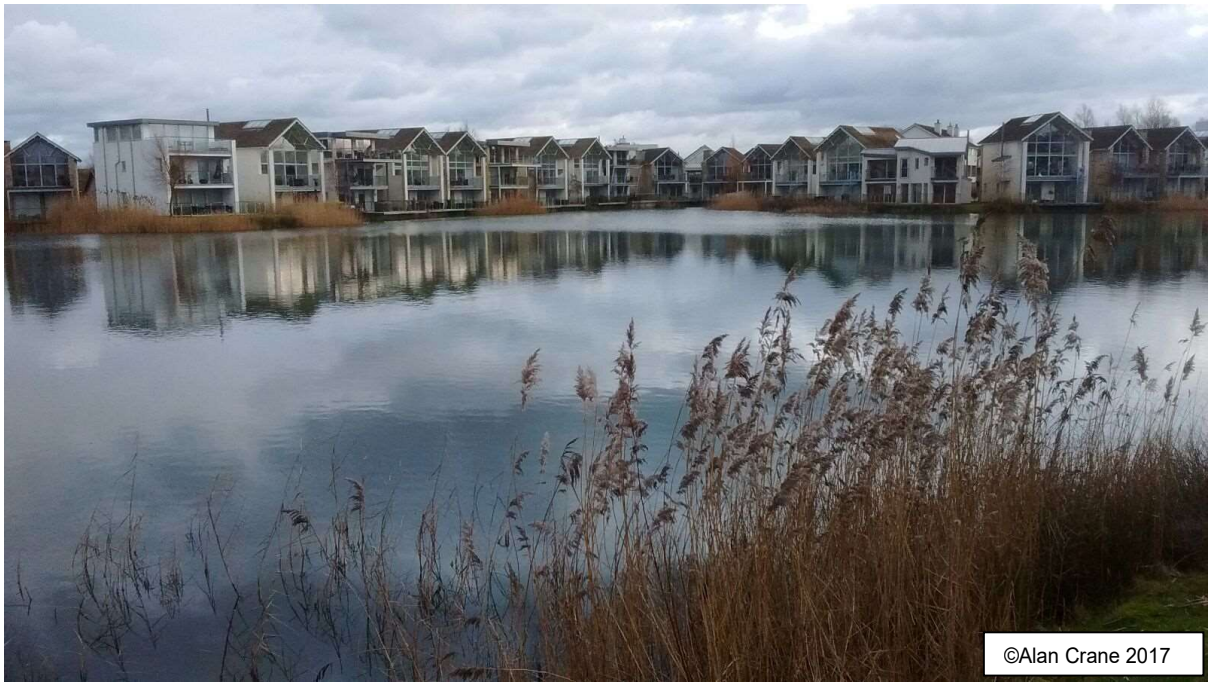

Lower Mill Estate, Cotswold Water Park
Ecological Monitoring 2020 - 2021
Lower Mill Estate
05 May 2021

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CONTENTS

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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 2020 – 2021 and the results are summarised below:

Wintering Waterbirds

Twelve surveys were carried out (bi-monthly) between October 2020 and March 2021. The peak count overall for the five priority species was 291 on visit 10 in January 2021 which is lower than the peak count of priority species for the previous two years (442 in 2020 and 525 in 2019). There was an overall decrease in numbers of priority species in 2020/21. Results from this survey suggest that a greater number of species increased in number (mean) this year. Most notably was a 446% increase in red crested pochard.

Compared to the previous winter, the mean count for the total water bird assemblage decreased from 545 in 2019/2020 to 527 this winter. The peak count however, increased from 780 to 803 on visit 8 in January 2021.

Breeding Waterbirds

Monthly surveys were carried out between June and August 2020, with the survey numbers reduced due to the Covid-19 pandemic. With the reduction of numbers of early breeding birds, overall, the number of waterbirds breeding at LME appears to be stable, although there is considerable 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 and has stabilised after this between 10 and 12 species. Between 2007 and 2019 the number of species recorded has varied between five and fourteen.

Based on the annual totals in the last five years most species appear to be stable with the only species still showing a decline being the mute swan.

Breeding Terrestrial Birds

Lower Mill Estate

As expected, given the reduced number of survey visits, the numbers of confirmed and possible territories are reduced from 2019. The dominant species remained wren, black cap and blue tit with fewer sedge warblers recorded. A lower number of species were recorded in 2020 with greenfinch, pied wagtail and

willow warbler absent during the surveys this year, but cuckoo was recorded after being absent in 2019. Kingfisher was confirmed to be breeding on the northern banks of Freeth Mere.

The number of regularly occurring species is reduced to 18 this year but is likely to be a direct result of the reduction of survey visits this year, which missed the earlier part of the breeding season, and the same applies for the number of territories/pairs recorded which dropped to 121. The number of territories is now decreasing as a result of these lower figures, but the species numbers remain stable.

Swillbrook Lakes

The number of species confirmed as breeding has decreased in 2020 from 14 species last year to 12 species this year. However, including possible breeders this increases from 17 to 18 species. The total number of territories held (including confirmed and possible) in 2020 was 36 which is a reduction from 63 the previous year.

Breeders from 2020 that did not breed last year were dunnock (possible), and kingfisher and goldfinch (both confirmed). Blackbird, black cap, blue tit, garden warbler, sedge warbler and song thrush all decreased in 2020, while dunnock, goldfinch, kingfisher and long-tailed tit all increased in numbers.

The numbers of regularly occurring species appears stable, ranging between 17 and 20 over the last five years. The numbers of territories also decreased this year, but this is likely to be due to the reduced survey effort in 2020.

Nightingale

The nightingale surveys were undertaken in late May and early June (two surveys) 2020. No nightingales were recorded but the surveys were closer together than normal due to site access restrictions for COVID-19. It is possible that nightingales were not recorded earlier in the month. Further areas of dense scrub, coppice or thicket would benefit this species.

Reed Bunting

Four individual sightings and four territories were recorded for reed bunting. 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 less sightings than 2018 or 2019 but this could be attributed to the shortened survey season due to Covid-19 restrictions.

Reed Warbler

Five confirmed territories were recorded and three individual sightings for reed warbler which shows 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) despite the shortened survey period for 2020.

House martin

The numbers of occupied and apparently occupied nests were down on last year's totals but there was an increase in apparently unoccupied nests in Mill Village and Clearwater. This could indicate earlier breeding in 2020 with the nests subsequently abandoned. Alternatively, there are many reports on bird websites for 2020 that suggest that house martins arrived later in 2020 and in lower numbers which would explain the 2020 results.

Tern Rafts

On Raft 1 in Somerford Lagoon up to five pairs of common tern were attempting to breed producing two young and up to five pairs of black-headed gull were recorded attempting to breed, producing 1 young.

For Raft 2, three pairs of common tern bred, producing 6 young and three black-headed gull young were observed with no adults observed on the raft.

Bats

The three bat lofts at Clearwater, Howell's Mere No.1 and No.2 were surveyed for the presence of bats in July 2019. 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

Covid restrictions meant that not all of the habitat suitable for Brown hairstreak egg laying was surveyed. However, during the surveys that were undertaken, 135 Brown hairstreak butterfly eggs were recorded along with; 8 Blue-bordered carpet moth eggs; Lackey moth eggs, Drinker moth larva; and large numbers of 7-spot ladybirds.

1 Introduction

1.1 PLANNING HISTORY AND LEGAL OBLIGATIONS

1.1.1 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.

1.1.2 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.

1.1.3 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.

1.1.4 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.”*

1.2 MONITORING OBJECTIVES

1.2.1 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.

1.2.2 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.

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

1.2.4 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).

1.2.5 Due to restrictions on access to Lower Mill Estate during early 2020, it was not possible to undertake the surveys for amphibians or odonata for the 2021 monitoring report. Further to this, a reduced number of visits were undertaken for the breeding terrestrial and waterbird surveys with no surveys undertaken in April or May 2020.

1.2.6 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*).

1.2.7 A 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. It 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 current levels standing at a 47% decrease. The decrease has been greater than the 20% threshold level for three of the past five years. There have been substantial reductions in the mean peak counts for the target species coot and great crested grebe. These decreases have been somewhat compensated for by an increase in numbers of tufted duck and a small increase in numbers of gadwall. However, overall, there has been a decrease in the mean peak of target species at LME 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 2020 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.

2 Wintering Waterbirds

2.1 METHODS

2.1.1 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 Leica binoculars and Kowa telescope. The vantage points used along the transect route are shown in Figure 2. The surveys were carried out by Alan Crane on behalf of Davidson-Watts Ecology Ltd.

2.1.2 No allowance has been made within this survey for secretive species which are likely to have been under-recorded.

2.1.3 12 surveys were carried out on the lakes at LME between October 2020 and March 2021. The dates of the surveys were -

- Visit 1 - 14/10/2020
- Visit 2 - 26/10/2020
- Visit 3 - 09/11/2020
- Visit 4 - 23/11/2020
- Visit 5 - 14/12/2020
- Visit 6 - 29/12/2020
- Visit 7 - 11/01/2021
- Visit 8 - 25/01/2021
- Visit 9 - 08/02/2021
- Visit 10 - 22/02/2021
- Visit 11 - 08/03/2021
- Visit 12 - 22/03/2021

2.2 RESULTS

2.2.1 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 (BoCC4) are identified.

2.2.2 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 2020/2021

Species		**Counts**		
Common	Scientific	Min	Peak	Mean
Tufted duck	***Aythya fuligara***	**48**	**127**	**80**
Coot	***Fulica atra***	**83**	**174**	**132**
Mallard *	*Anas platyrhnchos*	26	141	65
Wigeon *	*Anas penelope*	9	108	40
Teal *	*Anas crecca*	0	73	27
Mute swan *	*Cygnus olor*	4	56	18
Red crested pochard	*Netta rurina*	2	168	71
Great crested grebe	***Podiceps cristatus***	**13**	**31**	**20**
Goldeneye *	*Bucephala clangula*	0	28	10
Canada goose	*Branta canadensis*	1	78	17
Gadwall*	*Anas strepera*	**5**	**23**	**10**
Cormorant	*Phalacrocorax carbo*	5	21	13
Moorhen	*Gallinula chloropus*	4	33	11

LME priority species * BoCC Amber listed

2.2.3 In 2019/2020 13 species had a mean count of 10 or over. This an increase from 10 last year. Cormorant, moorhen and gadwall were added to the list.

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

- goosander (*Mergus merganser*) 6,
- grey heron (*Ardea cineria*) 3,
- great white egret (*Ardea alba*) <1,
- greylag goose (*Anser anser*) 1,
- kingfisher (*Alcedo atthis*) <1,
- little egret (*Egretta garzetta*) 1,
- little grebe (*Tachybaptus ruficollis*) <1,
- pochard (*Aythya ferina*) 2 and
- shoveler (*Anas clypeata*) 2.

2.2.5 Coot and wigeon had noticeably lower mean counts compared to last winter. Cormorant, moorhen, mute swan and red crested pochard had higher counts this year. There were no records of pintail in 2020 / 2021.

2.2.6 The species count was slightly lower this year with a count of 22 with the absence of pintail causing the slight reduction.

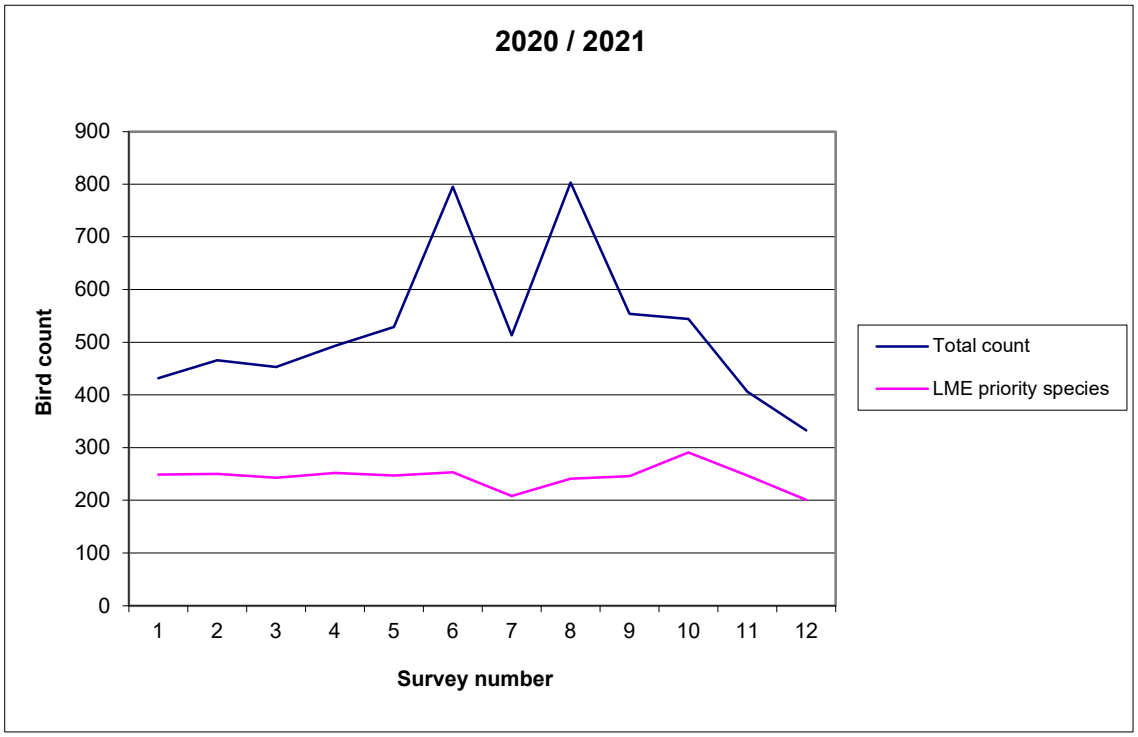
2.2.7 The maximum number of species recorded over the whole site in a single visit was 20 (slightly higher than last year's 19) and was recorded on visits 7 (11th January 2021) and 8 (25th January 2021). The minimum was 14 species which were recorded during visit 1 (14th October

2019) which was the higher than last year's count of 13 but also at the same time of year. This is most likely due to the fact that birds are still arriving on site for the winter at this time.

2.2.8 The peak count for the total water bird assemblage (excluding gulls) was 803 on visit 8 (25th January 2021) which is higher than the peak recorded last winter of 780 which was recorded earlier in the survey period (December 2019).

2.2.9 The peak count overall for the five priority species was 291 on visit 10 (22nd January 2021) which was a reduction on the numbers from last year where a peak count of 443 was recorded and 2018/19 with a peak count of 525. This is summarised in Figure 1.

Figure 1: LME peak water bird counts October 2020 to March 2021



2.2.10 Compared to the previous winter, the mean count for the total water bird assemblage decreased from 545 in 2019/2020 to 527 this winter. The peak count however, increased from 780 to 803 on visit 8 (25th January 2021).

2.2.11 Water levels returned to normal levels this year with minimal freezing observed during the survey period. Despite this, the mean totals had reduced again this year. The whole of the Cotswold Wildlife Park is being re-designated by Natural England as a Site of Special Scientific Interest (SSSI). This is in part due to the difficulty in setting specific lakes as a SSSI as birds naturally move between lakes at different times of day or when disturbed. The expansion in number of lakes across the park and these fluctuations are a contributing factor to the declines in wintering water birds that have been observed at LME.

2.2.12 Mean counts for two of the five LME priority species (gadwall and pochard) had increased from the previous winter with identical counts recorded for tufted duck (which decreased last year). Numbers of coot and great crested grebe had reduced. The results are shown in Table 2 below.

Table 2: Mean counts for the five target species.

Species	Count	% increase/decrease
Coot	198 down to 132	33% decrease
Gadwall	8 up to 10	25% increase
Great crested grebe	24 down to 20	17% decrease
Pochard	1 up to 2	100% increase
Tufted duck	80	0

2.2.13 Numbers of coot saw a 33% decrease after being stable the year before. This reflects national decreases in this species: "Winter abundance on large still waters showed shallow increase from the mid 1980s to around 2000/01 but has since declined in all four UK countries (WeBS: Frost *et al.* 2020)".

2.2.14 Pochard and gadwall increased but have not returned to the numbers recorded two years ago (20 and 16 respectively). 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." Great crested grebe decreased again for the second year running and this mirrors a decline nationally of 15% between 2008-2018 as reported in the State of UK Birds (RSPB, 2020). Tufted duck remained at the numbers from last year (after decreasing the previous year). These have shown a 2% decrease nationally over the 10-year period 2008-18 (State of UK Birds, RSPB 2020). Therefore, there was an overall decrease in numbers of priority species during 2020/2021.

2.2.15 Results from this survey suggest that a greater number of species increased in numbers recorded (mean) this year. Most notably was a 446% increase in red crested pochard. This is shown in Table 3 below.

Table 3: Overall changes in wintering waterbirds

Species	Mean 2019 / 2020	Mean 2020 / 2021	% change
Coot	198	132	-33
Gadwall *	8	10	25
Great crested grebe	24	20	-17
Pochard #	1	2	100
Tufted duck	80	80	0
Canada goose	12	17	42
Cormorant	8	13	63
Goldeneye *	12	10	-17
Goosander	5	6	20
Grey heron	4	3	-25
Great white egret	0	0	0
Greylag goose *	1	1	0
Kingfisher *	0	0	0
Little egret	1	1	0
Little grebe	1	0	-100

Mallard *	61	65	7
Moorhen	7	11	58
Mute swan *	12	18	50
Pintail *	3	0	-100
Red crested pochard	13	71	446
Shoveler *	1	2	100
Teal *	23	27	17
Wigeon *	71	40	-44

* BoCC 4 Amber listed # Bocc 4 Red listed

LME Priority Species

2.2.16 Mill Lake supported the highest peak bird numbers with 227 recorded on visit 8 (25th January 2021). The mean count was 119 with a maximum of 10 species recorded on visits 9 (8th February 2021) and 12 (22nd March 2021). Freeth Mere supported the second highest peak bird numbers again (189 peak, 115 mean) with the maximum species recorded being 11 on visit 5 (14th December 2020). Somerford Lagoon supported the highest mean count of 134 (186 peak, 134 mean) with a maximum species count of 11 on visits 3 (9th November 2020) and 10 (22nd February 2021).

2.2.17 Flagham Fen's peak and mean counts increased this season (75 peak, 30 mean), but the maximum species count decreased to 8 on visit 5. Farmhouse Lakes peak and mean both dropped (35 peak, 20 mean), as did the maximum species count with 7 recorded on visit 1.

2.2.18 For the second year running all the wigeon were recorded on Freeth Mere. Inland pastures are important for this species for foraging during winter and it may be that the surrounding pasture to the south of this lake are more beneficial for foraging wigeon.

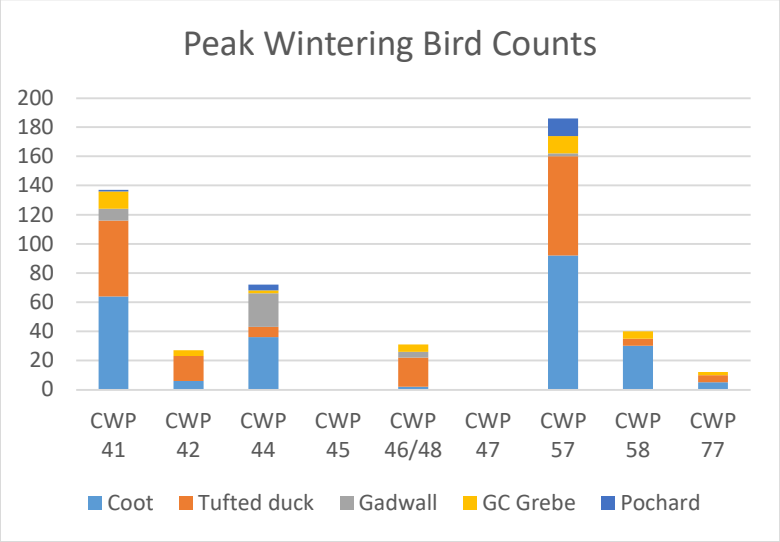
2.2.19 Swillbrook lakes had a peak of 176 and a mean of 88, both an increase on last winter. A species maximum of 14 was recorded which was the same as last year. This was on visit 10. This was the highest number of species on a single visit for the whole LME site and was the same as the previous year.

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

- 1 snipe (*Gallinago gallinago*) was flushed from reeds at Spinney Lake on visit 11.
- 1 snipe was flushed from the area between Somerford Lagoon and Flagham Fen on visit 8.
- A water rail (*Rallus aquaticus*) was heard but not seen at Somerford Lagoon on visit 10.
- Somerford Lagoon supported 104 lesser black backed gulls (*Larus fuscus*) on visit 1 and 85 on visit 4.
- 1 Egyptian goose (*Alopochen aegyptiacus*) was present on Somerford Lagoon on visit 7.
- 4 oystercatchers (*Haematopus ostralegus*) were present at Somerford Lagoon on visit 11.
- An Osprey was recorded feeding on Somerford Lagoon and across the Estate for just over one week over winter.

2.2.21 The spread in the target species over the lakes is shown in Chart 1 below.

Chart 1: Peak target wintering bird counts



3 Breeding Waterbirds

3.1 METHODS

3.1.1 Breeding waterbirds were surveyed according to Gilbert et al (1998). However, due to access restrictions to Lower Mill Estate due to the Covid-19 pandemic, we were unable to undertake a survey in April or May 2020. The survey dates were:

- 2 June 2020,
- 30 June 2020,
- 13 July 2020, and
- 18 August 2020.

3.1.2 The surveys were carried out by Alan Crane on behalf of Davidson-Watts Ecology Ltd.

3.1.3 The breeding bird surveys have been extended into July or August 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 (*Netta rufina*) (Harris, 2012a).

3.1.4 A pre-determined survey route was followed (Figure 4), stopping at suitable vantage points. Direct evidence of breeding activity was recorded, for example the presence of active nests or recently hatched young.

3.1.5 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.

3.1.6 In the case of scarce and/or secretive species (e.g. gadwall and moorhen), single records were considered sufficient to determine 'probable' breeding.

3.2 RESULTS

3.2.1 The results of the LME and SWBL breeding waterbird surveys are summarised in Table 3 below, and locations of breeding birds / nests/ broods are shown in Figures 5 and 6. 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.

Table 3: Lower Mill Estate and Swillbrook Breeding Waterbirds 2020

	Lake (Territories / pairs)									
Species	41	42	44	45	47	57	58	77	SWBL	All
Black-headed gull (A)	0	0	0	0	0	3 - 5	0	0	1	4 - 6
Common tern (A)	0	0	0	0	0	1 - 5	0	0	3	4 - 8
Coot	2	3	2 - 4	1	0	4 - 6	1	1	2	16 - 20
Great crested grebe	4	1	2	0	0	2 - 5	1	0 - 1	2	12 - 16
Greylag Goose (A)	0	0	0	0	0	0	0	0	0	0
Mallard (A)	0	0	1	0	0	1	0	1	1	3 - 5
Moorhen	1 - 2	1	0	1	0 - 1	0 - 2	0 - 1	1	1	5 - 10
Mute swan (A)	0	0	1	0	0	1	0	1	1	4
Red crested pochard	0	0	0 - 1	0	0	0 - 1	0	0	0	0 - 2
Tufted duck	0	1 - 2	1 - 2	0	0	0 - 3	0	0 -1	0 - 1	2 - 9
Total	**7 - 8**	**6 - 8**	**6 - 10**	**2**	**0 - 1**	**11 - 29**	**4 - 5**	**3 - 5**	**10 - 11**	**49 - 79**
Species	**3**	**5**	**5**	**2**	**1**	**9**	**4**	**5**	**8**	**9**

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 (BoCC)

Lower Mill Estate

3.2.2 Overall, the number of waterbirds breeding at LME appears to be stable, although there is fluctuation from year to year (Appendix C). The total number of species regularly breeding peaked in 2011 with a count of 14. In 2020 nine species were recorded as breeding which is a reduction of three from 2019. Species not recorded in 2020 included greylag goose, Canada goose and gadwall. The overall number of pairs of breeding birds recorded this year was also lower than last year. This is considered likely to be due to a much shorter survey season due to Covid 19 restrictions as some of the species not recorded or recorded in lower numbers breed earlier in the season. Bird species were well distributed across the lakes for all species (Figure 5).

3.2.3 Other species noted during the surveys were grey heron *Ardea cinerea* (including juveniles), sand martin (*Riparia riparia*) and cuckoo (*Cuculus canorus*). These species could potentially breed in suitable habitat at LME and two artificial sand martin boxes were installed on the

eastern bank of Somerford Lagoon in February 2020 which could increase the presence on site for this species. Further to this, two Egyptian geese *Alopochen aegyptiaca* were recorded on Somerford Lagoon on 2nd June 2020 which are an introduced species.

3.2.4 Historical comparisons covering the period 2004 to 2020 are presented for each lake in Appendix C. Overall, the number of waterbirds breeding at LME appears to be stable, although there is considerable fluctuation from year to year (Appendices C, D and E). The total number of species regularly breeding dropped from a peak of 14 in 2011, to a stable level of between 10 and 12 species between 2016 and 2019. Between 2007 and 2019 the number of species has varied between five and fourteen. There was a slight drop in the 2020 results which reflects the fact that the early breeding birds would not have been included in the survey results.

3.2.5 Based on the annual totals in the last five years most species appear to be stable. Black headed gull, coot, gadwall, mallard, great crested grebe, tufted duck and moorhen have shown stable populations. Therefore, the only species that are declining overall appear to be mute swan which is not in line with current population trends for this species. This species like shallow lakes and it might be that the current habitats at the site do not currently favour this species.

Swillbrook Lakes

3.2.6 Species numbers were reduced in 2020 with one less species recorded than 2019 (greylag goose), however the overall trend for species at this lake is increasing. A reduction was also recorded in mallard with the numbers of breeding pairs reducing from 2-4 pairs in 2019 to one confirmed pair in 2020. However, the reduction of the survey period due to Covid-19 may have meant that early breeding birds of these species were not captured in these figures. The distribution of birds was again predominantly on the western half of the lake with no breeding birds recorded on the eastern arm (Figure 6).

3.2.7 Common tern numbers were reduced to three confirmed pairs breeding on the raft this year from six in 2019. Despite this, the trend for this species shows an overall increase since it was first recorded in 2017.

3.2.8 The trend for black headed gull went from declining last year to stable this year and greylag goose went from stable to declining although as previously mentioned, this may be due to birds missed at the beginning of the season.

3.2.9 A great white egret *Ardea alba* was present on Swillbrook Lakes on 30th June 2020.

4 Breeding Terrestrial Birds

4.1 METHODS

Breeding Bird Surveys

4.1.1 This year the whole site was surveyed on single visits. The transect route is given in Figure 4. 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 (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. The surveys were carried out by Alan Crane on behalf of Davidson-Watts Ecology Ltd.

4.1.2 Three visits were undertaken. The survey dates were:

- 1st June;
- 28th June and
- 14th July 2020.

4.1.3 The first three visits could not be completed due to access being unavailable to LME during the beginning of the Covid-19 pandemic.

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

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

4.1.6 The methodology was slightly modified in 2020 to reflect the reduced number of visits. Clusters of registrations (singing males in most cases) were classified as 'confirmed' breeding territories where a species was present on two visits. This was modified to avoid an unrepresentative number of species with no breeding which would be unlikely. Clusters containing two registrations were classified as 'possible' breeding territories providing they occurred within a reasonably close timeframe, rather than ‘probable’ as in previous years. A single registration would not be enough to suggest probable breeding.

Nightingale Surveys

4.1.7 Two surveys were undertaken for nightingale with one night survey and one dawn surveys. These were supplementary to the breeding terrestrial bird surveys and were undertaken on the following dates:

- 31st May 2020 – start 23:30 to 01:30 with a temperature of 17°C; and
- 1st June 2020 – start 04:30 to 06:30 with a temperature of 10ºC.

4.1.8 The surveys were closer together than normal as access was not available to the site for the May surveys.

4.1.9 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. The surveys were carried out by Alan Crane on behalf of Davidson-Watts Ecology Ltd. A map of the transect route taken is shown on Figure 9.

House Martin Surveys

4.1.10 House martin (*Delichon urbicum*) surveys were undertaken on the 29th June 2020. The surveys were carried out by Alan Crane on behalf of Davidson-Watts Ecology Ltd.

4.1.11 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

4.1.12 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 2019.

Tern rafts

4.1.13 New tern rafts were installed in 2017 which were obtained using S106 funding. For 2020, this included one rafts on Somerford Lagoon (for use by black-headed gulls *Chroicocephalus ridibundus*) and one raft on Swillbrook Lakes (for common terns). The locations of the rafts are shown in Figure 14. 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 2nd June, 30th June, 13th July and 18th August 2020.

4.2 RESULTS

Terrestrial Breeding Bird Surveys

Lower Mill Estate

4.2.1 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.

4.2.2 Results for the LME (excluding Swillbrook Lakes) are presented in Table 4 below, Appendix G and Figure 7.

Table 4: LME Breeding Terrestrial Birds in 2020

Species		Territories / pairs		
Common name	**Scientific name**	**Confirmed**	**Possible**	**Total**
Blackbird	*Turdus merula*	3	4	7
Blackcap	*Sylvia atricapilla*	10	3	13
Blue tit	*Cyanistes caeruleus*	6	2	8
Bullfinch (A)	*Pyrrhula pyrhula*	0	5	5
Chaffinch	*Fringilla coelebs*	2	1	3
Chiffchaff	*Phylloscopus collybita*	4	4	8
Cuckoo (R)	*Cuculus canorus*	0	2	2
Dunnock (A)	*Prunella modularis*	4	2	6
Garden warbler	*Sylvia borin*	3	7	10
Great tit	*Parus major*	0	3	3
Greenfinch	*Chloris chloris*	0	0	0
Long-tailed tit	*Aegithalos caudatus*	0	3	3
Pied wagtail	*Motacilla alba*	0	0	0
Reed bunting (A)	*Emberiza schoeniculus*	3	3	6
Reed warbler (A)	*Acrocephalus scirpaceus*	4	3	7
Robin	*Erithacus rubecula*	4	4	8
Sedge warbler	*Acrocephalus schoenobaenus*	2	0	2
Song thrush (R)	*Turdus philomelos*	2	0	2
Whitethroat	*Sylvia communis*	2	2	4
Willow warbler	*Phylloscopus trochilus*	0	0	0
Wren	*Troglodtes troglodytes*	16	8	24
Total		**65**	**56**	**118**
Species		**14**	**16**	**18**

R = Red List Species A = Amber list species (BoCC4 2015)

4.2.3 A number of other species, listed below, were recorded as present during the breeding season and are likely to have been breeding in suitable habitat within the Estate or on the boundary: Magpie (*Pica pica*), carrion crow (*Corvus corone*) and jackdaw (*Corvus monedula*).

4.2.4 As expected, given the reduced number of survey visits, the numbers of confirmed and possible territories are reduced from 2019. The dominant species remained wren, black cap and blue tit with fewer sedge warblers recorded. A lower number of species were recorded in 2020 with greenfinch, pied wagtail and willow warbler absent during the surveys this year, but cuckoo was recorded after being absent in 2019.

4.2.5 No evidence of green woodpecker (*Picus viridis*) breeding was recorded in 2020 but kingfisher (*Alcedo atthis*) was confirmed to be breeding on the northern banks of Freeth Mere.

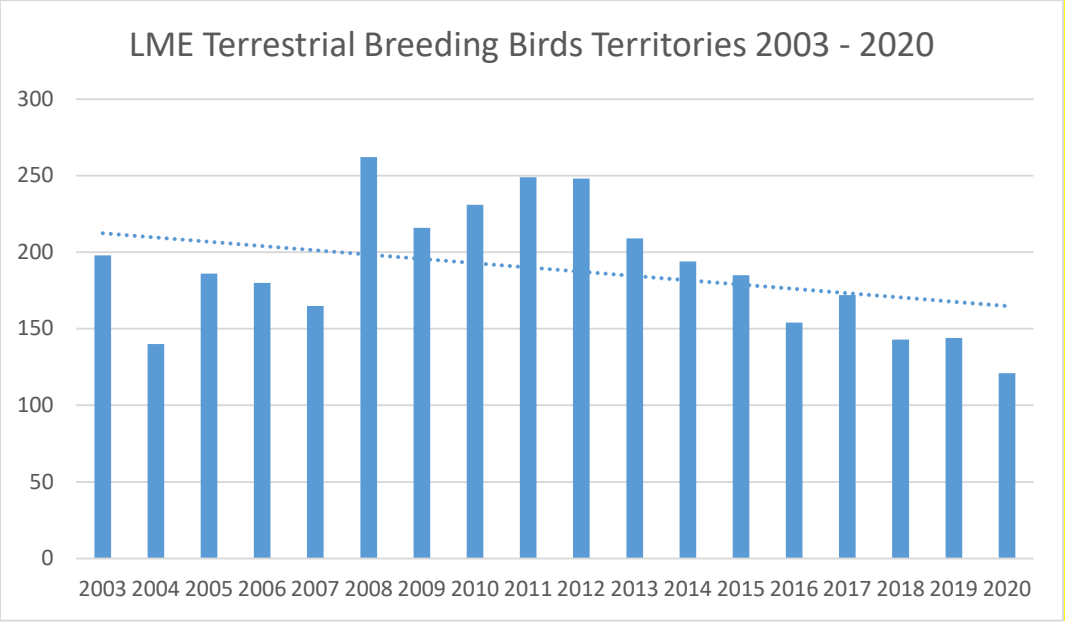
4.2.6 Other terrestrial bird species with possible or confirmed territories, but excluded from the table above for consistency with previous reports were:

- Cetti's warbler (*Cettia cetti*) – two confirmed and two possible territories,
- Goldcrest (*Regulus regulus*) – two confirmed and one possible territory, and
- Goldfinch (*Carduelis carduelis*) – three confirmed territories.

4.2.7 No passage migrants were recorded during the terrestrial breeding bird surveys undertaken in 2019.

4.2.8 Historical comparisons with previous years (and species trends) are given in Appendix G and illustrated in chart 2 below. The number of regularly occurring species in reduced to 18 this year but is likely to be a direct result of the reduction of survey visits this year and the same for the number of territories/pairs recorded which dropped to 121. The number of territories is now decreasing as a result of these lower figures, but the species numbers remain stable.

Chart 2: LME Terrestrial Breeding Bird Territories 2003 to 2020



4.2.9 Increases and decreases in individual species territories are not comparable for 2020 with previous years as birds breeding earlier in the season may have been missed although the species numbers were comparable to previous years showing that the birds are present on site, but may not have been recorded breeding this year.

4.2.10 Dunnock, song thrush and bullfinch were distributed throughout the late edges, reed bunting were recorded predominantly around the edges of Somerford Lagoon and cuckoo was recorded to the north of Spinney Lake and on the western edge of Freeth Mere.

Swillbrook Lakes

4.2.11 The number of species confirmed as breeding has decreased in 2020 from 14 species last year to 12 species this year. However, including possible breeders this increases from 17 to 18 species. The total number of territories held (including confirmed and possible) in 2020 was 36. This is greatly reduced from last year (63).

4.2.12 Breeders in 2020 that did not breed last year were dunnock (possible), and kingfisher and goldfinch (both confirmed).

4.2.13 Blackbird, black cap, blue tit, garden warbler, sedge warbler and song thrush all decreased in 2020, while dunnock, gold finch, kingfisher and long tailed tit all increased.

4.2.14 The results for Swillbrook Lakes are presented in Table 5 below and in Appendix H and Figure 8. The numbers of regularly occurring species appears stable, ranging between 17 and 20 over the last five years. The numbers of territories also decreased this year, but this is likely to be due to the reduced survey effort in 2020.

Table 5: SWBL Breeding Terrestrial Birds 2020

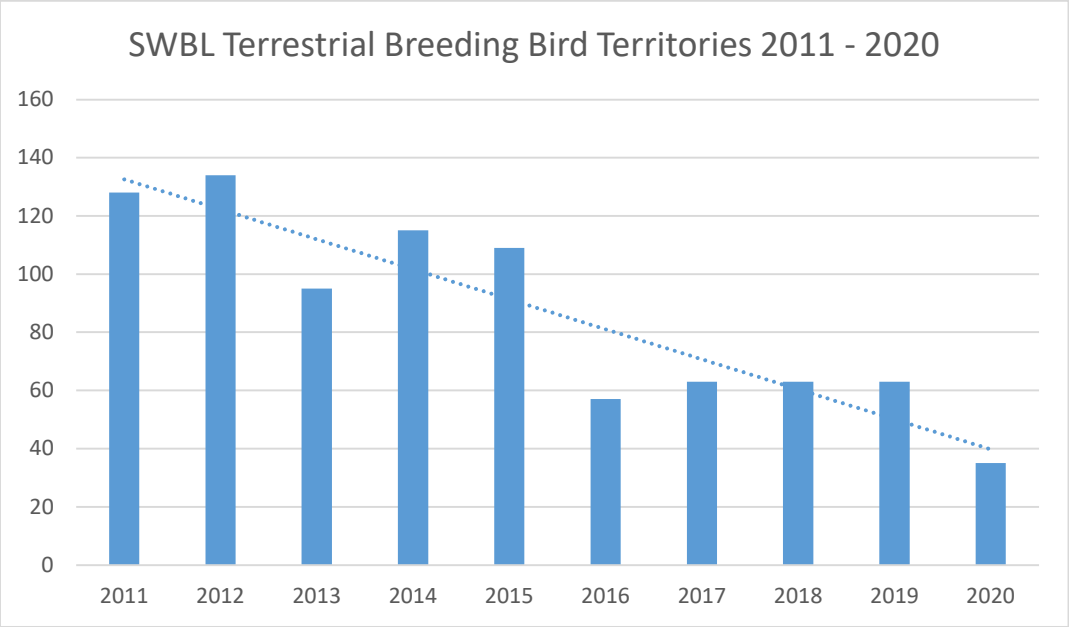
Species		Territories / pairs		
Common name	**Scientific name**	**Confirmed**	**Possible**	**Total**
Blackbird	*Turdus merula*	0	1	1
Blackcap	*Sylvia atricapilla*	1	3	4
Blue tit	*Cyanistes caeruleus*	1	1	2
Bullfinch (A)	*Pyrrhula pyrhula*	0	0	0
Cetti's warbler	*Cettia cetti*	1	0	1
Chaffinch	*Fringilla coelebs*	0	0	0
Chiffchaff	*Phylloscopus collybita*	2	3	5
Cuckoo (R.)	*Cuculus canorus*	0	0	0
Dunnock	*Prunella modularis*	0	1	1
Garden warbler	*Sylvia borin*	1	0	1
Goldcrest	*Regulus regulus*	1	1	2
Goldfinch	*Carduelis carduelis*	0	1	1
Great spotted woodpecker	*Dendrocopos major*	0	0	0
Great tit	*Parus major*	0	1	1
Greenfinch	*Chloris chloris*	0	0	0

Species		Territories / pairs		
Common name	**Scientific name**	**Confirmed**	**Possible**	**Total**
Green woodpecker	*Picus viridis*	0	0	0
Long-tailed tit	*Aegithalos caudatus*	1	0	1
Reed bunting (A)	*Emberiza schoeniculus*	1	0	1
Reed warbler	*Acrocephalus scirpaceus*	1	0	1
Robin	*Erithacus rubecula*	3	0	3
Sedge warbler	*Acrocephalus schoenobaenus*	0	1	1
Song thrush (R)	*Turdus philomelos*	0	2	2
Whitethroat	*Sylvia communis*	0	0	0
Willow warbler	*Phylloscopus trochilus*	0	0	0
Wood pigeon	*Columba palumbus*	0	0	0
Wren	*Troglodtes troglodytes*	4	3	7
Total		**22**	**18**	**40**
Species		**11**	**11**	**17**

4.2.15 Bullfinch, chaffinch, cuckoo, green and great spotted woodpecker, whitethroat and woodpigeon were not recorded at Swillbrook this year but kingfisher was confirmed to be breeding again in Freeth Mere.

4.2.16 Chart 3 below illustrates the downward trend of breeding bird territories in the SWBL since 2011 but with territory numbers stabilising for four years (not including 2020 due to the reduced survey data).

Chart 3: SWBL Terrestrial Breeding Bird Territories 2011 to 2020



4.2.17 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. Historical comparisons with previous years are given in Appendix H. The number of regularly occurring species remains the same as 2019 with a count of 17 species.

4.2.18 Song thrush (red listed) were recorded on the north and south banks of Swillbrook Lakes, reed bunting was recorded on the north banks (amber listed) and dunnock was recorded on the north bank (amber listed). This is shown in Figure 8.

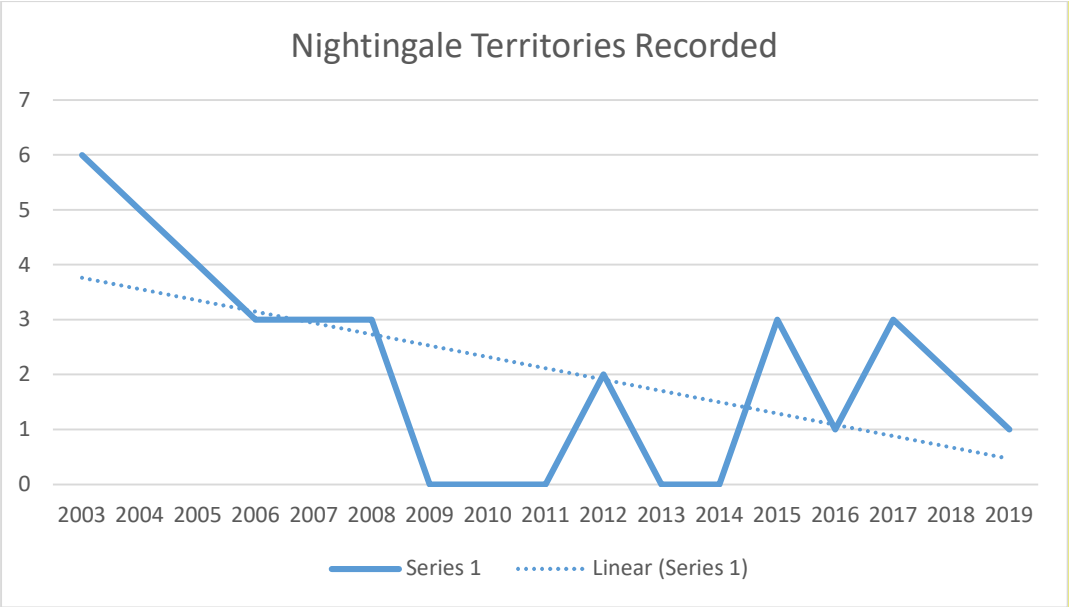
4.2.19 A Bittern was heard booming on Swillbrook Lakes several times over early spring.

Nightingale Surveys

4.2.20 No nightingales were recorded during the transects but it is possible that the survey was carried out too late this year to record singing nightingale.

4.2.21 Previously, three nightingale territories were recorded in 2017 and two in 2018. Surveys since 2009 had found no nightingale territories, apart from a peak in 2012 when additional survey effort was applied as a result of the National Nightingale Survey (BTO,2014) and 2015 when three (probably four) territories were recorded. Chart 4 below demonstrates that the population trend still appears to be in decline since 2003 but the increase in territories after 2016 is encouraging. Nightingales are therefore still present within LME but the positive survey results of 2015 should be treated with caution at this stage. 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.

Chart 4: Nightingale Territories 2003 to 2019



House Martin Surveys

4.2.22 Results for the house martin surveys are summarised in Table 6 below.

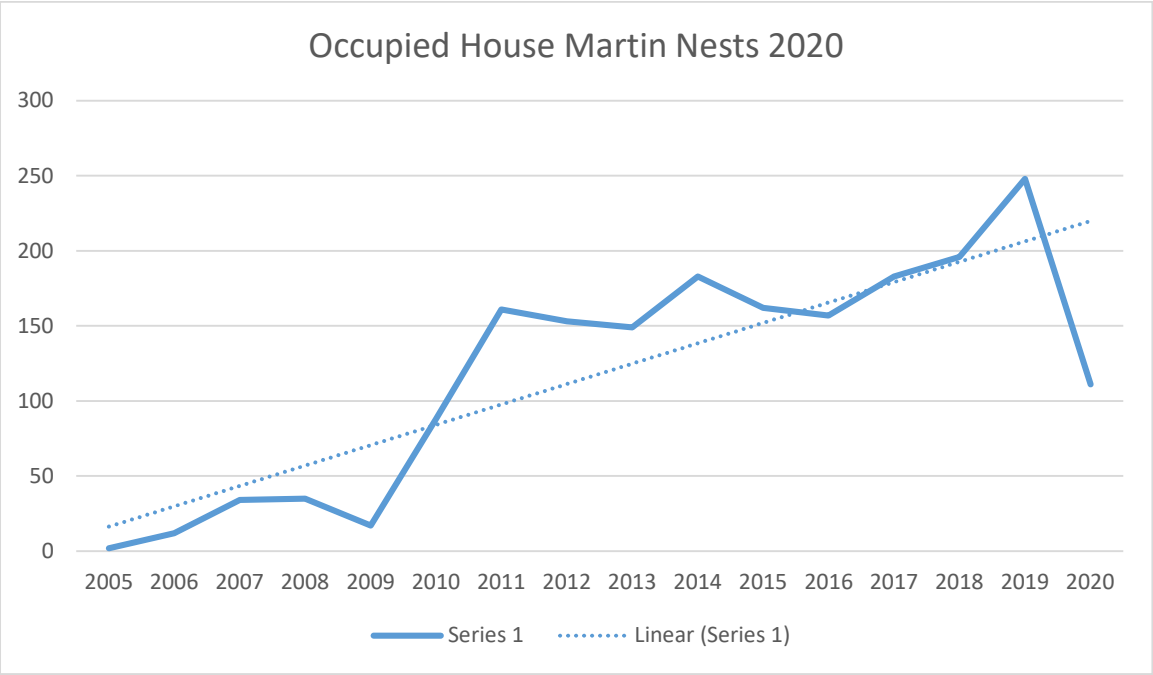
Table 6: House Martin Nests in 2020

Area	Confirmed occupied	Apparently occupied	Apparently unoccupied
Mill Village	12	29	24
Clearwater	15	42	117
Howells Mere	2	11	33
Total 2020	29	82	174
Total 2019	101	147	84

4.2.23 The numbers of occupied and apparently occupied nests was down on last year's totals but there was an increase in apparently unoccupied nests in Mill Village and Clearwater. This could indicate earlier breeding in 2020 with the nests subsequently abandoned. Alternatively, there are many reports on bird websites for 2020 that suggest that house martins arrived later in 2020 and in lower numbers. 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. Regardless of this, there is still a positive trend of growth for house martins at LME.

4.2.24 No new nests were observed on buildings that have been built over the last three years. These properties comprise more wooden cladding and less of the rendered wall style which the house martin seem to favour.

Chart 5: Occupied House Martin Nests 2006 to 2020



Reed Bunting and Reed Warbler

4.2.25 The survey map for the distribution of reed buntings in 2020 is included in Figure 10. Four individual sightings and four 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 less sightings than 2018 or 2019 but this could be attributed to the shorted survey season due to Covid-19 restrictions.

4.2.26 The survey map for the distribution of reed warbler in 2020 is included in Figure 11. Five confirmed territories were recorded and three individual sightings which shows 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) despite the shortened survey period for 2020.

Tern rafts

4.2.27 The results for the tern raft surveys are shown in Table 7 below and the raft locations are shown in Figure 14.

Table 7: Tern Raft Surveys

Date	**Tern Raft 1 (Somerford Lagoon)**	**Tern Raft 2 (Swillbrook Lakes)**
2nd June 2020	5 common tern AONs* and 3 black headed gull AONs	2 common tern AONs 3 black-headed gull AONs
30th June 2020	4 common tern AONs 5 black-headed gull AONs	3 common tern broods (total 6 juveniles)
13th July 2020	3 common tern AONs (total 1 juvenile) 1 black-headed gull AON (total 1 juvenile)	2 common tern broods (total 5 juveniles)
18th August 2020	1 common tern AON – 1 juvenile	Empty

*AONs (apparently occupied nests) are usually defined as well-constructed nests, attended by at least one adult and capable of holding an egg (even if nest contents are unknown, or the nest is known to be empty). Seabird monitoring handbook for Britain and Ireland - (P.M. Walsh, D.J. Halley, M.P. Harris, A. del Nevo, I.M.W. Sim, & M.L. Tasker).

4.2.28 Therefore in 2020 Raft 1 in Somerford Lagoon up to five pairs of common tern were attempting to breed producing two young and up to five pairs of black-headed gull were recorded attempting to breed, producing 1 young.

4.2.29 For Raft 2, three pairs of common tern bred, producing 6 young and three black-headed gull young were observed with no adults observed on the raft.

5 Bat Lofts and Boxes

5.1 METHODS

5.1.1 Internal and external surveys of the three bat lofts were undertaken on 19th July 2020. 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 12.

5.1.2 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.

5.1.3 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.

5.1.4 Two pairs of bat boxes in two locations were also checked for evidence of use by bats (shown in Figure 12).

5.1.5 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). The survey commenced at 10:00 and the weather conditions were 18c, 40% cloud cover with wind speeds of Beaufort scale 3 and no rain.

5.2 RESULTS

5.2.1 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. 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 2019 or 2020.

5.2.2 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 or 2020. Several areas of bat droppings were found in this roof void in August 2017.

5.2.3 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.

5.2.4 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.

5.2.5 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 Brown Hairstreak

6.1.1 Covid restrictions meant that not all of the habitat suitable for Brown hairstreak egg laying was surveyed. However, during the surveys that were undertaken, 135 Brown hairstreak butterfly eggs were recorded along with; 8 Blue-bordered carpet moth eggs; Lackey moth eggs, Drinker moth larva; and large numbers of 7-spot ladybirds.

7 Recommendations

7.1 WINTERING WATERBIRDS

7.1.1 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 and Cetti's warblers, and maybe even attracting bittern to overwinter and potentially breed. 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.

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

7.2 BREEDING BIRDS

Breeding waterbirds

7.2.1 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 and around the edges of Spinney Lake.

7.2.2 Further to this, shallow margins or wet scrapes may encourage wintering waders including lapwing and mute swan which have been declining at the site.

7.2.3 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

7.2.4 There are no further recommendations for breeding terrestrial birds.

Nightingale

7.2.5 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. The distribution of nightingale at the northern extent of its range is however contracting, with numbers increasing in Europe by contrast.

House Martin

7.2.6 The mud area (opposite tennis court near estate office) that has previously attracted house martins gathering nest material has now grassed over. A new muddy puddle has been created in Millstone Park in Clearwater Village for the house martin. The puddle is connected to a water fountain, so that when people refill their water bottle any water overflow is fed into the puddle to keep it wet. Several homeowners also maintain patches of bare earth to allow the house martins to collect mud and the natural edges of the lake margins offer plenty of places for the birds to gather nesting material.

7.3 BATS

7.3.1 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.

7.3.2 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.

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Figure 1 Estate Context Plan

Lower Mill Estate Monitoring 2021

Figure 1: Estate Context Plan

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Reviewed by: IDW

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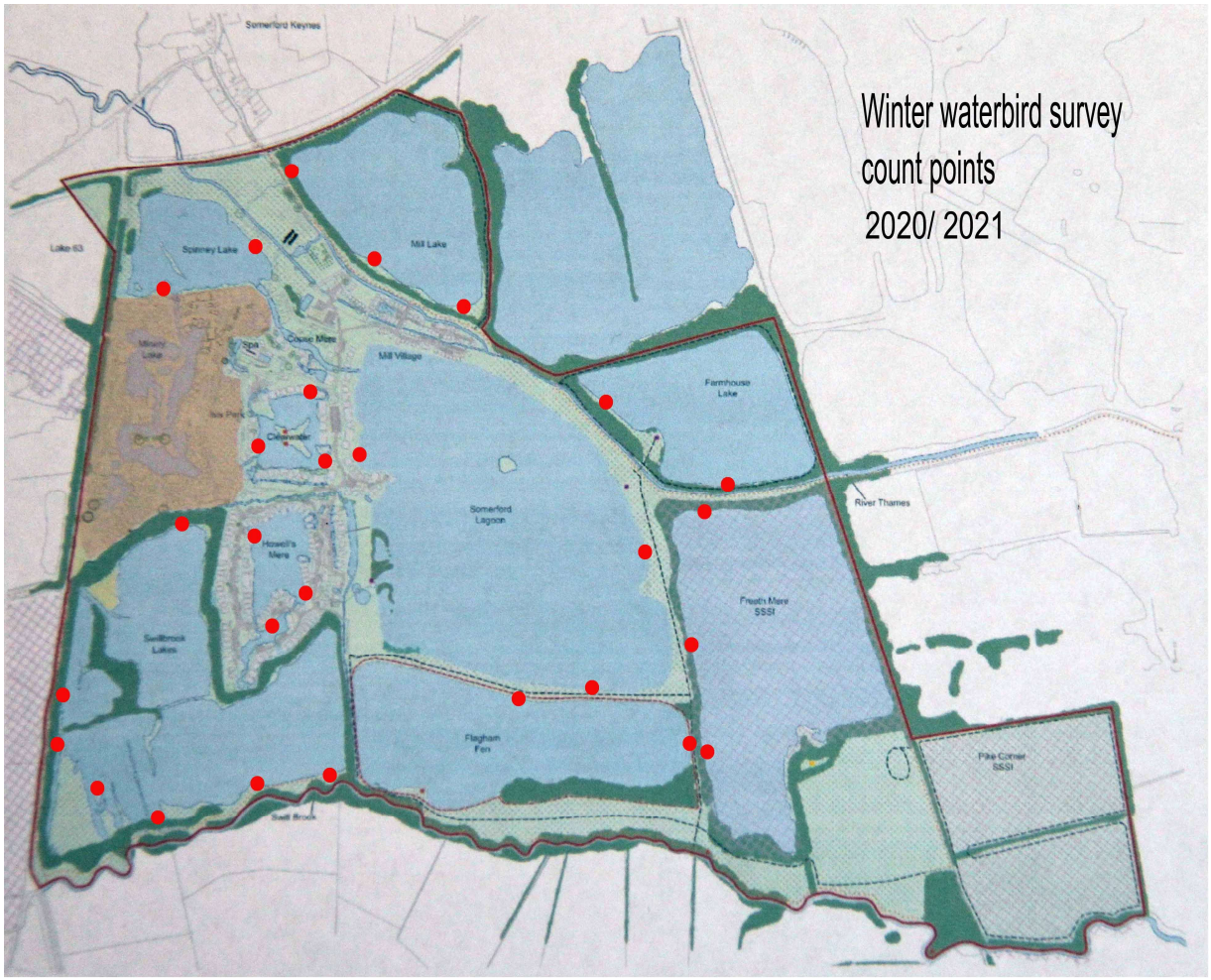
Figure 2 Wintering Waterbirds Vantage Points



KEY

Vantage point

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Figure 2: Wintering Birds Transect

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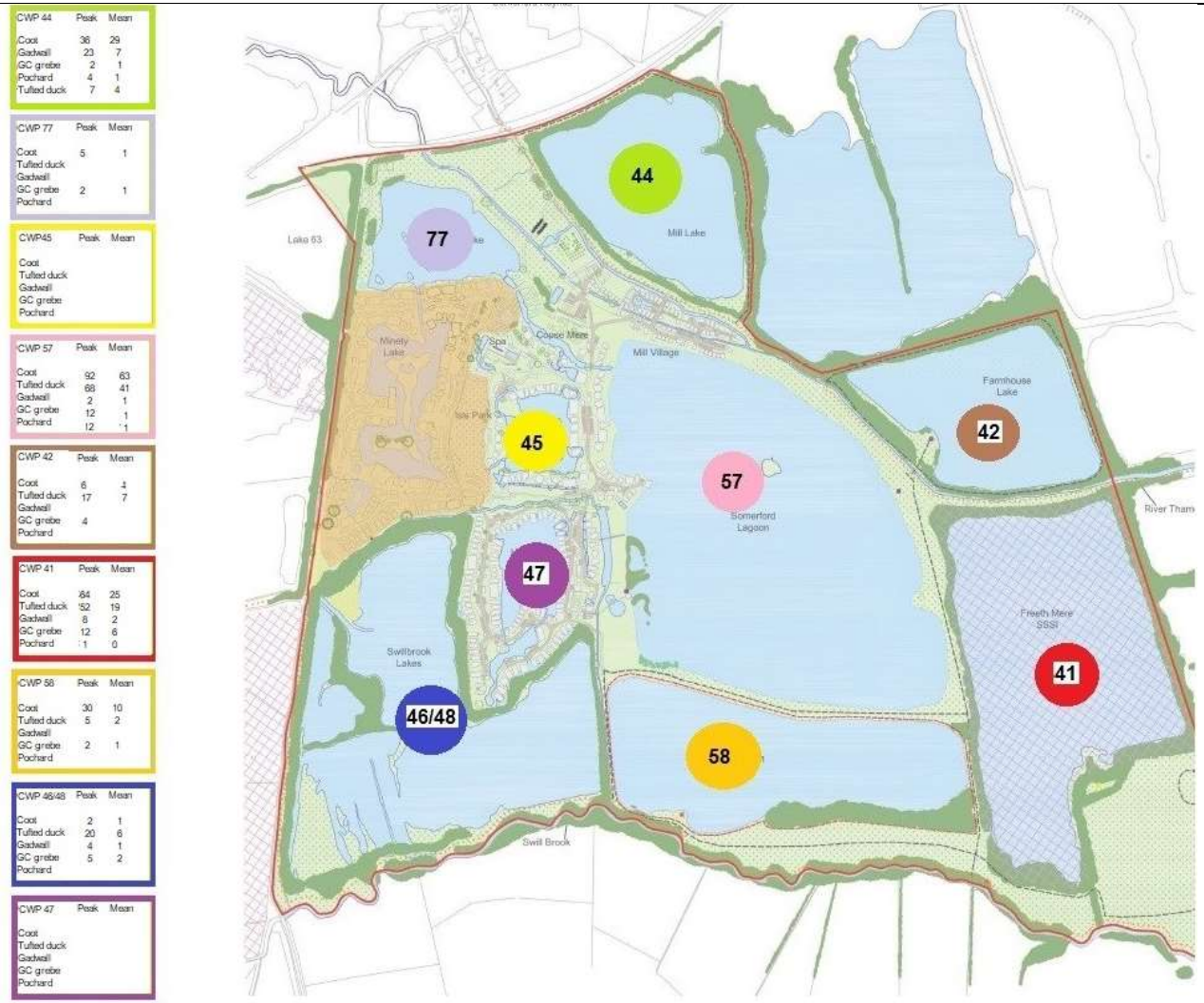
Figure 3 Wintering Waterbirds 2020-2021



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 3: Wintering Birds Survey

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Figure 4 Breeding Bird Surveys Transect Route

Key

Transect route

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Figure 4: Breeding Bird Route

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Figure 5 Breeding Waterbirds (LME)

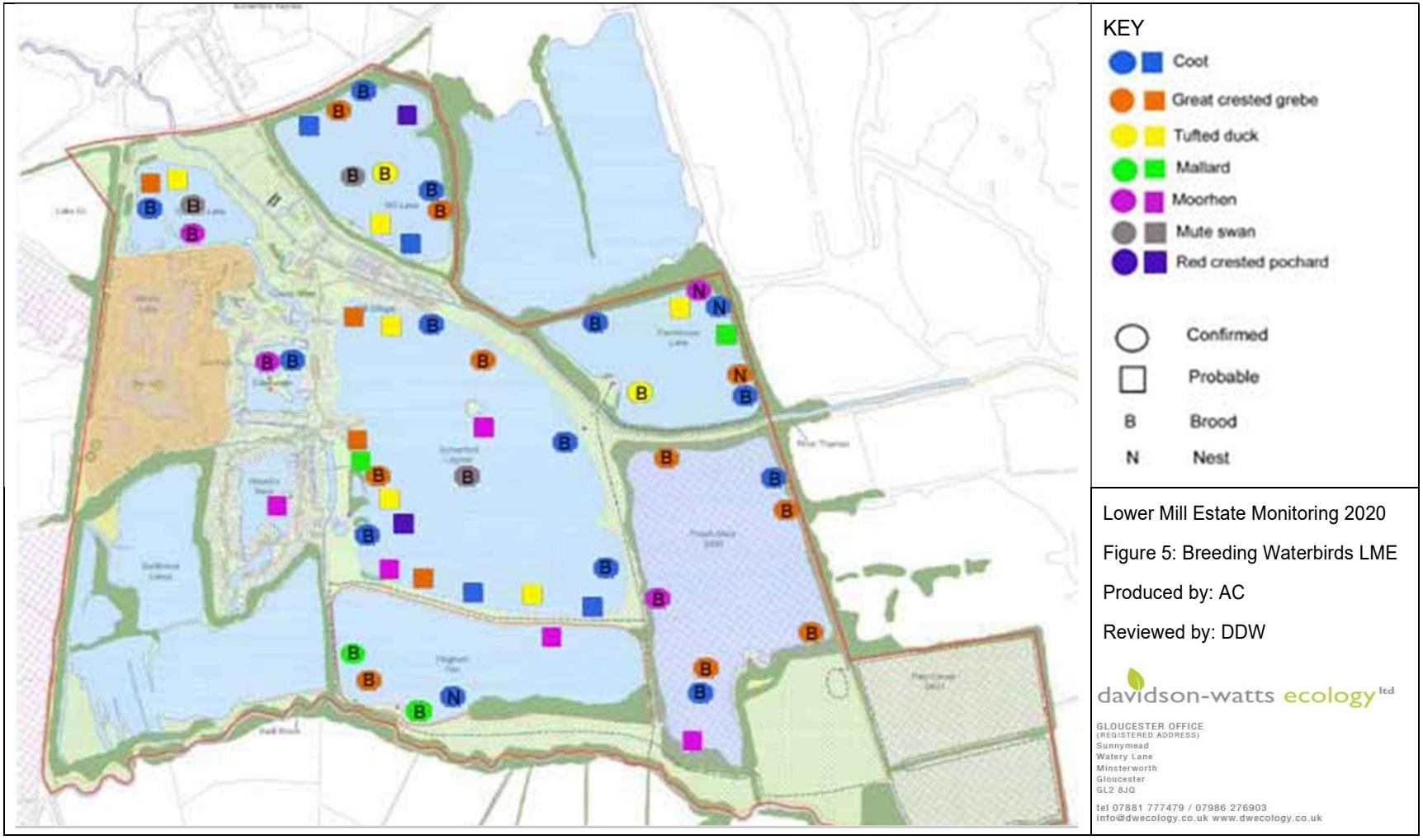
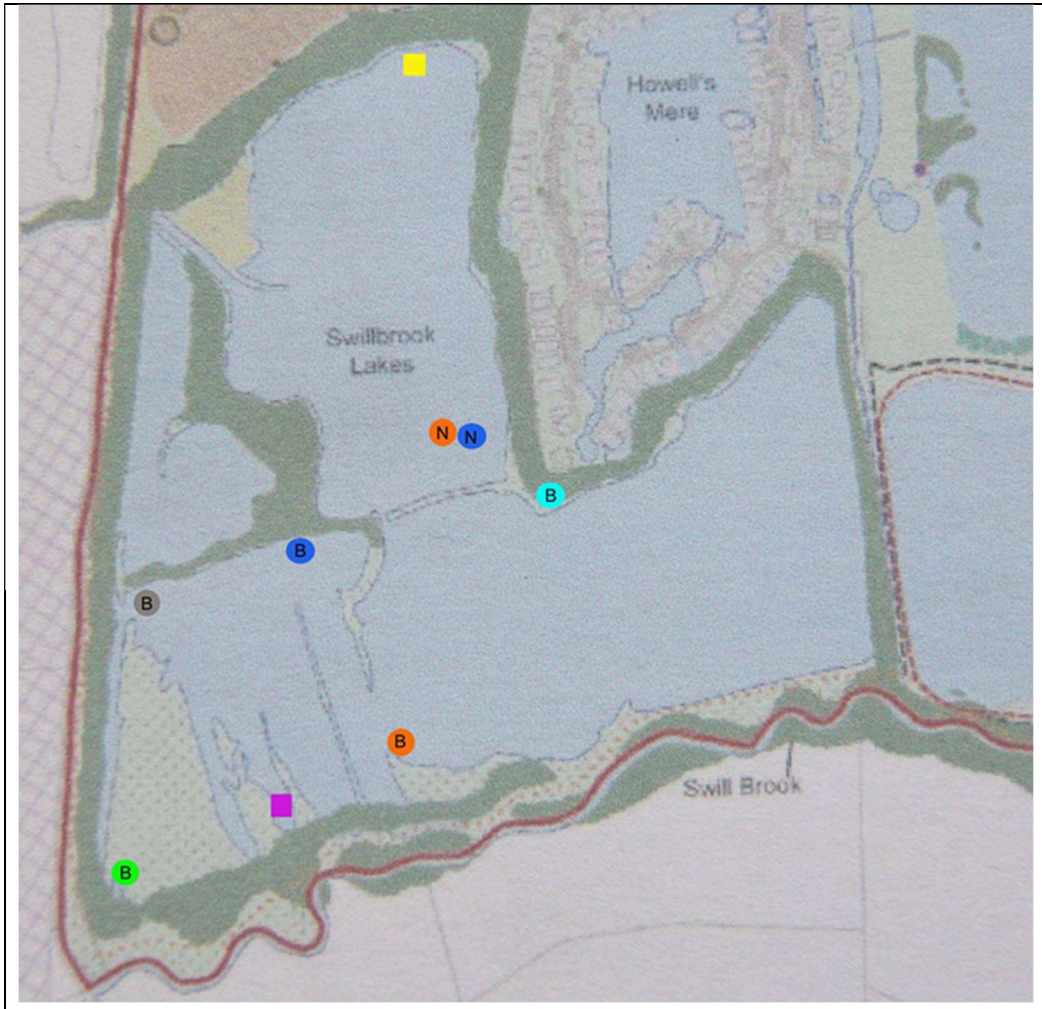


Figure 6 Breeding Waterbirds (Swillbrook Lakes)



KEY

- Coot
- Great crested grebe
- Tufted duck
- Mallard
- Moorhen
- Mute swan
- Red crested pochard

- Confirmed
- Probable
- B Brood
- N Nest

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Figure 6: Breeding Waterbirds SWBL

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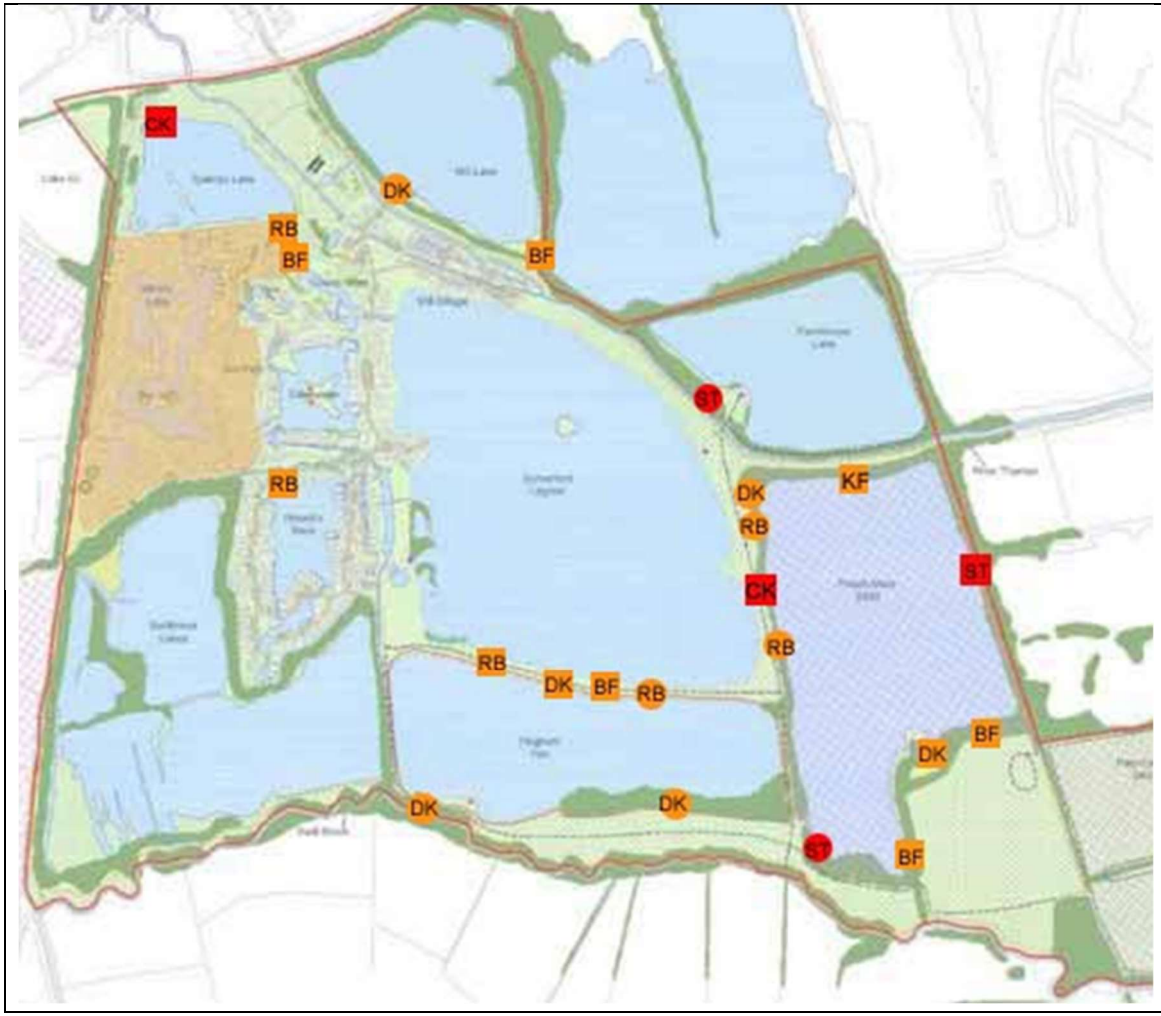
Figure 7 Red and Amber Species (LME)



KEY

Red/Amber listed species

BF Bullfinch
RB Reed bunting
ST Song thrush
DU Dunnock
KF Kingfisher

Red listed

Amber listed

Confirmed territory

Possible territory

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Figure 7: Red and Amber Species LME

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Figure 8 Red and Amber Species (Swillbrook Estate)

KEY

Red/Amber listed species

BF Bullfinch
RB Reed bunting
ST Song thrush
DU Dunnock
KF Kingfisher

Red listed

Amber listed

Confirmed territory

Possible territory

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Figure 8: Red and Amber Species SWBL

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Figure 9 Nightingale Transect

Key

- Transect Route

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Figure 9: Nightingale Results

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Figure 10 Reed Bunting Locations

Reed bunting

Sighting locations 2019

- Territories
- Individual sightings

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Figure 10: Reed Bunting Locations

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Figure 11 Reed Warbler Locations

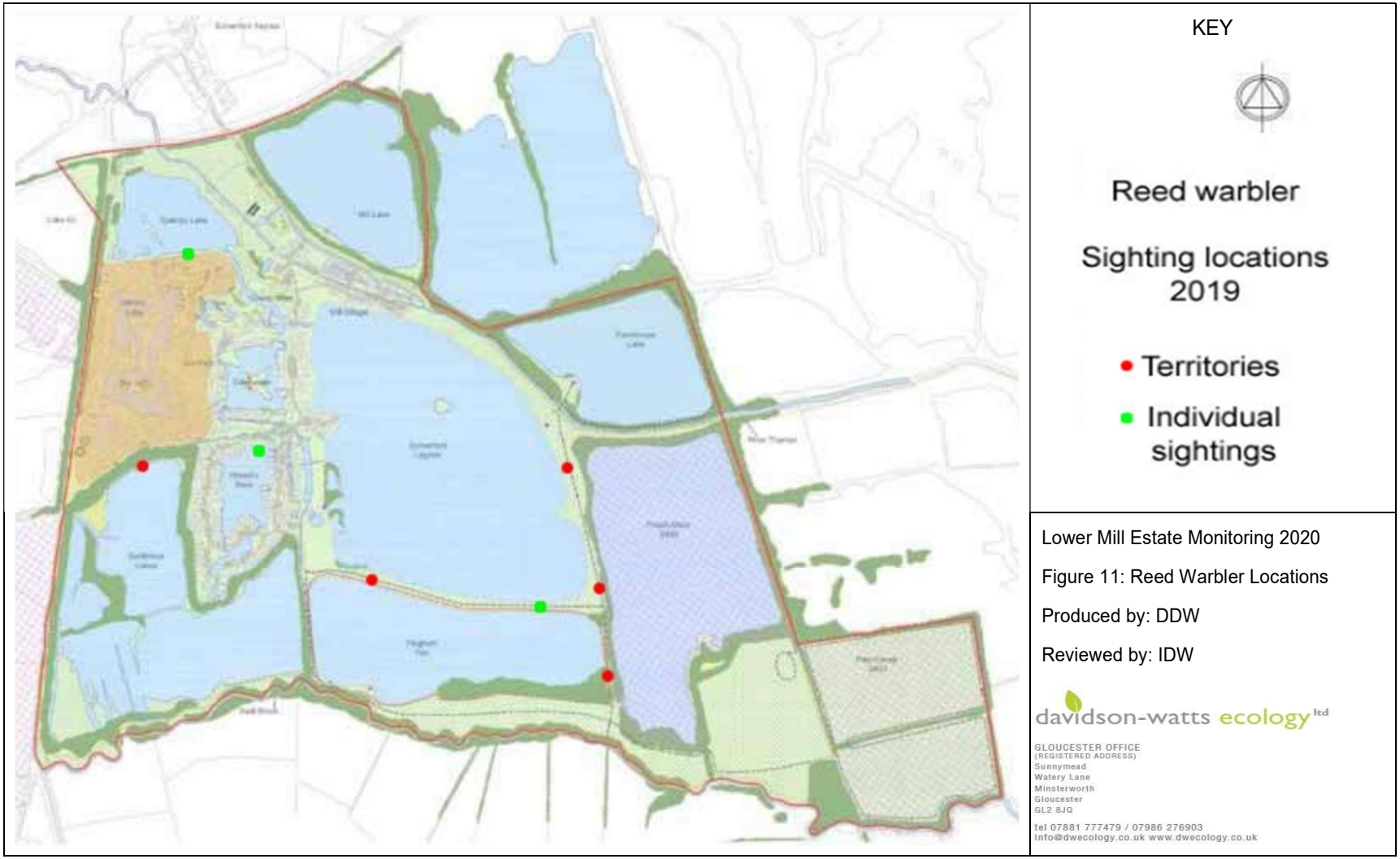
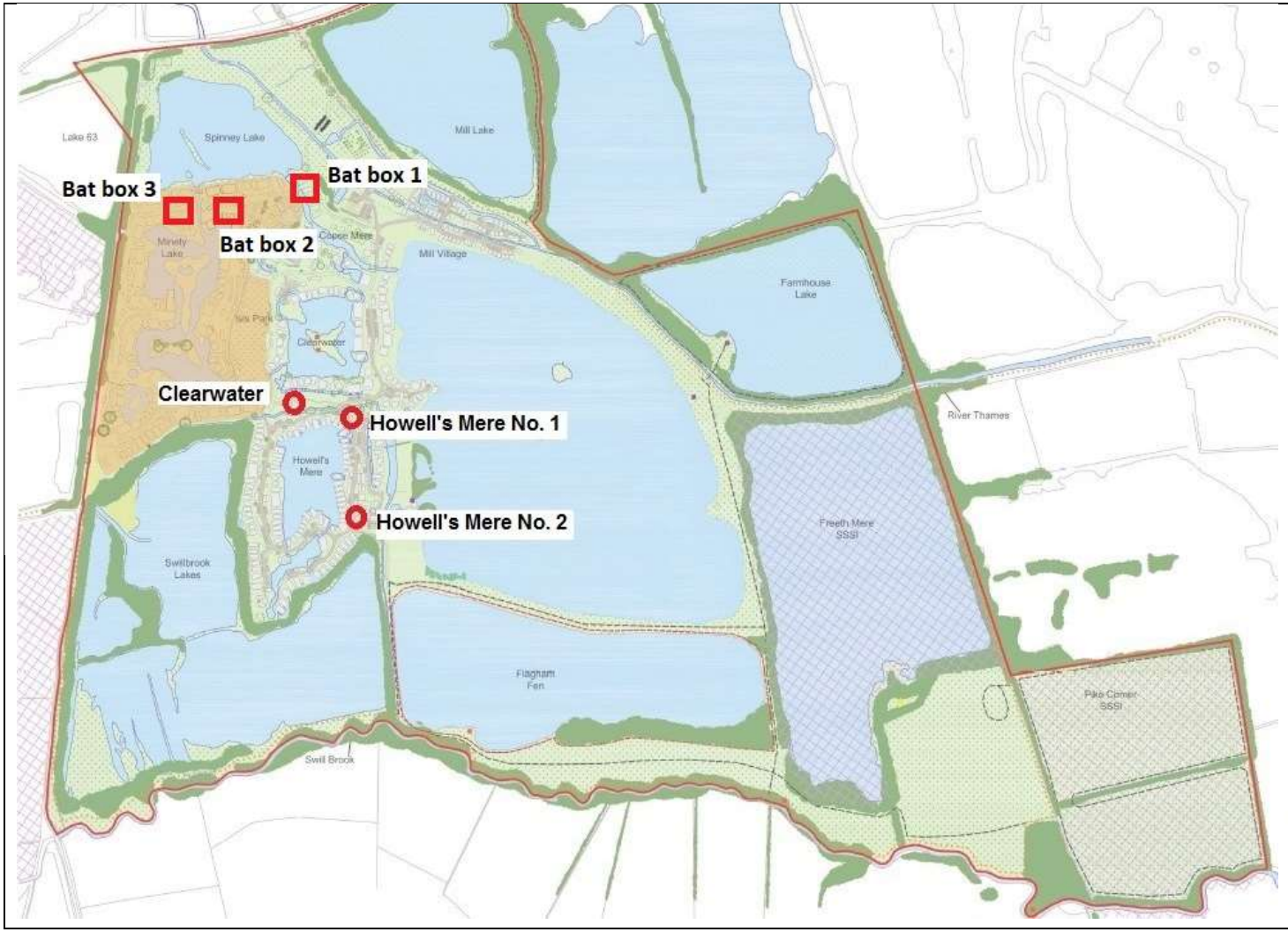


Figure 12 Bat Loft and Box Locations under Bridges



KEY

O Bat loft locations

Bat box bridge locations

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Figure 12: Bat Loft Locations

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Figure 13 Tern Raft Locations

KEY

Tern raft locations

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Figure 13: Tern raft locations

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Appendix A Wintering Waterbirds 2020 – 2021

	2020						2021								
	Oct		Nov		Dec		Jan		Feb		Mar				
Species	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Min**	**Peak**	**Mean**
Coot	174	160	152	159	144	121	127	127	116	132	83	86	83	174	132
Gadwall *	8	8	5	6	7	9	7	23	14	13	15	6	5	23	10
Great crested grebe	19	20	19	18	13	21	23	15	19	19	31	27	13	31	20
Pochard #				2		13	1	4	4		2		0	13	2
Tufted duck	48	62	67	67	83	89	50	72	93	127	116	82	48	127	80
Canada goose	2	9	13	1	2	20	14	78	22	15	13	9	1	78	17
Cormorant	21	19	16	18	12	14	13	11	11	8	6	5	5	21	13
Goldeneye *				5	4	16	13	16	18	28	6	9	0	28	10
Goosander		4	4	15	5		1	7	1	22	3	4	0	22	6
Grey heron	4	6	3	3	4	2	5	4		2	1	3	0	6	3
Great white egret			1		1		1	1					0	1	0
Greylag goose *				3						2	2	5	0	5	1
Kingfisher *							1	1		1	1		0	1	0
Lapwing #													0	0	0
Little egret	1		1	2	2		1	1		1	1		0	2	1
Little grebe								1					0	1	0
Mallard *	79	57	69	90	50	141	61	75	54	49	26	32	26	141	65
Moorhen	4	7	5	8	7	6	9	33	7	14	7	19	4	33	11
Mute swan *	56	52	28	11	9	10	10	7	4	7	8	10	4	56	18
Pintail *													0	0	0
Red crested pochard	2	11	17	29	69	168	139	155	104	77	65	17	2	168	71
Scaup #													0	0	0
Shelduck *													0	0	0
Shovler *	5	6	2			4	2						0	6	2
Teal *		6	17	29	68	73	5	64	41	12	3	4	0	73	27
Wigeon *	9	39	34	27	49	88	30	108	46	15	17	15	9	108	40
Total	432	466	453	493	529	795	513	803	554	544	406	333			527
Species	14	15	17	18	17	16	20	20	15	18	19	16			

LME priority Species

* BoCC 4 Amber listed

Bocc 4 Red listed

Appendix B LME Priority Species Lake by Lake

Lake 41 Freeth Mere

Species	Peak	Mean
Coot	64	25
Gadwall	8	2
Great crested grebe	12	6
Pochard	1	0
Tufted duck	52	19

Lake 42 Farmhouse Lake

Species	Peak	Mean
Coot	6	4
Gadwall		
Great crested grebe	4	2
Pochard		
Tufted duck	17	7

Lake 44 Mill Lake

Species	Peak	Mean
Coot	36	29
Gadwall	23	7
Great crested grebe	2	1
Pochard	4	1
Tufted duck	7	4

Lake 45 Clearwater Lake

Species	Peak	Mean
Coot		
Gadwall		
Great crested grebe		
Pochard		
Tufted duck		

Lakes 46/48 Swillbrook Lakes

Species	Peak	Mean
Coot	3	1
Gadwall	7	2
Great crested grebe	5	2
Pochard		
Tufted duck	21	5

Lake 47 Howell's Mere

Species	Peak	Mean
Coot		
Gadwall		
Great crested grebe		
Pochard		
Tufted duck		

Lake 57 Somerford Lagoon

Species	Peak	Mean
Coot	92	63
Gadwall	2	1
Great crested grebe	12	6
Pochard	12	1
Tufted duck	68	41

Lake 58 Flagham Fen

Species	Peak	Mean
Coot	30	10
Gadwall		
Great crested grebe	5	3
Pochard		
Tufted duck	5	2

Lake 77 Spinney Lake

Species	Peak	Mean
Coot	5	1
Gadwall		
Great crested grebe	2	1
Pochard		
Tufted duck	5	1

A blank box indicates no birds observed

Appendix C LME Breeding Waterbirds 2004 – 2020

Lake 41 Freeth Mere	Year																
Species	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Black headed gull	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 -1	0	0	0	0	0	0	0	0
Common tern	0	0	0	0	0	0	0	0	0	0	0 to 3	0	0	0	0	0	0
Coot	10	6	1	5 - 12	6 - 8	8	8 - 11	12 - 16	5 - 8	9 - 11	6 - 10	4-5	3 - 4	3 – 8	2 – 7	4-6	2
Gadwall	0	1	1	1 - 2	0	1	3	0 to 4	0	0	0	0	0	0 – 2	0	0-1	0
Great crested grebe	3	2	1	3 - 7	3 - 4	1 - 3	3 - 4	6 - 8	2 - 3	3 - 5	5 - 7	9	3	3 – 5	4	2-3	4
Greylag goose	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	7	7	3	1 - 3	4 - 7	3 - 5	2 - 3	2+	0 - 3	0 - 5	2 - 3	2-3	0	1 – 7	3	1-3	0
Moorhen	1	1	1	1	0 - 1	0 - 1	1	1	0 - 2	0	0 - 1	2-3	2	3	1	1	1-2
Mute swan	0	0	0	1	1	0 - 1	1	1	1	1	1	2	2	1	1	1	0
Red crested pochard	0	0	0	0	0	0 - 2	0 - 1	1 - 2	0 - 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 - 4	1 - 3	1	2	8 - 10	0	1 - 4	0	0-1	1 - 2	1	1 – 4	2-3	0
Water rail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**21**	**19**	**13**	**13 -30**	**15 -24**	**14 -22**	**21 -27**	**31 - 44**	**8 -18**	**14 - 26**	**14 - 25**	**19-23**	**11 - 13**	**12 – 27**	**12 - 20**	**11-18**	**7-8**
Species	**5**	**6**	**7**	**7**	**6**	**8**	**9**	**8**	**7**	**5**	**6**	**6**	**5**	**7**	**6**	**7**	**3**

Lake 42 Farmhouse Lake	Year																
Species	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Black headed gull	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coot	4	4	7	6	10	9 - 10	9 - 10	9 - 10	9	4 - 6	1 - 5	3-5	3	2 – 6	4 - 5	2-3	3
Gadwall	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0-1	0
Great crested grebe	2	1	1	1	1	2	2	2	1 - 2	1	1	2	1	1	2	2-3	1
Greylag goose	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	1	7	2+	1	1	1	3 - 4	1 - 3	0	2	3	0	1	1 – 3	1 – 2	1	0-1
Moorhen	0	1	1	2	1	1	1	1	1	2	1	1-3	0 - 1	0 – 1	0	0-1	1
Mute swan	1	1	1	1	1	1	1	1	1	0 - 1	1	0	0	0	0	0	0
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 - 1	2 - 4	0 - 1	1 - 2	0	0-1	2	0 -2	1 - 3	0-2	1-2
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 - 11**	**16 - 19**	**16 - 21**	**12 - 14**	**10 - 15**	**7 - 12**	**6-11**	**7 - 8**	**4 – 13**	**9 - 13**	**5-11**	**6-8**
Species	**4**	**6**	**5**	**5**	**5**	**6**	**6**	**6**	**5**	**6**	**5**	**4**	**5**	**5**	**4**	**6**	**5**

Lake 44 Mill Lake	Year																
Species	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Black headed gull	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coot	5	11	7	9 - 14	9	12	9 - 10	10	8 - 11	5 - 7	2 - 4	4	2 - 3	1 – 4	3 - 5	5	2-4
Gadwall	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 - 2	2	2	1	1	2	1	1	3	1	1	2
Greylag goose	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	1	1	1	1 - 2	1 - 2	2	3 - 5	0	0 - 1	0 - 1	0	1	0	0	0	0	0
Moorhen	0	2	2	3	1 - 2	3	2	2	1	0 - 1	0 - 1	2	1	0 – 2	1	0	0
Mute swan	0	1	1	1	1	1	1	1	1	0	0	0	0 - 1	0	1	0-1	1
Red crested pochard	0	0	0	0	1	0	1	0 - 1	0	0	0 - 2	0	0	0	2	0	0-1
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 - 1	1 - 2	1	1 - 2	0	0-1	0 - 1	0 – 2	1 - 2	1	1-2
Water rail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**8**	**17**	**13**	**15 - 21**	**14 - 16**	**20 - 22**	**17 - 21**	**16 - 18**	**12 - 16**	**7 - 12**	**4 - 9**	**8-9**	**4 - 7**	**4-11**	**9 - 13**	**7-8**	**6-10**
Species	**3**	**6**	**6**	**5**	**6**	**7**	**7**	**6**	**6**	**5**	**4**	**5**	**5**	**4**	**6**	**4**	**5**

Lake 45 Clearwater	Year																
Species	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Black headed gull	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 - 1	0	0	0	0	0	0	0	0	0
Common tern	0	0	2	1	1	0	0	0	0 - 1	0	0	0	0	0	0	0	0
Coot	0	3	1	3	3	2	2	3	1	2 - 3	0	1-2	0 - 1	1	0	0	1
Gadwall	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	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	0	0	0	0	1	0	0	1	0 - 1	0 - 1	1	0-1	0 - 1	0 – 1	0	0	0
Moorhen	0	2	1	2	1	0 - 1	1	1	2	0 - 1	0	2-3	1	2	1	1	1
Mute swan	0	0	1	1	1	1	1	0 - 1	1	1	1	1	1	0 – 1	0	0-1	0
Red crested pochard	0	0	0	0	0	1	0 - 1	0	1	0	0	0	0	1	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 - 2	0 - 1	0 - 1	0	0 - 1	0	0	0	0	0	0 - 1	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 - 9**	**6 - 9**	**4 - 6**	**5 - 7**	**5 - 8**	**3 - 6**	**2**	**4-7**	**2 - 4**	**4 – 6**	**1 - 2**	**1-2**	**2**
Species	**0**	**3**	**5**	**6**	**6**	**5**	**5**	**5**	**7**	**4**	**2**	**4**	**4**	**5**	**2**	**2**	**2**

Lake 47 Howells Mere	Year																
Species	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Black headed gull	No data collected						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							0	0	0	0	0	0	0	0	0	0	0
Coot							1	3	1	0 - 1	1	2	2 - 3	0	1	0	0
Gadwall							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							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							0	1	0	0 - 1	0	0	1	0	0 - 1	1	0
Moorhen							0	0	0	0	0	1	1	0	0 - 1	1	0-1
Mute swan							1	1	0 - 1	1	1	1	1	1	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 - 2**	**1 - 3**	**2**	**4**	**5 - 6**	**1**	**0 - 1**	**2**	**0-1**
Species							**2**	**3**	**1**	**3**	**2**	**4**	**4**	**1**	**2**	**2**	**1**

Lake 57 Somerford Lagoon	Year																
Species	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Black headed gull	0	0	0	0	3 - 4	4 - 5	6 - 9	10	5 - 10	8 - 12	c11	0	9	3	1	0-7	3-5
Canada goose	2	2	3	1 - 3	5 - 7	1 - 5	1 - 5	1 - 2	0 - 1	0	0	0	0	0	1	0	0
Common tern	0	2	1	3 - 5	3 - 6	1 - 4	2 - 3	3 - 4	1 - 2	2 - 3	0 - 3	0	0 - 3	1	0	0	1-5
Coot	20	9	8+	4 - 8	10 - 11	23 - 24	21 - 23	10 - 16	6 - 13	11 - 15	2 - 7	3-4	3 - 5	4 – 6	7 – 10	3-6	4-6
Gadwall	0	2	0	1	1	0 - 1	2	0 - 1	0	0	0	0	0	0	0	0	0
Great crested grebe	3	1	3	3 - 5	4	2 - 5	6 - 9	6 - 8	3 - 4	3 - 4	3 - 4	1	3	2 – 4	3 – 5	3-6	2-5
Greylag goose	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Lapwing	0	0	0	0	0	0	0 - 1	0 - 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 - 1	0	1	1	0	0	0	0	0	0	0	0	0	0	0
Mallard	3	3	4	4 - 5	1 - 3	1 - 2	1 - 3	2 - 5	1 - 2	0 - 2	4	3-5	0 - 1	1 – 5	1 – 3	1-4	0-1
Moorhen	2	1	1+	1 - 2	4	2 - 3	3	2	2	3	3	4-6	1 - 3	1 – 2	4 - 5	1-3	0-2
Mute swan	2	0	1	1	1	1	2	1	1	1 - 2	2	0	1 - 2	0	1	0	1
Red crested pochard	2	1	1	0 - 2	2 - 4	1 - 6	3 - 4	0 - 1	0 - 1	0	0 - 1	0	0	0	0	1	0-1
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 - 8	2 - 3	2 - 3	0 - 10	3 - 10	1 - 6	0 - 3	3	2-3	1	0 – 1	0 - 3	0-4	0-3
Water rail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**34**	**29**	**26**	**20 - 40**	**38 - 50**	**39 - 60**	**47 - 74**	**39 - 62**	**20 - 42**	**28 - 44**	**28 - 43**	**13-19**	**18 - 27**	**12-22**	**18 - 29**	**9-31**	**10-22**
Species	**7**	**10**	**11**	**10**	**13**	**11**	**12**	**13**	**10**	**8**	**9**	**5**	**8**	**7**	**8**	**7**	**9**

Lake 58 Flagham Fen	Year																
Species	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Black headed gull	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coot	3	4	2	9 - 10	11 - 13	10 - 13	10 - 13	18	10 - 11	12	3 - 6	4-5	3 - 4	3-6	1	2	1
Gadwall	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Great crested grebe	2	1	1	1 - 2	4	2 - 3	2 - 3	2	2	2	1	3	1	1	0 – 1	1	1
Greylag goose	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	3	4	2	1 - 2	1	1 - 2	3 - 4	3 - 4	1	1 - 3	2	0	0 - 1	1	1	1	2
Moorhen	1	1	1	1 - 3	1	1	1	0	0	0	0 - 1	1-2	1	0	0	0	0-1
Mute swan	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 - 1	2	2	1 - 2	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	1	0	0	2 - 4	1 - 2	0 - 2	1 - 2	1 - 2	0 - 1	0	0	0	0	0 – 1	0 - 2	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 - 22**	**19 - 23**	**15 - 24**	**16 - 24**	**25 - 28**	**15 - 17**	**13 - 15**	**6 - 10**	**8-10**	**6 - 8**	**5-9**	**2 - 5**	**4**	**4-5**
Species	**6**	**5**	**5**	**6**	**7**	**6**	**6**	**5**	**6**	**2**	**4**	**3**	**5**	**4**	**4**	**3**	**4**

Lake 77 Spinney Lake	Year																
Species	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Black headed gull	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	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Coot	7	3	3	4 - 8	7	7	5	4	3	4	1 - 2	1-2	1	1-2	1	2	1
Gadwall	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 – 1	0	0
Great crested grebe	1	1	1	1	1	1	0 - 1	1	1	1	0	2	0	0-1	0 – 1	0-1	0-1
Greylag goose	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 - 2	0 - 1	2	1 - 2	0	0 - 1	0 - 1	2	1	1	0 – 1	0-1	0
Moorhen	0	1	1	2	1	0 - 1	0	1	0	0	1 - 2	4	0 - 2	0-2	1 – 2	1-2	1
Mute swan	0	1	1	1	0	1	1	1	1	1	0 - 1	1-2	0	0-1	1	1	1
Red crested pochard	0	0	0	0	0	0 - 1	0	0	0	0	0 - 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 - 4	0 - 1	3 - 4	1 - 3	1 - 2	2	0 - 1	0	1	1	0 – 1	0-1	0-1
Water rail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**10**	**13**	**11**	**13 - 17**	**14 - 16**	**9 - 14**	**11 - 13**	**10 - 13**	**6 - 7**	**8 - 9**	**2 - 10**	**8-12**	**3 - 5**	**3-8**	**3 - 8**	**4-8**	**3-5**
Species	**4**	**6**	**6**	**6**	**5**	**7**	**5**	**7**	**4**	**5**	**6**	**5**	**4**	**6**	**7**	**6**	**5**

Appendix D LME Breeding Waterbirds (All Lakes) 2001 to 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 – 2020

	Year														
Species	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**Trend**
Black headed gull	0	3-4	4-5	6-9	10	5-10	10	11	0	9	3	1	3	3-5	Stable
Canada goose	4-6	5-7	1-7	1-5	1-3	0-1	1	0	0	0	0	1	1	0	Declining
Common tern	4-6	5-6	1-4	2-3	3-4	1-3	2-3	0-6	0	0-3	1	0	1	1-5	Declining
Coot	40-58	57-61	70-71	66-75	69-80	43-57	47-59	16-35	26-33	17-24	15-33	20-32	15-33	14-18	Declining
Gadwall	2-3	1	1-2	5	0-5	0	0	0	0	0	0-2	0 - 1	0-2	0	Declining
Great crested grebe	10-14	14-15	9-16	14-20	19-23	10-13	11-14	12-15	24	9	10-15	10-14	10-15	10-14	Stable
Greylag goose	0	1	0	0	0	0	0	0	0	1	0	0	1	0	Stable
Lapwing	0	0	0	0-1	0-1	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	9-12	10-17	8-14	15-20	11-18	2-8	3-16	12-14	11-18	4-6	5-18	6-11	5-18	2-4	Declining
Moorhen	12-17	9-11	6-11	9	8	6-8	5-7	5-9	19-30	7-12	6-12	8-11	6-12	4-9	Declining
Mute swan	7	6	5-7	8	6-7	7-8	5-7	6-7	9-10	5-7	2-4	4	2-4	3	Declining
Red crested pochard	0-2	3-6	1-14	6-9	2-6	2-4	2-3	0-4	0	1	1	2	1	0-2	Declining
Shelduck	0	0	0	0	1	0	0	0	0	0	0	0	0	0	-
Tufted duck	8-16	8-14	5-10	5-21	16-31	3-12	5-13	3-4	3-9	5-7	2-8	3-16	2-8	2-8	Declining
Water rail	1	0	0	0	0	0	0	0-2	0	0	0	0	0	0	-
Total	**98-143**	**123-150**	**112-162**	**134-186**	**147-198**	**79-142**	**91-133**	**65-156**	**92-124**	**58-79**	**45-97**	**55-93**	47-99	36-68	**Declining**
Species	**12**	**13**	**12**	**13**	**14**	**10**	**10**	**9**	**6**	**10**	**10**	**10**	**12**	**9**	**Declining**

Appendix F SWBL Breeding Waterbirds 2011 – 2020

	Date										Trend
Species	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	
Black headed gull						2	0	2	0-1	1	Stable
Canada goose	1	0-1	0-1	P	0	P	0-1	1	0-1	1	Stable
Common tern							1	8	6	3	Increasing
Coot	10-13	3-7	8-10	2-6	4	1-2	1-3	2	1	2	Declining
Gadwall	0	0	0	0	0	0	0	0	0	0	-
Great crested grebe	3	3-5	4-5	2-4	6	1-2	1-2	1-2	1-2	2	Declining
Greylag goose	0-1	0-1	P	P	0	1	0	1	1	0	Declining
Mallard	3	1-2	7-9	3	3-6	1	0-1	1	2-4	1	Declining
Moorhen	0-1	1-2	3-8	6-4	2-6	0	1-3	1-2	1	1	Declining
Mute swan	1	1	1-2	1	4	1	2	1	1	1	Stable
Red crested pochard	0	P	0	0	0	0	0	0	0	0	-
Tufted duck	2	0-2	0-2	0	1-3	1	0-2	0-1	0-1	0-1	Stable
Water rail	0	0	0	0-2	0	0	0	0	0	0	Stable
Total	**20-25**	**9-22**	**23-35**	**8-20**	**20-29**	**8-10**	**5-14**	**18 - 21**	**15-20**	**11-12**	**Stable**
Species	**8**	**8**	**7**	**6**	**6**	**7**	**7**	**10**	**10**	**9**	**Increasing**

Appendix G LME Breeding Terrestrial Birds 2003 – 2020

Species	Territories / pairs																		
Common name	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**Trend***
Blackbird	19	6	7	8	6	11	8	9	8	12	13	13	16	12	6	8	9	7	D
Blackcap	11	11	15	19	17	28	15	22	32	29	25	23	24	18	18	19	24	13	I
Blue tit	14+	16	18	20	8	9	9	12	5	10	4	7	7	15	17	17	12	8	D
Bullfinch (A)	2	0	2	2	2	3	2	3	2	2	2	1	0	1	3	4	3	5	I
Chaffinch	12	10	12	17	11	24	12	14	12	16	13	9	13	8	8	7	7	3	D
Chiffchaff	10	10+	5	4	4	7	5	13	15	11	12	11	9	9	7	5	7	8	I
Cuckoo (R.)	2	3	3	2	2	2	2	2	2	2	1	1	1	0	1	1	0	2	D
Dunnock (A)	7	3	8	5	13	15	11	8	5	4	5	7	6	5	7	5	5	6	D
Garden warbler	2	4	4	5	2	8	14	10	20	20	19	18	17	6	12	8	9	10	I
Great tit	10	5	11	10	6	9	9	7	11	8	2	6	4	3	7	8	2	3	D
Greenfinch	4	2	1	2	2	2	2	2	2	3	3	5	0	0	1	1	1	0	D
Long-tailed tit	2	7	2	1	3	3	2	4	5	3	3	2	1	3	1	2	2	3	S
Pied wagtail	1	0	2	2	1	1	2	1	1	3	3	1	0	0	1	0	1	0	D
Reed bunting (A)	20	13	20	22	15	17	10	10	10	8	6	9	3	9	6	7	3	6	D
Reed warbler	11	2+	9	8	14	36	33	49	49	27	18	16	14	4	5	3	8	7	D
Robin	22	8	13	19	18	31	24	10	12	21	21	20	26	19	22	8	11	8	D
Sedge warbler	10	6	14	9	4	12	10	9	13	9	9	8	7	15	15	10	3	2	D
Song thrush (R)	4	6	4	2	2	2	6	7	8	10	7	11	9	3	4	4	6	2	I
Whitethroat (A)	4	0	0	1	2	4	1	2	9	8	9	5	2	3	5	2	5	4	I
Willow warbler (A)	2	1	1	0	1	2	0	1	4	1	2	0	0	0	0	1	3	0	S
Wren	23	22	31	19	29	33	39	36	24	39	31	21	26	21	26	26	23	24	S
Total	198	140	186	180	165	262	216	231	249	248	209	194	185	154	172	143	144	121	S
Species	21	18	20	20	21	21	20	21	21	21	22	22	18	17	20	19	20	18	S

*Trend - D Decreasing I Increasing S Stable

Appendix H SWBL Breeding Terrestrial Birds 2011 to 2020

Species	Territories / pairs										
Common name	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**Trend**
Blackbird	3	3	3	7	7	2	3	4	3	1	D
Blackcap	15	16	15	11	13	8	7	10	7	4	D
Blue tit	4	4	2	2	7	4	7	6	5	2	I
Bullfinch (A)	2	1	0	1	3	2	1	3	1	0	S
Cetti's warbler	0	2	0	6	0	0	2	2	1	1	I
Chaffinch	6	5	7	9	3	2	0	1	2	0	D
Chiffchaff	10	8	7	1	10	5	6	6	7	5	D
Cuckoo (R.)	1	1	1	0	1	0	0	0	0	0	D
Dunnock (A)	4	3	4	7	3	2	1	1	0	1	D
Garden warbler	11	6	7	2	5	2	2	2	3	1	D
Goldcrest	0	3	1	1	1	2	2	2	2	2	I
Goldfinch	1	2	1	0	1	0	0	0	0	1	D
Great spotted woodpecker	1	1	1	3	1	0	1	1	0	0	D
Great tit	4	6	2	1	2	2	2	2	3	1	D
Green woodpecker	1	1	1	1	0	0	1	0	0	0	D
Jay	1	1	0	1	0	0	0	0	0	0	D
Long-tailed tit	3	3	1	1	1	0	2	1	0	1	D
Reed bunting (A)	6	7	2	10	0	2	3	1	2	1	D
Reed warbler	11	11	4	0	5	2	0	0	1	1	D
Robin	4	10	6	8	16	7	6	5	3	3	D
Sedge warbler	2	1	1	1	0	1	1	2	3	1	I
Song thrush (R)	5	5	3	1	3	1	2	3	4	2	D
Tree creeper	4	3	0	1	0	0	0	0	0	0	D
Whitethroat (A)	2	1	2	13	1	0	1	0	0	0	D
Willow warbler (A)	2	0	2	21	1	2	1	1	2	0	D
Wood pigeon	8	6	8	7	8	0	0	0	0	0	D
Wren	15	22	15	11	17	11	12	10	14	7	D
Total	128	134	95	115	109	57	63	63	63	35	D
Species	26	27	23	26	23	17	20	19	17	17	D