

Appendix C : Natural England's comments on Dr Clegg's research

From: [REDACTED]

Sent: Monday, January 29, 2024 7:07 PM

To: [REDACTED]

Subject: RE: Parrett phosphate study - Report 8

Hello John

Thank you for forwarding the Report from Andrew Clegg which shows an impressive amount of work and produced some extremely interesting findings. However, the report should not be relied on by your Authority as a means of demonstrating that a particular planning application will not contribute to phosphorus loads within the Somerset Levels and Moors Ramsar.

From an initial assessment of the report we would note the following points:

- The report seems to be suggesting the upper R Parrett catchment, as gauged at Chiselborough, is dominated by STW inputs and some spring water from the limestone ridge is dominated by spring water from the limestone ridge. However, this is not the case as this catchment area is largely clay and some greensand. While you would expect a steady baseflow for a limestone aquifer the flows derived from clay streams are flashy and more liable to mobilise silts and phosphorus derived from agricultural sources.
- The assertion that there is no hydrological connectivity during winter is not true, the Levels flood and overtopping of the Parrett flood banks occurs (in addition, Curry Moor is used for flood storage). Such floods will transport silts into Ramsar which will contribute to phosphorus loads on the site over the year. Flooding may also have a role in the remobilisation of phosphorus, for example from river sediments.
- The resolution of the data is low, both temporally and spatially and therefore cannot be used to characterise the upper Parrett catchment, or indeed this particular sub catchment. For example, relatively few fields are sampled and in a limited part of the catchment and sampling is weekly. The latter may be important as summer flushing events on clay streams will happen over a matter of hours rather than days and are therefore likely to be underestimated in a weekly monitoring strategy.
- The methodology used only samples dissolved phosphates. During periods of high run-off there will also be phosphorus carried by sediment and organic material, the latter especially in high livestock catchments. Such inputs will occur predominantly in winter but will also contribute to phosphorus loads during high summer rainfall events.
- The 2023 data shown in the report is for a largely wet period during which rainfall events can mobilise phosphorus in run-off from catchment soils, even in summer. The measured phosphorus concentrations may not therefore be only from sewage treatment works (STWs). Sampling over a long dry / drought period will be required to provide more conclusive evidence of influence of STWs on phosphorus concentration. That said, it would not be surprising if STWs were the major contributor of phosphorus to the Ramsar's inlets over the summer months. However, the total phosphorus load experienced in the Ramsar will also include phosphorus deposited on the site during winter floods and how this source of phosphorus behaves under different flow regimes, temperatures, oxygen levels is uncertain and may well vary depending on the characteristics of the water carrier.
- It cannot be assumed that the water take from the R Parrett onto the Ramsar in summer will follow historical patterns. Longer summer dry periods will necessitate longer periods of

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water take increasing exposure of the Ramsar to summer phosphorus concentrations. These water takes onto the Moors are critical for maintaining condition and so cannot be avoided.

- The assessment of impacts of housing needs to be both precautionary and future proofed ie consider the potential long term (in perpetuity) impacts. Seven months of one year is simply too short a sample period to be able to make any firm conclusions. As mentioned above in future with ongoing climate change it is reasonable to expect longer drier spells in summer necessitating longer period of water take on to the Ramsar. Equally, summer rainfall events may also increase in intensity thereby increasing the mobilisation of silts and increasing contributions from agriculture. Similarly, winter floods are likely to be more severe and longer in duration. Warmer conditions will also increase likelihood of anoxic conditions which will also impact on the mobilisation of phosphorus. These factors will impact on the total phosphorus loads experienced on the Ramsar.
- The point made that a very large proportion of the total catchment phosphorus load will bypass the Ramsar is of course correct, however, the same proportion of benefits from land change and STWs improvements will also bypass the Ramsar. The Ramsar is reliant on a water source that is blended with phosphorus loads derived to varying degrees at different locations and times of year from both agriculture and STWs. As noted above the importance of different phosphorus sources in each sub catchment may also change over time. Only mitigation measures directly located on the intakes of the Ramsar i.e. intercepting the summer flows would ensure the full benefits of the mitigation measure reaches the Ramsar, but any discounting for new development on this basis would be ignoring the current and potential future influence of winter flooding.
- Irrespective of the above the project is sampling at a limited number of locations and cannot be used to characterise other catchments or indeed sub catchments as they are all likely to differ.

Natural England would be very pleased to continue to work and liaise with Mr Clegg with a view to improving the understanding of behaviour of phosphorus within the hydrological catchment of the Somerset Levels and Moors Ramsar and to develop strategies for not only enabling new development but also for restoring the site. However, given the remaining significant uncertainties Natural England's advice to your Authority is that development which results in increased phosphorus discharges to the Ramsar's hydrological catchment should be considered in combination to have a likely significant effect and therefore be subject of an Appropriate Assessment (AA). As your will be aware Natural England is a statutory consultee on the Appropriate Assessment stage of the Habitats Regulations Assessment process.

Should you require further clarification of this advice please do not hesitate to contact me directly.

Regards

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