

Assessment of the fishery at Walthamstow Reservoirs

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ASSESSMENT OF THE FISHERY AT WALTHAMSTOW RESERVOIRS

Executive summary

Walthamstow reservoirs is a complex consisting of 10 reservoirs. The prime purpose of these is to supply water to Coppermills Treatment Works, but three of the reservoirs are used for trout fishing and seven for coarse fishing.

A review of the fishery was completed from historical information supplied by Thames Water Utilities and a one day site visit. Issues considered were water quality, physical habitat, previous stocking, statistics on the performance of the fishery and on-site management and facilities.

A number of recommendations on future strategy are made.

Recommendations

- That each of the coarse fishing lakes is focused to a particular type of fishery. Suggested types and the reservoir most suited to each type is given in Table 2.
- That the lakes are restocked. The exact strategy will depend on resource availability, but it is suggested that some of the lakes are initially stocked with 100 lb of fish per acre. Future stocking can be adjusted in the light of the results from this experiment.
- Facilities for growing fish in protected environments should be extended.
- Habitat should be improved by the addition of macrophytes and/or reef structures, as well as trees on the banks.
- Data on the performance of the fishery should be collected and collated regularly.
- The on-site management of the fishery should be strengthened either by employing a fishery manager directly or by making use of a consultant's services for short periods.
- The site should be tidied and thought given to the provision of facilities for food and drink to improve the atmosphere of the fishery.

Introduction

The Walthamstow reservoir complex consists of 10 reservoirs currently used as a mixed coarse and trout fishery. In recent years there has been a perception that the quality of fishing in these reservoirs, particularly for coarse fish, has declined along with the use of the complex by anglers. This has prompted a review of the fishery.

The objective of this study was to review available information on the fishery and provide initial advice on future management of the reservoir complex for angling.

Methods

A review was made of available information covering water quality, previous stocking and statistics on the performance of the fishery from data supplied by Thames Water Utilities. This was supplemented by a one-day site visit to the reservoir complex, and discussions with the wardens.

Description of fishery

General

The reservoirs are used to store water used in the Coppermills Treatment Works. The source of the water is either the River Thames or the River Lee. Water to the low level reservoirs (No.'s 3, 2 & 1) comes from the treatment works and is used to back-wash the sand filters. The water enters No. 3 and flows through No. 2 to No. 1. This water is very turbid and consequently No. 3 has become very silted and shallow at one end. The demands of the Treatment works for water means that the water levels in the reservoirs fluctuate over short periods and the water in them is replaced regularly. The exception to this is West Warwick which is used as a balancing reservoir. This has the added impact of making the water in this reservoir clearer than the others.

A description of the current type of fishing in each of the 10 Walthamstow reservoirs is given in Table 1. The source of the information used in constructing this table was Thames Water Utilities, a site visit and discussions with the wardens on site.

Water quality

Standard chemical analyses were supplied for some of the reservoirs at spot time intervals over a period of one year. The data describes a typically productive, eutrophic still water body, with regular algal blooms.

Levels of unionised ammonia (NH_3) are a slight cause for concern particularly for the rainbow trout. It is important to distinguish between unionised

ammonia and total ammonia. It is the unionised form which is toxic to fish. Presentation of the water quality data suggests that it is unionised ammonia that is being measured but this should be checked with the company that completed the analysis.

Table 1. A description of the current status of the fishing in each of the reservoirs in the Walthamstow fishery

Reservoir Name	Size (acres)	Level (Depth)	Bank Structure	Type of fishing	Water Clarity
Lockwood	74	High (19 ft)	Concrete and grass	Specimen carp	Medium
High Maynard	38	High (19 ft)	Concrete	Specimen carp	Medium
Low Maynard	25	High (19 ft)	Grass	Specimen carp & bream	Medium
No. 4	30	High (19 ft)	Concrete	Trout Any method	Medium
No. 5	41	High (19 ft)	Concrete	Trout Fly only	Medium
No. 2	13	Low (12 ft)	Grass	Mixed fishery. Large carp	Turbid
No. 3	12	Low (12 ft)	Grass	Mixed fishery. Large carp	Turbid
No.1	19	Low (12 ft)	Concrete and grass	Mixed fishery. Easy water	Medium
East Warwick	43	High (19 ft)	Concrete and grass	Trout Fly only	Medium
West Warwick	34	High (19 ft)	Concrete and grass	Specimen carp bream & pike	Clear

Background levels of unionised ammonia in Lockwood, High Maynard and East Warwick were $0.05 \text{ mg NH}_3 \text{ l}^{-1}$, but levels regularly rose to $0.2 \text{ mg NH}_3 \text{ l}^{-1}$ and on one occasion the level reached $0.65 \text{ mg NH}_3 \text{ l}^{-1}$ in Lockwood. Quoted concentrations of free ammonia above which adverse effects occur in rainbow trout are $0.025 \text{ mg NH}_3 \text{ l}^{-1}$ (Alabaster & Lloyd, 1980). Between this concentration and $0.2 \text{ mg NH}_3 \text{ l}^{-1}$ the effects are sub-lethal and could include a reduction in growth rates. $0.2 \text{ mg NH}_3 \text{ l}^{-1}$ is the lowest lethal concentration for

rainbow trout (Alabaster & Lloyd, 1980). This concentration is unlikely to cause large fish kills but it is likely to increase mortality. Concentrations as high as 0.65 mg NH₃ l⁻¹ are much more likely to cause a significant fish kill if they persist over more than 24 hours.

In general, coarse fish can withstand high concentrations for a longer period than rainbow trout, although they are equally intolerant of high background levels.

Habitat

In general the reservoirs are bowl shaped with an uncomplicated shape. With the exception of the low level reservoirs and small parts of West Warwick the banks and littoral zone are clear and not lined with trees or emergent vegetation. The high level reservoirs are all of a very similar habitat type. Emergent macrophytes have not always been absent from the reservoirs and photographic evidence shows that in the past there has been a healthy growth of these plants. Their recent absence may be due to an increase in the magnitude of water level changes or increases in the intensity of algal blooms.

Fish populations

There is very little quantitative data on the fish populations, with the exception of the trout which are stocked every fortnight. The wardens thought catches of coarse fish were low and this is borne out by the fall in the number of anglers visiting the reservoirs this year. The fish that are caught tend to be large and specimen carp can be caught in most of the reservoirs along with large bream. Good bags of roach appear to be available in No.1 reservoir, but not in other reservoirs.

Much of the blame for the perceived decline of the fishery has been placed on the presence of large numbers of cormorants. There have been intermittent counts of cormorants on some of the reservoirs, most notably on No. 4 reservoir since late 1994. Although the counts are not recorded regularly there is some evidence that the number of cormorants increases dramatically in the days succeeding stocking of rainbow trout, with numbers of up to 150-200 feeding birds being estimated.

From the data provided it is difficult to quantify the impact of these birds. They undoubtedly eat trout, but how this has been reflected in the returns of trout to anglers could not be assessed because collated angler returns were not available after 1987. However, the trout fishery did report an operating profit in 1993/1994. Their impacts on coarse fish are even harder to assess. Certainly, bowl shaped reservoirs with little cover for fish make efficient hunting grounds for cormorants and the presumed structure of the fish population i.e. a lack of medium sized fish would be consistent with heavy

predation on that group. Any medium sized fish that are present appear to be most common in the low level reservoirs which are frequently coloured making foraging more difficult for cormorants.

However, other fisheries in the vicinity, such as Lee Valley Park have just as many cormorants but are still able to run a coarse fishery successfully. Although cormorants will increase mortality of fish and therefore be a cost to the fishery, it is believed that the fishery could be run successfully in spite of them.

Performance of the fishery

Records of catches and angler visits were available from 1978-1987. The quality of the records decreases with time, with better records being kept towards the beginning of the period. Despite this it was possible to extract some of the essential statistics kept for the trout fishery and there did not appear to be a decline in the performance of the fishery during this period. That is, the number of angler visits and catch per unit effort did not decline notably over the period. However, data for 1993/1994 suggests that a total of 7,906 trout anglers made visits, about half that achieved in the early 1980's.

Apart from the number of tickets sold, statistics on the coarse fishery are less well kept. There does not appear to be any decline in the number of day tickets sold between the 1980/1981 and 1993/1994 seasons, with numbers approximating 10,000 per season. However, the number of season tickets sold does appear to have declined from 1300 to 750 over the same period. This year both the number of day and season tickets sold are thought to have declined significantly.

Currently trout anglers are required to complete catch returns, however these do not seem to have been collated in recent years. Coarse anglers are not required to fill in returns and there is no data currently collected on the performance of the coarse fishery.

Stock enhancement

Records of stocking show that between 1978 and 1988 fish were stocked into the reservoirs on an annual basis. The numbers stocked were never particularly high and the sizes stocked are not reported, but this type of low level regular stocking would have helped to supplement natural production of fish. However, since 1988 the rate and numbers of fish stocked has declined dramatically, with the exception of the recent introduction of 500 carp to No. 1 reservoir in 1992. Lockwood reservoir has not been stocked since 1972. Although one might expect some recruitment from the spawning of these fish, the perceived low angler catches would suggest that this is not sufficient to maintain the quality of fishing at satisfactory levels.

The reason for the recruitment shortfall and the absence of medium sized fish is not easy to assess. It may have something to do with the cormorants or it may be the result of some resource deficiency. However, if the perception of declining fish populations and catches is correct then stocking will need to be resumed.

Recommended stock levels for these reservoirs would be between 400 and 500 lb of catchable fish per acre. There are known to be some fish in the reservoirs because anglers catch them but exact stock levels are not known and neither is it easy to measure them. To re-stock, one would need to make some assessment from the anglers catches of the existing stock and thus the stocking that is required.

The wardens collect eggs each year from some of the reservoirs and rear the resultant fry in the stew pond until they reach about 2 lb after two years when they move them to No.1 reservoir. In the 1993/1994 season about 500 fish were reared in this way. This type of activity where the natural recruitment is given a helping hand is to be applauded. Unfortunately it is currently done on a very small scale, but if it could be extended to other fish species and sections of other reservoirs it could solve a greater part of the stocking problem. It would provide flexibility to react to declines in a particular fish species or size group.

On-site management

Currently, there are three wardens on site with apparently no management structure or distinction in responsibilities. This was most apparent in that none of them appeared to be responsible for making management decisions. Whilst they had many ideas for improving or running the fishery there was no one on site to implement the worthy ones. This has resulted in the normal control, monitoring and record keeping functions ceasing to be run efficiently. The installation of a fishery manager with these responsibilities should improve the running and profitability of the fishery. If economic resources preclude such action, then a consultant employed for short periods should perform a similar function.

Facilities

The facilities provided for anglers at the reservoirs were poor in comparison to other fisheries of this size. It is recognised that this is partly to do with its geographical location and restrictions on space. However, provision of somewhere to get food and drink, picnic areas or alternative facilities where anglers can gather and talk would improve the general atmosphere of the fishery. The site itself looked untidy with a great deal of rubble and rubbish around the reservoirs. At the very least the site should be tidied up.

Discussion and recommended future strategy

Type of fishing offered

With 10 reservoirs there is an enormous amount of fishing available. Currently these are split into two distinct types; these being trout angling and coarse angling. Within the trout fishery some attempt has been made to vary the angling provided. That is, one lake has fly fishing only, another has bait fishing and the third has larger but fewer fish (Table 1). However, many of the coarse fishing reservoirs, over a period of time, have become similar in the type of fishing they offer (Table 1). That is, they are nearly all described as specimen carp and bream lakes. With such a large number of reservoirs it would be better if active management assigned a more focused type of fishing to each lake. This would have the impact of increasing variety, improving marketing potential and will give anglers a focus for their activity. Suggested uses and the stock required for each use are detailed in Table 2.

It is recognised that it is not possible to absolutely control the contents of any one lake, but by managing the habitat, stocking practices and resources available it should be possible to approach the ideal.

West Warwick, is selected as the pike lake as it has the best water clarity, which is good for a visual feeder such as the pike. In addition it has a small amount of emergent vegetation which will help the pike population reproduce and provide cover for the prey species. The amount of weed in the lake needs to be managed, as too much will result in over production of the pike and slower growth rates. Pike could be moved into this reservoir from other reservoirs, or collected from waters that do not want them.

The match and beginner lakes could both equally be installed in No.1, 2 or 3, because of their size and accessibility, but No.1 is selected as the match fishery because it is already pegged and has one straight and relatively uniform side, giving each angler a more equal chance. This would leave No 2 & 3 as the junior/beginner lakes. The smaller size of fish necessary for this type of fishing will be better protected from cormorant predation by the coloured nature of the water in them. Further, the colouration will aid inexperienced anglers approaching the reservoir without disturbing the fish.

Table 2. Suggested use for coarse fishing reservoirs at the Walthamstow fishery.

Type of fishery	Reservoir name	Fish stock
Junior/Beginner	No. 2 & 3	High stock of a wide variety of species, not many large fish
Match Lake	No. 1	High stock of roach and bream from small to medium sizes, no large fish
General Water	Low Maynard	A mixture of everything available in all the other lakes
Pike Lake	West Warwick	A medium stock of small to large pike, together with a supply of food fish
Carp Lake	High Maynard	A medium stock of mixed sizes of carp, from small to large
Specimen Lake	Lockwood	Large fish, probably carp and bream

High Maynard and particularly Lockwood are quite isolated from activity and therefore might be more prone to cormorant predation if small fish are present in them. Therefore, these have been selected for the carp and specimen lakes, which should contain fish of a size less prone to predation from cormorants.

This leaves Low Maynard as a general lake, which would suit its accessibility from the ticket office.

Some of the charging structures will need to be altered to cater for these changes in reservoir usage.

Over a period of time, these suggested uses can be adjusted in response to demand and natural fluctuations in the fish populations, as detected by the recorded fishery statistics.

The trout fishery makes a smaller operating profit than the coarse fishery by virtue of the regular purchase of stock. Despite this, the cormorant predation and the poor water quality, it is recommended that the trout fishery continues

in its current state. During this period catch statistics should be collated regularly and the performance re-assessed after one year.

Performance of the fishery

Collection of fishery statistics is vital to the efficient management of the fishery since all future management decisions, from issues such as stocking to the type of fishing offered, will be based on them. This should not present a problem for the trout angling since trout anglers expect to complete such returns. It would not be possible to collect catch returns from all coarse anglers, however some information on the performance of the fishery, as well as individual reservoirs, needs to be collated. This could be done by visiting the reservoirs regularly and talking to the anglers. This is probably already being done but someone should be given the responsibility for formally recording the data on a regular basis.

Stock enhancement

There is a risk in stocking without knowing the quantity of stock already in the reservoirs, and in the case of these reservoirs there is an additional risk that stocked fish will be consumed by cormorants. However, as well as improving the performance of the fishery, the activity of stocking itself will attract anglers and will increase the marketability of the fishery. Any source of stocked fish must be checked to ensure they are disease free.

Given no constraints, a short term stocking of 100 lb per acre is suggested for the coarse fishery, perhaps initially in one reservoir to test the effectiveness of this. Preferably the stocking should be with small amounts at a time to reduce the predation threat from cormorants. The rate of stocking of other reservoirs can be adjusted in the light of this experiment.

Longer term, the increase in facilities for rearing fry in protected habitats, such as cages or pens is recommended. This would probably be cheaper than buying in stock.

Habitat

There is very little complicated habitat available for fish to find refuge, at sizes vulnerable to predation. It is recommended that this situation is improved by establishing some macrophytes in the reservoirs or adding reefs, possibly of hollow concrete. Materials, such as tyres, that leach toxic chemicals should be avoided for these structures.

Trees can act to break up the harsh lines of the banks, making them more aesthetically pleasing and can give anglers the impression of seclusion. It is

recommended that tree planting is extended on the banks where possible.

On-site management

It is recommended that on-site management is strengthened either by employing a fishery manager directly or by making use of a consultant's services for short periods.

Facilities

The site should be tidied and thought given to the provision of facilities for food and drink to improve the atmosphere of the fishery.

References

Alabaster, J.S. and R. Lloyd. 1980 Water quality criteria for freshwater fish. London, Butterworth.

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