



Broads Angling Services Group

Wensum Fish Survey analysis and comparisons
EA Surveys from 1997 – 2019

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Locations



Summary

This report looks at 30 years of fish surveys undertaken by the Environment Agency on the River Wensum and looks at two comparable rivers in East Anglian for comparison on both Density and Biomass. It then explores the environment factors between the 3 rivers.

All sites were surveyed using EA electric fishing methodology with a minimum of 2 separate passes at each site to measure catch depletion. Capture efficiency using electric fishing methods is less effective for fish below 99 mm FL. Historically fish over 99 mm FL are used to generate report data and estimates. This report uses this protocol and concentrates on 6 key species of fish and includes fish with a fork length of greater than 99mm.

The survey data uses an algorithm known as Carle & Strubb to overcome inconsistencies and variance across the surveys, these are applied to the measures on density and bio-mass sometimes known as standing crop per 100m².

The EA has provided the base data for this report. The Wensum data has since been further validated and verified, removing some years when complete data wasn't available. This completes an attempt to compile historic trends and comparison to comparable rivers like on the Upper Ouse and River Gipping to the Wensum. But no two rivers have the exact ecology and makeup. So this is more of a reference than a scientific comparison.

Figure 1

The graph captures the mean numbers of fish per 100m2.

Roach and Dace are clearly on average the dominate species. This is a net mean result across all 6 survey locations.

Years 2004, 2005 2007 & 2008 does include a full annual survey, so is excluded as per the EA analysis.



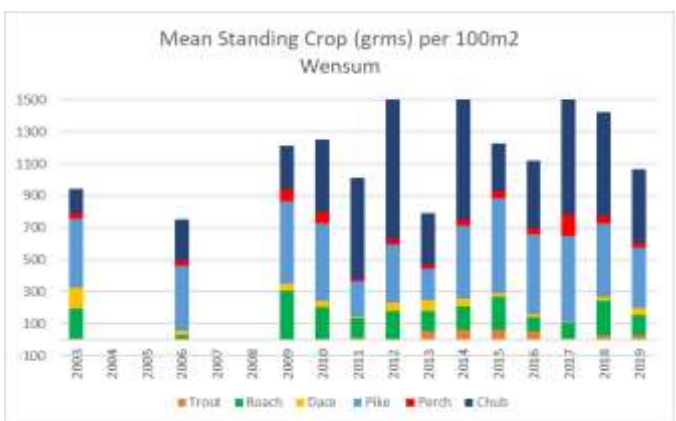
Figure 2

The graph captures the mean bio-mass of fish per 100m2.

When shown as the bio-mass clearly on average Pike and Chub dominate by weight.

This is a net mean result across all 6 survey locations.

Years 2004, 2005 2007 & 2008 does include a full annual survey, so is excluded as per the EA analysis.

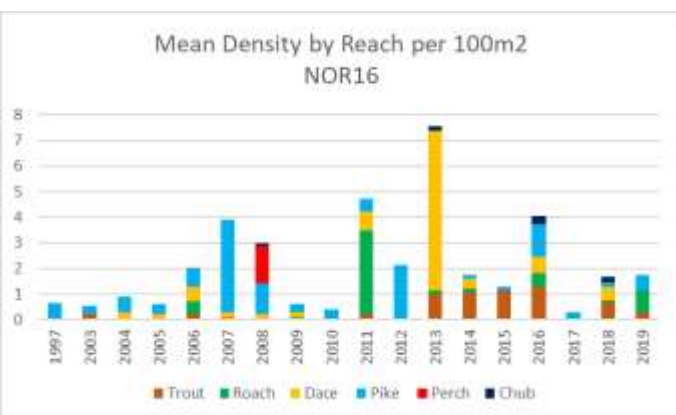


Analysis by Reach

NOR16

D/S Great Ryborough Bridge

Dace appear to the dominant species.



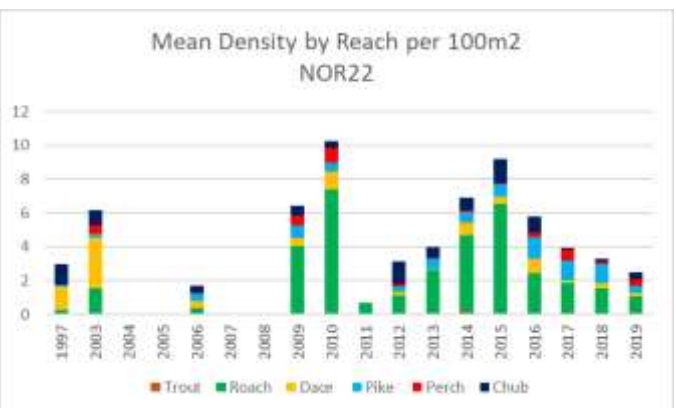
NOR22

Swanton Morley

Clear evidence of the stocking program at this location between 2009 – 2012.

Roach appear the dominant species particularly from 2009-2014.

Surveys not undertaken in 2005,2005,2007 & 2008

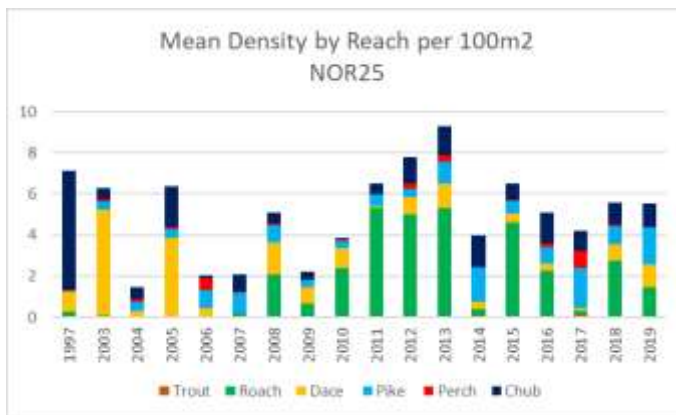


NOR25

D/S Elsing Mill

This shows the upstream stocking program with the fish moving past Elsing Mill.

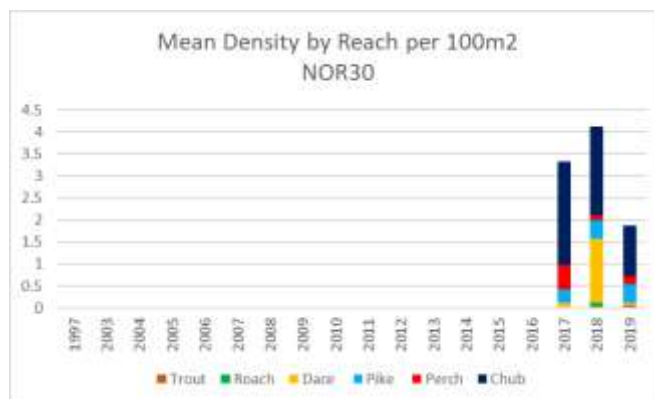
Dace have been overtaken by Roach as the dominant species.



NOR30

Sparham Pool, Lyng

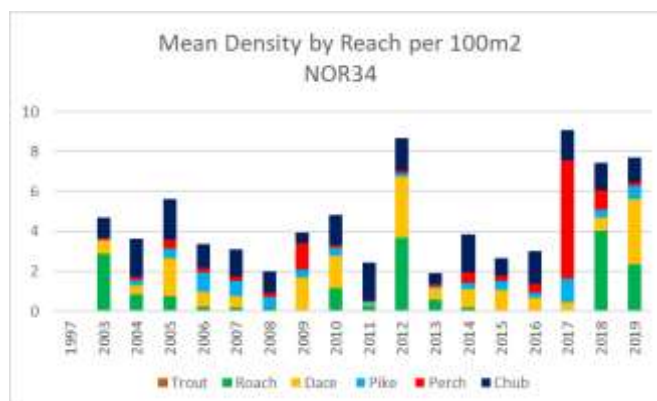
This is a relatively new survey location, with little trend over time.



NOR34

Alders Spinney

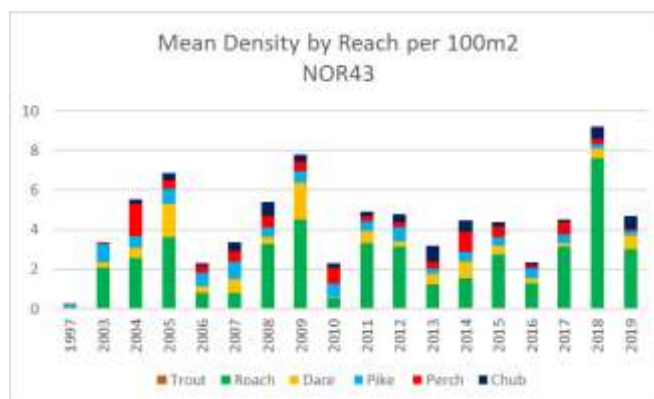
There appears to be a change in species balance across the survey.



NOR43

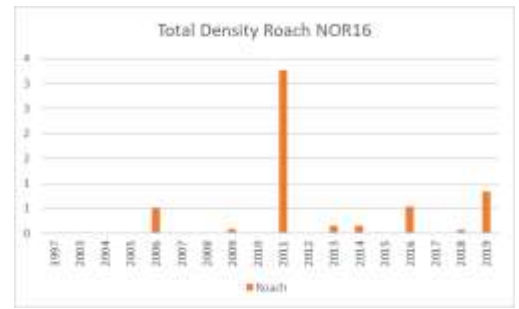
Hellesdon Road (Albert's)

Roach have maintained a strong presence throughout the survey period.

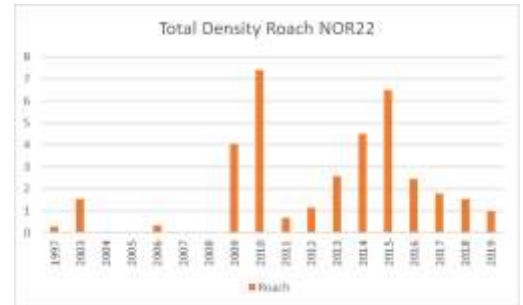


Roach

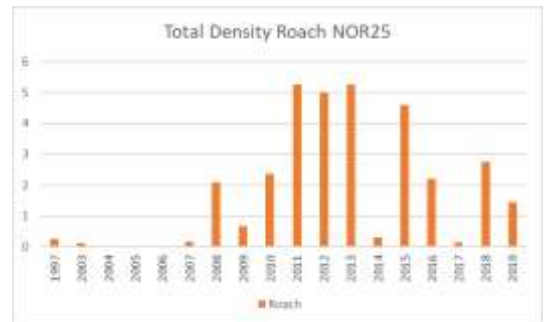
The graph NOR16 shows the Roach density at D/S Gt Ryburgh Bridge. The trend line shows that during the period 1990 – 2008 the stock was almost zero.



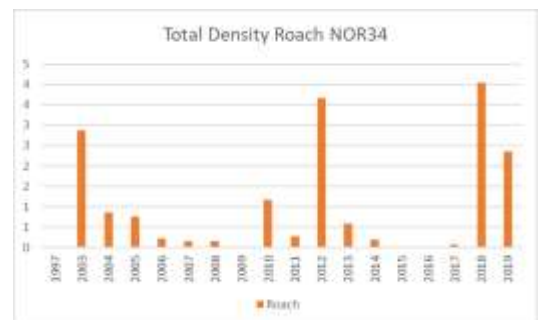
NOR22 show Roach density at Swanton Morley. The trend line shows that during the period 1990 – 2008 the stock was almost zero, but 4 years 2004,2005,2007 & 2008 weren't surveyed. Clear evidence of the stocking on Roach from 2010 – 2013 is shown, but these fish subsequently disappear from 2014.



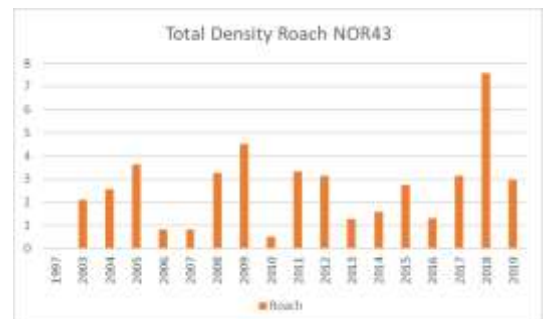
Further downstream at NOR25 Elsing Mill the same trend is almost replicated. But again, the fish disappear between 2015-2017.



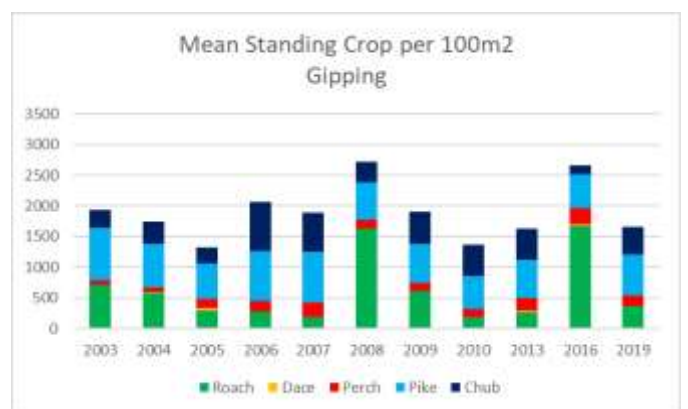
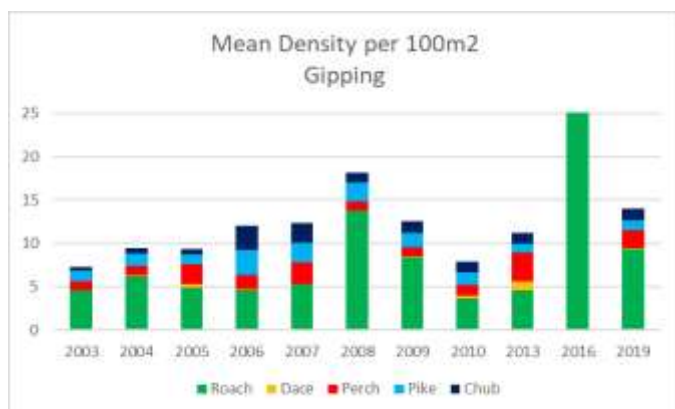
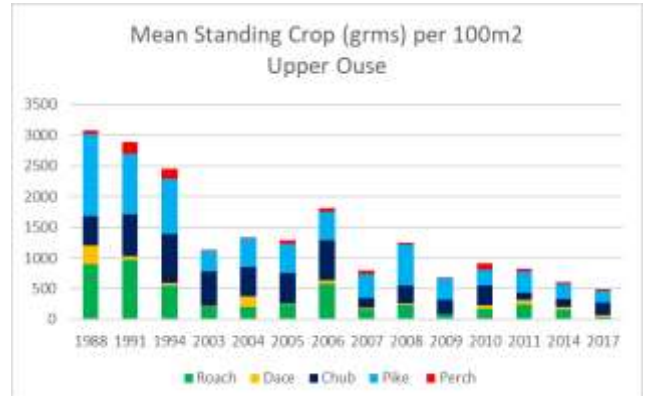
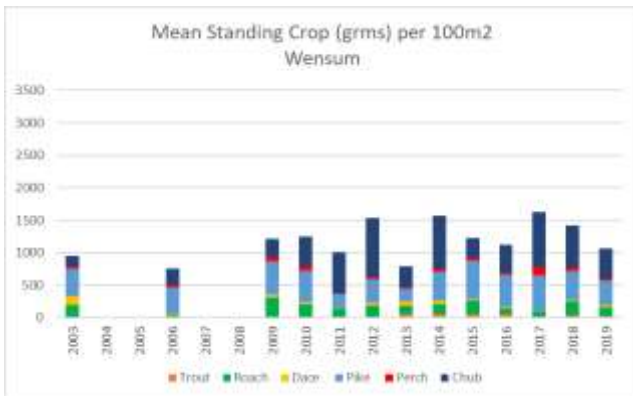
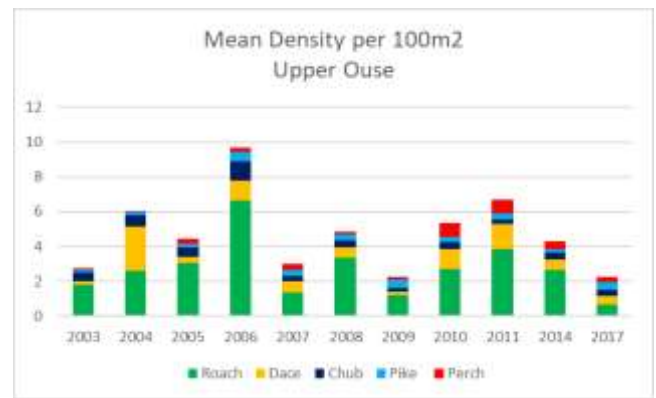
Further downstream at NOR34 Alders Spinney. But again, the fish are very thin on the ground



As you move downstream into NOR43 Hellesdon there seems at times a more stable Roach community when compared to the rest of the upstream river. But in recent years this is not the case.



Comparable Survey to the Upper Ouseⁱ and River Gippingⁱⁱ

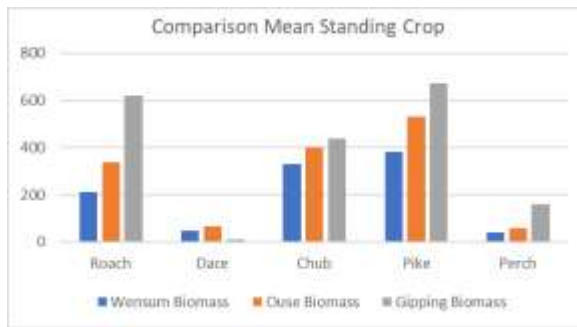
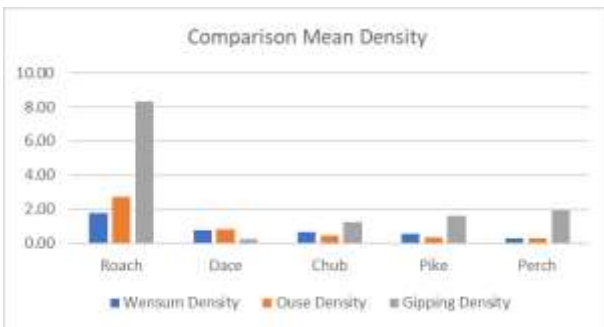


Comparing directly several years of surveys from 2003 to the most recent results between the Upper Ouse, River Gipping and the Wensum. It takes an average across multiple sample sites forming a long term trend, using the same standard techniques. .

The sites used on the Gipping are Sproughton, d/s Bramford Lock, Station Road Bridge, Needham Market and Stowmarket, as shown on the map below left. The sites used on the Ouse are: Newport Pagnell, Clifton Reynes and Turvey as shown on the map below right.



The comparison graphs and table below show the actual data.



Species	Wensum Density	Ouse Density	Gipping Density	Wensum Biomass	Ouse Biomass	Gipping Biomass
Roach	1.80	2.73	8.30	211	338	619
Dace	0.80	0.85	0.26	48	67	9
Chubb	0.68	0.46	1.24	331	400	438
Pike	0.59	0.34	1.63	382	531	672
Perch	0.33	0.32	1.94	39	60	159

It is very evident that Roach in the Gipping are 4 times more dense and have 3 time more biomass than within the Wensum and in the Upper Ouse they are nearly twice more dense and have twice the biomass than within that of the Wensum. Only Dace seem more abundant as a species within the Wensum. These are some significant variances and cannot be dismissed. The Gipping Roach density is slightly influenced by a significant 2 catches in the 2016 survey which if normalised would pull back the overall mean Roach density by 1.

Historic Context Flow

Flow rates also seem to show no specific trend from 1969 to today. As shown in the graph below taken from UKCEH modelⁱⁱⁱ For all 3 river gauging stations, there appears little annual variance over time in flows. However Natural England have enforced some Wensum abstractions changes following a review in 2010 for implementation in AMP6 2013-2018. This review used 3 monitoring points Fakenham, Swanton Morely and Hellseden. It enforced some significant abstraction changes impacting both Fakenham and Hellseden, to enable recovery of Q95 flows.^{iv}

When comparing flows using a flow duration curve, there is some apparent change over time. See figure 3.

A further review is planned in 2024. There is currently no flow duration curve charts available since the 2019 changes in abstractions.

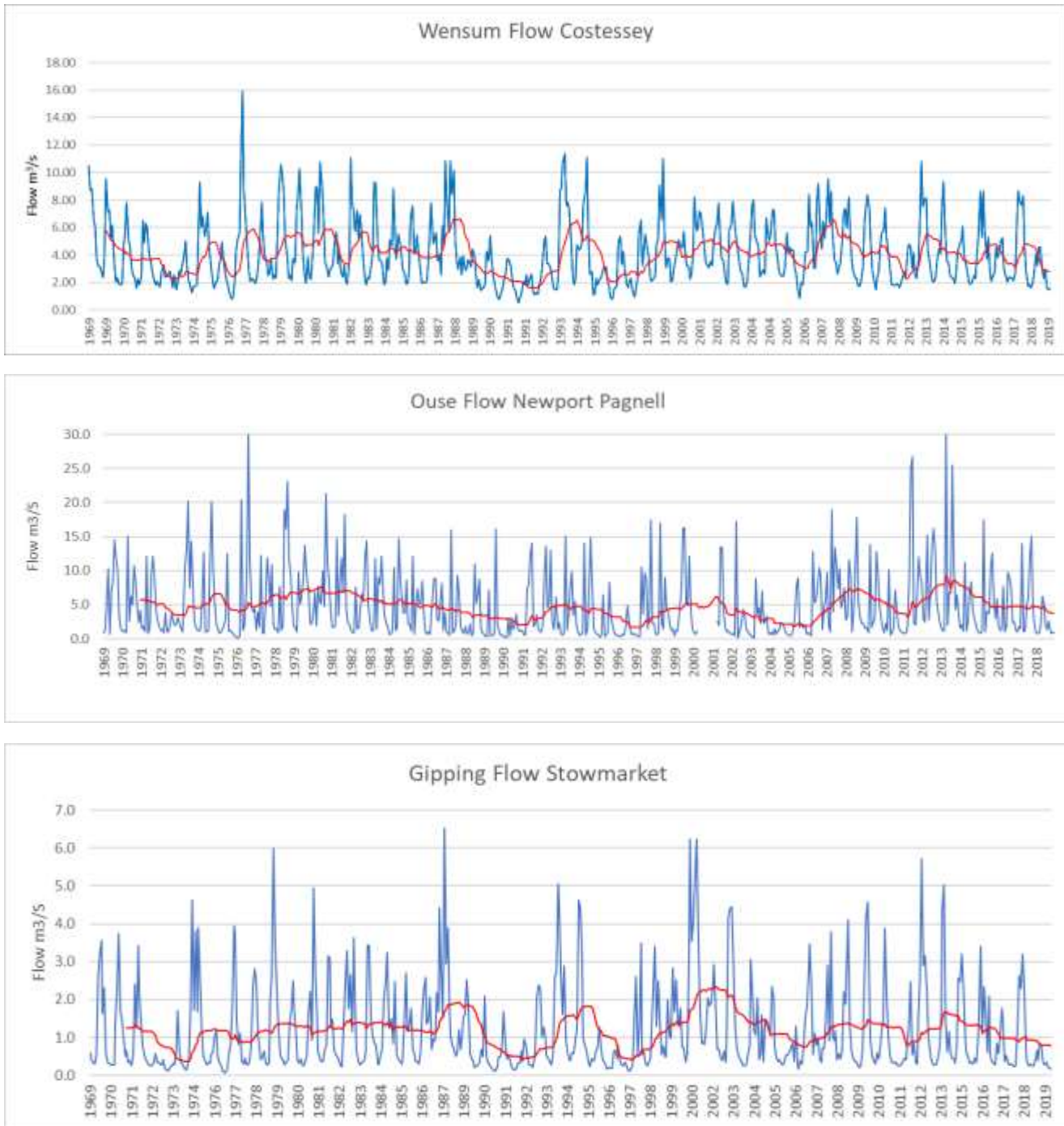
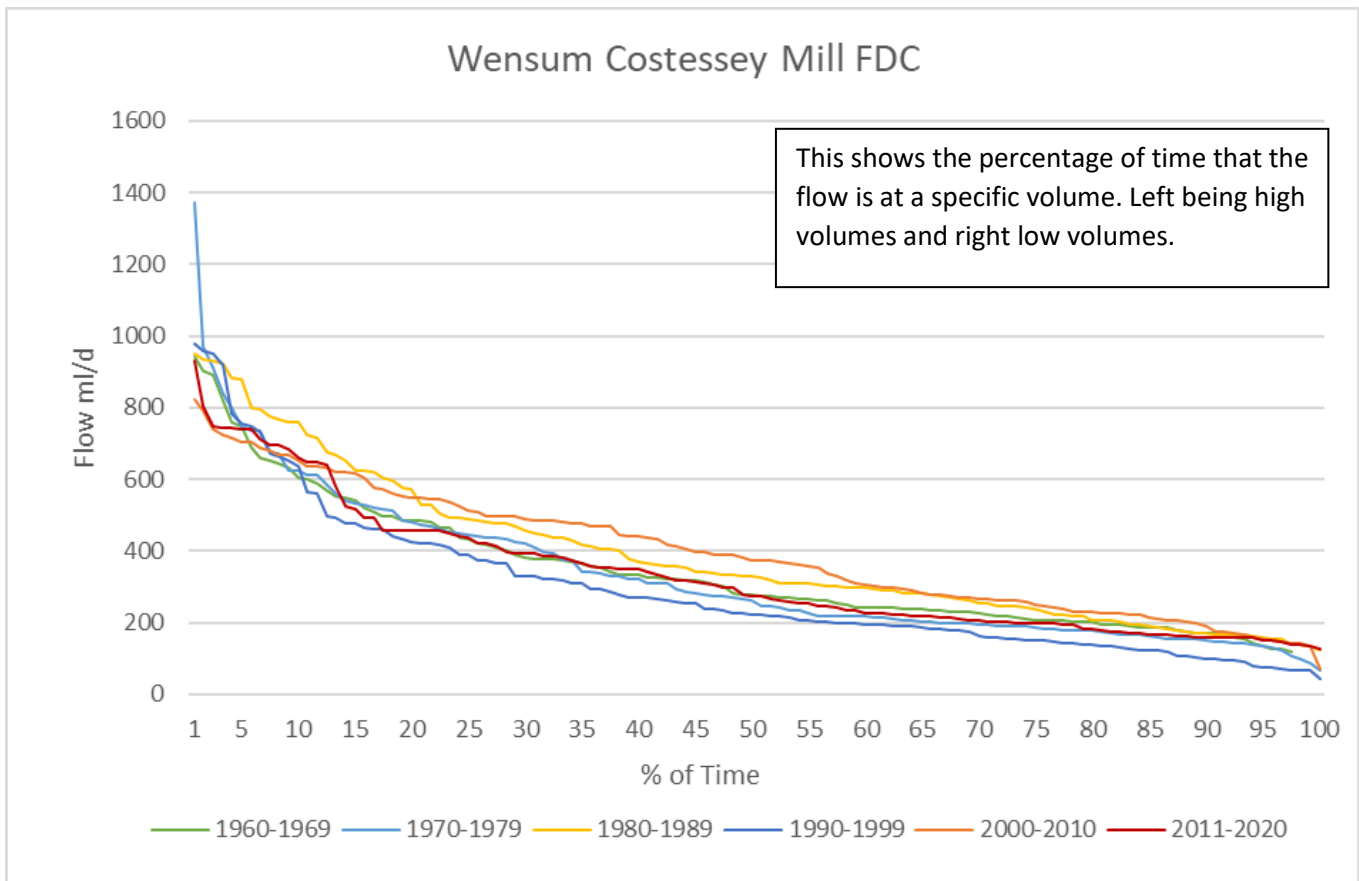


Figure 3



You can see over time how flow variance has impacted on the river, particularly apparent in the period 1990-1999. This is primarily related to the AWS abstraction point, as it moved to Costessey.

Historic Context Chemical Analysis

<https://environment.data.gov.uk/water-quality/view/sampling-point/AN-WEN180>

<https://environment.data.gov.uk/water-quality/view/sampling-point/AN-GIP130>

<https://environment.data.gov.uk/water-quality/view/sampling-point/AN-05M03>

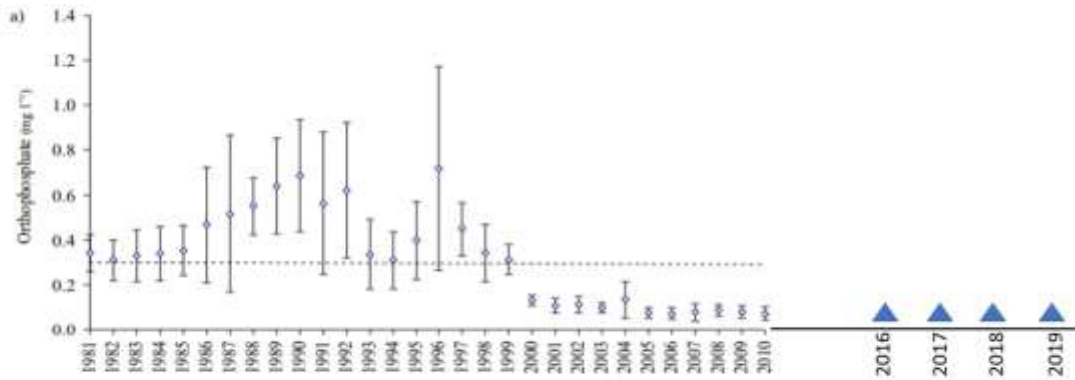
Chemical values seem comparable across the 3 rivers, apart from Orthophosphate which appear 10 times higher on both Ouse and Gipping and reflects the additional measures introduced to protect the Wensum SAC.

Much study has been undertaken over the last two decades looking at the demise of Wensum Roach, with a detailed thesis named “Factors affecting the growth and recruitment of cyprinid populations of the River Wensum, Eastern England, with special reference to roach *Rutilus rutilus* (L.)” by Helen Beardsley in 2012.’

This paper references to many previous studies, but its conclusion reads “In summary, the growth rates of these three cyprinid fish were revealed to be significantly variable over time, with much of this variability in roach able to be explained by environmental parameters, especially temperature, and in more recent years, by a shift to less eutrophic conditions. This roach growth suggests the anthropogenic pressure of organic enrichment (and reversal) was an important driver of change, with shifts in water quality potentially having important ecological consequences for fish populations that may then negatively impact aspects of fishery performance.”

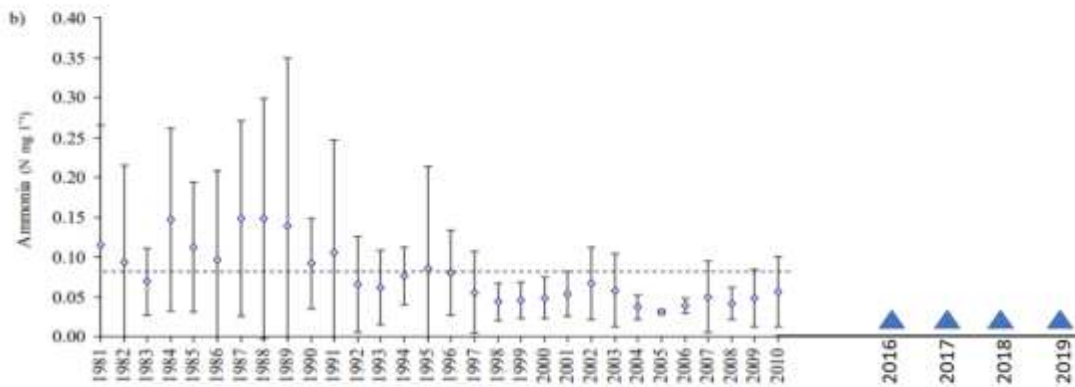
A more recent review of the three key chemical elements, shows little has changed from that of the period between 2000-2010. So that’s two decades without any form of natural recovery.

Wensum long term trend Orthophosphate



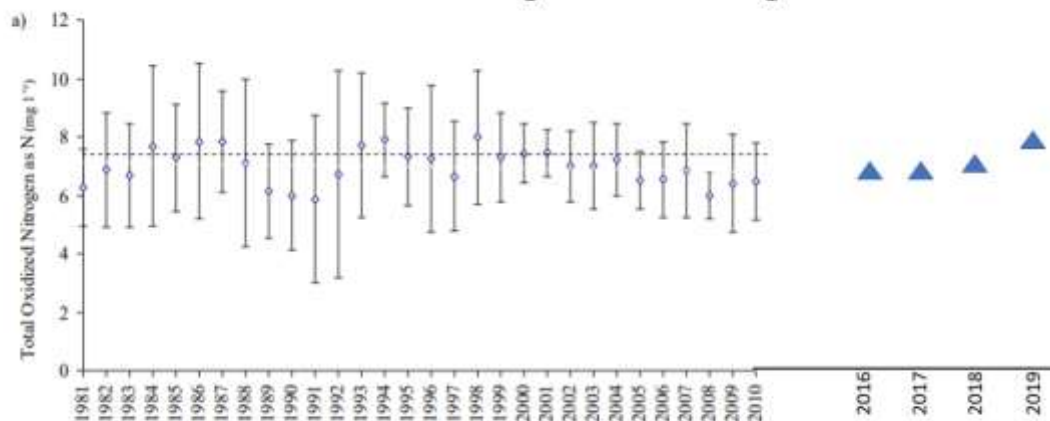
Source 1981 – 2010 http://eprints.bournemouth.ac.uk/20684/2/Beardsley%2CHelen_M.Phil._2012.pdf
 2016 – 2019 <https://environment.data.gov.uk/water-quality/view/download>

Wensum long term trend Ammonia



Source 1981 – 2010 http://eprints.bournemouth.ac.uk/20684/2/Beardsley%2CHelen_M.Phil._2012.pdf
 2016 – 2019 <https://environment.data.gov.uk/water-quality/view/download>

Wensum long term trend Nitrogen



Source 1981 – 2010 http://eprints.bournemouth.ac.uk/20684/2/Beardsley%2CHelen_M.Phil._2012.pdf
 2016 – 2019 <https://environment.data.gov.uk/water-quality/view/download>

Historic Context Roach and Anglers Catches



Older anglers amongst us today have memories of the Wensum being abundant with large 2lb Roach, like the picture from the mid seventies caught by the late Terry Housego.

The UK Roach population was decimated by the columnaris outbreak in 1967 which devastated the roach population. There was a period after this when a number of Wensum survivors and their progeny grew to exceptional sizes, but by about the mid – late eighties both numbers and ultimately sizes of roach in the river had finally dwindled to a fraction of what they once were and ultimately reflected in the graphs shown earlier in the document.

Conclusion

The Wensum does have some significant shortages of Roach stock, when compared with similar comparable rivers. One has to ask what is the optimum stock of Roach and should it be higher to enable any form of self-sustainment and recovery.

The Wensum Working Group are currently investigating all forms of connectivity to the river, to understand off channel habitats and spawning locations, if any exist for Roach. But given the long term trend of over 30 years, it appears that nature will require a helping hand to recover to any form of comparable stock levels to be reached.

Once these investigations are concluded, a management plan and options appraisal will be produced for stakeholder agreement to restore it back to something akin to a comparable chalk stream river.

Acknowledgements

I would like to thank the East Anglian Analysis and Reporting team for providing the underlying data and the undertaken the surveys, Julia Stansfield, Jon Diss and Justin Mould in particular.

ⁱ <https://aterforum.co.uk/index.php/reports-ea-bc/item/305-river-ouse-newport-pagnell-to-bedford-2017-updated>

ⁱⁱ <https://aterforum.co.uk/index.php/reports-ea-esn/item/343-river-gipping-survey-2019>

ⁱⁱⁱ <https://nrfa.ceh.ac.uk/data/station/meanflow/34014>

^{iv} <https://basg.online/1324-2/>

^v http://eprints.bournemouth.ac.uk/20684/2/Beardsley%2CHelen_M.Phil._2012.pdf