



Interested Party ID: 20025904

The Sizewell C Project: EN010012

Deadline 10 submission

Written summary of oral case made at ISH15 together with further representations on the Water Management Strategy and Desalination Plant.

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1. Introduction

We refer the ExA to our previous submission concerning this topic, namely our Comments on ISH11, Water Management Strategy, agenda item 2, [REP8-268](#). In this we expressed our deep concerns about the extreme lateness of the Applicant's proposals and that, as local people, we have been aware over the past decade that there would be insufficient water in this very dry region for such a massive infrastructure project.

We also raised some of the problems associated with further abstraction from the River Waveney. In this report we add to these concerns, especially with regard to the likely impact on the Broads National Park and the many designated sites within this area, national and international, of great value for both people and wildlife.

Furthermore, we have made it clear that our members are totally opposed to a desalination plant in this highly sensitive location. There is a considerable body of peer-reviewed research that points to the damaging effects to the marine environment of the concentrated brine that is returned to the sea, along with the chemicals that are used to keep the various works 'clean'. In this report we focus in particular on the impacts to benthic foraminifera from the brine discharge.

During the Hearing we referred to research that indicates that raised temperature in the sea exacerbates the negative impacts of the saline plume discharged from the desalination plant. This is relevant to the situation at Sizewell, where the ambient temperature surrounding the outflow from Sizewell B station is increased by 11 degrees. We discuss this further below.

2. The River Waveney and Broads National Park

The Broads are described as 'one of Europe's finest and most important wetlands for nature conservation'. (Broads Authority, retr. 2021.) Nearly all the 32 Sites of Special Scientific interest within the Broads also have international designation under European Habitats & Birds Directives and Ramsar Convention. The River Waveney sustains the southern and easternmost areas of the Broads and, as such, is of vital importance for the health of these wetlands and the many species that depend on them, some very rare. The Waveney and its tributaries is a designated Natura 2000 (N2K) Catchment.

Sadly, the River Waveney has deteriorated in quality over the last few years. In 2016 it passed its chemical status, but in 2019 it failed. It was also too high in nutrients. (E.A., 2019.) The overall condition of the river was classed as only 'moderate' (rather than 'good', 'very good' or 'high'). One of the 20 water bodies constituting the catchment was classed as 'bad'. This therefore is a river under stress, largely due to pesticide and fertiliser run-off

from farmland in combination with high abstraction rates. It is because of this contamination that this area of the Broads is now described as being in ‘unfavourable’ condition.

The National Character Area Profile of the Broads states:

*The ecological status of the wetland habitats and many of the ecosystem values within the Broads **are critically dependent on sustainable water management and land use practices upstream...** as these directly affect the quality and quantity of both groundwater and surface water sources. (Natural England, 2015.)*

The river suffers from seasonal variability in flow, with low water in summer due to lack of rain in this region. Ground water is further depleted by the River Waveney Augmentation Scheme, which supplements the low surface flows. All of these factors together with tidal flooding have allowed salt water to penetrate further upstream. The NCAP goes on to state:

The Water Framework Directive status and SSSI condition of open water remains below target in almost all cases.

With climate change and longer periods of drought, this situation can only become increasingly worse. As the river already fails to conform to WFD targets, the extra very large abstraction proposed for Sizewell C will only make the targets even more difficult to achieve.

Bearing this in mind, it is very regrettable that the Water Industry National Environment Programme (WINEP) modelling has not been forthcoming as promised, initially by 24 September and then by 30 September, and summarised in the Environment Agency’s letter submitted to the ExA on 24 September 2021 ([REP8-161](#)). As stated in our previous report, some of our members live in the Waveney area and all of us have a very particular interest in the river, on account of the beauty and richness of its wildlife, together with opportunities for recreation. We are disappointed that we will not be able to comment on the WINEP report during the examination and request, therefore, that it will be put into the public domain.

Equally, Northumbrian Water’s sustainability assessment has also not been provided to the ExA. The company will have difficulty in deciding how its available water from the Barsham Treatment Works should be distributed, considering the poor ecological status of the River Waveney, the other problems outlined above and the fact that we have a growing population here in the East, with planning for 175,000 new houses within the next five years. (Simpson, 2021.) Despite Essex & Suffolk Water’s statement of 29/09/2021, it is hard for our members to imagine that there will be sufficient mains water for a further 2.2Ml/day

on average and 2.8MI/day at peak to supply Sizewell C. (We note that this amount has been reduced from the 3.5MI/day at peak as first proposed.) Indeed, it remains uncertain that the proposals for the Sizewell C Transfer pipeline are viable. In a letter to the ExA submitted at Deadline 8 the Environment Agency makes clear that Northumbrian Water may not have sufficient 'headroom' to supply Sizewell C by these means ([REP8-161](#)). (E.A., 24/09/21.)

Our members cannot support this proposed large abstraction from the River Waveney for Sizewell C. Knowing the river very well, it is our view that further deterioration would result, **which would have a very serious impact on the network of international designated sites that the River Waveney sustains.** The provisions of sec. 62 of the 1995 Environment Act and secs. 85 and 97 of the Countryside & Rights of Way Act 2000, confer duties on statutory agencies and local authorities 'to have regard to the purposes of national parks, Areas of Outstanding Natural Beauty and the Broads'. It is not possible to enhance the special interest features of the protected sites, as required, and at the same time cause further deterioration of the river by such a large abstraction

3. Detrimental effects of the concentrated brine discharge on the marine ecosystem

One of the worst impacts of reverse osmosis, the system proposed for the Sizewell C desalination plant, is the concentrated brine that is returned to the marine environment. There is a considerable body of peer-reviewed research that attests to these impacts.

Because the brine is of a greater density than the receiving water, it has a tendency to sink. The organisms that live on the sea floor, therefore, may not be able to survive the more concentrated salinity:

Most at risk are the benthic marine organisms living at the sea bottom. The increase in salt concentration disrupts the ecosystem, leading to dehydration, decrease of turgor pressure, and death. (Younos, 2005.)

There is also a lack of dissolved oxygen within the brine plume, causing suffocation:

High salinity and reduced dissolved oxygen levels can have profound impacts on benthic organisms, which can translate into ecological effects observable throughout the food chain. (Jones et al, 2019.)

This is a crucially important point. **The upward impact on the food chain needs proper and thorough investigation by the Applicant, in particular the impact on protected species within the Outer Thames Estuary SPA and Southern North Sea SAC.** The proposed cooling system would already cause a chronic reduction in available food sources for protected fish,

marine mammals and birds. The desalination plant would add significantly to this burden. Yet in SZC Co's Consultation Document on the desalination plant, it is stated under 2.4.15 that there would be 'negligible losses of fish and invertebrates'. This statement is directly at odds with the peer-reviewed research. (EDF/SZC Co, 2021.)

Kenigsberg *et al* focused their studies on the effect on benthic foraminifera of brine discharge from desalination plants (2020). They investigated in particular three such plants on the Israeli coast. While the Mediterranean Sea is obviously different from the Southern North Sea, nevertheless both have soft-bottomed sediments and results can be reasonably extrapolated. Indeed, these very small organisms are widely used to monitor marine pollution.

At all three plants, species richness varied according to the season. However, compared with the control stations, both species diversity and population numbers were reduced in and around the brine plumes, demonstrating that many species are highly sensitive to elevated salinity. Worryingly, the shells of some species were prone to deformation and abnormalities. Further analysis displayed 'significant differences between the foraminifera assemblages of the outfall and control stations'.

In their consultation document (EDF/SZC Co, 2021), the Applicant suggests that the use of a diffuser head at the outfall would provide suitable mitigation, as it would mix and dilute the brine with the surrounding sea water (2.4.10). However, results at the Sorek plant, where a diffuser system was used, indicated that it made little difference to the impact on the marine organisms. Indeed, the brine plume simply spread out, showing higher salinity values for up to 1.5km²

During the Hearing ISH15 we mentioned the raised water temperature surrounding the cooling system outflow of Sizewell B, with an increase of approximately 11° C. It is sometimes the practice at desalination plants to dilute the brine by mixing it with the cooling water discharge from nearby power stations. Due to the raised temperature, a floating brine plume forms that can extend for several kilometres away from the discharge site, thus spreading out the pollution. **It is therefore extremely important for the Applicant to assess whether there could be a similar impact from the raised temperature around the cooling water outflow from Sizewell B.**

4. Conclusion

Suffolk Coastal Friends of the Earth have identified that the Applicant's proposed water strategy has the potential to cause deterioration of the national and international designated sites within the southern and eastern areas of the Broads National Park, due to further abstraction from the River Waveney, a river already under stress.

Furthermore, research demonstrates that the desalination plant is likely to cause harm to the marine benthic organisms within the Southern North Sea SAC and Outer Thames Estuary SPA due to the polluting brine discharge and various chemicals associated with the process. Reduction in the food supply at the bottom of the chain may affect the fish, mammals and birds further up that chain, including those that are protected species.

We call on the Applicant to put in place detailed environmental assessments of these two pathways, together with realistic plans for mitigation and monitoring. We ask that this information be put into the public domain.

REFERENCES

Broads Authority, retr. 2021. 'Broads Wildlife and Habitat Importance and Designations.' Appendix 8.

https://www.broadsauthority.gov.uk/data/assets/pdf_file/0029/183872/APPENDIX-8-Nature-Conservation-Information.pdf

EDF/SZC Co, 2021. *Consultation on Temporary Desalination Plant*. August 2021.

Environment Agency, 2019. 'Bur & Waveney & Ware & Lothing', Catchment Data Explorer: <http://environment.data.gov.uk/catchment-planning/WaterBody/GB510503410700>

Environment Agency, 2021. Letter to Wendy McKay, National Infrastructure Planning, 24/09/2021.

Jones, E. *et al*, 2019. 'The State of Desalination & Brine Production: A global outlook.' *Science of the Total Environment*: Vol. 657, 1343-1356. Elsevier.

Natural England, 2015. *The Broads National Character Area Profile*. NE449: No. 80, 28/04/2015.

Simpson, P., 2021. 'Spades in the ground mark start of UK's biggest water infrastructure project for generations.' Anglian Water, 24/06/2021: <https://www.anglianwater.co.uk/news/>

United Utilities Water Ltd, 2020. *Evolving the WINEP to deliver greater value*.

Younos, T., 2005. *Environmental Issues of Desalination*. Universities Council on Water Resources. *J. of Contemporary Water Research & Education*: Iss. 132, 11-18.