

London Borough of Merton



Wimbledon Park Lake

Fish Survey and Health Check

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By



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Introduction

A.G.A Bioengineering Systems Ltd (AGA) was instructed by Martin Boyle, Manager of Mitcham Common, on behalf of London Borough of Merton (LBM) (the Client) to complete a fish survey and fish health check on the fish population of Wimbledon Park Lake (CEFAS Reg: EW014-A-274).

LBM are currently working on a long-term project which could involve de-silting Wimbledon Park Lake. The aim of the works is to gain information on the fish population found within Wimbledon Park Lake and their health. Wimbledon Park is illustrated in *Figure 1* and the lake is outlined in red.



Figure 1 Location map of Wimbledon Park Lake highlighted in red

The lake covers approximately nine hectares and is fed by streams from Wimbledon Common. The outlet feeds into the River Wandle.

1.1 Background

Prior to the survey, AGA consulted Wimbledon Park Angling Club (WPAC) to gain a better understanding of the fish stock and where they are often caught. WPAC informed AGA that there a few fish found in the southern part of the lake and also in the margins; they are often found either in the middle of the lake or along the northern bank where the public often feed the local wildfowl with bread and other foodstuff.

With regards to the fish stock, there are large carp from 10lb to 20lb, some large bream up to 6 to 7lb and some large pike up to 10lb on the public side of the lake as well as the odd tench. There may be some small perch and small roach however the population of these species which were once predominant in the lake has noticeably declined in recent years.

2 Method

2.1 Fish Survey

The fish survey was completed by netting a section of the lake using a seine net. One end of the seine net was secured to the bank and, using a pontoon and outboard, the seine net was deployed into the lake and secured approximately 20m down the bank.

The electrofishing survey technique creates an electric circuit in the water that interferes with the fish central nervous system. This stuns the fish and enables them to be scooped up using a hand net. AGA used this technique to estimate the abundance through the use of a depletion survey. A depletion survey works by relying on the concept of a constant capture effort being applied to the same population and the size reduces as the fish are caught. This is applied to the sample area on two occasions. The fish caught on the first occasion are retained until after the second capture is complete. The population estimate (N) and variance of N are calculated using the below equation

$$N = C_1^2 / (C_1 - C_2)$$

Where C_1 = number of fish caught in first sample; and C_2 = number of fish caught in second sample.

However, a two-pass depletion estimate is quite unreliable because less than 20% of the population is caught per pass.

Once the fish are caught they will be measured, weighed and scales will be taken for age analysis. The fish scales will be observed under a microscope to count the number of annuli. The growing season for fish is regarded as 1st April to 30th September. Fish that are sampled in the winter months are in a period of little to not growth and the annulus is formed (*Figure 3*). The edge of the scale is therefore the end of the previous growing season and the age is given in full years.



Figure 3 A roach scale with one annuli

The length and weight will be used to calculate the condition factor for each fish. This is used to determine the health of an individual or population of fish and can be compared over time. When the fish is heavier than its weight, it is considered healthier than if the weight is less than the length. The condition factor can be used to monitor the fish population and measure the effectiveness of management actions.

In this case, the Fulton's condition factor, k , will be calculated using the following equation:

$$K = (W/L^3) \times 100,000$$

Where W is the standard weight in grams, and L is the length in millimetres.

2.2 Fish Health Check

AGA will remove 30 fish from Wimbledon Park Lake to complete the health check. This will be completed by Ash Girdler who is recognised by the Environment Agency (EA) as a Fish Health Consultant for purposes of Section 30 of the Salmon and Freshwater Fisheries Act 1975.

There a series of factors which need to be considered when completing a fish health check. For example, mortalities could be caused from poor watery quality therefore water quality parameter should be assessed.

Observing the behaviour of the fish can reveal a lot about disease and other problems within fishery. Indicators include poor feeding response, irritation or flashing, and crowding round inlets or aeration devices.

Additional factors that should be considered including any abnormalities on the following:

- Shape
- Skin
- Scales
- Mucus
- Fins and tail
- Eyes
- Gills

3 Results and Analysis

3.1 Fish Survey

When AGA completed the fish survey, AGA caught pike, perch and tench. Eels were also seen but weren't captured. A seine net was deployed along 20m of the public side of the lake. In addition, AGA completed spot sampling in areas along the margins and in the middle of the lake. The data collected is an estimate of the fish population.

The measurements of the fish are illustrated in *Table 1* below.

Table 1 Fish survey results

Number	Fish species (common name)	Length (mm)	Weight (g)	Age (years)	Condition Factor
1	Pike (with leeches)	650	3500	3	1.2
2	Pike (with leeches)	590	3000	3	1.4
3	Pike (with leeches)	650	3500	4	1.2
4	Tench	430	116	6	0.01
5	Perch	50	6	1	4.8
6	Tench	180	95	2	1.6
7	Tench	145	47	1	1.5
8	Perch	105	15	2	1.2
9	Perch	150	55	3	1.6
10	Tench	140	40	1	1.4
11	Tench	150	56	1	1.6
12	Tench (damaged tail)	150	55	2	1.6
13	Tench	130	21	1	0.9
14	Tench	150	35	2	1.0
15	Perch	110	17	2	1.2
16	Perch	120	12	1	0.6
17	Tench	130	36	1	1.6
18	Perch	105	13	1	1.1
19	Perch	100	14	1	1.4
20	Perch (damaged tail)	100	15	1	1.5
21	Perch	95	14	1	1.6
22	Perch	85	11	1	1.7
23	Perch	105	19	2	1.6
24	Perch	90	14	1	1.9
25	Tench	125	34	3	1.7
26	Perch	95	14	1	1.6

27	Perch	95	14	1	1.6
28	Perch	95	14	1	1.6
29	Perch	95	14	1	1.6
30	Perch	100	16	1	1.6

On the first run, three pike were caught within the netted area. No fish were caught on the second run. Regardless, the equation was applied and estimated a population of three fish within 107m². When this is applied to the rest of the lake, it is estimated there is 2,523 fish in Wimbledon Park Lake.

The young fish were caught in the stands of Common Reed. Large Carp are known to be present in the lake however were not caught on this occasion. At the time of the survey, the weather was very cold therefore it is thought the carp sought deeper water.

3.2 Fish Health Check

The fish health check did not display any visual signs of bacterial or viral infection. There were no parasites or diseases of clinical significance to report.

4 Recommendations and Advice

The sample as described in *Table 1* meets the criteria under The Keeping and Introduction of Fish Regulations (2015). The fish represented by the sample examined are suitable for transfer on the grounds of disease status.

When dredging the lake, the fish population should be considered before works commence. If the lake is not drained, the fish population should be managed within a section of the lake that is separate to the works.