

# CATCHMENT MANAGEMENT AND BIOBEDS AT SEVERN TRENT WATER

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*European Biobed Workshop  
Sept 2016*

**‘FARMING FOR CLEAN WATER’**



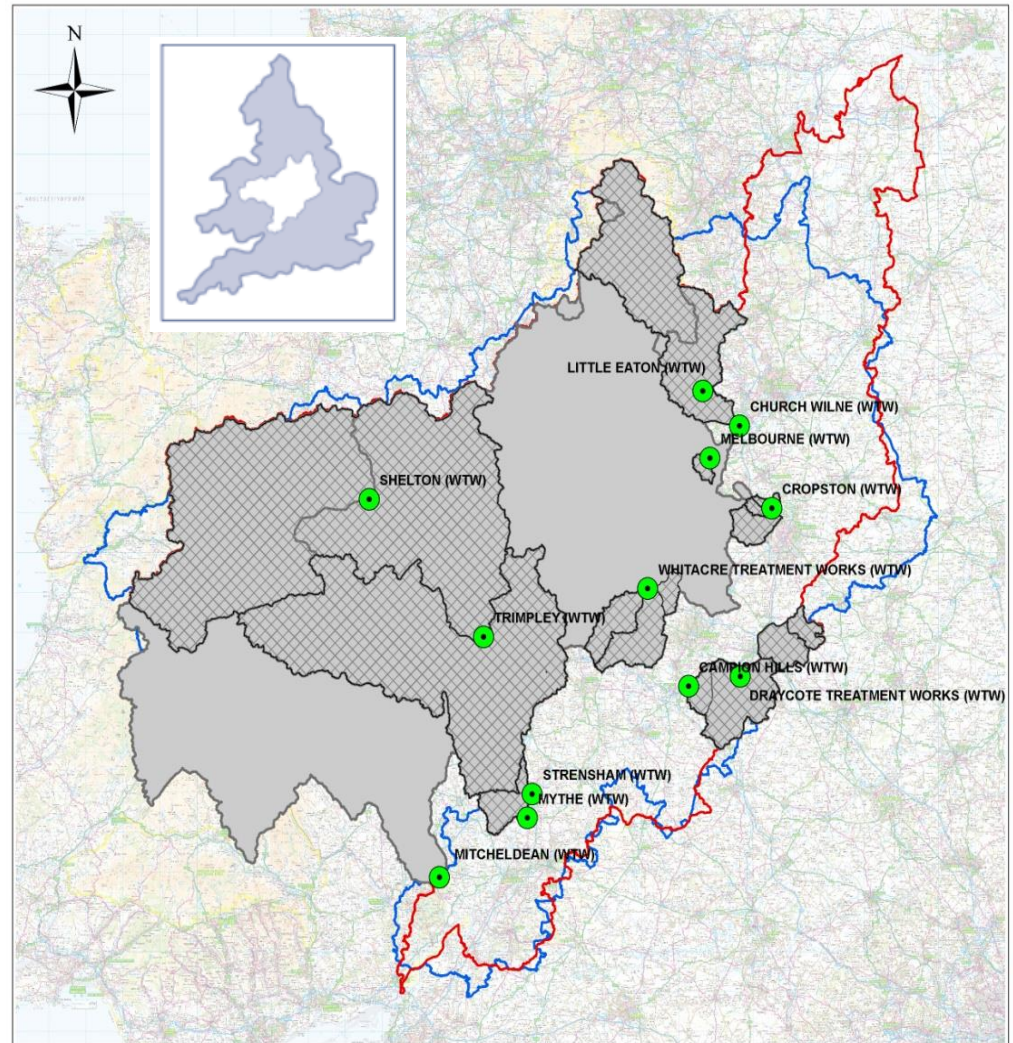
# OVERVIEW

- Background to Severn Trent Water (STW) and why we are investing in catchment management
- STW farmer support including biobeds and biofilter
- Our experiences of biobeds and biofilter – on farm monitoring and lab trial

# SEVERN TRENT WATER

## WHAT WE DO....?

- We supply 8 million customers with clean water daily
- This equals 2.2 billion litres of clean water a day
- We have 2 types of sources of water:
  - Surface water sites (e.g. rivers and reservoirs) = approx. two thirds of our raw water supply
  - Groundwater sites (e.g. boreholes and springs) = approx. one third of our raw water supply
- Each source has its own unique catchment and bespoke treatment set up



# WHY CATCHMENT MANAGEMENT?

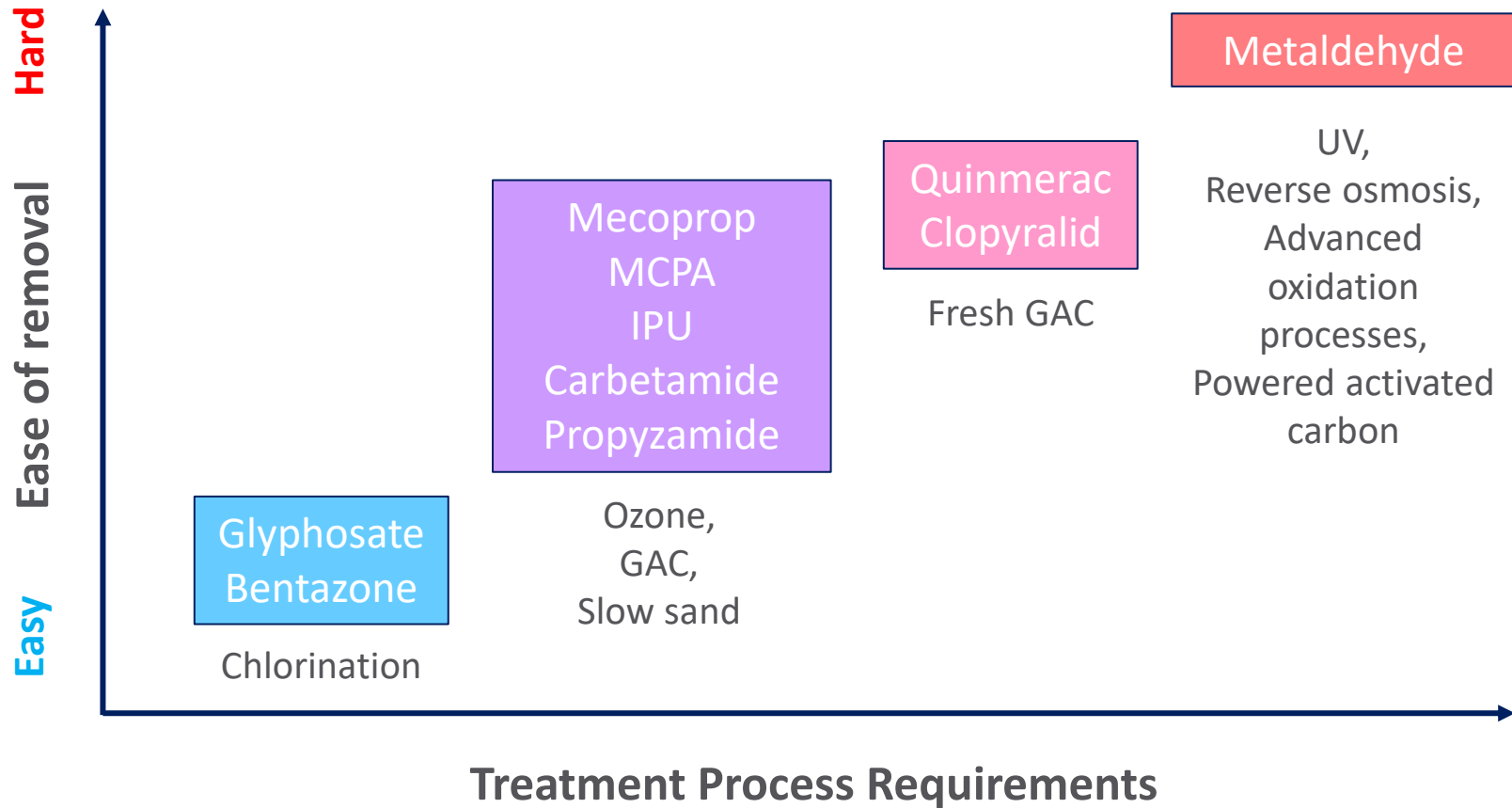
## Water Supply (Water Quality) Regulations

- ✓ We are required to carry out catchment risk assessments through our Drinking Water Safety Plans (DWSPS)
- ✓ We are required to monitor for pesticides which our risk assessments suggest might be present in raw water
- ✓ We have strict drinking water standards to meet (0.1ug/l for an individual pesticide) - this is equivalent to one paracetamol tablet in an Olympic sized swimming pool!

## Other Drivers

- Article 7 of the EU Water Framework Directive says we should not put in any new treatment
- Environment Agency's National Environment Programme (NEP)
- Some pesticides we can't remove through conventional treatment e.g. Metaldehyde
- Its more cost effective for our customers

# EASE OF PESTICIDE REMOVAL

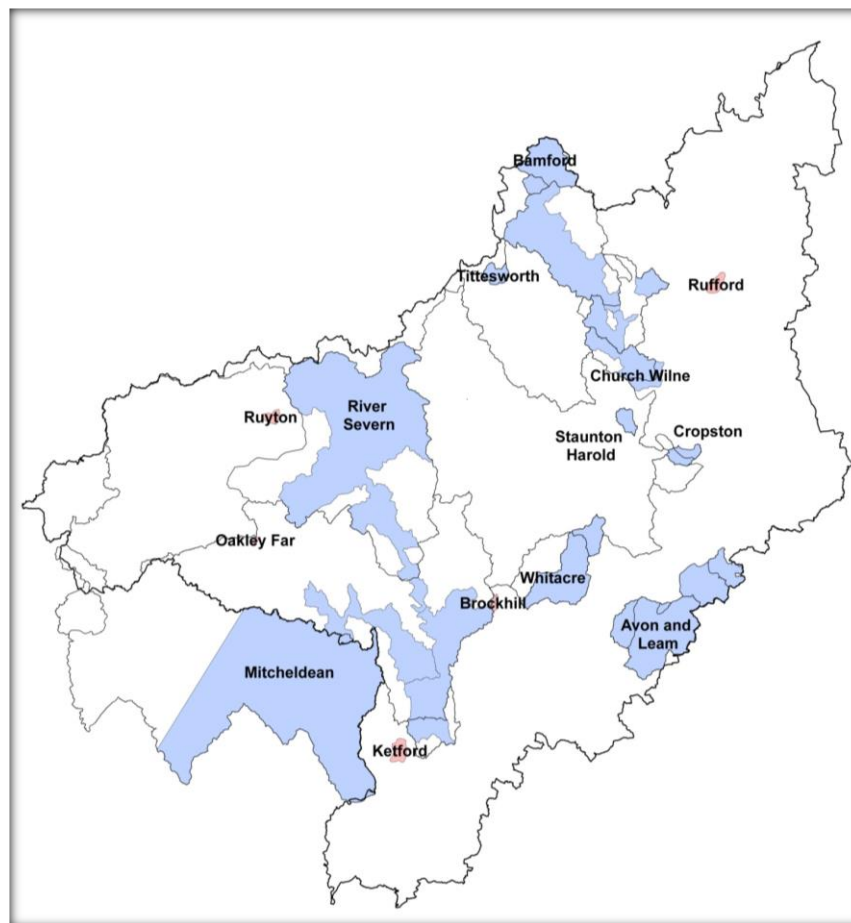




# STW FARMER SUPPORT

Working with farmers in 21 catchments covering approx. 4000km<sup>2</sup> and 4000 priority farmers

- **‘STEPS’ farmer grants**
  - Grants of up to £5000 for land management and infrastructure improvement works with a water quality benefit in STW priority catchments.
  - To date 280 grants have been awarded to farms in these catchments
  - Competitive scheme with priority items to meet catchment needs
- 12 catchment advisors
- Pesticide amnesty
- Free spreader and sprayer testing
- Range of technical events and demonstrations
- Access to specialist advise visits and soil testing
- Farmers as Producers of Clean Water ... a metaldehyde reduction scheme which rewards farmers for improvements in water quality



# STW FUNDED BIOBEDS AND BIOFILTERS

- To date we have awarded funding to 22 biofilter and 2 biobeds across the STW region
- Work must be completed by March 2017
- We are also providing 15 biobed and pesticide facility design visits via contractors over the next 6 months

Grant item	STEPS1 (2015/16)	STEPS2 (2016/17)	Total
Biobed	1	1	2
Biofilter	12	10	22

- Many farmers are opting for a flat packed biobox option
- Funding will be available for another 3 years (and hopefully more)

# ON FARM BIOFILTER MONITORING

- Leam Strategic Partnership project (Warwickshire) working with Natural England / Catchment Sensitive Farming
- Sprayer filling / washdown / storage area, 50000L rainwater harvesting tank and a biofilter part funded by CSF capital grant
- Samples taken from the puddles below the sprayer's wheels after use in the field and a rainfall event





# ON FARM BIOFILTER MONITORING

- Reduction in concentrations observed at the biofilter outlet vs. concentrations observed in puddles in sprayer wash down area before biofilter
- Spill resulted in elevated metazachlor concentrations
- Note that 'after' samples based on just one sampling occasion

Active	Max. Before biofilter (4 samples taken during Oct / Nov 2012)	Max. after biofilter (1 samples taken during Nov 2013)
Carbendazim (ug/l)	1.11	0.147
Flutriafol (ug/l)	2.28	0.017
Mecoprop (ug/l)	3.25	0.035
Metaldehyde (ug/l)	3.24	0.127
Metazachlor (ug/l)	23.4	19.4 – localised spill
Propyzamide (ug/l)	1.71	0.26

# METALDEHYDE BIOBED LAB TRIAL

## Aims and Approach

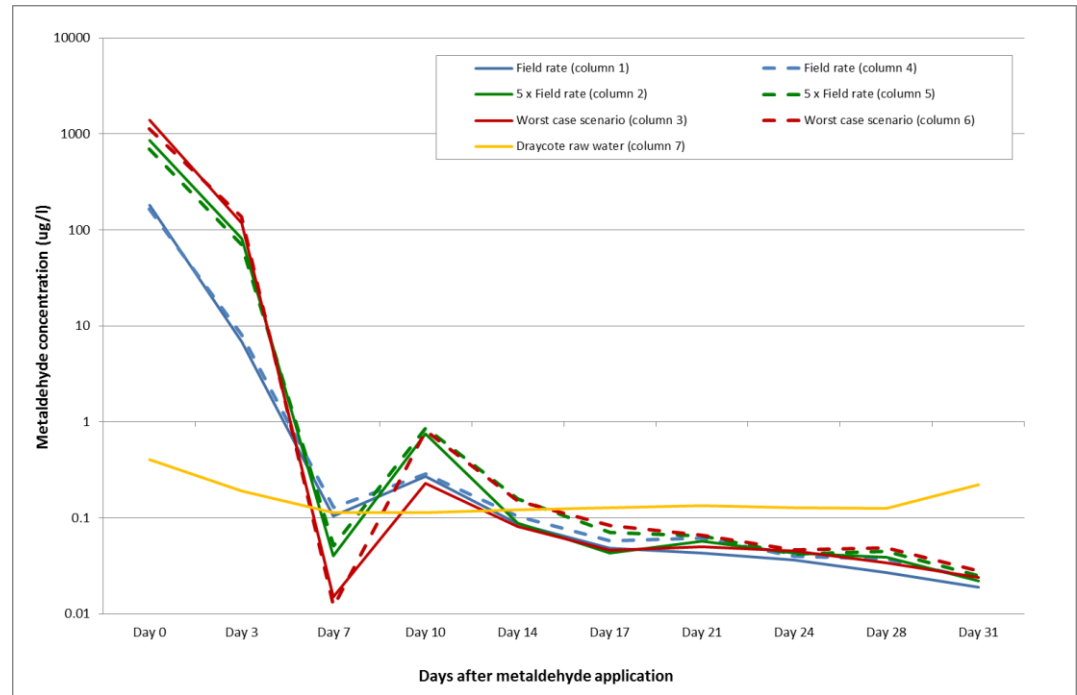
- 3<sup>rd</sup> year BSc. project with Durham University
- To investigate the capability of biobeds to remove metaldehyde from water
- Columns treated with different metaldehyde applications and irrigated with water to simulate rainfall / wash down of equipment
- Repeated with both soil and biomix to assess their relative effectiveness
- 3 different metaldehyde concentrations plus reservoir water
  - MSG guideline applications
  - 5 x MSG applications
  - Max amount measured on equipment
  - Draycote Reservoir (0.122ug/l)



# METALDEHYDE BIOBED LAB TRIAL

## Results

- Metaldehyde concentrations < 0.1ug/l from all treatments after 17 days, except for reservoir water. Reservoir water has higher TOC / concentrations not high enough to support microbes
- 50% of applied metaldehyde leached on day 1 from biomix columns due to preferential flows / high water content. Initial loss from soil lower due to higher clay content for sorption / existing microbe populations
- Unusual increase in concentrations on day 10 – desorption or change in microbe population?
- Mass balance showed approx. 50% degraded from biomix however metaldehyde concentrations in initial leachate high



# THANK YOU!

Any questions?