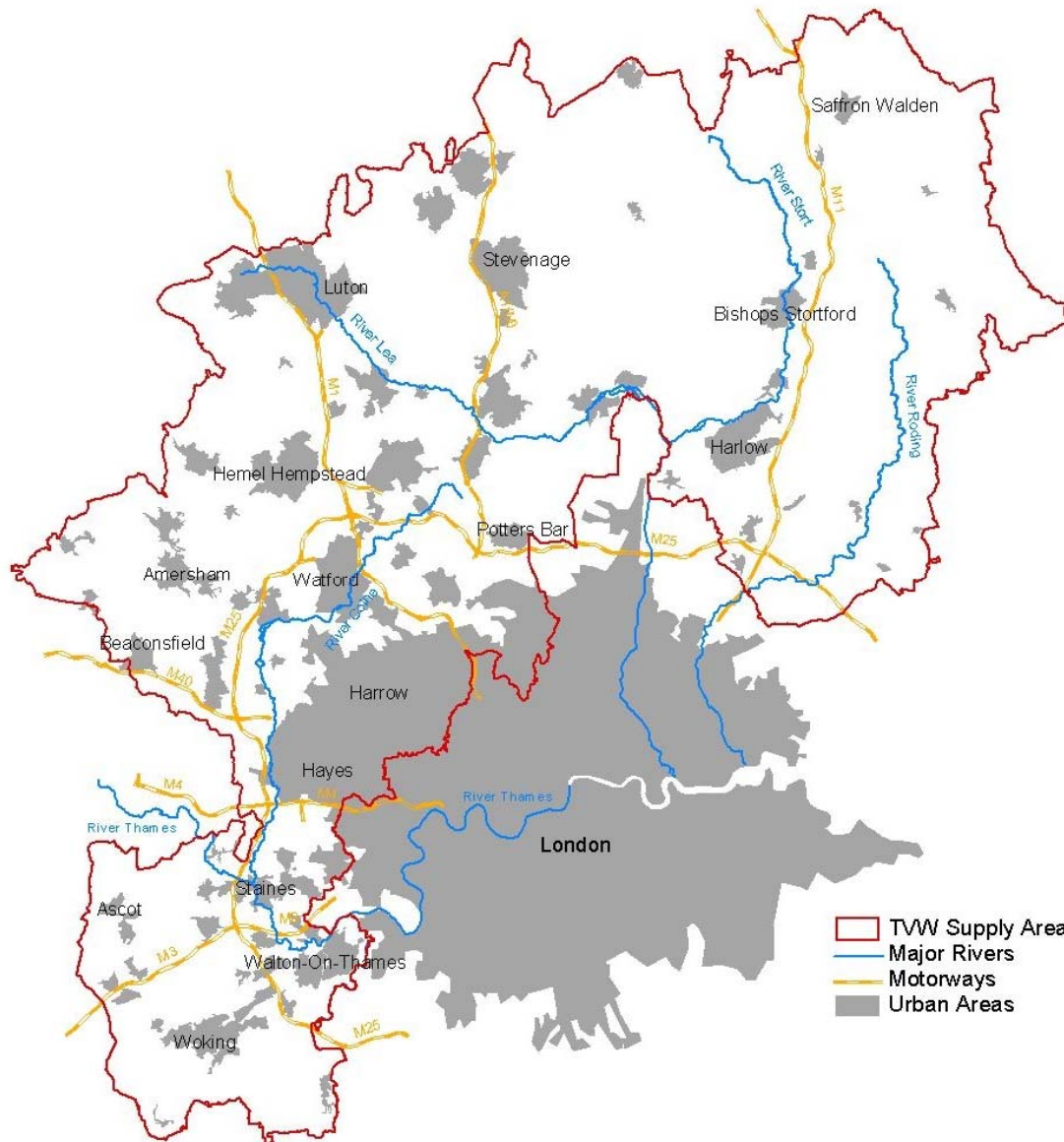
Water Resources Manager

Three Valleys Water



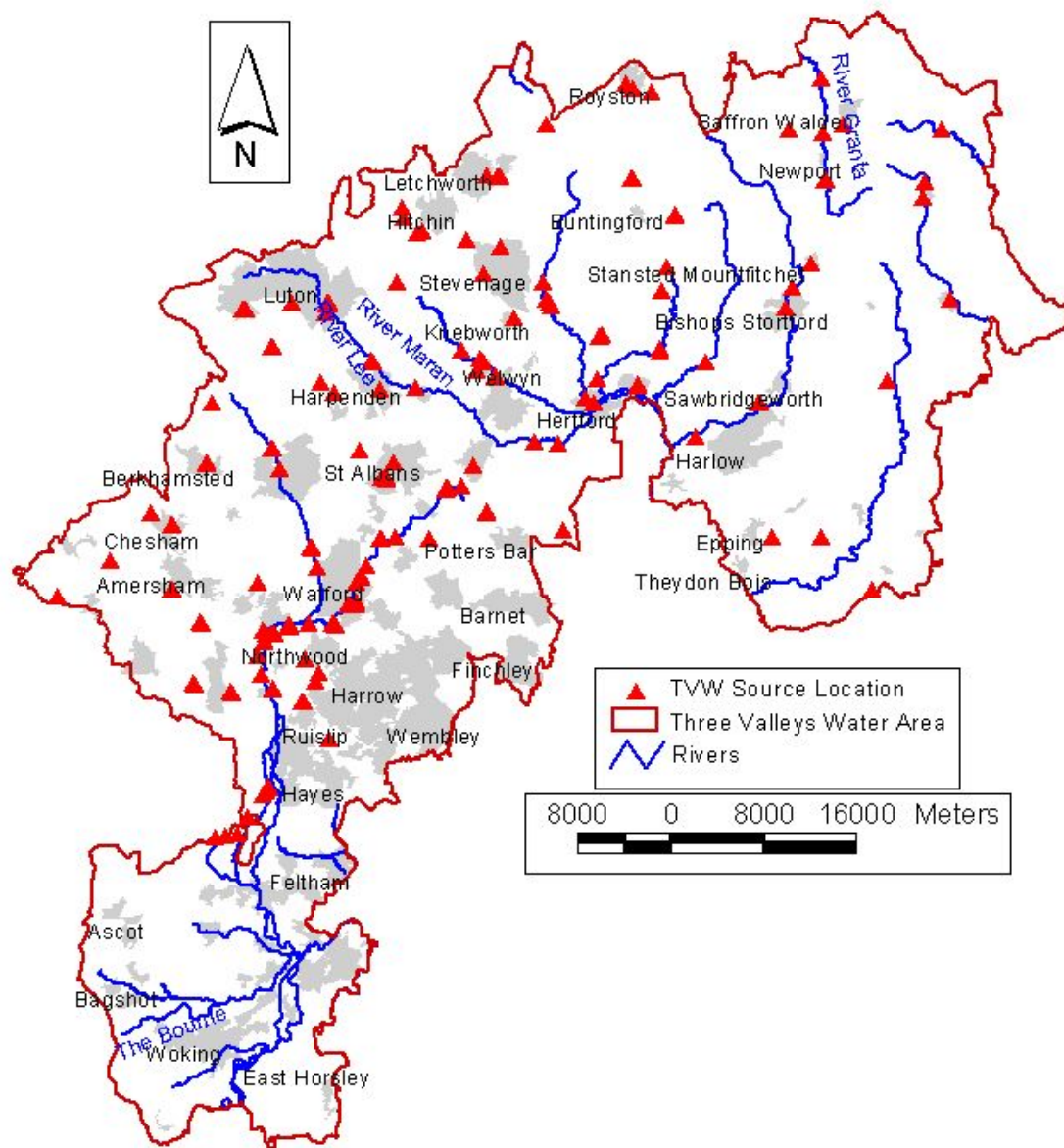
- **Who we are**
- **Supply demand balance**
- **Abstraction Licences and Deployable Outputs**
- **Impacts of abstraction**
- **Impacts of climate change**
- **Impacts of pollution**
- **Summary of current position**

Our Operating area



- **Our raw product - we couldn't provide a service without it !**
- **We need**
 - the right amount;
 - in the right place;
 - at the right time;
 - and of the right quality
 - with minimum impacts

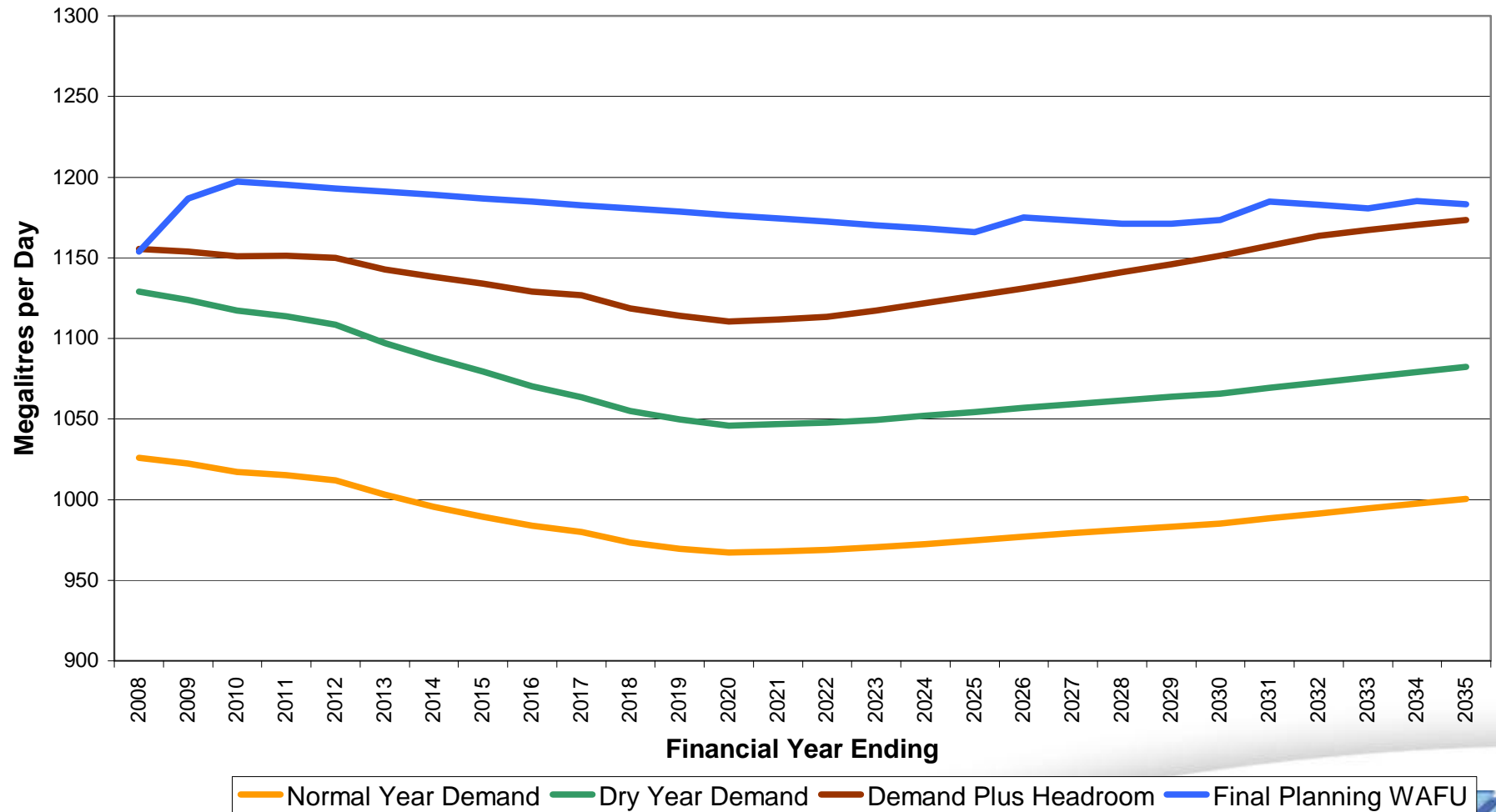
TVW Abstraction Locations



THREE VALLEYS WATER

TVW Supply Demand Balance

TVW Dry Year Critical Period Balance

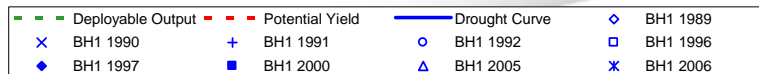
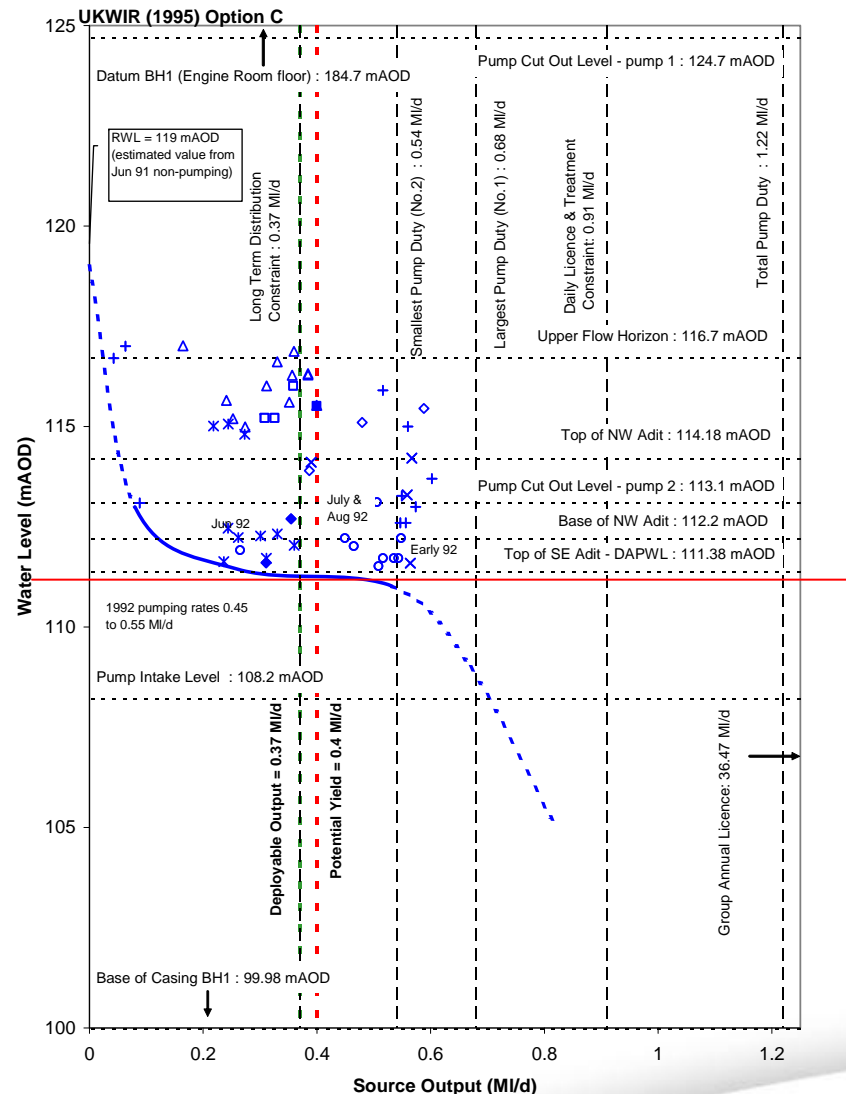


- **All abstraction is governed by Licences issued by the Environment Agency**
- **Licences state point(s) of abstraction, hourly, daily and annual volumes**
- **Can include conditions requiring lower outputs or support to rivers during low flow periods**
- **Licences of Right, time limited Licences**
- **Renewals/revisions must be supported by environmental assessments and statements of need**
- **We consider Licences as major assets**
- **Licences are under threat, CAMS, RSAP & WFD**

- **DO is an assessment of source capability**
- **Calculated by a standard methodology**
- **Concept of Deepest Advisable Water Pumping Level (DAPWL)**
- **Allows constraints to be identified**
- **Requires good operational data during droughts (low water level periods)**
- **2005/06 provided significant new data on capability of TVW sources**
- **Major re-assessment was undertaken for dWRMP**
- **AMP4 schemes in hand to increase DO and operational flexibility**

Example Summary Diagram

Source Output (Average Demand Condition)



Alleviation of Low Flow Schemes

NRA Driven (1990-2000)

looked at solving low flows in isolation from other rivers

Led to some solutions being implemented

National Environment Programme

Water Company led (funded) investigations (2001 to present)

May be Habitats Directive sites or local drivers

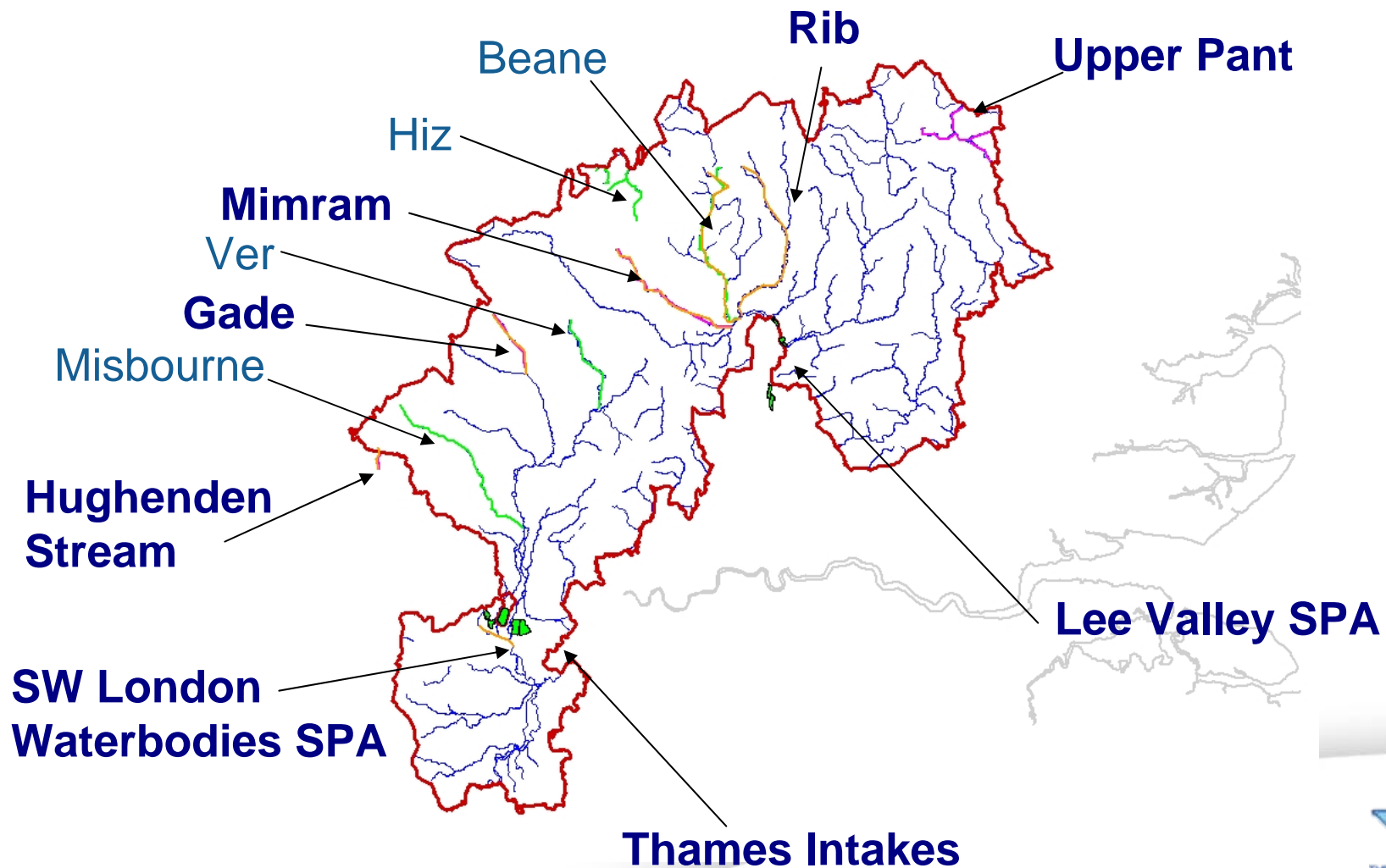
Studies to assess impacts and suggest solutions

Water Framework Directive

Could lead to 'poor status' on quantitative/qualitative grounds

Will require actions to return to good status

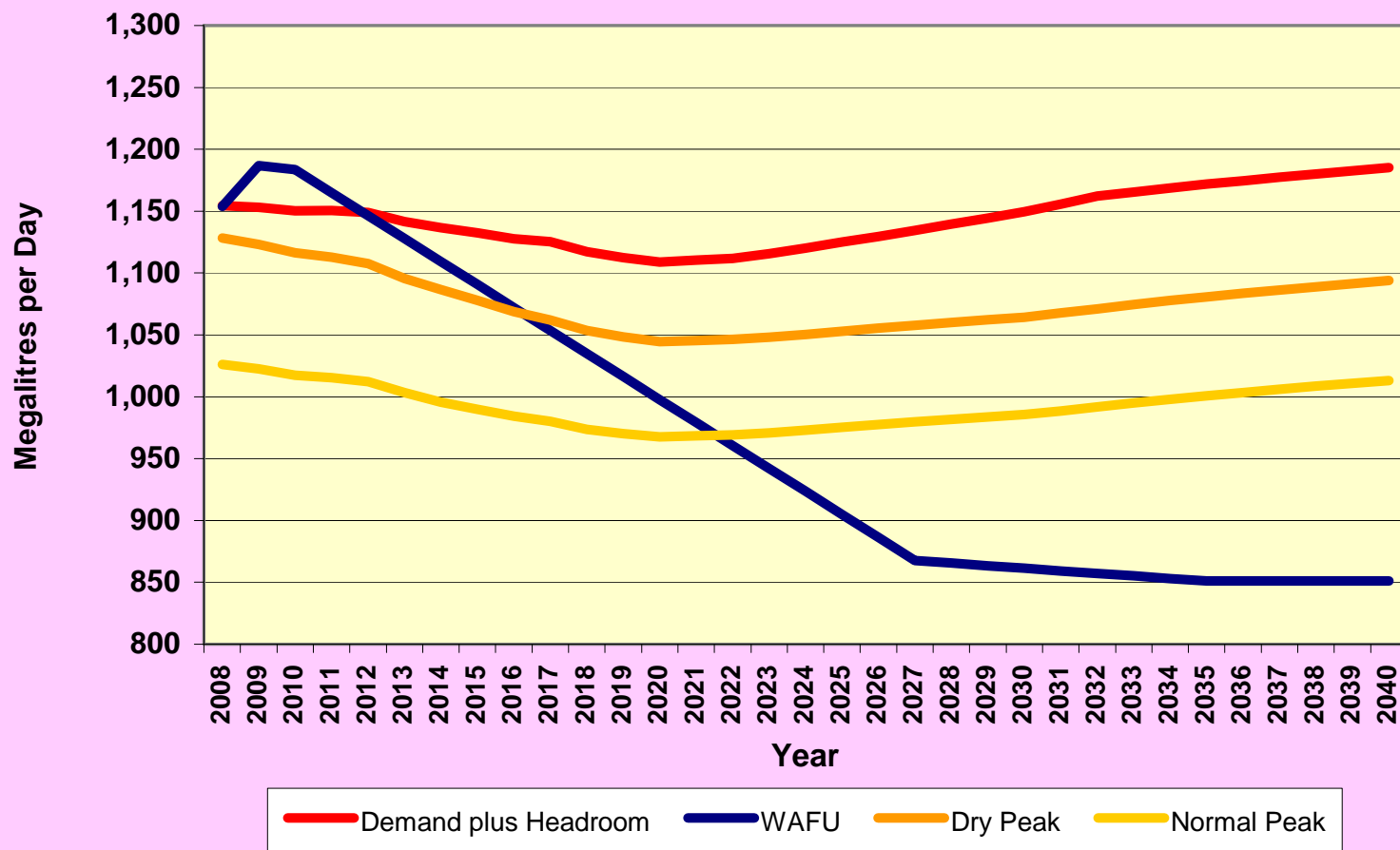
ALF and Environment Programme sites



S/D : Uncertainty - WFD Risks

Water Framework Directive 20%

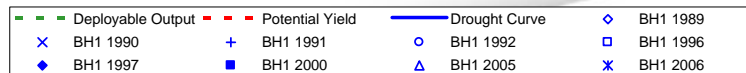
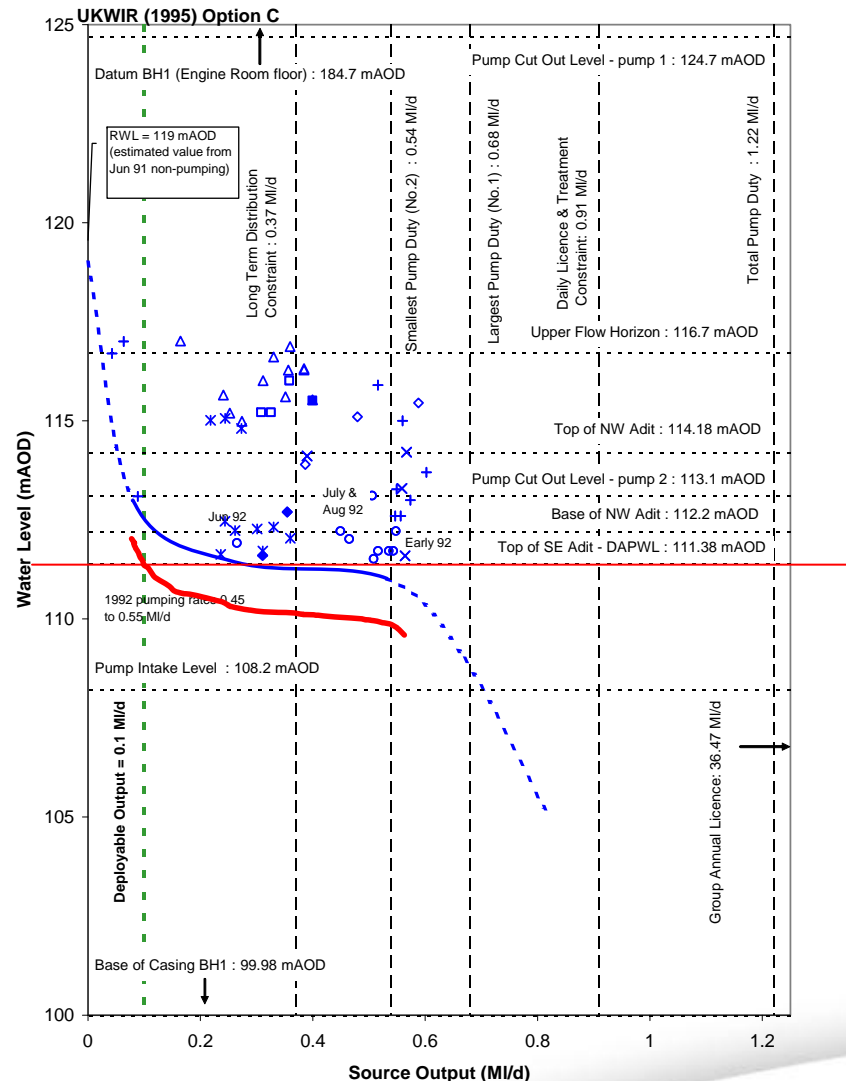
Dry Year Critical Period Water Balance



- **Impact on groundwater uncertain**
- **Recharge may increase or at least remain the same**
- **Variability of extremes will increase**
- **Two or three dry winters in a row are of concern**
- **Use models to estimate additional impact**
- **Groundwater levels below minimum recorded**
- **How will sources cope?**

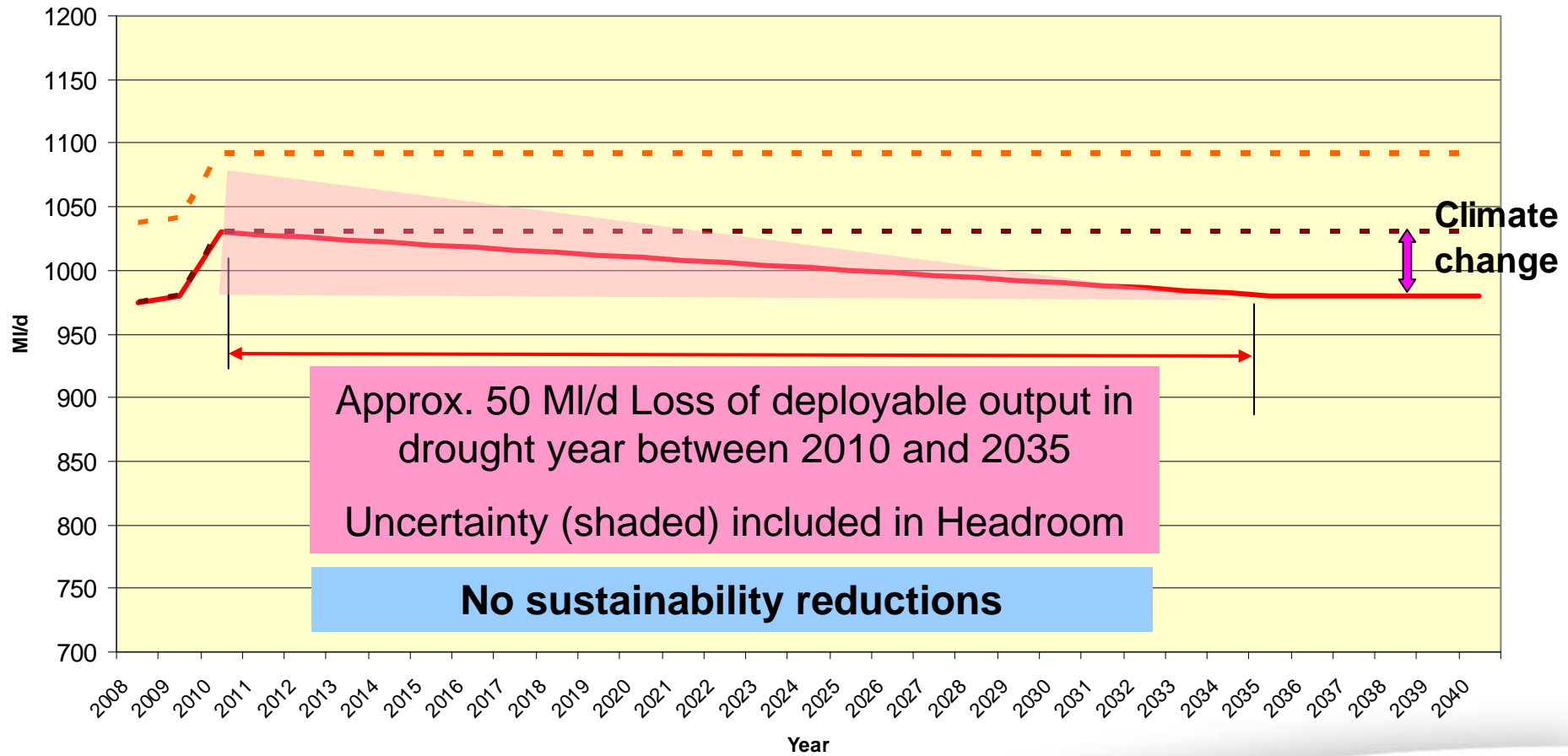
Summary Diagram Changes

Source Output (Average Demand Condition)



Impacts of Climate Change

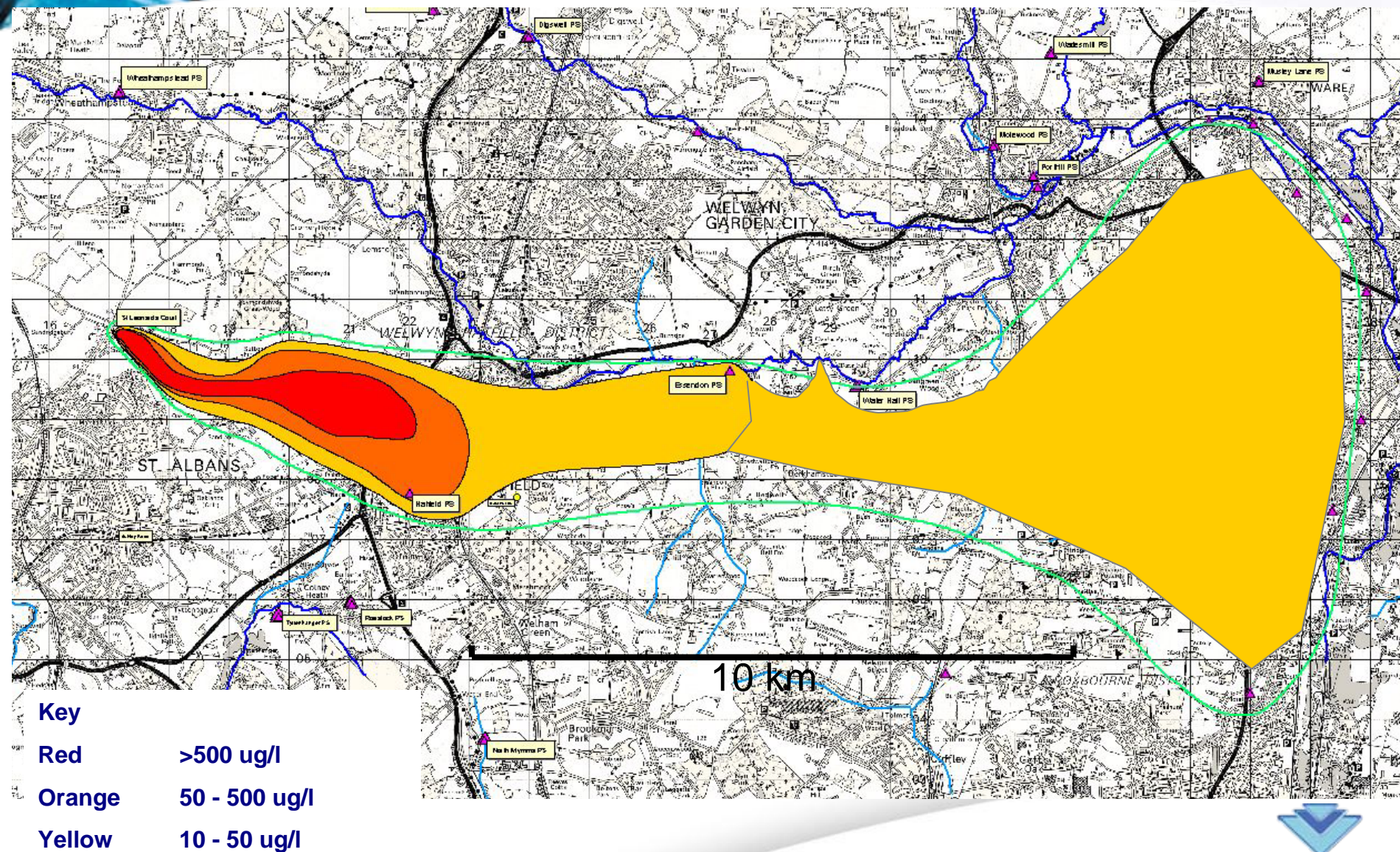
Supply Forecast including Climate Change



- **Significant Issue for TVW**
- **Unconfined Chalk, limited protection and rapid flows**
- **Legacy pollution from industrial sites and landfills**
- **Ongoing issues with diffuse pollutants and point releases**
- **Normally managed by installing treatment, blending or even abandonment/replacement of source**
- **Investigation and removal of source of pollution very difficult and expensive, legally complicated and subject to long time delays**
- **Polluter pays is not often end result**

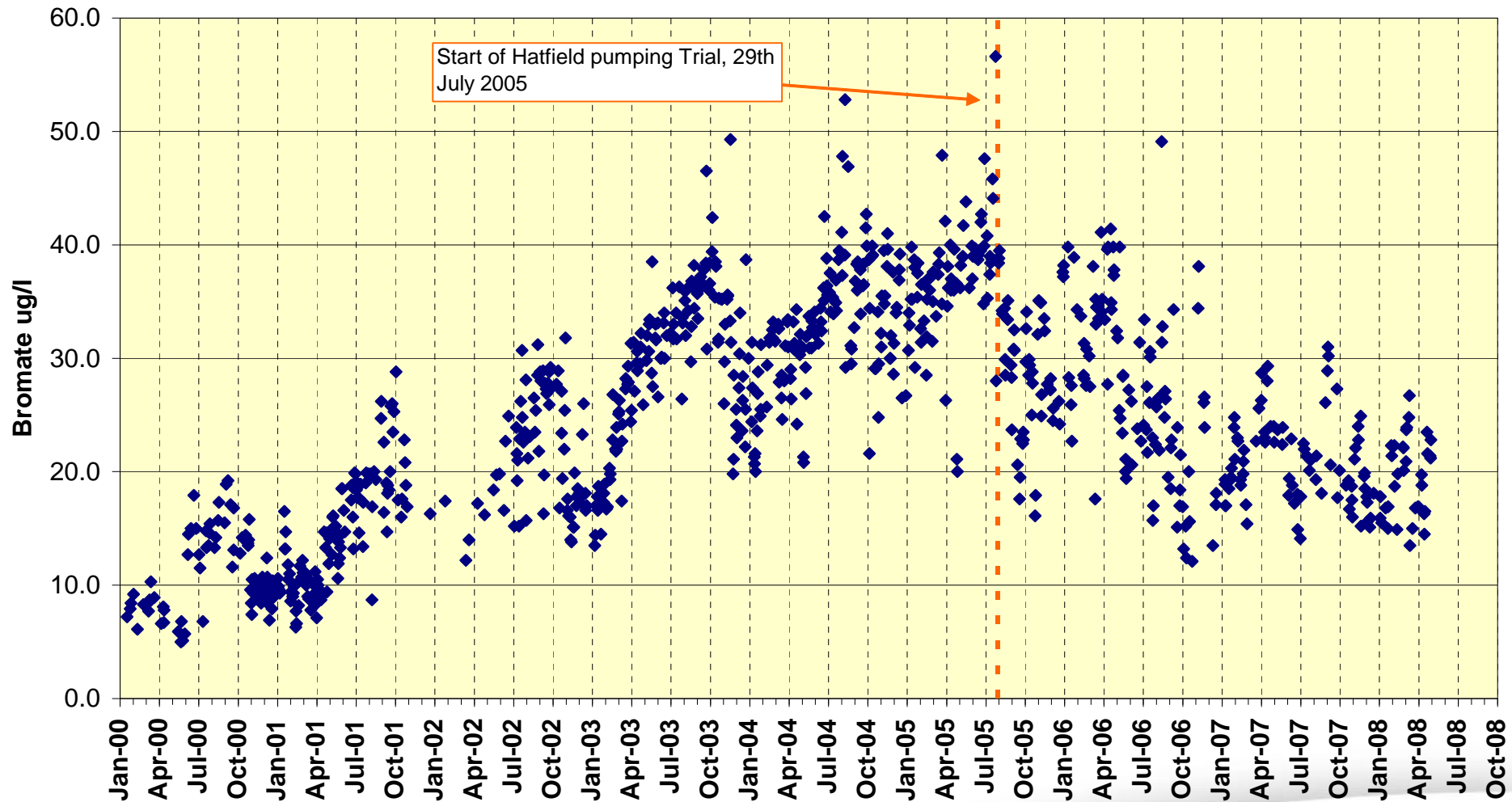
- **Major pollution of Chalk Aquifer, largest in UK**
- **First detected 8 Years Ago**
- **Impacting both TVW and TWUL**
- **Public Enquiry in April 2007**
- **Still no outcome**
- **Major investigations still ongoing**
- **Now operating pump and treat system to protect downstream sources**

Extent of Pollution plume

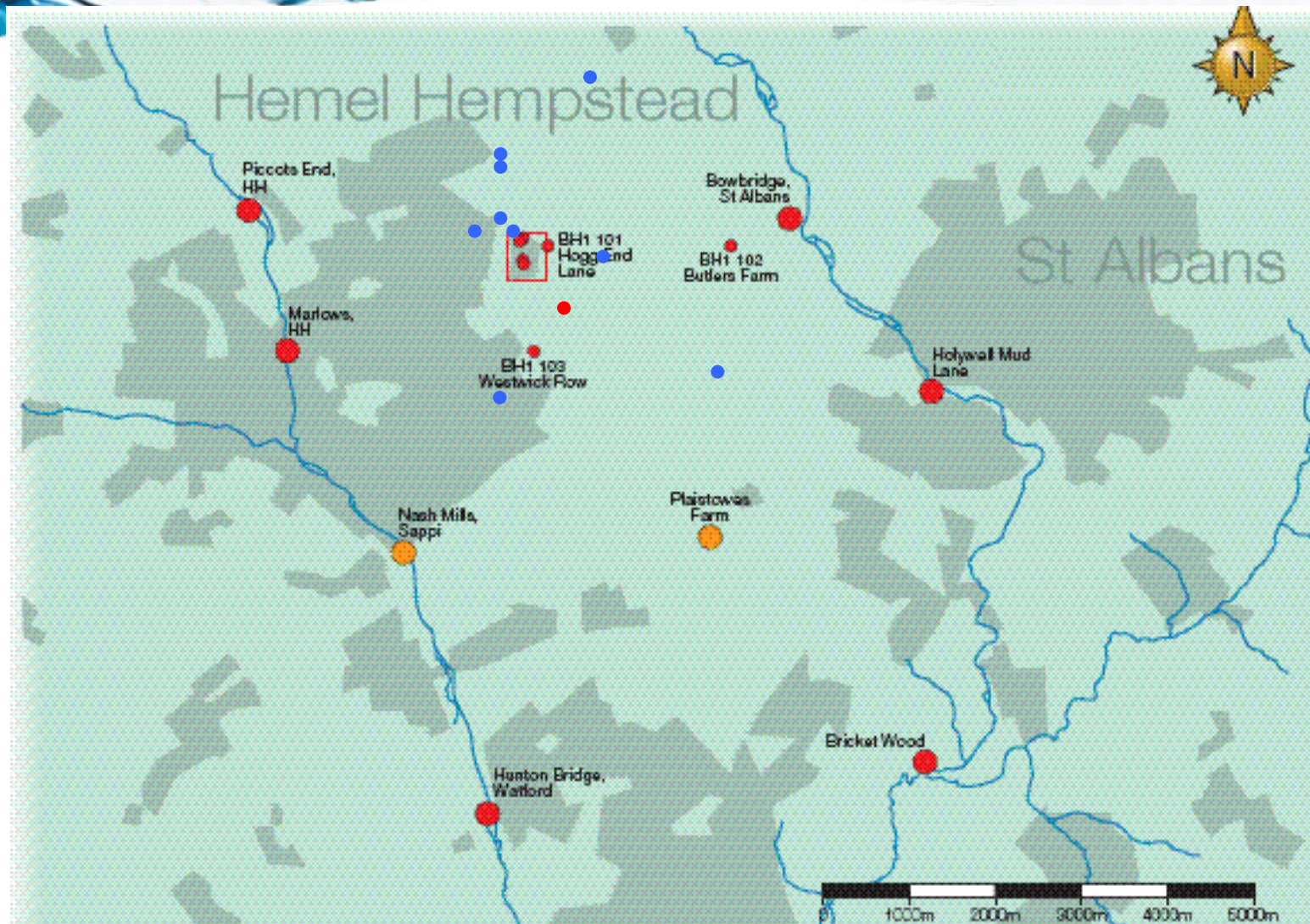


Impact of Scavenging

Essential Bromate Concentration



Buncefield Location



Buncefield



Figure 3



Figure 4



- **Groundwater forms an important component of water supply in TVW**
- **General picture requires little further development, however, there are many uncertainties in future availability as well as in the demand assumptions**
- **There is major concern on environmental issues relating to abstraction impacts, influencing our ability to abstract**
- **Uncertain impact of climate change, could further reduce availability in droughts**
- **Contamination of groundwater remains a major threat to supply base, the polluter does not always pay !**
- **Work on understanding and minimising these risks will continue**

Thank you for listening

Droughts



Floods



Any Questions?

