Changing catchments, changing contexts: the water industry in 2025 and 2050

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Foundation View

The privatised UK water industry is excellent

UK water regulators are world leading

But times change……..

How does this relate to catchment change?

- Catchments are not natural
- They are economic and political constructs
- Economic – just consider land use dynamics
- Political – a new reservoir needs an act of parliament but a catch water does not – I expect more catchwaters.
- Catchwaters are not trivial – a DEM based catchment area for Scar House would be 30% of the actual – and omit huge management options (EVOp take care).

- **Appreciation of future context, broadly defined is vital.**

Mapping the water business future

1. Shape of the the industry in 10 / 30 years?
   (in round dates 2025 and 2050)
2. Key challenges over those periods?
3. Requirements for progress?
4. Barriers?

ONE Water Industry?

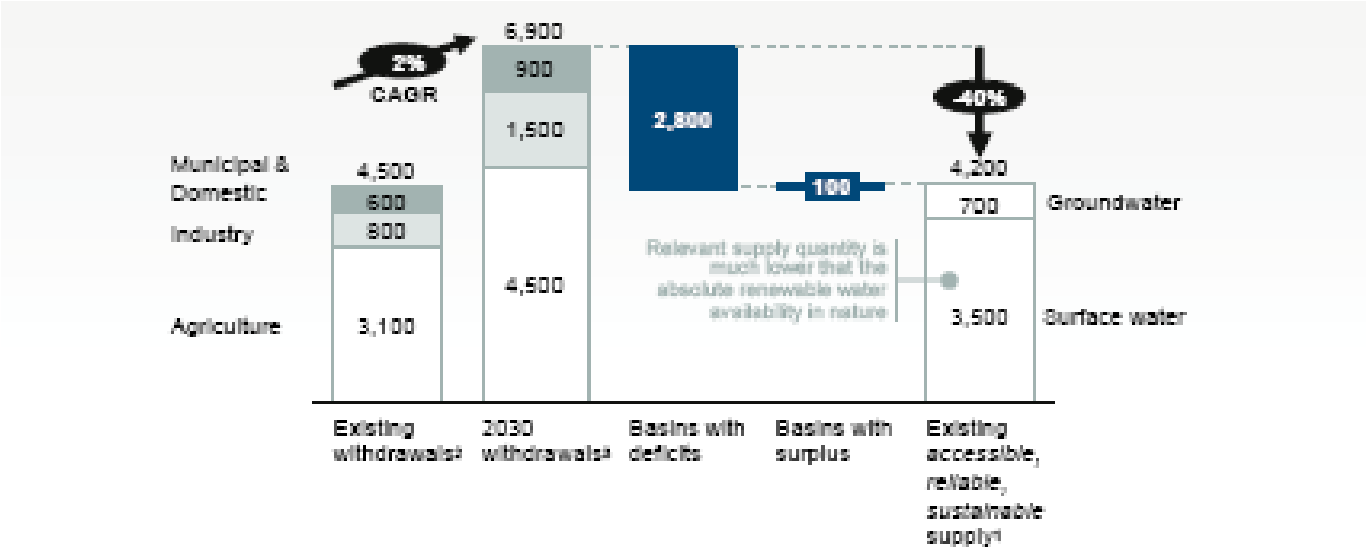
UK Europe Global? (ie the £70B or the £770B market?)

Potable, raw, waste, technology, information, economics?

- No mobile phones
- No personal computers
- No fax machines
- No internet
- No email
- No GPS
- No satnav
- No water authorities
- No water companies
- No ultrasound
- No bodyscanners

Aggregated global gap between existing accessible, reliable supply[1] and 2030 water withdrawals, assuming no efficiency gains

Billion m³, 154 basins/regions



1 Existing supply which can be provided at 90% reliability, based on historical hydrology and infrastructure investments scheduled through 2010; net of environmental requirements
2 Based on 2010 agricultural production analyses from IFPRI
3 Based on GDP, population projections and agricultural production projections from IFPRI; considers no water productivity gains between 2005-2030

SOURCE: Water 2030 Global Water Supply and Demand model; agricultural production based on IFPRI IMPACT-WATER base case

From McKinsey, 2009 Charting our Water Future

Key challenges

Global

- Population
- Climate change
- Urbanisation
- Industrialisation
- Energy costs

Local

- Climate change
- Demographics
- Resource sufficiency
- Energy efficiency
- Infrastructure replacement

The demographic backdrop to this economic landscape is a trend for continued population increase with the latest forecasts of demographic change in the UK suggesting that population growth and household growth will be a ubiquitous characteristic of local communities over the next 25 years. Ageing population profiles, increasing ethnic diversity and a reducing average household size are key considerations for planners and policy makers; ***more people living in more households.***

2025

- Next 2 years set in stone
- Following 5 already firmly in planning
- Expect change in the period 2019-2024
- All companies have internal grids trending smart
- Shared headroom and water support / transfer agreements
- Failures due to 3 dry winter sequence?
- Marked progress towards universal metering.
- Industry sliced? – retailer, distributor, buyer
- Waste water separated?

Internal grids - why

- Water security
- Avoiding national grid
- Mutual support
- Carbon efficiency
- Shared headroom
- Therefor cross connections

Questions for researchers

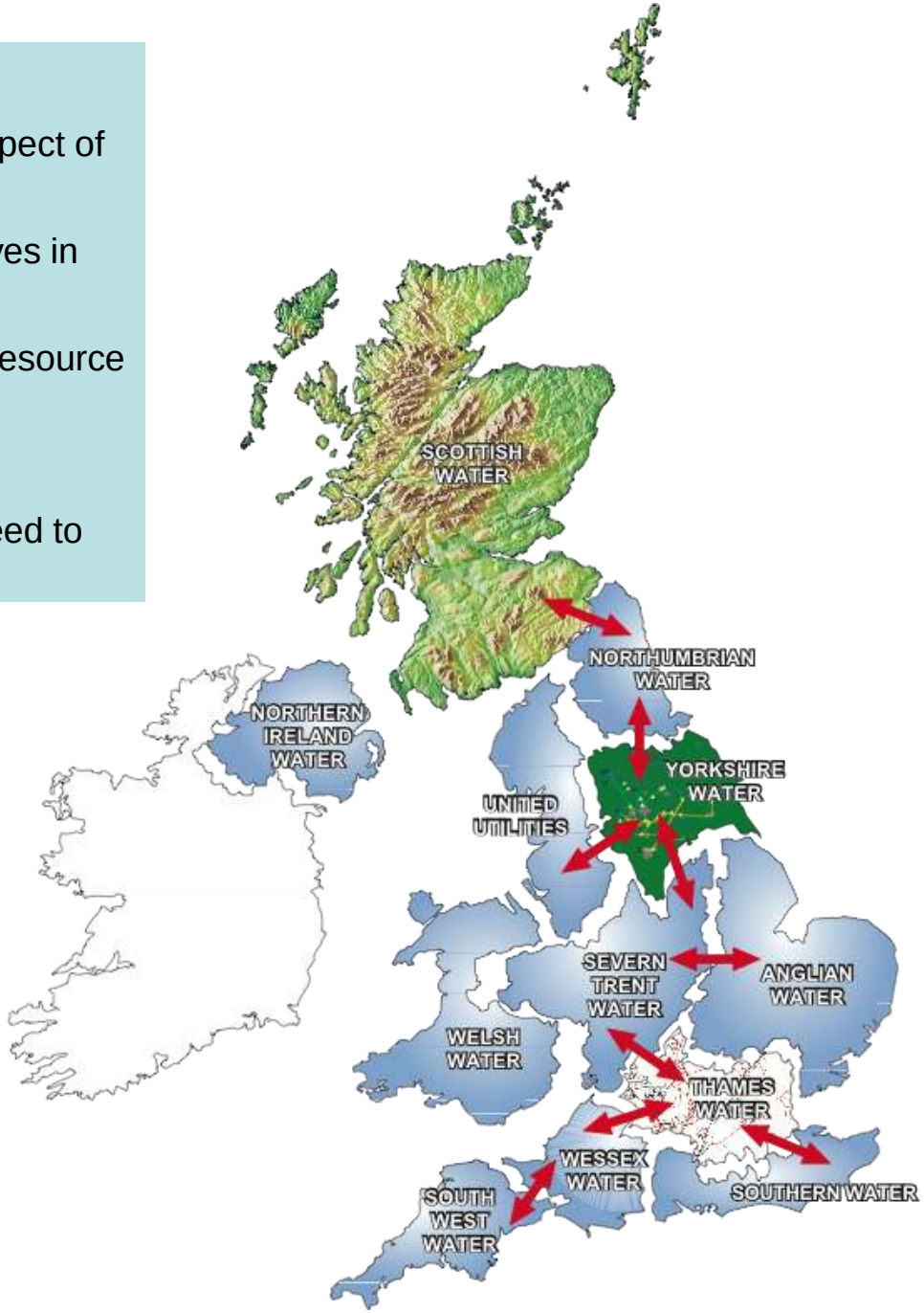
What spatial scales can we expect of future droughts?

Where are the resource reserves in extreme droughts?

What are the best models of resource transfer optimisation?

What does it cost?

What market/policy barriers need to be overcome?



Mutual support

Will it be by?

- Informal alliances – the East Anglian group
- Water transfer agreements ie a legal route
- By acquisition (so focus will be on physical and resource ‘fit’ rather than the financial return).

- Currently some companies are supporting investigations of joint opportunities.

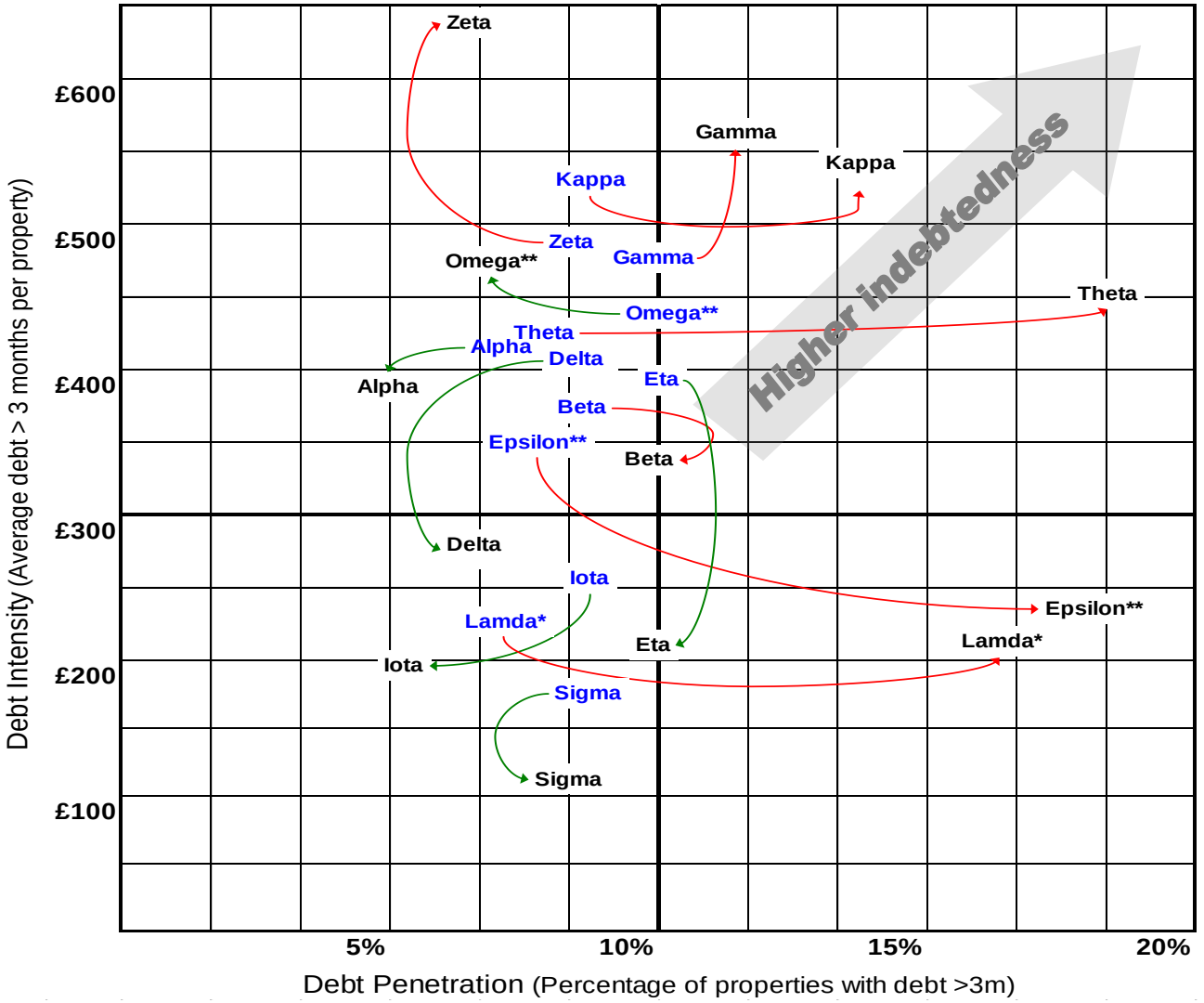
£1.58B

Blue labels indicate the expected level of debt penetration and debt intensity

Black labels indicate the actual level of debt penetration and debt intensity

Red arrows indicate increasing indebtedness from expected to actual

Green arrows indicate reduced indebtedness from expected to actual



Water Electricity Gas

Already exploring joint benefits!

2050

- Potable water no longer supplied
- Local / individual treatment for potable use
- Clean non-p water by smart grid.
- Smart grid uses digital neutrino communication technology
- Food has quadrupled in price, energy costs high, water price high, roof gathering is economic, internal water recycling.
- Extensive SUDS.
- Alex is selling water to the south ie a national grid emerges (and yes the Scottish Infrastructure Minister is looking at it seriously!)

Exploitation of groundwater resources in China for agricultural irrigation is unsustainable.

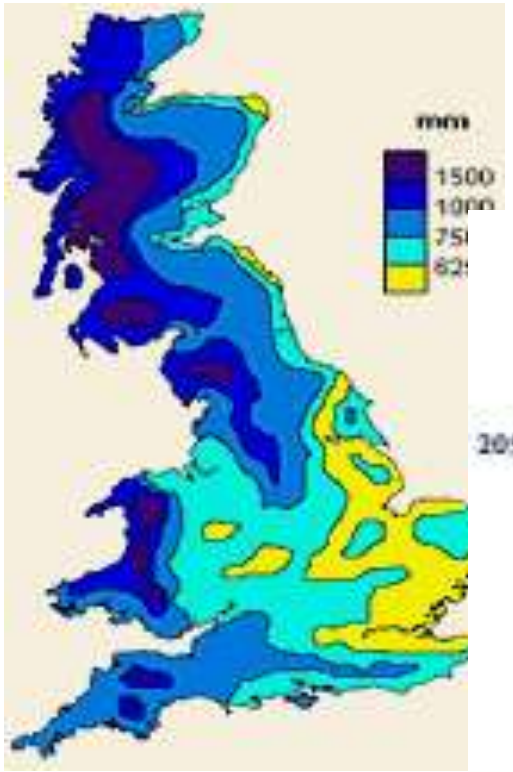
"The government must adopt a new policy to reduce water consumption. The main thing is to reduce demand. We have relied too much on engineering projects."

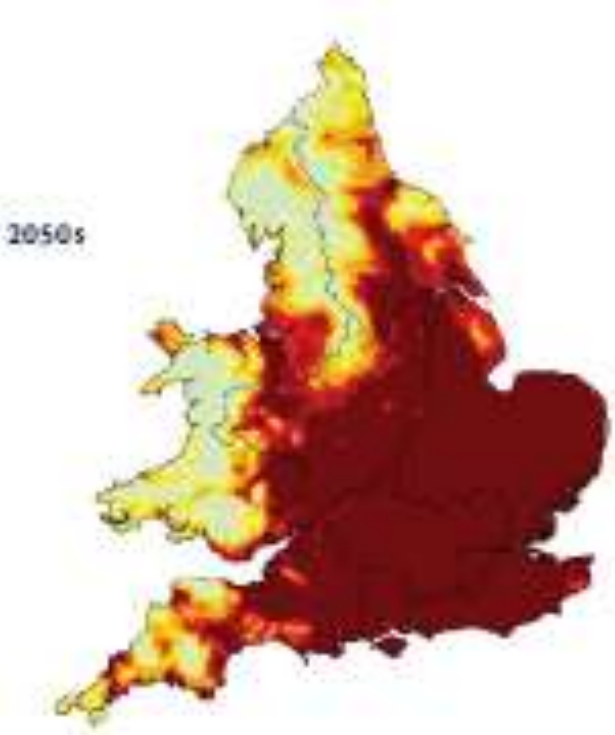
"We must reduce food production. It would be more economical to import."

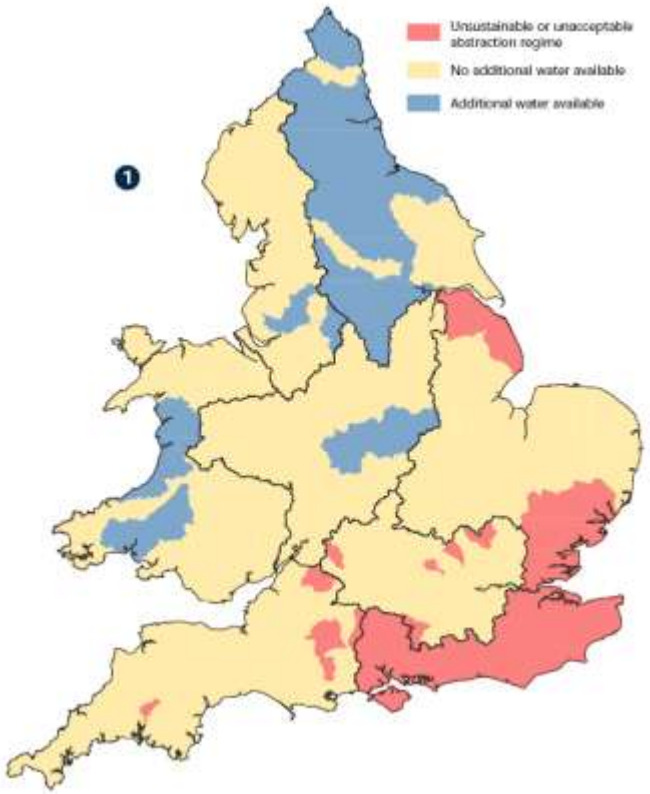
Zheng Chunmiao

G4: Distinguish clearly between potable and raw water demand. Demand management in the former is unlikely to solve issues in the latter.

We know we have a distribution issue








1. Small country
2. 60 M people
3. 55 M below line
4. 35M in SE

Regional transfer

Inter-regional support

Not mass transfer

Not moving Loch Ness water to London

Modest inter-regional optimisation

Market based

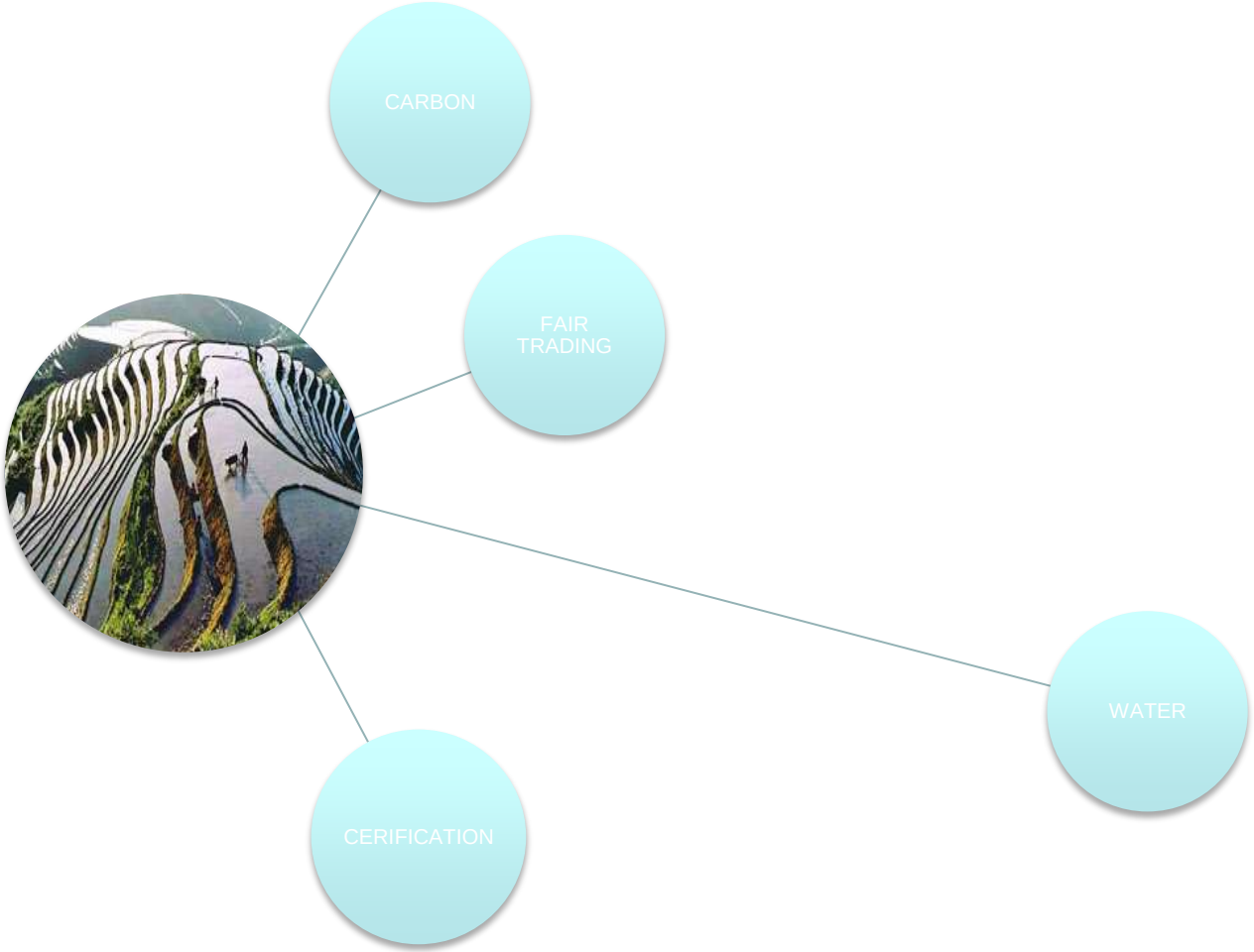
Considerations for companies

- Expect more droughts
- Expect more water transfers.
- Consequent variations in supply characteristics.
- Expect higher costs as headroom security increases.
- Expect a market in local water treatment.
- Expect pressure from customers for water efficiencies.
- Expect ‘water performance’ as part of product profile.

At policy level

- Expect pressure for compromise/prioritisation

Water in Corporate Social Justice



The US-CWA Top 15 Impairments

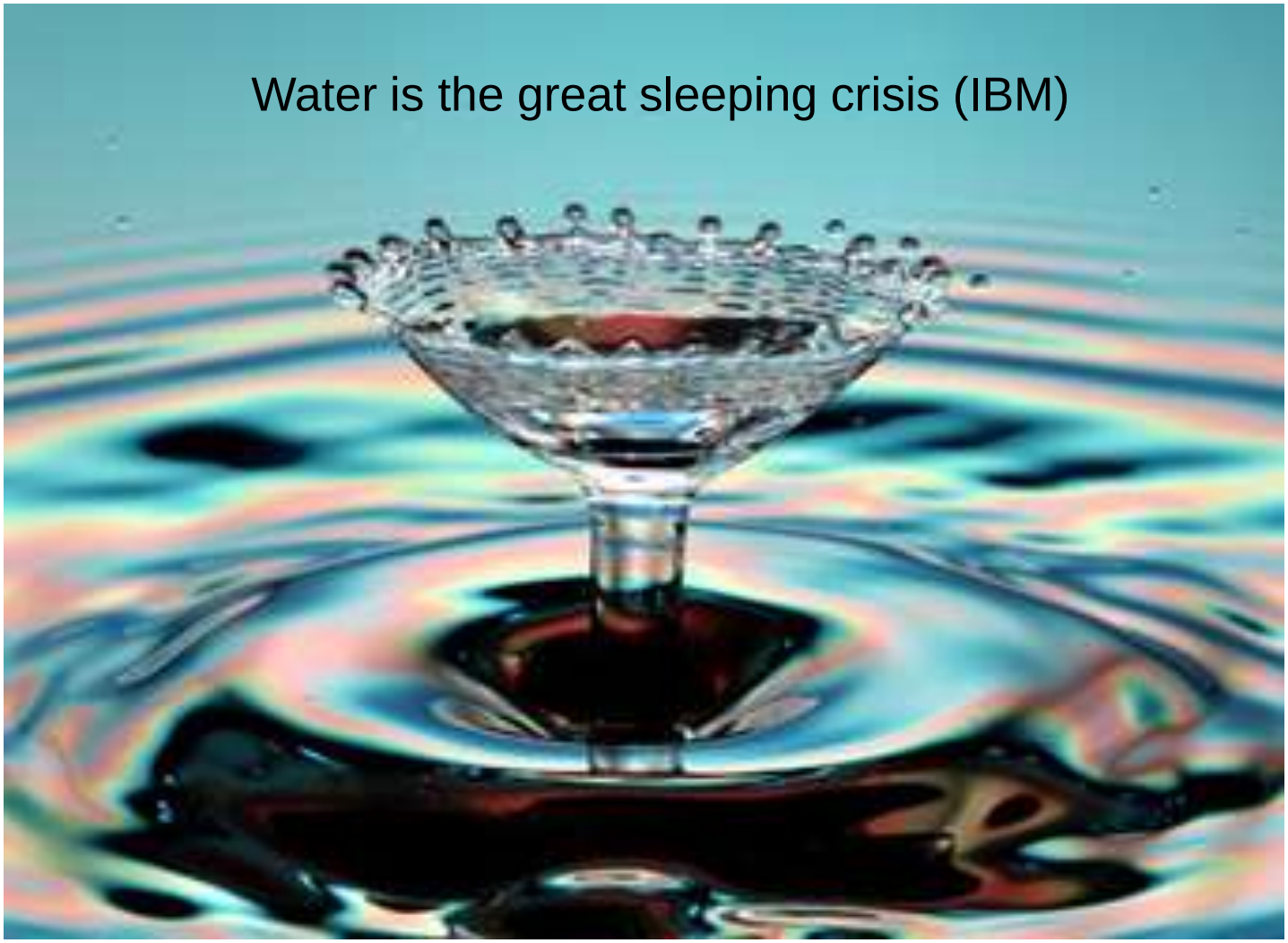
20/09/2011

Causes of Impairment for 303(d) Listed Waters

Description of this table

NOTE: Click on a cause of impairment (e.g. pathogens) to see the specific state-reported causes that are grouped to make up this category. Click on the "Number of Causes of Impairment Reported" to see a list of waters with that cause of impairment.

Cause of Impairment Group Name	Number of Causes of Impairment Reported
Pathogens	10,791
Metals (other than Mercury)	7,422
Organic Enrichment/Oxygen Depletion	7,002
Nutrients	6,727
Polychlorinated Biphenyls (PCBs)	6,364
Sediment	6,180
Mercury	5,004
pH/Acidity/Caustic Conditions	4,095
Cause Unknown - Impaired Biota	3,914
Temperature	3,053
Turbidity	3,034
Pesticides	1,877
Salinity/Total Dissolved Solids/Chlorides/Sulfates	1,732
Cause Unknown	1,262
Noxious Aquatic Plants	1,053



Thank you – Questions and Observations?