LOWER MILL
COTSWOLDS

LOWER MILL ESTATE

COTSWOLD WATER PARK ECOLOGICAL MONITORING

2021 - 2022

DATE: 20.09.22 / LANDMARK REF: 3583

HABITAT FIRST

EXECUTIVE SUMMARY

This report sets out the findings of ecological monitoring surveys undertaken at the Lower Mill Estate (LME) which is located within the Cotswold Water Park (CWP).

As part of the agreed Section 106 Agreement (Cotswold District Council CT.6641/J), Schedule 2 requires that the developer must undertake a series of audits to ". measure the success or otherwise of the implementation of nature conservation control and mitigation measures".

This report presents the findings of the monitoring surveys for the period 2021 – 2022 and the results are summarised below:

Wintering Waterbirds

Twelve surveys were carried out (bi-monthly) between October 2021 and March 2022. The peak count overall for the five priority species was 518 on visit 4 in November 2021 which was a significant increase on the numbers from last year where a peak count of 291 was recorded and back in line with the 2018/19 with a peak count of 525. The Priority species for these surveys are Coot (*Fulucia atra*), Gadwall, (*Anas strepera*), Great crested grebe (*Podiceps cristatus*), Pochard (*Aythya farina*) and tufted duck (*Aythya fuligula*).

Compared to the previous winter, the mean count for the total water bird assemblage increased significantly from 527 in 2020/2021 to 780 this winter. Most species had increased on the 2020/21 survey; of particular note was the increase in Coot, Gadwall, Wigeon (*Anas* Penelope) and Goosander (*Mergus merganser*).

The peak count for the total water bird assemblage (excluding gulls) was 978 on visit 7 on the 13th January 2022, which is higher than the peak recorded last winter of 803 which was recorded on the second January 2021 visit.

Breeding Waterbirds

Lower Mill Estate

Five monthly surveys were carried out between April and August 2021. Overall, the number of waterbirds breeding at LME appears to be stable, although there is fluctuation from year to year with a minimum number of five species in 2003 and a maximum of 14 species in 2011. The total number of species regularly breeding dropped from a peak of 14 in 2011, to a consistent level of 10 species in 2016, 2017 and 2018. This then decreased to nine in 2020 with a slight increase to 12 recorded in 2021. The additional species this year were Greylag goose (*Anser anser*), Canada goose (*Branta canadensis*) and Gadwall.

Between 2007 and 2021 the number of species has varied between five and fourteen. Based on the annual totals since 2007 most species appear to be in overall decline, this could be because more lakes have been created across the Cotswold Water Park thus increasing overall habitat in the area and reducing species numbers at Lower Mill Estate. However, in 2021 trends for all species remained the same as in 2020. This is despite Coot and Mallard (*Anas platyrhynchos)* numbers being higher this year as well as the total number of species, and the total overall numbers also being higher than 2020. This shows that numbers are now starting to stabilise and increase.

Swillbrook Lakes

The overall number of waterbird species breeding in swillbrook lakes has increased this year with ten species being recorded compared to nine recorded last year. Graylag goose was confirmed as breeding this year but were absent in surveys last year.

Breeding Terrestrial Birds

The terrestrial bird surveys were undertaken in two parts: LME and Swillbrook Lakes (SWBL). Both areas were surveyed on the same visit, but for consistency with previous reports the results have been separated.

Lower Mill Estate

The number of species confirmed as breeding has increased in 2021 from 17 species last year to 19 species this year. Including probable breeders this is from 22 to 23 species. The total number of territories held (including confirmed and probable) was 132 last year and 187 this year.

A possible breeder in 2021 that did not breed last year was green finch (*Chloris chloris*). Unlike last year, Kingfisher (*Alcedo atthis*) did not appear to breed in 2021.

Dunnock (*Prunella modularis*), Chaffinch (*Fringilla coelebs*) and Robin (*Erithacus rubecula*) all had increases in numbers in 2021. However, over the whole time of the surveys they still show a declining trend. Goldcrest (*Regulus regulus*), Goldfinch (*Carduelis carduelis*) and Song thrush (*Turdus philomelos*) have gone from an increasing trend to a stable trend. Long tailed tit (*Aegithalos caudatus*) has gone from stable to declining. Willow warbler (*Phylloscopus trochilus*) has gone from stable to showing an increase, while. Sedge warbler (*Acrocephalus schoenobaenus*) has gone from declining to stable.

Swillbrook Lakes

The number of species confirmed as breeding increased in 2021 from 12 species last year to 14 species this year. Including probable breeders this has increased from 18 to 19 species. The total number of territories held (including confirmed and probable) in 2021 was 64. This is considerably higher than last year's total of 36, although that was Covid year.

Possible breeders in 2021 that did not breed last year were Bullfinch (*Pyrrhula pyrrhula*), Chaffinch, Whitethroat (*Curruca communis*) and Willow warbler.

Not recorded as breeding this year were Goldfinch, Long tailed tit and Reed warbler (*Acrocephalus scirpaceus*).

Blackcap (*Sylvia atricapilla*) and Wren (*Troglodytes troglodytes*) increased in numbers this year compared to 2020. Chiffchaff has gone from declining to stable.

Nightingale

The nightingale (*Luscinia megarhynchos*) surveys were undertaken in May (two surveys) 2021. No nightingales were heard during either of these surveys. Further areas of dense scrub, coppice or thicket would benefit this species.

Reed Bunting

Seven individual sightings and five territories of Reed buntings were recorded. The sightings and territories were spread across LME with no particular concentrations of sightings. Reed bunting (*Emberiza schoeniclus*) were recorded in Swillbrook Lakes again this year. Overall, there were more sightings, and more territories recorded this year than in 2020.

Reed Warbler

Reed warblers were recorded around Somerford Lagoon with one probably territory on Clearwater Lake. Three individual sightings and five confirmed territories were recorded for Reed warbler, both of which are the same compared to results from 2020. The next surveys are planned for spring and early summer 2022.

House Martin

Forty occupied nests were recorded in 2021 which is an increase to the number of nests recorded in 2020 (29 nests). However, the number of apparently occupied nests decreased by more, leading to an overall decline in numbers. The number of apparently unoccupied nests also declined significantly. There is a suggestion that the change in surveyor might have led to a difference in survey technique and therefore a difference in count data.

Evidence from a variety of other sources suggests that as with 2020, the number of House martin (*Delichon urbicum*) reaching the UK declined significantly, perhaps by 50%.

Tern Rafts

It was difficult to count birds on the tern rafts as the sides were very dirty. On Raft 1 in Somerford Lagoon three to five pairs of Black-headed gull (*Chroicocephalus ridibundus*) were recorded, raising five young. On Raft 2 in Flagham Fen, one pair of Common tern (*Sterna hirundo)* were recorded, raising two young and two pairs of Black-headed gull were recorded, raising two young. On Raft 3 in Swillbrook Lake, two pairs of Common terns were recorded, raising two young and, two pairs of Black-headed gull were recorded also raising two young.

Bats

The three bat lofts at Clearwater, Howell's Mere No.1 and No.2 were surveyed for the presence of bats. No evidence of use by bats was recorded during the surveys. Previous *ad hoc* use has been recorded in 2015 and 2016 in the two Howells's Mere buildings but bat evidence has yet to be recorded in the Clearwater bat loft. No evidence of use by bats was recorded in the bat boxes under the bridges at location 2 and 3, with bat box 1 unavailable for survey.

Brown Hairstreak (*Thecla betulae*)

A total of 164 eggs were found across Lower Mill Estate which is an increase of 29 more than last year. The hedgerows along the edge of Swill Meadow were searched with 100 eggs recorded but more were likely to be present. An additional five eggs were recorded beside the picnic table on Swill Meadow, 15 in the field immediately east of there, then 44 in the big field further east that abuts the county boundary. All eggs were in Gloucestershire, with Lower Mill Estate being one of only two confirmed sites for the butterfly in that county. In addition, a very good number of eggs of the Blue-bordered Carpet (*Plemyria rubiginata*) were also recorded. Blackthorn is now incorporated into all hedgerow mixes in the development so it is hoped that the Brown hairstreak population will eventually spread through the developed areas too. Surveys are due again in 2022.

Amphibians

Four surveys were undertaken between April and June 2021 using three survey methods. Great crested newts (*Triturus cristatus*) were recorded in four ponds during the amphibian surveys with populations recorded in ponds A, 8, 10 and 11. A good diversity of amphibian species were present throughout the ponds. Lower numbers of Common toad (*Bufo bufo*) were recorded but the majority of frogs and toads may have completed their breeding cycle prior to the commencement of surveys. Common toads are usually found in good numbers across the Estate.

Odonata

The same 11 transects as 2018 were surveyed. Some transects do not hold a lot of odonata, presumably due to habit changes as the Estate matures. The surveyor feels it is important to carry on surveying these, so the results are comparable. In total, 18 species were seen in 2021, the same as 2018. The main species being Common blue damselfly (*Enallagma cyathigerum*) although there was a significant decline in numbers recorded, presumably due to the very poor early season weather reducing numbers or making the adults much less visible. Hairy dragonfly (*Brachytron pratense*) was not recorded in 2021, whereas a single make Broad-bodied chaser (*Libellula depressa*) was, having been absent in 2018.

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1.0 INTRODUCTION

Planning History and Legal Obligations

1.1 The monitoring site (Figure 1) forms part of the Cotswold Water Park (CWP). Several lakes which lie within and adjacent to the boundary of the site are of national importance for wintering waterfowl.

1.2 Outline planning permission for the comprehensive development of the Lower Mill Estate (LME) was granted by Cotswold District Council (CDC) in February 1999 (Reference: CT.6641/J). Subsequent permissions (both outline and detailed) have increased the permitted capacity of vacation units and allowed the construction of other (related) developments.

1.3 The original outline planning permission was granted subject to a Section 106 Agreement (S.106), with all subsequent permissions replicating the terms of the original agreement or amending it through Deed of Variation.

1.4 Obligation 24 of Schedule 2 of the S.106 Agreement requires that the developer must undertake a series of audits, to ‘’… measure the success or otherwise of the implementation of nature conservation control and mitigation measures.”

Monitoring Objectives

1.5 The objectives of the biodiversity audits were identified in the LME Nature Conservation Audit Document (Scott Wilson, 2001) as follows:

- To determine whether the development is causing changes to the abundance and distribution of target species; and
- To provide data upon which informed decisions can be made on enhancement measures and Estate management prescriptions.

1.6 Target groups/species were originally selected by Scott Wilson using the following established criteria for carrying out ecological monitoring and assessment (Sutherland, 1998). These require that target species should be:

- Key indicators of impact or habitat change, the behaviour and responses of which are indicative of the community as a whole,
- Easily identifiable as a species or group, and
- Likely to be present in sufficient numbers each year for census.

1.7 In addition, established and easily reproducible survey techniques were adopted to monitor target species.

1.8 Based upon these criteria (and following some refinements since 2001), the following species/groups currently form the basis of the S.106 audits across the whole of LME, including Swillbrook Lakes (SWBL).

- Aquatic macrophytes (every 4 years),
- Wintering and breeding waterbirds (annually),
- Breeding terrestrial birds (annually),
- House Martin & nightingale (annually),
- Bat roosts (annually),

- Amphibians (every two years, alternating with dragonfly surveys), and
- Dragonflies & damselflies (every two years, alternating with amphibian surveys).

1.9 A number of waterbird species have also been selected as target (priority) species for the specific purpose of informing the management of the Estate. They were selected because of the nationally important numbers of each species present in the Cotswold Water Park as a whole in winter. The target waterbird species are as follows:

- Coot (*Fulica atra*);
- Gadwall (*Anas strepera*);
- Great crested grebe (*Podiceps cristatus*);
- Pochard (*Aythya ferina*); and
- Tufted duck (*Aythya fuligula*).

1.10 A 5- year wildfowl abundance report was undertaken in 2017 (Davidson-Watts Ecology Ltd) which demonstrated that between 1999/2000 and 2014/15 the target populations increased markedly, relative to the 1999/00 to 2001/02 baseline. They then fell steadily, reaching a low point in 2006/07 and exceeding the 20% threshold before returning to baseline levels in 2008/9. Following this, there was a decline with the 2015 levels showing a 47% decrease. The decrease was greater than the 20% threshold level for three of those five years. There were substantial reductions in the mean peak counts for the target species Coot and Great crested grebe. These decreases were somewhat compensated for by an increase in numbers of Tufted duck and a small increase in numbers of Gadwall. However, overall, there was a decrease in the mean peak of target species at LME between 1999 and 2014 by 29% with a continuing distributional shift to the south and east, away from areas of development.

- Further monitoring surveys have been carried out between 2011 and 2021 and the general report structure, methodologies and results have been followed and replicated where possible to ensure consistency of approach and resulting monitoring data for later comparisons. These reports include:
- Cotswold Water Park Society (December 2011): Pond Surveys, House Martin Surveys, Nightingale Surveys and Bat Surveys Spring/Summer 2011.
- Cotswold Water Park Society (December 2011): Dragonfly and Damselfly Surveys Spring/Summer 2011.
- Cotswold Water Park Society (April 2012): Breeding Songbird and Waterbird Surveys of Swillbrook Lakes Reserve Spring/Summer 2011.
- Cotswold Water Park Society (July 2012): Pond Surveys, House Martin Surveys and Nightingale Surveys Spring/Summer 2012.
- Cotswold Water Park Society (April 2012): Wintering Waterbird Surveys Winter 2011-12.
- Cotswold Water Park Society (September 2012): Breeding Songbird and Waterbird
- Surveys of Swillbrook Lakes Reserve Spring/Summer 2012.
- Cotswold Water Park Society (July 2012): Pond Surveys, House Martin Surveys and Nightingale Surveys Spring/Summer 2012.
- Cotswold Water Park Society (October 2012): Breeding Songbirds and Breeding Waterbird Surveys Spring/Summer 2012.
- Cotswold Water Park Society (April 2013): Wintering Waterbird Surveys Winter 2012-13;
- The Landmark Practice 2014: Ecological Monitoring Report 2013 – 2014 for Lower Mill Estate.

- The Landmark Practice 2016: Lower Mill Estate, Cotswold Water Park Ecological Monitoring 2014 -15.
- The Landmark Practice 2016: Lower Mill Estate, Cotswold Water Park Ecological Monitoring 2016 -16.
- Davidson-Watts Ecology Ltd (2017) Lower Mill Estate, Cotswold Water Park Ecological Monitoring 2016 – 2017.
- Davidson-Watts Ecology Ltd (2018) Lower Mill Estate, Cotswold Water Park Ecological Monitoring 2017 – 2018.
- Davidson-Watts Ecology Ltd (2018) Lower Mill Estate, Cotswold Water Park Ecological Monitoring 2018 – 2019, and
- Davidson-Watts Ecology Ltd (2018) Lower Mill Estate, Cotswold Water Park Ecological Monitoring 2019 – 2020.
- Davidson-Watts Ecology Ltd (2018) Lower Mill Estate, Cotswold Water Park Ecological Monitoring 2020 – 2021

2.0 WINTERING WATERBIRDS

Methods

2.1 The wintering waterbird survey followed methods used in the Wetland Bird Survey (WeBS) Core Counts (Gilbert *et al.* 1998). Counts were made of all wetland species seen or heard on all wetland habitats around the LME lakes from suitable vantage points (Bibby *et al.* 2000). Vagrant species, introductions and escapes were also included. All were carried out in suitable weather conditions using high quality RSPB binoculars and Nikon telescope. The vantage points used along the transect route are shown in Figure 2. The surveys were carried out by Nick Adams of TN Wildlife.

2.2 No allowance has been made within this survey for secretive species which are likely to have been under-recorded. Four surveys were carried out to finish at dusk to assess the roosting populations of certain species following the anecdotal records from 2020/21.

2.3 12 surveys were carried out on the lakes at LME between October 2021 and March 2022. The dates of the surveys were –

- Visit 1 - 13/10/2021
- Visit 2 - 26/10/2021
- Visit 3 - 10/11/2021
- Visit 4 - 25/11/2021
- Visit 5 - 10/12/2021
- Visit 6 - 25/12/2021
- Visit 7 - 13/01/2022
- Visit 8 - 27/01/2022
- Visit 9 - 15/02/2022
- Visit 10 - 27/02/2022
- Visit 11 - 09/03/2022
- Visit 12 - 23/03/2022

Results

2.4 The results for the wintering waterbird survey are summarised in Table 1 below. All species with a mean count of 10 or more are included, in descending order of the mean count for the period. Mean counts are rounded to the nearest whole number. LME target

species for the purposes of priority monitoring, and those on the Birds of Conservation Concern Amber and Red lists (BoCC5) are identified.

2.5 A full detailed list of results for all species on all lakes is provided in Appendix A. Appendix B provides the details of LME priority species for individual lakes which are further illustrated on Figure 3.

Table 1: Wintering waterbird counts 2021/2022

Species		**Counts**		
Common	Scientific	Min	Peak	Mean
Coot	***Fulica atra***	**50**	**326**	**165**
Tufted duck	***Aythya fuligara***	**77**	**201**	**146**
Mallard*	*Anas platyrhnchos*	53	148	102
Black-headed gull*	*Chroicocephalus ridibundus*	3	207	75
Wigeon*	*Anas penelope*	34	106	73
Gadwall*	***Anas strepera***	**12**	**86**	**43**
Mute swan	*Cygnus olor*	15	74	43
Moorhen*	*Gallinula chloropus*	21	57	39
Great crested grebe	***Podiceps cristatus***	**19**	**39**	**30**
Cormorant	*Phalacrocorax carbo*	4	59	28
Teal*	*Anas crecca*	0	95	26
Common gull*	*Larus canus*	0	69	22
Red-crested pochard	*Netta rurina*	0	65	19
Canada goose	*Branta canadensis*	0	104	18
Lesser black-backed gull*	*Larus fuscus*	0	67	17
Goldeneye**	*Bucephala clangula*	0	32	15
Goosander	*Mergus merganser*	0	51	13

LME priority species * BoCC5 Amber-listed ** BoCC5 Red-listed

2.6 In 2021/2022, 17 species had a mean count of 10 or over. This an increase of four on 2020/21 and seven on 2019/20. Black-headed gull, Common gull (*Larus canus*), Lesser black-backed gull (*Larus fuscus*) and Goosander were added to the list.

2.7 Other birds recorded with a mean count of less than 10, in alphabetical order, were:

- Egyptian goose (*Alopochen aegyptiaca*) <1,
- Grey heron (*Ardea cineria*) 6,
- Great white egret (*Ardea alba*) <1,
- Greylag goose (*Anser anser*) <1,
- Herring gull** (*Larus argentatus*) 6,
- Kingfisher (*Alcedo atthis*) 2,
- Little egret (*Egretta garzetta*) <1,
- Little grebe (*Tachybaptus ruficollis*) <1,
- Pintail* (*Anas acuta*) 1,
- Pochard** (*Aythya ferina*) 4,

- Shoveler* (*Anas clypeata*) 2,
- Smew** (*Mergus albellus*) <1 and
- Water rail (*Rallus aquaticus*) 5.
- *BoCC5 Amber-listed ** BoCC5 Red-listed

2.8 Most species had increased on the 2020/21 survey; of particular note was the increase in Coot, Gadwall, Wigeon and Goosander. The first three species will show similarities in trends as the Coot are kleptoparasited by the latter two. Goosander may have benefited from a reduction in angling due to the pandemic, as angling causes disturbance around the lake edges where they hunt for small fish, this might be the reason for the single record of Smew. The only species that declined significantly is Red crested pochard (Netta rufina), a species that flocks up into a few large accumulations so their presence can tend to be a bit hit and miss.

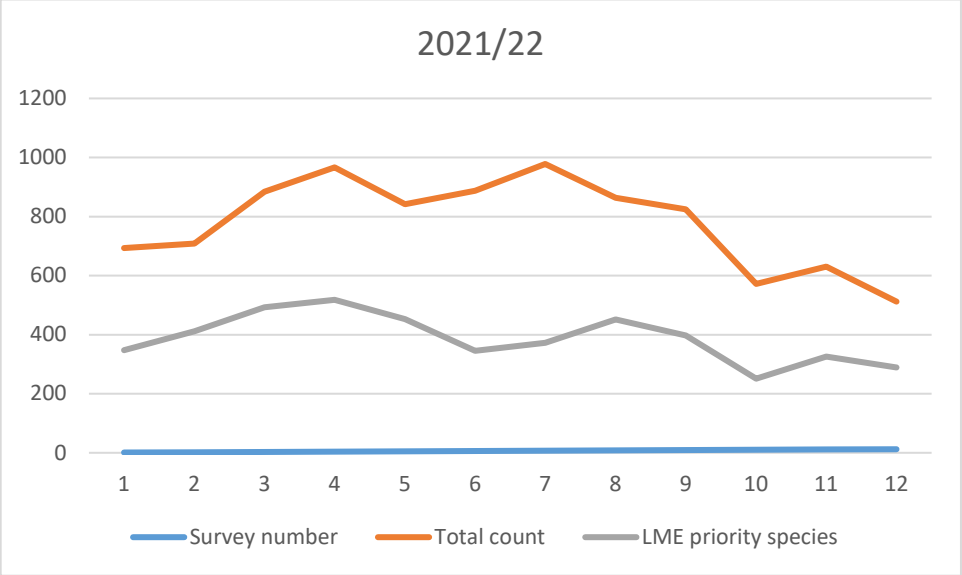
2.9 The species count increased on last year with a count of 26 with Pintail, Smew, Egyptian goose and Water rail causing the increase. Water rail is included in the main section this year due to the number of records. In 2020/21 there was one record of a singleton. In 2021/22 there were a total of 54 records. Water rail are regular visitors to the waterways in the villages on the Estate.

2.10 The maximum number of species recorded over the whole site in a single visit was 21 (slightly higher than last year's 20) and was recorded on visits 5 (10th December 2021) and 6 (25th December 2021). The minimum was 12 species which were recorded during visit 2 (26th October 2021) which was lower than last year's count of 14 on visit 1. October will usually have the lowest abundance as a number of species will not have reached the UK on their migration by then.

2.11 The peak count for the total water bird assemblage (excluding gulls) was 978 on visit 7 (13th January 2022) which is higher than the peak recorded last winter of 803 which was recorded on the second January 2021 visit.

2.12 The peak count overall for the five priority species was 518 on visit 4 (25th November 2021) which was a significant increase on the numbers from last year where a peak count of 291 was recorded and back in line with the 2018/19 with a peak count of 525. This is summarised in chart 1.

Chart 1: LME peak water bird counts October 2021 to March 2022



2.13 Compared to the previous winter, the mean count for the total water bird assemblage increased significantly from 527 in 2020/2021 to 780 this winter.

2.14 Water levels were at or below normal levels this year with minimal freezing observed during the survey period. The numbers of birds did increase, and this could potentially be the result of minimal angling seen during the surveys. The only fishing noted was a member of the public fishing on Freeth Mere on visit 7. Despite gates being locked, people were encountered in the 'no access' area between Somerford Lagoon and Freeth Mere on five of the 12 visits.

2.15 The vast majority of the Cotswold Water Park (CWP) is now designated as a Site of Special Scientific Interest (SSSI). The new designation covers all 177 lakes in the CWP, protecting the large populations of breeding and wintering birds that live there, as well as the aquatic plants. As wildlife declines across the country, areas such as CWP are increasingly important to ensure sustainable populations can thrive. It is, therefore, important that people continue to be excluded from the 'no access' area and that all steps are taken to enforce this.

2.16 Mean counts for all five LME priority species had increased from the previous winter. The results are shown in Table 2 below.

Table 2: Mean counts for the five LME priority species

Species	2020/21	2021/22	Increase / (decrease)
Coot	132	165	25%
Gadwall	10	43	330%
Great crested grebe	20	30	50%
Pochard	2	4	100%
Tufted duck	80	146	83%

2.17 The increase in Coot is at odds with the trend for Western UK which shows a steady decline due to birds from eastern Europe choosing to 'short stop' on their migration on mainland

Europe. The peak in numbers was during November as is traditional at CWP, therefore it's not suggestive of a late, cold weather movement but perhaps the result of an early cold snap on Mainland Europe.

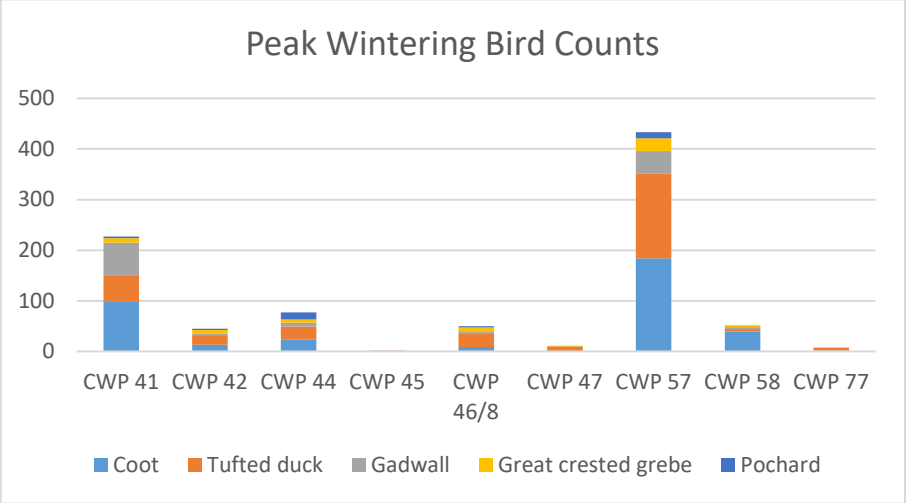
2.18 An increase in Gadwall numbers would be expected when Coot number increase as the two species have a kleptoparasitic relationship. Gadwall follow Coot about, waiting for them to dive down to bring up weed to eat. The Gadwall then steal as much of the weed as they can for themselves.

2.19 Great crested grebe are relatively sedentary at CWP, the numbers peak in October/November, at the end of the breeding season, then slowly decline throughout the winter. The increase suggests a better than average breeding season on the nearby lakes.

2.20 Pochard are perhaps the most important species using LME. The State of UK Birds report states that: "Pochards are threatened with extinction globally (they are classed as Vulnerable by the IUCN), and the decrease in their UK overwintering numbers may be a symptom of a wider global population decline." The small increase noted is really positive.

2.21 The peak count of the five priority species on each lake is shown on chart 2 below

Chart 2: Peak target species wintering bird counts



2.22 The Wetland Bird Survey (WeBS) indices, produced by the BTO show a 6% decrease in the 25yr trend for Tufted duck. The increase noted at LME is a significant shift from that trend. Perhaps due to a change of conditions on LME or an adjacent site making LME more favourable to this species.

2.23 Results shown the change in mean counts for all tableted species is shown in the Table 3 below:

Table 3: Overall changes in wintering waterbirds

Species	2020/21	2021/22	Increase / (decrease)
Coot	**132**	**165**	**25%**
Gadwall*	**10**	**43**	**330%**
Great crested grebe	**20**	**30**	**50%**
Pochard**	**2**	**4**	**100%**
Tufted duck	**80**	**146**	**83%**
Canada goose	17	18	6%
Cormorant	13	28	115%
Egyptian goose	0	0	0
Goldeneye	10	15	50%
Goosander	6	13	117%
Great white egret	0	0	0
Grey heron	3	6	100%
Greylag goose	1	0	-100%
Kingfisher	0	2	200%
Little egret	1	0	-100%
Little grebe	0	0	0
Mallard	65	102	57%
Moorhen	11	39	255%
Mute swan	18	43	139%
Pintail	0	1	100%
Red crested pochard	71	19	-73%
Shoveler	2	2	0
Smew	0	0	0
Teal	27	26	-7%
Water rail	0	5	500%
Wigeon	40	73	83%

2.24 The vast majority of species have shown an increase, suggestive of a change in circumstances either at LME or on an adjacent site, or a mix of the two. During these surveys there was little angling observed. On 12 visits no anglers were recorded around the edge of Mill Lake, on the two occasions people were in the area, they were on the path parallel with Mill Lane, well screened from the lake.

2.25 Some species are impacted by factors that are more obvious. Mute swan (*Cygnus olor)* will be present when the conditions are suitable for foraging, when weed is within their reach. This was the case on Flagham Fen where the majority of the swan were recorded. Similarly, Wigeon will be present in larger numbers when weed feeders like Mute swan,

Coot and Red crested pochard are present in higher numbers, giving more opportunities for kleptoparasitism.

Table 4: Maximum and Mean counts plus max species present per lake (including gulls).

Lake	Max count (visit)	Mean count	Max species (visit)
Somerford Lagoon	666 (4)	355	18 (7)
Swillbrook Lakes	223 (9)	134	19 (10)
Freeth Mere	214 (9)	158	17 (8)
Flagham Fen	214 (6)	121	11 (6,7,11)
Mill Lake	90 (7)	44	11 (8)
Farmhouse Lake	55 (7)	34	11 (7)
Clearwater Lake	43 (10)	21	7 (10)
Howell's Mere	36 (4)	18	5 (12)
Spinney Lake	28 (10)	17	10 (12)

2.26 Maximum species abundance increased at all sites when compared to the previous year's records. The inclusion of gulls in these numbers may, in part, account for this increase.

2.27 Maximum counts increased at all sites except Mill Lake. This is often the main site for large counts of Red crested pochard and these were recorded in much lower numbers in this survey season. Similarly, mean counts at Mill Lake fell.

2.28 Swillbrook lakes had a peak of 223 and a mean of 134, both an increase on last winter. A species maximum of 19 was recorded on visit 10 which was also an increase from 14 species recorded last year. This was the highest number of species on a single visit for the whole LME site and was the same as the previous two years.

2.29 Other species of interest recorded during the wintering bird surveys were:

- Singleton Snipe (*Gallinago gallinago*) was recorded on Somerford Lagoon on visits 11 and 12.
- A pair of Oystercatcher (*Haematopus ostralegus*) were recorded around Spinney Lake on surveys 10 – 12.
- Three Oystercatchers were recorded around Somerford Lagoon on visit 11, with two present on visit 12.
- A singleton Oystercatcher was present on Clearwater on visit 12.
- First winter male and female Marsh harrier (*Circus aeruginosus*) were present across the Estate on visit 5.
- A male Bittern (*Botaurus stellaris)* was booming on Swillbrook Lakes on visit 10.
- An adult Mediterranean gull (*Larus melanocephalus*) was in the gull roost on Somerford Lagoon on visit 2.
- A first winter Yellow-legged gull (*Larus michahellis*) was present in the gull roost on Somerford Lagoon on visit 2.
- An adult Great black-backed gull (*Larus Marinus*) was present in the gull roost on Somerford Lagoon on visit 8.
- A flock of 200 Linnet (*Linaria cannabina*) were noted going to roost on the causeway between Somerford Lagoon and Flagham Fen on visit 8.

- Approximately 350 Pied wagtail (*Motacilla alba*) were noted going to roost in the Howell's Mere / Clearwater reeds and willows on visit 2.
- The maximum gull roost counts were as follows (visit in brackets):
    - Black-headed gull - 1,940 (2)
    - Common gull - 850 (8)
    - Herring gull - 3,720 (8)
    - Lesser black-backed gull - 1,410 (8)

3.0 BREEDING WATERBIRDS

Methods

3.1 Breeding waterbirds were surveyed according to Gilbert et. al. (1998). 5 survey visits were made in 2021 starting in April. The survey dates were:

- 13th April 2021
- 10th May 2021
- 14th June 2021
- 12th July 2021
- 2nd August 2021

3.2 Compared with earlier surveys, those undertaken since 2006 have been extended into July / August. This is to provide better estimates for species that have a long breeding season, or which tend to breed later in the year, such as Great crested grebe, Tufted duck and Red-crested pochard (Harris, 2012).

3.3 A pre-determined survey route was followed, stopping at suitable vantage points. Direct evidence of breeding activity was recorded, for example the presence of active nests or recently hatched young.

3.4 In addition, the following criteria were also used to judge whether birds were territorial or not (i.e., where direct evidence of breeding was lacking

- Confirmed - recorded on 3 consecutive visits in the same location;
- Probable - recorded on 2 visits in the same location (consecutive or alternate visits); and
- Possible - recorded on one occasion only.

3.5 In the case of scarce and / or secretive species such as Gadwall and Moorhen (*Gallinula chloropus*), single records were considered sufficient to determine 'probable' breeding. It should be noted that the use of this classification, which was introduced in 2007, may have resulted in slight increases in numbers of breeding pairs reported when compared with earlier (pre-2007) surveys (Harris, 2012).

Results

Lower Mill Estate

3.2.1 The results of the LME breeding waterbird surveys are summarised in Table 5 below, and locations of breeding birds / nests / broods is shown in Figure 4. Where two figures are given in the tables, the lower (minimum) figure is the confirmed number of territories / breeding pairs, whereas the higher (maximum) figure also includes probable territories / pairs. Historical comparisons covering the period 2004 to 2021 are presented for each lake in appendix C.

Table 5: LME Breeding Waterbird in 2021

	Lake Territories								
Species	41	42	44	45	47	57	58	77	All
Black head gull (A)	0	0	0	0	0	3 to 5	2	0	5 to 7
Canada Goose	0	0	0	0	0	0	0	2	2
Common Tern (A)	0	0	0	0	0	0	1	0	1
Gadwall	0 to 1	0	0	0	0	0	0	0	0 to 1
Coot	3 to 4	3 to 5	4 to 7	1	0	5 to 6	1	1	18 to 25
Great crested grebe	3	1	1	0	0	2 to 6	1	0 to 1	8 to 13
Greylag Goose	0	0	0	0	0	1	0	0	1
Mallard (A)	2	2	0	1	1	3	1	1	11
Moorhen	0 to 1	1 to 2	1	0 to 1	0	1	0	0 to 3	3 to 9
Mute Swan (A)	1	0 to 1	1	0 to 1	0	0	0	1	3 to 5
Red crested pochard	0	0	0 to 1	0	0	0 to 1	0	0	0 to 2
Tufted duck	1	1	1	0	0	O to 1	0	0 to 1	3 to 5
Total	**10 – 13**	**8 to 12**	**8 to 12**	**2 to 4**	**1**	**15 to 21**	**6**	**5 to 10**	**55 to 82**
Species	**7**	**6**	**6**	**4**	**1**	**8**	**5**	**7**	**12**

Lake references: 41 Freeth Mere; 42 Farmhouse Lake; 44 Mill Lake; 45 Clearwater Lake; 47 Howell's Mere; 57 Somerford Lagoon; 58 Flagham Fen; 77 Spinney Lake. A = amber list species (BoCC4)

3.6 Overall, the number of waterbirds breeding at LME appears to be stable, although there is fluctuation from year to year (Appendices C, D and E refers). The total number of species regularly breeding peaked in 2011 with 14. In 2021, 12 species were recorded as breeding. This is three more than in 2020/21. Species recorded breeding this year but not last were Greylag goose, Canada goose and Gadwall. The overall number of pairs of breeding birds recorded in 2021/22 was higher than last year, with Coot and Mallard both increasing. Between 2007 and 2021 there has been an overall decline in numbers at Lower Mill. This may be due to the increased number of lakes that have been dug across the Cotswold Water Park during this time.

3.7 Based on the annual totals since 2007 most species appear to be in overall decline. In 2021 trends for all species remained the same as in 2020. This is despite Coot, Mallard, the total number of species, and total individual numbers all being higher this year.

3.8 Other species noted during the surveys were Sand martin (*Riparia riparia*) and Cuckoo (*Cuculus canorus*). These could potentially breed in suitable habitat at LME. No sand martins were seen around the new sand martin nesting wall.

Swillbrook Lake

3.9 The results of the SWBL breeding waterbird surveys are summarised in Table 6 below and in Figure 5. Where two figures are given, the lower (minimum) figure is the confirmed

number of territories/pairs, whereas the higher (maximum) figure also includes probable territories/pairs. Data and trends from previous years is shown in Appendix F.

Table 6: SWBL Breeding Waterbirds in 2021

Swillbrooks Lakes Territories/pairs 2021	
Black headed gull (A)	2
Canada goose	3
Common tern (A)	2
Coot	2
Gadwall (A)	0
Great crested grebe	1 to 2
Grey lag goose (A)	1
Mallard (A)	1 to 2
Moorhen	2 to 5
Mute swan (A)	1
Red crested pochard	0
Tufted duck	0 to 1
Water rail	0
Total	**15 to 21**
Species	**10**

3.10 The 2021 survey results for Swillbrooks Lakes were up compared to last year (9 species in 2020, 10 in 2021). Greylag goose was added this season. This species and Mallard both went from a declining to a stable trend this year.

4.0 BREEDING TERRESTRIAL BIRDS

Methods

Breeding Birds Surveys

4.1 The whole site (LME and Swillbrooks Lakes) was surveyed on single visits. The route is given in Figure 6. Results for the two parts, LME and Swillbrook Lakes, have been separated for consistency with previous reports. A shortened version of the British Trust for Ornithology (BTO) Common Birds Census (Gilbert *et al*, 1998) was adopted. The observer followed a pre-determined route that encompassed most of the field boundaries and/or water bodies, recording all bird registrations of territorial males (birds seen or heard) on a large-scale field map. The start and end points were varied to prevent the same sections being visited at the same times of day. Standard BTO species codes and symbols were used for field recording.

4.2 Six visits were undertaken. The survey dates were:

- 6th April 2021
- 19th April 2021
- 3rd May 2021
- 25th May 2021
- 13th June 2021
- 12th July 2021

4.3 All visits were made early in the morning (beginning before 07:00) and were undertaken in good weather conditions with low wind speed.

4.4 Once all the surveys had been completed, territory maps were drawn up for individual species using the BTO's guidelines (Marchant, 1983), allowing the number of territories of each species present to be estimated. This data is tabulated for presentation below.

4.5 Clusters of registrations (singing males in most cases) were classified as 'confirmed' breeding territories where a species was present on three or more visits. Clusters containing two registrations were classified as 'probable' breeding territories providing they occurred within a reasonably close timeframe (i.e., they did not span more than four visits)'.

Nightingale Surveys

4.6 Two surveys were undertaken for nightingale with one night survey and one dawn surveys both continued for 2 hours. The survey followed the same route as last year (figure 7). These were supplementary to the breeding terrestrial bird surveys and were undertaken on the following dates:

- 18th May 2021 – start 23:30 to 01:30
- 25th May 2021 – start 04:30 to 06:30

4.7 Nightingales typically arrive at the CWP in early spring, most often during the third week of April, with females and additional males arriving at the beginning of May (Harris, 2012b). It is therefore possible that some nightingales were missed from earlier in the month.

House Martin Surveys

4.8 House martin (*Delichon urbicum*) surveys were undertaken on the 16th of June 2021. The surveys were carried out by Nick Adams.

4.9 All properties were fully examined for nests, using binoculars where required. All walls and eaves were assessed and the presence of nesting birds both in nest boxes and natural (built) nests were recorded. Nest sites were categorised as follows:

- Definitely occupied nests (DON) – adults and/or juveniles present,
- Apparently occupied nests (AON) – e.g., fresh mud or faeces noted and no cobwebs across the entrance hole, but no birds present at the time of survey, and
- Apparently unoccupied nests (AUN) – mainly old (including damaged) nests from previous years, showing no signs of current occupancy.

Reed Warbler and Reed Bunting

4.10 To meet the requirements of the S106 agreement, the locations of the Reed warbler (*Emberiza schoeniculus*) and Reed bunting (*Acrocephalus scirpaceus*) were mapped separately during the breeding waterbird surveys in 2021.

Tern Rafts

4.11 New tern rafts were installed in 2017 which were obtained using S106 funding. For 2021, this included one raft on Somerford Lagoon (for use by Black-headed gulls *Chroicocephalus ridibundus*), one raft on Swillbrook Lakes (for Common terns) and another raft on Flagham fen. The locations of the rafts are shown in Figure 8. The rafts were observed from the bank using high quality Leica binoculars and a Kowa spotting scope. Observations were made whilst carrying out the breeding water bird surveys on 13th April, 10th May, 14th June, 12th July and 2nd August 2021.

Results

Terrestrial Breeding Bird Surveys

Lower Mill Estate

4.12 National data from the British Trust for Ornithology (BTO) State of UK Birds 2017 shows that many migratory birds are arriving earlier and leaving later and have positive trends in population size whereas species that have not altered their migratory timings are in decline. It is possible that the increase in temperatures due to climate change (almost 1°c temperature rise since 1980) may be affecting prey availability with earlier breeding missing peak prey availability as well as a shift northward in species distributions.

4.13 Results for the LME (excluding Swillbrook Lakes) are presented in Table 7 below. Locations of red and amber listed species are shown in Figure 9.

Table 7: All LME Breeding Terrestrial Birds in 2021

Species		**Territories / pairs 2021**		
Common name	**Scientific name**	**Confirmed**	**Possible**	**Total**
Blackbird	*Turdus merula*	7	1	8
Blackcap	*Sylvia atricapilla*	19	7	26
Blue tit	*Cyanistes caeruleus*	8	7	15
Bullfinch (A)	*Pyrrhula pyrhula*	0	3	3
Cettis warbler	*Cettia cetti*	3	1	4
Chaffinch	*Fringilla coelebs*	6	1	7
Chiffchaff	*Phylloscopus collybita*	8	4	12
Cuckoo (R.)	*Cuculus canorus*	0	2	2
Dunnock (A)	*Prunella modularis*	8	2	10
Garden warbler	*Sylvia borin*	3	3	6
Goldcrest	*Regulus regulus*	1	0	1
Goldfinch	*Carduelis carduelis*	3	0	3
Great spotted woodpecker	*Dendrocopos major*	0	0	0
Great tit	*Parus major*	2	3	5
Greenfinch	*Chloris chloris*	0	1	1
Green woodpecker	*Picus viridis*	0	0	0
Kingfisher	*Alcedo atthis*	0	0	0
Long-tailed tit	*Aegithalos caudatus*	0	2	2
Pied wagtail	*Motacilla alba*	0	0	0
Reed bunting (A)	*Emberiza schoeniculus*	4	1	5
Reed warbler	*Acrocephalus scirpaceus*	5	4	9
Robin	*Erithacus rubecula*	14	2	16
Sedge warbler	*Acrocephalus schoenobaenus*	5	7	12
Song thrush (R)	*Turdus philomelos*	1	0	1
Whitethroat	*Sylvia communis*	4	4	8
Willow warbler (A)	*Phylloscopus trochilus*	3	0	3
Wren	*Troglodtes troglodytes*	27	1	28
Total		131	56	187
Species		19	19	23

A = amber list species R = red list species (BoCC4 - 2015)

4.14 The number of species confirmed as breeding has increased in 2021 from 17 species last year to 19 species this year. Including possible breeders this has increased from 22 to 23 species. The total number of territories held, including both confirmed and probable, was 132 last year and 187 this year.

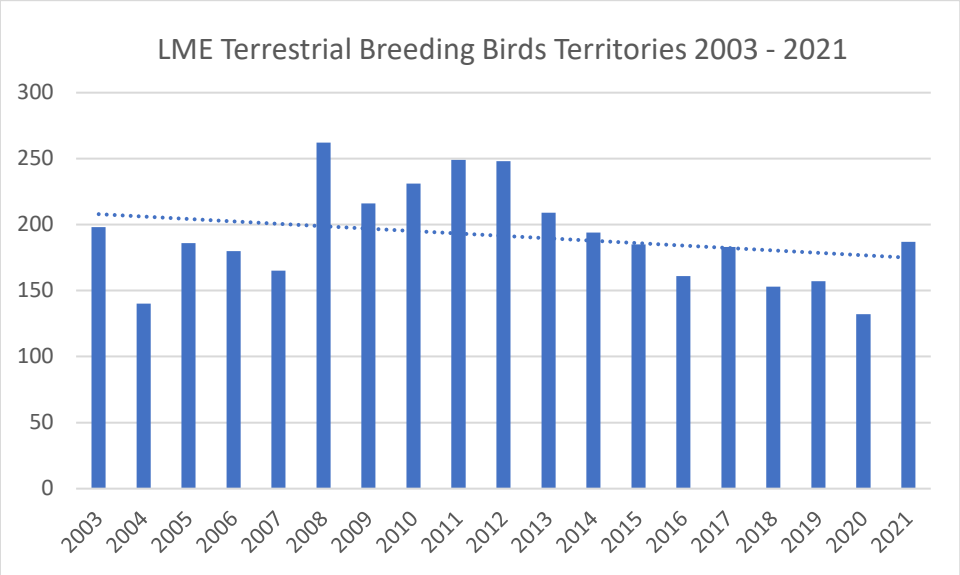
4.15 The dominant species were Wren, Black cap and Blue tit (*Cyanistes caeruleus*). A higher number of species were recorded in 2021 with Kingfisher being absent during the surveys this year. However, Greenfinch and Willow warbler were recorded in these current surveys after being absent in 2020.

4.16 Dunnock, Chaffinch and Robin all increased in number in 2021. However, there has been a decline in their numbers when compared to counts made in 2003. Chaffinch have seen a national population decline of 18% between 2005 and 2015 which reflects in results found at Lower Mill Estate (Barnes, 2020).

4.17 No passage migrants were recorded during the terrestrial breeding bird surveys undertaken in 2021.

4.18 Historical comparisons with previous years (and species trends) are given in Appendix G and illustrated in chart 3 below. The number of regularly occurring species increased to 23 this year with the number of territories/pairs recorded also increasing from 121 last year to 187 this year.

Chart 3: LME Terrestrial Breeding Bird Territories 2003 to 2021



4.19 In 2021 Willow warbler territories rose from stable to increasing, while Sedge warbler territories rose from declining to stable. However, Goldcrest, Goldfinch and Song thrush all saw a decline from an increasing trend to a stable trend. Long-tailed tit territories went from stable to declining.

4.20 Other species of note during the surveys were a Bittern seen around Somerford Lagoon, Common sandpiper (*Actitis hypoleucos*) on Freeth Mere and a Nuthatch (*Sitta europaea*), all of which were seen once during the surveys. Kestrel (*Falco tinnunculus*) were seen near Freeth Mere on most visits. Barn owl box checks in 2021 recorded four kestrel chicks in the box situated in the Nature Reserve adjacent to Freeth Mere. These were subsequently ringed under licence.

Swillbrook Lakes

4.21 The number of species confirmed as breeding increased in 2021 from 12 species last year to 14 species this year, including possible breeders, this increases from 18 to 19 species. The total number of territories held (including confirmed and possible) in 2021 was 64. This is considerably higher compared to last year's total of 36, although that was during the Covid pandemic when some surveying could not be undertaken.

4.22 In 2021, Bullfinch, Chaffinch, Whitethroat and Willow warbler were recorded as possible breeders. These had not been recorded as possible or confirmed in the previous year's survey.

4.23 Blackcap and Wren increased in numbers although their overall trend remains declining. Chiffchaff went from declining to stable.

4.24 Reed bunting was recorded on the north banks (amber listed)

4.25 Goldfinch, Long tailed tit and Reed warbler were bot recorded during these surveys.

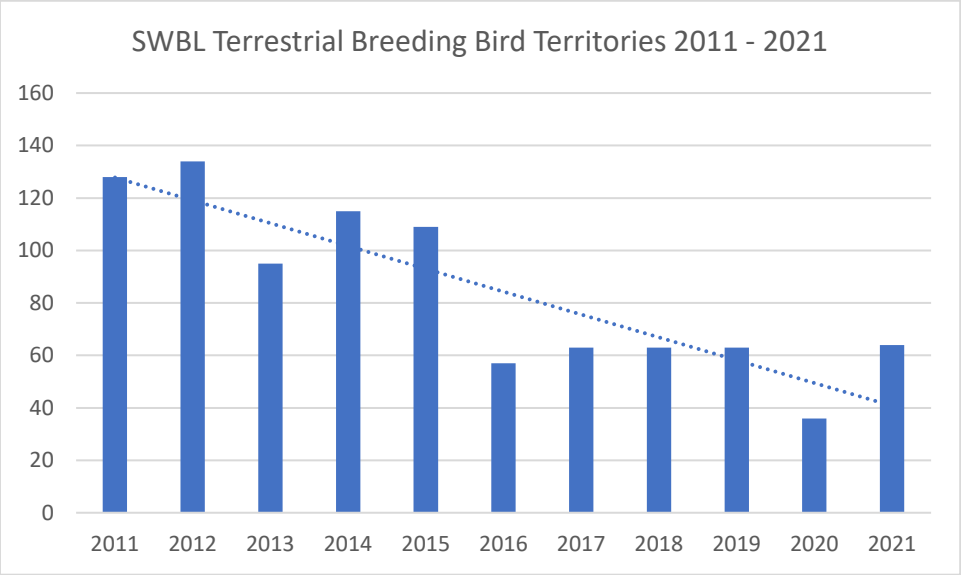
4.26 The results for Swillbrook Lakes are presented in Table 8 below and in Appendix H. Locations of red and amber listed species are shown in Figure 10. The numbers of regularly occurring species appears stable, ranging between 17 and 20 over the last five years. The numbers of territories also increased this year with 64 compared to 36 recorded in 2020.

Table 8: All SWBL Breeding Terrestrial Birds 2021

Species		**Territories / pairs 2021**		
Common name	**Scientific name**	**Confirmed**	**Possible**	**Total**
Blackbird	*Turdus merula*	2	1	3
Blackcap	*Sylvia atricapilla*	7	1	8
Blue tit	*Cyanistes caeruleus*	2	4	6
Bullfinch (A)	*Pyrrhula pyrhula*	0	1	1
Cettis warbler	*Cettia cetti*	1	1	2
Chaffinch	*Fringilla coelebs*	0	1	1
Chiffchaff	*Phylloscopus collybita*	9	1	10
Cuckoo (R.)	*Cuculus canorus*	0	0	0
Dunnock (A)	*Prunella modularis*	2	0	2
Garden warbler	*Sylvia borin*	1	1	2
Goldcrest	*Regulus regulus*	1	1	2
Goldfinch	*Carduelis carduelis*	0	0	0
Great spotted woodpecker	*Dendrocopos major*	0	0	0
Great tit	*Parus major*	1	1	2
Green woodpecker	*Picus viridis*	0	0	0
Jay	*Garrulus glandarius*	0	0	0
Kingfisher	*Alcedo atthis*	0	1	1
Long-tailed tit	*Aegithalos caudatus*	0	0	0
Reed bunting (A)	*Emberiza schoeniculus*	1	0	1
Reed warbler	*Acrocephalus scirpaceus*	0	0	0
Robin	*Erithacus rubecula*	4	1	5
Sedge warbler	*Acrocephalus schoenobaenus*	1	1	2
Song thrush (R)	*Turdus philomelos*	1	0	1
Tree creeper	*Certhia familiaris*	0	0	0
Whitethroat	*Sylvia communis*	0	1	1
Willow warbler (A)	*Phylloscopus trochilus*	0	1	1
Wood pigeon	*Columba palumbus*	0	0	0
Wren	*Troglodtes troglodytes*	12	1	13
Total		45	19	64
Species		14	16	19

4.27 Chart 4 below illustrates the downward trend of breeding bird territories in the SWBL since 2011 but with territory numbers stabilising for five years (not including 2020 due to the reduced survey data).

Chart 4: SWBL Terrestrial Breeding Bird Territories 2011 to 2021



4.28 Following declines in previous years, it now appears that the numbers are beginning to stabilise at SWBL with total territories being the same (63) between 2017 and 2019 with 64 being recorded in 2021. Historical comparisons with previous years are given in Appendix H. The number of regularly occurring species has increased with a count of 19 species compared to 18 from last year but has, overall, remained stable since 2017.

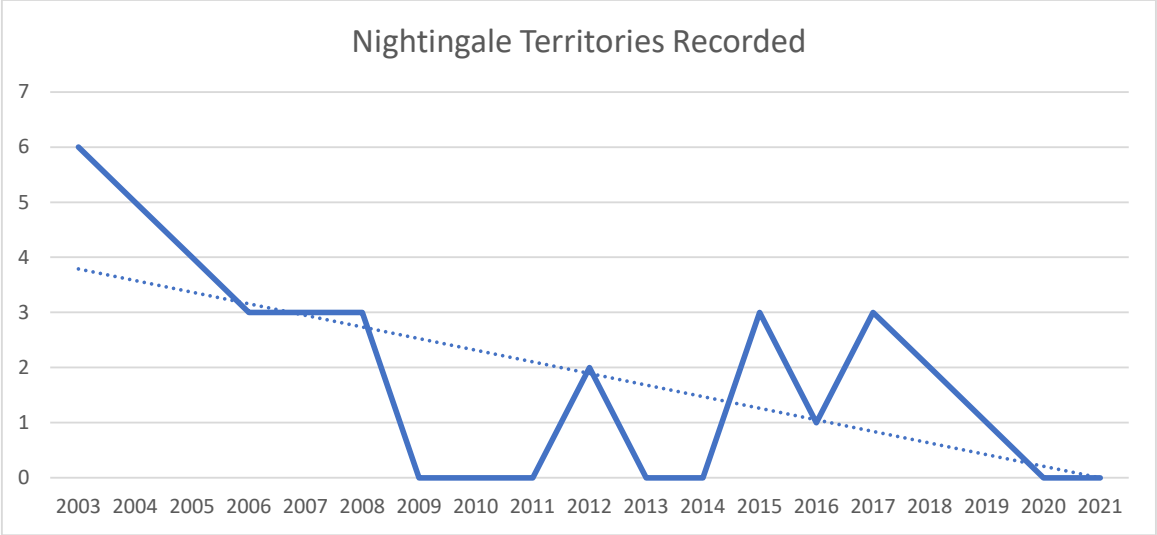
Nightingale Surveys

4.29 No Nightingales were recorded during the transects.

4.30 Previously, Nightingales were recorded in 2012 and 2015 in 2017 three Nightingale territories were recorded in 2017 and two territories were recorded in 2018. Since that time, no Nightingales have been recorded. All opportunities for habitat management and creation that benefits nightingale should be taken, especially in the areas where they were previously recorded to the south-west and south of the site.

4.31 The decrease in nightingale numbers at Lower Mill Estate could be due to the continued national and global decline of the species which has estimated to have declined by 61% from 1993 to 2018 (Hewson *et al*., 2018).

Chart 5: Nightingale Territories 2003 to 2021



House Martin Surveys

4.32 Results for the house martin surveys are summarised in Table 9 below.

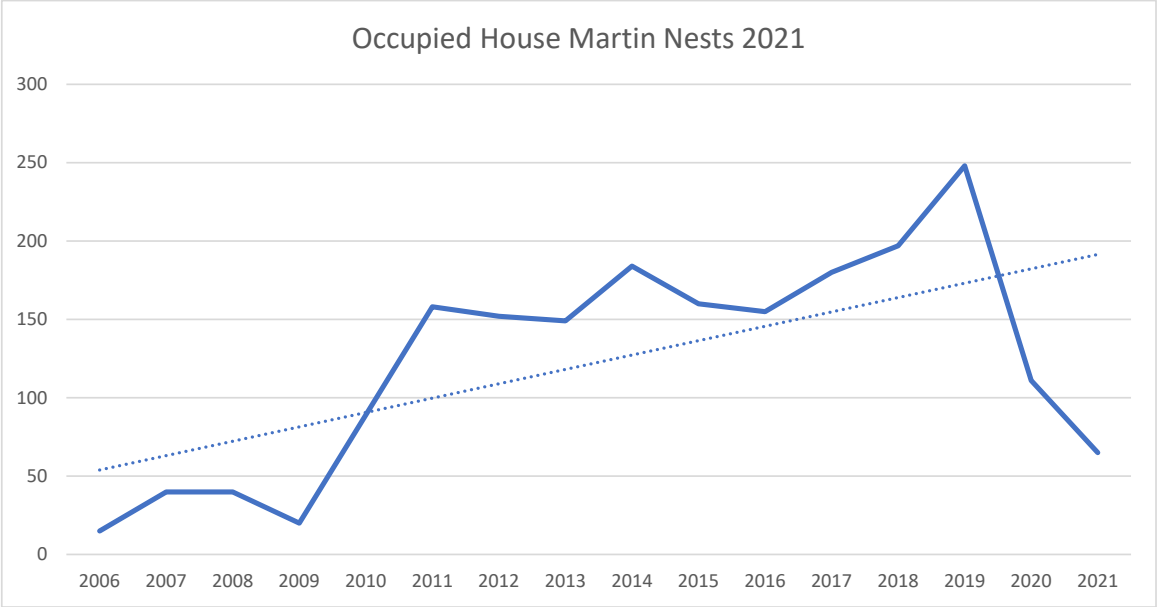
Table 9: House Martin Nests in 2021

Area	Confirmed occupied	Apparently Occupied	Apparently Unoccupied
Mill Village	10	6	17
Clearwater	23	17	40
Howells Mere	7	2	12
Total 2021	40	25	69
Total 2020	29	82	174

4.33 The numbers of confirmed occupied nests increased in 2021 from 29 to 40. The number of apparently occupied nests decreased from 82 to 25 and the apparently unoccupied nests declined from 174 in 2020 to 69 in 2021. The monitoring in 2021 may have shown some difference due to a change in surveyor between the two years. However, Evidence suggests that as with 2020, the number of House martin reaching the UK declined significantly. The birds also arrived as much as 3-4 weeks later than normal, suggesting adverse weather conditions on their northerly migration. Therefore, the lower numbers recorded at LME could be part of the decline observed over the UK or simply that the birds had not fully commenced breeding at this time.

4.34 The birds still show a preference for those properties with a white/cream render finish. The more modern, wooden clad properties have to date not recorded any nesting House martins.

Chart 6: Occupied House Martin Nests 2006 to 2021



Reed Warbler and Reed Bunting

4.35 The survey map for the distribution of Reed buntings in 2021 is included in Figure 11. Seven individual sightings and five territories were recorded. The sightings and territories were spread across LME with no concentrations of sightings. Reed bunting were recorded in Swillbrook Lakes again this year. Overall, there were more sightings and territories recorded in 2021 than in 2020.

4.36 The survey map for the distribution of Reed warbler in 2021 is included in Figure 12. Five confirmed territories and three individual sightings were recorded which is the same as the results from the 2020 survey. Although this is a decrease in territories from 2019 (nine territories and four sightings), this is still a good result given that the results are still greater than in 2018 (three sightings and no territories).

Tern Rafts

4.37 The results for the Tern raft surveys are shown in Table 10 below and the raft locations are shown in Figure 8.

Table 10: Tern raft surveys

	Raft 1 Somerford Lagoon	**Raft 2 Swillbrook Lakes**	**Raft 3 Flagham Fen**
Common tern	None	2 pairs raising 2 young	1 pair raising 2 young
Black headed gull	3 to 5 pairs raising 5 young	2 pairs raising 2 young	2 pairs raising 2 young

4.38 In 2021, no Common tern bred on Raft 1 in Somerford Lagoon. However, up to five pairs of Black-headed gull were recorded as breeding, producing 5 young.

4.39 For Raft 2, two pairs of common tern bred, producing 2 young and two black-headed gull were observed raising 2 young.

4.40 For Raft 3 in Flagham Fen, one pair of common tern bred, producing 2 young and two black-headed gull were observed raising 2 young

5.0 BAT LOFTS AND BOXES

Methods

5.1 Internal and external surveys of the three bat lofts that have been retrofitted into bin stores were undertaken. The surveys were undertaken towards the end of the bat breeding season to allow for the accumulation of droppings throughout the year. The locations of the three lofts are shown in Figure 13.

5.2 An internal and external search was undertaken using binoculars, endoscope and Clu-lite torches to identify any roosting bats or evidence of roosting. All potential roosting sites were examined and any characteristic field signs of bats, for example accumulations of droppings or obvious scratch/wear marks were also identified where possible.

5.3 The exterior building search was combined with internal searches of all parts of the building (where safely accessible) to search for signs of bats, including droppings, urine staining, feeding remains (for example, large accumulations of moth wings), and individual bats.

5.4 Two pairs of bat boxes in two locations were also checked for evidence of use by bats (shown in Figure 13).

5.5 The inspection survey was undertaken by accredited agent Alan Crane under registration number 2015-12209-CLS-CLS and followed guidance as provided in the Bat Conservation Trust Good Practice Guidelines (Collins, J. (ed), 2016).

Results

5.6 Clearwater Bat Loft is located at SU0212294026 and was constructed within the Clearwater Phase. It consists of a converted loft space over a refuse store with a chimney-style access point that allows access for Lesser horseshoe bats (*Rhinolophus hipposideros*). No evidence of use by bats was recorded externally, in the chimney access, within the voids or within the purpose-built baffle boards in July 2020 or 2021.

5.7 Howells Mere Bat Loft (No. 1) is located at SU0220894001 and is adjacent to the Howells Mere phase of the development. It consists of a converted loft space over a refuse store with a chimney style access directly into the loft space. No evidence of use by bats was recorded in this roof void in 2018, 2019, 2020 or 2021. Several areas of bat droppings were found in this roof void in August 2017.

5.8 Howells Mere Bat Loft (No. 2) – is located at SU0221398313 and was constructed within the Howells Mere phase of the development. It consists of a converted loft space above a refuse store and bats can access the loft via specially constructed bat tiles in the roof which favour crevice loving bats such as pipistrelle bats and Myotis bats. No evidence of use by bats was recorded externally, in the chimney access, within the voids or within the purpose-built baffle boards. A small number of old bat droppings were recorded in this bat loft in 2015 but no droppings were recorded after 2016 including this survey.

5.9 The bat box survey results were as follows:

- Bat box location 1 – no boxes were present.
- Bat box location 2 - no evidence of use by bats was found in the two bat boxes at location 2 and the bat box was clean.
- Bat box location 3 – no evidence of use by bats was found in the two bat boxes at location 1 and the bat box was clean.

5.10 It should be noted that the bat boxes surveyed as part of the requirements for this report were specifically designed to be located under bridges. Other bat boxes which have been installed around Lower Mill Estate are also monitored separately and are well-used and there are roosts in many of the properties and outbuildings.

6.0 AMPHIBIANS

Methods

6.1 Surveys were undertaken on 14th April, 6th May, 19th May and 3rd June 2021.

6.2 Surveys were undertaken of 8 ponds and the locations of the ponds are shown in Figure 14. All ponds were surveyed using three survey methods, which were torchlight surveying, egg search and netting. All surveys commenced one hour after dusk.

6.3 The surveys were carried out by Jade Flear O'Rourke on behalf of Davidson-Watts Ecology Ltd under Class Licence Registration Number 2018-33247-CLS-CLS.

Results

6.4 The weather conditions during the surveys were as follows:

- 14th April 2021 – 10°c, wind speed Beaufort scale 2, 3/8 cloud cover, no rain, min 5°c at end;
- 6th May 2021 - 11°c, wind speed Beaufort scale 2, 2/8 cloud, no rain, min 5°c at end;
- 19th May 2021 – 14°c, wind speed Beaufort scale 2, 2/8 cloud, no rain, min 9°c at end; and
- 3rd June 2021 - 17°c, wind speed Beaufort scale 2, 4/8 cloud cover, no rain, min 13°c at end

6.5 The survey results are summarised in Table 11 below.

Table 11: Summary of Amphibian Survey Results 2021

Pond	GCN Present/Absent	GCN Maximum Count	Other Amphibians/Fish (Maximum counts)
Mill Village	Absent		1 Toad 1 smooth newt Fish
Spa Pond	Absent		6 smooth newts Fish
Eco Pool	Absent		11 smooth newts
Pond A	Present	3 male, 4 female GCN	8 smooth newts 3 frogs 3 toads
Pond B	Absent		7 smooth newts 1 toad Fish
Pond 11	Present	5 male, 2 female GCN	1 smooth newt 1 frog
Pond 10	Present	2 male, 3 female GCN	1 smooth newt
Pond 8	Present	1 male	4 smooth newt

6.6 Great crested newts were recorded in four ponds during the amphibian surveys with populations recorded in ponds A, 8, 10 and 11. The locations of the GCN ponds are shown in Figure 14.

6.7 GCN eggs were found in pond A and pond 8 both of which were recorded on the 3rd of June. The absence of eggs in other ponds may be a result of the presence of fish, or the absence of suitable egg laying vegetation. GCN are therefore likely to be present throughout all suitable terrestrial habitats in the 250m surrounding these ponds and careful consideration should be given to any habitat management in these areas to ensure that GCN are not killed, injured or disturbed.

6.8 A good diversity of amphibian species were present throughout the ponds. With Common toad being found in three ponds and frogs in two. Smooth newts (*Lissotriton vulgaris*) were present in every pond surveyed.

6.9 Fish were recorded in Mill village pond, Spa pond and pond B.

7.0 BROWN HAIRSTREAK

7.1 Surveys for Brown hairstreak butterfly eggs were undertaken by members of Gloucestershire Butterfly Conservation. The hedgerows along the edge of Swill Meadow were searched with a total of 100 eggs being found. An additional 64 eggs were recorded on Lower Mill Estate in the surrounding area. All eggs were in Gloucestershire, one of only two confirmed sites for the butterfly in this county. Twenty-nine more eggs were found than last year which is very encouraging. Blackthorn is now incorporated into all hedgerow mixes in the development so it is hoped that the Brown hairstreak population will eventually spread through the developed areas too.

7.2 Blackthorn on Swill Meadow is being coppiced on rotation to encourage the year one and two growth that the butterflies prefer to lay eggs on.

8.0 ODONATA

Methods

8.1 Five surveys were completed in 2021 on the 18th May, 20th June, 15th July, 11th August and the 7th September. The weather in May and into June was wet, cold and windy. This again delayed the start of the survey work and greatly impacted the second survey in June that was spread over two days. However, the surveys were well spread out with the weather towards the latter surveys being excellent.

8.2 The same 11 transects as 2018 were surveyed. Some transects did not hold a lot of odonata, presumably due to habit changes as the Estate matures. However, the surveyor felt it is important to carry on surveying these, so the results are comparable.

The following transects were therefore surveyed in 2021:

- NEW1
- NEW2
- NEW3
- NEW4
- OLD1
- OLD2
- OLD4
- OLD6
- OLD8
- OLD9
- OLD10

Results

8.3 The survey results for odonata recorded in 2021 are summarised in Table 12

Table 12: Summary of Odonata Survey Results 2021

Common name	Scientific name	Max count	Transects present
Beautiful demoiselle	*Calopteryx virgo*	1	1
Banded demoiselle	*Calopteryx splendens*	6	3
Emerald damselfly	*Lestes sponsa*	8	1
Large red damselfly	*Pyrrhosoma nymphula*	19	5
Blue-tailed damselfly	*Ischnura elegans*	212	11
Common blue damselfly	*Enallagma cyathigerum*	7257	11
Azure damselfly	*Coenagrion puella*	114	10
Red-eyed damselfly	*Erythromma najas*	435	8
Hairy dragonfly	*Brachytron pratense*	0	0
Brown hawker	*Aeshna grandis*	13	8
Southern hawker	*Aeshna cyanea*	6	5
Migrant hawker	*Aeshna mixta*	36	9
Emperor	*Anax imperator*	11	7
Downy emerald	*Cordulia aenea*	7	4

Broad-bodied chaser	*Libellula depressa*	1	1
Four-spotted chaser	*Libellula quadrimaculata*	14	7
Black-tailed skimmer	*Orthetrum cancellatum*	25	7
Common darter	*Sympetrum striolatum*	36	11
Ruddy darter	*Sympetrum sanguineum*	71	10

8.4 In total, 18 species were recorded in 2021, the same number as 2018. The main species recorded was Common blue damselfly (*Enallagma cyathigerum*), although there was a significant decline in numbers recorded, presumably due to the very poor early season weather reducing numbers or making the adults much less visible.

8.5 Hairy dragonfly (*Brachytron pratense*) was not recorded in 2021, whereas a single male Broad-bodied chaser (*Libellula depressa*) was observed, having been absent in 2018.

8.6 In the previous two surveys it was noted that Azure damselfly (*Coenagrion puella*) was perhaps added in with Common blue damselfly. This species was counted separately in the 2021 surveys so its number may appear higher than in previous years.

8.7 Other generalist species including Blue-tailed damselfly (*Ischnura elegans*), Emperor (*Anax Imperator*), Brown hawker (*Aeshna grandis*), Black-tailed skimmer (*Orthetrum cancellatum*), Four-spotted chaser (*Libellula quadrimaculata*) and Common darter (*Sympetrum striolatum*) were also common and widespread across the site as whole. Other large hawkers occurred in lower number across the site but are considered to be probably breeding here.

8.8 Early spring species such as Hairy dragonfly and Downy emerald (*Cordulia aenea*) are probably more common on the site but under-recorded as they have very short flight seasons and also tend to fly over open water which is very difficult to survey on the majority of the transects.

8.9 The Emerald damselfly (*Lestes sponsa*) is only found in the ponds in the NEW4 transect and this transect should be managed accordingly as is almost unique on the site.

9.0 RECOMMENDATIONS

Wintering waterbirds

9.1 Increasing the area of reedbed could be of benefit to birds such as Water rail both wintering and breeding. It would also benefit breeding birds such as Reed, Sedge, Cetti's warblers, as well as overwintering, and potentially breeding, Bittern. A Bittern was heard booming around site in spring 2019 and in January 2021 grounds staff reported hearing one around Somerford Lagoon. The Bittern is slowly increasing in numbers in the UK.

9.2 The creation of graded, shallow margins around some edges of the lakes could encourage wintering waders.

Breeding waterbirds

9.3 The development of greater areas of reed bed would be beneficial to summer warblers and Water rail and would provide greater cover for species such as Coot and Moorhen.

New reed beds are proposed for Minety Lake, Barberry Lake and around the edges of Spinney Lake.

9.4 Further to this, shallow margins or wet scrapes may encourage wintering waders including lapwing (*Vanellus vanellus*) and mute swan which have been declining at the site.

9.5 Boat surveys may be beneficial to enhance the breeding waterbird surveys as areas of the shoreline of several lakes are inaccessible for survey and nesting birds may be missed. This is particularly the case for Swillbrook Lakes**.**

Breeding terrestrial birds

Nightingales

9.6 Modification of the survey scope and methods should be considered, including the possibility of acoustic monitoring at key sites. As stated in the 2015 monitoring report, Nightingale are well known niche specialists, therefore it is important that the right mixture of ages of suitable habitat is maintained in the long-term (which can be secured through appropriate habitat management). There is good tree canopy connectivity throughout the site, but further areas of dense scrub, coppice or thicket would be beneficial both to nightingales and other terrestrial bird species, suggested areas are shown in 15.

House martin

9.7 Mud supplies should be made available from at least mid-April until the end of June for the house martins to make nests. There are also a number of artificial boxes on unsuitable sites, these could be re-sited. Discussing with residents about artificial nests where halos only are on walls will also be beneficial. They can be erected in a spot that is more user-friendly for the residents.

Bats and bat lofts

9.8 Consideration could be given to leaving static loggers in the bat lofts on two separate occasions (pre- and post-birth) for periods of five nights to capture any visiting bats and night roosting bats. This would help with any further species-specific refinements to the lofts in the future and should be considered if use of the bat lofts by bats increases.

9.9 Checks for evidence of use by bats could be undertaken at separate times of the year, for example in October at the end of the bat season. If any droppings are found, these could be sent off for eDNA analysis to further refine the mitigation for these species.

Amphibians

9.10 Ponds 10 and 11 would benefit from species such as Floating sweetgrass (*Glyceria spp*.), Water mint (*Mentha aquatica*) and Water forget-me-not (*Myosotis scorpiodes*). Egg laying and egg surveys could also benefit from artificial egg strips being placed. It is likely that if access to both these ponds and pond 8 were improved, the GCN count would be higher than what is currently achieved.

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APPENDIX A: WINTERING WATERBIRDS 2021 -2022

APPENDIX A: WINTERING WATERBIRDS 2021 – 2022

	2021								2022						
	Oct		Nov		Dec		Jan		Feb		Mar				
Species	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Min**	**Peak**	**Mean**
Coot	150	222	326	213	218	151	165	188	118	86	95	50	50	326	165
Gadwall*	49	53	17	81	67	86	21	57	37	12	26	14	12	86	43
Great crested grebe	38	37	39	31	26	28	30	25	29	19	25	27	19	39	30
Pochard**	0	0	0	1	6	3	1	17	12	0	3	0	0	17	4
Tufted duck	111	99	111	192	136	77	155	165	201	134	177	198	77	201	146
Canada goose	0	0	2	23	13	23	104	9	10	11	9	16	0	104	18
Cormorant	38	39	31	59	33	36	18	27	22	18	14	4	4	59	28
Egyptian goose	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0
Goldeneye**	0	0	5	16	10	26	20	32	15	15	21	14	0	32	15
Goosander	0	0	0	4	1	10	51	23	40	19	8	1	0	51	13
Great white egret	0	1	0	0	1	1	0	0	0	0	0	0	0	1	0
Grey heron	4	6	3	8	6	4	16	3	1	5	12	6	1	16	6
Greylag goose	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0
Kingfisher	4	3	1	2	2	1	2	2	3	2	5	2	1	5	2
Little egret	0	0	0	0	0	0	1	2	0	1	0	0	0	2	0
Little grebe	0	0	0	0	1	2	0	0	0	0	0	0	0	2	0
Mallard*	148	86	126	142	136	145	93	65	102	60	62	53	53	148	102
Moorhen*	32	21	40	49	35	36	57	33	40	50	42	33	21	57	39
Mute swan	62	68	74	44	42	56	25	15	24	38	32	30	15	74	43
Pintail*	6	0	0	0	0	0	0	0	0	0	0	0	0	6	1
Red crested pochard	0	0	18	0	0	65	24	12	34	34	24	19	0	65	19
Shoveler*	0	0	0	0	5	2	6	4	0	0	8	3	0	8	2
Smew**	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0
Teal*	0	0	19	11	3	22	78	95	60	19	0	8	0	95	26
Water rail	3	0	13	10	4	7	9	3	3	1	1	0	0	13	5
Wigeon*	48	74	59	80	96	106	102	87	74	48	64	34	34	106	73
Total	694	711	887	970	847	893	985	872	834	582	641	526			780
Species	13	12	16	17	21	21	20	20	18	18	19	18			

LME Priority species
*BoCC5 Amber-listed
**Bocc5 Red-listed

APPENDIX B: LME PRIORITY SPECIES LAKE BY LAKE

APPENDIX B: LME PRIORITY SPECIES LAKE BY LAKE

Lake 41 Freeth Mere		
Species	**Peak**	**Mean**
Coot	98	36
Gadwall	66	26
Great crested grebe	9	4
Pochard	3	0
Tufted duck	51	24

Lake 42 Farmhouse Lake		
Species	**Peak**	**Mean**
Coot	13	7
Gadwall	3	1
Great crested grebe	7	4
Pochard	3	0
Tufted duck	19	9

Lake 44 Mill Lake		
Species	**Peak**	**Mean**
Coot	24	14
Gadwall	8	2
Great crested grebe	6	2
Pochard	14	2
Tufted duck	25	11

Lake 45 Clearwater Lake		
Species	**Peak**	**Mean**
Coot	1	0
Gadwall		
Great crested grebe		
Pochard		
Tufted duck	1	0

Lakes 46/8 Swillbrook Lakes		
Species	**Peak**	**Mean**
Coot	9	1
Gadwall	4	2
Great crested grebe	7	3
Pochard	3	0
Tufted duck	27	8

Lake 47 Howell's Mere		
Species	**Peak**	**Mean**
Coot		
Gadwall		
Great crested grebe	1	0
Pochard		
Tufted duck	10	1

Lake 57 Somerford Lagoon		
Species	**Peak**	**Mean**
Coot	184	83
Gadwall	45	12
Great crested grebe	25	14
Pochard	12	1
Tufted duck	167	92

Lake 58 Flagham Fen		
Species	**Peak**	**Mean**
Coot	39	23
Gadwall	4	1
Great crested grebe	4	1
Pochard		
Tufted duck	5	1

Lake 77 Spinney Lake		
Species	**Peak**	**Mean**
Coot	2	1
Gadwall		
Great crested grebe	1	0
Pochard		
Tufted duck	5	1

A blank box indicates no birds observed

APPENDIX C: LME BREEDING WATERBIRDS 2004 – 2021

APPENDIX C: LME BREEDING WATERBIRDS 2004 – 2021

1. LME Breeding Waterbirds Lake 41, Freeth Mere (2004 – 2021)

	Year																
Species	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Black headed gull (A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Canada goose	0	0	0	0	0	0	0	0	0 to1	0	0	0	0	0	0	0	0
Common tern (A)	0	0	0	0	0	0	0	0	0	0	0 to 3	0	0	0	0	0	0
Coot	10	6	1	5 to 12	6 to 8	8	8 to 11	12 to 16	5 to 8	9 to 11	6 to 10	3 to 4	3 to 8	2 to 7	4 to 6	2	3 to 4
Gadwall (A)	0	1	1	1 to 2	0	1	3	0 to 4	0	0	0	0	0 to 2	0	0 to 1	0	0 to 1
Great crested grebe	3	2	1	3 to 7	3 to 4	1 to 3	3 to 4	6 to 8	2 to 3	3 to 5	5 to 7	3	3 to 5	4	2 to 3	4	3
Greylag goose (A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lapwing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Little grebe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Little ringed plover	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mallard (A)	7	7	3	1 to 3	4 to 7	3 to 5	2 to 3	2+	0 to 3	0 to 5	2 to 3	0	1 to 7	3	1 to 3	0	2
Moorhen	1	1	1	1	0 to 1	0 to 1	1	1	0 to 2	0	0 to 1	2	3	1	1	1 to 2	0 to 1
Mute swan (A)	0	0	0	1	1	0 to 1	1	1	1	1	1	2	1	1	1	0	1
Red crested pochard	0	0	0	0	0	0 to 2	0 to 1	1 to 2	0 to 1	0	0	0	0	0	0	0	0
Ruddy duck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shelduck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tufted duck	0	2	4	1 to 4	1 to 3	1	2	8 to 10	0	1 to 4	0	1 to 2	1	1 o 4	2 to 3	0	1
Water rail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**21**	**19**	**13**	**13 to 30**	**15 to24**	**14 to22**	**21 to27**	**31 to 44**	**8 to18**	**14 to 26**	**14 to 25**	**11 to 13**	**12 to27**	**12 to 20**	**11 to 18**	**7 to 8**	**10 to 13**
Species	**5**	**6**	**7**	**7**	**6**	**8**	**9**	**8**	**7**	**5**	**6**	**5**	**7**	**6**	**7**	**3**	**7**

2. LME Breeding Waterbirds Lake 42, Farmhouse Lake (2004 – 2021)

	Year																
Species	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Black headed gull (A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Canada goose	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common tern (A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coot	4	4	7	6	10	9 to 10	9 to 10	9 to 10	9	4 to 6	1 to 5	3	2 to 6	4 to 5	2 to 3	3	3 to 5
Gadwall (A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 to 1	0	0
Great crested grebe	2	1	1	1	1	2	2	2	1 to 2	1	1	1	1	2	2 to 3	1	1
Greylag goose (A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lapwing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Little grebe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Little ringed plover	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mallard (A)	1	7	2+	1	1	1	3 to 4	1 to 3	0	2	3	1	1 to 3	1 to 2	1	0 to 1	2
Moorhen	0	1	1	2	1	1	1	1	1	2	1	0 to 1	0 to 1	0	0 to 1	1	1 to 2
Mute swan (A)	1	1	1	1	1	1	1	1	1	0 to 1	1	0	0	0	0	0	0 to 1
Red crested pochard	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ruddy duck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shelduck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tufted duck	0	1	0	0	0	1	0 to 1	2 to 4	0 to 1	1 to 2	0	2	0 to 2	1 to 3	0 to 2	1 to 2	1
Water rail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**8**	**15**	**12+**	**11**	**14**	**9 to 11**	**16 to 19**	**16 to 21**	**12 to 14**	**10 to 15**	**7 to 12**	**7 to 8**	**4 to 13**	**9 to 13**	**5 to 11**	**6 to 8**	**8 to 12**
Species	**4**	**6**	**5**	**5**	**5**	**6**	**6**	**6**	**5**	**6**	**5**	**5**	**5**	**4**	**6**	**5**	**6**

3. LME Breeding Waterbirds Lake 44, Mill Lake (2004 – 2021)

	Year																
Species	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Black headed gull (A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Canada goose	0	0	0	0	0	0 to 1	0	0	0	0	0	0	0	0	0	0	0
Common tern (A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coot	5	11	7	9 to 14	9	12	9 to 10	10	8 to 11	5 to 7	2 to 4	2 to 3	1 to 4	3 to 5	5	2 to 4	4 to 7
Gadwall (A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Great crested grebe	1	1	1	1	1	1 to 2	2	2	1	1	2	1	3	1	1	2	1
Greylag goose (A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lapwing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Little grebe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Little ringed plover	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mallard (A)	1	1	1	1 to 2	1 to 2	2	3 to 5	0	0 to 1	0 to 1	0	0	0	0	0	0	0
Moorhen	0	2	2	3	1 to 2	3	2	2	1	0 to 1	0 to 1	1	0 to 2	1	0	0	1
Mute swan (A)	0	1	1	1	1	1	1	1	1	0	0	0 to 1	0	1	0 to 1	1	1
Red crested pochard	0	0	0	0	1	0	1	0 to 1	0	0	0 to 2	0	0	2	0	0 to 1	0 to 1
Ruddy duck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shelduck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tufted duck	0	1	1	0	0	1	0 to 1	1 to 2	1	1 to 2	0	0 to 1	0 to 2	1 to 2	1	1 to 2	1
Water rail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**8**	**17**	**13**	**15 to 21**	**14 to 16**	**20 to 22**	**17 to 21**	**16 to 18**	**12 to 16**	**7 to 12**	**4 to 9**	**4 to 7**	**4 to 11**	**9 to 13**	**7 to 8**	**6 to 10**	**8 to 12**
Species	**3**	**6**	**6**	**5**	**6**	**7**	**7**	**6**	**6**	**5**	**4**	**5**	**4**	**6**	**4**	**5**	**6**

4. LME Breeding Waterbirds Lake 45, Clearwater (2004 – 2021)

	Year																
Species	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Black headed gull (A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Canada goose	0	1	1	3	0	0	0	0 to 1	0	0	0	0	0	0	0	0	0
Common tern (A)	0	0	2	1	1	0	0	0	0 to 1	0	0	0	0	0	0	0	0
Coot	0	3	1	3	3	2	2	3	1	2 to 3	0	0 to 1	1	0	0	1	1
Gadwall (A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Great crested grebe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Greylag goose (A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lapwing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Little grebe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Little ringed plover	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mallard (A)	0	0	0	0	1	0	0	1	0 to 1	0 to 1	1	0 to 1	0 to 1	0	0	0	1
Moorhen	0	2	1	2	1	0 to 1	1	1	2	0 to 1	0	1	2	1	1	1	0 to 1
Mute swan (A)	0	0	1	1	1	1	1	0 to 1	1	1	1	1	0 to 1	0	0 to 1	0	0 to 1
Red crested pochard	0	0	0	0	0	1	0 to 1	0	1	0	0	0	1	0	0	0	0
Ruddy duck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shelduck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tufted duck	0	0	0	0	1 to 2	0 to 1	0 to 1	0	0 to 1	0	0	0	0	0 to 1	0	0	0
Water rail	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**0**	**6**	**6**	**11**	**8 to 9**	**6 to 9**	**4 to 6**	**5 to 7**	**5 to 8**	**3 to 6**	**2**	**2 to 4**	**4 to 6**	**1 to 2**	**1 to 2**	**2**	**2 to 4**
Species	**0**	**3**	**5**	**6**	**6**	**5**	**5**	**5**	**7**	**4**	**2**	**4**	**5**	**2**	**2**	**2**	**4**

5. LME Breeding Waterbirds Lake 47, Howells Mere (2004 – 2021)

	Year																
Species	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Black headed gull (A)							0	0	0	0	0	0	0	0	0	0	0
Canada goose							0	0	0	0	0	0	0	0	0	0	0
Common tern (A)							0	0	0	0	0	0	0	0	0	0	0
Coot							1	3	1	0 to 1	1	2 to 3	0	1	0	0	0
Gadwall (A)							0	0	0	0	0	0	0	0	0	0	0
Great crested grebe							0	0	0	0	0	0	0	0	0	0	0
Greylag goose (A)							0	0	0	0	0	0	0	0	0	0	0
Lapwing							0	0	0	0	0	0	0	0	0	0	0
Little grebe							0	0	0	0	0	0	0	0	0	0	0
Little ringed plover							0	0	0	0	0	0	0	0	0	0	0
Mallard (A)		No data collected					0	1	0	0 to 1	0	1	0	0 to 1	1	0	1
Moorhen							0	0	0	0	0	1	0	0 to 1	1	0 to 1	0
Mute swan (A)							1	1	0 to 1	1	1	1	1	0	0	0	0
Red crested pochard							0	0	0	0	0	0	0	0	0	0	0
Ruddy duck							0	0	0	0	0	0	0	0	0	0	0
Shelduck							0	0	0	0	0	0	0	0	0	0	0
Tufted duck							0	0	0	0	0	0	0	0	0	0	0
Water rail							0	0	0	0	0	0	0	0	0	0	0
Total							**2**	**5**	**1 to 2**	**1 to 3**	**2**	**5 to 6**	**1**	**0 to 2**	**2**	**0 to1**	1
Species							**2**	**3**	**1**	**3**	**2**	**4**	**1**	**2**	**2**	**1**	1

6. LME Breeding Waterbirds Lake 57, Somerford Lagoon (2004 – 2021)

	Year																
Species	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Black headed gull (A)	0	0	0	0	3 to 4	4 to 5	6 to 9	10	5 to 10	8 to 12	c11	9	3	1	0 to 7	3 to 5	3 to 5
Canada goose	2	2	3	1 to 3	5 to 7	1 to 5	1 to 5	1 to 2	0 to 1	0	0	0	0	1	0	0	0
Common tern (A)	0	2	1	3 to5	3 to 6	1 to 4	2 to 3	3 to 4	1 to 2	2 to 3	0 to 3	0 to 3	1	0	0	1 to 5	0
Coot	20	9	8+	4 to 8	10 to 11	23 to 24	21 to 23	10 to 16	6 to 13	11 to 15	2 to 7	3 to 5	4 to 6	7 to 10	3 to 6	4 to 6	5 to 6
Gadwall (A)	0	2	0	1	1	0 to 1	2	0 to 1	0	0	0	0	0	0	0	0	0
Great crested grebe	3	1	3	3 to 5	4	2 to 5	6 to 9	6 to 8	3 to 4	3 to 4	3 to 4	3	2 to 4	3 to 5	3 to 6	2 to 5	2 to 6
Greylag goose (A)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Lapwing	0	0	0	0	0	0	0 to 1	0 to 1	0	0	0	0	0	0	0	0	0
Little grebe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Little ringed plover	0	1	0 to 1	0	1	1	0	0	0	0	0	0	0	0	0	0	0
Mallard (A)	3	3	4	4 to 5	1 to 3	1 to 2	1 to 3	2 to 5	1 to 2	0 to 2	4	0 to 1	1 to 5	1 to 3	1 to 4	0 to 1	3
Moorhen	2	1	1+	1 to 2	4	2 to 3	3	2	2	3	3	1 to 3	1 to 2	4 to 5	1 to 3	0 to 2	1
Mute swan (A)	2	0	1	1	1	1	2	1	1	1 to 2	2	1 to 2	0	1	0	1	0
Red crested pochard	2	1	1	0 to 2	2 to 4	1 to 6	3 to 4	0 to 1	0 to 1	0	0 to 1	0	0	0	1	0 to 1	0 to 1
Ruddy duck	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shelduck	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Tufted duck	0	7	3	2 to 8	2 to 3	2 to 3	0 to 10	3 to 10	1 to 6	0 to 3	3	1	0 to 1	0 to 3	0 to4	0 to 3	0 to 1
Water rail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**34**	**29**	**26**	**20 to 40**	**38 to 50**	**39 to 60**	**47 to 74**	**39 to 62**	**20 to 42**	**28 to 44**	**28 to 43**	**18 to 27**	**12 to 22**	**18 to 29**	**9 to 31**	**10 to 22**	**15 to 24**
Species	**7**	**10**	**11**	**10**	**13**	**11**	**12**	**13**	**10**	**8**	**9**	**8**	**7**	**8**	**7**	**9**	**9**

7. LME Breeding Waterbirds Lake 58, Flagham Fen (2004 – 2021)

	Year																
Species	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Black headed gull (A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Canada goose	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common tern (A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Coot	3	4	2	9 to 10	11 to 13	10 to 13	10 to 13	18	10 to 11	12	3 to 6	3 to 4	3 to 6	1	2	1	1
Gadwall (A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Great crested grebe	2	1	1	1 to 2	4	2 to 3	2 to 3	2	2	2	1	1	1	0 to 1	1	1	1
Greylag goose (A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lapwing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Little grebe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Little ringed plover	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mallard (A)	3	4	2	1 to 2	1	1 to 2	3 to 4	3 to 4	1	1 to 3	2	0 to 1	1	1	1	2	1
Moorhen	1	1	1	1 to 3	1	1	1	0	0	0	0 to 1	1	0	0	0	0 to 1	0
Mute swan (A)	1	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0
Red crested pochard	0	1	0	0	0 to 1	2	2	1 to 2	1	0	0	1	0	0	0	0	0
Ruddy duck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shelduck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tufted duck	1	0	0	2 to 4	1 to 2	0 to 2	1 to 2	1 to 2	0 to 1	0	0	0	0 to 1	0 to 2	0	0	0
Water rail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**11**	**11**	**7**	**15 to 22**	**19 to 23**	**15 to 24**	**16 to 24**	**25 to 28**	**15 to 17**	**13 to 15**	**6 to 10**	**6 to 8**	**5 to 9**	**2 to 5**	**4**	**4 to 5**	**6**
Species	**6**	**5**	**5**	**6**	**7**	**6**	**6**	**5**	**6**	**2**	**4**	**5**	**4**	**4**	**3**	**4**	**5**

8. LME Breeding Waterbirds Lake 77, Spinney Lake (2004 – 2021)

	Year																
Species	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Black headed gull (A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Canada goose	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Common tern (A)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Coot	7	3	3	4 to 8	7	7	5	4	3	4	1 to 2	1	1 to 2	1	2	1	1
Gadwall (A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0 to 1	0	0	0
Great crested grebe	1	1	1	1	1	1	0 to 1	1	1	1	0	0	0 to 1	0 to 1	0 to 1	0 to 1	0 to 1
Greylag goose (A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lapwing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Little grebe	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Little ringed plover	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Mallard (A)	1	3	3	1	1 to 2	0 to 1	2	1 to 2	0	0 to 1	0 to 1	1	1	0 to 1	0 to 1	0	1
Moorhen	0	1	1	2	1	0 to 1	0	1	0	0	1 to 2	0 to 2	0 to 2	1 to 2	1 to 2	1	0 to 3
Mute swan (A)	0	1	1	1	0	1	1	1	1	1	0 to 1	0	0 to 1	1	1	1	1
Red crested pochard	0	0	0	0	0	0 to 1	0	0	0	0	0 to 1	0	0	0	0	0	0
Ruddy duck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shelduck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tufted duck	1	3	2	3	3 to 4	0 to 1	3 to 4	1 to 3	1 to 2	2	0 to 1	1	1	0 to 1	0 to 1	0 to 1	0 to 1
Water rail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**10**	**13**	**11**	**13 to 17**	**14 to 16**	**9 to 14**	**11 to 13**	**10 to 13**	**6 to 7**	**8 to 9**	**2 to 10**	**3 to 5**	**3 to 8**	**3 to 8**	**4 to 8**	**3 to 5**	**5 to 10**
Species	**4**	**6**	**6**	**6**	**5**	**7**	**5**	**7**	**4**	**5**	**6**	**4**	**6**	**7**	**6**	**5**	7

APPENDIX D: LME BREEDING WATERBIRDS (ALL LAKES) 2001 – 2006

APPENDIX D: LME BREEDING WATERBIRDS (ALL LAKES) 2001 – 2006

	Year				
Species	**2001**	**2003**	**2004**	**2005**	**2006**
Black headed gull	0	0	0	0	0
Canada goose	0	0	0	0	0
Common tern	0	0	1	3	3
Coot	45	95	49	39	29
Gadwall	0	0	0	3	1
Great crested grebe	16	39	12	7	8
Greylag goose	0	0	0	0	0
Lapwing	0	0	0	0	0
Little grebe	0	0	0	0	0
Little ringed plover	0	0	0	0	0
Mallard	14	26	16	15	15
Moorhen	7	0	4	10	10
Mute swan	7	36	5	6	6
Red crested pochard	0	0	0	0	0
Ruddy duck	0	0	0	0	1
Shelduck	0	0	0	0	0
Tufted duck	13	11	2	14	10
Water rail	0	0	0	0	0
Total	**183**	**207**	**92**	**107**	**91**
Species	**6**	**5**	**7**	**8**	**9**

Explanatory note: The breeding waterbird surveys were carried out by Scott Wilson in 2001 and by CWPSoc/Trust from 2003. In 2007, the method of estimating the number of territories/pairs was changed. Therefore, the results from 2007 onwards are presented separately in Appendix E below.

APPENDIX E : BREEDING WATERBIRDS (ALL LAKES) 2007 – 2021

APPENDIX E: BREEDING WATERBIRDS (ALL LAKES) 2006 – 2021

Species	2007	2008	2009	2010	2011	2012	2013	2014	2016	2017	2108	2019	2020	2021	Trend
Black headed gull (A)	0	3 to4	4 to 5	6 to 9	10	5 to 10	10	11	9	3	1	3	3 to 5	5 to 7	Stable
Canada goose	4 to 6	5 to 7	1 to 7	1 to 5	1 to 3	0-1	1	0	0	0	1	1	0	2	Declining
Common tern (A)	4 to 6	5 to 6	1 to 4	2 to 3	3 to 4	1 to 3	2 to 3	0 to 6	0 to 3	1	0	1	1 to 5	1	Declining
Coot	40 to 58	57 to 61	70 to 71	66 to 75	69 to 80	43 to 57	47 to 59	16 to 35	17 to 24	15 to 33	19 to 30	15 to 33	14 to 18	18 to 25	Declining
Gadw all (A)	2 to 3	1	1 to 2	5	0 to 5	0	0	0	0	0 to 2	0 to 1	0 to 2	0	0 to 1	Declining
Great crested grebe	10 to 14	14 to 15	1 to 1	14 to 20	19 to 23	10 to 13	11 to 14	12 to 15	9	10 to 15	10 to 14	10 to 15	10 to 14	8 to 13	Stable
Greylag goose (A)	0	1	0	0	0	0	0	0	1	0	0	1	0	1	Stable
Lapw ing	0	0	0	0 to 1	0 to 1	0	0	0	0	0	0	0	0	0	
Little grebe	0	0	0	1	1	0	0	0	0	0	0	0	0	0	
Little ringed plover	1	1	1	0	0	0	0	0	0	0	0	0	0	0	
Mallard (A)	9 to 12	10 to 17	8 to 14	15 to 20	11 to 18	2 to 8	3 to 16	12 to 14	4 to 6	5 to 18	6 to 11	5 to 18	2 to 4	11	Declining
Moorhen	12 to 17	9 to 11	6 to11	9	8	6 to 8	5 to 7	5 to 9	7 to 12	6 to 12	8 to 11	6 to 12	4 to 9	3 to 9	Declining
Mute sw an (A)	7	6	5 to 7	8	6 to 7	7 to 8	5 to 7	6 to 7	5 to 7	2 to 4	4	2 to 4	3	3 to 5	Declining
Red crested pochard	0 to 2	3 to 6	1 to 14	6 to9	2 to 4	2 to 4	2 to 3	0 to 4	1	1	2	1	0 to 2	0 to 2	Declining
Ruddy duck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Shelduck	0	0	0	0	1	0	0	0	0	0	0	0	0	0	
Tufted duck	8 to 16	8 to 4	5 to 10	5 to 21	16 to 31	3 to 12	5 to 13	3 to 4	5 to 7	2 to 8	3 to 16	2 to 8	2 to 8	3 to 5	Declining
Water rail	1	0	0	0	0	0	0	0 to 2	0	0	0	0	0	0	
Total	**98 to 143**	**123 to 150**	**112 to 162**	**134 to 186**	**147 to 198**	**79 to 142**	**91 to 133**	**65 to 156**	**58 to 79**	**45 to 97**	**54 to 91**	**47 to 99**	**36 to 68**	**55 to 82**	**Declining**
Species	**12**	**13**	**12**	**13**	**14**	**10**	**10**	**9**	**10**	**10**	**10**	**12**	**9**	**12**	**Declining**

APPENDIX F: SWBL BREEDING WATERBIRDS 2011 – 2021

APPENDIX F: SWBL BREDING WATERBIRDS 2011 – 2021

	2011	2012	2013	2014	2016	2017	2018	2019	2020	2021	Trend
Black headed gull (A)					2	0	2	0 to 1	1	2	Increasing
Canada goose	1	0 to 1	0 to 1	P	P	0 to 1	1	1	1	3	Increasing
Common tern (A)						1	8	6	3	2	Increasing
Coot	10 to 13	3 to 7	8 to 10	2 to 6	1 to 2	1 to 3	2	2	2	2	Declining
Gadwall (A)	0	0	0	0	0	0	0	0	0	0	
Great crested grebe	3	3 to 5	4 to 5	2 to 4	1 to 2	1 to 2	1 to 2	1 to 2	2	1 to 2	Declining
Greylag goose (A)	0 to 1	0 to 1	P	P	1	0	1	1	0	1	Stable
Mallard (A)	3	1 to 2	7 to 9	3	1	0 to 1	1	2 to 4	1	1 to 2	Declining
Moorhen	0 to 1	1 to 2	3 to 8	4 to 6	0	1 to 3	1 to 2	1	1	2 to 5	Stable
Mute swan (A)	1	1	1 to 2	1	1	2	1	1	1	1	Stable
Red crested pochard	0	P	0	0	0	0	0	0	0	0	
Tufted duck	2	0 to 2	0 to 2	0	1	0 to 2	0 to 1	0 to 1	0 to 1	0 to 1	Stable
Water rail	0	0	0	0 to 2	0	0	0	0	0	0	Stable
Total	**20 to 25**	**9 to 22**	**23 to 35**	**8 to 20**	**8 to 10**	**5 to 14**	**18 to 21**	**15 to 20**	**11 to 12**	**15 to 21**	**Declining**
Species	**8**	**8**	**7**	**6**	**7**	**7**	**10**	**10**	**9**	**10**	**Increasing**

APPENDIX G: LME BREEDING TERRESTRIAL BIRDS 2003 – 2021

APPENDIX G: LME BREEDING TERRESTRIAL BIRDS 2003 – 2021

Species	Territories / pairs																		
Common name	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**Trend**
Blackbird	19	6	7	8	6	11	8	9	8	12	13	13	12	6	8	9	7	8	D
Blackcap	11	11	15	19	17	28	15	22	32	29	25	23	18	18	19	24	13	26	I
Blue tit	14+	16	18	20	8	9	9	12	5	10	4	7	15	17	17	12	8	15	D
Bullfinch (A)	2	0	2	2	2	3	2	3	2	2	2	1	1	3	4	3	5	3	I
Cetti's warbler													4	3	4	6	4	4	I
Chaffinch	12	10	12	17	11	24	12	14	12	16	13	9	8	8	7	7	3	7	D
Chiffchaff	10	10+	5	4	4	7	5	13	15	11	12	11	9	7	5	7	8	12	I
Cuckoo (R)	2	3	3	2	2	2	2	2	2	2	1	1	0	1	1	0	2	2	D
Dunnock (A)	7	3	8	5	13	15	11	8	5	4	5	7	5	7	5	5	6	10	D
Garden warbler	2	4	4	5	2	8	14	10	20	20	19	18	6	12	8	9	10	6	I
Goldcrest													1	3	1	1	3	1	S
Goldfinch													2	5	5	5	3	3	S
Great spotted woodpecker															3	1	0	0	D
Great tit	10	5	11	10	6	9	9	7	11	8	2	6	3	7	8	2	3	5	D
Greenfinch	4	2	1	2	2	2	2	2	2	3	3	5	0	1	1	1	0	1	D
Green woodpecker															0	0	0	0	S
Kingfisher													1	1	0	0	1	0	D
Long-tailed tit	2	7	2	1	3	3	2	4	5	3	3	2	3	1	2	2	3	2	D
Pied wagtail	1	0	2	2	1	1	2	1	1	3	3	1	0	1	0	1	0	0	D
Reed bunting (A)	20	13	20	22	15	17	10	10	10	8	6	9	9	6	7	3	6	5	D
Reed warbler	11	2+	9	8	14	36	33	49	49	27	18	16	4	5	0	8	7	9	D
Robin	22	8	13	19	18	31	24	10	12	21	21	20	19	22	8	11	8	16	D
Sedge warbler	10	6	14	9	4	12	10	9	13	9	9	8	15	15	10	3	2	12	S
Song thrush (R)	4	6	4	2	2	2	6	7	8	10	7	11	3	4	4	6	2	1	S
Whitethroat	4	0	0	1	2	4	1	2	9	8	9	5	3	5	2	5	4	8	I
Willow warbler (A)	2	1	1	0	1	2	0	1	4	1	2	0	0	0	1	3	0	3	I
Wren	23	22	31	19	29	33	39	36	24	39	31	21	21	26	26	23	24	28	S
Total	198	140	186	180	165	262	216	231	249	248	209	194	161	183	153	157	132	187	D
Species	21	18	20	20	21	21	20	21	21	21	22	22	21	24	23	24	22	23	I

Trend (overall years shown) - D Decreasing, I Increasing, S Stable

APPENDIX H: SWBL BREEDING TERRESTRIAL BIRDS 2003 – 2021

APPENDIX H: SWBL BREEDING TERRESTRIAL BIRDS 2003 – 2021

Species	Territories / pairs										
Common name	**2011**	**2012**	**2013**	**2014**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**Trend**
Blackbird	3	3	3	7	2	3	4	3	1	3	D
Blackcap	15	16	15	11	8	7	10	7	4	8	D
Blue tit	4	4	2	2	4	7	6	5	2	6	I
Bullfinch (A)	2	1	0	1	2	1	3	1	0	1	S
Cetti's warbler	0	2	0	6	0	2	2	1	1	2	S
Chaffinch	6	5	7	9	2	0	1	2	0	1	D
Chiffchaff	10	8	7	1	5	6	6	7	5	10	S
Cuckoo (R.)	1	1	1	0	0	0	0	0	0	0	D
Dunnock (A)	4	3	4	7	2	1	1	0	1	2	D
Garden warbler	11	6	7	2	2	2	2	3	1	2	D
Goldcrest	0	3	1	1	2	2	2	2	2	2	I
Goldfinch	1	2	1	0	0	0	0	0	1	0	D
Great spotted woodpecker	1	1	1	3	0	1	1	0	0	0	D
Great tit	4	6	2	1	2	2	2	3	1	2	D
Green woodpecker	1	1	1	1	0	1	0	0	0	0	D
Jay	1	1	0	1	0	0	0	0	0	0	D
Kingfisher						1	0	0	1	1	S
Long-tailed tit	3	3	1	1	0	2	1	0	1	0	D
Reed bunting (A)	6	7	2	10	2	3	1	2	1	1	D
Reed warbler	11	11	4	0	2	0	0	1	1	0	D
Robin	4	10	6	8	7	6	5	3	3	5	D
Sedge warbler	2	1	1	1	1	1	2	3	1	2	I
Song thrush (R)	5	5	3	1	1	2	3	4	2	1	D
Tree creeper	4	3	0	1	0	0	0	0	0	0	D
Whitethroat	2	1	2	13	0	1	0	0	0	1	D
Willow warbler (A)	2	0	2	21	2	1	1	2	0	1	D
Wood pigeon	8	6	8	7	0	0	0	0	0	0	D
Wren	15	22	15	11	11	12	10	14	7	13	D
Total	128	134	95	115	57	63	63	63	36	64	D
Species	26	27	23	26	17	20	19	17	18	19	D

Trend (overall years shown) - D Decreasing, I Increasing, S Stable

FIGURES

Figure 1: Estate Context Plan

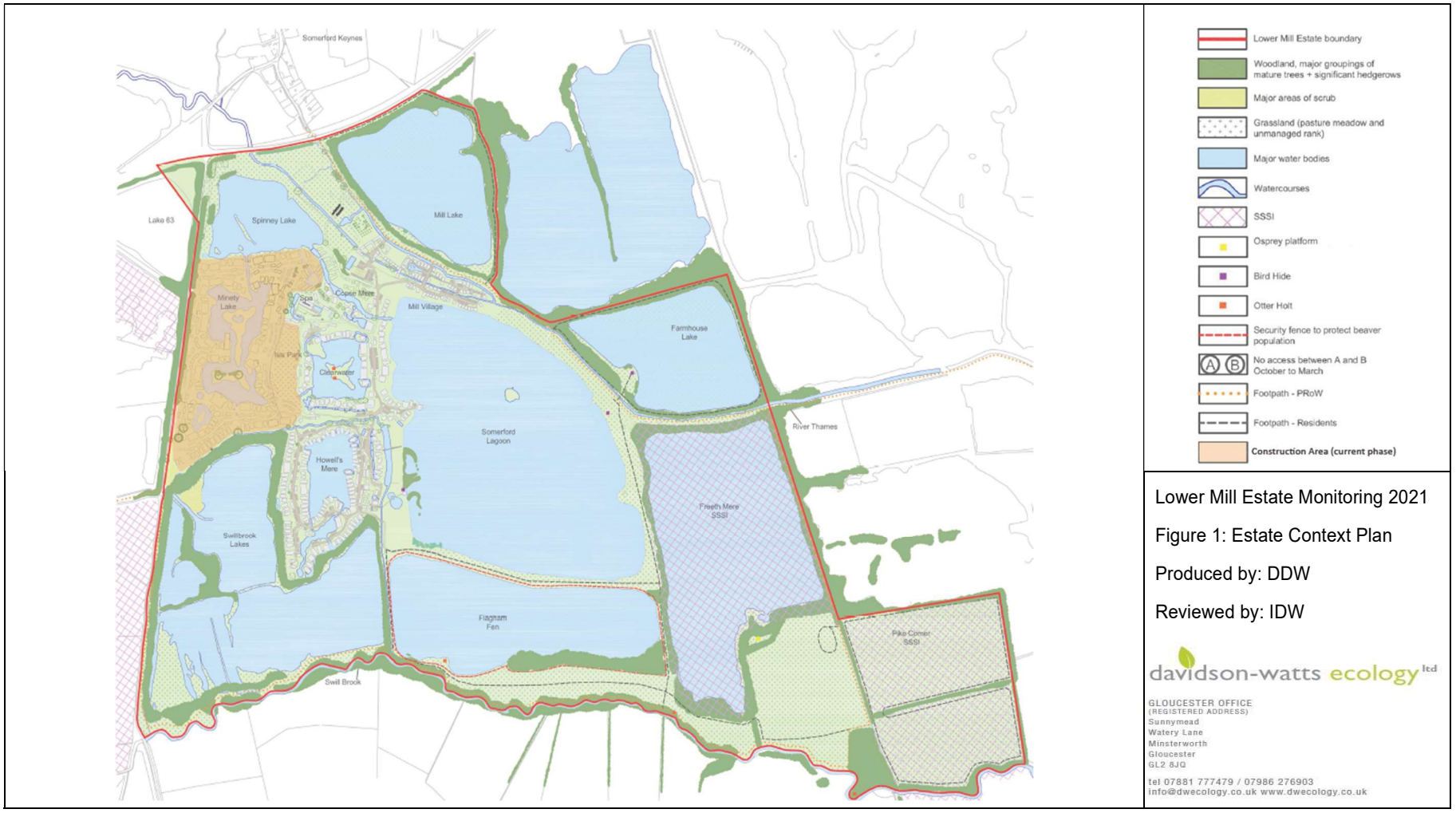
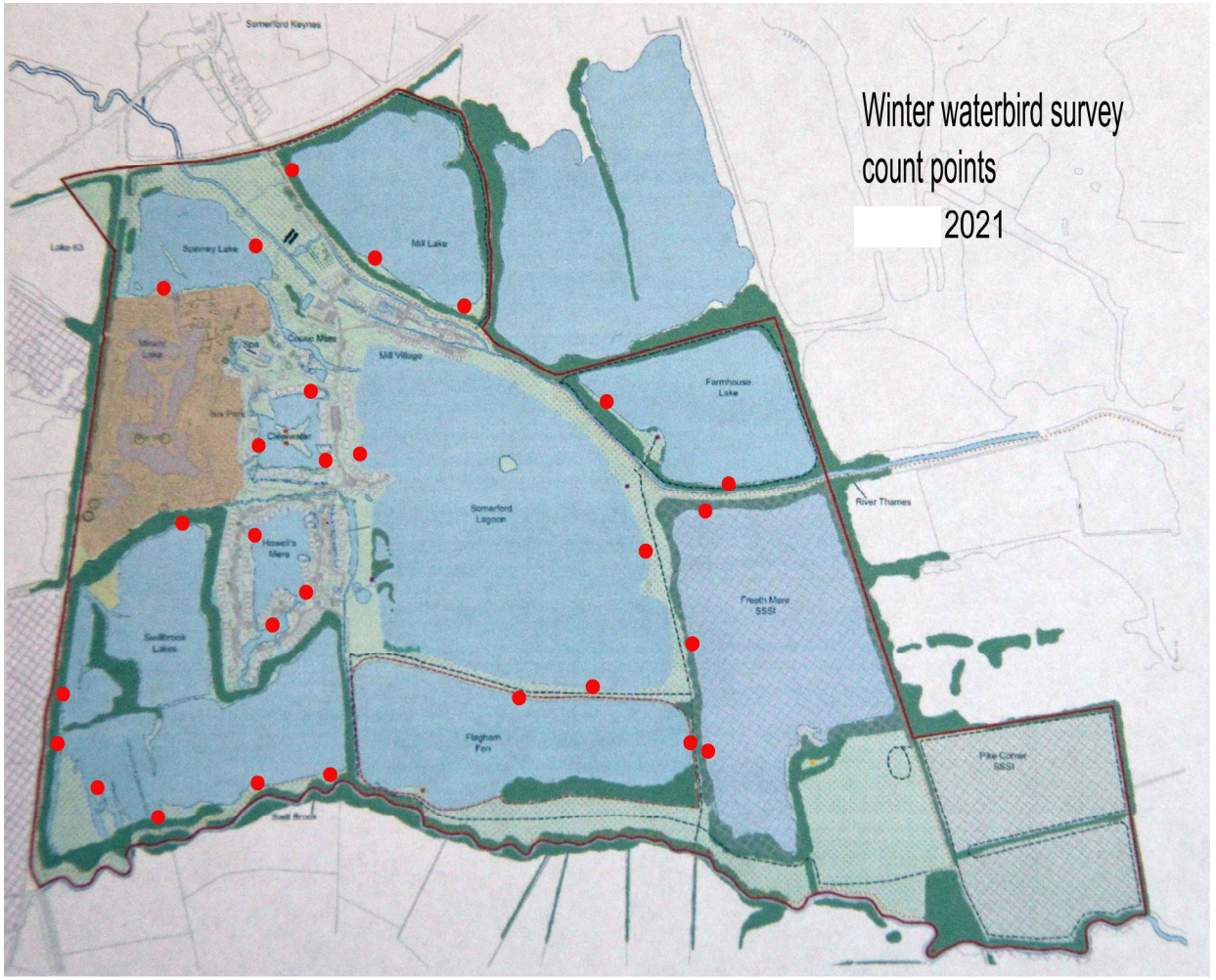


Figure 2: Wintering Waterbirds Vantage Points



KEY

Vantage point

Lower Mill Estate Monitoring 2021

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Figure 3: Wintering Waterbirds 2021 - 2022

Lake 41 Freeth Mere	Peak	Mean
Coot	98	36
Gadwall	66	26
Great crested grebe	9	4
Pochard	3	0
Tufted duck	51	24

Lake 42 Farmhouse Lake	Peak	Mean
Coot	13	7
Gadwall	3	1
Great crested grebe	7	4
Pochard	3	0
Tufted duck	19	9

Lake 44 Mill Lake	Peak	Mean
Coot	24	14
Gadwall	8	2
Great crested grebe	6	2
Pochard	14	2
Tufted duck	25	11

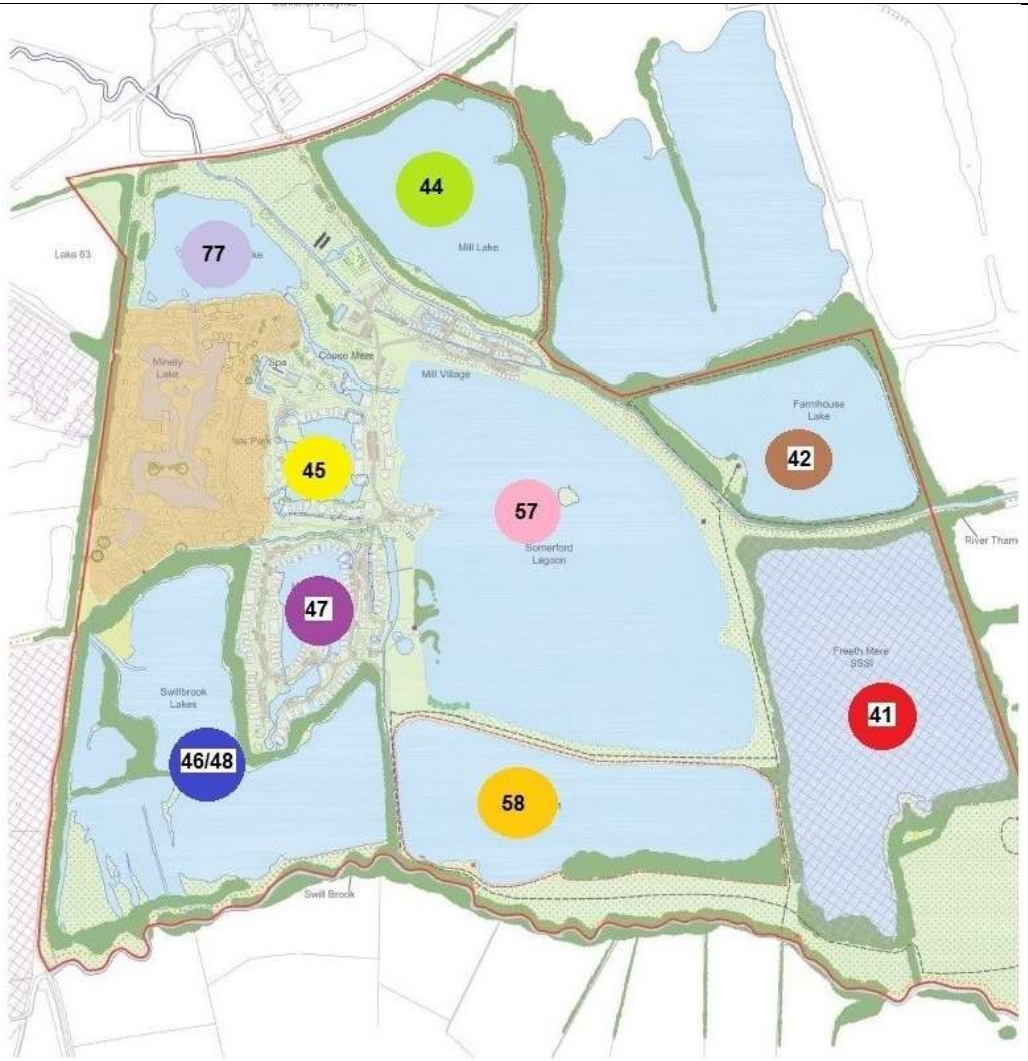
Lake 45 Clearwater Lake	Peak	Mean
Coot	1	0
Gadwall		
Great crested grebe		
Pochard		
Tufted duck	1	0

Lakes 46/8 Swillbrook Lakes		
Species	**Peak**	**Mean**
Coot	9	1
Gadwall	4	2
Great crested grebe	7	3
Pochard	3	0
Tufted duck	27	8

Lake 47 Howell's Mere		
Species	**Peak**	**Mean**
Coot		
Gadwall		
Great crested grebe	1	0
Pochard		
Tufted duck	10	1

Lake 57 Somerford Lagoon		
Species	**Peak**	**Mean**
Coot	184	83
Gadwall	45	12
Great crested grebe	25	14
Pochard	12	1
Tufted duck	167	92

Lake 58 Flagham Fen		
Species	**Peak**	**Mean**
Coot	39	23
Gadwall	4	1
Great crested grebe	4	1
Pochard		
Tufted duck	5	1



Lake 77 Spinney Lake		
Species	**Peak**	**Mean**
Coot	2	1
Gadwall		
Great crested grebe	1	0
Pochard		
Tufted duck	5	1

KEY

41 Freeth Mere

42 Farmhouse Lake

44 Mill Lake

45 Clear Lake

46/48 Swillbrook Lake

57 Somerford Lagoon

58 Flagham Fen

77 Spinney Lake

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Figure 4: Breeding Waterbirds (LME)

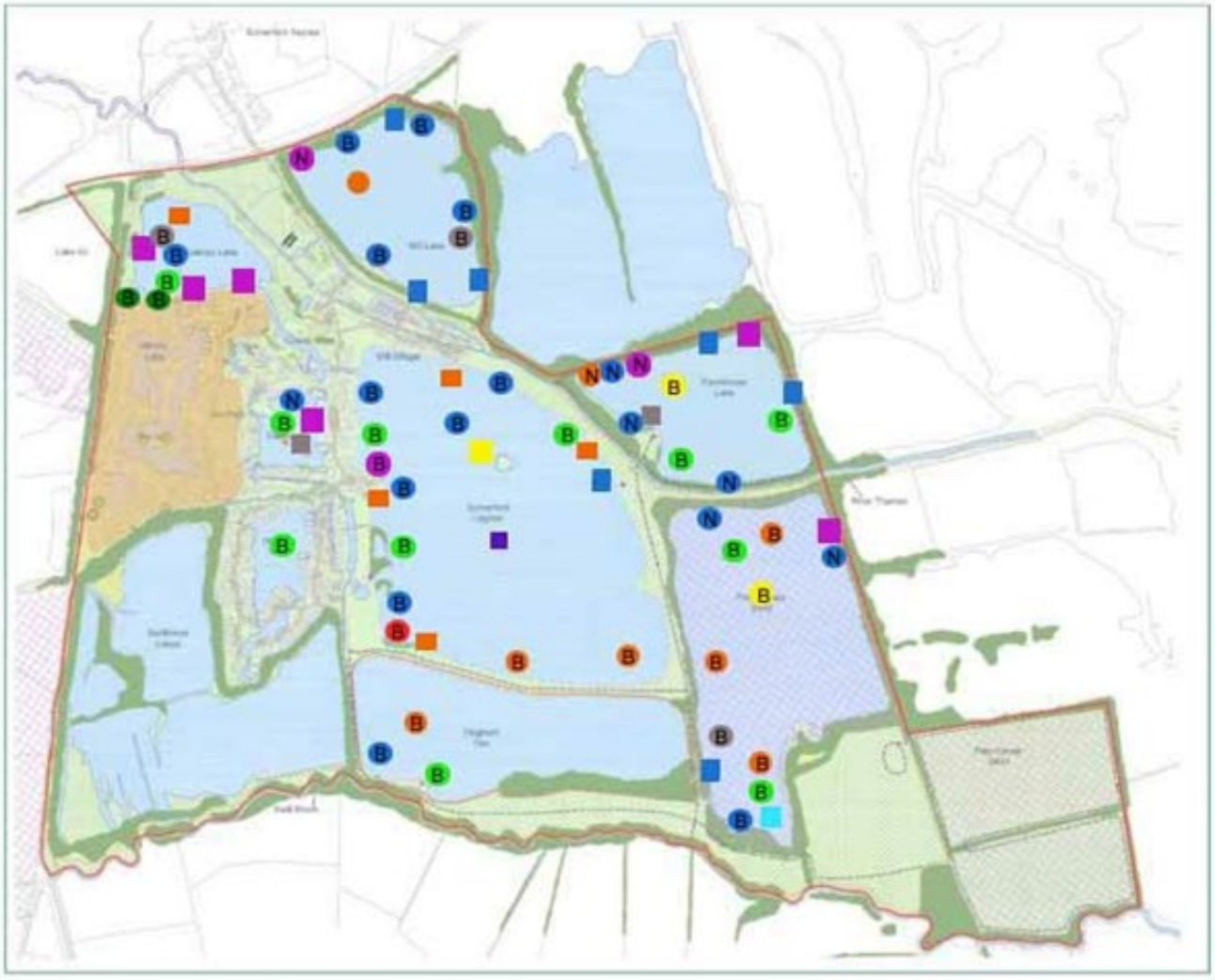

Figure 5: Breeding Waterbirds (Swillbrook Lakes)

Coot
Great crested grebe
Mallard
Moorhen
Mute swan
Canada goose
Greylag goose

Confirmed
Probable
B Brood
N Nest

Figure 6: Breeding Bird Surveys Transect Route

Key

Transect route

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Figure 7: Nightingale Transect

Key

- Transect Route

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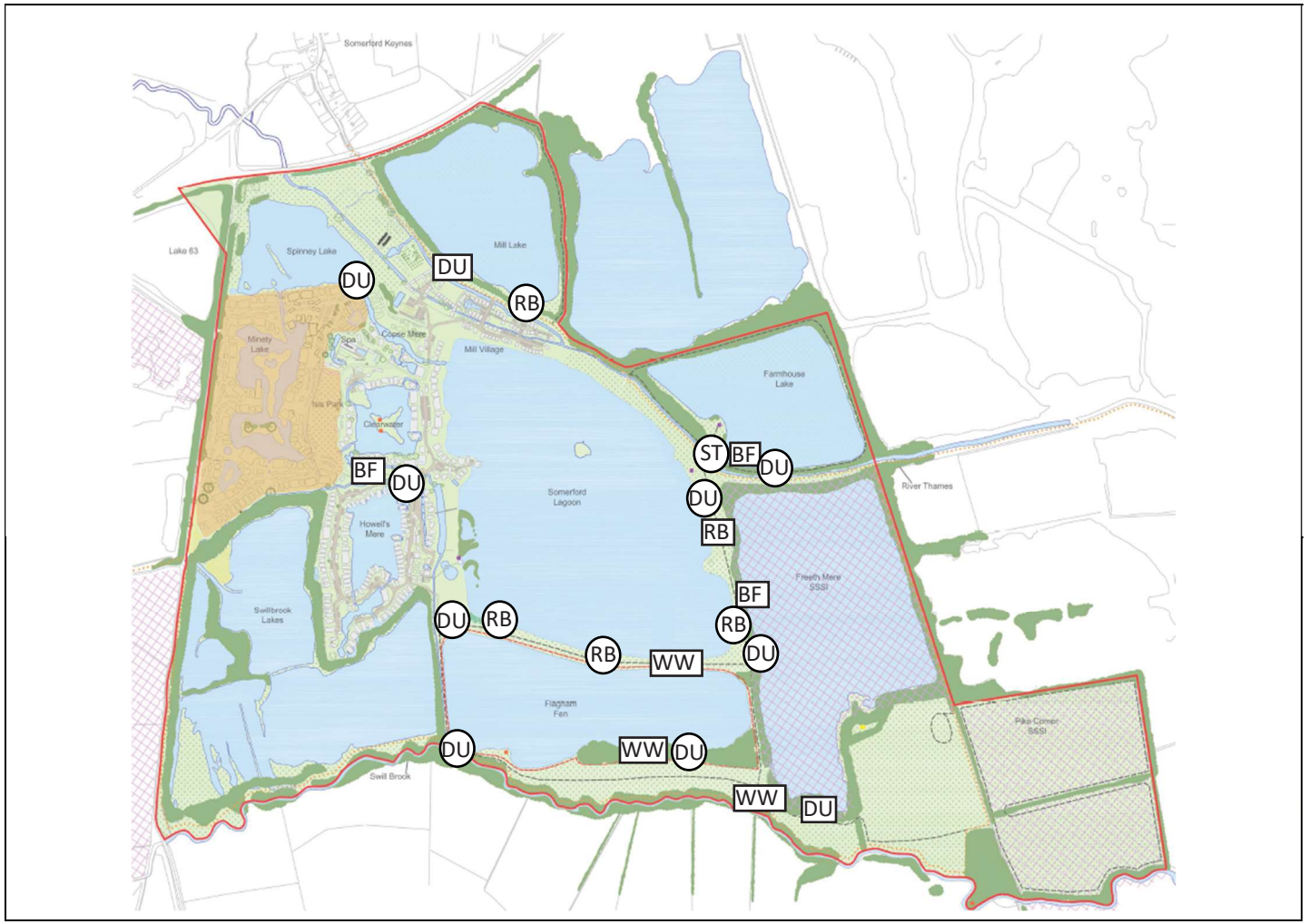
Figure 8: Tern Raft Locations

Figure 9: Red and Amber Listed Species (LME)



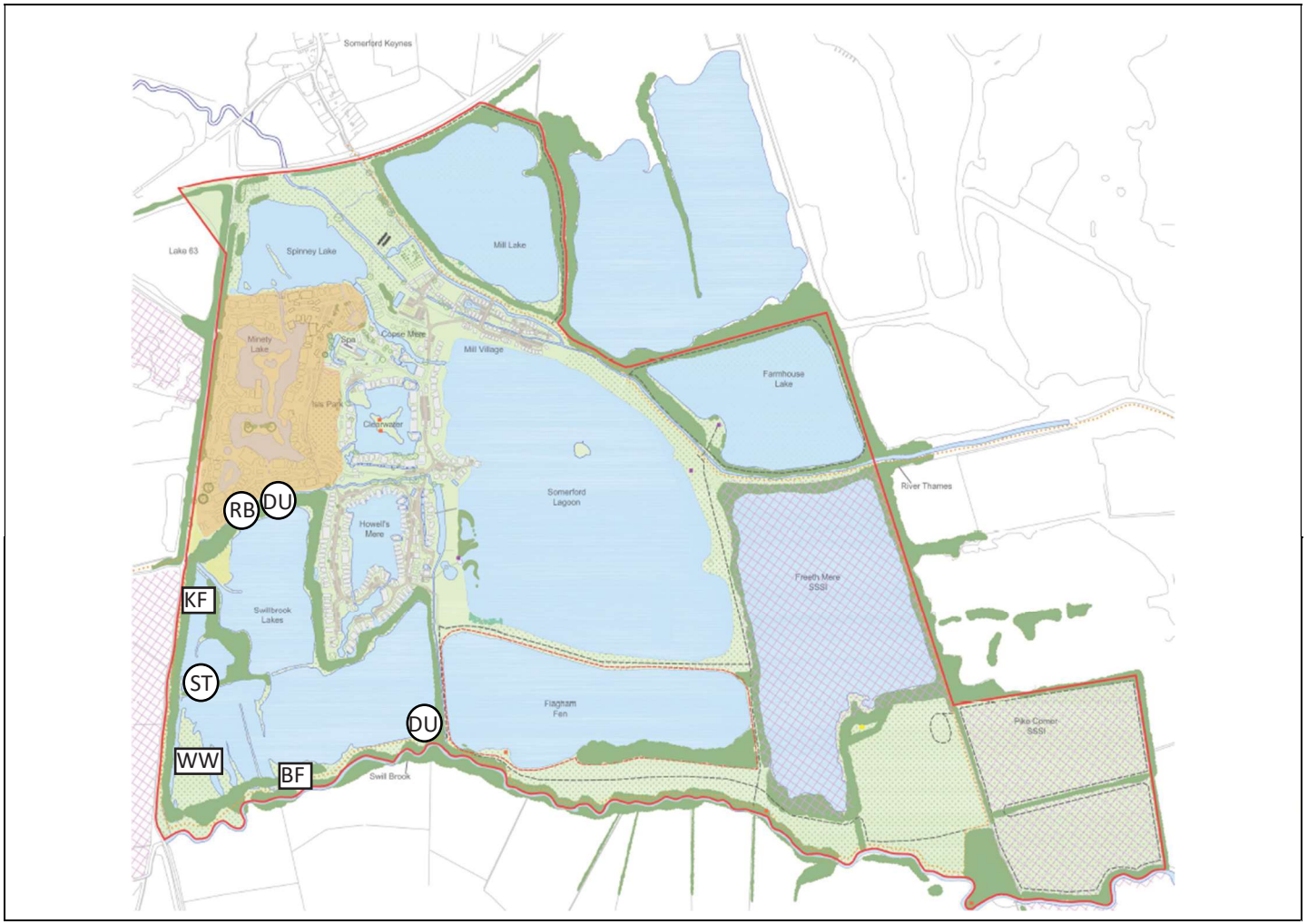
Red and Amber Listed Species

BF	Bullfinch	Amber
DU	Dunnock	Amber
RB	Reed bunting	Amber
ST	Song thrush	Red
WW	Willow warbler	Amber

Confirmed territory

Probable territory

Figure 10: Red and Amber Listed Species (Swillbrook Lakes)



Red and Amber Listed Species

BF	Bullfinch	Amber
DU	Dunnock	Amber
KF	Kingfisher	Amber
RB	Reed bunting	Amber
ST	Song thrush	Red
WW	Willow warbler	Amber

Confirmed territory

Probable territory

Figure 11: Red Bunting Locations

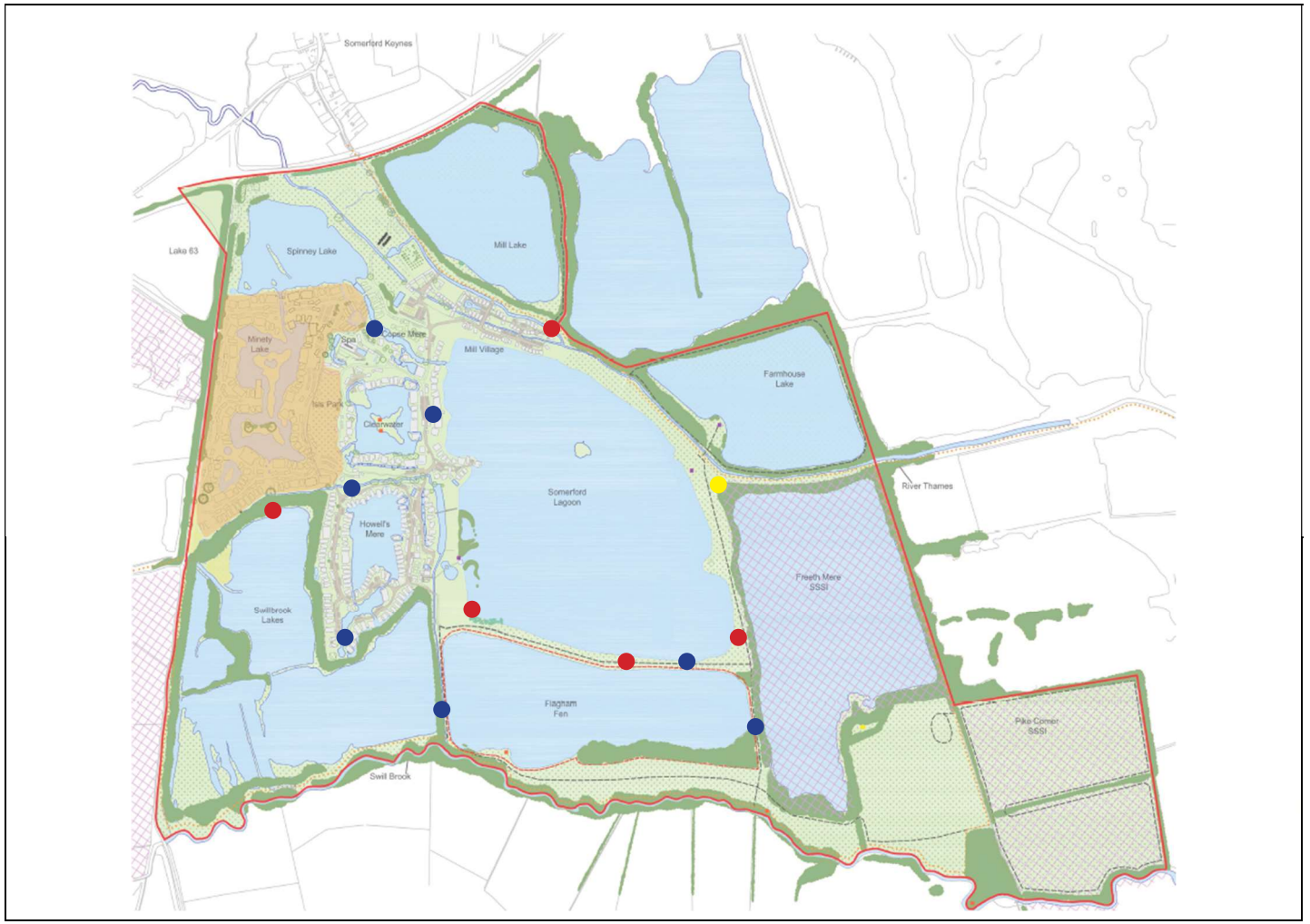


Figure 12: Red Warbler Locations

Figure 13: Bat Loft and Box Locations

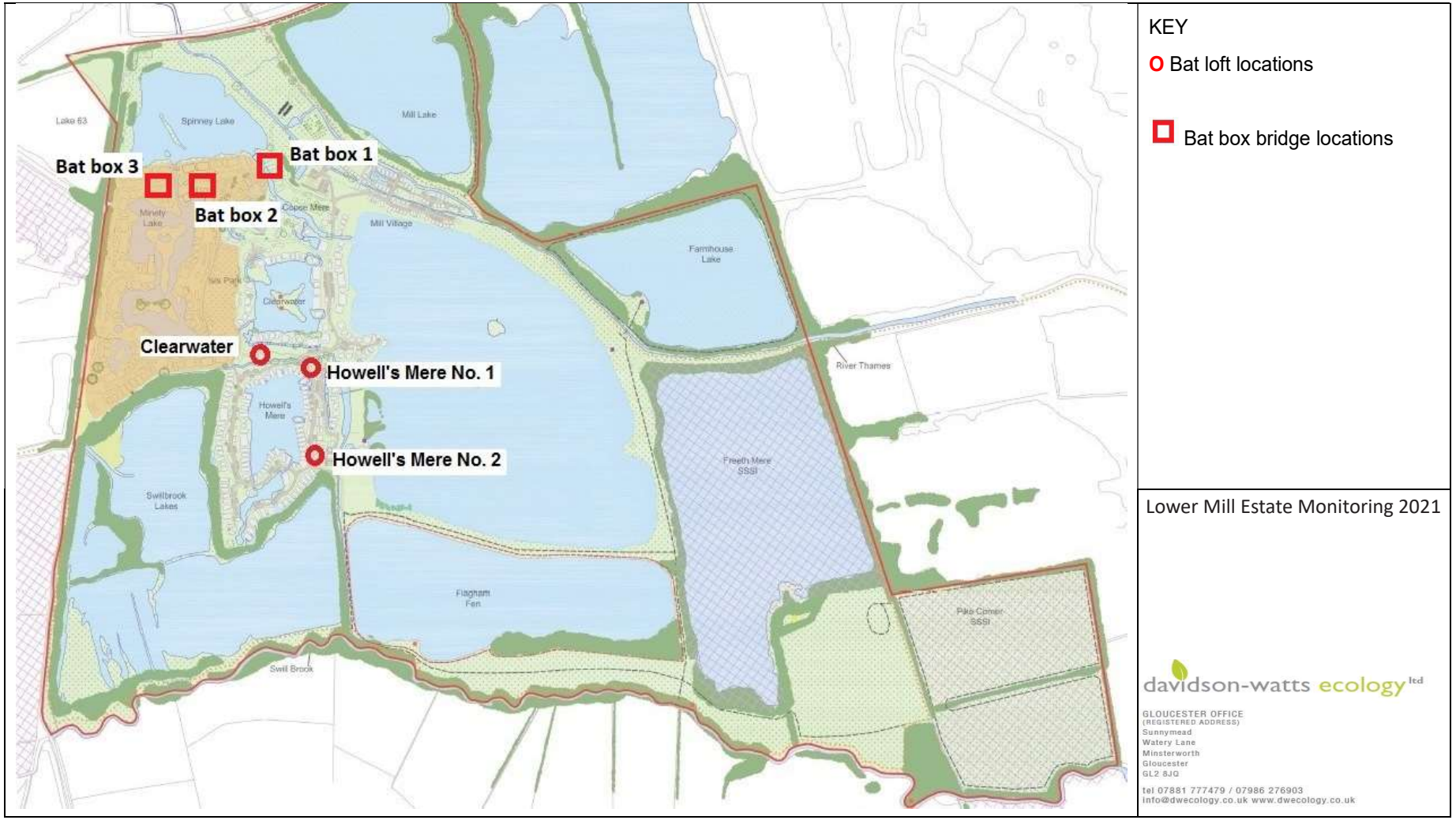


Figure 14: Approximate Location of GCN ponds

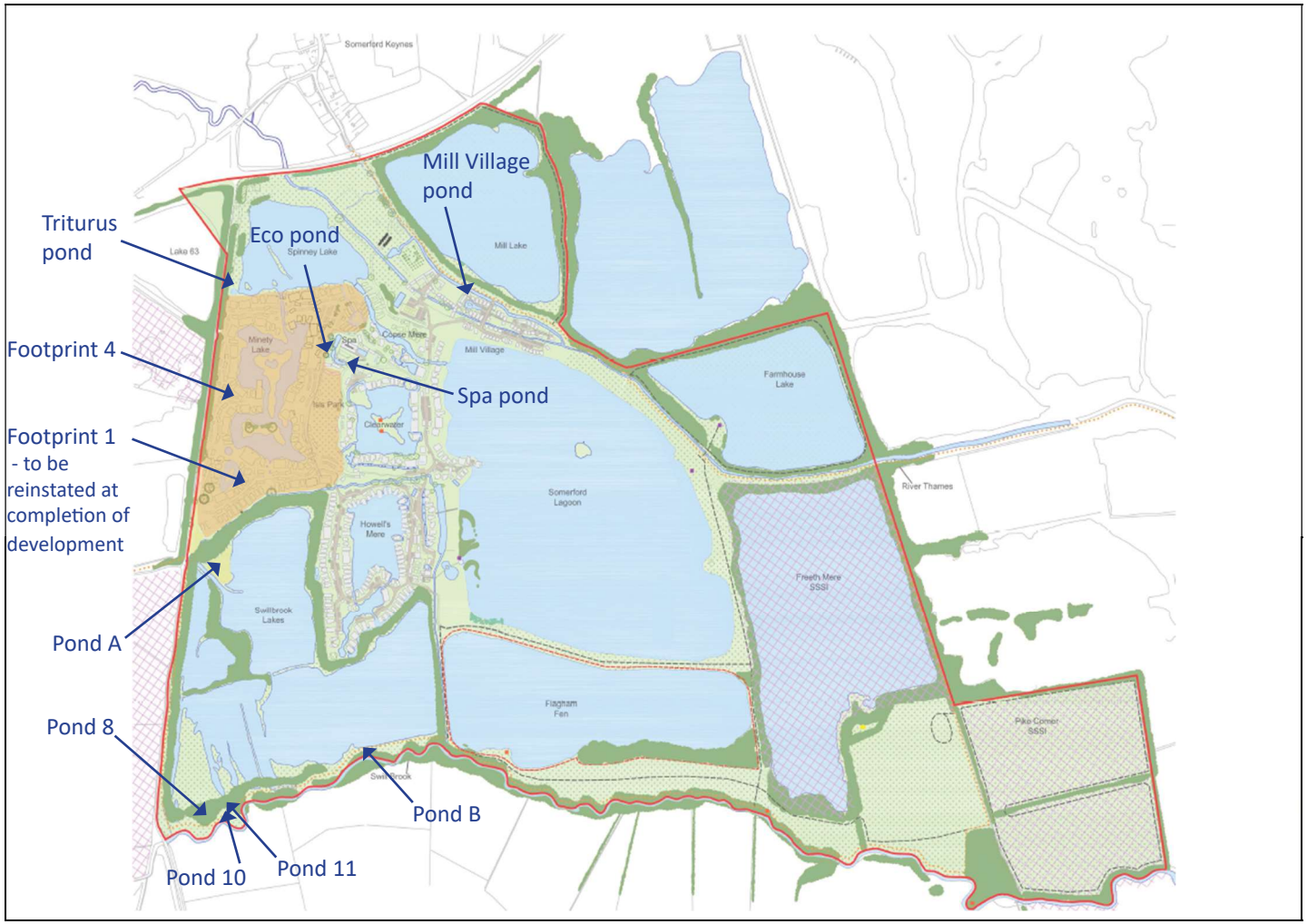


Figure 15: Suggested Nightgale Habitat Locations