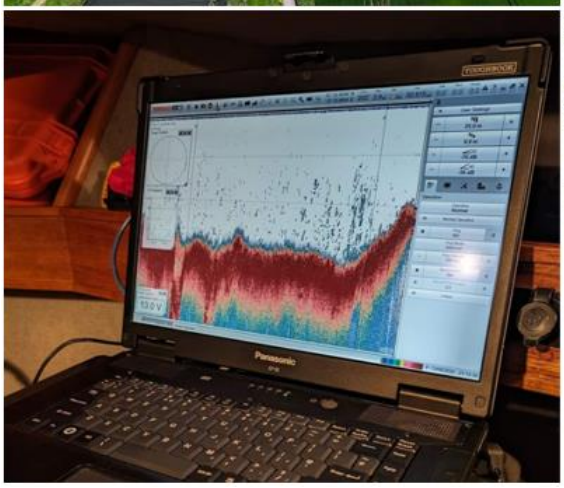
Hydroacoustic fish population survey

The Ely Ouse

Surveyed 11th, 12th & 13th June 2024



This report provides a summary of the results from our recent hydroacoustic fish population survey between Popes Corner and Denver.

The survey was carried out to assess the health of the river and enable management of our principal fisheries.

In 2024 our sampling occurred a little later in the season than usual and the reason for this was threefold; firstly, we had hoped river temperature would be rising, secondly, we wanted to ensure our survey boat would be operational following repair work and finally, we would be assisting our national fisheries team to trial and intercalibrate the next generation of hydroacoustic survey apparatus. This new equipment will eventually be rolled out to area fisheries teams and replace the aging apparatus currently in use.

Summary

- The Ely Ouse was surveyed on the 11th – 13th June 2024.
- A total of 60 km of channel was sampled.
- For ease of analysis the data is broken up into three reaches.
- The limit of these reaches is demarked by an obvious feature.
- Each sector represents one night surveying.

Reach 1: Popes Corner to Queen Adelaide Bridge

Reach 2: Queen Adelaide Bridge to Brandon Creek

Reach 3: Brandon Creek to Denver

Sampling occurs along each bank, and both upstream (left hand bank) and downstream (right hand bank) runs are completed through each sector on the same night to minimise any stock movement that may influence our results.

The average fish density estimate derived from our downstream and upstream runs equate to 23.1 Ind./1000m^3 and 28.7 Ind./1000m^3 respectively, giving an overall population estimate of 25.9 Ind./1000m^3.

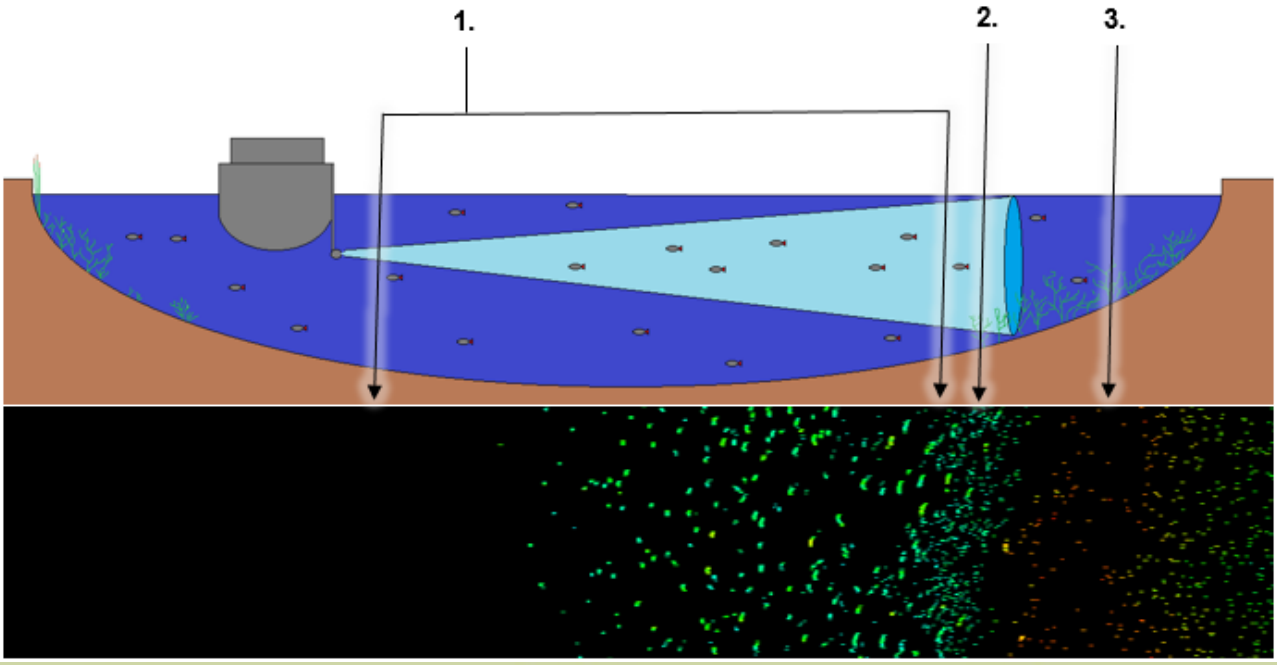
These current results are a considerable increase over that observed in 2023 and sit within the range of values previously recorded on the Ely Ouse during the past ten survey cycles.

Survey technique

- Our hydroacoustic survey technique utilises sound waves (pings) that are fired across the river channel at a rate of 10 'pings' per second. These 'pings' are reflected to the transducer from objects within the 4m x 10m elliptical beam.
- The 2024 survey used both old and new acoustic apparatus during the survey, each sounder being aimed at the same area of river to allow close comparison of the results gained. **Image 4** (right) shows the new sounder (red) and old unit (black) attached to the rotator unit; a mechanism which allows fine tuning of the acoustic beam alignment within the water column.
- When struck by the acoustic beam, solid items such as the far bank, bridge supports, and riverbed reflect extremely strong returns; echoes from fish give a moderate return and surface scatter reflect a much weaker echo (See **Image 5**).
- The survey boat travels at 6 km/Hr along the edge of the marginal shelf. Positioning the boat in this way helps avoid submerged macrophyte growth which may otherwise become wrapped around the sounder unit obscuring the acoustic beam or, at the very least, reduce sample range.
- Hydroacoustic surveys are conducted at night since fish are distributed more evenly throughout the water column during darkness and this allows them to be easily distinguished from reflected substrate and bankside 'noise'.
- After the survey is complete the data is post-processed, and output is provided as a fish density estimate expressed as individuals per 1000m^3 (Ind./1000m^3) and can also be displayed as density groupings via map format and these are provided at the back of this report (**Maps 1-2**)

Image 5: A simplified image of the hydroacoustic survey technique and raw echogram output (below).

1. Open water and clearly visible fish echoes.
2. Limit of the 'usable' data surface scatter (light blue) and echoes from rooted plants (light green).
3. Heavy (red and brown) echoes from marginal slope and riverbank.



Results

Our 2024 hydroacoustic survey of the Ely Ouse produced average fish density estimates of 23.1 and 28.7 Ind./1000m^3 from our downstream and upstream sampling and an overall population estimate of 25.9 Ind./1000m^3 which represents an 86% increase in density since the prior survey in 2023. This previous result was somewhat concerning, being the second lowest on record, however we had received no feedback to suggest that fishery performance had suffered and wondered whether fish had moved into the connected pits marinas and smaller tributaries such as the Lark, Wissey and Little Ouse.

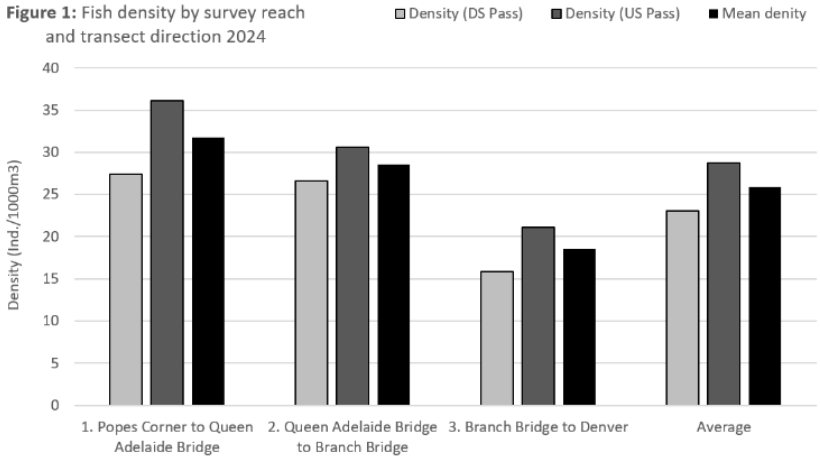
Reach level data is presented below as **Table 1** and **Figure 1**.

Table 1: Fish density (Ind./1000m3) by survey reach and transect direction 2022

River reach	Density (DS Pass)	Density (US Pass)	Mean density
1. Popes Corner to Queen Adelaide Bridge	27.4	36.1	31.8
2. Queen Adelaide Bridge to Branch Bridge	26.6	30.6	28.6
3. Branch Bridge to Denver	15.9	21.1	18.5
Average	23.1	28.7	25.9

Popes Corner to Queen Adelaide:

Figure 1: Fish density by survey reach and transect direction 2024



The river between Popes Corner and Queen Adelaide possessed the highest average density of the three reaches sampled (**Figure 1**) with an average population estimate of 31.8 Ind./1000m^3. The upper river has held the highest average density in three of the past four surveys and density estimate from this reach has tended to lie around 30 Ind./1000m^3 (although the 2022 result is a significant outlier in the dataset with a population of 71 Ind./1000m^3!).

The cause of the exceptional 2022 result remains uncertain, data from the upper river was somewhat 'noisy' and possessed both the shortest beam range and sample volume (due to the smaller channel dimensions) however when the data was post processed a second time to confirm the unusually high results the outputs were closely comparable.

During the 2024 survey, 'hotspots' with elevated fish numbers were observed between Soham Lode and Little Thetford, Braham Dock Drain (130 Ind./1000m^3) around the Ely bypass road bridge, and between Roswell Pits and Queen Adelaide. Overall, the density estimate within the upper river has shown a 10 percent increase in density between 2021 and 2024.

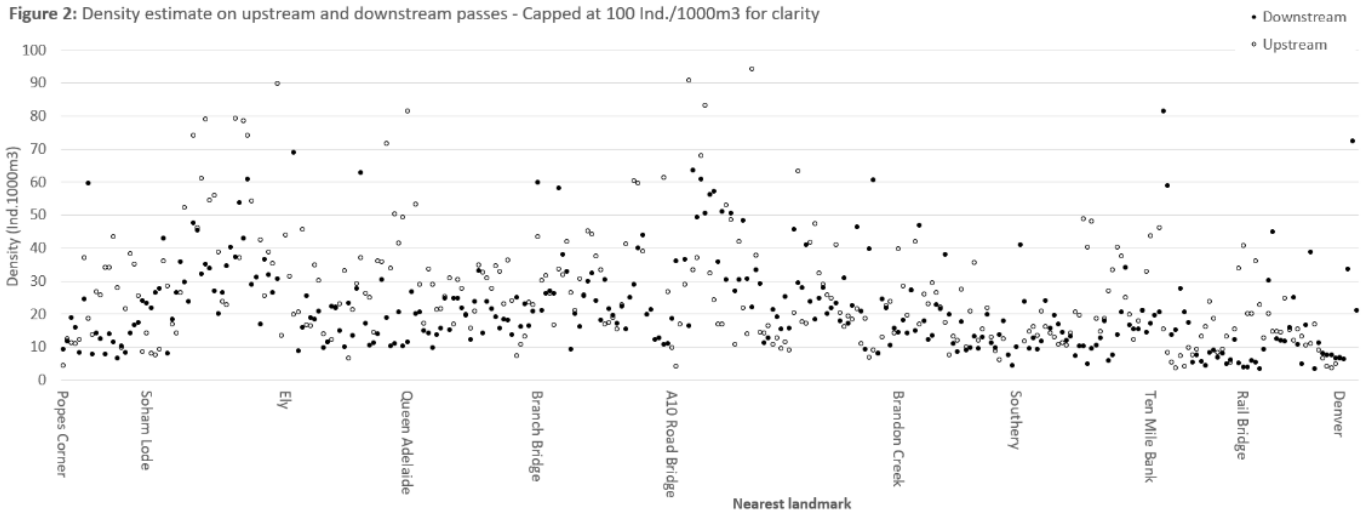
Queen Adelaide to Brandon Creek: The average population density from the middle reaches of the Ely Ouse indicates a 50% reduction in population density since 2021, that said, the 2024 result is more than double than that recorded in 2023. Fish density was reasonably consistent between Queen Adelaide and Littleport with higher densities observed between Sandhills Bridge and a short distance downstream of the A10 road bridge.

Brandon Creek to Denver:

The river between Brandon Creek and Denver produced the lowest density estimate from the three reaches sampled; that said, the recent result still represents a considerable increase compared to 2023; recorded density more than doubling from 8 Ind. to 18.5 Ind./1000m^3. If we look at the population data that has been broken into in sub-reaches (i.e. since 2021) then this suggests a 35% reduction in population density.

Despite this, there were still some large aggregations of fish observed, particularly around Modney Bridge and Ten Mile Bank rail bridge and Kings Lynn Angling Association (the controlling angling club) have stated that Ten Mile Bank has produced "plenty of silver fish" for visiting anglers and "had fished well all summer" on their Facebook page. We had hoped to conduct a short investigative survey around Ten Mile Bank once the water had fully warmed to assess whether population density would improve, or distribution change significantly, unfortunately a resurgence of electrical issues on our survey boat cut the 2024 survey season short.

Figure 2: Density estimate on upstream and downstream passes - Capped at 100 Ind./1000m3 for clarity



Long term density estimate

The 2024 population estimate of 26 Ind./1000m^3 demonstrates an 85% increase in density since the previous survey year and the current estimate lies within the mid to lower range of values recorded previously; being some 25% lower than the long-term average derived since 2012. Fish populations are known to display cyclic patterns of growth and loss, and it is possible that this is what we are seeing within the long-term acoustic dataset as density rises and falls throughout the ten-year 2013 to 2023 period.

Figure 3: Long term fish density derived from hydroacoustic survey on the Ely Ouse 2007-2024

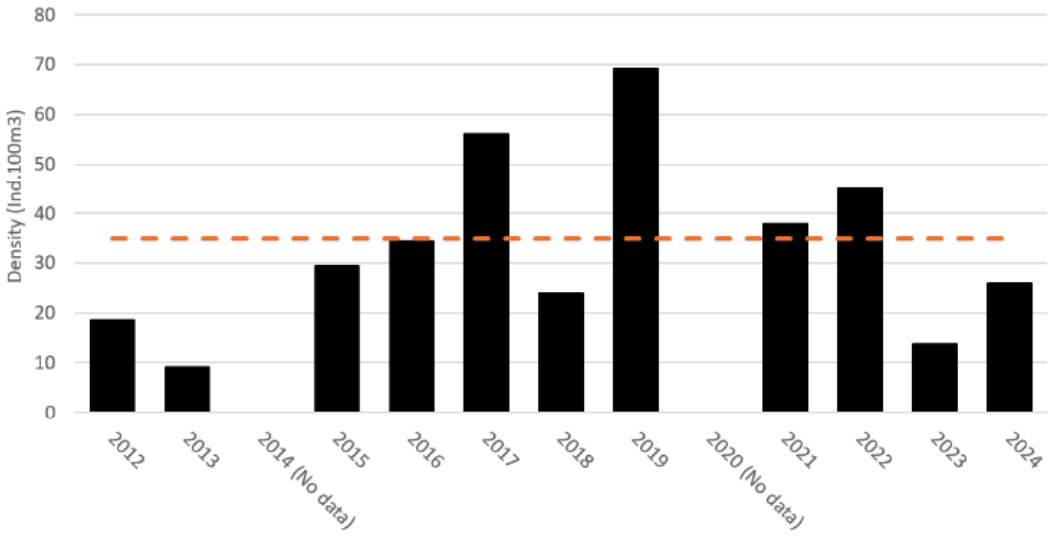


Table 2: Density estimate for upstream and downstream transects 2012-2024

Year	US density (Ind./1000m3)	DS density (Ind./1000m3)	Mean density (Ind./1000m3)
2012	18	19	19
2013	9	9	9
2014 (No data)	-	-	-
2015	28	31	30
2016	38	31	34
2017	55	57	56
2018	25	23	24
2019	70	68	69
2020 (No data)	-	-	-
2021	40	36	38
2022	38	51	45
2023	12	16	14
2024	29	23	26

Validation data: Angler participation & The Match Catch Database

Within the Great Ouse catchment area, we gratefully receive match returns from a small number of angling clubs and these results can prove a valuable source of information, be a useful indicator on the status of the fish stock present and allow anglers to support their fishery and have a say on the quality of sport that they experience.

This rod-and-line derived data is useful to validate our results and may also add to them, for example, by including species rarely caught in routine surveys.

Table 3: Class	CPUE		CPUE	
	Grams / angler hour		Decimal Ounce / angler hour	
	Rivers / canals	Stillwater	Rivers / canals	Stillwater
A+	>290	>909	>10.00	>32.00
A	150 - 289	150 - 909	5.27 - 10.00	5.27 - 32.00
B	110 - 149		3.8 - 5.26	
C	70 - 109		2.5 - 3.84	
D	<70		<2.50	

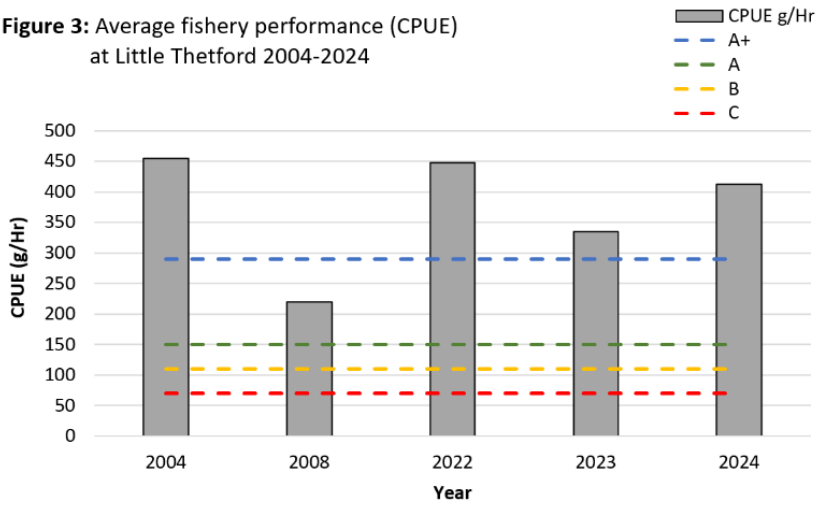
On the Ely Ouse we are fortunate to have an excellent long-term dataset from Little Thetford and an expanding dataset within the river's lower reaches. The match results are stored on the EA Match Catch Database and this software permits rapid analysis of angler catches over time. Output from the match catch database is principally as catch per unit effort (CPUE) values expressed as weight caught in grams per hour. The CPUE value is classified using five categories from 'A+' to 'D' which are defined in **Table 3** (above).

If clubs wish to provide match data for analysis and inclusion in subsequent reports, then this is encouraged and will be greatly valued.

We currently hold data from eleven matches that occurred subsequent to our acoustic survey; nine took place at Little Thetford and the remining two were conducted on the Ten Mile Bank. During these matches 316 anglers competed for a total of 1703 hours fished, and over 700 kilos of fish were caught. Combined values from the eleven matches produce an average CPUE value of 404 g/Hr meaning that the river receives an 'A+' classification.

It is apparent that fishery performance at **Little Thetford** exceeded the 'A+' category threshold (290 g/Hr) during most of the events fished this year, although one match did receive an 'A' rating (the CPUE value being 4g/Hr below the 'A+' class).

Figure 3: Average fishery performance (CPUE) at Little Thetford 2004-2024



The highest CPUE value from Little Thetford during 2024 (at the time of writing) was 775 g/Hr and was recorded during the first match of the season. There have been no 'dry nets' at Little Thetford during 2024 (so far!) and all anglers competing have weighed-in at the end of each match; of course, the 2024 matches do not cover the full range of environmental variables likely to be experienced during a fisherman's year, and it is likely that the late season matches, with more difficult conditions and cooler water temperatures, will negatively influence the average CPUE value.

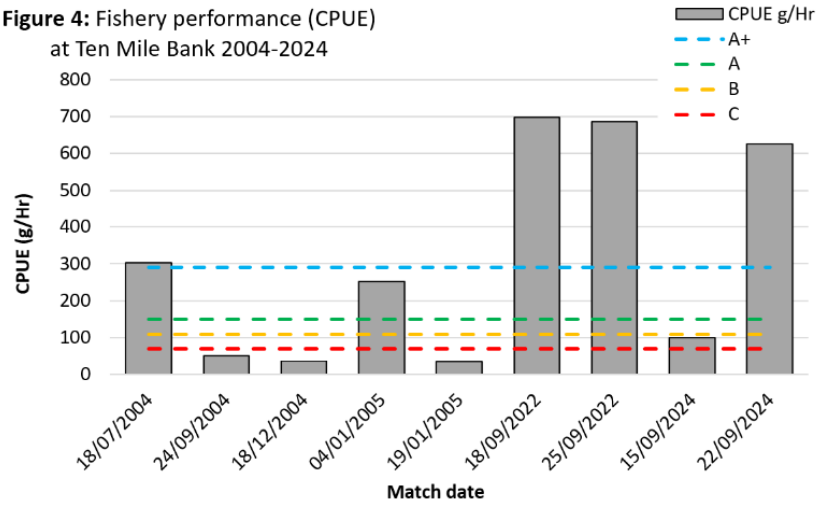
Long term average CPUE data, drawn from all match results in each year, is expressed above as **Figure 3** and shows that fishery performance at Little Thetford has achieved an 'A+' classification in all years (where data was available) apart from 2008 which received an 'A'.

Species composition during the four early season matches at Little Thetford saw common bream dominant, backup weights were chiefly composed of roach and tench, rudd, perch, silver bream, ruffe and eel also included. However, as the season has progressed it is roach that become the major component of catches, and this is principally due to the roach being more actively sought when they are the most 'catchable' (or are the species most consistently feeding) and can therefore provide greater match weights. The species assemblage from Little Thetford, derived from match returns, fits well with the results of our seine netting survey in 2023 which identified roach dominant, followed by perch and common bream. Our seine netting survey did not record any large common bream during 2024 (maxim of 190mm long) so the inclusion of large individuals in matches demonstrates that mature fish remain resident within this reach.

Examples of angler catches at Little Thetford are shown as **Image 6** at the end of this report.

At **Ten Mile Bank** we have results from two 2024 matches that were fished over consecutive weekends in mid-September. The first match produced a comparatively disappointing CPUE value of 100 g/Hr which equates to a class 'C' rating. This certainly appears to have been a challenging match and five competitors did not weigh-in; although whether this was due to nil-catches, or a catch that the competitor did not think worthy of weighing-in, is not known.

Figure 4: Fishery performance (CPUE) at Ten Mile Bank 2004-2024



The second match, conducted just one week later, was the antithesis of the first, providing a CPUE value over *double* that required to attain 'A+' classification and a winning weight of almost eight kilos (with backup weights of 6.7 and 4.9 Kilos in second and third place). The total weight caught during this match exceeded 130 kilos and roach, rudd and smaller 'skimmer' bream constituted the majority of fish caught.

The 2024 match results from Ten Mile Bank show that, despite the lower population estimate derived from hydroacoustic survey, this lower section of river can still provide excellent catches for both match and pleasure anglers, although acoustic data suggests that sport could be somewhat hit-or-miss, and location will be key to success.

It would be extremely useful to compile a dataset of match returns from both the middle and lower extent of the watercourse; this would be of value to both the EA and the wider angling community, allowing more detailed analysis and validation of our survey results and, if an angling club had concerns on fishery performance, a long-term record of CPUE values would be readily available against which catches could be compared.

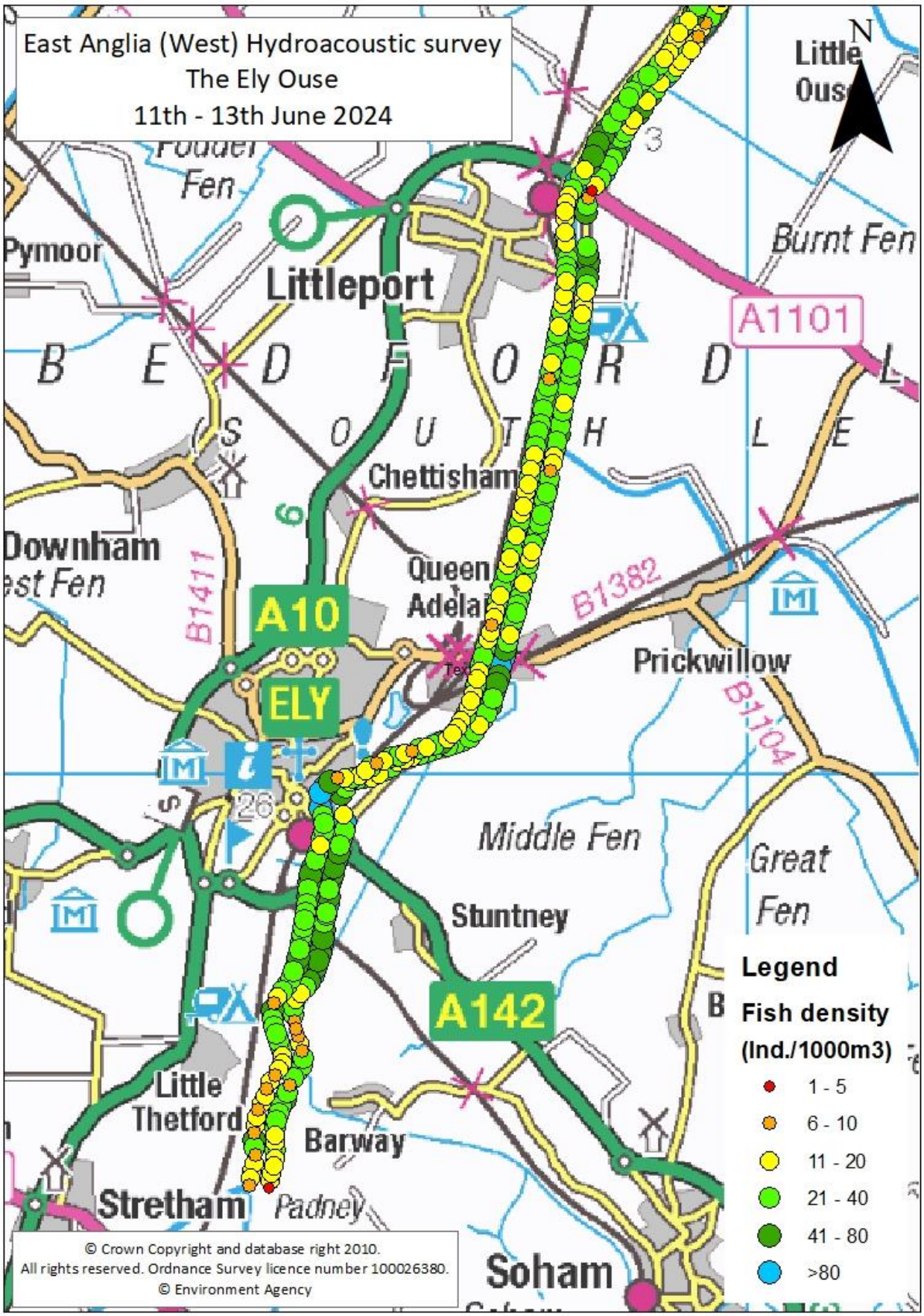
By bringing together multiple data streams, combining hydroacoustic and seine netting survey data with angler match returns we can create a more complete picture of the fishery and hopefully we will be better able to understand the impact of confounding factors such as migration and stock aggregation. Triennial netting surveys will continue at Little Thetford, Sandhills Bridge and Ten Mile Bank to provide physical data and allow analysis of growth rates amongst key species.

Based on the current hydroacoustic survey data, and recent match returns, it is expected that the Ely Ouse will continue to provide good sport to visiting anglers.

- The next detailed Ely Ouse report will be written in 2026 and will include the results from our triennial seine netting programme, match-catch returns and hydroacoustic survey output.
- The next hydroacoustic survey will be undertaken in 2025.
- If any angling clubs hold matches on the Ely Ouse and wish to provide data for analysis and inclusion in these reports then a blank return is included at the end of this report.

Image 6: Examples of catches made at Little Thetford 2024

Justin Mould
A&R
22nd October 2024


East Anglia (West) Hydroacoustic survey
The Ely Ouse
11th - 13th June 2024
N
Little Ouse
Burnt Fen
Littleport
A1101
Pymoor
Chettisham
Downham
Queen Adelaide
B1382
Prickwillow
A10
ELY
B1411
B1104
Middle Fen
Great Fen
Stuntney
A142
Little Thetford
Barway
Stretham
Padney
Soham
Legend
Fish density (Ind./1000m3)
1 - 5
6 - 10
11 - 20
21 - 40
41 - 80
>80
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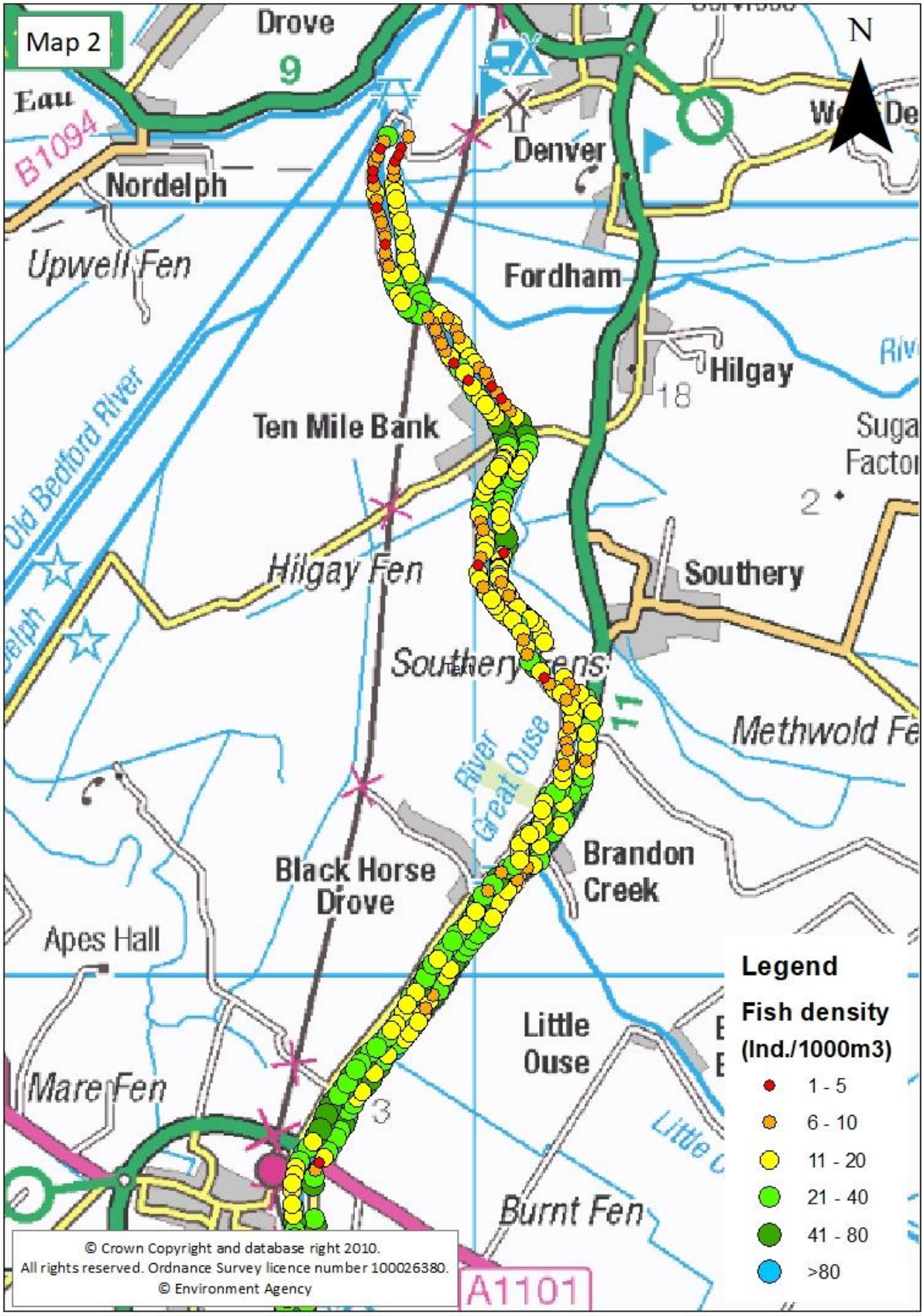
Map 2
Drove
9
Eau
B1094
Nordelph
Upwell Fen
Denver
Fordham
Hilgay
18
Ten Mile Bank
Old Bedford River
Hilgay Fen
Southery
Southery Fens
11
Methwold Fe
River Great Ouse
Brandon Creek
Black Horse Drove
Apes Hall
Little Ouse
Mare Fen
3
Burnt Fen
A1101
N
Legend
Fish density (Ind./1000m3)
1 - 5
6 - 10
11 - 20
21 - 40
41 - 80
>80
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