

Review ESSD-2017-139 Thames R water quality

Good data set, well-justified and clearly presented. Absence of any presentation or discussion of data uncertainties remains a substantial weakness.

Specific comments:

P1, I27: “extensively used for fishing, walking and boating.” Technically, users do not walk on the river itself? Rather, walkers, runners, cyclists, others make extensive use of riverside pathways? The wider range of users probably adds to the monetary impact alluded to on line 28? Many of these rivers support abundant, even crowded, fleets of narrow boats? Alluded to under the generic term ‘boating’ above? Their individual or cumulative impact on water quality or river economy (or river morphology?) has a substantial impact?

P3, I5: “... fourth feature of the Thames Initiative has that it needed ...” ‘was’ rather than ‘has’?

P4, I2: explain 5-year lag, 2013 to 2018?

P5, I29: explain a STW (sewage treatment works) population estimate. Total basin sewage load, in terms of BOD over some multi-day period? Perhaps give the reader / user some perspective on STW PE in the Thames vs other European rivers?

Delay in data access over a weekend, suggests a person involved. Not the easy one-click access that ESSD users expect. CEH (or the UK generally) needs to seriously re-think their data access policies and practices. I have an existing CEH login and it still required Thursday to Monday for data delivery?

Data file in easy-to-use format, clean, well-documented. I can easily reproduce e.g. Figures 3, 4, 5 etc.

The biggest deficiency arises from the absolute absence of any sense of uncertainty limits or error terms in these data. Yes, the methods come from Standard Procedure recipes, contained in practical handbooks that many of us keep (rarely used) on our bookshelves. But each of those methods, from the handbooks or as modified by subsequent cited research, whether for nutrients, cations, chlorophyll, solids, even temperature, has some uncertainty. Amplify that fundamental uncertainty, often determined among replicates in the laboratory, by any sampling uncertainty peculiar to this location and this particular sampling protocol, across multiple years involving variable weather and changing personnel, and every measurement has some cumulative uncertainty. The authors of course recognise this but they do not share the information with readers / users. On page 5 line 16 the authors mention commercial quality control standards but we get no information about which of any or all the samples met those standards, what the authors did if a sample did not pass, etc. We read earlier (page 5 line 11) about instrument failure (for DOC) and we find occasional gaps in many (most?) data records from most locations. A figure like Figure 3 should show error bars or an uncertainty band? Or show us that the error bars or uncertainty bands all consistently fall below some acceptable limits? River flow data from third party comes with its own uncertainties? Likewise STW PE has some range of reliability? For each measured parameter we need at least a plus/minus uncertainty, at 95% CI or 2 std dev. We also need a paragraph or more on overall uncertainties, including recommendations on what data to avoid when and on how one would improve the overall quality. What has or will have changed in 2018 compared to 2009?