

National Biofilm Innovation Centre. SCELSE Drinking water systems and alternative water resources (webinar 1)



September 7th 2021



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Innovation Discovery - Project Manager

Water Industry Biofilm - an Anglian perspective.





Today's Presentation

- Anglian Water
- Historic perspective
- Identifying
- Categorising
- Understanding
- Monitoring
- Final Thoughts

Anglian Water

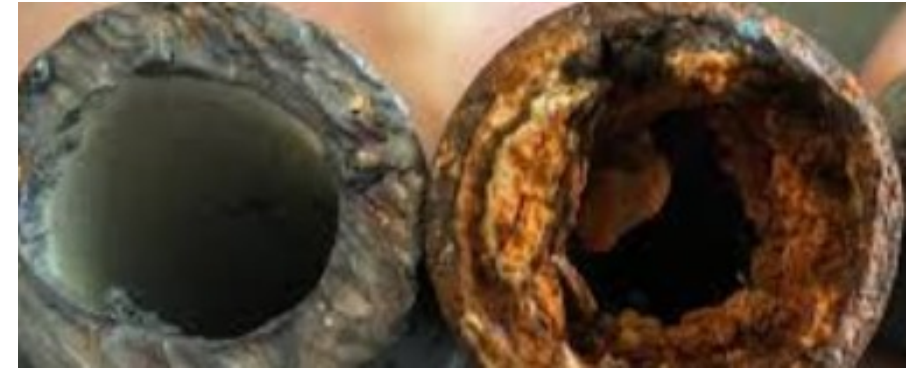
- Geographically the largest water company in England and Wales.
- Driest region only 2/3 Nat. Av. or 600mm.
- Supply drinking water to 4.3 million water customers & 6 million with waste.
- 424 BH's, 8 reservoirs and 9 rivers.
- 143 Water Treatment works supplying over 1 billion litres of water a day.
- 38,185km mains.
- The impact of Biofilms – Water quality!



Historic perspective

Where we were!

- Treatment – chemical
- Distribution – thousands of kilometres of pipework largely enclosed.
- Storage tanks – enclosed.
- Laboratory techniques/methods less well developed.
- Instrumentation less advanced.

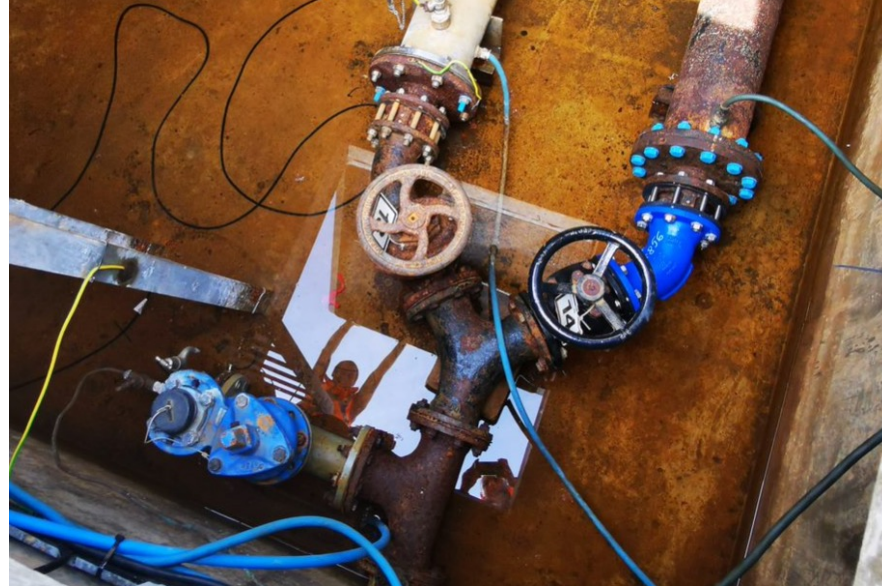


General pipe wall images showing progression of biofilm and corrosion.

Historic perspective

More Recently

- Risk Based
- Chlorine
- Temperature
- Plate counts
- Flushing
- Concentrated sampling surveys
- Instrumentation and data analytics.



Identifying.

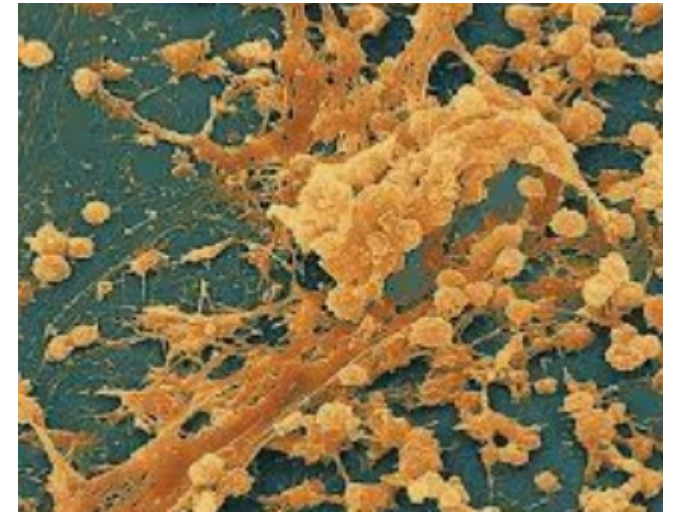
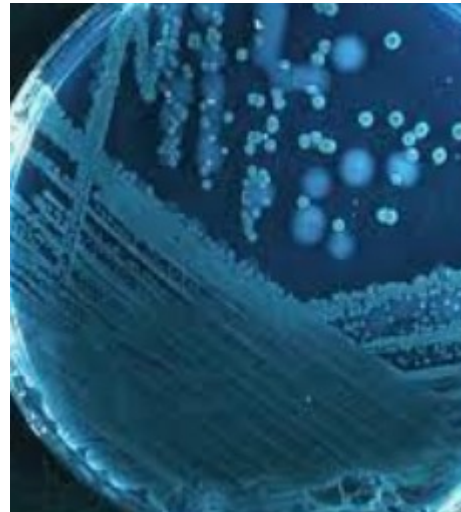
Academic collaborations

Sheffield University

- Distribution
- Pipe loops.
- Coupons.
- Recreating environments.
- Communities

Cranfield University

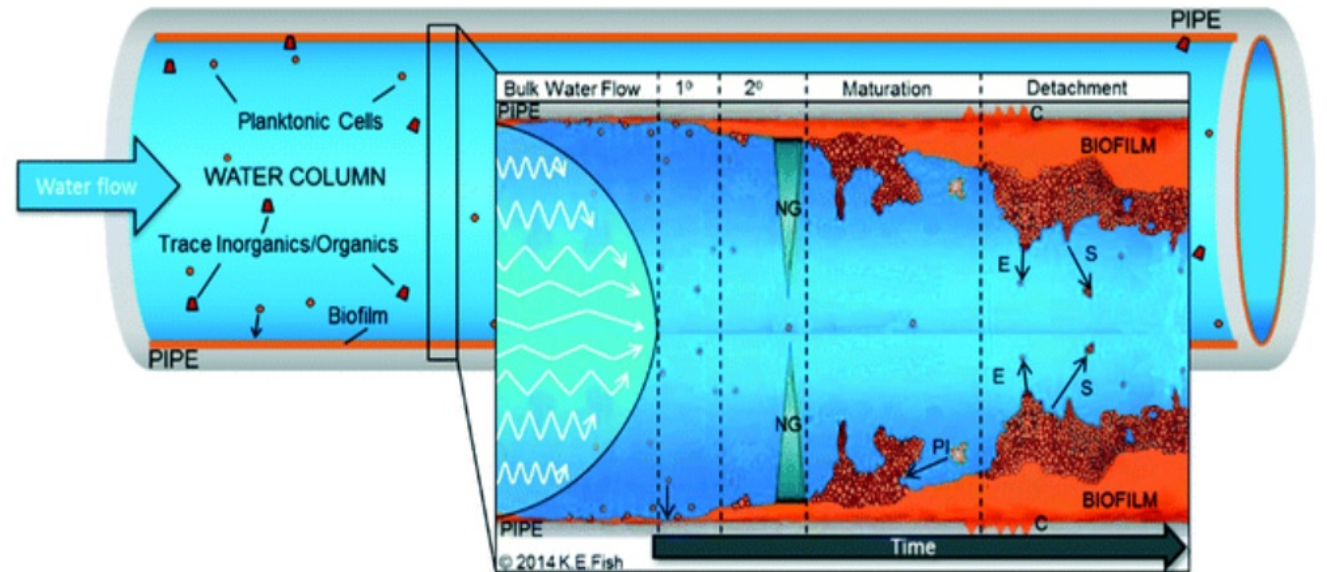
- Treatment
- Filters
- Organics



Categorizing

Good? Bad? Other?

1. Early colonisersnew pipes/systems?
2. Communities and how they interact?
3. Stable or dynamic systems – flow/demand
4. Seasonality?

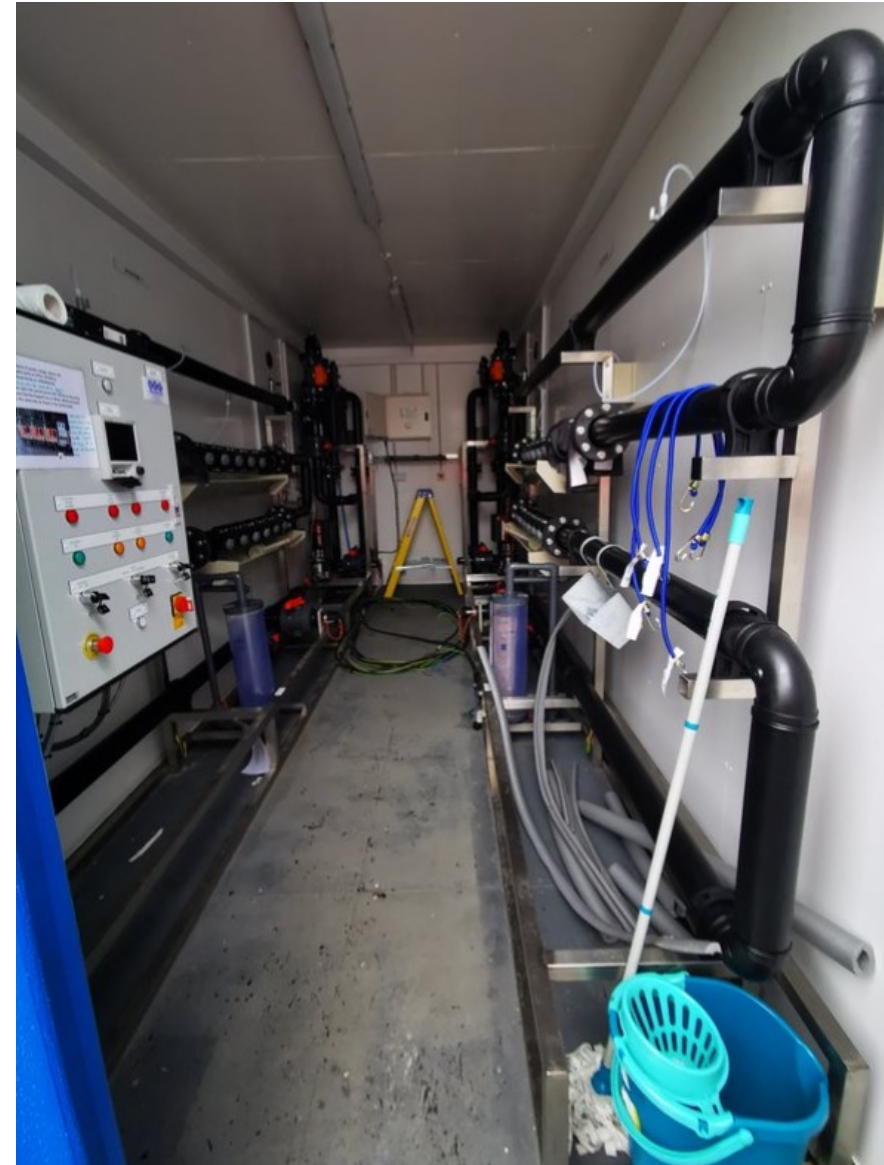


Biofilm development - courtesy of Sheffield University

Understanding

Recreating live systems.

- Chemical free Water research.
- Pipe loops installed at 2 treatment works.
- Rigs simulate distribution.
- Coupons monitor biofilm with and without Chlorine and Orthophosphate.



Monitoring

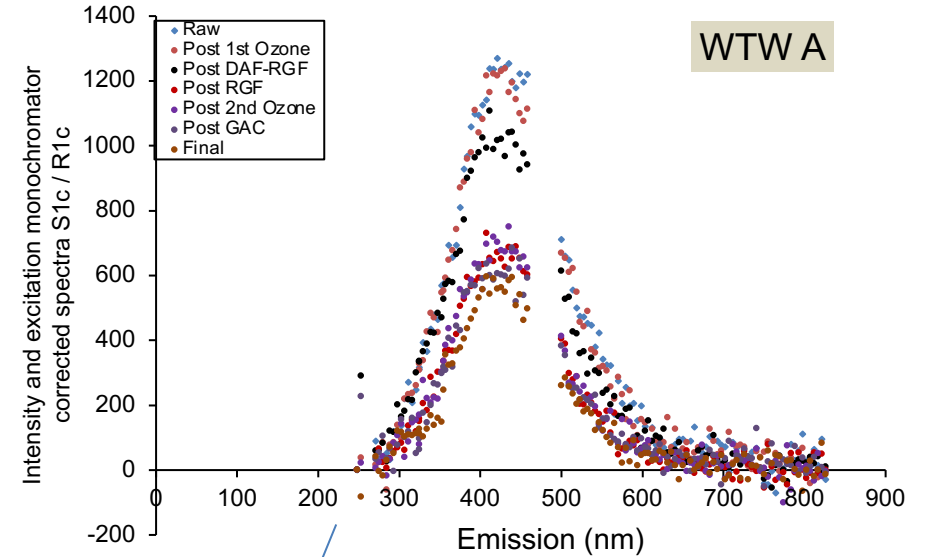
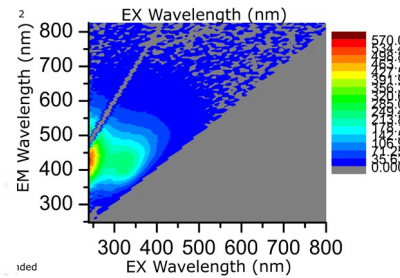
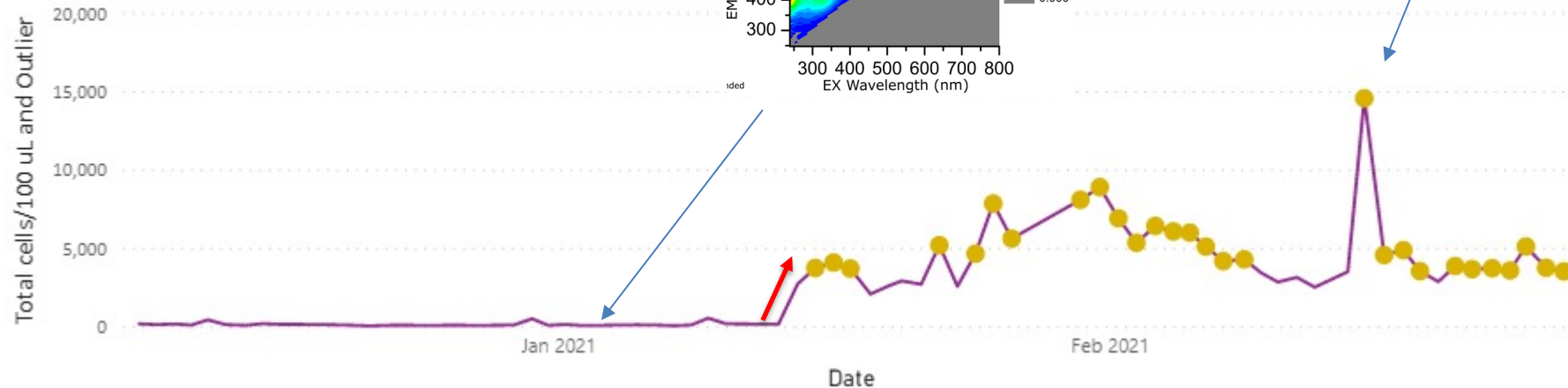
Innovation!

- Flow Cytometry
- FEEMS and Fluorescence
- Bacteria and Organics/AOC
- Distribution simulation.



Total cell count trend with outliers

● Total cells/100 uL ● Outlier



WTW A

Final Thoughts

We've started the journey!

- A lot to understand, research driven.
- Collaborations essential.
- Sampling and Monitoring techniques?
- Understanding and management, not prevention!

Thank You

- Francis Hassard
- Denis Moran
- Irene Carra
- Lorenzo Falzarano
- Natalie Lamb.

Thank you 
for listening