



Groundwater Forum  
Climate Change the future of  
Groundwater Management

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Planning for an uncertain future

Southern Water Perspective

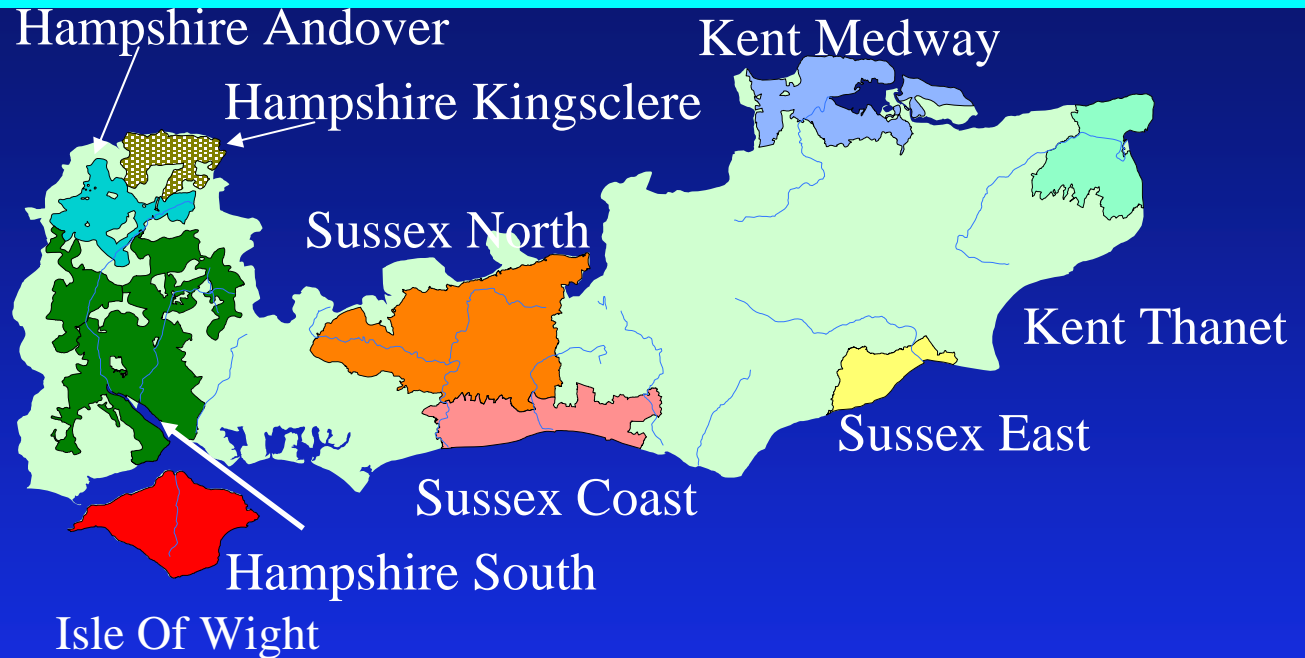
# Overview

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- ◆ Company background
- ◆ How will climate change impact on the water side of the business ?
- ◆ Adaptation strategies

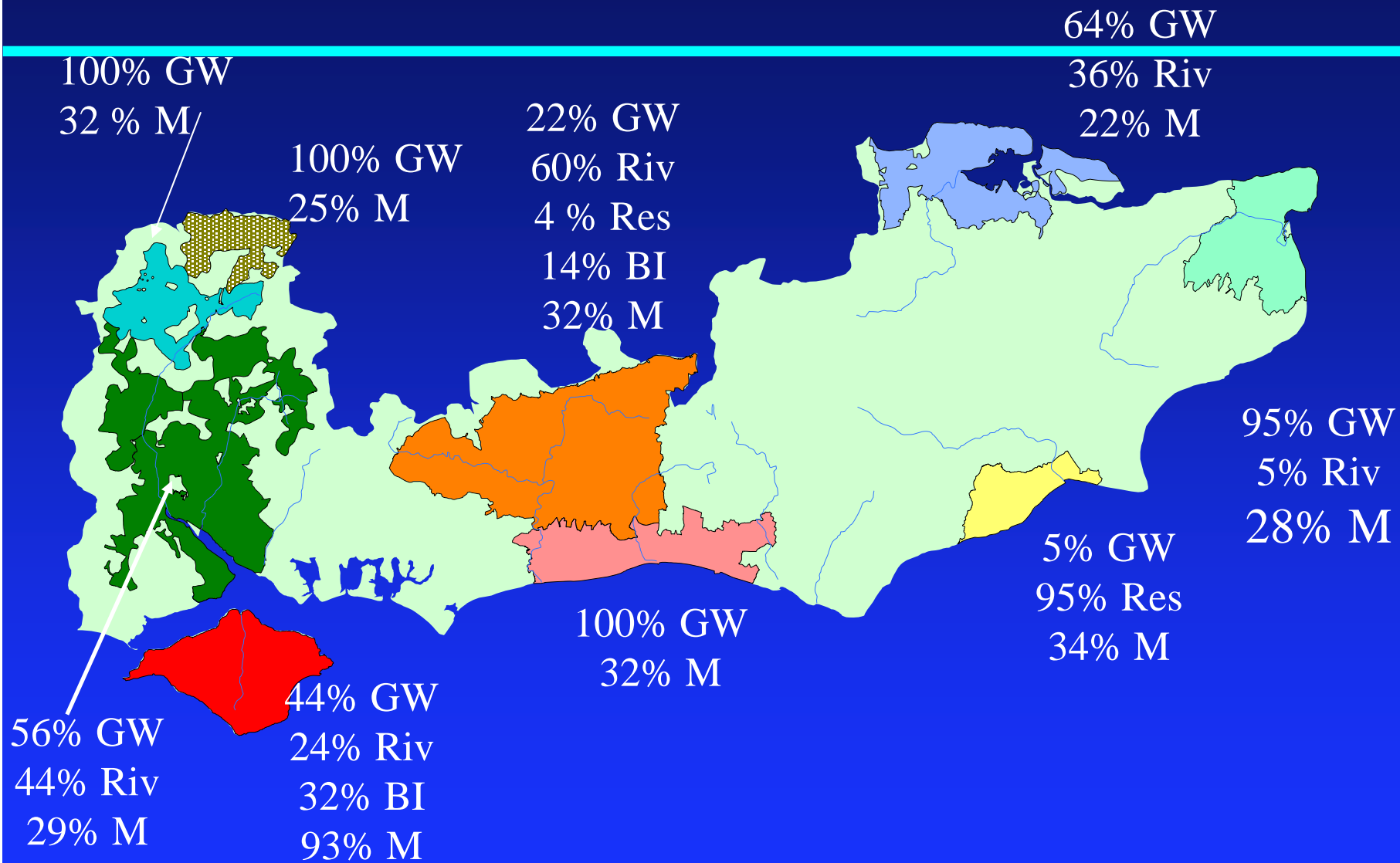
## Southern Water's Resource Zones

- Supply water to 9 distinct areas in the South East
- Currently supply water to 2.28 M customers, set to increase to 2.61M by 2025.



- 70% of the water we abstract comes from the Groundwater; 23% from rivers and 7% from reservoirs.
- Current average daily demand is 595 Ml/d and this will increase to 661 Ml/d by 2025.
- Collect and treat the effluent for all of the area

# Southern Water's Resource make up per zone

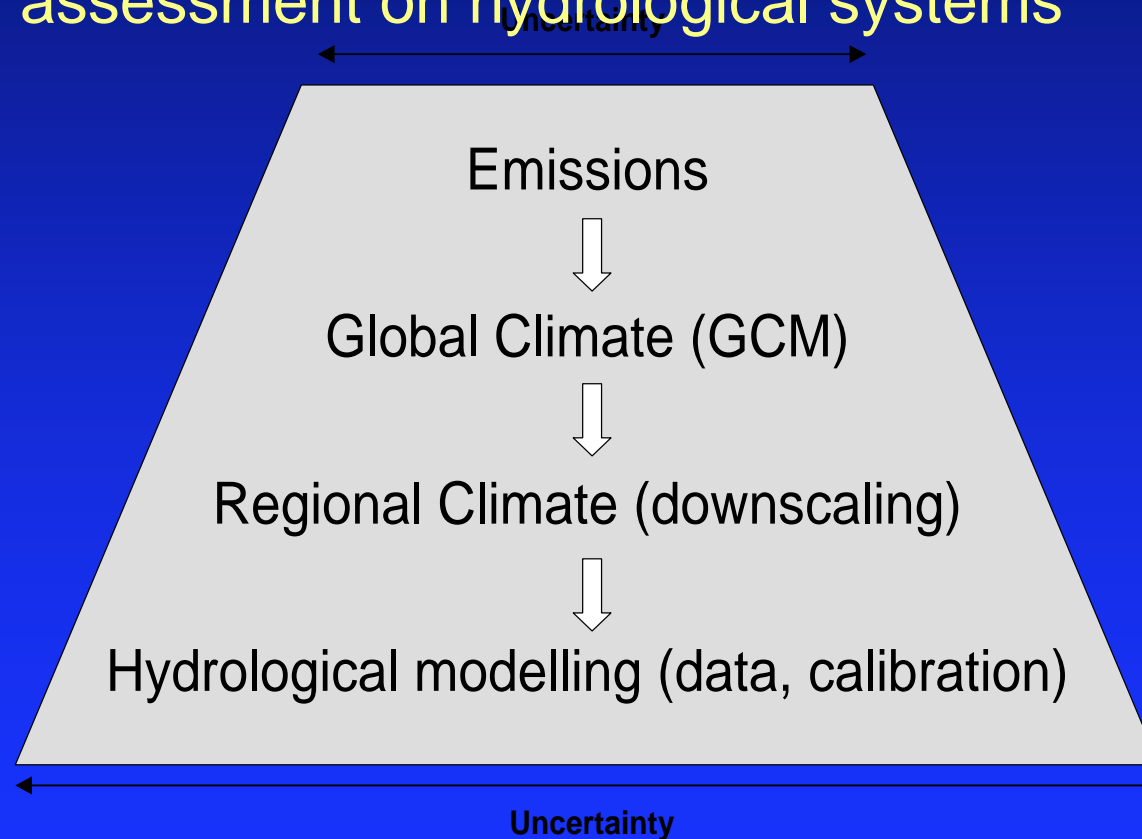


# The impact of climate change

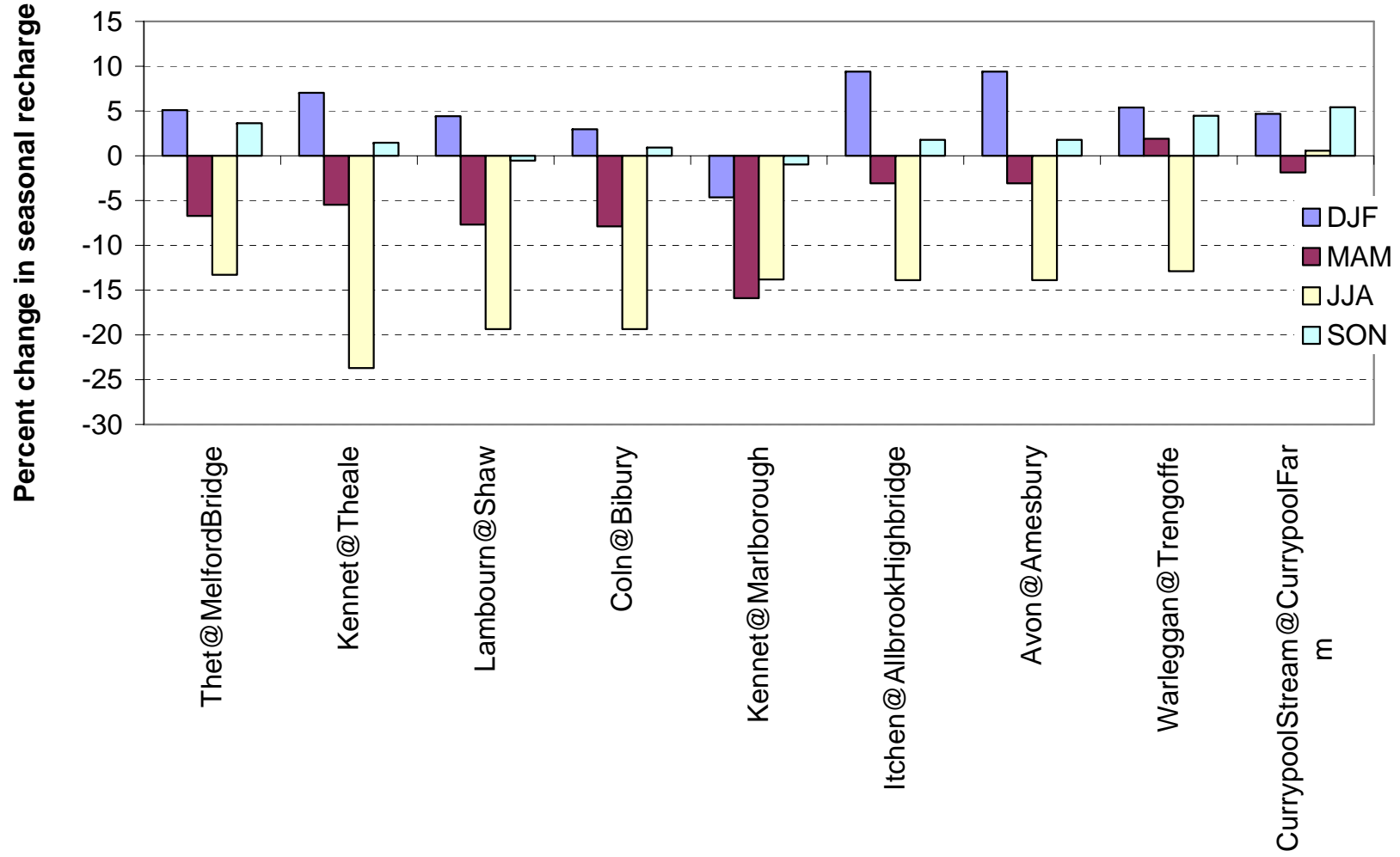
- ◆ Likely impacts:
  - Resources
  - Increases the frequency of the hot dry summers
  - Changes in raw water quality
  - Need to reduce our existing footprint
- ◆ On the downside water is a heavy product to move (1 cubic meter = 1 tonne)
- ◆ What do the models show (ref UKWIR report).

# Global to local impacts

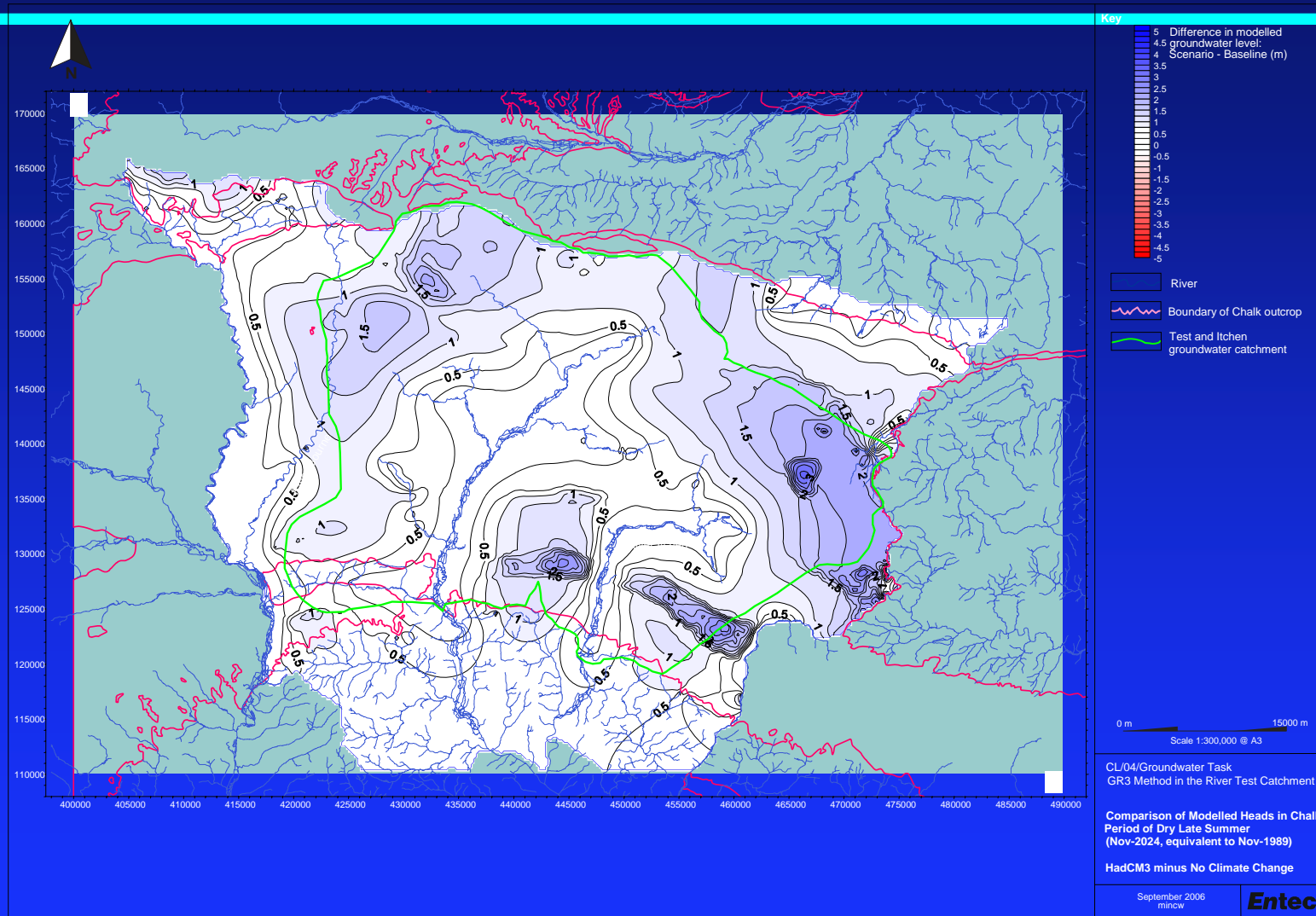
The “cascade of uncertainties” relevant to an impacts assessment on hydrological systems



# Groundwater recharge

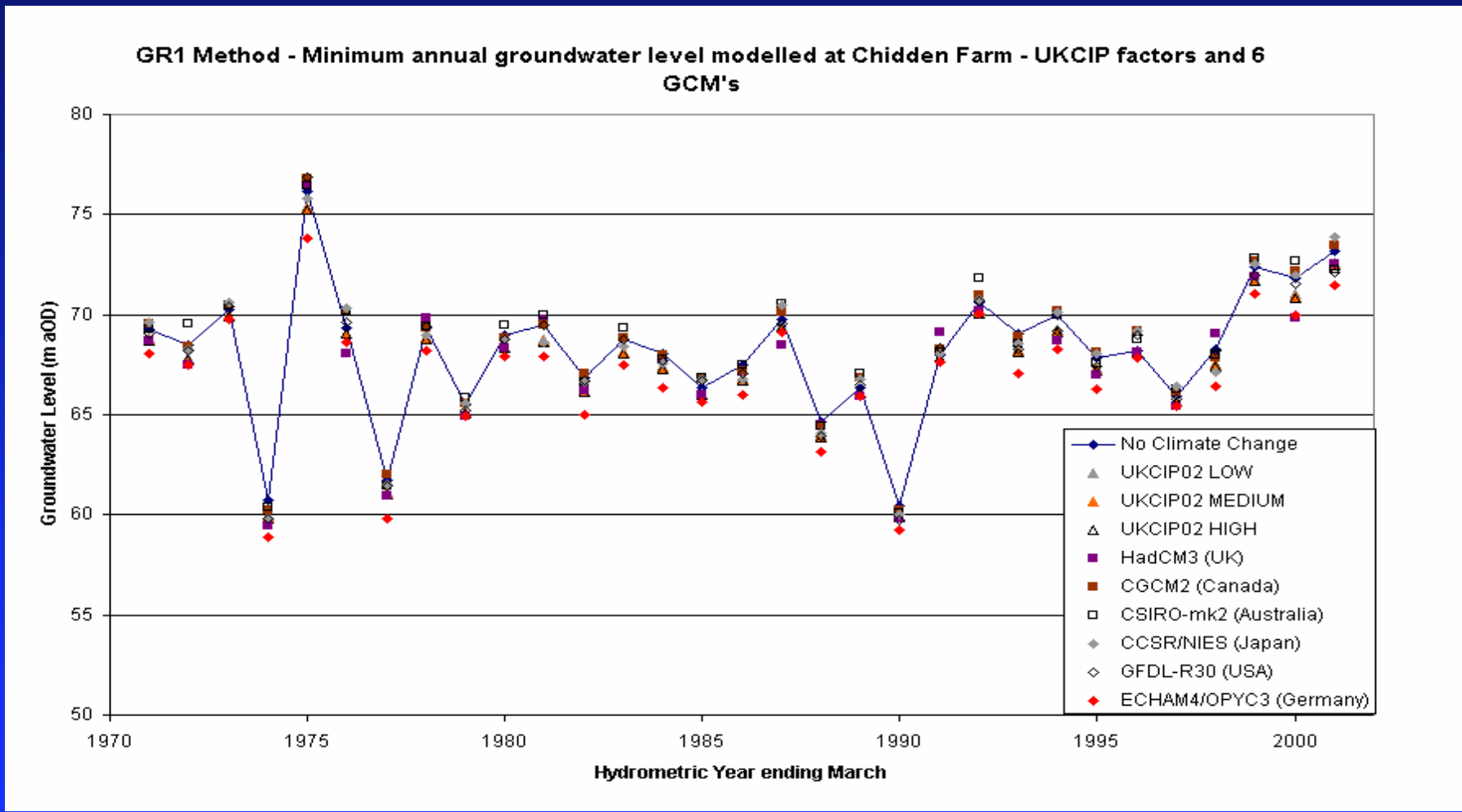


# GR3 – Modelled Change in Groundwater Level (HADCM3 vs Baseline)

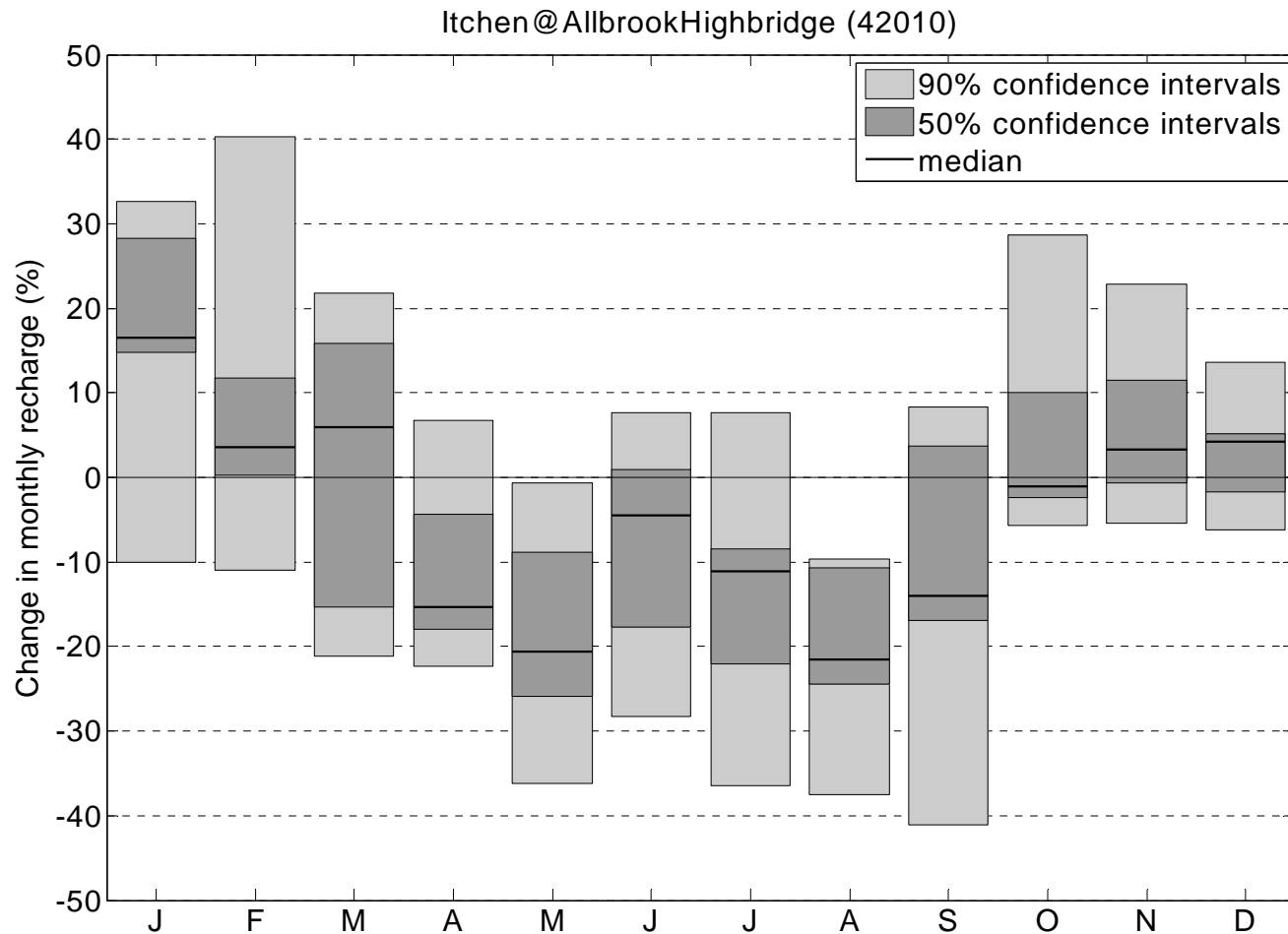




# Groundwater levels scenarios



# Monthly Flow Factors for 2020s - Kent

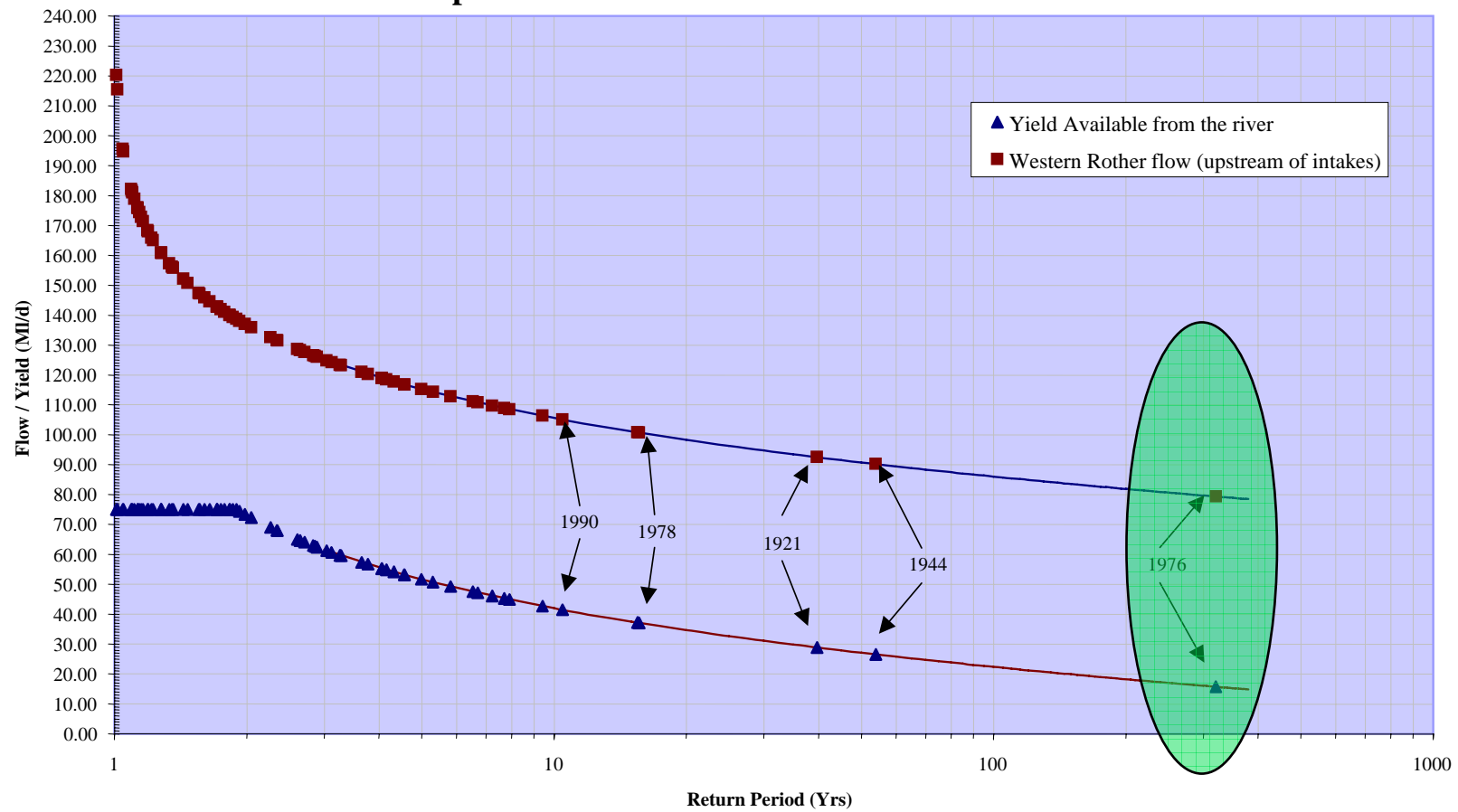


# Source impacts

- ◆ Rivers impacted the most with lower summer and autumn flows
- ◆ Groundwater is also impacted but to a lesser extent, may see delay in recharge of the groundwater.
- ◆ Reservoirs should benefit from wetter winters
- ◆ But is this the whole picture ?

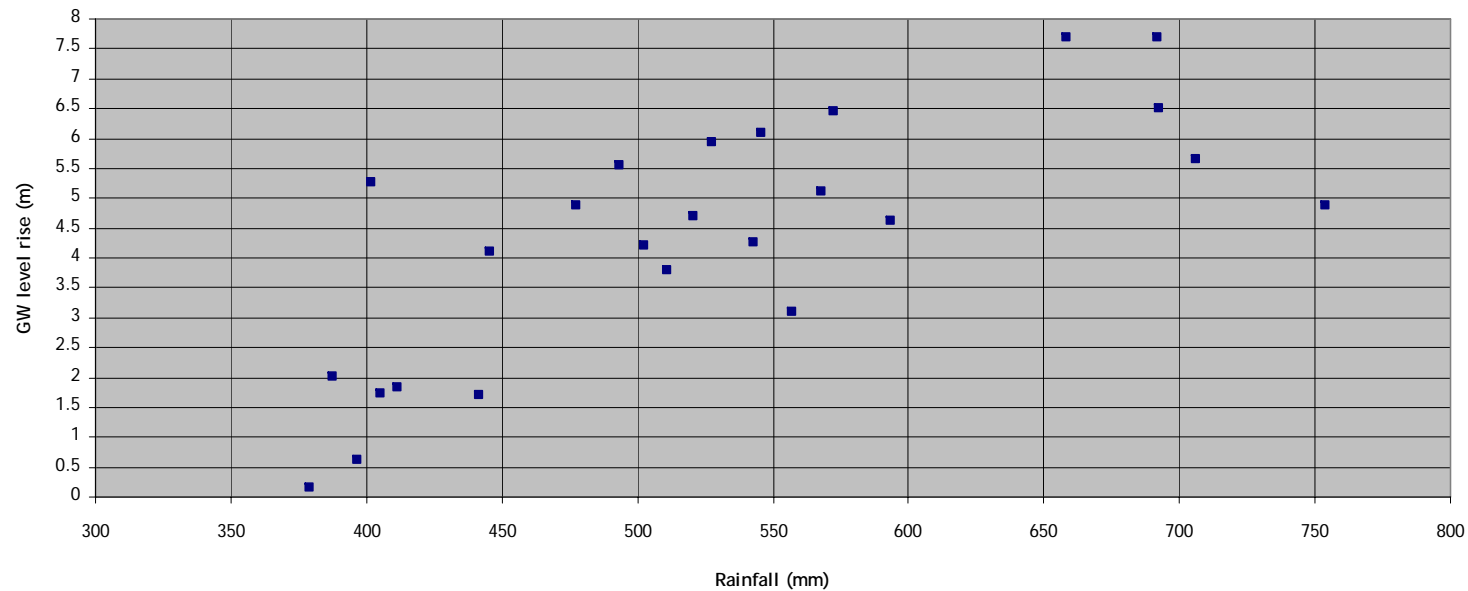
# Resource planning

Low Flow Return Period Graph for the Western Rother  
Upstream of the Hardham WSW intakes



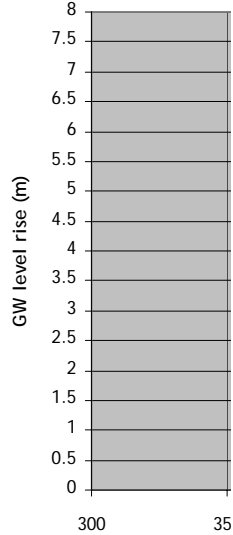
# Climate change and future droughts ?

Winter Rainfall v Groundwater level increases in the Worthing Chalk block  
(1974 to 2006)

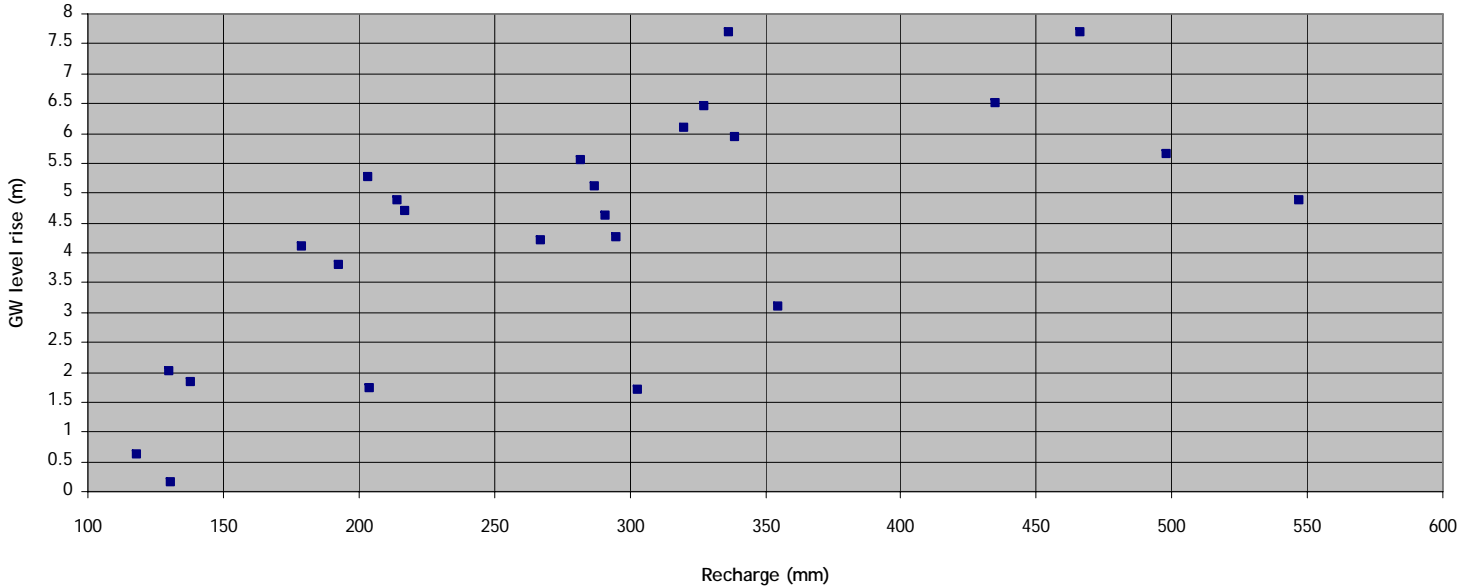


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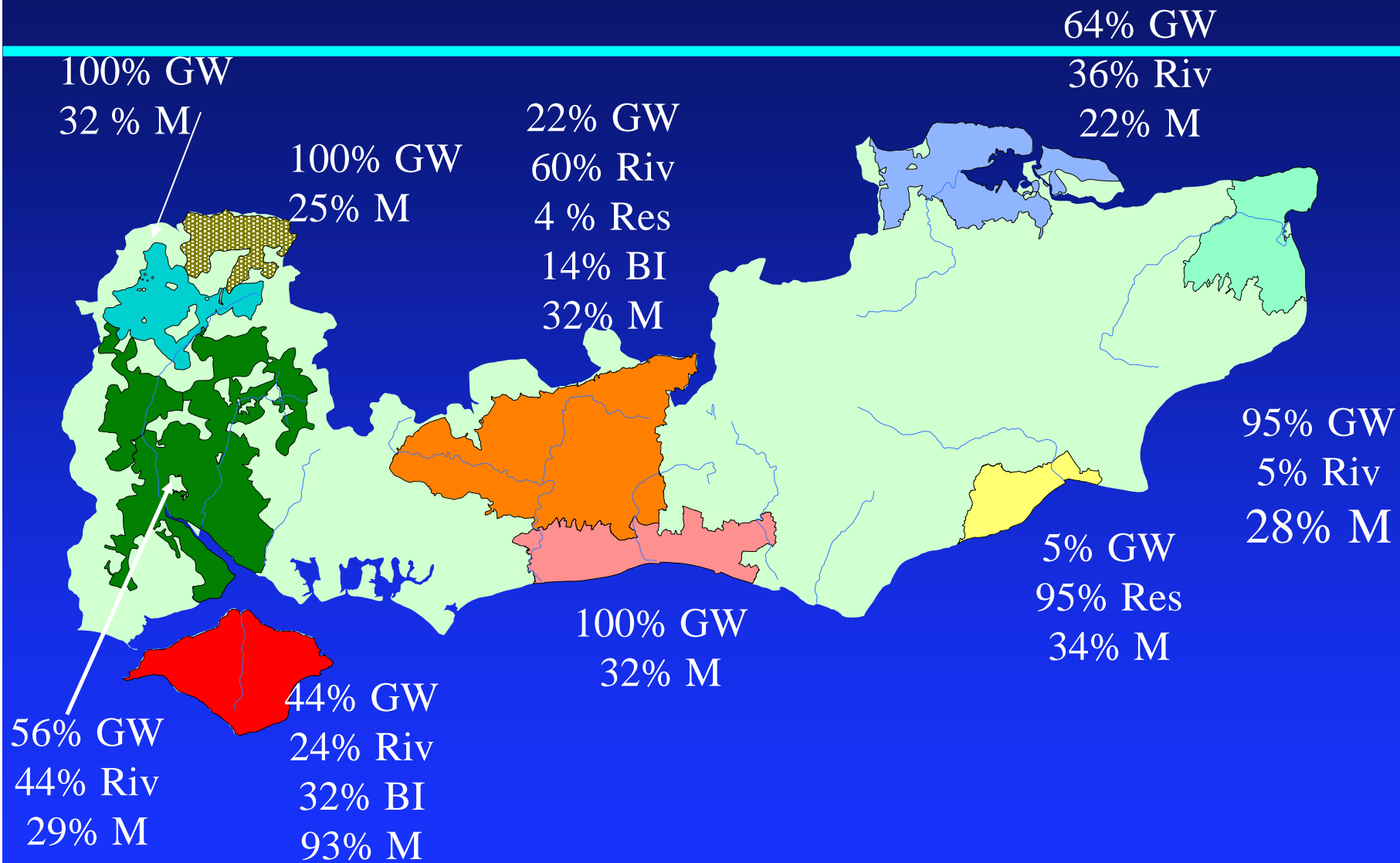
Winter Recharge v Groundwater level increases in the Worthing Chalk block  
(1974 to 2006)



# Droughts and Climate change

- ◆ Monthly factors will mask the true impact of dry spells in the future
- ◆ The frequency of dry winter events might not change in the future. However, there is likely to be a change in the frequency of hotter summers.
- ◆ Combination of hot summers and dry winters or even average winters with extreme months will lead to further resource problems

# Southern Water's Resource make up per zone





# What are the adaptation strategies ?

- ◆ Ensure customers understand what they are using through metering
- ◆ Help the existing and future housing stock become more water efficient
- ◆ However, in a 2 or 3 year drought using less water helps but without storage then water that not is taken today will not be there tomorrow.
- ◆ Move away from single source dominant supply areas, particularly river, to ensure the systems can capture the water when it is appropriate to do so. Different combinations of sources will improve the robustness of a zone
- ◆ Look to solutions that will make the most of the opportunities afforded by climate change e.g. winter water.
- ◆ Ideally plan around schemes whose output are less sensitive to droughts. Drawback is that these use more power
- ◆ Look for low energy solutions which require less pumping or minimal treatment
- ◆ Future selection of solutions will take account of carbon footprint, both during construction and operation

# Future schemes

- ◆ Reservoirs: multiple season; river regulation
- ◆ Desalination
- ◆ Indirect effluent re-use: river augmentation; boiler feed water; non-potable supplies for other industrial process, etc.
- ◆ Aquifer storage and recovery
- ◆ Bulk supplies from different types of sources
- ◆ Metering: tariffs
- ◆ Leakage reductions: fix and find; infra-structure renewals
- ◆ Large scale retro-fit programs: toilets, shower heads, taps
- ◆ Improved connectivity

# What else ?

- ◆ Focus on catchment integrated solutions rather than just end of pipe solutions (polluter pays ?)
- ◆ Regulations that encourage global solutions
- ◆ Technology:
  - More funded investment in R&D,
  - full scale trials on innovative solutions,
  - National studies
- ◆ CHP