

Walthamstow Wetlands
Bird Monitoring Report
Year 5: April 2019 to March 2020



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London Wildlife Trust; summary

London Wildlife Trust ('the Trust'), a registered charity founded in 1981, is dedicated to protecting the capital's wildlife and wild spaces, and engaging Londoners in nature through community engagement, education, access to our nature reserves and campaigning. Our vision is a city rich in biodiversity, where all people treasure wildlife and natural spaces and where access to quality natural green space is a right for all.

Our role is becoming ever more important in a city facing climate change, economic recession and a growing population, where people are increasingly disconnected from their natural environment. The Trust has a strong history of community engagement projects that target disadvantaged groups and those under-represented in nature conservation such as mental health service users, young people, and people with disabilities.

London Wildlife Trust has been engaged since 2014 as the delivery partner for Walthamstow Wetlands.

Walthamstow Wetlands; Bird Monitoring Report <i>Year 5: April 2019 to March 2020</i>		
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Executive summary

London Wildlife Trust is currently managing the Bird Monitoring Programme, as required for the Walthamstow Wetlands project planning overseen by the partnership of Waltham Forest Council, Thames Water, and the Trust.

The Bird Monitoring Programme was originally established by BSG Ecology as part of the planning application and Habitat Regulations Assessment requirements for the Wetlands' Development Programme in 2014. It was determined that project partners should monitor the Site of Special Scientific Interest (SSSI) and Special Protection Area (SPA) designated 'key species'¹, their distribution and the disturbance caused to them as a result of increased access to the Walthamstow Reservoirs for a five-year period.

Following the start of the development phase BSG were commissioned to deliver the first three years (2015-18) of monitoring and to produce annual reports, the last of which was completed in March 2018. Prior to the completion of the BSG monitoring period, London Wildlife Trust set out methodologies in line with those used by BSG Ecology and have adopted these since April 2018.

The Trust and its volunteers have been collecting bird disturbance and distribution data and have produced reports in a similar layout to the BSG reports preceding them. Replicating the survey methodology, QGIS mapping, and report style and layout provides a more consistent and comparable data set across the five year survey period. The Trust have now completed the fifth and final year of monitoring and this report presents the data from 2019-2020 and provides comparison to the full five-year survey period. Furthermore, British Trust for Ornithology (BTO) Wetland Bird Survey (WeBS) data was analysed from nine other waterbodies to provide a London context to the populations of key species.

There are several key findings from the report that indicate the impacts from increased visitor access. Several high disturbance areas have emerged that directly affect some of the key species in the immediate short term and a population decline is apparent for over-wintering pochard.

East Warwick Reservoir recorded high disturbance at its northern tip and its southern end for the first time in this period of monitoring (2019-20). It is recommended that these areas, and the accessible pathway of East Warwick, be subject to specific visitor monitoring to obtain a better data set about its use and potential misuse. While these areas have not yet caused any apparent distributional shift of significance, caution should be applied as the high disturbance area on Low Maynard Reservoir appears to have caused a shift in the pochard distribution in that reservoir.

The breeding pochard population in Low Maynard is showing signs of re-distribution that is most likely linked to a high disturbance locations. The south-west corner of Low Maynard is in close proximity to a visitor entrance and has, in two years of survey, been highlighted as susceptible to disturbance events. Since the opening of the site, breeding pochard have shown an aversion to the grid squares in this corner, when in previous years it was a favoured location. Screening options might need to be considered in order to mitigate this change, although these would need to recognise Thames Water's operational and legislative obligations.

The past year of monitoring shows that the over-wintering pochard population has experienced a significant decline when compared to the first year of survey (2015-16) and the first year of increased

¹ Key species refers to gadwall, shoveler, pochard, tufted duck, and grey heron.

access (2017-18). This is of concern as the BTO have a Medium Alert for the species at the Wetlands and 2019-20 showed the lowest counts to date. Increased visitor access is unlikely to be the driving factor of this decline, but it is now a component of a longer downward trend on site. Efforts to mitigate losses should be made and a recommendation of introducing a new seasonal path closure has been made in this report.

This, the fifth annual bird report, closes the five-year monitoring period required by the Habitat Regulation Assessment in order to achieve the discharge of planning Conditions 20 & 21. The Trust recognises that some changes to species distribution and populations have occurred since the site opened in October 2017. However, recommendations to mitigate against these losses and changes have been made, and if implemented, could limit or reverse the negative effects. The Trust also believe that continuation of this survey is paramount and should continue for the next five years culminating in a ten-year review.

1. Introduction

1.1 Site context

The Walthamstow Wetlands project was established in 2014. Its aim was to transform a set of 10 operational reservoirs, that have national and international designations for resident and migratory waterfowl, into a publicly accessible nature reserve for people to immerse themselves in and celebrate urban nature conservation.

An application to the then National Heritage Lottery Fund to deliver the initial stages of the project was approved in July 2014, and led to a number of enhancement and restoration works, including habitat creation and access improvements. The site opened to the wider in public in October 2017 and has recently, at the time of writing, welcomed its one-millionth visitor. The project has now, in 2020, completed its fifth and final year of the development and establishment phase.

Walthamstow Wetlands encompasses Reservoirs One, Two, Three, Four & Five, East and West Warwick Reservoirs (all in the southern portion of the site), Low Maynard, High Maynard and Lockwood Reservoirs (in the northern portion), as well as tracts or edges of the Coppermill Stream, River Lee, and Lea Navigation, and a network of vegetated embankments and other terrestrial habitats – trees, scrub, grassland - covering approximately 211 hectares in the Lower Lee Valley.

The site encompasses the Walthamstow Reservoirs Site of Special Scientific Interest (SSSI), contributes towards the Lee Valley Special Protection Area (SPA), and forms part of a larger Site of Metropolitan Importance for Nature Conservation (site M071 *The Lee Valley*).²

The Lee Valley SPA is designated for its importance for overwintering waterfowl, namely shoveler *Anas clypeata*, gadwall *Mareca strepera*, but also bittern *Botaurus stellaris*. Gadwall and shoveler however, occur on the Wetlands throughout the year in varying numbers. The SSSI designation outlines the site's importance as a breeding site for grey heron *Ardea cinerea*, tufted duck *Aythya fuligula* and pochard *Aythya farina*. Furthermore, the SSSI also identified the importance of the site for post-breeding tufted duck; over-wintering tufted duck, shoveler, pochard, great crested grebe *Podiceps cristatus* and coot *Fulica atra*; and winter roosting cormorant *Phalacrocorax carbo ssp. sinensis*. The Wetlands also falls within the Lee Valley Ramsar site designated in 2000 under the Convention on Wetlands of International Importance, 1971.

Prior to opening the Wetlands to the public, BSG Ecology undertook a survey to inform the Habitats Regulation Assessment (HRA) process and to guide the planning application conditions (BSG Ecology, 2014). This initial survey was used to inform long-term patterns of waterfowl distribution on site and the seasonal access constraints (e.g. through path closures) around Walthamstow Wetlands upon opening to the public.

Walthamstow Wetlands received planning consent in June 2014, subject to a number of Conditions and sub conditions, several of which relate to ecology, and which have resulted in a requirement for monitoring of the bird community present. Predominantly these are based on the recommendations of the HRA Report.

² The boundaries of the Wetlands do not entirely align with those of the SSSI and SPA. It falls entirely within the SMINC.

1.2 Planning Conditions

Planning Condition 20 for Walthamstow Wetlands states:

'Prior to the commencement of development, a bird impact management plan shall be submitted to and approved in writing by the Local Planning Authority. This management plan will address any potential impact on birds within the SSSI, SPA and Ramsar areas resulting from visitors to the site by addressing:

- *The collection of visitor monitoring data for a minimum period of five years from the commencement of development*
- *The collection of bird monitoring data for a period of no less than five years from the commencement of development*
- *Details of the process by which bird monitoring and visitor monitoring data will be assessed by the relevant parties*
- *Details of the means by which any negative impacts will be mitigated and how any required mitigation measures will be implemented in relation to geographical location, design and timeframe factor*

The approved scheme shall be implemented in accordance with the approved details unless any variation is agreed in writing.'

Planning Condition 21 states:

'the development shall be carried out in accordance with the mitigation measures contained in the Walthamstow Reservoirs report reference 6342 01_HRA_R_020414 (Walthamstow Wetlands Bird Monitoring Report, BSG Ecology – April 2014) and the approved scheme shall be implemented in accordance with the approved details unless any variation is agreed in writing.'

In order to achieve the discharge of the planning conditions, a Five Year Bird Impact Management Plan (BIMP) was compiled (Waltham Forest Council, 2014), and submitted to Natural England and the Walthamstow Wetlands Board.

BSG Ecology were contracted to deliver the first three years of the plan, the results of which are available in the BSG Bird Monitoring Reports for 2015-16, 2016-17 and 2017-18. London Wildlife Trust adopted the delivery of the five-year BIMP for 2018-19 and it is now in its fifth and final year.

1.3 Aims of study

The aim of this report is to address Section 4 of the BIMP. To achieve this, it considers the fifth year (April 2019 to March 2020) of monitoring data and identifies whether there is evidence of:

- Any significant reduction in the extent and distribution of the habitats used by key species;
- Any changes to the structure and function of the habitats used by key species;
- Any changes to supporting processes upon which the habitats of key species rely;
- Any significant reduction in the populations of key species using the site as a result of increase recreational use;
- Any significant changes to the distribution of key species within the site as a result of increased recreational use.

1.4 Mitigating for enhanced access

Access throughout the Wetlands by visitors is passively controlled via a network of seasonal gates and footpaths. This ensures visitor disturbance in areas sensitive to the Ramsar, SPA and SSSI features during key periods of the year is avoided or minimised as best as possible. These key areas

for features of importance have been directed by the results of preliminary site surveys in the HRA Report and agreed by Natural England. Consequently, the seasonal access map has been drawn up and agreed by the Walthamstow Wetlands Board and Natural England (See Appendix 2).

The primary access path through the north of site, open at all times of the year, runs from the Wetlands' entrance gate north of High Maynard, along the east bank of Lockwood and west of Low Maynard to the entrance at Forest Road. For the south side of the Wetlands the continuation of this path runs alongside the west of the Coppermill Stream to the gate at Coppermill Lane. This also give access to the eastern bank of East Warwick Reservoir. This path is open to all site visitors, including cyclists and joggers, and is commonly used during the day as a cut-through between the reserve and sites to the north and south (such as Walthamstow Marshes).

The secondary paths are closed during sensitive periods to reduce disturbance, especially to the key species related to the sites' designations. For example, the pathway east of Reservoirs Four and Five is closed from June to November (as a minimum) to limit disturbance to post-breeding aggregations of tufted duck. All secondary pathways are walking routes only; no cycling or jogging is permitted on these paths.

A further set of paths are closed to the general public all year round, including those around West Warwick, the western bank of East Warwick and the eastern side of Reservoirs Four and Five. These paths, however, are accessible throughout the year for Thames Water and London Wildlife Trust staff to deliver work and as continued access for anglers. A limited amount of birdwatchers, through a permit scheme, also have access to these paths.

As in previous survey years and prior to the site being opened to the public, permit-holding birdwatchers and anglers are present throughout the year and have access to the whole reservoir complex. They regularly use all paths and visit the majority of the reservoirs and are not restricted by seasonal path closures. Bird watchers occurred in low numbers across the entire site throughout the year, either as individuals, pairs or when a notable bird was on site in small groups of five or more. Angler numbers were greatest around Reservoirs Two, Three, Five and Low Maynard.

Since opening Walthamstow Wetlands to the general public birdwatchers are no longer able to purchase one day permits from the Thames Water fisheries office to access the site during fisheries opening hours. They now apply to an annual permit scheme, issued by the Trust, giving them access to the Wetlands during the fishery's operational hours (07.00-sunset). Birders without permits are restricted to official Wetlands opening hours (09.30–17.00) and limited pathway access.

1.5 Changes to a long-standing birdwatching destination

There has been some understandable concern that the bird populations – and not just those relating to the designated species – could be adversely affected by the establishment of the Wetlands as a publicly accessible site. That the site would be open to the public, with an anticipated number of annual visits reaching 250,000 five years after opening in 2017, was a key consideration in the Wetlands' design and its on-going management. However, the popularity of the site after opening dramatically exceeded expectations, and the behaviours of some visitors were undoubtedly influenced by the Wetlands' initial messaging that focused on it being a newly open place to visit (but implicitly akin to a park).

The Reservoirs, however, have a long-standing place in London ornithological circles that stretches back to the early 20th century, and are justifiably cherished by many birdwatchers for the number of

bird species recorded here and the relative peace and quiet the site provided. Over 245 species have been recorded at Walthamstow Reservoirs, with 141 recorded in 2017 and 143 in 2018.

The Reservoirs are also noted for a few London 'records'; these include the first recorded breeding of little egret *Egretta garzetta* (2006), the largest flock of merganser *Mergus merganser* (1956), the longest staying black-throated diver *Gavia artica* (nine months up to June 1957), largest colony of cormorant (360 pairs, 2004), earliest arriving migrant common tern *Sterna hirundo* (9th March 1924), and first and only record of dusky warbler *Phylloscopus fuscatus* (2010).

There is a dedicated group – the Walthamstow Birders – that provide a detailed update on birds seen at Walthamstow Wetlands and environs on their website, and a number of national survey schemes are also undertaken on the site, reflecting its regional importance for birdwatching and recording. David Bradshaw, a long-standing member of the Walthamstow Birders shared these words for this report:

“Understandable concern about the impact of a large increase in visitors on bird populations was increased by the initial decision to allow unrestricted access to the entire site and failure to make clear that jogging and cycling were not permitted on the reservoirs’ banks. This led immediately to changes in behaviour with early signs that tufted ducks and shovelers were abandoning favourite locations.

This is not surprising as research has shown, for example, that birds are much less tolerant of people when they run than walk. A continuation of the initial free-for-all may well have led to damaging fall in bird numbers including those species which have statutory protection under the SSSI designation.

There was a welcome understanding from the Wetlands partners that changes had to be made. The decision to fence off areas, to improve signage so visitors understood the rules and improve policing of the site for safety reasons has been very positive. Thames Water, who financed much of this extra work, in particular deserve credit for their very positive approach to protecting the reserve’s wildlife.

The closing of No 4 and 5 in late summer, for example, now means the nationally important flock of 2,000 tufted ducks can conduct their moult, when they are particularly vulnerable to disturbance, in relative peace. Even when, as on East Warwick at the weekend, the number of visitors is high, birds can now move to the other side of the reservoir. This has helped reduce disturbance while enabling the public to continue enjoying the wildlife at the nature reserve.”

These observations reflect meetings between Trust staff and birdwatching representatives, during after the first few months of opening, and through on-going liaison, including the birdwatchers’ opportunity to input into the monitoring report for this and the previous report.

Now, in 2020, the site has been open for two and half years, and having received its one-millionth visitor, this report endeavours to analyse the numbers and, to a greater extent, the distribution of key bird species as they become accustomed to the Wetlands as a publicly accessible nature reserve. The way in which the Wetlands was originally promoted and infrastructure that was initially installed led to some usage behaviours not anticipated in the early stages. However, the liaison with birdwatchers, together with the partners’ own observations, resulted in subsequent changes to the site management, signage and barriers. This is an on-going development as the Wetlands partnership adapts to the needs of all site users.

2. Methods

2.1 Identification of focal species

The Trust has followed the methodology set out and implemented by BSG Ecology since 2015. The rationale for the determination of the focal species for the monitoring is set out in this section.

The Lee Valley SPA was designated due to its importance for three bird species; over-wintering gadwall *Mareca strepera*, shoveler *Anas clypeata*, and bittern *Botaurus stellaris*. The SPA area includes the Walthamstow Reservoirs SSSI (and hence the Wetlands).

Bittern is an occasional visitor to the Walthamstow Reservoirs; all records relate to the winter period. Regular winter roosting sites of bittern have been identified elsewhere within the Lee Valley SPA (Harris, 2006), and Walthamstow is not currently one of the regular resources used by the SPA population. As the frequency of visits by bittern is low, disturbance directly as a result of increased recreational use of Walthamstow Wetlands would be difficult to measure; it is not subject of detailed consideration in this report. Nevertheless, circumstances may change in the future which would require its monitoring.

The other two SPA citation species – gadwall and shoveler - do occur with regularity, and detailed consideration is given to data collected with regard to them.

The SSSI citation lists several further bird species that meet thresholds of national importance, or for which the site is notable, namely:

- Breeding grey heron *Ardea cinerea*
 - A heronry survey was conducted by BSG Ecology in 2013 (Walthamstow Wetlands Bird Monitoring Report BSG Ecology, 2013) which identified that grey herons within the heronries did not show any reaction to people on the banks and that the majority of herons foraged off site. It was therefore considered that detailed monitoring of the grey heron population was unnecessary.
- Breeding tufted duck *Aythya fuligula*
- Breeding pochard *Aythya farina*
- Post-breeding tufted duck
- Overwintering tufted duck, shoveler, pochard, great crested grebe *Podiceps cristatus*, and coot *Fulica atra*
 - Although both over-wintering great crested grebe and coot were identified within the SSSI citation and are present on site in large numbers, neither occurs in nationally important numbers (i.e. over 1% of British population), and baseline work had not identified any evidence that either species were particularly affected by periodic disturbance at the site. They are therefore not considered focal species.
- Winter roosting cormorant *Phalacrocorax carbo ssp. sinensis*, *carbo* and hybrids
 - Although winter roosting cormorant is identified within the SSSI citation and the species is present on site in large numbers, it is not currently deemed of conservation concern. It was therefore considered that detailed monitoring of apparent effects on cormorant was unnecessary.

Therefore the focal species for monitoring considered in detail in this report are:

- Breeding tufted duck, gadwall, shoveler and pochard

- Post-breeding (moulting) tufted duck
- Over-wintering gadwall, shoveler, tufted duck and pochard.

2.2 Field survey

The monitoring methodology is based on the approach set out in the discharge of condition 20 (see 1.3) and is the same as that undertaken for Years 1-3 (2015-18). This ensures that ornithological data are being collected in a consistent manner as best possible, and direct comparison of bird distribution within the area is possible minimising bias.

Data are recorded using a grid system (see Figure 1a & b), and consistent basic information is collected during each monitoring visit. The survey area includes all the reservoirs within Walthamstow Wetlands (see Figure 1). The grid system consists of a 50 x 50m digitised grid of the survey area created using QGIS. Each reservoir has been assigned a letter code with all component grid squares sequentially numbered in rows from the north-west to the south-east corner to enable standardised recording and distribution mapping of bird species. This is consistent with that undertaken in the baseline survey.

The order in which the reservoirs are surveyed is varied so that each one is not always surveyed at the same time of day. Monitoring is undertaken during the Wetlands opening hours for public access (09.30-17.00). Where possible one survey per month is undertaken during weekend days to capture a full representation of how the birds respond to the Wetlands' visitors and activities. Visitor numbers are generally higher at weekends than mid-week. The aim of this is to give information on any response of waterfowl to the presence of larger groups using the designated access paths. Effort is also taken to carry out the surveys during a range of different weather conditions, although conditions that made recording problematic or inaccurate (e.g. prolonged heavy rain, snow, dense mist or fog) were avoided.

Two visits are made per month. During the first visit of each month all waterfowl species are counted (as individuals) and mapped using the grid system, including those using islands and the immediate shoreline.

On the second visit of the month a targeted disturbance monitoring survey is undertaken. A full count of all waterfowl species is carried out whilst also recording disturbance events. This enables a more detailed understanding of how visitors may be disturbing the range of waterfowl present, whilst still providing detailed information on the distribution and numbers of the target species.

Any recreational or operational activity or external noise is recorded, together with details of the approximate location from which it originates (e.g. the adjacent grid squares using the grid system) for all visits. Any apparent behavioural response by waterfowl to these events (including details of the species and numbers involved) is recorded using a 9-point scale:

1. No behavioural response noted
2. Bird(s) becoming alert but showing no other signs of avoidance
3. Birds swimming slowly away from the activity / moving into fringing vegetation
4. Birds swimming rapidly away from activity source
5. Birds flushing and submerging / making short flight over the water surface and resettling further from the activity source (but typically within 50 m)
6. Birds making a directional flight away from the activity source but resettling within visual distance of the surveyor

7. Birds flying a considerable distance from the activity source but apparently resettling elsewhere on the site
8. Birds making prolonged wheeling flights before (apparently) resettling on a different part of the site
9. Birds apparently leaving the site and not returning.

The cause of disturbance is recorded and classified using these terms and definitions:

Surveyor	The persons undertaking the bird disturbance survey
Angler	Persons partaking in fishing at water's edge
Visitor	Member of the public walking around the wetlands
Vehicle	A vehicle permitted to be on site, e.g. Thames Water, London Wildlife Trust or contractor's vehicle
Operations	Persons or actions relating to Thames Water operations, not in a vehicle
Cyclist	Persons on a bicycle
Jogger	Persons moving at speed, above a walking pace. Also includes running
Train	Train on railway passing through site, West Anglia Mainline or Gospel Oak to Barking line

A bespoke survey form is used for each visit to capture the above information and to ensure consistency of recording (see Appendix 1).

For the purposes of monitoring the relevant key species, the breeding season is taken as the months April, May and June; the post-breeding (moult) season is taken as August and September; and the overwinter season is taken as October to March inclusive.

2.3 Additional data

The Trust undertook additional standardised surveys to extend the research and reviewed data collected by third parties on behalf of the BTO.

A Breeding Bird Survey was undertaken during the 2019 breeding season. A transect route that incorporates all the reservoirs north and south of Ferry Lane was walked every two weeks during the months of April to July (inclusive). Birds undertaking any behaviour in relation to breeding were identified and their location was recorded using BTO species codes and additional breeding codes. The numbers of young were also recorded. The data collected during these surveys is referenced in the breeding section of this report.

A Grey Heron Census was conducted during the 2020 breeding season in line with the BTO methodology. Each of the three islands known to have breeding grey heron was circumnavigated on the nearest possible pathway and surveyors used telescopes to count apparently occupied nests (AON). Three counts were taken during the breeding months. In addition, on-site staff have been facilitating a ringing programme that requires two visits per year to the heronries, through which more accurate nest counts have been taken. Data collected during the ringing efforts have been referenced in this report.

Britain's waterfowl populations are monitored extensively through the BTO's Wetland Bird Survey (WeBS) by experienced and dedicated volunteers. The data collected is used to produce indices

and national trends which help to calculate current threshold values³. The WeBS data in this report has been used to assess whether fluctuations seen at the Wetlands are part of recognisable trends within the Lee Valley, and in addition, compared to the South West London Waterbodies SPA.⁴ Graphs were created of annual peak counts of species per site and overlaid with one another providing a graphical representation of the data that could be used to easily compare annual peak populations between sites. At the time of writing WeBS data was only available up to the year 2018.

Data were provided by WeBS, a Partnership jointly funded by the British Trust for Ornithology, Royal Society for the Protection of Birds and Joint Nature Conservation Committee, in association with The Waterfowl & Wetlands Trust, with fieldwork conducted by volunteers.

³ Under Criterion 6, (of the Ramsar Convention) a wetland is considered international important if it regularly hold at least 1% of the individuals in a population of one species (BTO, 2019).

⁴ The South West London Waterbodies, seven reservoirs/gravel pits to the south/south-west of Heathrow, form the other SPA partly within Greater London. In addition, part of the Lee Valley SPA lies outside Greater London.

3. Results and interpretation

3.1 Changes in habitats used by key species

The operational nature of the reservoirs means that water levels fluctuate according to the needs of water production and not as would be found in a naturally occurring waterbody. There were no Thames Water 'draw downs' in this survey period that had any notable impact on the key species.

There have however been new habitats created and introduced through the Environment Agency's National Environment Programme. Three large vegetated rafts have been created and anchored on Lockwood and East Warwick, four new tern rafts on West Warwick, and the East Warwick island has been re-landscaped into a wader scrape. These works were delivered by Aquatic Engineering throughout the year and are of relevance to a number of population and distributional changes in some key species.

3.2 Breeding season (April to June inclusive)

3.2.1 Tufted duck (Figure 2)

A peak count of 337 tufted duck was recorded on 26th June 2019 late into the breeding season. Most individuals on this count were males (294) with the remainder (43) females. Previous years counts range from a low of 229 in 2012 (baseline date) and a peak count of 395 in 2015. Excluding the baseline year, the average population over the five-year monitoring period is 319 tufted duck present during breeding season.

The first and last surveys of the breeding period saw high records of tufted duck with 326 and 337 respectively compared to late April to early June surveys with a peak of 174. Of the birds recorded during the breeding period 41% of those records were in East Warwick which had a late season peak of 146 on 26th June 2019. East Warwick maintained consistently high numbers throughout the season when compared to all other reservoirs. High Maynard also had consistency but with far fewer records. Reservoir Four had a peak of 90 on 26th June and Lockwood showed a peak of 69 on 16th April. Tufted duck were recorded in all reservoirs in the breeding season.

Broadly speaking, distribution of tufted duck present during breeding season has remained relatively even across the site and within the individual reservoirs. However, there are three areas that show a slight divergence in the last two years of monitoring when compared to the first three. The first two of these differences are represented by a simple reduction of numbers and, by association, distribution of tufted duck in Reservoir Two and along the eastern edge of Reservoir One. The third concerns East Warwick's southern edge. In 2015, '16 and '17 there were aggregations of records, at the higher end of their relative peak counts, in the southern corner and surrounding grid squares. In 2018 there were no records in these squares and whilst in 2019 these grid squares did hold records, they were significantly lower numerically, though there were a greater proportion of grid squares with lower accumulated records.

3.2.2 Gadwall (Figure 3)

The peak count of 35 Gadwall was recorded on 10th May 2019 made up of 29 males and 6 females. The breeding season this year had the highest peak count of the five-year survey period. The highest peak previously recorded was 14 individuals in 2015 matched also in 2017 with a low of five in 2018.

East Warwick was of significance for this species over the breeding season often holding most, if not, all the birds present during survey days and was the only reservoir to have records from each survey visit. When combined, 69% of records captured during the breeding season were on East Warwick which had a peak of 25 on 10th May 2019. The following survey, 16 days later, recorded only eight gadwall on the entire site suggesting that the birds attributing to the peak of 35 on 10th May were part of a migratory group. High Maynard had a peak of seven and the remaining reservoirs recorded three or less but with at least one record per reservoir.

This year (2019) showed the most widespread distribution of gadwall and for the first time in the five-year period birds were recorded on all reservoirs. One notable diversion from previous years is the reduction of records in Reservoirs One, Two & Three, but more specifically Reservoir Three. In 2019 there were only two gadwall recorded in this area on one survey day and in 2018 there were none. In all other years this reservoir has been of importance in relation to numbers present in those years.

3.2.3 Shoveler (Figure 4)

Shoveler were absent throughout the breeding season with the exception being the arrival of seven individuals, four males and three female, on 26th June 2019. This peak count is in line with previous years surveys showing a low of three in 2015 and a peak of eight in 2017.

Shoveler seen on 26th June were a small flock closely grouped together on East Warwick. These birds were not recorded during the surveys in July and appeared to have left the site.

Distribution of shoveler across the five-year monitoring period has remained broadly the same. Birds were unanimously recorded on the southern side of the site and were recorded most frequently on East Warwick and, to a lesser extent, Reservoir One. There is no discernible pattern to the distribution that can be attributed to the presence of visitors to the site.

3.2.4 Pochard (Figure 5)

A peak count of 110 pochard was recorded on 26th June 2019 late in the breeding season and comprised 86 males and 19 females. Previous annual peaks included a high of 115 in 2017 and a low of 69 in 2018, giving a five-year breeding period average of 93.

Pochard numbers were relatively consistent across the first four surveys until the late season increase of 58+ individuals culminating in a peak in June. East Warwick consistently had the highest numbers of pochard of each of the survey visits, having a peak of 68 on 17th June and 57% of the season's pochard records. High Maynard received 44% of the season's total records with birds present on each of the survey visits. Low Maynard, Reservoir One and Reservoirs Two & Three had 30, 33 and 34% respectively of the season's total with varying degrees of residency across the season.

Pochard on High Maynard appear to have aggregated in greater concentrations around the northern island in 2018 and 2019 presenting a comparable contraction in their distribution to previous years. In 2015, '16 and '17 pochard did congregate around this island but were also recorded using other areas either more frequently or in greater numbers. Equally the same could be said for pochard on East Warwick where a greater number of records were either on or close to (within 50m) the island in 2018 and '19. In previous years, records on East Warwick were either low (peak of 2) or showing smaller groups of records distributed round the reservoir. This also appears to be the case on the southern island on Reservoir Three. Distribution of pochard in 2018 and '19 seems to be more

restricted to the southern end of Reservoir Three with the majority of records captured within proximity to the island. In the previous years, 2015, '16 and '17 pochard did utilise the island but were more evenly distributed across Reservoirs Two & Three.

In the years 2015, '16 & '17 pochard on Low Maynard were recorded using most parts of the reservoir but there is a clear indication of favourability towards the south-western corner. This has not been the case for years 2018 & '19 with fewer grid squares recorded and an almost complete absence of pochard in the south-west corner. In 2019 eight pochard were recorded in that south-west corner but this record came from a single survey day and is therefore not a reflection of distribution across an entire season.

3.3 Post-breeding period (August to September inclusive)

3.3.1 Tufted duck (Figure 6)

The peak counts for tufted duck present during the moult was 2,255 on 12th August 2019. The peak count for males was 2,065 on the same date while the female peak count came later on 28th August with 310. Previous surveys have shown that the later arrival of females is common as their moult period is marginally later which is attributed to breeding behaviour. Peak counts from previous surveys include a low of 1,979 in 2018 to a high of 3,026 in 2015. Excluding the baseline year (2012) the average population over the five-year monitoring period is 2,644 tufted duck present during the post-breeding moult.

Moulting tufted duck were recorded on all reservoirs and as with all previous years of monitoring reservoirs Four and Five were of high value that, when combined, attributed to over 55% of the total season's records. Reservoir Four had a peak of 925 on 12th August and Reservoir Five 660 on 28th August. East Warwick, Low Maynard and High Maynard all had populations that followed the seasonal pattern of higher numbers in August and a gradual reduction throughout September. Combined, these three reservoirs attributed 34% of the seasonal total records. Reservoirs One, Two & Three and West Warwick all had low uptake in this monitoring period.

The greatest change in the final year of monitoring was the absence of tufted duck on Reservoir One with only four birds recorded on the first survey of the period. Birds were well distributed on Low Maynard, recording, at the very least, a single bird on all but seven of the grid squares. Years 2018 and '19 recorded a reduced distribution on Lockwood in comparison to previous years with arguably fewer records in the central grid squares of the reservoir.

3.4 Over-wintering period (October to March inclusive)

3.4.1 Gadwall (Figure 7)

Over-wintering gadwall recorded a peak of 92 on 13th January 2020. This represents the highest peak count of the five-year survey period with the second highest peak of 58 in 2019 and the lowest of 30 in 2017. This substantially raises the five-year average to 53.

Both High Maynard and Reservoir Five were of significance for over-wintering gadwall with peaks of 59 and 31 respectively and accounting for 32 and 31% of the season's total records. From November to February numbers of gadwall remained above or equal to the five-year average with most birds resident on High Maynard and Reservoir Five. A peak of 29 was recorded on East Warwick in proximity to the island on 14th October 2019. However, renovation works on the East Warwick island began on 15th October which caused a distributional change thereafter.

Post commencement of the renovation works, over-wintering gadwall were mainly recorded on the southern end of East Warwick, bearing similarities to the 2015 results. With this exception, the distribution of over-wintering gadwall is broadly the same across the entire five-year period. Areas of importance to over-wintering gadwall, prior to opening, continue to be of importance in all years, namely the Reservoir Five island and, to a lesser extent, the northern arm of High Maynard.

3.4.2 Shoveler (Figure 8)

Shoveler had a peak count of 133 recorded on 14th October 2019. Previous counts for the five-year period were a low of 15 in 2017 and a high of 141 on 23rd October 2018, however, it is worth noting that 199 were recorded in the baseline year of 2012.

On 14th October shoveler present on site were recorded on East Warwick (99), West Warwick (27) and Five (7). Those recorded on East Warwick were gathered on and around the island. The records for shoveler during the 2019-20 period came from a single survey date with the exception of a few sporadic records. It should be noted that the habitat renovation works on East Warwick commenced on 15th October and following the commencement of this work shoveler became largely absent from the site.

The only discernible trends across the five-year period was the use of East Warwick island and northern half of the reservoir and, to a lesser extent, the eastern island and corner of Reservoir Five. In each year West Warwick recorded shoveler in the north end with variable numbers and in some years lower numbers in the southern end.

3.4.3 Tufted duck (Figure 9)

The peak count for tufted duck during the winter period was 791 on 14th October 2019. This count is the lowest of the five-year monitoring period but in line with the baseline year (2012) count of 708. Other peaks within the five-year period were a high of 1,610 in 2016 to 1,141 in 2018. The 791 peak was recorded on the first survey of the season but declined to an average of 316 for the remaining 10 surveys.

Distribution of tufted duck was relatively even across the reservoirs with Reservoir Four gaining 17% of the over-wintering records. Close to that were East Warwick (14%), Reservoirs Two and Three (13%) and Five (10%). The remaining reservoirs recorded 11% or lower the over-wintering records.

There are two notable changes during the 2019-20 monitoring period. The first, mirroring findings from 2018-19, is that the highest peak numbers were recorded on Reservoirs Four & Five opposed to previous years' peaks, captured on the Warwick reservoirs. There is also a cluster of grid squares to the north of Reservoir Two that show the highest number of accumulated records for the season in apparent proximity to an open path. It should be noted that this corner is sheltered from disturbance by vegetation, operational infrastructure and angling platforms thereby reducing the proximity of visitor presence.

The second change is a contraction in the distribution of tufted duck in Lockwood. Birds present were rarely recorded in the interior of the reservoir and instead favoured the edges. The two most frequently recorded grid squares, indicating the highest densities, were on the mid-west bank and the northern tip of the reservoir. The reduction of tufted duck using the east bank could be caused by seasonal variation, food availability and/or weather conditions but is unlikely to be visitor induced.

as this data is in direct contrast with high density distribution in the previous year of survey, 2018-19.

3.4.4 Pochard (Figure 10)

A peak count of 58 pochard was recorded on 30th March 2020. This represents the low end of the five-year monitoring period with the highest peak of 240 in 2016. The average over-wintering population when looking at the annual peak counts is 136 birds.

There was a relatively consistent population of pochard during the over-winter period with a low of 27 on the 13th December 2019. High Maynard recorded the most consistent pochard numbers (average of nine per survey) while Reservoir One had peak counts of 23 and 30 late in the season representing 24% and 25% of the accumulated season records respectively. The most frequented grid squares were those surrounding islands in those reservoirs, though there were a few isolated exceptions. East Warwick had the next highest accumulated records at 18% with a late season peak of 16 individuals.

High Maynard is of importance for pochard, with the island and northern arm having the greatest aggregations. This is true of all years of monitoring however the overall population is in decline and more notably so since the opening of the site. This may account for the reduction in distribution in the Maynard Reservoirs. Years 2017, '18 & '19 show a reduction in records and distribution on Reservoirs Four and Five, in particular those grid squares that are within 50m of the reservoir edges. In 2015 and '16 Reservoirs Four and Five are not noted as of significance to over-wintering pochard.

The 2019-20 pattern of distribution in the northern side of the site is a close match to that seen in the 2015 over-wintering period. Aside from this, the distribution of over-wintering pochard was largely consistent over the five-year monitoring period.

3.5 Other species

3.5.1 Breeding grey heron

Grey heron was recorded on all reservoirs during the fifth year of monitoring. A peak of 17 was recorded on 26th May 2019. The lowest annual peak was 13 recorded in 2018 and the highest annual peak was 48 in 2016. In a minor divergence from all previous years Reservoirs Two and Three recorded the highest annual total of 46 whilst Reservoir One recorded a total of 15.

In addition, volunteers undertook the annual BTO Heronries Census which showed a total of 43 apparently occupied nests (AON) on Reservoirs One, Two & Three.

3.5.2 Winter roosting cormorant

A peak count of 96 over wintering cormorant was recorded on 27th November 2019. Previous peaks were a low of 90 in 2018 to a high of 322 in 2016. The 2019 peak is considerably lower than previous years though this is thought to be due to a disparity in methodologies. Birds roosting on islands were not counted in 2018 and 2019.

Cormorants are included in the BTO Heronries Census methodology and during the 2019 breeding season 193 AON were recorded by the volunteers.

3.5.3 Over-wintering great crested grebe

A peak of 53 great crested grebe was recorded on 14th October 2019. The lowest peak count was 40 in 2017 and the highest was 70 in 2016. Great crested grebes were often recorded on all reservoirs for most of the survey days.

3.5.4 Over-wintering coot

Coot were present on all reservoirs throughout the wintering period with a peak of 533 on 14th October 2019. The lowest annual peak count was 496 in 2016 and the highest was 1,027 in 2015. It remains one of the most numerous species on site.

3.6 Disturbance data

Figure 11 illustrates the disturbance events that occurred during the 2019-20 monitoring period. There were 281 disturbance events caused by stimuli including but not limited to, surveyor, operational vehicles and visitors.

The most frequent cause of disturbance was, as in all years, the surveyors' presence whilst undertaking the survey and is to be expected. Surveyors were responsible for 79% (or 222 incidents) of the recorded events, 84% of which were low level, where the response is no greater than 'birds swimming rapidly away from activity source' and typically to a distance of no more than 10m.

Of the high level disturbance events (34 incidents) caused by the surveyor only nine affected the designated species which were gadwall, heron, pochard and tufted duck; the highest of which was a single heron that made a 'prolonged wheeling flight before resettling on a different part of the site'.

The remaining 21% of events (59 incidents) were caused by vehicles (12%) of contractors, Thames Water personnel and security, visitors (5%) including cyclists and joggers, and anglers (4%). Of those 59 incidents, only seven were high level, two of which affected grey herons.

Whilst the most common cause of disturbance was the surveyor it is important to remember that a surveyor mimics the behaviour of a pedestrian visitor and should be taken as such whilst analysing the distribution of disturbance. Of the 281 incidents 104, or 37%, of total incidents occurred on pathways that are either main access routes or on routes that were open during their seasonal access period. 46 of those incidents affected designated species but only five were recorded as high level. Those were a single tufted duck that made '*a directional flight away from the source but resettled within visual distance of the surveyors*' and four herons, three of which '*flew a considerable distance but apparently resettled elsewhere on site*', and one that '*apparently left the site and did not return.*'

Disturbance events in the 2019-20 year of monitoring were distributed evenly across the site, however, there were several clusters of records that were either similar to the 2018-19 disturbance results or new findings. The south eastern corner of Low Maynard⁵ has for the second year recorded either high levels or frequent records of disturbance.

Frequent events that were low-level affected a range of species including pochard and tufted duck, and the higher level events, tufted duck and two grey heron records. For the first time there was an

⁵ The south-west corner of Low Maynard is in close proximity to the entrance/exit gate for the north side of the Wetlands and experiences high levels of use.

increase in disturbance frequency and level recorded at the south-east corner and the north-west corners of East Warwick⁶. The most frequently recorded stimuli for these events was the surveyor, though anglers and visitors did also contribute. Low-level events affected gadwall, grey heron, pochard and tufted duck; and one high-level event caused a grey heron to fly a considerable distance before apparently resettling elsewhere on site.

The distribution of events that are in line with previous years are the western edge of High Maynard which, for the fifth year, recorded high disturbance both in frequency and level, the northern tip of High Maynard and the northern tip of Reservoir Two.

Across all years there are several similarities in the data that show absence of disturbance incidents. The eastern edge of Lockwood has received only four disturbance events (2018-19) all of which were caused by vehicles. The lack of disturbance on this side of the reservoir will most likely be surveyors not walking this route due to the size of the reservoir complex. The same could be said for the eastern bank of West Warwick, though its perimeter is largely vegetated by Cyperaceae and *Phragmites* spp. acting as a natural screen reducing the likelihood of disturbance.

Another similarity is the lack of records along the central pathway between Reservoirs One and Two & Three. This pathway is walked by surveyors, so lack of disturbance may be the result of a high level of vegetative screening as was the desire in the landscaping of the site to help protect birds from disturbance.

⁶ East Warwick is a raised reservoir that is surrounded by a grass mound allowing access to a circular track for Thames Water operational purposes. This track has become an important feature of the visitor infrastructure and is frequently used by walkers and occasionally, joggers and cyclists. Signs are in place to deter the latter two visitor types.

4. Discussion

The aim of this analysis is to identify any changes in key species abundance and/or distribution and whether or not there is a causal link between those changes and the introduction and promotion of wider public access to the site.

In isolation, the results of the 2019-20 survey show only a limited snapshot of the abundance and distribution of key species and how they responded to disturbance stimuli during surveys. This discussion therefore considers all years of monitoring to provide a summary of the five-year monitoring period.

4.1 Distribution

Each of the preceding Bird Monitoring Reports concluded that there appeared to be no significant differences seen in the distribution of any of the key species when compared to its relative predecessor. The 2018-'19 report found that of the minor variances in distribution, none could be solely attributed to the presence and behaviour of visitors and, by extension, not an effect of opening the site to a wider audience.

The results from this year of monitoring are reflective and bear similarities to of each of the preceding four years independently and, in general, they all share a common distribution pattern.

However, there are a number of distribution discrepancies that could be interpreted to be indicative of a minor distributional shift of some key species when comparing pre- and post-opening years⁷. These distributional shifts were alluded to in Results and Interpretation but more specifically under sections: breeding tufted duck (3.2.1), gadwall (3.2.2) and pochard (3.2.4); moulting tufted duck (3.3.1); and over-wintering tufted duck (3.4.3) and pochard (3.4.4).

Tufted duck, section 3.2.1, showed changes in distribution in relation to East Warwick's southern edge when comparing pre and post opening years. The data show from 2018-19 and 2019-20 less occupation of grid squares in this area in relation to the population's peak counts. The cause for the lack of records in this area could be linked to visitor presence as this is adjacent to the site's most southern entrance/exit gate. Furthermore, in the 2019-20 survey this area has become an area of concern in the disturbance part of the study. The changes shown here are not of significant concern, though recommendations for mitigating accumulative affects are made in the recommendation section of this report.

Section 3.2.2, data showed that while gadwall records were the highest in 2019 and well distributed around the site, there was an absence of records in previously favoured locations. The southernmost island on Reservoir Three in the pre-opening years had recorded gadwall present during each breeding season in high densities. This is not the case for the 2018 and '19 breeding season. This location has had habitat improvement works in the form of additional silt beds designed to increase reedbed coverage of the site. The beds have some common reed but are dominated by reedmace, sedges and other wetland vegetation. It could be that this additional habitat has established sufficiently to provide isolated pools in which gadwall are able to hide and thus avoid being counted on survey days. The amount of vegetation and relative safety of the island are likely to reduce the effects of disturbance through visitor presence.

⁷ Hereafter pre-opening is taken to mean 2015 to October 2017 and post-opening October 2017-2020

The breeding population of pochard is showing some signs of a distribution shift when compared to the pre-opening years. Section 3.2.3 showed that pochard in East Warwick, High Maynard and Reservoir Three are recorded more frequently in close proximity to the islands and that their overall distribution within those reservoirs has reduced. Apparent preference for islands may not be directly linked to visitor presence. However, there are significantly fewer pochard present in grid squares adjacent to open pathways. Furthermore, there is a significant decline of pochard present in the south-west corner of Low Maynard as opposed to pre-opening years. This area is close to the entrance/exit gate of the north side of the Wetlands and has been highlighted as a high disturbance area in the post-opening years. Recommendations to mitigate this can be found in Section 4.5

Tufted duck present during the moult, Section 3.3.1, were recorded, as in all years, using all reservoirs. However, Reservoir One had only four individual records for the entire season. This is unlikely to be caused by visitor presence as the pathway on its western edge is well screened with vegetation and there is permit holder access only on its eastern edge. Changes here are most likely to be driven by other factors such as food availability or changes in water quality.

Section 3.4.3 data showed that over-wintering tufted duck are, in the post-opening years, showing a slight distributional change. In the pre-opening years the Warwick reservoirs accumulated the highest percentage of the population, whilst in the post-opening years the highest can be found on Reservoirs Four and Five. It is important to note that this percentage shift is minor⁸ but could indicate a move towards reservoirs that are seasonally closed, and as a result, have fewer visitors.⁹

4.2 Populations

Fluctuations of bird populations is an entirely natural process with any number of potential driving factors, from limited food availability to wider climatic changes or habitat alterations. Determining a causality for population fluctuations at the Wetlands is possible in some cases, such as the East Warwick island renovation in relation to shoveler¹⁰, but for most species the causes are likely to be multi-faceted and complex.

To give the Wetlands' population changes local and regional context, WeBS data collected at nine other London waterbodies has been analysed and compared to each other and the Wetlands.

Nine WeBS sites were chosen based on their relevance to populations of the key species in both the Lee Valley SPA catchment and the South West London Waterbodies SPA (SWLW). The Lee Valley sites chosen are Rye Meads, Holyfield, King George V (KGV) reservoir and Lee Valley Gravel Pits (LVGP) and the SWLW sites are Wraysbury, King George VI (KGVII), Queen Mary, Staines North and Staines South Reservoirs. The sites vary from operational reservoirs to gravel pits, concrete lined or well vegetated, open access and closed to the public. It should be noted that many sites within these catchment areas are excluded from this review, therefore the data presented may not fully reflect or illustrate trends across the entire catchment and all its encompassing waterbodies.

4.2.1 Tufted duck

Walthamstow Wetlands hosts the most significant populations of tufted duck in the Lee Valley, most of which are present during the moult period. Over the five-year monitoring period the highest annual count was 3,026 in 2015 and the lowest 1,979 in 2018. This low count was recorded during the moult

⁸ In 2019-20 Reservoir Four 17% and East Warwick 13%.

⁹ Visitors in this instance are taken to mean all users of the site and not specifically members of the public.

¹⁰ See section 4.3

in the site's first year of open access and it could, therefore, be inferred that this apparent decline in numbers was a direct result of that increased access.

In a Lee Valley context, the KGV also hosts a significant proportion of moulting tufted ducks. It too was subject to a decrease in numbers in that same 2017-18 period, though to a lesser significance relative to its average population, without the apparent pressure of increased visitor access. LVGP had a much more stable population of tufted ducks over the five-year period with a variation of around 200 individuals.

However, when looking at data collected at other London sites over a five-year period it is clear that large fluctuations in populations are not an uncommon occurrence. There are three sites in the SWLW that show a numerically similar fluctuation range without the apparent pressure of increased visitor access. KGVI, Staines North Reservoir and Staines South Reservoir have recorded decreases of between 800 to 1000 individuals from one year to the next and though this drop in figures could be down to any number of local driving factors, there have also been increases of 1000 individuals from one year to the next.

The fluctuations of tufted duck at Walthamstow Wetlands are therefore, not unique within a London regional context. However, the size of the population at Walthamstow and its contribution to the site specific SSSI are of such significance that large fluctuations seen in the post-opening years should not be dismissed as only down to natural variations. Further monitoring is required to better understand the population to ensure that these variations do not have an accumulative effect leading to a long-term decline.

4.2.2 Gadwall

Gadwall present at Walthamstow Wetlands appear to show a relative stability when compared to other key sites with a low count of 14 in 2014 and a five-year peak of 58 in 2019. In the first two years of monitoring there was a difference of 38 individuals, the largest variance in the Walthamstow population, representing a considerable number in relation to the population size.

In the Lee Valley the LVGP and Rye Meads are the most important sites for gadwall. The annual population fluctuations bear a remarkable resemblance to one another over the five-year WeBS sample period with their peaks in 2015 and low counts in 2017. Holyfield, while of less significance to the overall population, mirrors the former two sites' pattern, though the 2015 peak was proportionally greater in relation to its annual average population. 2017 appeared to be a negative year for gadwall in this WeBS sample, with three out of the five sites recording the lowest peak counts, though numbers did improve in 2018.

Similarly, the South West London Waterbodies display an overall decline in gadwall over the five-year WeBS sample period. KGVI, Wraysbury and Queen Mary reservoirs show a distinct and steady downward trend and though Staines North and South Reservoirs also show the overall decline they do so with a little more variability.

4.2.3 Pochard

Annual peak counts of pochard at the Wetlands display a high level of variability with year on year differences ranging from 135 to 76. Looking at the peak counts chronologically starting in 2014 show; 105, 240, 115, 191, and 110 in 2019. With this limited data set there appears to be a stable base population present of no less than 100 individuals that is boosted by substantial influxes every second year.

The peak counts above show annual peak counts rather than the seasonal counts that are reflective of the designated features. When looking at the over-wintering population of pochard a significant decline can be seen over the five-year period. The peak counts represented chronologically from 2015-2020 are as follows; 240, 123, 191, 69, and 58.

This short term snapshot of the over-wintering population is significant as the BTO WeBS Report Online has triggered a WeBS alert for the Walthamstow Reservoirs SSSI in relation to pochard. The current status is a Medium alert for a long-term trend of -44% taken from a baseline year of 1991-1992 to 2016-17 (BTO, 2019). This excludes the low count data recorded in the years following this BTO alert.

In contrast, the other Lee Valley sites, over the five-year WeBS period, all display a gradual increase in their respective populations.

Staines North Reservoir and Staines South Reservoir in the SWLW are highly significant for pochard populations. Between them they account for almost all of the pochard records for the five sites over the WeBS sample period. There are fluctuations between the Staines reservoirs though they sustain a relatively stable population.

It is not possible to implicate open access as causing a decrease in the over wintering populations of pochard at Walthamstow. Nevertheless, the population has shown a gradual decline from the first year of public access to well below any previously recorded levels and, as such, is cause for concern as it is direct contrast with the trends seen within the other Lee Valley sites' WeBS counts. Recommendations for mitigation of losses are made in the recommendations section of this report.

4.2.4 Shoveler

Numbers of shoveler in the five-year monitoring period have shown two significant drops in population that raise questions about the relative stability of the site's population. The highest peak count recorded for the site was captured during the baseline year of 2012. 199 birds were present and this remains far above the peaks shown for the five-year period, the closest is 141 in 2018. The 133 recorded in 2019 was an increase on years 2015-17 but the island renovations proved to be too disruptive, eliminating the possibility of larger numbers occurring. The lowest peak count was 15 in 2017 which could have been a result of the site opening in October 2017 and the subsequent influx of visitors in those opening weeks.

The LVGP hosts the highest proportion of shoveler present in the Lee Valley in each year of the WeBS sample period, but like Walthamstow Wetlands and KGV the population regularly fluctuates. Year on year differences have been as high as 165 reducing the peak of 369 in 2015 to 204 in 2016. LGVP, KGV and Walthamstow Wetlands appear to have very fluid populations of shoveler for which the cause is not yet known.

According to the BTO, the Lee Valley population of shoveler has triggered Short-term, Medium-term and Long-term High Alerts having seen a decline of -64% from the baseline year (BTO, 2019).¹¹

In the SWLW, shoveler only occur in significant numbers at Staines North and South reservoirs, between which the population has a five-year peak of 581 in 2014 and a low of 188 in 2018. Over

¹¹ Baseline year 1991-92 to current records 2016-17

the five-year WeBS sample these two reservoirs are interchangeable in their records, with peaks on one side reflected by lows on the other, though there is still a marked downward trend over the entire period.

Shoveler numbers seem to fluctuate more significantly than any of the key species in this study as is shown by the addition of the WeBS data. If the low peak count in 2017 (14) was a direct impact of increased access, the following years showed that the impact was restricted to a single year and that, with the presence of visitors, the site could still hold respectively relevant populations of shoveler. The clear and direct impact of the island renovation works may therefore be short-lived and restricted to a single year.

4.3 East Warwick island renovation

The renovation of the East Warwick island was scheduled to take place in the summer months to avoid periods of time when East Warwick is of significance to key species. However, the project was subject to lengthy delays caused by complications and difficulties in obtaining work permits, and results and implications from UXO surveys.¹² This resulted in a later start date than originally intended and Natural England assent was granted to deliver the works during a period of sensitivity. Delaying the project was not a favourable option as this would have created financial complications with the funder.

The renovation of the East Warwick island commenced on 15th October 2019, at the start of the over-wintering period. It was recognised that there would be an impact on overwintering species in the short-term, but the renovation works would, in the long-term, provide additional habitat for a wider range of species and therefore mitigate against temporary losses.

The response of most species was minor with slight distributional shifts to the southern end of East Warwick or to other reservoirs. The response of shoveler however was extreme as all 133 birds present of the 14th October left the site almost immediately, completely and for the remainder of the over-wintering season. It was hoped that birds would re-distribute around the site, possibly to Reservoir Five, where in previous years (2016-18) the peak counts were recorded. This redistribution did not occur and shoveler remained absent for the six month period across the whole site.

This year's loss of over-wintering shoveler is a cause for concern for the Wetlands and possibly the Lee Valley as a whole. Recently the BTO reported that "*numbers of Shoveler over-wintering on Lee Valley SPA have been decreasing in the short-term*" and that the declines "*are most likely due to site-specific pressures*" as this decline is in direct contrast with the long-term stability of shoveler in the Thames region (Frost, 2020).

The renovation of the East Warwick island had a substantial impact on shoveler resulting in distribution data from a single survey and not an entire season. This loss will make comparisons in future years more difficult as the 2019-20 distribution map is not representative of normal behaviour. Recommendations for future years can be found in Section 4.5.

4.4 Recommendations to mitigate against disturbance and declines

The disturbance section of this report indicates that there are three key areas where disturbance levels are high. This is both from individual high level events, and accumulative effects of frequent

¹² Unexploded Bomb Surveys; these are mandatory for the site as it was targeted during WW2.

low level events. The areas are the south-west corner of Low Maynard, the northern tip of East Warwick and the southern tip of East Warwick.

Low Maynard's south-west corner is in close proximity to an entrance/exit gate and recorded high levels and frequent records of disturbance. The data in section 3.2.4 also showed that pochard have re-distributed away from this south-west corner. The 2018-19 report suggested that screening in this area could help to reduce the disturbance impacts and this report's findings reinforce that. Options for screening this area, however, have to primarily take account of allowing Thames Water to maintain operational water supply and the physical integrity of the reservoir's banks (and the ability to inspect it) as required by the Reservoirs Act 1975. It is recognised that only measures that do not compromise this can only be considered.

The northern tip of East Warwick has, for the first year been highlighted as a high disturbance area. A single year's data is not enough to identify patterns of disturbance and therefore screening is not suggested for the moment. Understanding the visitor use of this pathway is key to determining the effects of visitor presence and should be subject to targeted visitor monitoring.

The south-west corner of East Warwick, like the northern tip, has for the first year been recorded as a high disturbance area. It too is subject to the same high-level usage by visitors and should therefore have additional visitor monitoring over the next five-year period (2020-25).

As seen in Section 4.2.3, frequent disturbance at the south-western edge of Low Maynard has led to a re-distribution of pochard on that reservoir. Particular attention should be paid to the East Warwick areas mentioned above in an attempt to recognise similar signs of re-distribution of the key species in relation to those high disturbance areas.

Section 4.2.3 highlighted the BTO's Medium Alert for pochard in relation to the SSSI and the decline seen in the over-wintering population reported as part of this survey. In an attempt to mitigate against these losses it is the author's opinion that experimental steps should be taken to provide a greater level of seclusion for over-wintering aggregations. As such, the Trust proposes that, for a test and monitoring period of no less than five-years (2020-25), a seasonal pathway closure should be introduced to the path between Low Maynard and High Maynard¹³. The closure would operate from October to April annually to cover the over-wintering period. The effects of this closure should be reviewed in 2025 as part of a 10-year review of the bird monitoring data.

The East Warwick island renovation discussed in 4.3 showed the immediate impacts of this work on the over-wintering shoveler population. This, in combination with the 2017-18 over-wintering population low of 15 individuals and BTO's WeBS Alert should be cause for concern. All efforts to avoid any non-immediate works to reservoirs or habitats used by shoveler should be paramount. The Lee Valley SPA population declines have been shown to be site specific and therefore, any additional site-specific pressures could have serious implications for the population and, by association, the Lee Valley's SPA status.

The Trust strongly recommends that these surveys and associated methodology should continue into the next five-year period. This report has shown that there are changes occurring to some populations and that distributional shifts can occur. It should be the responsibility of any organisation(s) managing Walthamstow Wetlands to ensure that those changes are not to the detriment of the waterfowl and by association, the site's designated conservation status.

¹³ See Appendix 2

5. Conclusions

5.1 Summary

The aim of this five-year study was to establish whether or not opening the Wetlands for wider access could have an adverse impact on the designated bird species that contribute to the site's SSSI status and the Lee Valley SPA (and Ramsar) status. The basis for this was set out in Section 4 of the Bird Impact Management Plan and this report addresses the key points.

There have been several changes to the structure and function of some of the habitats used by key species. Each year there have been essential maintenance works carried out by Thames Water and in the latter years of the survey period, works aimed at improving habitat availability and suitability.

Thames Water operational drawdowns of reservoirs are essential to carry out maintenance and repair works¹⁴ and the effects of these appear to be temporary. Several have occurred throughout the five-year period but aside from any immediate impact while the works are ongoing there appears to be no long-lasting effect on the bird species using them after the work has resolved.

There have been several habitat enhancements and additions over the course of the project, but most significantly in this the last year of survey. While these works had, in some cases, a clear and immediate impact on particular species and populations, it is too soon to tell what the long-term changes or benefits may be.

There have been fluctuations in population sizes for each of the key species within the five-year period, though the causes for those fluctuations remains unclear. Looking at the WeBS data it is shown that population variations are seen at other sites free from the apparent and specific anthropogenic changes at Walthamstow Wetlands.

Fluctuations seen at the Wetlands occur seasonally and annually and are broadly in line within a Lee Valley context and bear resemblance to fluctuations seen at the SWLW. Others, however, seem to be unique to the Wetlands and to coincide with the opening of the site in October 2017.

Apparent declines in populations since the site opened are not necessarily a direct impact of increased visitor access. The cause for those declines is likely to be multi-faceted and complex, and visitor presence is now a key component of those changes. However, these changes should not be simply dismissed as solely due to natural variances and some steps could be taken in an attempt to mitigate against apparent population declines, as well as maintain rigorous monitoring of both birds and people.

In particular, shoveler are experiencing significant declines within the Lee Valley SPA triggering a High Alert, and pochard declines at Walthamstow Wetlands SSSI have triggered a Medium Alert. Therefore, declines or absences in populations, like those seen at the Wetlands in the post-opening years, should be cause for concern and pre-emptive precautionary mitigations (such as additional screening) should be applied where reasonable and possible.

¹⁴ operational drawdowns have occurred throughout the lifespan of the Walthamstow Reservoir complex

Generally, the distribution of key species on site has only seen minor changes since the site opened to the public. From October 2017 onwards the few distributional changes that are apparent could be a direct impact of visitor presence as they bear resemblance to the high disturbance locations.

These areas are largely confined to the entrance gates at the south end of East Warwick from Coppermill Lane and the south-west of Low Maynard from Forest Road. There are seemingly less tufted duck using the former in comparison to closed years (see 3.2.1) and seemingly less pochard using the latter than in closed years (see 3.2.4).

5.2 Conclusions

The Trust has completed the five-year study period as required by the Habitat Regulations Assessment in order to achieve the discharge of planning Conditions 20 & 21.

This report shows that some species have been affected by increased visitor access and are associated with high disturbance areas. Methods to mitigate against these areas have been suggested in the report and should be considered by the partners for implementation to help reduce these impacts. The short-term decline of the over-wintering pochard population is a small part of a much longer monitoring period and therefore cannot be solely attributed to increased access. Steps to mitigate against the short-term decline have been suggested and if implemented the cause might be easier to determine.

Continuation of the monitoring is essential and should be continued for a period of no less than five years with annual reports being produced, culminating in a ten-year study report in 2025.

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7. Figures (overleaf)

- 1a. Grid squares used for the survey (south)
- 1b. Grid squares used for the survey (north)
2. Distribution of tufted duck present during breeding season April to June inclusive
3. Distribution of gadwall present during breeding season April to June inclusive
4. Distribution of shoveler present during breeding season April to June inclusive
5. Distribution of pochard present during breeding season April to June inclusive
6. Distribution of post-breeding tufted duck August to September inclusive
7. Distribution of over-wintering gadwall October to March inclusive
8. Distribution of over-wintering shoveler October to March inclusive
9. Distribution of over-wintering tufted duck October to March inclusive
10. Distribution of over-wintering pochard October to March inclusive
11. Disturbance events recorded during Year 5

Figure 1a; Grid squares used for the survey (south)



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LEGEND

 50 x 50 m study grid

PROJECT TITLE
WALTHAMSTOW RESERVOIRS MONITORING
YEAR 2

DRAWING TITLE
Figure 1b: Reservoirs and study grid (south)

DATE: 06.04.2017 CHECKED: PN SCALE: 1:5,000
DRAWN: COH APPROVED: OG STATUS: FINAL

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Figure 1b; Grid squares used for the survey (north)



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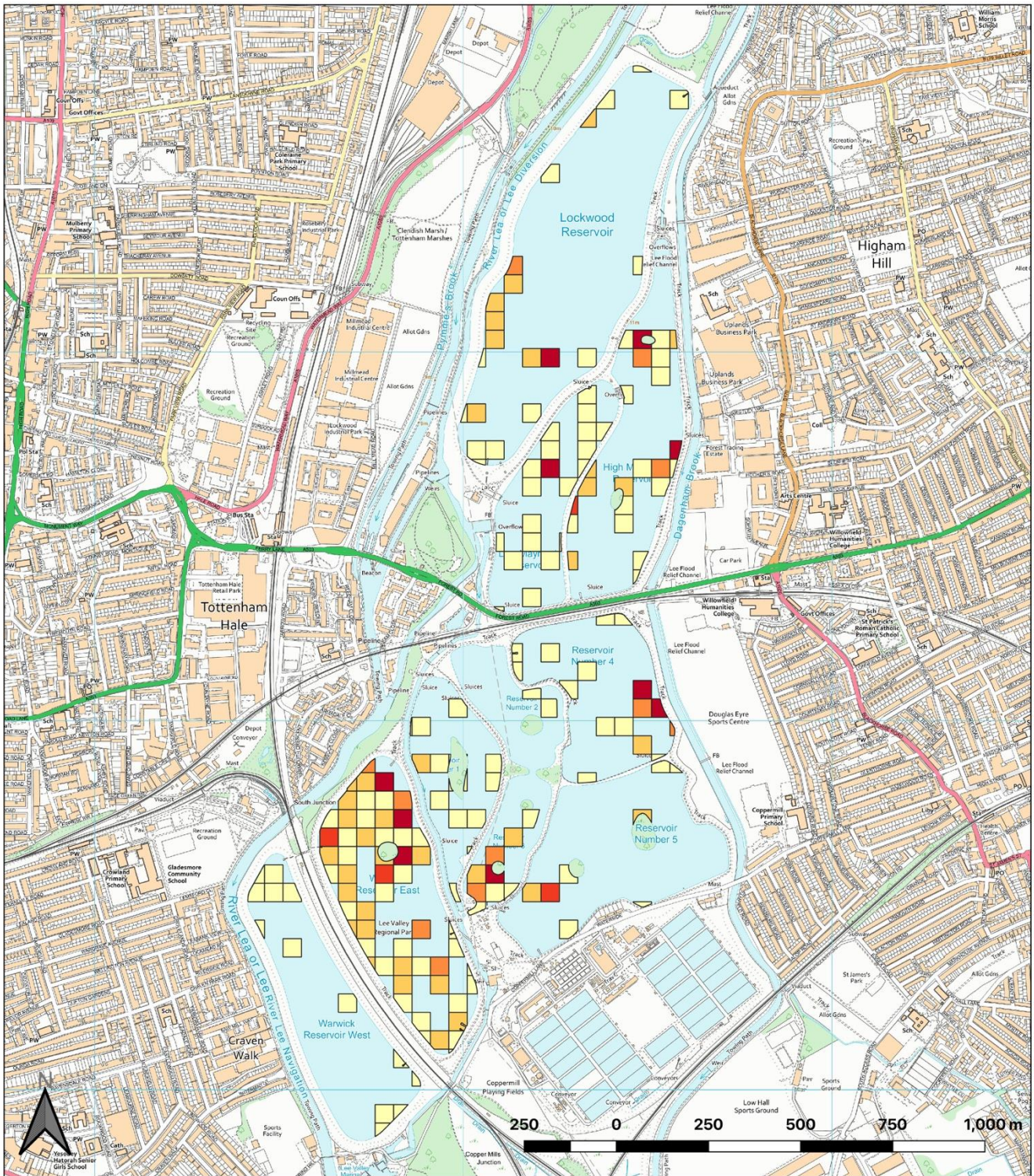
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WALTHAMSTOW RESERVOIRS MONITORING
YEAR 2

DRAWING TITLE
Figure 1a: Reservoirs and study grid (north)

DATE: 06.04.2017 CHECKED: PN SCALE: 1:5,000
DRAWN: COH APPROVED: OG STATUS: FINAL

LEGEND
50 x 50 m study grid

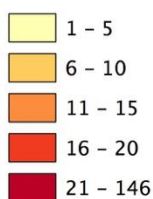
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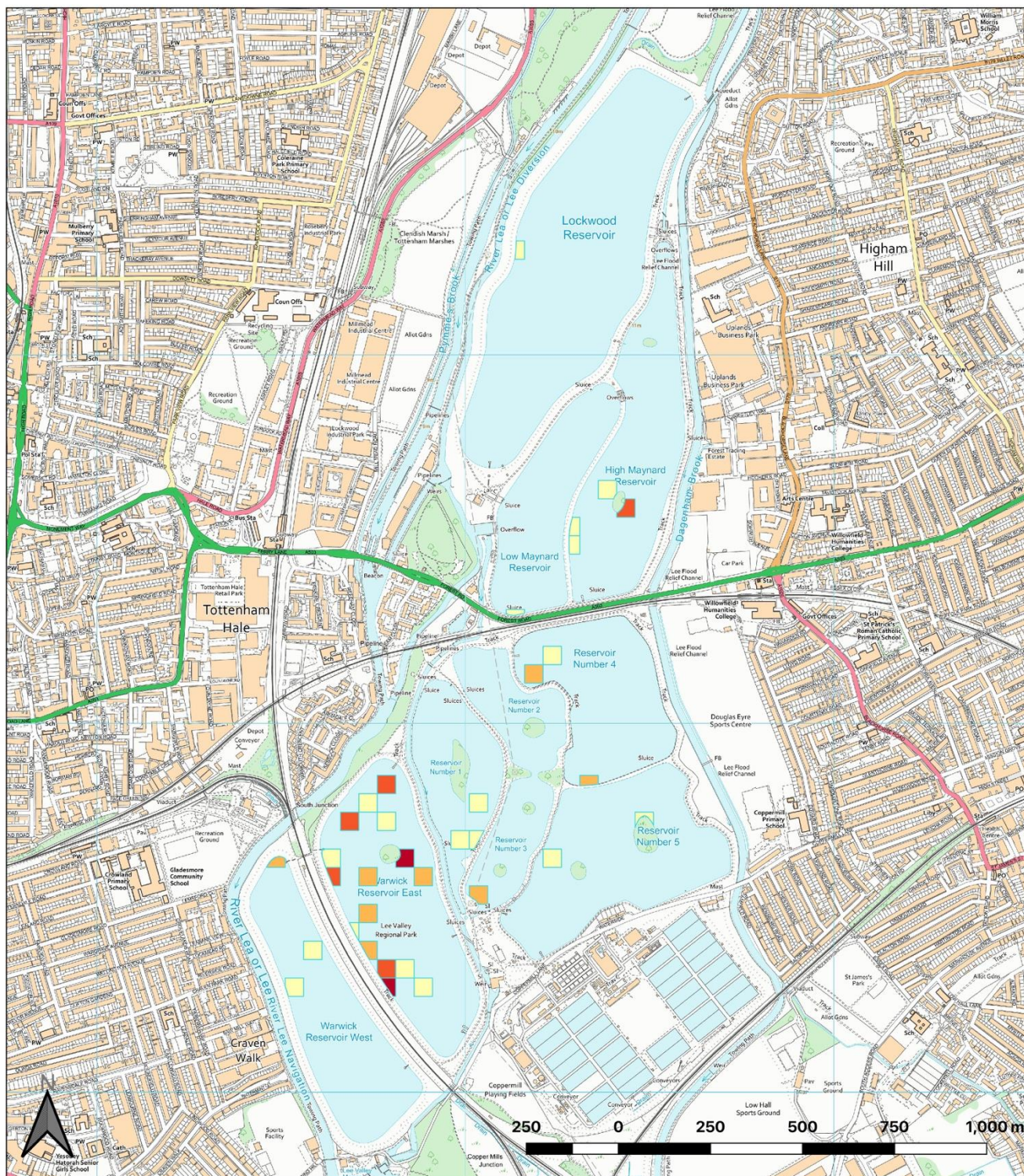


**WALTHAMSTOW WETLANDS
MONITORING YEAR 5**

Figure 2: Distribution of tufted duck present during breeding season April to June inclusive

KEY





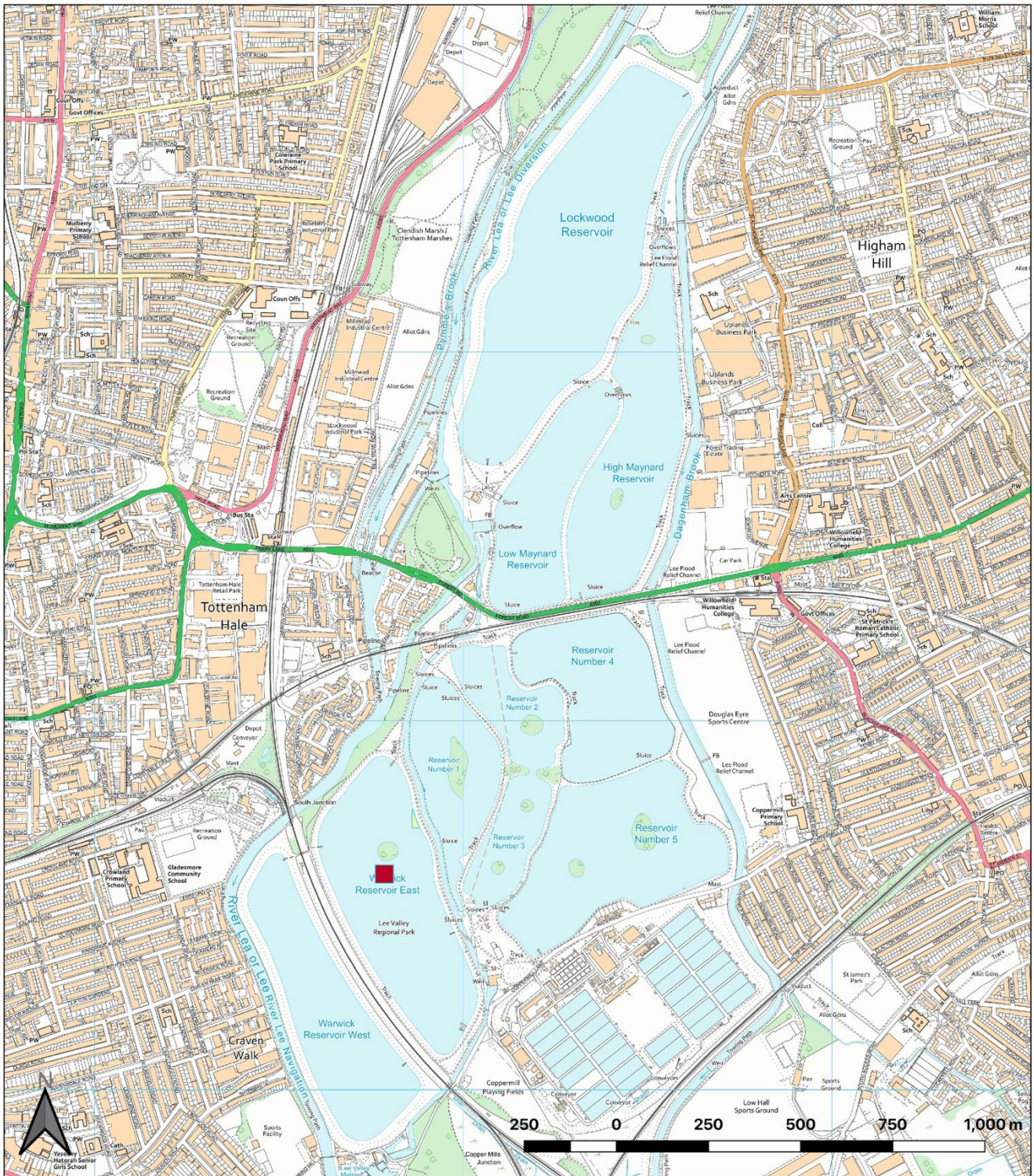
**WALTHAMSTOW WETLANDS
MONITORING YEAR 5**

Figure 3: Distribution of Gadwall present during breeding season April to June inclusive

KEY

- 1 - 1
- 2 - 3
- 4 - 8
- 9 - 12





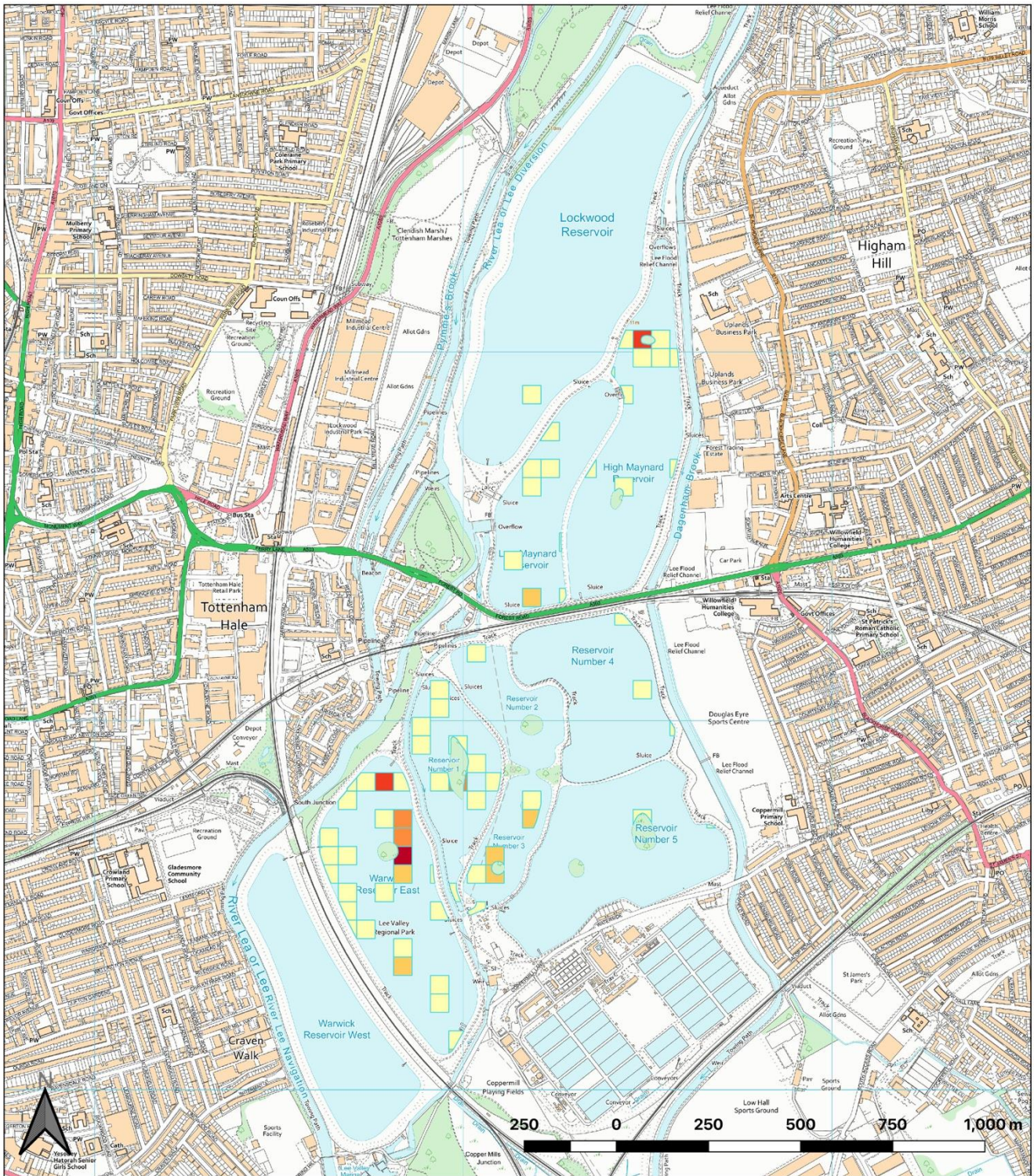
**WALTHAMSTOW WETLANDS
MONITORING YEAR 5**

Figure 4: Distribution of Shoveler present during breeding season April to June inclusive

KEY

- 1 – 3
- 4 – 5
- 6

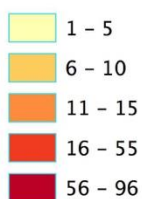


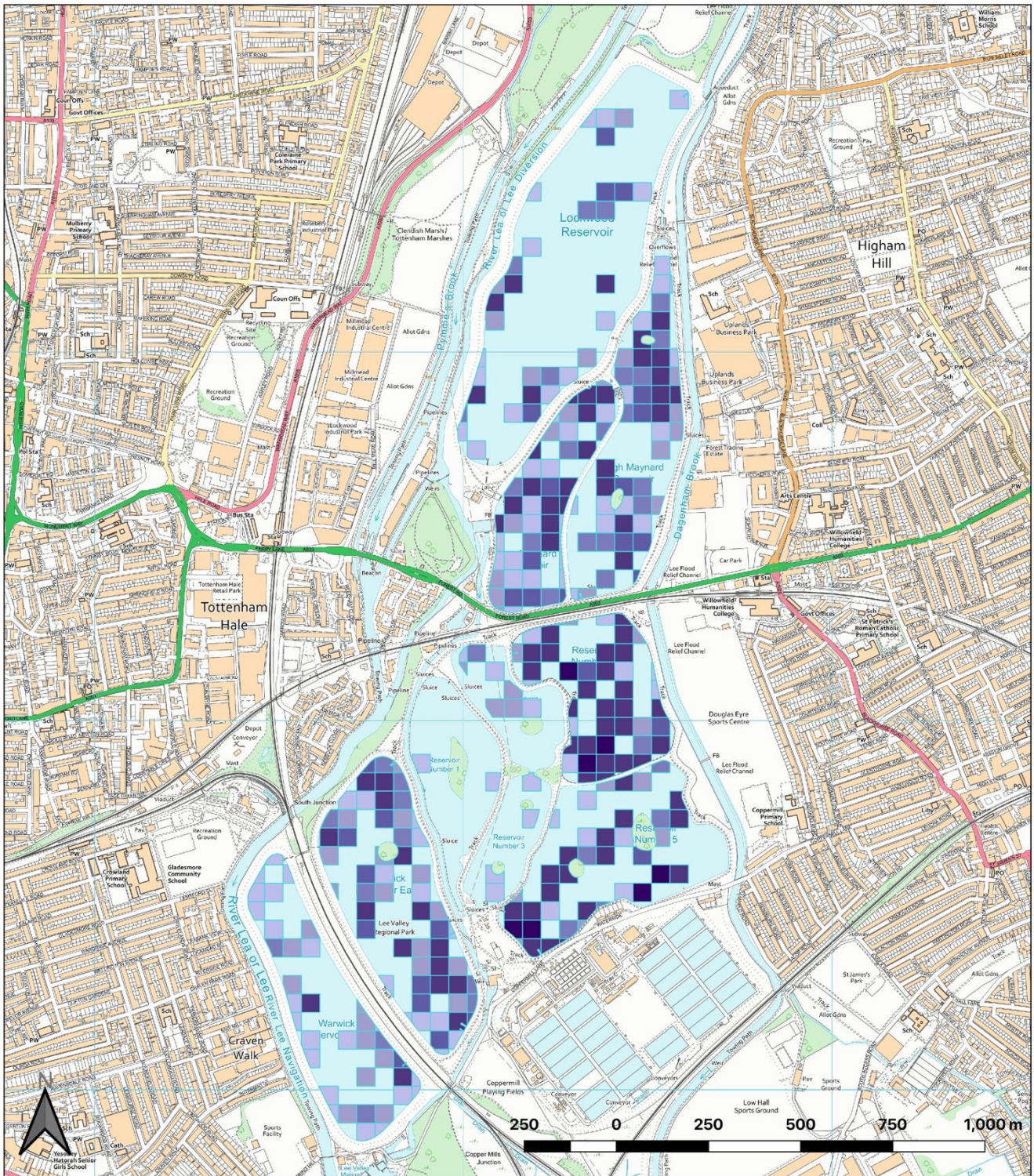


**WALTHAMSTOW WETLANDS
MONITORING YEAR 5**

Figure 5: Distribution of Pochard present during breeding season April to June inclusive

KEY





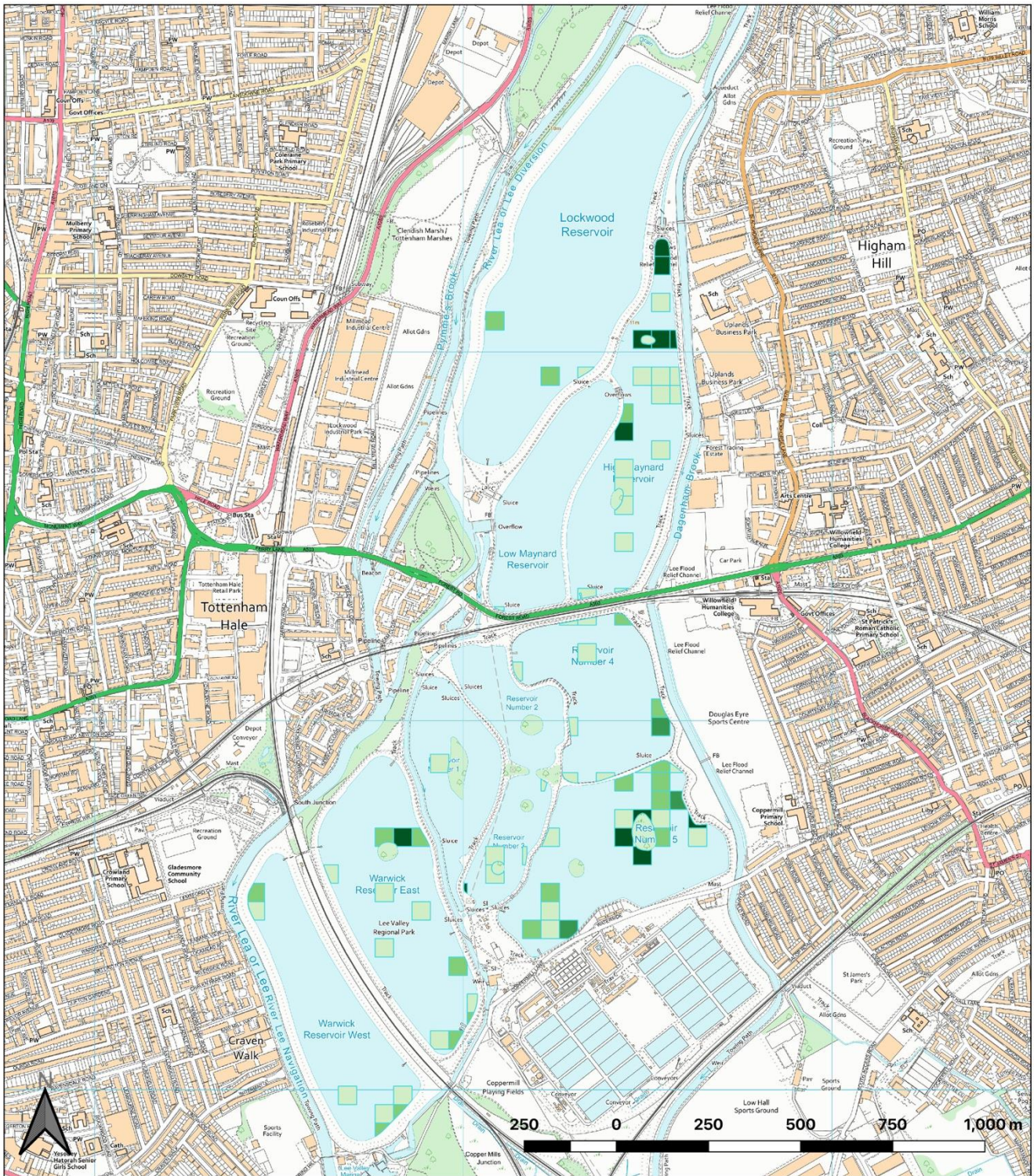
**WALTHAMSTOW WETLANDS
MONITORING YEAR 5**

Figure 6: Distribution of tufted duck present post-breeding August to September inclusive

KEY

- 1 – 5
- 6 – 10
- 11 – 15
- 16 – 20
- 21 – 125
- 126 – 200





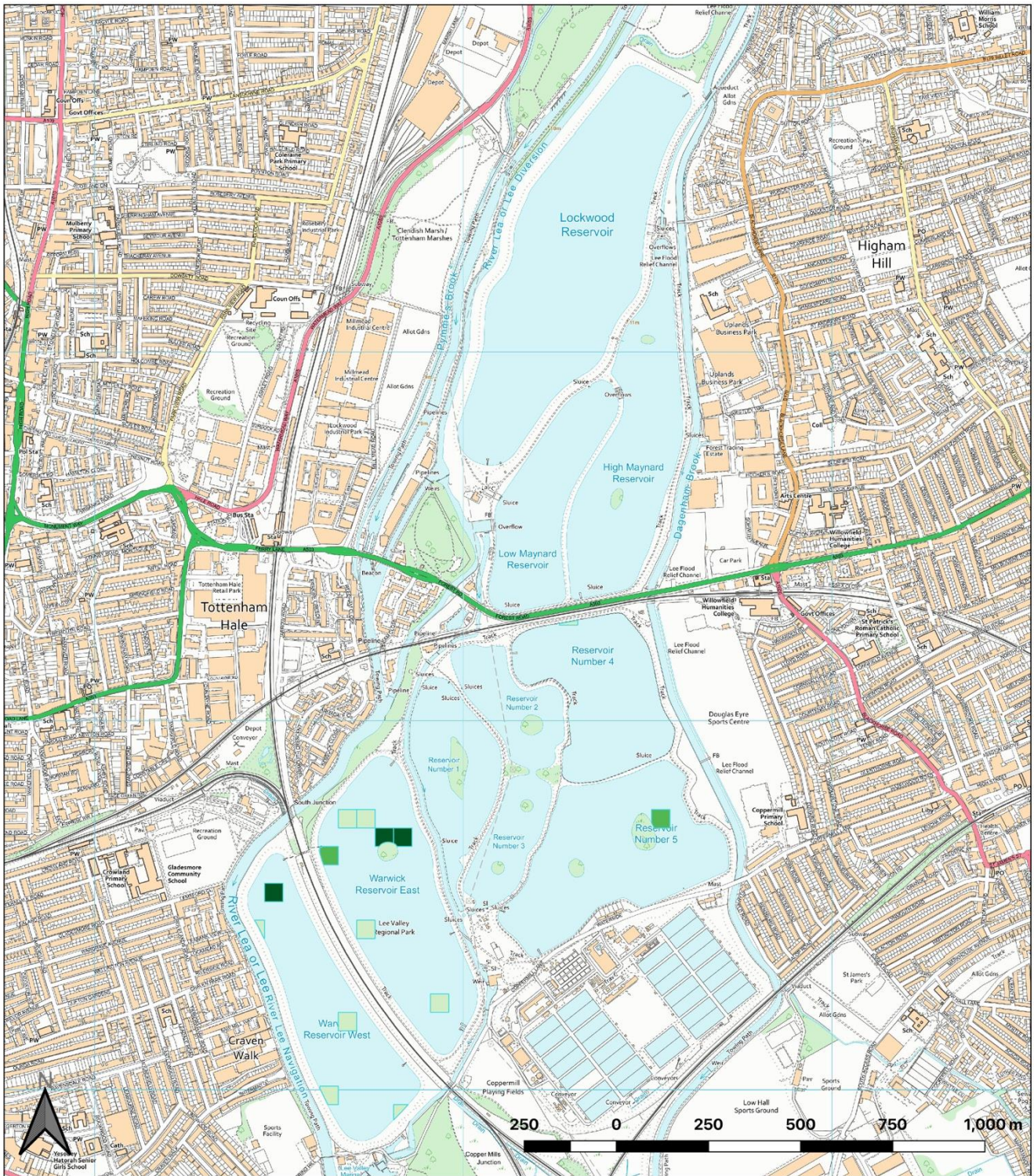
**WALTHAMSTOW WETLANDS
MONITORING YEAR 5**

Figure 7: Distribution of Gadwall over-wintering October to March inclusive

KEY

- 1 - 4
- 5 - 8
- 9 - 11
- 12 - 50





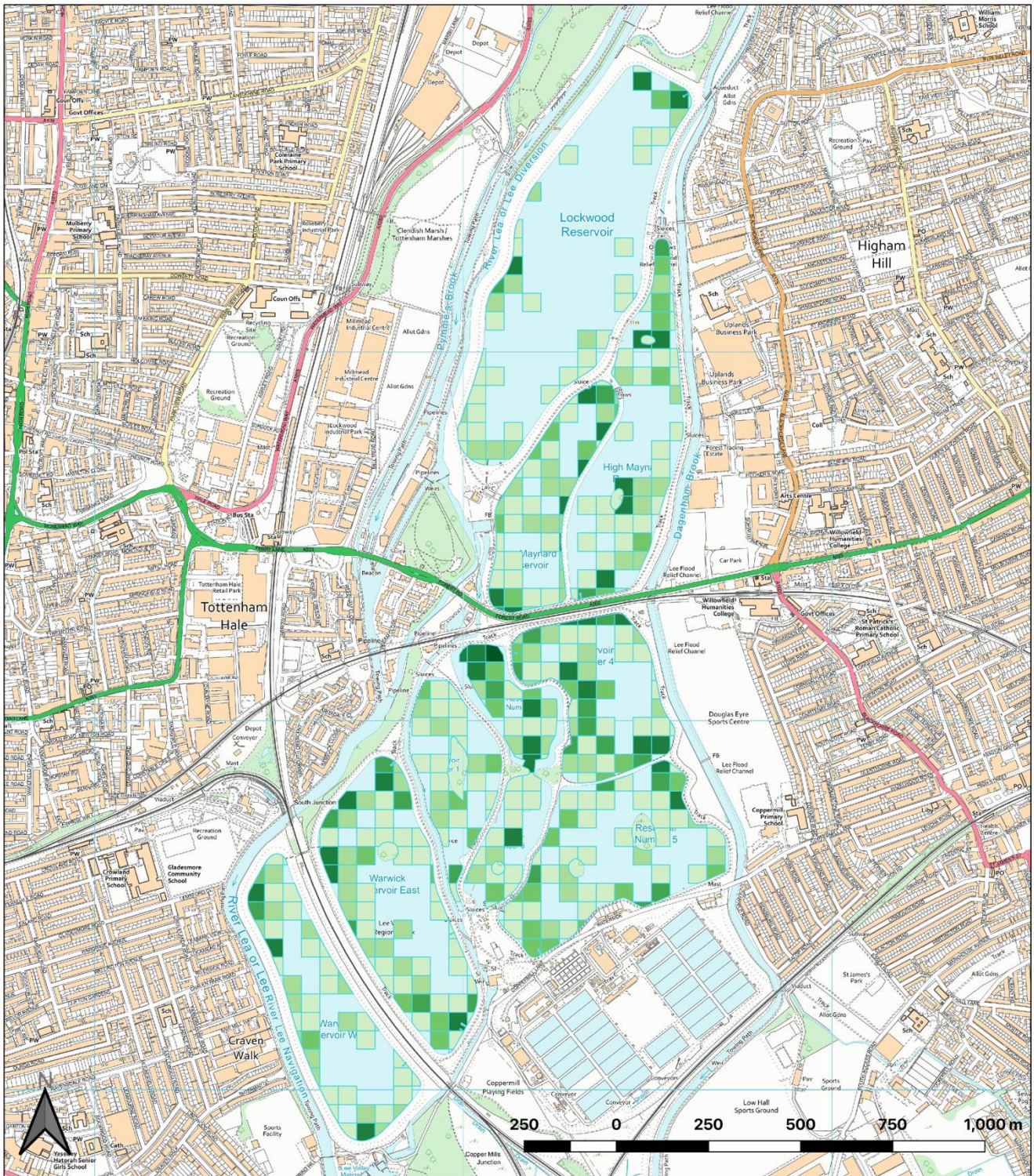
**WALTHAMSTOW WETLANDS
MONITORING YEAR 5**

Figure 8: Distribution of Shoveler over-wintering October to March inclusive

KEY

- 1 - 4
- 5 - 12
- 13 - 72





**WALTHAMSTOW WETLANDS
MONITORING YEAR 5**

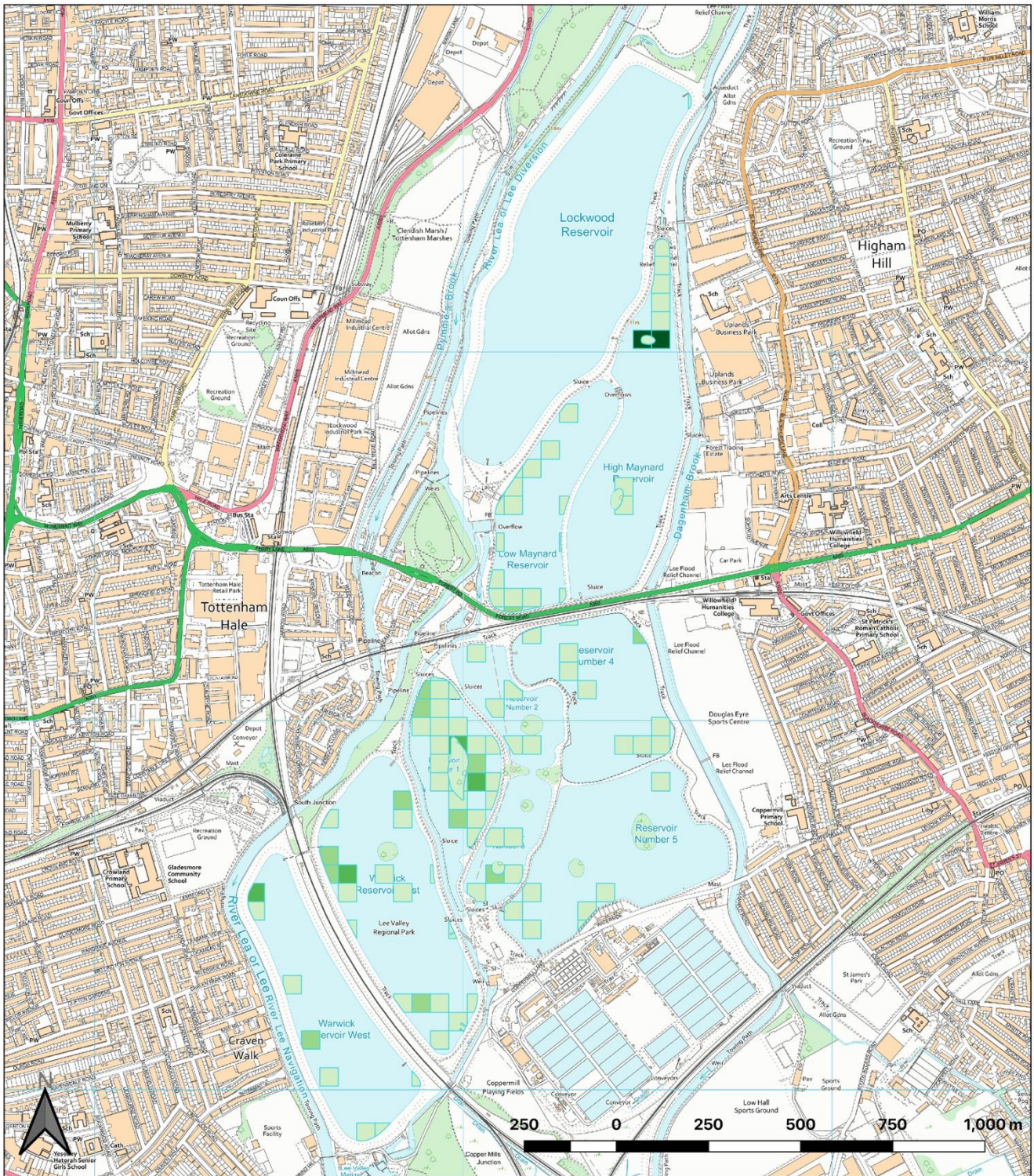
Figure 9: Distribution of tufted duck over-wintering October to March inclusive

KEY

- 1 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- 21 - 90
- 91 - 108

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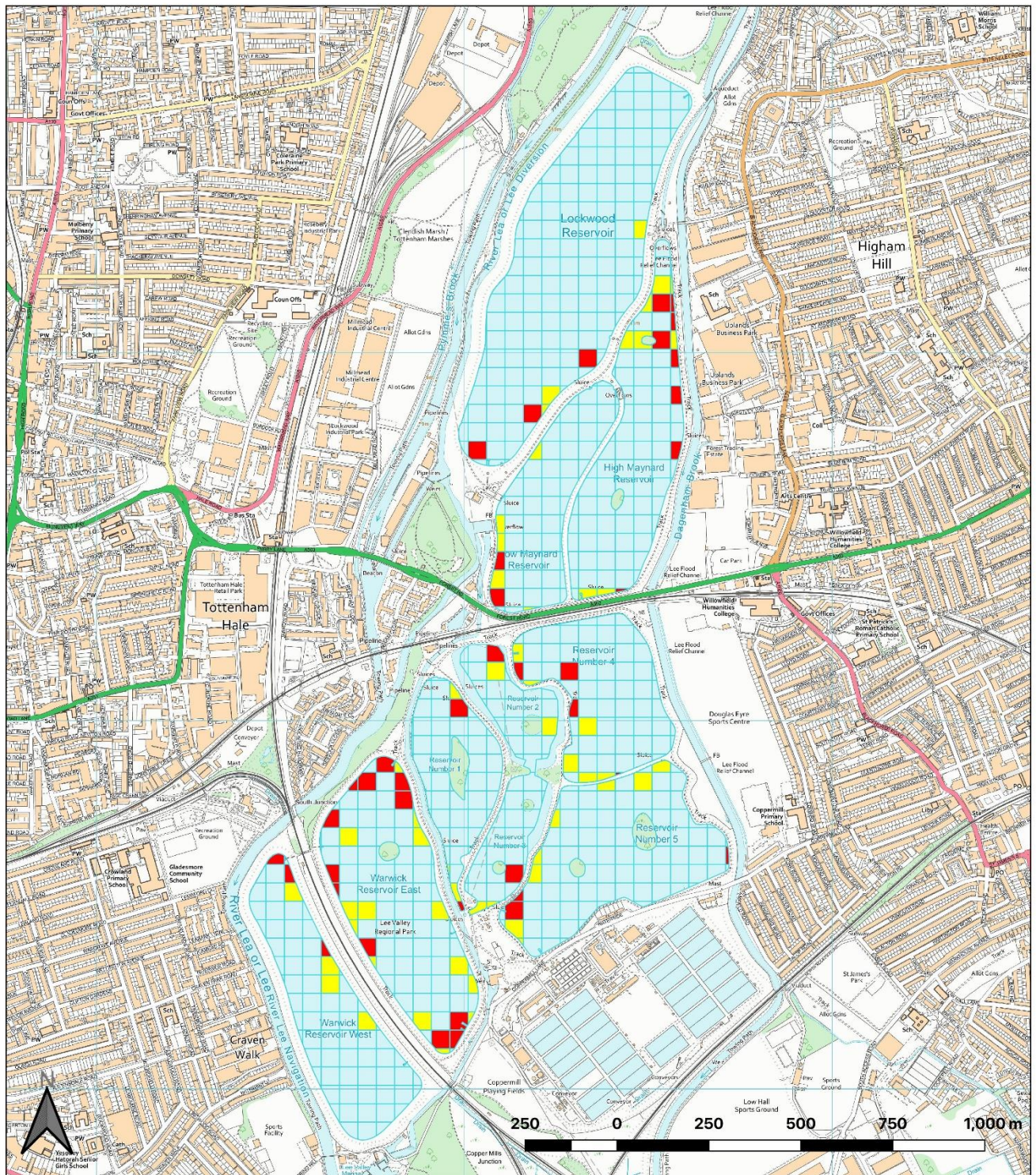
**WALTHAMSTOW WETLANDS
MONITORING YEAR 5**

Figure 10. Distribution of pochard over-wintering October to March inclusive

KEY

- 1 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- 21 - 57





**WALTHAMSTOW WETLANDS
MONITORING YEAR 5**

Figure 11: Disturbance events recorded during Year 5

KEY

- Low
- High



8. Appendices

Appendix 1: Example recording forms

Bird distribution and count survey form

This form is to be used from April to June (inclusive). For Tufted (TU), Pochard (PO), Shoveler (SV) & Gadwall (GA) please record male and female numbers in their respective columns. Do not fill in the 'Number' column for the afore-mentioned species as this will be done when data is digitised. Please record anglers as much as practically possible.

Reservoir Count Form (Breeding Season)																
Reservoir ID							Wind speed						Cloud Cover			
Date							Wind direction						Percentage Ice			
Observer							Precipitation						Condition of surface			
Start/end time							Temperature								Anglers	
Square	Species	Number	Female	Male	Square	Species	Number	Female	Male	Square	Species	Number	Female	Male		Square

Disturbance recording form

Reservoir	Grid Squares/ Location	Time	Species	Neutral	Neg.	Pos.	Notes/Comments

Disturbance vector definitions

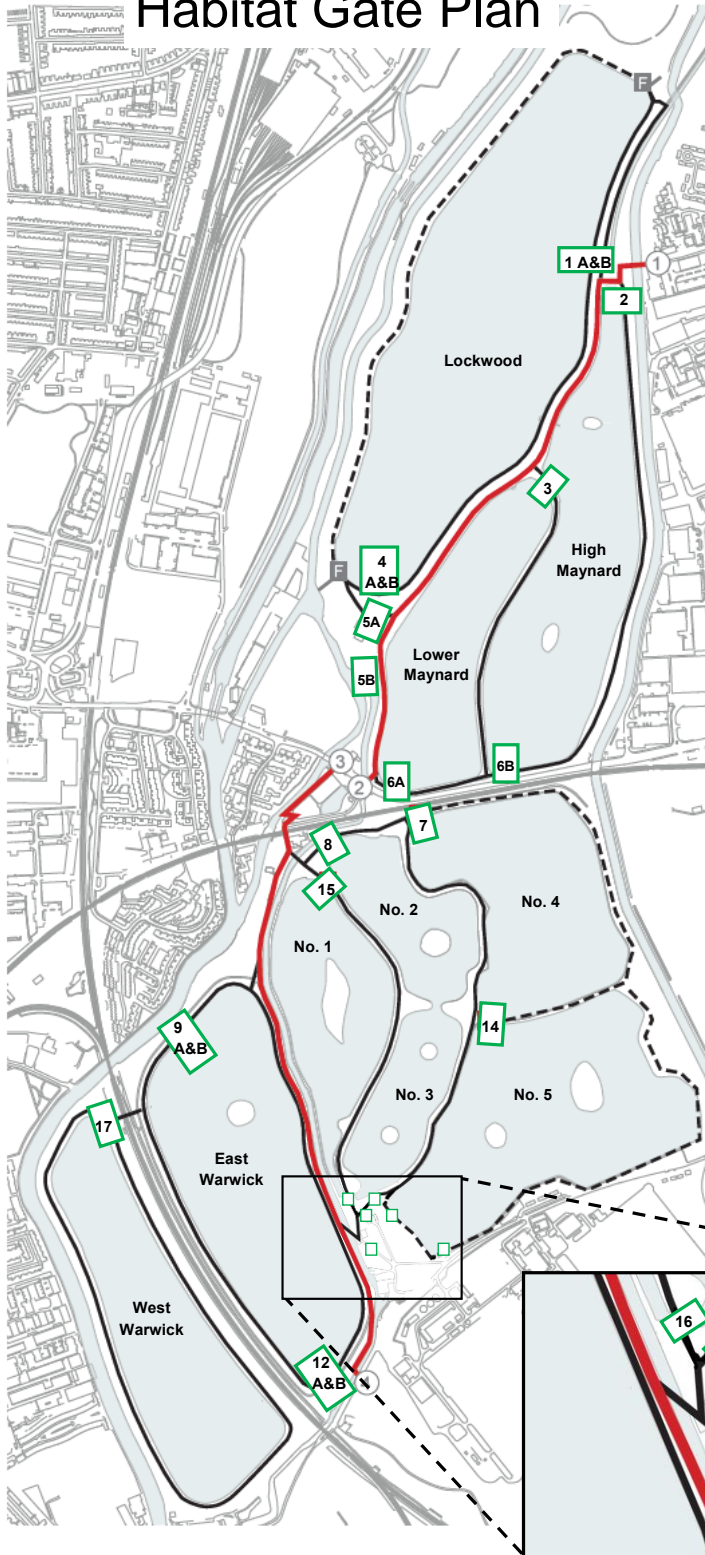
Surveyor	The persons undertaking the bird disturbance survey, generally singly or in pairs
Angler	Persons partaking in fishing at water's edge, generally occasional movement
Visitor	Member of the public walking around the wetlands, generally slow or gently paces, singly, small or occasionally large groups
Vehicle	A vehicle permitted to be on site, e.g. Thames Water or London Wildlife Trust van
Operations	Persons or actions relating to Thames Water operations, not in a vehicle
Cyclist	Persons on a bicycle, generally moving at pace
Jogger	Persons moving at speed, above a walking pace, often running.
Train	Train on embanked railway line passing through site, West Anglia Mainline or Gospel Oak to Barking line

Appendix 2. Seasonal access map 2020 onwards



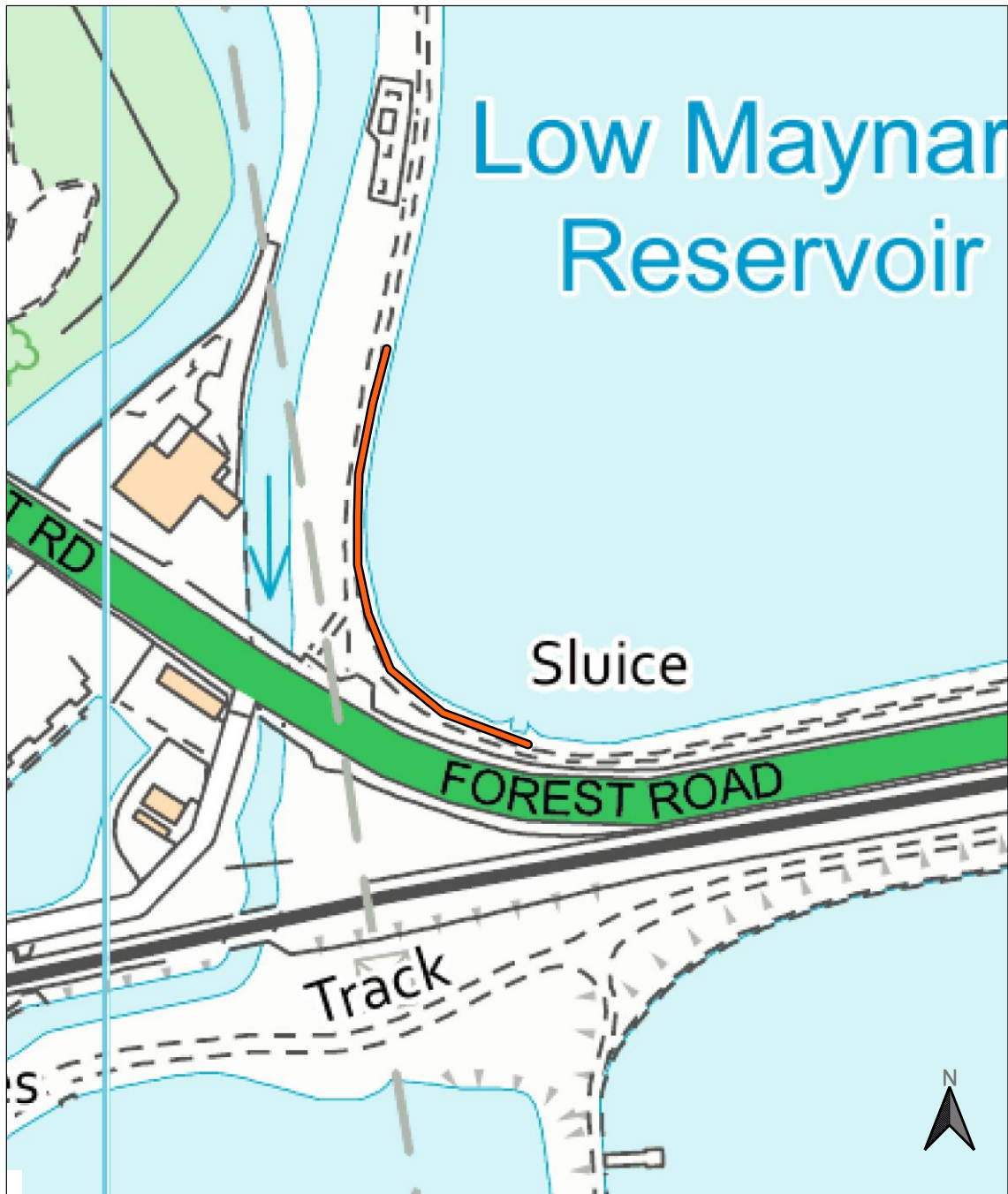
WALTHAMSTOW
WETLANDS

Habitat Gate Plan



GATE	OPEN	CLOSED
1 A & B	-	ALL
2		ALL
3	1st Apr – 30th Sept	1st Oct – 31st Mar
4 A & B	-	ALL
5 A & B	-	ALL
6A	1st Apr – 30th Sept	1st Oct – 31st Mar
6B		ALL
7	-	ALL
8	1st Apr – 31st Jun	1st Aug – 31st Mar
9 A & B		ALL
10 A	-	ALL
10 B	1st Apr – 31st Jun	1st Aug – 31st Mar
10 C	-	ALL
11	-	ALL
12 A & B	-	ALL
13	-	ALL
14	-	ALL
15	1st Aug – 29th Feb	1st Mar – 31st Jul
16	1st Aug – 29th Feb	1st Mar – 31st Jul
17	-	ALL

Appendix 3. Mitigation recommendations

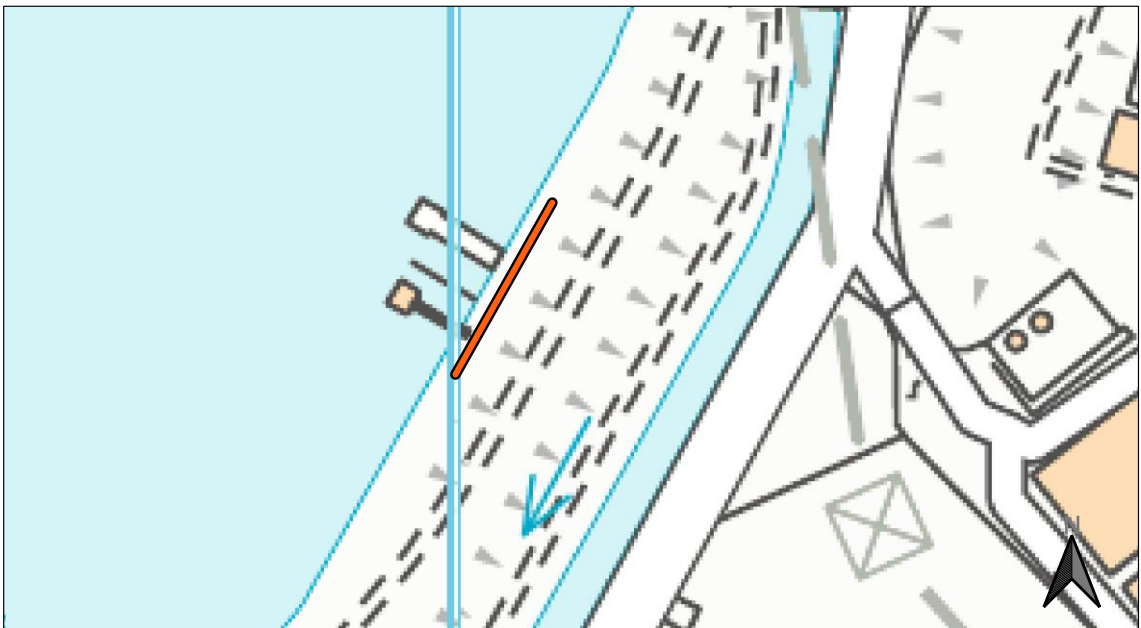
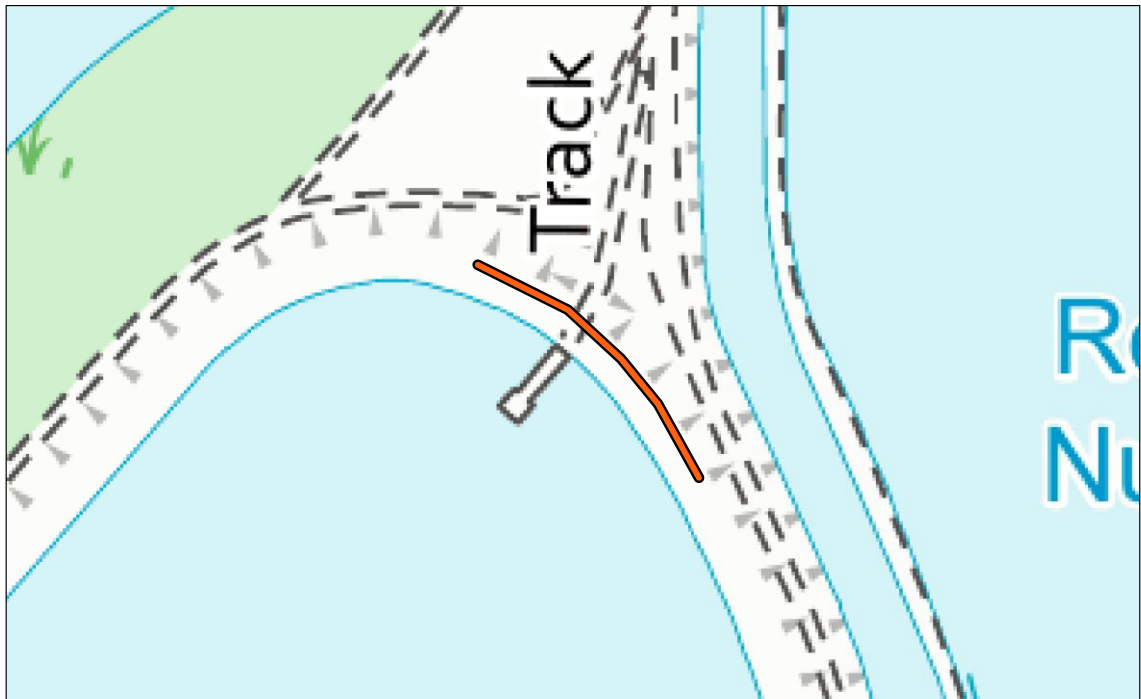


WALTHAMSTOW WETLANDS PROPOSED DISTURBANCE MITIGATIONS

Image above - Low Maynard south west corner. Orange line shows recommended screen placement.

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WALTHAMSTOW WETLANDS PROPOSED DISTURBANCE MITIGATIONS

Top image - East Warwick northern tip. Orange line shows recommended screen placement.

Bottom image - East Warwick southern bank. Orange line shows recommended screen placement.

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