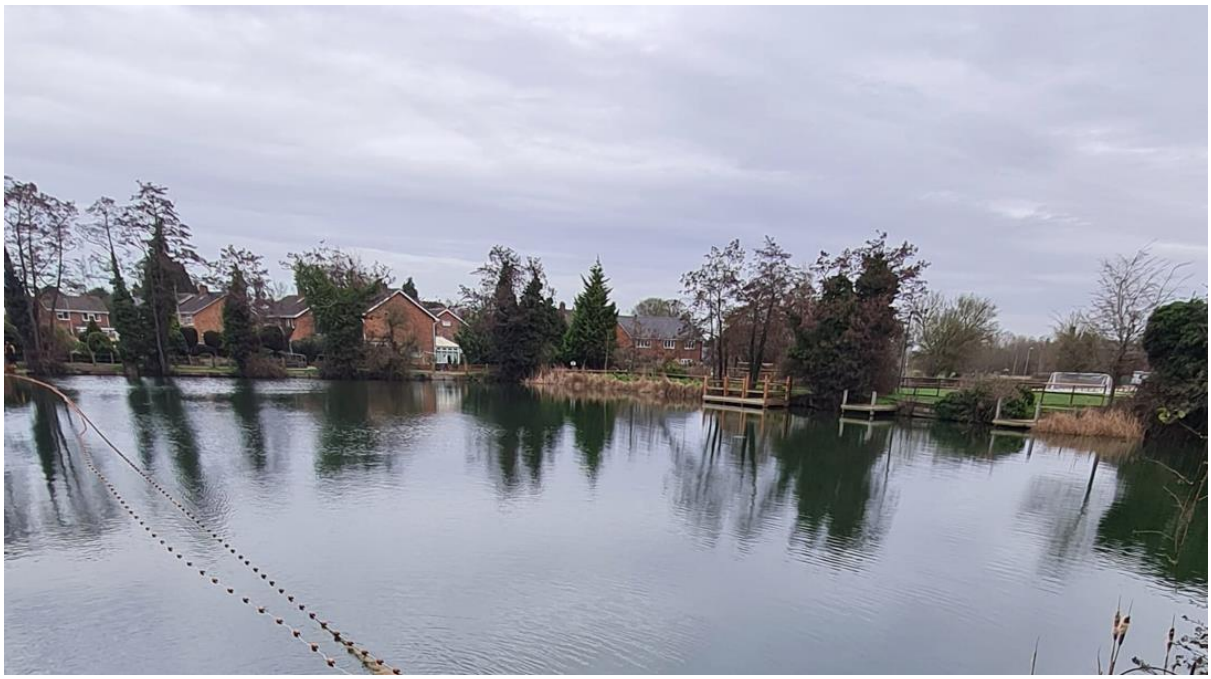


Introduction

The Environment Agency were invited by Ed Sharkey, Chairman, Barton under Needwood Parish Council to undertake a fish stock assessment at Barton Village Pond, off Efflinch Lane, Barton-under-Needwood, DE138EU. National Grid Reference (NGR) SK19106 18216. The stock assessment was commissioned to provide an indication of the current stocking density to identify the impact that this may be having on water quality, following a fish kill event in 2024 (refer to *Barton Pond Fishery Post Incident Report*).

The netting team consisted of five Environment Agency Fisheries Technical Officers- Jody Hughes (Area Officer), Mick Buxton, Tom Astley, Harry Ballard and Tom Morgan. Ed Sharkey and other members of the local community were also present.

Barton Village Pool is a pleasure fishery located within a village centre. The Fishery provide free fishing to the local community and operates as a day ticket water for anglers travelling from outside of the village. The fishery is managed by Barton under-Needwood Parish Council.

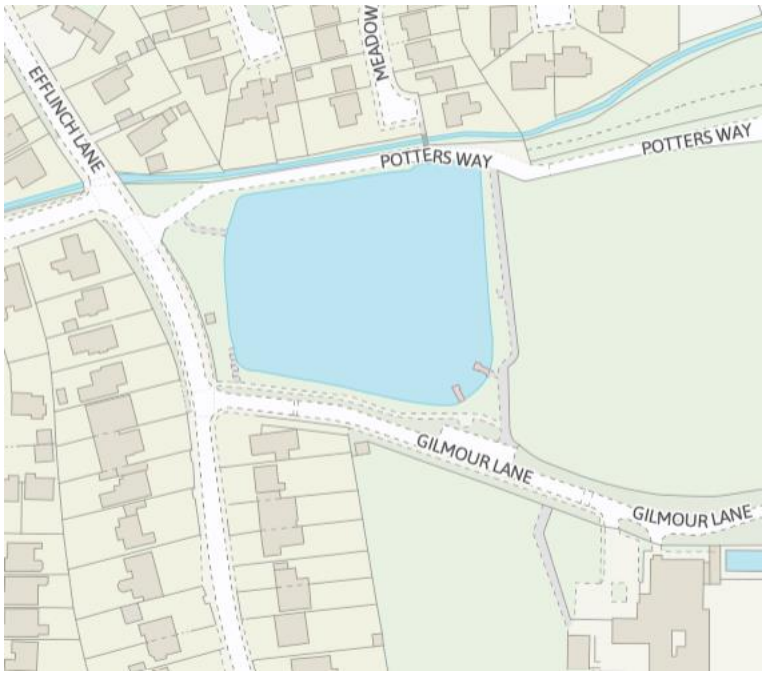
The Fishery is circa 1.70 acres (0.70 ha) and would be classified as an ‘On line Stillwater’. The fishery is registered with CEFAS (Ref EW054-I-946). There is no

Environment Agency Site Permit in place. The depths within the waterbody range from 3ft to 6ft.

Site location

The Fishery consists of a single waterbody. The aerial plan can be seen in *Figure 1* below.

Figure 1. Aerial plan



Aims and objectives

The objective of the report is to document the findings from the fish stock assessment undertaken on 3rd March 2026. The Environment Agency take a holistic approach to waterbody management and consideration is given to the use of the waterbody, surrounding land use, the surrounding topography of the waterbody as well as its localised ecology. The aim of the report is to provide the customer with a brief summary of the survey results to be used as a reference document when considering future management techniques. The ultimate aim is to maintain a balanced aquatic environment within the waterbody that ensures that the waterbody

has resilience to future climatic challenges and their associated impacts, without being detrimental to its primary function.

Site history

Whilst historically fish population surveys have been undertaken, the results of these are unknown. This survey will provide baseline data to inform of the species present and approximate biomass of the fishery.

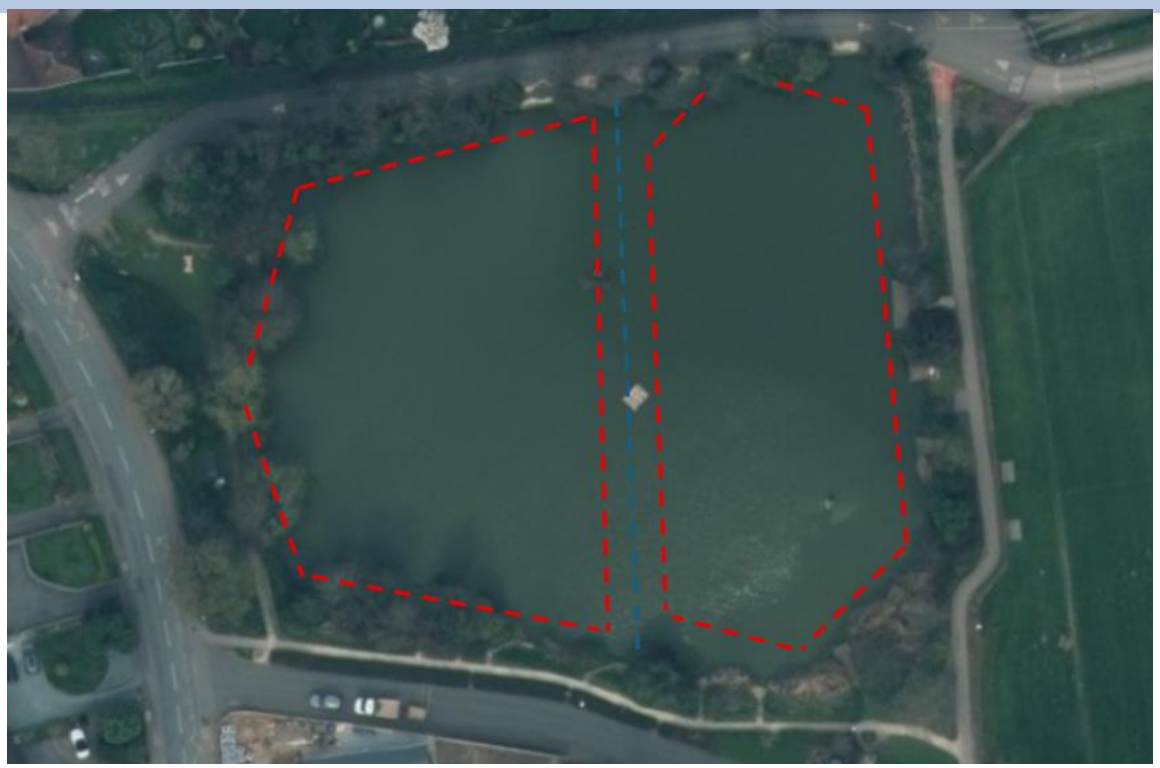
Method

The fish stock assessment was undertaken on the 3rd March 2026 and involved Seine netting fishing methodology. This method is regulated under section 27A Salmon and Freshwater Fisheries Act 1975. Environment Agency authorisation is required to fish using instruments (other than rod and line).

A section of the waterbody was partitioned off using a seine net to prevent the movement of fish in and out of the sample area. The area to be sampled was selected following a prior visit and was determined by ease of access and the limitations when considering floating islands, underwater structures, depth, substrate etc. The fishery representatives removed any large debris items which could affect the efficiency of the survey, prior to our arrival.

The areas surveyed is depicted by the red dashed line, the blue dashed line depicts stop net locations, this can be seen in *Figure 2* below.

Figure 2. Fish survey location.



EA Fisheries Officers used seine netting methodology. A seine net consists of a single sheet of meshed netting that is held vertically in the water column. Floats are attached to the head rope and weights are attached to the bottom (lead) line. When it is deployed, the net will form a wall between the surface of the water and the bottom of the waterbody, trapping any fish which are inside the wall. Once the net is laid and both ends meet at the bank, both ends of the nets are slowly pulled ashore. It is important the lead line maintains contact with the bottom and the float line does not sink. This method will capture a wide variety of fish species and is not selective.

Limitations

A single sweep of a seine net in a predetermined location can be unreliable when used to predict the fish population in natural and man-made waterbodies. This is because of fish species ability to avoid capture by burrowing into the substrate or seeking refuge within vegetation or undercut banks which could not be effectively

surveyed. It is also likely that, particularly smaller fish species can escape through the mesh of the net.

Topographical challenges such as depressions in the substate or raised plateaus can also impact the survey success as fish are more likely to evade capture.

Therefore, the results of the survey should be used as an indication (best estimate) of overall biomass, which in these circumstances is adequate. The purpose of the survey was an exploratory assessment of the current fish population. The survey methodology is deemed proportionate when considering the desired outcome.

To enable a comprehensive fish stock assessment, it would be recommended that the water level is decreased. Then undertake a combination of capture techniques such as seine netting, electric fishing and fry traps in each area until the catch returns have depleted. This methodology is only required is specific circumstances.

Results

To complete the survey, an area of approximately 5,000m² was seine netted. This is approximately 80% of the waterbody.

The first sweep of the seine net appeared to fish effectively. The second sweep of the net had challenges when retrieved. This was primarily due to a raised plateau in the centre of the waterbody, as well as large debris items which caught on the net. Both aspects can lift the lead line upon retrieval and lead to escapement of fish. The was mitigated as much as possible by increasing the amount of netsmen monitoring the lead line and retrieving the net slowly. Once the nets were retrieved, the carp, and carp hybrids were weighed separately to the other species to prevent mechanical damage to the smaller fish. Please note that due to the abundance of non-carp species captured, five sample batches were weighed and the average weight of these were used to calculate the overall weight captured. Scale samples were also taken from 32 roach and 34 common bream, which were sent to the National Fish Laboratory (NFL) for examination. The NFL report will be submitted as an appendix to this report.

It is my estimation that considering the challenges discussed that approximately 60-70% of the overall fish population were captured. The data obtained from the fish survey is presented in *Table 1* below.

Table 1. Fish survey results

Number	Fish Species (Common Name)	Fish Species (Scientific Name)	Approximate weight (lbs)
1	Common Carp and hybrid variants	*Cyprinus carpio*	254
2	Perch	*Perca fluviatilis*	1067
3	Common Bream	*Abramis brama*	
4	Roach	*Rutilus rutilus*	
5	Rudd	*Scardinius erythrophthalmus*	
Total			1321
Total captured biomass			777lb/acre

Discussion

As discussed previously, a single sweep of a seine net is not an efficient method to accurately calculate overall biomass of a fishery due to the aspects detailed in the limitation section of this document. The results however can give an indication of the overall stocking density of the waterbody and species present.

A sustainable pleasure fishery should try and achieve an overall biomass of 500-1000lbs per acre. Obviously, this is dependent on interlinking ecological factors therefore it is difficult to associate stocking densities with a numerical figure, and fish also grow and reproduce!

It is possible to maintain stocking densities in excess of the carrying capacity (1000-2000lbs per acre), but this will require additional management intervention such as supplementary feeding and aeration, and fish may be more vulnerable to environmental stressors.

With a likely stocking density of >1000lb per acre, I would suggest that this fishery's stocking density is moderately elevated in regard to current biomass.

The main proportion of the biomass consisted of roach and common bream (79% of the biomass). 77 carp and carp hybrids were captured which consisted of 19% of the biomass. with rudd and perch making up the remaining 2%.

Summary

This fish stock assessment was undertaken following EA advice after a fish mortality event to provide baseline data when considering future management practises. The results indicate that the fishery has a moderately elevated biomass however regarding inter-species dynamics and abundance, the fish population is relatively balanced. The NFL fish ageing data indicates that both roach and bream have a fast growth rate up to circa 7 years old, this then reduces as the fish age. Interestingly, with fisheries that are considered to be operating with an elevated biomass the growth rate is usually limited due to stress and food availability.

It is clear from the algae abundance and historic water quality issues that eutrophication (nutrient enrichment) is the limiting factor at this fishery. This unsettled environment is also the likely cause of chronic fish mortalities at the site. The abundance of phytoplankton (algae) supports a zooplankton community both of which are vital food sources for fish species, which may explain the elevated growth rates of younger fish and increased juvenile survival rate, alongside a noticeable absence of predatory fish species. The concern related to this scenario is that the fishery is at risk of a 'boom and bust' event, where environmental conditions (particularly water quality) can exceed the tolerance of fish species. Currently perhaps the older or Immunol compromised fish are dying, whereas if the scenario worsens there is a high risk of a significant fish kill event.

The results of the fish population survey provide information that is vital when considering a holistic approach to fisheries management. Essentially, whist the fish population is moderately elevated, it appears balanced and proportionate. With this considered, the waterbody would benefit from periodic cropping of smaller fish in the

future but the stocking density is not the single cause of the historic mortalities, rather a minor contributing factor.

Recommendations

I have included recommendations below. For clarity these recommendations have been prescribed previously (refer to *Barton Pond Fishery Post Incident Report* and *Barton Pond Management Plan),* however I have updated them following the stock assessment and subsequent additional discussions with the fishery representatives. The primary objective at this location is to improve water quality which in turn will significantly limit the stress on the fish population. Improving habitat and stock manipulation are important aspects of fisheries management and will enhance this fishery.

Water quality monitoring

I would recommend a continual monitoring programme of basic water quality parameters such as Dissolved Oxygen (DO). These records provide the Fishery Manager with basic knowledge of what is happening within the water at a snapshot in time. Water quality monitoring can identify consistencies as well as the impact that other factors can have on the waterbody, such as algae abundance, increased rainfall, low water level and temperature. Water quality records can also be useful when investigating fish mortality incidents. Ultimately basic water quality monitoring could forecast the requirement for supplementary aeration and preventing potential fish mortalities. The Environment Agency can provide advice on appropriate level of monitoring required and equipment can also be applied for through the Fisheries Improvement Programme (FIP).

Mitigating potential sources of pollution

Due to the continual nutrient enrichment at this waterbody, I would recommend monitoring for eutrophicating water quality parameters such as nitrate and phosphate. Ammonia should also be monitored as this can indicate an organic input. I would suggest monitoring the adjacent watercourse (Barton Brook) as well as the

Fishery, the results of this specific monitoring may indicate trends or that the inflowing water may have elevated levels of nitrate or phosphate which could be contributing to the poor water quality in the fishery.

Our records also indicate that there is a combined sewage overflow pipe (CSO) that runs under Potters Way, adjacent to the north bank of the fishery. I would suggest investigating if there are any drainage pipes that enter the fishery on that bank to eliminate any concerns related to asset. I will also make enquiries internally to see if we can explore this aspect in further detail.

Supplementary aeration

Supplementary aeration should be available in times when waterbodies are subject to environmental stressors, and not as a means of supporting a fishery. Therefore, it is recommended that the fishery have access to suitable aeration equipment that can be deployed as required. An efficient monitoring regime can assist with forecasting for this.

The fishery does have aeration equipment in the form of a paddlewheel unit, the use of this should be intelligence led, based on current and forecasted DO records as well as current and forecasted climatic conditions.

Algae control

I would recommend limiting the algae community within the waterbody to maintain stable water quality and reduce the risk of significant oxygen fluctuations. Successful algae control can be achieved by the addition of barley straw, Dosing with barley straw should be undertaken in March, before excessive algae proliferation occurs, and maintained until October. Repeat doses should be added every 2-3 months during Spring/Summer. Please note that the biological process within the straw will take a period of time to become active, dependant on temperature. Therefore, the initial dose of barley straw should remain within the waterbody for 1 month following redosing, before it is removed.

The addition of barley straw is a preferred method of algae control as it does not impact the overall ecology of the fishery.

Some consultants (and fisheries) make and sell barley straw extract. This has been used with varying degrees of success. Certainly, it is less laborious to apply than raw barley straw, however the concentration of the active ingredient that inhibits algae cannot be quantified accurately. This may be a preferred if deploying raw barley straw is not a viable option.

Aquatic dye has been used to control algae in fisheries in recent years, however this method reduces UV penetration therefore impacts the establishment of organisms at the base of the food chain. This will essentially impact the overall productivity of the fishery and is not recommended unless other control methodologies have been exhausted.

Silt content

An application of aquatic chalk will assist the decomposition process of organic matter. The hydro-soil (silt) should have an initial dose of Aquatic chalk and then annually should be re-dosed. This is to facilitate the natural cycles of mineralisation and decomposition, so when the organic matter enters the waterbody (such as leaf litter and waterfowl excrement) it has a means of breaking down, therefore assisting in precipitating phosphates. The products available are either calcium sulphate di-hydrate or calcium carbonate. Both of these ‘water treatments’ increase the calcium concentration within the water. This in turn increases the buffering capacity of the water which refers to the water's ability to keep the pH stable forming a natural resistance to fluctuations in pH. Calcium also encourages the development of phytoplankton thereby increasing the productivity of the waterbody.

Calcium products also help to neutralise the methane and hydrogen sulphide build-up in the silt which can have a detrimental effect on the fish community. Submerged and floating aquatic plants such as lilies can also be adversely affected by the presence of hydrogen sulphide in the hydro-soil.

With the above said, the fishery manager must be realistic regarding the results that can be achieved during this process. It is of the authors opinion that a significant increase in depth as a result of chemical desilting is unlikely, however a calcium treatment will assist with facilitating bacterial decomposition of organic detritus therefore assist nutrient recycling within the waterbody. It is recommended that a silt survey is undertaken prior to application to identify the requirement of the treatment as well as the silt distribution within the waterbody.

Periodic fish removal (cropping)

Periodic biomass reductions will give the fishery manager an opportunity to understand the current population dynamics of the fishery. It will also provide an opportunity to remove smaller fish to help limit the stress on the remaining fish population. I would suggest considering another stock assessment in 2-3 years.

Before any fishing instrument other than rod and line is used the operator must obtain Environment Agency permission.

Biosecurity

Appropriate biosecurity measures will reduce the risk of disease and INNS coming onto the site. There is no mention of biosecurity measures within the rules on the waterbody's social media site.

Disinfectant net dip stations are an effective way to reduce the risk of unwanted introductions in the fishery. Net dips can be placed adjacent to the waterbody and anglers should be encouraged to dip nets prior to angling. I am conscious that this would require some management, and they may be at risk of vandalism (and perhaps some health and safety considerations) however good biosecurity practises are essential when considering limiting the risk of pathogens being brought into the fishery. Biosecurity signage around the perimeter of the fishery may be a more viable option. A biosecurity fact sheet will be provided as an appendix to this document.

Tree maintenance

The fishery has significant tree growth around the margins of the north and west banks resulting in overall, circa 60% canopy shading. Tree cover creates shading and subsequent cooler areas that fish utilise for sanctuary from sunlight and piscivorous predators. Conversely, excess canopy shading can reduce wind action on the waterbody, therefore limiting movement on the water's surface and reducing its ability to absorb oxygen from the atmosphere. Trees can also contribute to the organic loading on the waterbody through seasonal leaf fall. Canopy shading also reduces UV penetration and limit the establishment of aquatic marginal vegetation in these areas.

I would recommend a maintenance programme to selective trees located around the perimeter of the waterbody. The recommended works include the following:

- Selectively remove/ or thin out deciduous trees to open up the tree canopy to create 'wind tunnels', to allow agitation of the water surface.
- Remove any self-set trees that have established to prevent them from maturing and increasing the organic loading on the waterbody through autumn leaf fall.

Aquatic vegetation

In areas where the margins have not been impacted by canopy shading, there is desirable aquatic vegetation. If the recommended tree maintenance works are undertaken, it is likely that the aquatic vegetation present will self-propagate into these niches. If this isn't the case, manual planting can be undertaken to help plants establish in these areas.

Management plan and record keeping

It is recommended that the future management and aims of the fishery is clearly documented in a 5 year management plan. It is obvious that some management methodologies are ongoing, such as water quality monitoring, whereas other aspects may not be required as frequent, fish stock assessments for example.

A management plan would provide a structured document that will allow for overall improvements and maintenance measures over a prolonged time period, often dictated by available funding and overall aims of the fishery. Records of previous management techniques should also be documented so that the successfulness of

the works can be assessed in the future. Essentially a management plan will also assist when allocating funds for the fishery and assist with prioritising tasks.

Water quality data, such as DO readings should also be retained as this could be of assistance when making decisions regarding supplementary stocking, requirement for aeration and in possible future mortality investigations etc.

Fisheries Improvement Programme

The Fisheries Improvement Programme (FIP) is funded by Rod licence sales, to help provide fisheries with financial support when undertaking essential fisheries management tasks. Details of what can be applied for are documented on the link below, but certainly DO meters and habitat improvements would be considered.

Further information on the Fisheries Improvement Programme can be found at https://anglingtrust.net/funding/fisheries-improvement-programme/

For any further information, or questions related to the document please contact Jody Hughes, Fisheries Technical Officer jody.hughes@environment-agency.gov.uk or 07407 186599

Fish survey images