

UK Water Industry Research Limited

The Performance of Sustainable
Wastewater Treatment Systems in the
UK Water Industry

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The Project...

“Performance of Sustainable Wastewater treatment Works Solutions”



...gather evidence on the in service performance of sustainable wastewater treatment systems

...determine their potential to meet current and future environmental quality standards.

...gather evidence on operating costs of these systems.

Data returned...

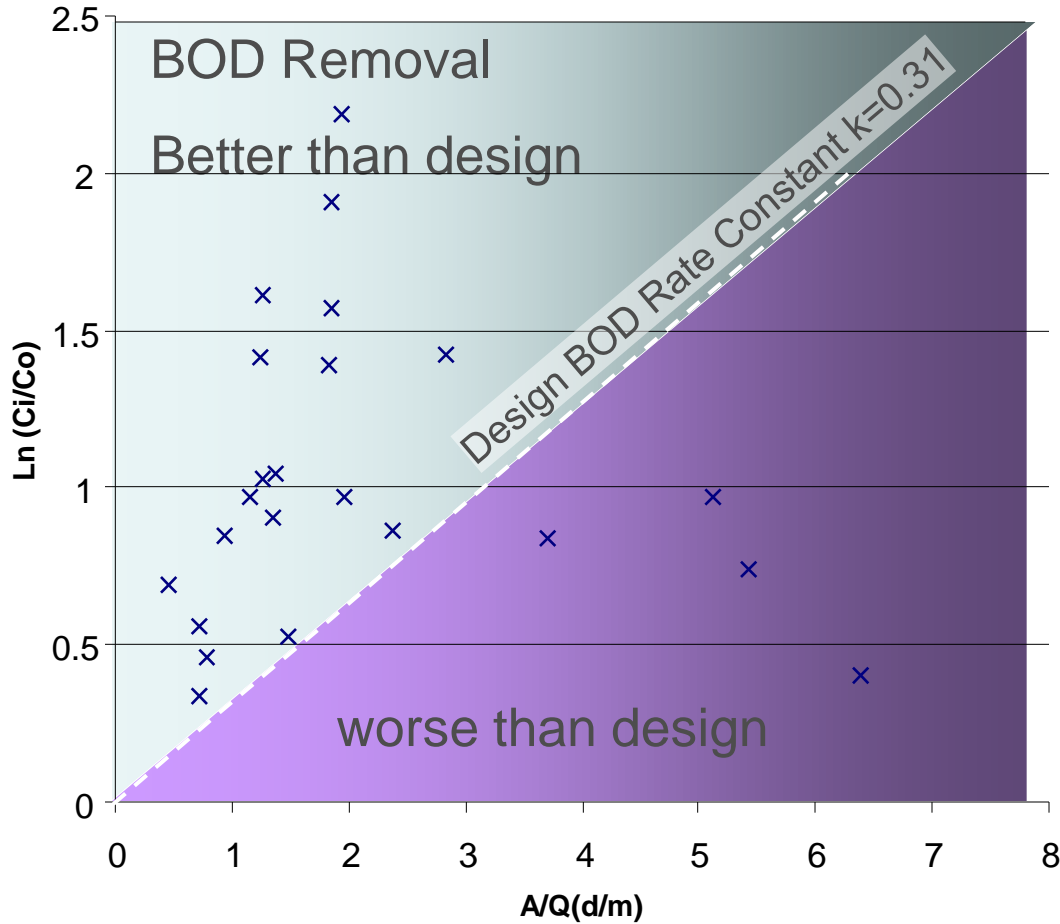
- 79 systems, constructed wetlands, lagoons, grass plots, primary, secondary, tertiary;
- 10 water companies represented;
- 12 parameters;
- Information about wetland media replacement;
- mainly tertiary, mainly constructed wetland systems (reed beds).

Image courtesy of ARM Reed Beds



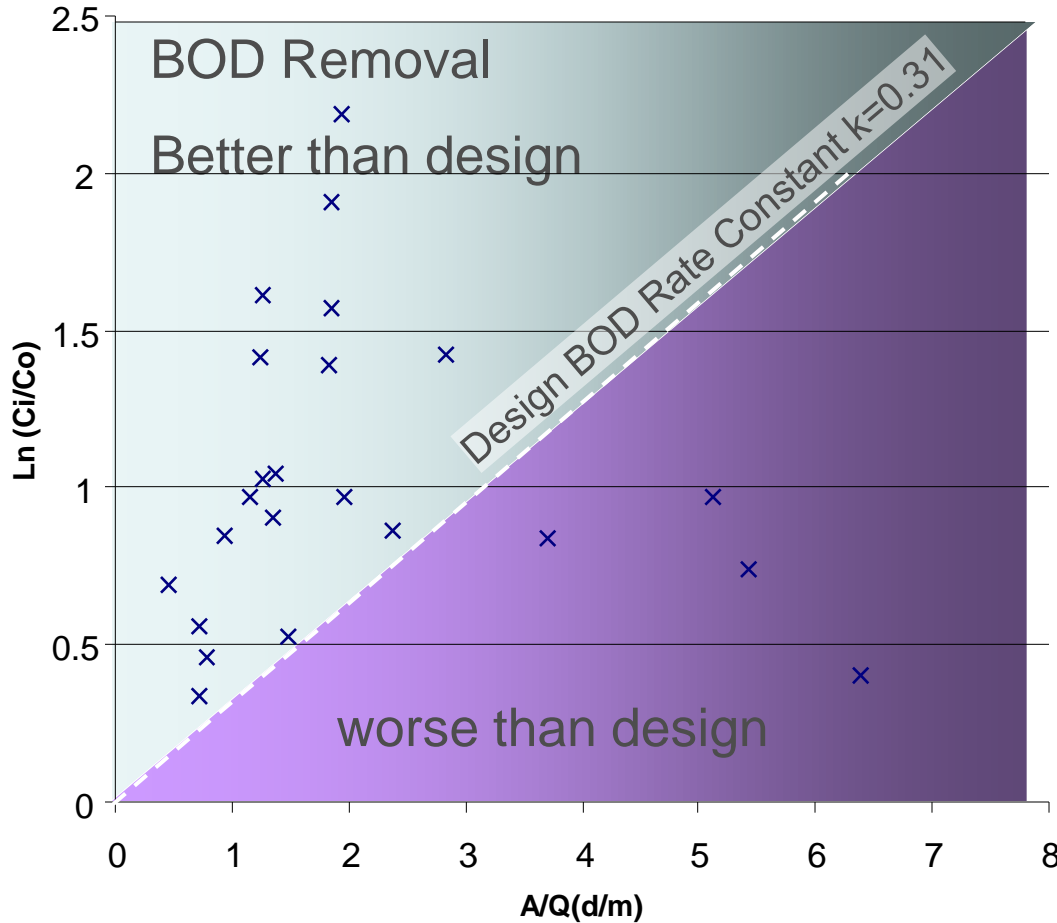
Tertiary Wetlands...

Mean BOD removal rate: $k_{\text{BOD}} = 0.31 \text{ m/d}$



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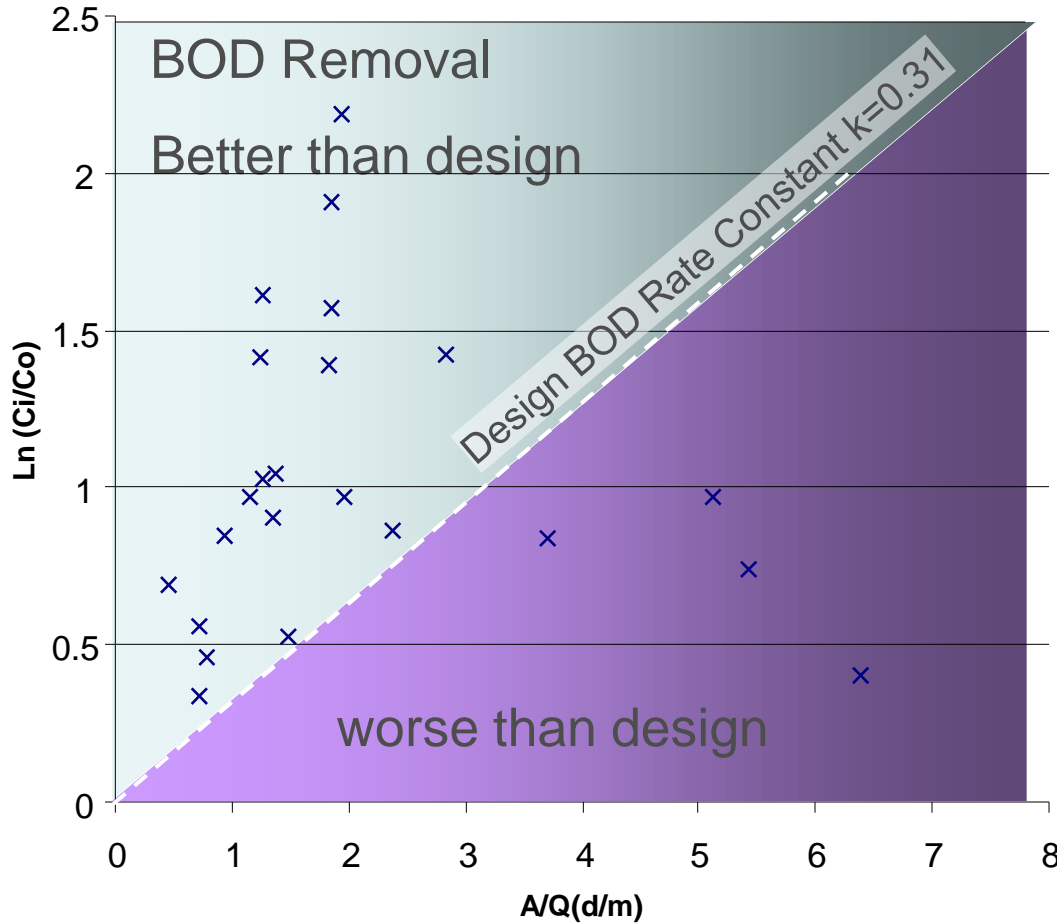
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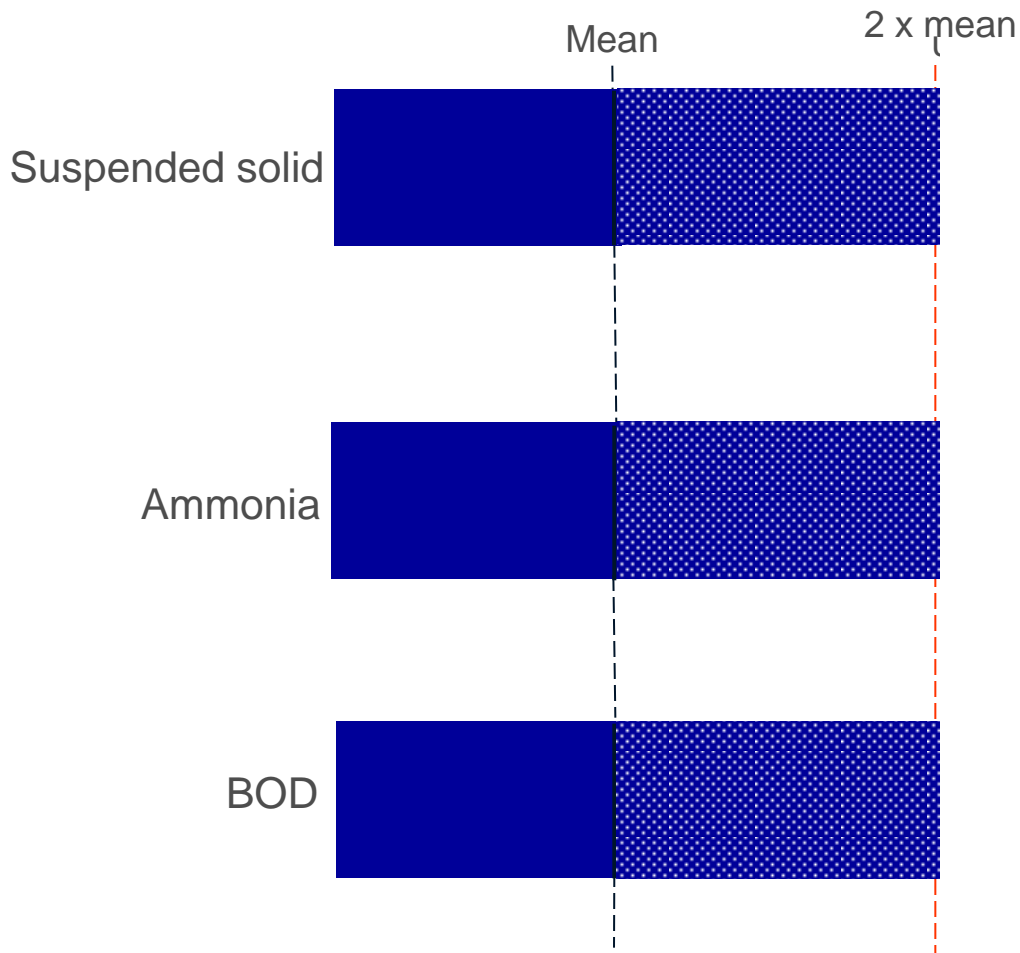
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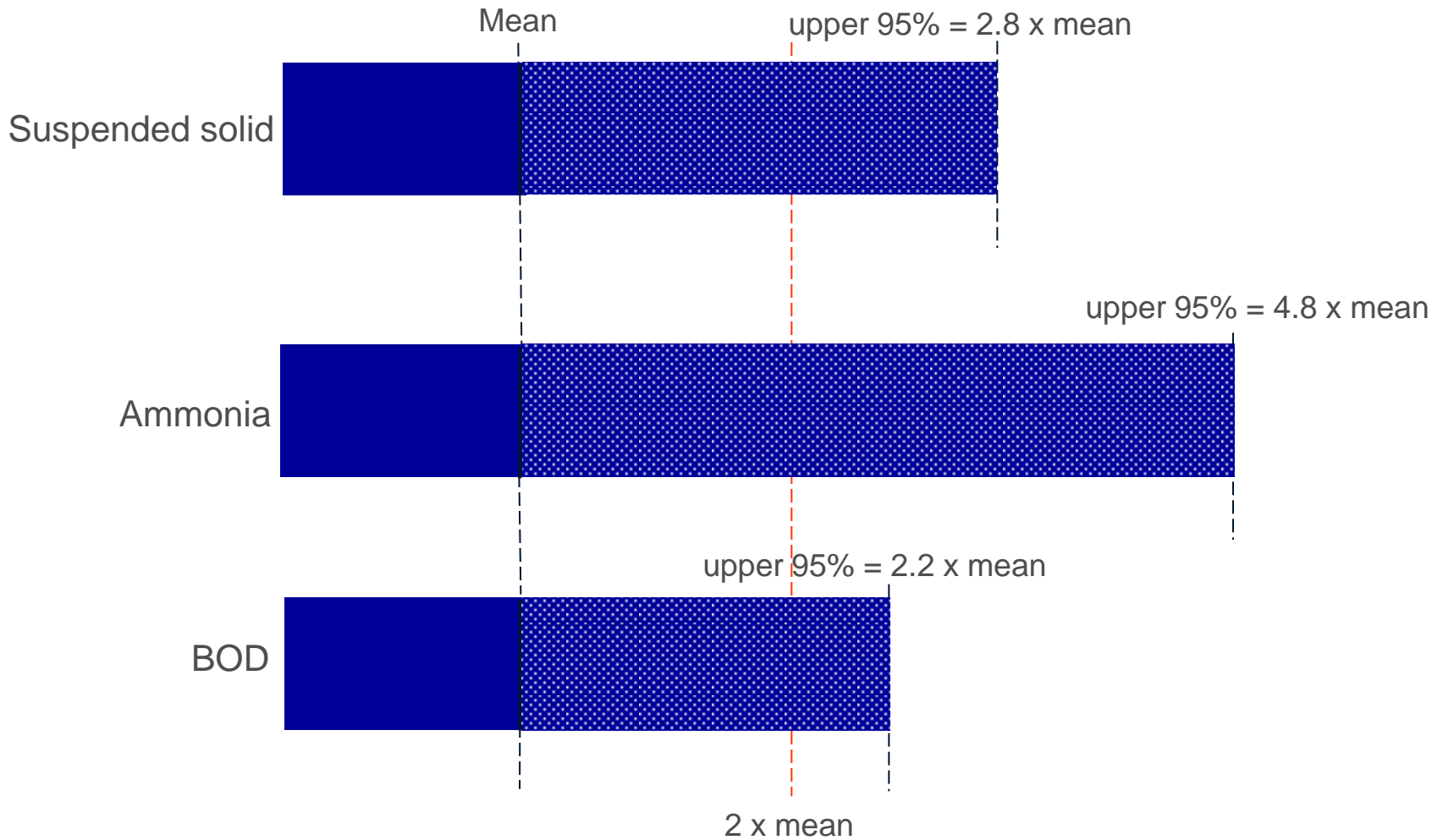
Limit of mean final effluent quality around 4mg/l BOD

Removal efficiencies:
suspended solids: 52%-74%
Ammonia: 38%-70%

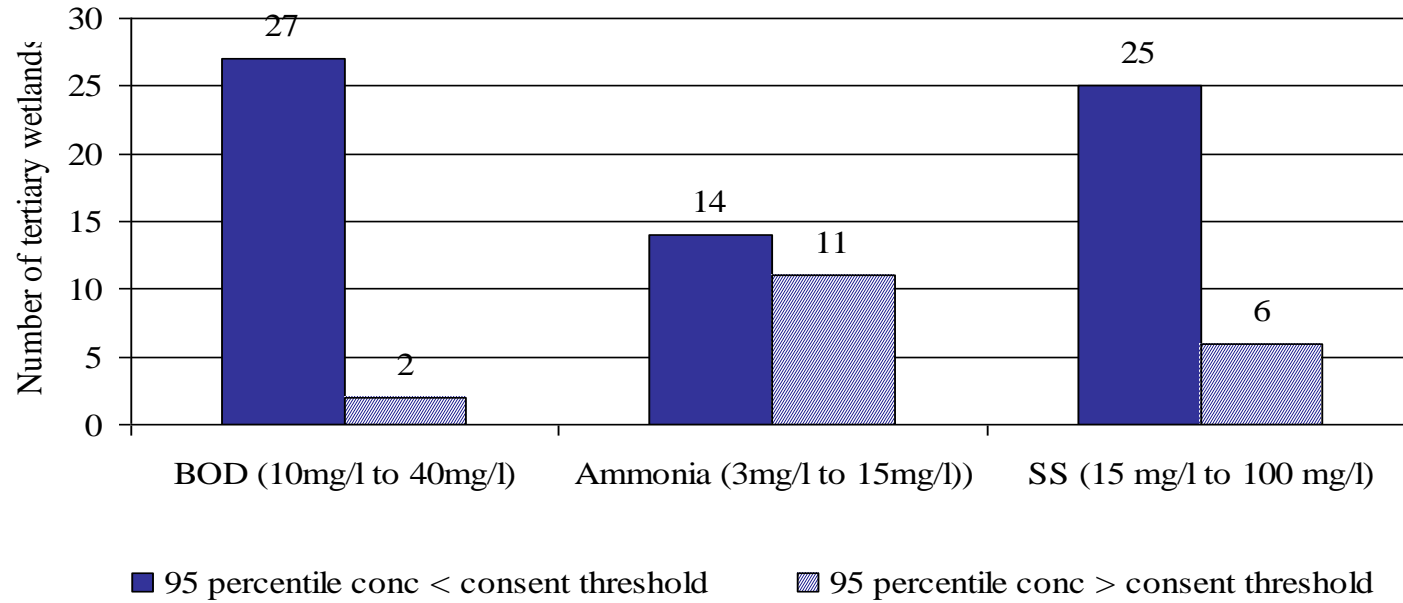
Tertiary Wetlands: Variation in effluent quality...



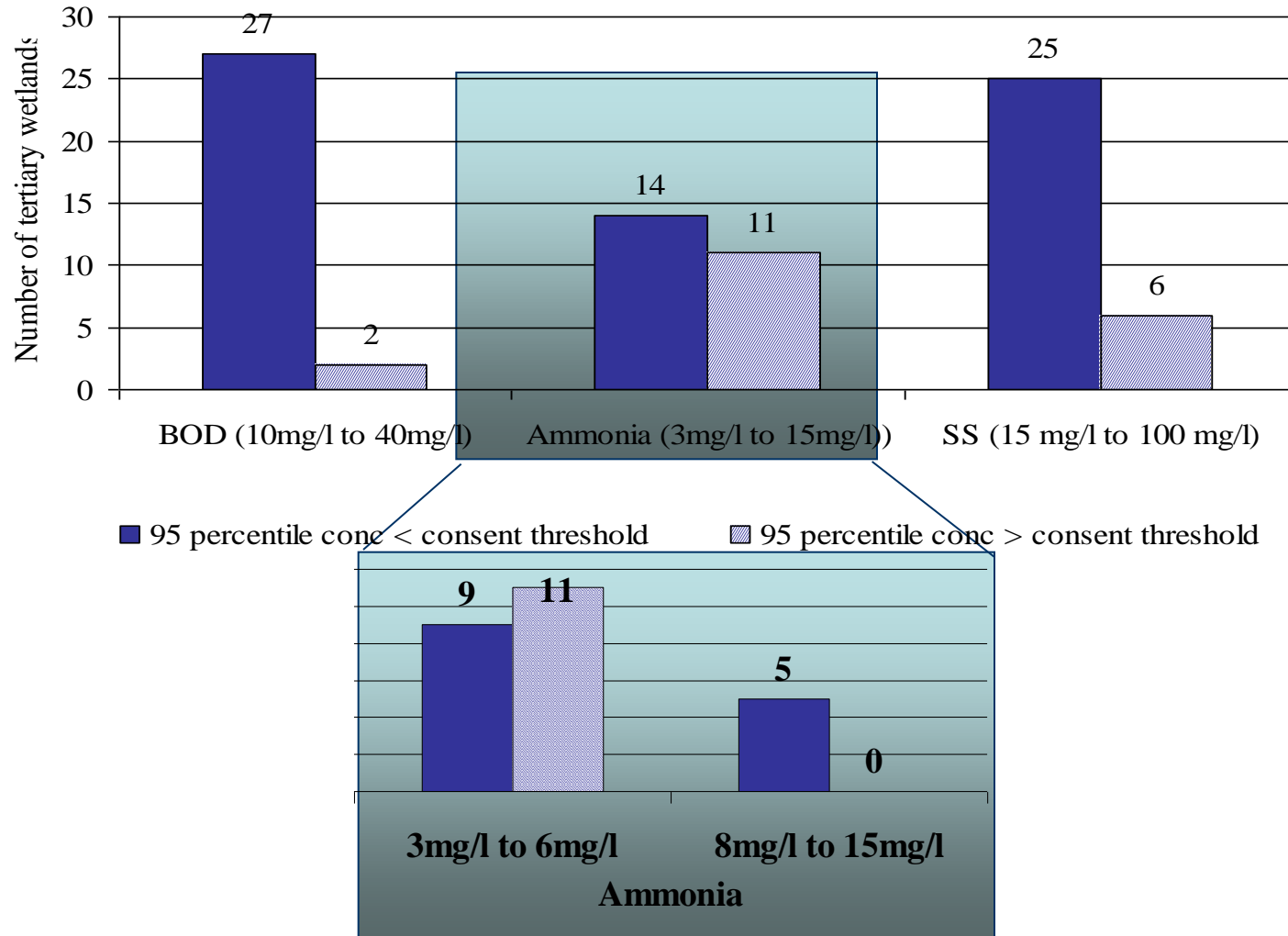
Tertiary Wetlands: Variation in effluent quality...



Tertiary Wetlands: 95th Percentiles vs Consent



Tertiary Wetlands: 95th Percentiles vs Consent



So What?

Designers:

have we accounted correctly for the historical variation in effluent quality when dealing with 95% consents?

Technology
Users:

do we fully understand capability of the technology?

Environmental
Regulator:

do we want to be flexible about consenting to encourage low carbon technology?

Other report headlines...

- Wetlands used to treat raw screened effluent in the UK!
- Natural oestrogens removed, synthetic ones are not
- Good ammonia removal from grass plots
- No significant effluent deterioration in winter
- Likelihood of media replacement was investigated



“Performance of sustainable wastewater treatment works solutions”