

**The wetland resource of the Colne Valley:  
an assessment of its importance to nature conservation,  
with special reference to waterbirds**



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## **Executive summary**

This study aimed to describe the wetland resource of the Colne Valley, Greater London and to assess its significance to waterbirds, updating a similar report from 2008 (White & Harris 2008). The study included all the water-bodies in the Colne Valley from Rickmansworth south to the A40.

The Colne Valley supported between 1,857 and 3,011 waterbirds between September 2022 and March 2023. The peak total count was of 3,011 birds in January 2023. This compares with totals of between 3,400 and 4,618 waterbirds in the previous study in 2006-07. Coot was the most numerous species, followed by Tufted Duck, with these two species forming over 60% of the total, but with only Coot having peak counts into four figures. Shoveler, Pochard and Canada Goose had peak counts of over 200 birds, Mallard, Wigeon, Gadwall, Great Crested Grebe, Greylag Goose and Cormorant all over 100.

Counts of two individual species (Shoveler and Pochard) were above the figure set for the level of national significance. When the Colne Valley was considered as a whole the total count is significantly below the threshold for national significance. Broadwater Lake alone exceeded the level of national significance for Shoveler. In the previous study, counts of six species (Gadwall, Shoveler, Tufted Duck, Smew, Great Crested Grebe and Cormorant) were above the level of national significance when the valley was considered as a whole.

Broadwater Lake and Stocker's Lake are the most important sites, both supporting around 800 birds at peak periods. These sites function as refuges from disturbance from other sites and are likely to be supporting birds from beyond the Colne Valley study area. Lynsters, the Troy Lakes, Pynesfield and Denham Lakes all peaked at between 300 and 400 birds. In the previous study, Stocker's Lake and Broadwater Lake were also the most important sites, but both supporting over 1,000 birds at peak periods. In addition, Broadwater Lake supports an important summer moult of Tufted Duck.

Only four species were found to be stable or increasing in the Colne Valley in the current study: Shoveler, Red-crested Pochard, Canada Goose and Greylag Goose. Pochard have declined but their importance locally has increased due to a declining national population and a lowering of the importance threshold. The key reasons for declines in the remaining species are considered to be one or more of the following:

- The impact of climate change; milder winters and 'short-stopping'.
- The impact of natural succession; the loss of early succession, shallow water.
- The impact of declining food resource; aquatic plants and the impact of fish populations.
- The impact of disturbance or conflict with human activity.

Habitat management recommendations including proposals for priority use – nature conservation, recreation or combined (integrated) use – are given for the Colne Valley in general and for individual sites. Current issues that may influence habitat management, such as climate change and the impact of changing water levels are also discussed.

## **1. Introduction**

### **1.1 Background**

The landscape of the Colne Valley has been transformed over the past century by sand and gravel extraction. Many of the pits resulting from the extraction have filled with water and there are now a series of lakes of varying size and form. Most of the lakes are used for recreational activities, including angling and water sports. A large local population means that the wetland landscape is a valuable resource for informal recreation such as walking and bird watching. The study area forms part of the Colne Valley Regional Park.

The gravel pits and River Colne attract one of the most important wetland breeding bird communities in Greater London: Coot, Kingfisher, Great Crested Grebe, Mute Swan and Tufted Duck all nest regularly, while others such as Gadwall, Pochard and Shoveler breed less frequently. Cormorant, Grey Herons and Little Egrets nest on the islands at Stocker's and Broadwater Lakes. Many species of wintering wildfowl are attracted to the extensive water areas; with Coot, Tufted Duck, Pochard, Shoveler, Gadwall and Great Crested Grebe all being familiar birds on the wetlands.

Although Broadwater Lake and Stockers Lake are reasonably well studied, less is known about the ecological significance of other water bodies in the Colne Valley and how they are used by water birds throughout the seasons.

This study aims to repeat an assessment carried out in 2008 and increase our understanding of how the Colne Valley functions as a wetland system and how birds use the many water-bodies strategically to fulfill their requirements for feeding, breeding and moulting. A number of factors have changed since 2008, not least the construction of HS2 across the valley, which has impacted on a number of water-bodies, including Broadwater Lake. In addition, there are significant pressures for water abstraction in the Colne Valley which may result in short and/or prolonged falls in water levels within the lakes. It is anticipated that the study will identify which lakes are most sensitive to potential future changes in relation to use by waterbirds and if these changes have a negative impact upon the bird populations within the valley.

### **1.2 Project brief**

To describe the wetland resource of the Colne Valley and assess its significance to water birds. The study will include all the accessible water-bodies in the Colne Valley from Rickmansworth south to the A40.

### **1.3 Project outputs**

The project outputs are as follows:

1. An assessment of the WeBS data for the Colne Valley water-bodies to ascertain if there have been changes in waterbird populations, distribution or activity since the last assessment (White and Harris 2008).
2. Dedicated counts of water birds on key water-bodies on non-WeBS count days to inform assessment of water bird usage of the Colne Valley, notably movement of birds between sites, from September 2022 until March 2023.

3. An assessment of the WeBS data collected above (and historical WeBS counts which are available for some of the sites) to identify the most important lakes and for each lake to identify the main use by waterbirds eg feeding, roosting, breeding, moulting. Identify the key species for each of the water-bodies. Initial conclusions should also identify if there are any observed links between recreational activity and bird numbers or species recorded on each water-body.
4. An ecological evaluation of the watercourses and water-bodies, describing:
  - Location (OS grid reference), topography and size.
  - Habitats and key species, to include fish (where data available from angling clubs).
  - Ecological issues, including links between water-bodies.
  - A qualitative scoring for each water body on its sensitivity to low water levels, in the short term and also to a prolonged drop.
  - Recreational use and impacts on water birds, notably identifying any changes since the last assessment in 2008.
  - Management recommendations including proposals for priority use – nature conservation, recreation or combined (integrated) use.
5. It is accepted that a thorough assessment of the impacts of recreation on water birds is beyond the scope of this report. However, research carried out previously in the Colne Valley should be captured within the report. Using data collected in the 1990s, a case study of the effectiveness of the refuge area within Broadwater Lake as a sanctuary for birds affected by recreational activity, both within Broadwater Lake and the surrounding area, should be included as an appendix.
6. Based on the data collected and analysed, the report should make basic recommendations for future habitat management of the water-bodies. The report should also identify remaining gaps in understanding the ecology of the Colne Valley and if more work is required to ensure sustainable management of the resource for the future.

## **2. Analysis of wetland bird counts in the Colne Valley**

### **2.1 Details of the counts**

The weather conditions during the winter of 2022/2023 were generally mild and wet, with 2022 being, on average, one of the warmest years on record. The first half of the winter saw water-bodies recovering from prolonged drought conditions during the year. After a short but severe cold spell in December, with water-bodies extensively frozen, conditions became very mild and rainfall was above average. Although February remained mild, March was cooler than normal with over double the average rainfall, ensuring lakes were at peak water levels by the end of the winter. Overall, the weather was not harsh enough to initiate any significant cold weather movements of birds.

Counts were undertaken principally on midweek days before or after the designated WeBS counts. Most of these counts were undertaken in the morning. Some however, were undertaken in the late afternoon to look for different patterns of behaviour at this time, notably to gather information on roost sites, and a couple of counts were undertaken at weekends. The counts were undertaken by Graham White. Additional data was obtained from local birders via the eBird website.

Most sites were directly accessible or viewable from public footpaths. A few were inaccessible though, either due to HS2 works, or being privately owned or managed by angling clubs.

### **2.2 The waterbird community of the Colne Valley**

The Colne Valley supported between 1,857 and 3,011 waterbirds between September 2022 and March 2023. The peak total count was of 3,011 birds in January 2023 (see Table 1 for species included). This compares with totals of between 3,400 and 4,618 waterbirds in the previous study in 2006-07.

Coot was the most numerous species, followed by Tufted Duck, with the two species forming over 60% of the total, but with only Coot having peak counts into four figures. Shoveler, Pochard and Canada Goose had peak counts of over 200 birds, Mallard, Wigeon, Gadwall, Great Crested Grebe, Greylag Goose and Cormorant all over 100.

Counts of two individual species (Shoveler and Pochard) were above the figure set for the level of national significance. When the Colne Valley was considered as a whole the total count is significantly below the threshold for national significance. However, it should be noted that this figure needs to be achieved as a mean of the peak counts over a 5-year period. These counts are highlighted in Table 1. Broadwater Lake alone exceeded the level of national significance for Shoveler.

Table 2 shows the total number of waterbirds recorded at each site on the count dates. Broadwater Lake and Stocker's Lake are the most important sites, both supporting around 800 birds at peak periods. Lynsters, the Troy Lakes, Pynesfield Lakes and Denham Lakes all peaked at between 300 and 400 birds. WeBS counts for the last ten years were available for some sites, the mean peak count over those ten years for WeBS sites is given under each species account.

**Table 1. Counts of waterbirds in the Colne Valley September 2022 to March 2023**

Counts of national significance are underlined.

	<b>27 Sep</b>	<b>10 Oct</b>	<b>18 Nov</b>	<b>23 Dec</b>	<b>10 Jan</b>	<b>06 Feb</b>	<b>13 Mar</b>	<b>Peak Count</b>	<b>Level of national significance</b>
<b>Great Crested Grebe</b>	79	103	92	54	69	75	72	103	170
<b>Cormorant</b>	54	53	109	86	70	100	90	109	620
<b>Mute Swan</b>	20	18	28	64	55	49	31	64	500
<b>Canada Goose</b>	185	194	12	24	134	167	305	305	N/A
<b>Greylag Goose</b>	100	108	12	0	13	2	4	108	N/A
<b>Wigeon</b>	14	20	7	107	46	62	82	107	4500
<b>Gadwall</b>	40	49	53	184	100	102	46	184	310
<b>Teal</b>	3	7	18	22	20	12	7	22	4300
<b>Mallard</b>	92	113	86	146	85	91	53	146	6700
<b>Shoveler</b>	48	83	109	184	<b>228</b>	<b>344</b>	132	344	190
<b>Red-crested Pochard</b>	0	0	0	32	13	22	4	32	N/A
<b>Pochard</b>	80	195	<b>234</b>	171	191	191	186	234	230
<b>Tufted Duck</b>	173	400	746	522	655	660	388	746	1300
<b>Goldeneye</b>	0	0	7	15	13	13	15	15	190
<b>Smew</b>	0	0	1	1	1	1	0	1	1
<b>Goosander</b>	0	0	2	0	0	1	0	2	150
<b>Coot</b>	969	1158	1400	1379	1318	1075	695	1400	2000
<b>TOTAL</b>	<b>1857</b>	<b>2501</b>	<b>2916</b>	<b>2991</b>	<b>3011</b>	<b>2967</b>	<b>2110</b>	<b>3011</b>	



**Table 2. Totals of waterbirds at individual sites in the Colne Valley September 2022 to March 2023**

Peak counts in this study are compared with those in the 2006-07 study.

	<b>27 Sep</b>	<b>10 Oct</b>	<b>18 Nov</b>	<b>23 Dec</b>	<b>10 Jan</b>	<b>06 Feb</b>	<b>13 Mar</b>	<b>Peak count</b>	<b>Peak Count 2006-07</b>
<b>Stocker's complex</b>	663	756	722	684	842	717	544	834	1431
<b>Springwell</b>	8	8	6	11	18	45	60	60	276
<b>Maple Lodge</b>	10	17	48	77	75	87	55	87	151
<b>Lynsters</b>	87	259	283	263	290	278	205	290	662
<b>Pynesfield</b>	154	178	225	332	298	240	159	332	263
<b>North Troy</b>	50	46	78	291	95	91	38	291	107
<b>Troy Mill</b>	208	198	391	334	364	273	210	391	369
<b>Tilehouse</b>	28	36	58	62	52	47	36	62	226
<b>Broadwater complex</b>	459	557	589	443	560	784	501	784	1160
<b>Savay</b>	34	46	56	50	41	59	45	59	395
<b>Harefield No 2</b>	19	98	143	132	109	100	84	143	95
<b>Denham Complex</b>	137	302	316	309	266	245	173	316	303
<b>TOTAL</b>	<b>1857</b>	<b>2501</b>	<b>2916</b>	<b>2991</b>	<b>3011</b>	<b>2967</b>	<b>2110</b>	<b>3011</b>	<b>4618</b>

## 2.3 Individual species accounts

### 2.3.1 Mute Swan

The population of Mute Swans in the Colne Valley is of low national significance with the peak total count for the valley of just 64 in December 2022, well below the threshold for national significance (500). The Stocker's Lake complex remains the key site (notably Batchworth Lake and the adjacent river).

Numbers appear to have declined throughout the valley over the years with, apart from the Stocker's complex, this winter's counts being lower than the ten-year mean peaks and the total in 2006-07 being 138 (see Table 3 below). Formerly, large numbers were typical at Bury Lake where the birds were fed by visitors to the Aquadrome and birds gathered to form moulting and wintering flocks.

Mute Swans in the UK are generally very sedentary with local movements to wintering or moulting sites. The national trend is of a steady increase from the mid-1980s to around 2000, but largely stable since then. The 25-year trend (1995/96 to 2020/21) of the UK wintering population shows an increase of 16%, but with a slight decline of 3% in the latter ten years (BTO data). Numbers in the Colne Valley would seem to show an increased decline over the last 15 years locally, with the losses more of non-breeding birds rather than breeding pairs. The valley does remain a stronghold of the species in Hertfordshire though.

	<b>27-Sep</b>	<b>10-Oct</b>	<b>18-Nov</b>	<b>23-Dec</b>	<b>10-Jan</b>	<b>06-Feb</b>	<b>13-Mar</b>	<b>10-yr mean peak</b>	<b>Peak 06-07</b>
<b>Stocker's Lake complex</b>	14	13	10	41	45	30	11	39	79
<b>Springwell Lake</b>	0	0	0	0	0	0	2		24
<b>Maple Lodge</b>	0	0	0	0	0	0	0	2	2
<b>Lynsters</b>	0	0	0	0	0	0	0	14	25
<b>Pynesfield N &amp; S</b>	4	3	0	8	6	0	2	10	6
<b>Troy Mill &amp; North Troy</b>	0	0	11	9	4	17	14	25	2
<b>Tilehouse</b>	0	0	0	0	0	0	0		6
<b>Broadwater Lake</b>	2	2	2	0	0	0	0	14	26
<b>Savay</b>	0	0	0	0	0	0	0		8
<b>Harefield No 2</b>	0	0	0	0	0	0	0		5
<b>Denham complex</b>	0	0	5	6	0	2	2		7
<b>TOTAL</b>	<b>20</b>	<b>18</b>	<b>28</b>	<b>64</b>	<b>55</b>	<b>49</b>	<b>31</b>		<b>138</b>

### 2.3.2 Canada Goose

The peak count of Canada Goose for the valley was 305 in March 2023 (see Table 4 below). Numbers were high in autumn, declining in November/December as birds presumably used local farmland for feeding. No threshold levels for national significance are set for this naturalised introduced species. Three sites in the valley attracted the highest numbers of Canada Geese; the Stocker's complex, Lynsters and Broadwater Lake. At Lynsters, geese are regular on the grazed fields of the farm adjacent to the lake and at Broadwater Lake, moulting and roosting birds are typically present in late summer.

Nationally the population shows a continuing increase (+72% 25-year trend between 1995/96 and 2020/21) and is now estimated to be over 165,000 birds, although the increase has slowed in recent years. The annual pattern typically shows a late summer peak followed by a decline during the winter, a pattern typical of a largely resident species. Most of the national increase has been in areas previously unoccupied, with older populations more stable. The Colne Valley counts reflect this, with a largely stable population. The monthly totals appear to be somewhat erratic, probably due to local movements in and out of the valley to farmland where they may be missed on count days. The March counts are a good indication of the local population as birds return to breeding locations.

	<b>27-Sep</b>	<b>10-Oct</b>	<b>18-Nov</b>	<b>23-Dec</b>	<b>10-Jan</b>	<b>06-Feb</b>	<b>13-Mar</b>	<b>10-yr mean peak</b>	<b>Peak 06-07</b>
<b>Stocker's Lake complex</b>	149	158	10	18	72	92	146	172	222
<b>Springwell Lake</b>	0	0	0	0	0	0	0		8
<b>Maple Lodge</b>	0	0	0	0	0	0	2	7	3
<b>Lynsters</b>	0	0	0	0	60	58	50	79	58
<b>Pynesfield N &amp; S</b>	0	0	0	0	0	0	0	8	2
<b>Troy Mill &amp; North Troy</b>	0	0	0	6	0	4	8	13	0
<b>Tilehouse</b>	0	0	0	0	0	0	0		8
<b>Broadwater Lake</b>	36	36	2	0	2	5	86	71	133
<b>Savay</b>	0	0	0	0	0	0	0		15
<b>Harefield No 2</b>	0	0	0	0	0	2	4		2
<b>Denham Complex</b>	0	0	0	0	0	0	0		5
<b>TOTAL</b>	<b>185</b>	<b>194</b>	<b>12</b>	<b>24</b>	<b>134</b>	<b>167</b>	<b>305</b>		<b>383</b>

### 2.3.3 Greylag Goose

The Colne Valley supports small but increasing numbers of Greylag Geese. Peak total counts for the valley were 108 in October 2022 (see Table 5 below). No threshold levels for national significance are set for this largely naturalised introduced species (although wild continental birds increasingly mix with the population). The Stocker's Lake complex and Broadwater Lake, along with the fields by Lynsters Lake, are generally the most regular places in the valley for Greylag Geese. Numbers will be more dispersed in summer as birds breed on the various lakes throughout the valley.

The UK wintering population now tops 230,000 birds, with the 25-year trend being an increase of 210%, although this has slowed considerably in recent years. The Colne Valley figures match this national trend with an increase in both wintering and breeding populations. The low level of counts during the bulk of the winter reflects birds being out feeding on farmland during the day.

	<b>27-Sep</b>	<b>10-Oct</b>	<b>18-Nov</b>	<b>23-Dec</b>	<b>10-Jan</b>	<b>06-Feb</b>	<b>13-Mar</b>	<b>10-yr mean peak</b>	<b>Peak 06-07</b>
<b>Stocker's Lake complex</b>	60	66	12	0	4	0	4		8
<b>Springwell Lake</b>	0	0	0	0	0	0	0		12
<b>Maple Lodge</b>	0	0	0	0	0	0	0		5
<b>Lynsters</b>	0	0	0	0	0	0	0		86
<b>Pynesfield N &amp; S</b>	0	0	0	0	0	0	0		0
<b>Troy Mill &amp; Helicon</b>	0	0	0	0	9	0	0		0
<b>Broadwater Lake</b>	40	42	0	0	0	2	0	48	44
<b>Denham Complex</b>	0	0	0	0	0	0	0		0
<b>TOTAL</b>	<b>100</b>	<b>108</b>	<b>12</b>	<b>0</b>	<b>13</b>	<b>2</b>	<b>4</b>		<b>86</b>

### 2.3.4 Wigeon

The numbers of Wigeon in the Colne Valley are of very low significance. The maximum total count was only 107 in December 2022, with the peak site counts being 34 at Troy Mill in December, 38 at Broadwater Lake in February and 46 at the Stocker’s Lake complex in March. The threshold for national significance is 4,500.

After an early arrival of a few birds in September/October, there was a small cold weather arrival in the short severe spell of weather in December. Most of these birds appeared to settle in the valley for the remainder of the winter. Wigeon generally gather where there is abundant food in the form of suitable grassland for grazing or submerged aquatic plants.

The UK trend for the wintering population has been of slight decline, over the 25 years 1995/96 – 2020/21 there was a decline of 11%. Numbers in the Colne Valley in the past have been higher but appear to have never been close to levels of national significance. Within the valley there is a lack of undisturbed grazing areas adjacent to water, particularly in latter years as vegetation succession has continued. Wigeon in the valley tend to feed on aquatic plants, which are not only cyclical in abundance but also seem to have declined, perhaps again through successional changes within the water-bodies.

	<b>27-Sep</b>	<b>10-Oct</b>	<b>18-Nov</b>	<b>23-Dec</b>	<b>10-Jan</b>	<b>06-Feb</b>	<b>13-Mar</b>	<b>10-yr mean peak</b>	<b>Peak 06-07</b>
<b>Stocker's Lake complex</b>	0	0	0	15	16	24	46	58	64
<b>Springwell Lake</b>	0	0	0	0	0	0	0		16
<b>Maple Lodge</b>	0	0	2	3	2	0	0	1	0
<b>Lynsters</b>	0	6	0	0	0	0	0	18	65
<b>Pynesfield N &amp; S</b>	6	6	3	19	14	0	0	24	49
<b>Troy Mill &amp; North Troy</b>	0	0	0	34	0	0	0	59	0
<b>Tilehouse</b>	0	0	0	0	0	0	0		8
<b>Broadwater Lake</b>	8	8	2	36	14	38	36	78	78
<b>Savay</b>	0	0	0	0	0	0	0		2
<b>Denham Complex</b>	0	0	0	0	0	0	0		0
<b>TOTAL</b>	<b>14</b>	<b>20</b>	<b>7</b>	<b>107</b>	<b>46</b>	<b>62</b>	<b>82</b>		<b>114</b>

### 2.3.5 Gadwall

Numbers of Gadwall in the Colne Valley have declined in recent years and are no longer of national significance, partly because of an increase nationally. The maximum total count was 184 in December 2022 after an influx following severe weather, with the peak site count being 63 at the Troy Lakes in the same month. The threshold for national significance is 310.

Gadwall generally gather where there is abundant food in the form of submerged aquatic plants. During the 2006-2007 study, the key concentration was on Inn's Lake, with birds moving to and from Stocker's Lake, with smaller numbers at Broadwater, Lynsters, Pynesfield and Springwell. In the current study, the key sites were Troy, Pynesfield and Lynsters, mirroring the distribution of Coot. A significant decline at the Stocker's complex and Broadwater Lake most likely reflects a lack of available aquatic food.

The overall national trend has been of a long-term, steady increase in population, levelling off since around 2010/11. Overall, the UK wintering population 25-year trend has been a 73% increase, but with a decline of 5% in the last ten years. The UK wintering population is now around 31,000 birds. Increasing numbers of Gadwall now summer and breed in the valley notably at Maple Lodge. Some of the largest numbers now occur in the late summer months as breeding birds mingle with winter arrivals.

**Table 7. Counts of Gadwall in the Colne Valley September 2022 to March 2023**

	27-Sep	10-Oct	18-Nov	23-Dec	10-Jan	06-Feb	13-Mar	10-yr mean peak	Peak 06-07
<b>Stocker's Lake complex</b>	4	10	4	12	2	15	0	60	138
<b>Springwell Lake</b>	0	0	0	0	0	0	0		36
<b>Maple Lodge</b>	0	0	8	26	24	21	8	17	51
<b>Lynsters</b>	0	8	4	12	12	36	25	26	45
<b>Pynesfield N &amp; S</b>	12	7	17	46	36	12	7	32	48
<b>Troy Mill &amp; North Troy</b>	6	6	10	63	14	14	0	52	24
<b>Tilehouse</b>	0	0	0	0	2	0	0		12
<b>Broadwater Lake</b>	18	18	4	18	6	4	4	53	67
<b>Savay</b>	0	0	0	0	0	0	0		16
<b>Harefield No 2</b>	0	0	0	0	0	0	0		0
<b>Denham Complex</b>	0	0	6	7	4	0	2		18
<b>TOTAL</b>	<b>40</b>	<b>49</b>	<b>53</b>	<b>184</b>	<b>100</b>	<b>102</b>	<b>46</b>		<b>264</b>

### 2.3.6 Teal

The Teal is an increasingly scarce bird in the Colne Valley. The maximum valley count of 22 is way below the national significance threshold of 4,300. The most important site in the Colne Valley is Maple Lodge, which is virtually the only site which now provides its favoured shallow muddy habitats. Numbers here are lower than in the past due to a decreasing area of suitable habitat as natural succession continues, and this year in particular, the site being dry in September. Broadwater Lake usually supports a few birds, but this site is also poorer than in the past as the favoured silt lagoon area has now succeeded to willow and alder scrub. The UK wintering trend over 25-years is a 5% increase, although there has been a 9% decline in the last ten years. As mentioned above, the valley decline is almost certainly due to lack of the Teals favoured shallow water feeding habitat.

	<b>27-Sep</b>	<b>10-Oct</b>	<b>18-Nov</b>	<b>23-Dec</b>	<b>10-Jan</b>	<b>06-Feb</b>	<b>13-Mar</b>	<b>10-yr mean peak</b>	<b>Peak 06-07</b>
<b>Stocker's Lake complex</b>	0	0	0	0	0	0	2	4	3
<b>Springwell Lake</b>	0	0	0	0	0	0	0		0
<b>Maple Lodge</b>	0	7	18	12	14	12	5	25	74
<b>Lynsters</b>	0	0	0	0	0	0	0	1	0
<b>Pynesfield N &amp; S</b>	0	0	0	0	0	0	0	1	2
<b>Troy Mill &amp; North Troy</b>	0	0	0	0	0	0	0	1	0
<b>Broadwater Lake</b>	3	0	0	10	6	0	0	12	13
<b>Savay</b>	0	0	0	0	0	0	0		0
<b>Harefield No 2</b>	0	0	0	0	0	0	0		0
<b>Denham Complex</b>	0	0	0	0	0	0	0		0
<b>TOTAL</b>	<b>3</b>	<b>7</b>	<b>18</b>	<b>22</b>	<b>20</b>	<b>12</b>	<b>7</b>		<b>80</b>

### 2.3.7 Mallard

Numbers of Mallard in the Colne Valley are of low national significance. The maximum total count was only 146 in December 2022, with the peak site count being 46 at the Stocker's Lake complex in September. The threshold for national significance is 6,700. Mallard generally gather during the day at safe roosting sites before flying out to feed at night. In gravel pit habitats they favour sites with a variety of wooded islands that provide undisturbed and sheltered loafing areas throughout the day.

The overall UK trend has been of a steady decline in wintering numbers since the late 1980s (-37% trend between 1995/6 and 2020/21), but an increase in UK breeding numbers to around the year 2000 before a slight subsequent decline. In the Colne Valley there appears to have been a substantial decline over the years (with the peak count in the 2006-07 study being 353) and virtually all sites showing fewer birds this winter than the 10-year mean peak numbers (see Table 9 below). A reduction in wintering birds arriving from Europe is likely to be the reason for the changes, the Colne counts now largely reflecting the local breeding population.

	<b>27-Sep</b>	<b>10-Oct</b>	<b>18-Nov</b>	<b>23-Dec</b>	<b>10-Jan</b>	<b>06-Feb</b>	<b>13-Mar</b>	<b>10-yr mean peak</b>	<b>Peak 06-07</b>
<b>Stocker's Lake complex</b>	46	43	22	35	14	30	4	70	129
<b>Springwell Lake</b>	0	0	0	0	2	2	4		21
<b>Maple Lodge</b>	10	8	12	24	25	20	8	38	37
<b>Lynsters</b>	0	2	2	2	4	2	4	16	45
<b>Pynesfield N &amp; S</b>	2	2	2	6	4	4	8	11	16
<b>Troy Mill &amp; North Troy</b>	4	4	0	21	6	2	2	12	18
<b>Tilehouse</b>	0	0	0	0	0	0	0		24
<b>Broadwater Lake</b>	16	34	22	32	16	12	6	40	89
<b>Savay</b>	6	6	2	4	6	7	4		35
<b>Harefield No 2</b>	2	4	4	4	2	2	5		23
<b>Denham Complex</b>	6	10	20	18	6	10	8		36
<b>TOTAL</b>	<b>92</b>	<b>113</b>	<b>86</b>	<b>146</b>	<b>85</b>	<b>91</b>	<b>53</b>		<b>353</b>

### 2.3.8 Shoveler

Numbers of Shoveler in the Colne Valley are of national significance. The maximum total count was 344 in February 2022, with the peak site counts being 232 at Broadwater Lake in the same month (although a higher count of 315 was recorded by Greengage Ecology on 24<sup>th</sup> January 2023). The threshold for national significance is 190. Stocker’s and Broadwater Lakes are consistently the most favoured locations, with birds being rather sparse elsewhere. Numbers recorded in this winter’s study are significantly higher than in the 2006-07 study, with the peak count more than doubling. The UK trend has been of a period of increase over the last 20 years or so, with a 25-year trend of 53% increase 1995/96 to 2020/21. This is likely to be due to more birds wintering in the UK rather than moving south as a result of milder winters under climate change. The total UK wintering population is now around 20,000 birds.

The Shoveler is a specialised feeder, favouring wetlands with abundant zooplankton. Highly productive sites attract the highest numbers and birds are often highly mobile as food resources are depleted. Birds in urban-fringe locations frequently have differing roosting and feeding sites, flying to shallow productive wetlands at night or when undisturbed. Wintering birds are often forced to move on in freezing conditions, appearing less able to tolerate the severe weather, although recent mild winters have reduced that pattern. A small spring peak of returning birds is often evident.

The counts during the winter show two sites are highly important: Broadwater Lake and Stocker’s Lake. However, it is clear that birds not only move between the two sites but also to other sites outside this study area as numbers fluctuated sharply. This study had a top count of 232 in February, but Simon Buckingham recorded 285 in December and Greengage Ecology noted 315 in February. The refuge area at Broadwater is important when other areas are disturbed. Shoveler are known to feed nocturnally in disturbed environments and it may be that they are using Stocker’s and Broadwater Lakes primarily as daytime roosts whilst foraging at other sites during the night. This highlights the importance of these undisturbed daytime roosts, but also that disturbed, seemingly unsuitable sites can be more valuable to wildfowl than daytime observations suggest.

**Table 10. Counts of Shoveler in the Colne Valley September 2022 to March 2023**

	27-Sep	10-Oct	18-Nov	23-Dec	10-Jan	06-Feb	13-Mar	10-yr mean peak	Peak 06-07
Stocker's Lake complex	18	24	41	80	132	112	76	91	87
Springwell Lake	0	0	0	0	0	0	0		1
Maple Lodge	0	0	0	0	0	0	2	11	12
Lynsters	0	0	6	0	0	0	0	3	6
Pynesfield N & S	0	0	0	0	0	0	0	3	2
Troy Mill & North Troy	8	0	0	0	14	0	0	12	2
Tilehouse	0	0	0	0	0	0	0		4
Broadwater Lake	22	59	62	104	82	232	54	96	92
Savay	0	0	0	0	0	0	0		16
Harefield No 2	0	0	0	0	0	0	0		0
Denham Complex	0	0	0	0	0	0	0		18
<b>TOTAL</b>	<b>48</b>	<b>83</b>	<b>109</b>	<b>184</b>	<b>228</b>	<b>344</b>	<b>132</b>		<b>150</b>

### 2.3.9 Red-crested Pochard

The numbers of Red-crested Pochard in the Colne Valley have been increasing slowly but steadily over the last decade or so, with a small population now breeding locally. No national thresholds are set for this naturalised species but the WeBS report list sites with mean peak counts of ten or more. The Colne Valley is currently listed in the top five UK locations, with the UK wintering population estimated as 570 in 2017.

However, the peak of 32 in December 2022 in this survey was somewhat lower than in recent winters with the total reaching over 60 birds in 2021/22. The birds were concentrated in the northern part of the valley from Bury Lake down to Broadwater Lake, with the peak count of 20 at Stocker’s Lake in February. The birds are mobile however, with other observers noting 22 at Stocker’s Lake in December. A pair bred at Maple Lodge in 2023; the UK breeding population was estimated at just 39 pairs in 2014.

**Table 11. Counts of Red-crested Pochard in the Colne Valley September 2022 to March 2023**

	27-Sep	10-Oct	18-Nov	23-Dec	10-Jan	06-Feb	13-Mar	10-yr mean peak	Peak 06-07
Stocker's Lake complex	0	0	0	9	11	20	4	40	9
Maple Lodge	0	0	0	0	0	0	0		4
Lynsters	0	0	0	0	0	0	0		5
Pynesfield N & S	0	0	0	13	0	0	0		0
Troy Mill & North Troy	0	0	0	10	2	0	0		0
Broadwater Lake	0	0	0	0	0	2	0	2	0
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>32</b>	<b>13</b>	<b>22</b>	<b>4</b>		<b>14</b>

### 2.3.10 Pochard

The numbers of Pochard in the Colne Valley exceeded the level of national significance during the survey period. The maximum total count was 234 in December, with the threshold for national significance being 230. The peak site counts were 133 at Broadwater Lake in March and 82 at Stocker’s Lake in October (although a higher count of 292 was obtained by Greengage Ecology at Broadwater Lake on 8<sup>th</sup> January 2023). These two sites regularly held the key concentrations during the survey year. Although numbers have declined over recent years, the national population has declined faster, thus making the Colne Valley increasingly significant for this species

Pochard generally gather on favoured roosting or feeding sites, often flying out at night if feeding sites are disturbed by day. Although the general pattern in the Colne Valley is of concentrations at the two key roosting sites with smaller numbers dispersed throughout the valley, this masks considerable mobility within and probably outside the valley. This mobility is further underlined by the variability in counts at the key sites. As with Shoveler, the key refuge at Broadwater is likely to be important for Pochard beyond the Colne study area.

The national occurrence pattern tends to show a mid-winter peak if birds move from the Continent in severe weather. However, the UK 25-year trend has been of steady decline (-73% between 1995/96 and 2020/21), partly due to milder winter weather. The national wintering population now stands at around 29,000 birds, with the Colne Valley being in the top 20 UK locations



	<b>27-Sep</b>	<b>10-Oct</b>	<b>18-Nov</b>	<b>23-Dec</b>	<b>10-Jan</b>	<b>06-Feb</b>	<b>13-Mar</b>	<b>10-yr mean peak</b>	<b>Peak 06-07</b>
<b>Stocker's Lake complex</b>	52	82	58	50	71	45	22	107	199
<b>Springwell Lake</b>	0	0	0	2	2	8	15		10
<b>Maple Lodge</b>	0	0	0	0	0	5	2	8	7
<b>Lynsters</b>	0	8	12	4	10	10	8	11	35
<b>Pynesfield N &amp; S</b>	0	0	18	39	6	0	6	16	32
<b>Troy Mill &amp; North Troy</b>	0	0	12	14	0	0	0	19	36
<b>Tilehouse</b>	0	0	2	4	2	2	0		16
<b>Broadwater Lake</b>	28	105	132	58	96	121	133	118	153
<b>Savay</b>	0	0	0	0	2	0	0		14
<b>Harefield No 2</b>	0	0	0	0	2	0	0		8
<b>Denham Complex</b>	0	0	0	0	0	0	0		12
<b>TOTAL</b>	<b>80</b>	<b>195</b>	<b>234</b>	<b>171</b>	<b>191</b>	<b>191</b>	<b>186</b>		<b>399</b>

### 2.3.11 Tufted Duck

Numbers of Tufted Duck in the Colne Valley have declined slightly and are now below the level of national significance. The maximum total count was 746 in November 2022, with the peak site count of 254 at Broadwater Lake in February 2023. The threshold for national significance is 1300. Broadwater Lake formerly held a sizeable flock of moulting birds in late summer: a check in early August 2023 found a moulting flock of 360 birds. Disturbance by sailing is not tolerated during the moult period when the birds are flightless unless a sizeable refuge is available.. Broadwater, Stocker’s and Troy Mill lakes remain the most important sites for wintering birds. Tufted Duck are generally very mobile and will move throughout the valley to feed, retreating to refuge sites at busy times.

The overall UK trend has been of a long-term increase in both wintering and breeding populations, although this has levelled off and declined slightly in recent years. The 25-year trend in wintering birds is an 11% decline. Fewer wintering birds are arriving from the continent in recent years.

	<b>27-Sep</b>	<b>10-Oct</b>	<b>18-Nov</b>	<b>23-Dec</b>	<b>10-Jan</b>	<b>06-Feb</b>	<b>13-Mar</b>	<b>10-yr mean peak</b>	<b>Peak 06-07</b>
<b>Stocker's Lake complex</b>	16	75	212	108	143	81	82	182	266
<b>Springwell Lake</b>	0	0	0	3	5	8	13		65
<b>Maple Lodge</b>	0	0	6	4	2	9	9	19	17
<b>Lynsters</b>	25	58	66	42	48	28	27	79	139
<b>Pynesfield N &amp; S</b>	6	6	21	39	56	64	34	64	41
<b>Troy Mill &amp; North Troy</b>	30	34	108	82	70	69	34	108	206
<b>Tilehouse</b>	0	2	10	16	14	17	12		64
<b>Broadwater Lake</b>	88	92	192	98	224	254	85	347	569
<b>Savay</b>	8	12	20	16	12	24	18		149
<b>Harefield No 2</b>	0	14	26	24	18	21	19		45
<b>Denham Complex</b>	0	107	85	90	63	85	52		110
<b>TOTAL</b>	<b>173</b>	<b>400</b>	<b>746</b>	<b>522</b>	<b>655</b>	<b>660</b>	<b>388</b>		<b>1116</b>

### 2.3.12 Goldeneye

The Goldeneye is present in the Colne Valley in very low and declining numbers. The maximum valley count of 15 is below the peak count of 72 in the 2006-07 winter and way below the national significance threshold of 190. The most important sites in the Colne Valley are Broadwater Lake and Stocker’s Lake, both functioning as roost sites. The general pattern was formerly of feeding birds widely dispersed throughout the Colne Valley in small numbers during the day, before gathering in late afternoon (or earlier if disturbed) at the roost sites, but numbers are now so low they remain mainly on the two key sites.

The national figures generally show a late arrival in November, followed by a mid-winter peak in numbers, but often followed by a secondary peak in late winter. The UK 25-year wintering trend shows a steady decline (-55%), although previously there had been a long period of increase. The Colne Valley shows a matching but even steeper decline. With Goldeneye being one of the species most associated with cold weather influxes, this decline reflects the trend to milder winters.

	27-Sep	10-Oct	18-Nov	23-Dec	10-Jan	06-Feb	13-Mar	10-yr mean peak	Peak 06-07
<b>Stocker's Lake complex</b>	0	0	4	7	7	5	3		29
<b>Springwell Lake</b>	0	0	0	0	0	4	4		9
<b>Maple Lodge</b>	0	0	0	0	0	0	0		0
<b>Lynsters</b>	0	0	0	0	0	0	0		4
<b>Pynesfield N &amp; S</b>	0	0	0	0	0	0	0		2
<b>Troy Mill &amp; North Troy</b>	0	0	0	2	1	0	0		2
<b>Tilehouse</b>	0	0	0	0	0	0	0		1
<b>Broadwater Lake</b>	0	0	3	6	5	4	8		32
<b>Savay</b>	0	0	0	0	0	0	0		6
<b>Harefield No 2</b>	0	0	0	0	0	0	0		0
<b>Denham Complex</b>	0	0	0	0	0	0	0		1
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>15</b>	<b>13</b>	<b>13</b>	<b>15</b>		<b>72</b>

### 2.3.13 Smew

The national trend of much lower wintering numbers of Smew in recent years is mirrored in the Colne Valley; a result of milder conditions and an associated shift towards the north-east of the wintering distribution. The first returning birds typically arrive in November or December and numbers peak in January/February, usually in periods of cold weather. Smew are typically mobile within a complex of water-bodies, tending to have a dispersed daytime feeding pattern, visiting favoured locations, before gathering to roost in the late afternoon.

Just one Smew was recorded during the 2022-23 winter, a drake that moved between Stocker’s Lake, Broadwater Lake and Tilehouse GP between December and February, demonstrating the mobility of such birds. This compares with a maximum count of eight birds, during 2006-07, with birds mostly being recorded at Stocker’s Lake but also Tilehouse and Denham Lakes. Although the numbers of Smew now wintering in the Colne Valley are very low, they are arguably of national significance, with the national threshold set at just one bird.

### 2.3.14 Goosander

The numbers of Goosander wintering in the Colne Valley are now exceptionally low, with just two birds at Stocker’s Lake in November and a single at Broadwater Lake in February. Other observers recorded up to four at Stocker’s in November and birds occasionally recorded on the River Colne. This compares to a peak count of 23 birds in the 2006-07 winter, with up to eight at Stocker’s, three at Broadwater Lake, four at Savay Lake and Harefield No 2 and 11 at the Denham complex. The national significance threshold is 150.

The annual index for Goosander continues a downward trend since the peak in the mid-90s. Wintering birds in the Colne Valley are likely to be from the Scandinavian breeding population (rather than the increasing UK breeding population) and these birds may not be moving so far south-west in the milder winters of late.

### 2.3.15 Great Crested Grebe

The peak total count of Great Crested Grebes was of 103 birds in October. Although Great Crested Grebes are well distributed throughout the valley, the key sites are the Stocker’s complex (25 in February), Broadwater Lake (42 in October) and the Troy Lakes (19 in January). The Colne Valley is no longer of national significance with the threshold set at 170.

Across the UK, Great Crested Grebe has shown a fairly stable trend to the wintering population over the last 20 years, with an increase up to the 2000’s, followed by a shallow decline. Overall there has been a decline of 17% in the UK 25-year trend, to a total of around 18,000. The monthly pattern usually shows a peak in September/October. At this time, the population is boosted by birds of the year, and adults will move to key locations to form moult gatherings. The 2006-07 study found a breeding population of 42 pairs. The count total of 72 birds in March 2023, suggests the breeding population remains similar, perhaps slightly lower, with the peak count of 103 birds in October 2022 suggesting that the population is mainly resident. However, this count is significantly lower than the peak of 218 in 2006-07, with declines across most sites but notably the late summer gatherings at Broadwater and Stocker’s Lakes. The reason for this decline is unclear but may be due to fewer wintering birds arriving.

**Table 15. Counts of Great Crested Grebe in the Colne Valley September 2022 to March 2023**

	27-Sep	10-Oct	18-Nov	23-Dec	10-Jan	06-Feb	13-Mar	10-yr mean peak	Peak 06-07
Stocker's Lake complex	20	19	29	15	16	25	22	26	46
Springwell Lake	0	2	0	0	1	4	4		8
Maple Lodge	0	0	0	0	0	0	0	1	0
Lynsters	4	4	4	2	4	3	4	9	12
Pynesfield N & S	8	8	4	5	4	6	6	8	10
Troy Mill & North Troy	12	6	14	11	19	14	12	14	20
Tilehouse	2	2	2	2	2	0	2		15
Broadwater Lake	20	42	24	5	11	9	8	28	89
Savay	4	4	2	2	2	4	4		9
Harefield No 2	2	5	6	6	5	6	6		26
Denham Complex	7	11	7	6	5	4	4		22
<b>TOTAL</b>	<b>79</b>	<b>103</b>	<b>92</b>	<b>54</b>	<b>69</b>	<b>75</b>	<b>72</b>		<b>218</b>

### 2.3.16 Cormorant

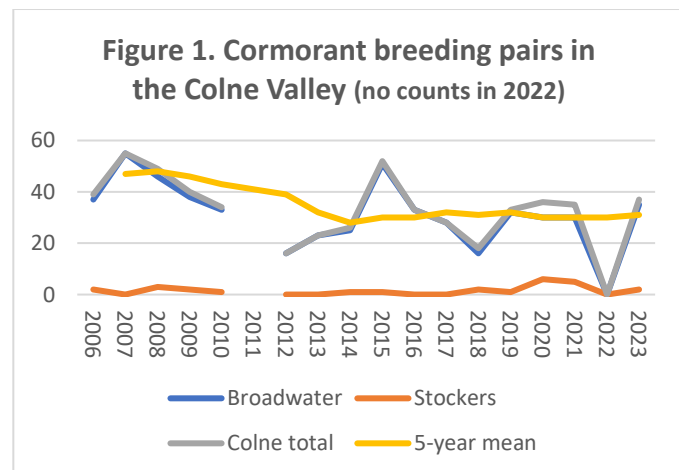
The numbers of Cormorant within the Colne Valley are now below the level of national significance of 620, due partly to a significant increase in the national population but also contrastingly, a decline in the Colne Valley population. The peak total count of 109 in November 2022 contrasts with 289 in October and December 2006. Broadwater and Stocker’s Lake remain the key sites, with breeding colonies and winter roosts.

The national population of Cormorants has seen a steady long-term increase over the last two decades. The increase is considered to be partly due to the rapid expansion of the continental race *sinensis* both as a breeding and wintering bird. The annual pattern is generally a late autumn peak followed by a steady decline through the winter.

**Table 16. Counts of Cormorant in the Colne Valley September 2022 to March 2023**

	27-Sep	10-Oct	18-Nov	23-Dec	10-Jan	06-Feb	13-Mar	10-yr mean peak	Peak 06-07
Stocker's Lake complex	18	21	24	27	25	18	18	34	59
Springwell Lake	0	2	2	4	0	0	0		3
Maple Lodge	0	0	0	0	0	0	0	2	1
Lynsters	0	1	4	3	2	3	2	4	18
Pynesfield N & S	0	0	4	3	0	2	3	5	7
Troy Mill & North Troy	4	0	28	27	23	18	12	17	14
Tilehouse	0	0	2	2	0	0	0		48
Broadwater Lake	32	28	34	13	16	42	45	53	227
Savay	0	0	2	1	1	2	1		56
Harefield No 2	0	0	2	0	2	4	2		11
Denham Complex	0	1	7	6	1	11	7		7
<b>TOTAL</b>	<b>54</b>	<b>53</b>	<b>109</b>	<b>86</b>	<b>70</b>	<b>100</b>	<b>90</b>		<b>289</b>

Cormorant breed at two sites in the valley; Broadwater Lake and Stocker’s Lake. The numbers from 2006 to 2023 are presented to the right. Most nest at Broadwater (peaking at 55, with 37 in 2023), and just a few at Stocker’s (maximum of six in 2020). The general trend is a slow decline. The five-year mean shows a decline from just under 50 to 30 over this period. The national breeding trend has been largely stable 1995-2020.



The reason for this local decline, against national trends, is unclear. However, it is known that culling of Cormorants is undertaken by local angling clubs. The numbers culled annually are likely to be greater than the productivity of the local breeding population.

### 2.3.17 Coot

The peak total count for Coot of 1400 birds in November was somewhat lower than the threshold for national significance (2000). Coot are well distributed throughout the valley with several sites holding winter populations up to 200 birds. The Stocker’s complex (primarily Bury Lake), Pynesfield, Lynsters, Troy Mill, and Denham Lakes all hold good numbers with the peak count being 346 at the Troy lakes in December. A moulting flock of 270 birds was recorded at Broadwater Lake in early August 2023.

Coot generally show an increase into the winter months, peaking between October and December. The Colne valley population follows this pattern. Coot generally remain on a site while food resources last, being amongst the most tolerant of waterbirds to disturbance.

Numbers of Coot in the Colne Valley seem to have declined over the years. The UK wintering population trend has seen a decline of 25% over the years 1995/96-2020/21 and the Colne follows this pattern. Following breeding, British Coot may either be sedentary or (particularly the young birds) dispersive. In addition, large numbers move out of north-western Europe to winter in the UK. However, recent milder winters are likely to have reduced the scale of this immigration.

However, not only have numbers declined, but the distribution has changed significantly with populations on some individual lakes appearing to have declined significantly, most notably on Stocker’s Lake, Springwell and Broadwater Lake, (compare counts with 10-year mean peak in Table 17). This strongly suggests a decline in the key food resource of aquatic plants at these sites and the possible reasons for this are discussed in the summary section below.

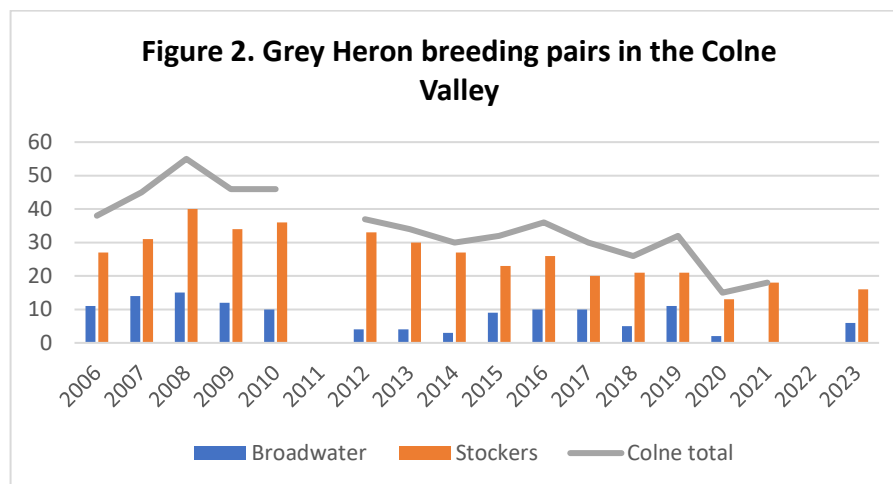
	<b>27-Sep</b>	<b>10-Oct</b>	<b>18-Nov</b>	<b>23-Dec</b>	<b>10-Jan</b>	<b>06-Feb</b>	<b>13-Mar</b>	<b>10-yr mean peak</b>	<b>Peak 06-07</b>
<b>Stocker's Lake complex</b>	266	245	294	267	282	220	104	412	468
<b>Springwell Lake</b>	8	4	4	2	8	15	12		145
<b>Maple Lodge</b>	0	2	2	8	8	18	16	23	52
<b>Lynsters</b>	58	172	185	198	152	138	82	223	288
<b>Pynesfield N &amp; S</b>	116	146	156	154	172	152	93	129	131
<b>Troy Mill &amp; North Troy</b>	194	194	286	346	297	226	166	367	229
<b>Tilehouse</b>	26	32	42	38	32	28	22		107
<b>Broadwater Lake</b>	146	91	110	65	82	58	36	381	414
<b>Savay</b>	16	24	30	27	18	22	18		142
<b>Harefield No 2</b>	15	75	105	98	80	65	48		27
<b>Denham Complex</b>	124	173	186	176	187	133	98		122
<b>TOTAL</b>	<b>969</b>	<b>1158</b>	<b>1400</b>	<b>1379</b>	<b>1318</b>	<b>1075</b>	<b>685</b>		<b>1606</b>

### 2.3.18 Other species

A number of other species were recorded as follows;

- **Egyptian Goose.** Up to six Egyptian Geese were seen on several lakes, most frequently on Stocker's Lake complex and Broadwater Lake. This introduced species is clearly well established in the valley now.
- **Mandarin Duck.** One or two Mandarin Duck were noted at Denham Country Park on most visits.
- **Grey Heron.** Numbers of Grey Heron were not recorded during this study, other than the number of breeding pairs between February and April. There are two heronries within the Colne Valley; at Stocker's Lake and Broadwater Lake. These heronries held 16 and 6 breeding pairs of Grey Herons respectively in 2023.

The long-term national annual index for Grey Heron has been relatively stable, albeit with a peak in abundance in the early 2000's followed by a subsequent decline. The Colne valley figures somewhat mirror the national trend but perhaps with a steeper decline (see figure below).



- The last report noted the increase in **Little Egrets** within the valley, up to ten were noted during the current survey, but numbers are certainly higher as ten pairs were recorded breeding at Stocker's Lake in April 2023. During this survey, a single **Great White Egret** was also present in the valley, being noted at various sites between Stocker's Lake and Troy Mill.
- **Kingfisher.** Up to 4 Kingfishers were recorded on the survey counts, mainly along the River Colne.

### **3. Summary of waterbird usage and importance within the Colne Valley**

#### **3.1 Summary points from this study.**

The Colne Valley supported between 1,857 and 3,011 waterbirds between September 2022 and March 2023. The peak total count was of 3,011 birds in January 2023 (see Table 1 for species included). This compares with totals of between 3,400 and 4,618 waterbirds in the previous study in 2006-07.

Coot was the most numerous species, followed by Tufted Duck, with the two species forming over 60% of the total, but with only Coot having peak counts into four figures. Shoveler, Pochard and Canada Goose had peak counts of over 200 birds, Mallard, Wigeon, Gadwall, Great Crested Grebe, Greylag Goose and Cormorant all over 100.

Whilst the total count for the Colne Valley is significantly below the threshold for national significance, counts of two individual species (Shoveler and Pochard) were above the figure set for the level of national significance when the valley was considered as a whole. However, it should be noted that this figure needs to be achieved as a mean of the peak counts over a 5-year period. These counts are highlighted in Table 1. Broadwater Lake alone exceeded the level of national significance for Shoveler. In the previous study, counts of six species (Gadwall, Shoveler, Tufted Duck, Smew, Great Crested Grebe and Cormorant) were above the level of national significance when the valley was considered as a whole. The possible reasons for these changes are discussed in the next section.

Broadwater Lake and Stocker's Lake are the most important sites, both supporting around 800 birds at peak periods. These sites function as refuges from disturbance from other sites and are likely to be supporting birds from beyond the Colne Valley study area. Lynsters, the Troy Lakes, Pynesfield and Denham Lakes all peaked at between 300 and 400 birds. In the previous study, Stocker's Lake and Broadwater Lake were also the most important sites, but both supporting over 1,000 birds at peak periods. Lynsters Lake peaked at near 700 birds, while most sites peaked at around 200-300. In addition, Broadwater Lake supports an important summer moult of Tufted Duck.

#### **3.2 Reasons for changes in species populations**

Only four species are stable or increasing in the Colne Valley: Shoveler, Red-crested Pochard, Canada Goose and Greylag Goose. Pochard have declined but their importance locally has increased due to a declining national population and a lowering of the importance threshold.

The key reasons for declines in the remaining species are considered to be one or more of the following, with these reasons discussed in more detail below.

- The impact of climate change; milder winters and 'short-stopping'.
- The impact of natural succession; the loss of early succession, shallow water.
- The impact of declining food resource; aquatic plants and the impact of fish populations.
- The impact of disturbance or conflict with human activity.

**The impact of climate change; milder winters and ‘short-stopping’.** A contributory factor to the decline of five species (Wigeon, Mallard, Goldeneye, Goosander and Smew) is likely to be reduced numbers arriving in the UK to winter due to ‘short-stopping’ in recent milder conditions, as a result of climatic change. More birds are remaining on the continent. If we return to colder winters, we may expect this trend to be temporarily reversed. Several other species, all with seemingly stable populations, may also be affected, for example, it may be that less Tufted Duck and Coot are wintering here.

Even though we can expect the species complement of individual protected areas, such as Broadwater Lake and Stocker’s Lake, to change in the face of the changing climate, these areas will remain important for a large number of wetland species. Existing protected area networks are likely to become even more important for maintaining biodiversity in the future. Therefore, it is critical that wetland habitats for species such as waterbirds are maintained within their flyways in the light of climate change, rather than downgrading sites if the specified ‘important’ species of the time shift their range.

**The impact of natural succession; the loss of early succession, shallow water.** A contributory factor to the decline of Teal (and possibly other species) may be successional change in the habitat. Successional development that occurs at gravel pits after extraction can be rapid and many of the gravel pits have changed significantly over the last 20 years. The most obvious change is the rapid growth of trees, mainly willows in the early stages, but latterly a wider range of species. Early colonising bands of marginal aquatic vegetation and open grassy margins are often shaded out or become scrubbed over. These successional changes that have occurred since extraction are, in general, likely to be detrimental to waterbird populations, certainly on the smaller water bodies. In the Colne Valley there are few shallow water habitats, with Maple Lodge being the most important.

**The impact of declining food resource; aquatic plants and the impact of fish populations.** After a period of increase, the herbivorous waterbirds, Wigeon, Gadwall and Coot, now appear to be declining. Although aquatic plant resource may not be the only issue in the decline, peak counts of these species certainly fluctuate somewhat on individual sites as the birds exploit abundant weed resources. The abundant growth of aquatic plants may follow a cyclical pattern, but it is also subject to the complex interaction between fish, birds, aquatic invertebrates and the increasing nutrient status of the lakes as they mature. Waterbird competition with fish for invertebrate food resources is known to be an issue (eg Giles *et al* 1990) and fish stocking with species such as Carp and Bream may drive the water to an algal dominated state.

Carp feed by ingesting food from the substrate as well as the water column. When feeding from the substrate, they suck sediment into the mouth, food is filtered through the gills and unwanted material is expelled into the water column. This feeding behaviour can uproot plants and re-suspend sediments, reducing water clarity and hence light available for submerged aquatic plants and visual feeding fish. One study in North America found that an increase in Carp biomass to 100 kg/ha was associated with a 50% decrease in both vegetative cover and waterfowl. A further increase to over 250 kg/ha coincided with a decrease in the vegetative cover to 17% of the lake's surface and a decline in waterfowl use to 10% of its original value. The biomass of fish in the stocked angling lakes may be considerably in excess of these figures (target figures of a total of 870-1090 kg/ha of all fish species are quoted) Food resource for waterbirds will be reduced significantly and this may explain declines on certain waters.



A more recent concern is the spread of non-native Signal Crayfish, which in abundance can significantly affect the turbidity of lakes by increasing sediment from burrowing, which in turn will impact on nutrient status and aquatic plant growth. They will also directly compete for food resources. This may in time be seen as equally damaging to the impact of non-native fish.

**The impact of disturbance or conflict with human activity.** Conflict with human activities, either by direct disturbance or conflicting land use can be a major problem for waterbirds. Water sports is an obvious issue and is the most damaging, but also angling and general bankside disturbance. These activities may alter patterns of activity or have a greater impact by suppressing overall populations in the valley.

Numbers of Cormorant appear to have declined in recent years after the rapid increase in the breeding population. There may be some dispersal of the breeding birds away from the valley but equally the decline may be part of a wider trend of conflict with angling interests. Productivity seems to be good, suggesting that lack of food is not an issue.

### **3.3 Patterns of distribution.**

Each species of waterbird will exhibit a different pattern of movement and behaviour within a complex of water-bodies such as the Colne Valley, most often related to tolerance to disturbance and to food preferences. For example, the following patterns of behaviour are seen:

- Tolerant species, such as Coot, Mute Swans and Great Crested Grebe will largely remain on a particular site until the food resource is eaten out.
- Less tolerant species will move to find food and remain until the level of disturbance forces a move to a refuge area. Some species, such as Pochard, Tufted Duck, Shoveler, Mallard and Teal will most frequently move to feed at dawn and/or dusk, or at night, on those lakes too disturbed by human activity by day, and will gather at safe refuges to roost by day. Patterns of behaviour may differ daily, depending on levels of disturbance.
- Several species, such as Goldeneye and Smew, will gather in nightly roosts after spreading out to feed during the day.

The abundance of Coot, a very tolerant species, on each lake will reflect the amount of food in the form of submerged aquatic plants. For, less tolerant species, the two major refuge sites are Broadwater Lake and Stocker's Lake. The evidence from this study is that species such as Tufted Duck, Shoveler and Pochard spread out in the valley (and probably beyond) to feed but withdraw to roost at refuge sites when disturbed. This pattern is not necessarily uniform but may depend on the level of disturbance, location of available food resources and weather amongst other factors. These major refuge sites are therefore critical in that they enable birds to exploit a much wider area.

The overall size of Broadwater is important, and the refuge area, although compromised somewhat by the sailing activity, is also notable for its size and particularly its openness. Dabblers will happily roost out of the water on islands, whereas diving duck want to be on the water, need space to take off and are generally more vulnerable to disturbance, particularly in larger flocks. Such areas will also be used by moulting birds, primarily July to September, and will be even more sensitive to disturbance.

## **4. Colne water-bodies – key factors influencing habitat management**

### **4.1 Introduction**

This section will introduce habitat management recommendations that will be applicable across most of the sites. But initially, current issues that may influence habitat management, such as climate change and the impact of changing water levels are discussed, to set the background to potential ecological change in the future. Implementing climate change adaptation measures will aim to ‘future-proof’ sites, examples of such measure are given in Table 19 below.

This section will also look at the priority use of each site, whether it be recreation of some sort or nature conservation, these are given in Table 20. Whatever the end-use, all sites will function better if managed in an ecologically sympathetic manner. For example, marginal stands of aquatic vegetation are important for both angling (fish habitat) and water-sports (anti-erosion).

Habitat management recommendations are outlined in section 4.1.4. They are split into those recommendations that will be relevant to most, if not all, waters in the valley, and then those that mainly apply to sites with a nature conservation priority use. Following these, some site-specific recommendations are given within each site description.

#### **4.1.1 Climate change adaptation**

Whilst it is difficult to be precise about climate in the future, the general trends are clear and in areas away from the coast we should expect the following:

- An increased frequency of storms and extreme weather, with a higher intensity of rainfall and the likelihood of flooding events.
- Longer drier periods with more prolonged droughts and fire risk.
- Increased average temperatures with longer growing seasons.
- Species distributions moving within their ideal climate ‘envelope’.

A range of adaptation measures can be considered, the following are targeted towards open water bodies and associated habitats. They are focused on three key areas: **resistance** (buffer or protect from change, increase refugia), **resilience** (return to normal conditions after climate disturbance) and **transition** (actively predict and promote change).

- Structural and species diversity in vegetation types is highly beneficial, for example, shorelines with a mosaic of trees and emergent vegetation. Maintain early successional habitats, reedbeds, ponds and wet grasslands in good condition.
- Manage pollutant loads to minimise impact on natural nutrient status.
- Restore and maintain natural hydrological regimes – good dynamic management.
- Good biosecurity to slow the spread of invasive non-native species, notably Signal Crayfish and Floating Pennywort in the Colne Valley.
- Predict increasing and colonising species and implement beneficial management.

<b>Table 19. Climate change adaptation measures</b>			
	<b>Resistance - buffer or protect from change, increase refugia</b>	<b>Resilience - return to normal conditions after disturbance</b>	<b>Transition - actively predict and promote change</b>
<b>Strategy</b>	<b>Identify, maintain or create refugia. Increase buffering from extremes.</b>	<b>Reduce risk and impact of climate disturbances</b>	<b>Facilitate change through species transition. Create stepping stones and create habitat in predicted locations.</b>
<b>Wetlands</b>	<ul style="list-style-type: none"> <li>*Maintain full range of successional states &amp; diversity of habitat structure.</li> <li>*Maintain value of wet grasslands and reedbeds through appropriate management regimes to adapt to varying conditions.</li> <li>*Ensure flexibility in grazing regimes to adapt to varying conditions.</li> <li>*Maintain ditch and pool networks to accommodate both high and low water levels.</li> <li>*Promote good biosecurity to slow spread of invasive non-native species.</li> <li>*Manage pollutants to minimise impact on natural nutrient status.</li> </ul>	<ul style="list-style-type: none"> <li>*Increase size and diversity of wetland.</li> <li>*Dynamic management - restore and maintain natural hydrological regimes.</li> <li>*Large scale rejuvenation of wetlands/reedbeds.</li> <li>*Consider long term water availability, through storage &amp; up to date water control structures.</li> </ul>	<ul style="list-style-type: none"> <li>*Restore large, naturally functioning wetlands.</li> <li>*Create habitat for colonising species eg large shallow meres, nesting sites for herons, egrets etc</li> <li>*Increase trophic cascade - reintroduce Beaver.</li> <li>*Transition to more sustainable habitats where appropriate.</li> </ul>
<b>Wet woodlands</b>	<ul style="list-style-type: none"> <li>* Diversify scrubby structure.</li> <li>* Maintain full range of successional states.</li> <li>* Soften woodland edges.</li> <li>* Increase dead wood component.</li> </ul>	<ul style="list-style-type: none"> <li>* Diversify tree and shrub species.</li> <li>* Increase water retention by damming ditches and creating pools.</li> </ul>	

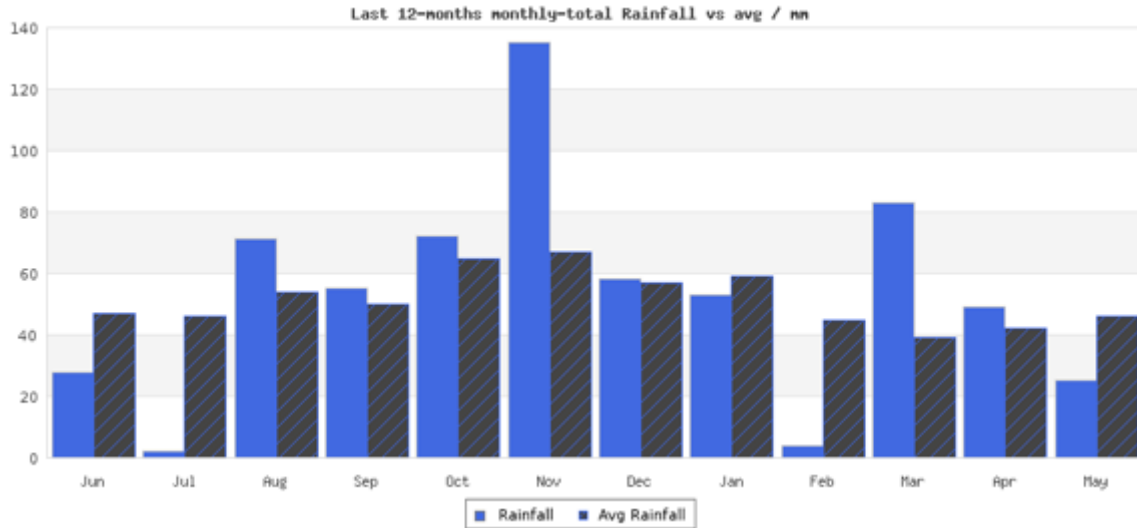
#### 4.1.2 Water levels and weather

This study had initially proposed to collect water level data from the key sites, as in the previous study, and assess the ecological impact of low water levels on each site. This did not prove possible but notes were made of water levels during each visit and compared with rainfall data.

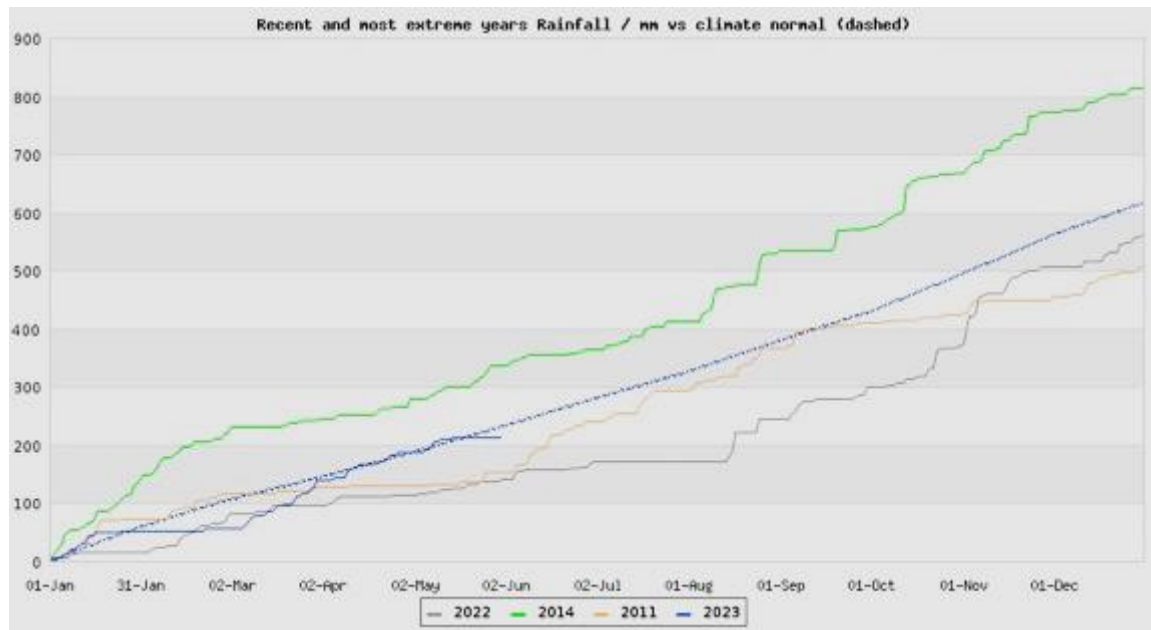
During 2022, rainfall was below normal through the first two-thirds of the year, though a wet autumn went some way towards offsetting this (see Figure 3 below). July was particularly dry and it was the driest January-August period since 1976 and drought conditions were declared across parts of England and Wales. The weather conditions during the winter of 2022/2023 were generally mild and wet, with 2022 being, on average, one of the warmest years on record. The first half of the winter saw water-bodies recovering from the prolonged drought conditions during the year. After a short but severe cold spell in December, with water-bodies extensively frozen, conditions became very mild and rainfall was above average. Although February remained mild, March was cooler than normal with over double the average rainfall, ensuring

lakes were at peak levels by the end of the winter. Overall, the weather was not harsh enough to initiate any significant cold weather movements of birds.

**Figure 3. Rainfall in west London during the survey period compared to the average.**  
(Data from nw3weather.co.uk)



**Figure 4. Rainfall in west London in 2022 compared to recent years**  
(Data from nw3weather.co.uk)



At the start of the survey period in September, many sites had low water levels. Much of Maple Lodge was dry and lakes such as Springwell and Broadwater had noticeably low water levels with algal blooms. After substantial rain in October-November, most sites were back up to normal winter water levels. Figures for rainfall for the year June 2022 to May 2023 are shown in Figure 3 above, and compared with the average conditions. Overall, 2022 was very dry compared with recent years (Figure 4).

Varying water levels will have both direct and indirect effects on the ecology of a water-body, and may be either beneficial or negative. Direct effects include both desiccation and freezing of habitats, and physical disturbance through wave activity and sediment mobilisation and movement. Indirect effects include alteration to habitats that are important as refuges from predators or for feeding by invertebrate and fish species, or indeed changing important wetland habitats themselves. Positive effects may be seen in the exposure of new habitat and its subsequent colonisation by plants and animals. In many wetlands, the drying and wetting process is seen to be a rejuvenating process. The significance of these impacts will depend largely on the extent, duration and timing of events and the ability of these communities to recover. The assessment of sensitivity of each lake to low water levels produced in the 2006/07 study is repeated below in the site accounts, unless there have been significant changes. The detail of these assessments is provided in Appendix 1.

### **4.1.3 Proposals for priority use**

In a wetland complex that has both nature conservation importance and a diversity of user groups, such as exists in the Colne Valley, it is usually beneficial to take a strategic approach to land-use management. Although this may be difficult in practice when uses are already established, there is a possibility that new potentially damaging uses will appear. This section proposes a priority use for each site, underpinned by the nature conservation importance as outlined in this report, but with established uses taken into account. The leisure use of each lake and a proposal for priority use is given in Table 20, together with a simple assessment of the level of nature conservation importance.

Where nature conservation is the priority use, maintaining the value of the site is the primary objective. However, this will not rule out recreational activities if they do not conflict with the wildlife importance. Where integrated use is suggested, a degree of balance must be achieved, but some positive management for wildlife would be expected, most likely in the form of a defined and managed refuge area. Where recreation is the priority, it is expected that the site should still be managed to sound ecological principles, as this will benefit the recreational use as well as maintaining existing wildlife value.

Many of the impacts of disturbance are subtle and difficult to measure, being dependent on the species, habitat, timing and the type of disturbance. Birds can perceive humans (and especially dogs), as predators and respond accordingly, disrupting behaviours and avoiding areas of valuable resources such as food resources. When considering waterbirds specifically, each type of activity will have varying levels of potential disturbance. Public access to bankside paths is likely to have the least issues, then angling (notably casting out into the water), while water sports of any type will be the most disturbing. Some general conclusions from disturbance studies are as follows:

- Waterbirds: flushing distance tends to increase with body size and with flock size. Many studies show flight distances at around 100m, less with increasing flock size.
- Quarry species have longer flushing distances than similar species which are not shot.
- Responses to a walker with a dog are stronger than a person approaching without one.
- Migrant waterbirds tend to be more sensitive than resident birds and are more sensitive to disturbance when they first arrive at a site. Moulting duck tend to be very sensitive.
- Recreational disturbance is a less serious problem if there are suitable adjacent refuge areas available.

Boats cause birds to flush when they approach too closely, but the distance at which this occurs will vary depending on species and the landscape of the waterbody. Boats deviating from established routes have been shown to cause a greater response than those in more predictable locations. Motor boats have been found to be particularly disturbing because of the speed and noise associated with them, but windsurfing and kayaking although quieter have the potential to be highly disturbing because they can occur in areas which are inaccessible to other types of visitor, and are otherwise seen as refuge areas.

Within the Colne Valley, it is critical that any increase in visitor activity on any site should have an assessment of the likely impact on the current conservation importance, with particular concern taken for any water-based activity.

<b>Site</b>	<b>Nature conservation importance</b>	<b>Current leisure uses</b>	<b>Proposal for priority use</b>
<b>River Colne</b>	High	Public access (some) Angling (some)	Integrated but maintain conservation importance.
<b>Batchworth Lake</b>	Low	Public access Water sports and angling	Recreation
<b>Bury Lake</b>	Medium	Public access Water sports and angling	Integrated use, an identified refuge area for Coot would be beneficial.
<b>Stocker's Lake</b>	High	Public access Angling	Nature conservation. Critical refuge area.
<b>Inn's lake</b>	Medium	Public access Angling	Recreation
<b>Springwell Lake</b>	Medium	Public access Angling	Integrated use
<b>Maple Lodge</b>	High	Controlled access to members	Nature conservation. Key refuge area.
<b>Lynsters Lake</b>	Medium	Angling – controlled access	Integrated use. Enhancing the viewing from Maple Lodge should be considered.
<b>Pynesfield Lake</b>	Medium	Angling – controlled access	Recreation
<b>North Troy</b>	Low	Angling – controlled access	Recreation
<b>Troy Mill</b>	Medium	Water sports Angling	Recreation. Establish refuge area.
<b>Broadwater Lake</b>	High	Public access Water sports and angling	Nature conservation. Critical refuge area. Manage as nature reserve.
<b>Tilehouse Lakes</b>	Low	Water sports Private lake – no access	Recreation/private
<b>Harefield Moor</b>	Medium	Angling	Uncertain future at present
<b>Korda</b>	Medium	Public access Angling	Uncertain future at present
<b>Savay</b>	Medium	Angling – controlled access	Recreation
<b>Harefield No2</b>	Low	Water sports and angling	Recreation
<b>Denham Complex</b>	Medium	Public access Angling	Integrated use. Establish refuge area on large lake.

#### 4.1.4 Generic habitat management recommendations for the Colne Valley

The following recommendations 1-4 for habitat management will be applicable to all sites and should be beneficial whatever the priority use of the site.

1. Reduction of tree cover to enhance marginal aquatic vegetation and structural diversity. The growth of trees around the water-bodies of the Colne Valley has been significant over the years. Whilst this does provide valuable habitat in itself, many of the waters are now heavily shaded, with the resultant loss of marginal aquatic vegetation such as reed or sedge. Although tree removal and subsequent management is expensive, the targeted reduction of tree cover will provide significant benefit for invertebrates, fish and birds. Tree reduction will encourage growth of understorey and marginal aquatic vegetation and reduce shading of the water. This will benefit aquatic habitats on angling sites, help reduce erosion where water sports take place and provide nesting areas for waterbirds in conservation sites or in refuge areas. Some of the angling organisations are already implementing such management, but more would be very beneficial. **Identify and manage tree cover in key areas to create structurally and species diverse lake margins.**
2. Maintain early succession habitats. Early succession, shallow water and open muddy habitats are amongst the most important in the valley, especially for some waterbirds. Where these are present, they need maintaining in good condition otherwise they are prone to rapid successional change. Key sites include Maple Lodge nature reserve but other smaller areas may exist on all sites. **Identify and manage appropriately and as a priority, key early successional habitats.**
3. Reduction in Signal Crayfish. Signal Crayfish will compete for food resources with waterbirds and with fish and may have an impact on water quality and turbidity, as well as aquatic plant growth. They appear to be abundant in some water-bodies and although elimination may be extremely difficult, measures should continue to reduce the population.
4. Management planning. A basic management planning system can be invaluable for setting clear objectives and monitoring against targets. **It is recommended that sites should have short, clear management plan documents that set out objectives for the next 5-10 years and review on a 5-year rotation.**

In addition, the sites with identified importance for water birds, should be aiming to protect the key features of the site; notably refuge areas and food resource.

5. Maintenance of waterbird refuge areas. The key refuge sites are the highest priority for protection. Where sites are used for recreational purposes the creation of refuge areas where a proportion of the waterbirds can retreat to during busy periods will be beneficial. Such areas will also provide nesting areas. On angling sites, such refuge areas may be easy to determine – extensive shallows or difficult to access areas, which can also be managed to enhance the survival of fish fry. Key refuge areas are present at Broadwater Lakes, Stocker’s Lake, Maple Lodge and Troy Mill. **Refuge areas should be identified and protected for each major site. Broadwater Lake is probably the most important for the valley and a wider area, and the refuge area should be managed as a nature reserve.**

6. Maintenance of a natural fish population. The majority of the sites in the Colne Valley have angling activity on them. Angling in itself may be no more disturbing than public access but the manipulation of fish communities through stocking can have serious consequences. The introduction of fish such as Carp can impact on wildfowl populations through direct competition for invertebrate food, or indirectly through habitat manipulation. This will include stirring up of sediment that may ultimately increase turbidity and promote a change from an aquatic macrophyte dominated system to an algal dominated system. **Identify key lakes to maintain a natural fish community.**

## 4.2 Site descriptions

### 4.2.1 Batchworth Lake

- **Location and size (TQ057940).** The northern-most lake within this study area, Batchworth Lake is located within the Rickmansworth Aquadrome complex. It is adjacent to the River Colne and the A404 road in Rickmansworth. Batchworth is an oblong shaped lake of around ten hectares in extent, with two major wooded islands and a network of public paths around the margins.
- **Habitats and key species.** The lake is largely surrounded by tall trees, mainly willows and Alders, although a number of planted ornamental trees are also present. Although a few marshy corners are present, with Lesser Pond Sedge and Common Reed, there is generally very little marginal aquatic vegetation. Some attempts have been made to increase vegetation by fencing sections along the bank. Very little submerged aquatic vegetation was noted.



The lake currently attracts only low numbers of the commoner and more tolerant waterbirds to feed on the lake, notably Coot, Tufted Duck and Mallard. As with most lakes a pair of two of Great Crested Grebes are present. The adjacent river and canal attract good numbers of Mute Swan (up to 39 in this study) and these birds move between the lake and river.

- **Ecological issues.** A typical mid succession gravel pit with banks lined with largely self-sown willows and Alders. These have progressively shaded out marginal aquatic vegetation. With little bird usage, there will be minimal movement between water-bodies but Tufted Duck will move from the adjacent Stocker's and Bury Lakes to feed on Batchworth in quieter periods.

Sensitivity to low water levels. Score – 2, minor impact. The lake is connected to the River Colne via a pipe, with water flowing in all but the lowest levels. Prolonged lowering of water levels may affect the marginal vegetation regeneration.



- **Recreational use and impacts on water birds.** Batchworth Lake is used for water-skiing and angling by the Uxbridge Rovers club. A large extent of the lake is utilised and affect all of the water area. Only small numbers of the most tolerant waterbirds remain on the lake. The paths around the margins are heavily used by visitors.
- **Habitat management recommendations.** As with the generic recommendations described above, diversification of the marginal habitats will be beneficial, notably enhancement of the marginal vegetation, combined with tree reduction in selected areas. This will also help to reduce wave erosion from the water sports and improve the aesthetic appeal of the lake. In particular the following actions are recommended:
  - Remove tree shading from above the existing fenced marginal vegetation zones to allow these areas to flourish and expand. Photograph below right shows struggling Pond Sedge with overshadowing trees.
  - Maintain the two wooded islands as non-intervention zones. They provide valuable nesting and refuge areas for a variety of species. Photograph below left shows one wooded island, with breeding duck and Great Spotted Woodpeckers noted.



#### 4.2.2 Bury Lake

- **Location and size (TQ053938).** Bury Lake is located between Batchworth Lake and Stocker's Lake; separated from the latter by a narrow causeway. This nine hectare rectangular lake has no islands and although not deep, appears to have an even depth. A small pipe forming a hydrological link to Stocker's Lake appears to have been sealed.
- **Habitats and key species.** The margins of the lake are a mixture of scrubby willows and other trees, with patches of mown, species-poor grassland. There is more extensive wet woodland habitat, largely dominated by willows, away from the lake towards the River Colne. The lake margins have scattered stands of emergent vegetation, mainly Branched Bur-reed, Common Reed, Reed Sweet-grass and Greater Pond Sedge.



Bury Lake is an important feeding site for waterbirds, notably aquatic plant feeders such as Coot. When it is not in use for water sports many other birds will flight in from Stocker's Lake, including diving duck. Submerged aquatic plants are abundant in some years with Nuttall's Pondweed appearing to be the dominant species. Previously Bury Lake was a key site for Mute Swan within the valley, with up to 100 birds gathering to be fed by visitors to the Aquadrome. Moulting Canada Geese use the lake during the summer months.

- **Ecological issues** A relatively large open lake but with scrub and trees developing on the margins, shading out the previous marginal aquatic vegetation. With its water sports use, there are regular movements of birds between Bury Lake and Stocker's Lake, either when disturbed or for roosting.

Sensitivity to low water levels. Score 2, minor impact. Prolonged lowering will affect the marginal vegetation regeneration.

- **Recreational use and impacts on water birds.** Bury Lake is used for water sports, mainly sailing, as well as model boat sailing and angling. The margins are perhaps the most heavily used of any lake in the valley, the circular route around the lake being very popular with visitors to the Aquadrome. Although the lake has high recreational pressure, birds are able to move to Stocker's Lake. The more tolerant Coot remain on the lake.
- **Habitat management recommendations.** Specific recommended actions for Bury Lake are as follows:
  - Open up the causeway between Stocker's and Bury Lakes by removing tree growth. This will allow reed to flourish and will enhance views for visitors. Photograph below left shows willow growth on the lake margin.

- Enhancement of the marginal vegetation will help to reduce wave erosion from the water sports and improve the aesthetic appeal of the lake. Photograph below right shows marginal sedge beds struggling under shading tree growth.
- Maintain the wet woodland habitat by the River Colne, notably maintain the current hydrological regime, maintain dead wood and implement a minimum intervention policy.



### 4.2.3 Stocker's Lake

- **Location and size (TQ 045934).** Owned by Affinity Water, Stocker's Lake is located just to the south of Rickmansworth and forms the central and largest lake within the Rickmansworth Aquadrome group of lakes. Stocker's Lake has a water area of around 28 hectares. An HMWT nature reserve, the site has access paths around the lake and a number of viewing structures for visitors.



- **Habitats and key species.** Gravel extraction started in the 1920s and was completed by the 1940s. Although up to seven metres deep in some places, the lake is characterised by parallel ridges of reject gravels with gullies in-between. Most of the ridges are below water level but a significant number form a series of linear islands, mainly along the western side of the lake. These islands have developed into woodland over the years. A range of habitats are represented within and around the lake, including open water, marsh, reed and sedge swamp, rough grassland, scrub and woodland, although natural succession to woodland is occurring in most marginal wetland habitats.

The lake supports a range of aquatic macrophytes, some years in abundance. They include Whorled Water-milfoil and Mare's-tail. Areas of reed and sedge swamp, and tall-herb grassland are found around the lake margins. The flora of these areas has been well studied and contains a diversity of species including the locally uncommon Meadow-rue, Narrow-leaved Water-plantain and Dittander. Small stands of Common Reed are found around the lake along with other marginal aquatic plants such as Greater Pond Sedge and Sweet Flag. Scrub and tree growth is well developed. Important areas of wet woodland dominated by willows and Alder are present on many of the islands and bank-sides. One of the most notable plants of this habitat is the Large Bittercress, found at its only Hertfordshire location. The scarce Moschatel is also present and large numbers of Broad-leaved Helleborine are found under the trees.

Stocker's Lake is one of the two major waterbird refuges in the Colne Valley, significant for Shoveler, Pochard and Tufted Duck. An important site for breeding waterbirds, notably Grey Heron, Little Egret, Cormorant, Pochard, Tufted Duck, Black-headed Gulls and Common Tern. The Heronry is one of the largest in the county. An important feeding site for several species, including Wigeon and Gadwall when aquatic plants are abundant. Formerly a roost for Goldeneye, Goosander and Smew, all these species have declined due to 'short-stopping' in warmer winters. During the 2022-23 winter, waterbird numbers for the complex of lakes were lower than in the 2006/07 study, with a maximum total count of 834 birds compared with 1431, mainly due to reduced numbers of Coot and Gadwall.

Coot, Gadwall and Wigeon had all increased over recent decades but have now declined, almost certainly due to a reduction in aquatic plant abundance in recent years. Geese have also declined as tree growth has increased around the lake. Twenty years ago, flocks of geese would graze the margins of the lake, such areas today are isolated from the water by marginal bands of trees. Inns Lake to the south of Stocker's was important for Coot and Gadwall in the 2006/07 study. This year there were virtually no birds all winter.

- **Ecological issues.** As with all sites, natural succession around the lake is reducing the amount of marginal aquatic vegetation. Stocker's Lake is a major refuge, with birds flying out to other lakes in the area. Although the extent of the flights is uncertain, birds certainly move to Bury, Batchworth, Springwell and Lynsters Lake. In colder winters, birds move from the shallow waters of Maple Lodge when they freeze.

Sensitivity to low water levels. Score 6, moderate impact. Although short-term exposure of islands may bring benefits to waterbirds by providing loafing areas and enhancing feeding opportunities, prolonged low water levels would be damaging. Associated wet woodland and marsh habitats would suffer and predators such as Foxes would have easier access to the important breeding birds on the islands.

- **Recreational use and impacts on water birds.** A circular path around the lake is well used by visitors but in most areas is away from the shoreline, reducing its impact on waterbirds. The lake is fished by the British Airways Angling Club. Angling is very low-key, from a limited number of swims and is well managed. The lake is stocked with mixed coarse fish, including Tench and formerly, Carp.
- **Habitat management recommendations.** Much habitat management is already undertaken by HMWT, the following actions focusing particularly on waterbirds are recommended.
  - There is a need to maintain habitat diversity around the site, maintaining the ponds, the grassland areas and the marginal vegetation. Open up small existing reedbeds by removing adjacent scrub and trees.
  - Clear and maintain some small islands of trees as has been done at the southern end. These are good for nesting waterbirds. In addition, maintain the selection of rafts (photo below left).
  - Open up key viewpoints around the lake to enable visitors to view the open water and enjoy the wildlife.
  - Maintain the excellent area of wet woodland and the key species within it, notably by implementing minimal intervention other than ensuring an appropriate hydrological regime (photo below right).



#### 4.2.4 Springwell Lake

- **Location and size (TQ 042930).** Owned by Affinity Water, Springwell Lake is located to the south of Springwell Lane, adjacent to the River Colne and the Grand Union Canal. Three Valleys Water have a pumping station by the eastern bank of the lake. Springwell Lake has a relatively long, thin shape and extends to 16 hectares. The lake was excavated in the first half of the 20<sup>th</sup> century and typically for the extraction methods of the time, has ridges of reject gravels just below the water surface. There is a short line of islands towards the northern end of the lake.
- **Habitats and key species.** The lake surrounds are largely wooded with mature planted trees. It supports a range of habitats including wet woodland, marginal sedge and reed swamp, marsh and grassland. Aquatic plants are abundant in some years, with Nuttall's Pondweed being recorded. The lake margins support a thin band of emergent aquatic vegetation. The dominant species are Lesser and Greater Pond Sedge, Reed Canary-grass and Branched Bur-reed. Scarcer species include Hemlock Water-dropwort, Dittander, Great Water Dock, Hemp Agrimony and Angelica.



An extensive sedge bed, mainly Lesser Pond Sedge, is found in a low-lying area between the lake and the pumping station. Brown Sedge, a scarce species in the London area, is found within this area. Although most of the trees have a planted origin, some areas of more natural wet woodland exist, notably at the southern end of the lake. Most interesting is a tangle of Crack Willow over a mixture of wetland plants including Yellow Iris, Blue-water Speedwell, Water Figwort and Water Forget-me-not.

Springwell Lake is favoured by feeding waterbirds when submerged aquatic plants are abundant within the lake, notably Coot, Gadwall and Wigeon and also small numbers of diving duck, including Goldeneye. However, during the 2022-23 winter, waterbird numbers were very low, with a maximum total count of only 60 birds (compared with 276 in the 2006-07 study). Conditions were certainly poor after the summer of 2022, with a notable algal bloom (see below) and no visible aquatic plants. Waterbird numbers picked up towards the end of the winter and may improve in future years.

- **Ecological issues.** At the beginning of this study, water levels were low on Springwell Lake, and more significantly, the water was dominated by an algal bloom, probably blue-green algae. This suggests high nutrient levels within the lake and resulted in highly turbid waters with virtually no birds present. As the winter progressed and the bloom subsided, more birds started to feed on the lake. In most years, there are movements of birds from Stocker's Lake (where they roost) to Springwell Lake (where they feed). Movements to and from Maple Lodge are also evident.

- Sensitivity to low water levels. Score 4, moderate impact. Although impact on the lake itself may be minor, there are associated wetland habitats of marsh, wet woodland and reedbed that are likely to suffer from prolonged low water levels. Although the significant Springwell Reedbed receives water from the River Colne, it is also connected to the lake via a culvert and the precise nature of the hydrology is uncertain.
- **Recreational use and impacts on water birds.** A public circular walk is present around part the lake and it is fished by the North Harrow Waltonians Angling Association. When the lake is well used by people, birds may be displaced, usually to Stocker's Lake.
- **Habitat management recommendations.** As well as applying the generic habitat management recommendations, the following site specific actions are given.
  - Open up key areas of marginal aquatic vegetation, such as the small reedbed in the photograph below left. Removing the scrub and clearing a small pool within the reedbed will provide good habitat for fish fry, invertebrates etc.
  - The excellent wet woodland along the western side and southern end (photograph below right) should be protected and maintained in its natural state. It is important to maintain a water supply to this area.



#### 4.2.5 Maple Lodge nature reserve

- **Location and size (TQ 036925).** Maple Lodge nature reserve is located to the east of Maple Cross village, adjacent to the Thames Water sewage works. The reserve extends to around 16 hectares, of which up to a third is open water. The lakes are all shallow. The nature reserve has a large membership and a number of paths and viewing structures. Maple Lodge is perhaps the best recorded site in the Colne Valley, with a long history of conservation management and bird ringing. Wildfowl counts date back to the 1960s.
- **Habitats and key species.** Maple Lodge nature reserve is a man-made wetland habitat consisting of two old gravel pits and a sludge settlement area formerly used by the nearby sewage treatment works. Some refuse dumping also occurred on part of the site and during the late 1950s and early 1960s an area in the east of the reserve was planted with poplars. From the early 1970s the site was largely undisturbed and developed naturally into mainly woodland and rank herb-rich grassland.

The margins of the pools support a diversity of marginal aquatic vegetation, including Common Reed, Reed Canary-grass, Yellow Iris, Great Hairy Willowherb and abundant Purple Loosestrife. Some areas of herb-rich grassland are found around the site and Marbled White butterflies are present. Areas of woodland include both drier, Ash-dominated stands and areas of excellent wet woodland. These areas have been enhanced by planting of native species such as Oak, Ash and Alder, whilst previously planted Poplars have been felled.

Maple Lodge attracts a distinctive range of waterbirds due to its shallow water bodies. It is the key valley site for Teal and for breeding waterbirds, including Gadwall, Pochard, Tufted Duck, Red-crested Pochard and Little Grebe. Gadwall have also gathered for a summer moult in recent years. Although a small site, it is also an important refuge for the above species.



However, current numbers are much lower than in the past. Recorded numbers of Coot were very high in the 1980s, with peaks of 639 in November 1983, 754 in January 1984 and 526 in January 1990. However, there was then a significant drop in numbers through the 1990s with counts rarely reaching three-figures. A similar pattern is noted for Mallard and Shoveler. Peak counts of Mallard are 358 in November 1970, dropping to highs of 100-200 birds through the 80s and generally under 100 since the 1990s. Peak counts of Shoveler were all in the 1980s, with 138 in February 1986 and 239 in January 1989.

By contrast, Teal were relatively scarce in the 1980s but increased through the 90s and into the last decade. Peak counts are 99 in December 1990, 150 in December 1996 and 82 in August 1997. Gadwall has also increased in recent years. Increasing through the 1980s, a peak winter count was of 61 in November 1986. However, since the late 90s, the peak counts of Gadwall have occurred during the summer months as a breeding population has established in the area and a gathering of moulting birds has occurred at Maple Lodge. During the 2022-23 winter, waterbird numbers continued the downward trend, with a maximum total count of only 87 birds (compared with 151 in the 2006-07 study).



- **Ecological issues.** The shallow wetlands of this reserve are vulnerable to rapid natural succession without management. Some excellent wet woodland habitat is developing but at the loss of valuable shallow early succession wetland. When the shallow waters of Maple Lodge dry out or freeze, birds move to local deeper waters, notably Stocker's Lake.

Sensitivity to low water levels. Score 7, high impact. The effects of prolonged low water levels have been clearly seen in recent years when most of the pools dried up. Pools have been colonised by marsh and terrestrial vegetation, including willow, changing the nature of the site. This important breeding site would rapidly lose its value without intervention.

- **Recreational use and impacts on water birds.** The only recreational use is as a nature reserve; but with the viewing structures provided and the screened pathways, this probably has a minimal effect on waterbirds.
- **Habitat management recommendations.** The habitat management at the reserve is good and a significant amount has been undertaken in the previous winter. However, if a return to something akin to previous importance for water birds is agreed, a step-change in management is required. This will include:
  - The removal of significant amounts of colonising scrub and herbaceous vegetation to open up and link the pools will be required. Some careful shallow excavation of pools could be considered.
  - A review of the hydrology and means of maintaining appropriate water levels should be undertaken. Although summer drying is not a problem in itself, with more extreme conditions in the future, some means of mitigating prolonged drought conditions should be sought.
  - Maintain the important wet woodland areas that have developed, retaining dead wood and implementing a largely minimal-intervention policy (tree works only for health and safety issues).



#### 4.2.6 Lynsters Lakes

- **Location and size (TQ 035918).** Lynsters Lakes are located to the north of Coppermill Lane, the minor road from West Hyde to Harefield. Lynsters Farm is on the northern side of the lakes. There are three lakes in the complex, the largest is around 23 ha with several peninsulas and islands. Although the depth is generally around 2-3m, a number of ridges just below the surface are exposed as islands at lower water levels, a feature typical of gravel pits of this age. Underwater springs are present in the lakes.
- **Habitats and key species.** Lynsters Lakes have a mixture of wooded and open grassy shorelines. Lynsters Farm borders the site to the north and has areas of improved grassland down to the waters edge. Much of the lake margins, including the islands are now wooded, with willows and Alder dominating, although Oaks and a mixture of other trees are also present. Marginal aquatic vegetation is generally scarce but some small stands of Reed, Pond Sedge and Reedmace are present.



The lakes support a range of fish including Carp, Bream, Tench, Roach and Rudd. There is little sign of Signal Crayfish. The open water supports abundant submerged aquatic plants in many years, mainly Nuttall's Pondweed. The fields adjacent to the lake are a regular haunt of both Greylag and Canada Geese on one of the few sites where grazed grassland occurs adjacent to water bodies.

Waterbird numbers can be reasonable when submerged aquatic plants form an abundant food resource. During the 2022-23 winter, Coot were numerous, along with Gadwall, suggesting that aquatic plants were abundant. Moderate counts of feeding Tufted Duck and Pochard are regular. Although the peak total count of 290 birds was substantially lower than the 662 of the 2006/07 study, most species have been stable or slight declines, with geese perhaps less regular in large numbers as the lake margins have grown up.

- **Ecological issues.** Although successional changes have occurred as on other lakes, the angling club has undertaken good management around the lake margins. Movements of waterbirds have been noted between Lynsters and Stockers Lake, Pynesfield Lake and Maple Lodge.

Sensitivity to low water levels. Score 4, moderate impact. Short-term events are likely to be beneficial or have a quick recovery eg exposure of islands. Longer-term events may lead to increased impact of the recreational use on waterbirds or on the recreational use itself.

- **Recreational use and impacts on water birds.** The lake has an active angling club and shooting also takes place. The lake is large enough to allow birds to redistribute within its boundaries with low levels of bank usage. Good numbers of birds were still using the waters during the current study.

- **Habitat management recommendations.** Overall, much good management is done by the angling club, notably on marginal vegetation for Water Voles, with fish and invertebrate surveys also undertaken. Continuing with this work is recommended, opening out marginal vegetation where it is becoming shaded (as in photograph below). In particular, opening up the view from the observation hide on the adjacent Maple Lodge would be good for visitors. The wooded islands are nice and should ideally be left as undisturbed areas for breeding waterbirds.



#### 4.2.7 Pynesfield Lakes

- **Location and size (TQ 037910).** Owned by Affinity Water, Pynesfield Lakes are located east of the village of West Hyde and south of Coppermill Lane. A public footpath runs between the two lakes. The 19.6 hectare lake is divided into two by a bund running east-west across the middle. This bund carries the public footpath between West Hyde and Harefield. The northern lake has a narrow spit of land running out into it, the result of tipping after the lake was excavated. The western side of the northern lake is occupied by the Three Valleys Water pumping station, set in mown grassland and ornamental planting.
- **Habitats and key species.** The lakes and their surrounds support a range of habitats including open water, some marshy margins, scrub and wet woodland. The lakes are mostly surrounded by mature trees, limiting the extent of marginal aquatic vegetation. There are extensively wooded islands. Some small stands of Branched Bur-reed, Yellow Iris and Greater Pond Sedge are present.



The aquatic vegetation includes several large beds of both Fringed Water-lily and Yellow Water-lily. Extensive mats of submerged aquatic plants are also present, mainly Nuttall's Pondweed. Large numbers of damselflies are present, with Common Blue Damselflies being abundant and smaller numbers of Red-eyed Damselfly and Black-tailed Skimmer. There is an interesting area of low-lying wet woodland adjacent to the northern lake. Dominated by a range of willows, the ground flora is surprisingly rich. It includes Yellow Iris, Hemp Agrimony, Male Fern, Common Spotted Orchid and Twayblade.

The lakes attract moderate numbers of Coot and Gadwall with low numbers of diving duck such as Pochard and Tufted Duck being regular. When aquatic plants are abundant, higher counts can occur. There were 102 Gadwall in January 1996 and November 1997, and a peak count of 146 in February 2004. However, the disturbed nature of the lakes can result in many birds flying in to feed at quieter periods. The peak count in the 2022/23 winter was of 332 birds, similar to the corresponding count of 263 in 2006/07. Coot and Gadwall were slightly higher than the 10-year average during this winter.

- **Ecological issues.** Waterbirds flight in to feed, particularly on the submerged aquatic plants. These birds probably roost at Stocker's Lake or Broadwater Lake.

Sensitivity to low water levels. Score 4, moderate impact. Short-term events are likely to be beneficial or have a quick recovery eg exposure of islands. Longer-term events may lead to an impact on the wet woodland and to the recreational (angling) use of the lakes.

- **Recreational use and impacts on water birds.** The site is fished by the Rickmansworth Conservative Club and District Angling Society. The small size of the lakes results in re-location of birds, either within the site, or away from the site in busy periods.
- **Management recommendations.** The generic habitat management recommendations will apply to Pynesfield, notably enhancing marginal vegetation and habitat structure.

#### 4.2.8 North Troy

- **Location and size (TQ 038908).** North Troy Lake, also known as Helicon Lake, is located adjacent to Pynesfield Lake and north of Troy Mill lake, to the west of Harefield. A small lake of around 13 ha almost subdivided by a long-wooded peninsula. The lake also has one largish island. The lake is fairly shallow and has the typical ridge and furrow topography of many of the older valley lakes.
- **Habitats and key species.** Aquatic weeds may be abundant in some years. The margins of the lake are surrounded by trees, mainly willows and Alder. The understorey is mainly species-poor, dominated by ruderals typical of these disturbed gravel pit margins. A few clumps of Common Reed and other marginal aquatic vegetation exist within the lake.



Generally moderate for waterbirds, mainly Coot, with small numbers of Gadwall and Tufted Duck. Seemingly a good year for aquatic plant growth given the numbers of Coot. A total of mainly around 90 birds was generally recorded in 2002/23 (similar to the peak of 107 in 2006/07) but a massive count of 291 in December 2022 due to an influx of Coot, which seemed to move to Troy Mill by January 2023.

- **Ecological issues.** Generally a small, easily disturbed lake where anything but Coot will flight in to feed. The diving duck that feed here, principally Tufted Duck and Pochard, will move to Troy Mill or Broadwater Lake when disturbed.

Sensitivity to low water levels. Score 2, minor impact.

- **Recreational use and impacts on water birds.** North Troy Lake is private and has no public access. It is fished by the Rickmansworth Conservative Club and District Angling Society. Disturbance around the banks generally results in all but the most tolerant birds leaving the site.
- **Habitat management recommendations.** As with Pynesfield, the generic habitat management recommendations will apply, notably enhancing marginal vegetation and habitat structure.

#### 4.2.9 Troy Mill Lake

- **Location and size (TQ 040905).** Troy Mill Lake (also known as South Troy) is located to the west of Harefield and is separated from Broadwater Lake to the south by the river Colne. A 22 ha almost circular lake with no islands. Some areas retain the ‘ridge and furrow’ topography typical of older mineral workings.
- **Habitats and key species.** Like most lakes in the valley, Troy Mill has a fair amount of self-set willow around the banks. However, the site also has a significant amount of more mature trees, mainly willows that pre-date the gravel extraction. These are located to the south and west of the lake along the boundary with the River Colne. The trees to the west have a marshy ground flora of sedge and grasses.



Around 50% of the lake margin remains fairly open and a thin band of emergent vegetation exists before the ground rises and supports the typical disturbed ground flora of Stinging Nettle and Comfrey. The emergent vegetation includes Branched Bur-reed, Reed Sweet-grass and some Common Reed.

This shallow lake, often with abundant submerged aquatic plants is a favoured feeding site for Coot and diving duck, particularly Tufted Duck. Its large open area attracts waterbirds, the abundance of each species depending on the prevailing conditions in any year. In the years when aquatic plants are abundant, Coot and Gadwall may reach significant numbers, for example, there were some high counts of Coot during the 1990s, with 500 in December 1991, 500 in November 1994 and 670 in October 1997. Gadwall have also been notable in past years with peaks of 200 in December 2000 and 130 in December 2001. Tufted Duck often reach three-figures, with a peak of 340 in December 1995. Cormorant and herons roost in the marginal trees by day. Traditionally the site attracts passage birds such as terns and occasional scarcer visitors, because of the size and open-ness of the lake. The peak count in the 2022/23 winter was of 682 birds, an increase on the corresponding count of 476 in 2006/07, mainly due to an increase in Coot.

- **Ecological issues.** The impact of vegetation succession is less due to the size of the lake. Birds flight south to Broadwater Lake when disturbed.

Sensitivity to low water levels. Score 2, minor impact.

- **Recreational use and impacts on water birds.** A water sports facility is located on the lake and when this is active, many waterbirds leave the site with generally only Coot and Great Crested Grebes remaining. The open nature of the lake with a lack of any natural refuge area results in the high impact of the activity. The lake is also fished by Uxbridge Rovers angling club. The lake is stocked and contains Carp, Bream and Tench.
- **Habitat management recommendations.** Given the importance of this large, open lake, establishing an effective refuge area around the wooded western and southern banks would be highly beneficial.

#### 4.2.10 Broadwater Lake

- **Location and size (TQ 045895).** Broadwater Lake is located to the north of Moorhall Lane and to the east of the River Colne. The largest lake within the study area at over 80 hectares, it has a number of large islands and some extensive areas of shallow water. The western edge is a HMWT nature reserve and the Broadwater Sailing Club operates from the northern end.
- **Habitats and key species.** Formerly with a high diversity of wetland habitats, including lowland river, alluvial grasslands, gravel islands and wet alder woodland, after the cessation of mineral extraction natural succession continues rapidly. The grasslands are succeeding to scrub and woodland with willow and Ash dominant. The margins of the lake support a variety of aquatic plants including Common Reed, Yellow Iris, Water Plantain and Reedmace. Large islands at the southern end of the lake support tall poplars, willow and Alder.

The old silt lagoon area has now succeeded to a dense tangle of willow, birch and Alder. Formerly very open and attractive to waders and duck such as Teal, this now provides an area of wet woodland. The River Colne flows along the western side of the lake and provides a high quality habitat with a meandering course in part, shallows and deeps. It has bands of marginal vegetation including Common Reed, Greater Reedmace and Reed Sweet-grass. In-stream it has Water-crowfoot and Water-starwort beds. It also has established beds of the non-native and invasive Floating Pennywort.

One of the two major waterbird refuges in the Colne Valley, Broadwater is significant for Shoveler, Pochard and Tufted Duck, the former two in numbers of national significance. The lake is noted to be important for moulting waterbirds, notably Tufted Duck, Coot and Great Crested Grebe. Tufted Duck first established a moult refuge at Broadwater in the 1970s. A moulting flock of 360 birds was recorded in early August 2023.



A significant site for breeding waterbirds, notably Grey Heron, Little Egret and Cormorant. Cormorants first nested at Broadwater in 1987 (the first breeding record for the London area), but it was not until a second nest in 1996 that a colony became established and increased to a peak of 55 nests, with a subsequent decline. Cormorants have also formed a winter roost at Broadwater since 1972/73. The lake forms an important feeding site for several species, including Wigeon, Coot and Gadwall when submerged aquatic plants are abundant. Gadwall numbers have seen an increase, with peak counts in excess of 400 in the past, but since then, numbers have been erratic, usually reflecting the abundance of aquatic plants. The islands and open water provide roost sites for Little Egret, Cormorant, Goldeneye, gulls and geese, as well as nesting areas for waterbirds such as Pochard and Tufted Duck. Summer moult gatherings still occur, of geese, Tufted Duck at Coot at least. The peak count in the 2022/23 winter was of 784 birds, somewhat lower than the corresponding count of 1160 in 2006/07, mainly due to a reduction in Coot and Gadwall.

- **Ecological issues.** As with other sites, natural succession around the lake is rapid, notably on the old silt lagoon and extraction operational area. Currently impacted by HS2, the western side has unfortunately become overgrown and neglected.

Birds appear to flight out widely from Broadwater to feed on other sites during the day, both in the Colne Valley and probably beyond. The numbers of birds on Broadwater and Stocker's can vary day by day, most likely reflecting movement between the two sites and beyond.

Sensitivity to low water levels. Score 5, moderate impact. Although exposure of islands may bring benefits to waterbirds, prolonged low water levels may threaten the wet woodland and marsh habitats and may allow predators access to the important breeding birds on the islands.

- **Recreational use and impacts on water birds.** The Broadwater sailing club operates from the northern shore and uses the northern half of the lake (see case study Appendix 2). When sailing is occurring birds relocate to the southern half of the lake in the refuge area around the wooded islands. The key feature of the refuge is the size, openness and buffer zone from the sailing activity, allowing waterbirds sufficient distance to move away from disturbances, whether water-based or bank-side. This is particularly important for summer moulting flocks. Broadwater Lake is principally fished for Carp, previously with low stocking levels of specimen fish. Recent studies have shown low fish populations in the lake.

- **Habitat management recommendations.**

- Maintaining the current refuge area and nesting islands is highly important, the openness and size of the refuge is critical. Islands within the refuge (also used for nesting herons and Cormorants) provide some shelter with the northern group being particularly critical (photo below right). Ideally the entire refuge area would be managed as a nature reserve to maintain its value.
- Continuing the present programme of reduction in tree cover, especially to restore a transition of marginal aquatic vegetation grading to wet woodland on the silt lagoon area would be beneficial.
- Restore the more open nature of the River Colne by removing rapidly growing scrub. Investigate removal of the non-native Floating Pennywort.





#### **4.2.11 Tilehouse, Harefield Moor and Korda Lakes**

All three of these lakes were inaccessible during this study, either due to construction works for HS2 rail, or in the case of Tilehouse north lake due to it being a private lake.

**Harefield Moor Lake** is located immediately to the south of Broadwater Lake, separated only by a narrow causeway. Its previously open silty margins are being rapidly colonised by willows. The lake has numerous shallow areas and ridges which are exposed at low water levels. The silt lagoon area on Harefield Moor was a favoured area for Teal. Little Ringed Plover and Common Tern have both nested on exposed islands in the past. The photograph below shows the current tree growth around the shallow, silty waters.

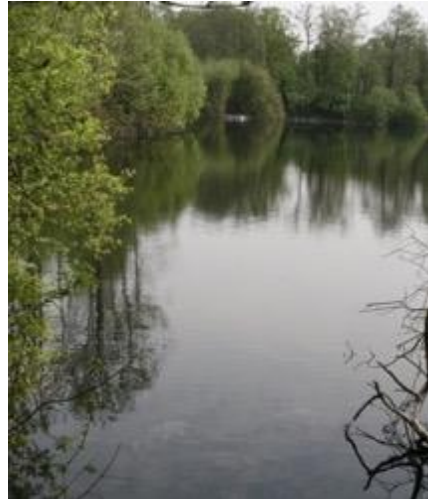
**Tilehouse lakes** were formerly favoured by diving duck and grebes for feeding. These small lakes were also noted as a regular site for Smew in colder winters from 1988 until 1998 at least, with a maximum of nine birds recorded. Past counts for most species were higher (but still of only moderate significance).

**Korda Lake** is located at the southern end of the Broadwater Lake complex, immediately north of Moorhall Lane. Korda Lake was also regularly noted as a site that attracts feeding Smew, with nine noted in February/December 1998 and ten in January 2002.



#### 4.2.12 Savay Lake

- **Location and size (TQ 050880).** Savay Lake is located to the south of Moorhall Lane and to the west of the Grand Union Canal. A large lake dissected by numerous islands and long peninsulas, forming rather narrow water areas. Much of the lake appears to be shallow.
- **Habitats and key species.** As with many other lakes in the valley, Savay has extensively wooded margins and islands. There is much willow, including some fine mature Crack willow along the canal side, but also much Birch and Alder. Marginal aquatic vegetation is generally scarce but a couple of stands of Common Reed are present. Submerged aquatic plants are present in the shallows and patches of Yellow and White Water-lily are present, presumably planted by the anglers.



Although readily disturbed by angling activities, Savay Lake forms a feeding site for several species. However, only low numbers of waterbirds were noted in the current study. Goosander use the site and the adjacent river in low numbers. The peak count in the 2022/23 winter was of just 59 birds, significantly lower than the corresponding count of 375 in 2006/07, mainly due to a reduction in Coot.

- **Ecological Issues.** Clear links to Broadwater Lake to the north, with most feeding diving duck roosting on Broadwater when disturbed.

Sensitivity to low water levels. Score 3, minor impact.

- **Recreational use and impacts on water birds.** Angling takes place on the lake, with intense activity usually disturbing most of the birds located there. Savay's main quarry species is Carp.
- **Habitat management recommendations.** As with other angling lakes, the generic habitat management recommendations will apply, notably enhancing marginal vegetation and habitat structure.

#### **4.2.13 Harefield No. 2 Lake**

- **Location and size (TQ 053880).** Harefield No. 2 Lake is located to the east of the grand Union Canal, south of South Harefield and to the north of Denham Country Park. A large oblong lake with no islands. It appears to be rather uniformly deep.
- **Habitats and key species.** This large lake is extensively wooded on most of its margins, mainly with self-set willows and Alders, with a smaller number of planted trees. The understorey is generally species-poor, dominated by ruderals. A number of stands of Common Reed and other marginal aquatic plants are found around the shoreline where not shaded out by the trees.

Only low numbers of commoner species were generally noted on the lake, with Coot the most numerous and reaching 100+ birds. A few diving duck feed here. Great Crested Grebe, Coot and Mallard breed. The peak count in the 2022/23 winter was of 143 birds, similar to the corresponding count of 95 in 2006/07.

- **Ecological issues.** The key issue is the ongoing construction of the HS2 rail flyover passing across the middle of the lake east to west (see photo right). Although commoner species were feeding around the works it is unknown if there are wider impacts on other species.



Natural succession continues around the lake, with the increasing loss of marginal vegetation.

- **Recreational use and impacts on water birds.** The lake is the base for a major water sports club. The lake is also used for angling, with the water reputedly holding large Pike and Carp.
- **Management recommendations.** As with Pynesfield, the generic habitat management recommendations will apply, notably enhancing marginal vegetation and habitat structure.

#### **4.2.14 Denham Complex (four water-bodies)**

- **Location and size (TQ 055867).** The Denham Complex of lakes is located to the north of the A40, east of the village of Denham. Of the four lakes in the complex, the two southern-most are the smallest and the northern lake by the canal the largest. A few very small wooded islands are present. An overflow channel takes water from the largest lake to the river.
- **Habitats and key species.** The lakes all have extensively wooded surrounds, mostly Alder, various willows and Hazel, with excellent adjacent stands of wet woodland. Aquatic vegetation is varied and frequent within the largely clear waters, with Fringed, White and Yellow Water-lily (presumably introduced by anglers). Nuttall's Pondweed is frequent, with Hornwort and Amphibious Bistort also present. Marginal aquatic vegetation includes small stands of Common Reed, Greater Reedmace, Pond Sedge and Branched Bur-reed.



*The largest, north-western lake, March 2023.*

Although dabbling duck were generally sparse, moderate numbers of Coot and diving duck were present, mostly on the largest lake. During the 2022-23 winter, waterbird numbers were generally stable in numbers, with a maximum total count of 316 birds (compared with 303 in the 2006-07 study). Breeding waterbirds include Great Crested Grebe, Coot and potentially Mandarin Duck.

- **Ecological issues.** The marginal stands of aquatic vegetation and the surrounding areas of wet woodland are most likely to suffer from prolonged lowering of water levels.
- **Recreational use and impacts on water birds.** Angling is permitted on all the lakes but the number of occupied 'swims' recorded during the year was never high. Disturbance by anglers is therefore unlikely to be a major issue. No clear links with other waters was established but Tufted Duck are likely to move to Broadwater Lake if disturbed.
- **Management recommendations.** The lakes are well managed at the moment but the generic habitat management recommendations will apply. Specifically for Denham lakes, the following actions are suggested.
  - The excellent wet woodland is a very important habitat, including the wooded islands. These areas should be managed as minimal intervention, maintaining decaying wood and ensuring the hydrology is suitable.
  - Consideration should be given to establishing a refuge area on the largest lake. This is largely symbolic as there is currently no disturbance, but it does put down a marker that the site is important.

- Establishing a viewpoint for visitors would highlight the importance of the site for waterbirds.



## **5. Acknowledgements**

This study was funded by the Herts and Middlesex Wildlife Trust.

Local WeBS counters, notably Paul Lewis, kindly made counts available during the study period. In addition, local birders provided extra counts.

The BTO kindly provided past data for Broadwater Lake, and the BTO website provided all the data on national trends of species.

## **6. References**

White 1993. The effects of sailing on the Wintering Wildfowl of the Mid-Colne Valley SSSI. HMWT.

White 1994. Conservation, Access and Recreation in the Colne Valley. HMWT.

White 1996. An investigation into the effectiveness of the wildfowl refuge within Broadwater Lake. HMWT.

White 1999. A study of the wintering waterbirds of the Mid-Colne Valley SSSI during the winter of 1998-1999. HMWT.

White & Harris 2008. The wetland resource of the Colne Valley: an assessment of its importance to nature conservation, with special reference to waterbirds. HMWT.

## Appendix 1. Ecological effects of low water levels in the Colne Valley

This summary was produced for the 2006/07 study into the waterbirds of the Colne Valley. It is repeated here below as it is still highly relevant to the Colne Valley wetlands.

### Qualitative scoring for each water-body on sensitivity to low water levels.

A qualitative scoring for each water-body on its sensitivity to low water levels, both in the short term and for prolonged periods, can be achieved by judging each site against a number of attributes. Score 0 (no or beneficial effect), 1 (minor or short term effect) and 2 (major or long term impact) for size of impact on each water body of:

1. effects on vegetation and habitat
2. effects on lake topography and area
3. effects on security (predators/disturbance)
4. effects on water quality.

This is scored in relation to the known ecological value of each site and the total score given a rating of concern:

Total score

0-3 - minor impact, no concerns

4-6 – moderate impact, consider appropriate action

7-8 – high impact, mitigation required.

Each site in the Colne Valley is considered against these criteria, with the results summarised in Table 21.

Site	Effects on vegetation and habitat	Effects on lake topography and area	Effects on security	Effects on water quality	Total score
Batchworth Lake	1	0	0	1	2
Bury Lake	1	0	0	1	2
Stocker's Lake	2	1	2	1	6
Inn's lake	1	0	0	1	2
Springwell Lake	2	1	0	1	4
Maple Lodge	2	2	1	2	7
Lynsters Lake	1	1	1	1	4
Pynesfield lake	2	1	0	1	4
North Troy	1	0	0	1	2
South Troy	1	0	0	1	2
Broadwater Lake	2	0	2	1	5
Tilehouse Lakes	2	0	0	1	3
Harefield Moor	1	1	2	0	4
Korda	1	0	0	1	2
Savay	1	0	1	1	3
Harefield No2	1	0	0	1	2
Denham Lakes	2	0	1	1	4

<b>Table 22. Potential ecological effects of low water levels on wetlands.</b>		
	<b>Potential effects</b>	<b>Examples of issues in the Colne Valley</b>
<b>Vegetation and habitat: submerged macrophytes</b>	Low water levels may allow additional light penetration and encourage plant growth. Drying out will temporarily kill plants and restrict them to deeper water although recovery is usually rapid on re-flooding.	Likely to be beneficial on many sites as aquatic macrophytes are an important food resource. Complete drying on shallow sites such as <b>Maple Lodge</b> may be serious.
<b>Vegetation and habitat: marginal aquatic vegetation</b>	Many species of marginal aquatic vegetation will not tolerate long periods of low water levels. Stands of reed etc will be invaded by terrestrial plants and will not tolerate fluctuating water levels. Nesting waterbirds may suffer when water drops below the level of marginal vegetation.	Sites with good stands of marginal Common Reed or Pond Sedge will be affected, especially if such stands are already under stress from shading trees and scrub. Examples are <b>Stocker's Lake, Maple Lodge, Springwell Lake, Tilehouse South and Denham Lakes</b> .
<b>Vegetation and habitat: water-dependant associated habitat</b>	Associated habitats, such as wet woodland or marsh, which are dependant on water flow or high groundwater, may suffer from prolonged drying. Prolonged effects lead to fragmentation of wetland habitats.	Notable wet woodland areas are present at <b>Stocker's Lake, Pynesfield Lake and Denham Lakes</b> . The reedbed adjacent to <b>Springwell Lake</b> is dependant on high water levels.
<b>Lake topography and area: bare mud and islands</b>	Exposed mud and islands may provide loafing, feeding or nesting areas for birds. Such areas may offer habitat for early successional plants and invertebrates. Prolonged exposure will allow colonisation by trees such as willow and other terrestrial vegetation. Exposed areas in winter may freeze, resulting in kills to invertebrates or wetland plants.	Shallow water-bodies or those with ridges just below the surface are likely to be affected. Short-term beneficial effects may be expected at key sites such as <b>Stocker's or Broadwater Lakes</b> . Very shallow sites such as <b>Maple Lodge</b> benefit for only short periods and prolonged drying quickly becomes detrimental.
<b>Lake topography and area: water area</b>	Reduced water areas may restrict access for fish to spawning habitat around the lake edge and may restrict feeding opportunities for water birds.	All sites where water may drop away from vegetation may be affected, shallower waters and those that experience longer and deeper drawdown, such as <b>Pynesfield Lakes</b> will be affected more.
<b>Security: shoreline access by predators</b>	Increased access to shorelines or islands will increase the risk of predation of nesting birds by foxes, mustelids etc.	Sites with important nesting concentrations on islands will be affected: <b>Stocker's Lake, Broadwater Lake and Maple Lodge</b> .
<b>Security: shoreline access by people</b>	Increased access to shorelines or islands will allow disturbance by humans.	Unprotected sites with access will be most affected, particularly those with unregulated angling.
<b>Water quality</b>	Poor water quality may lead to more turbid waters, through algal growth, including blue-green algal blooms, or increased sediment in suspension. This may restrict feeding opportunities for some species. Poor water quality may increase fish kill.	All sites will be affected to some degree but especially the shallower lakes or those with an inflow of river water. In 2006, during very low water levels, blooms of blue-green algae were prominent on <b>Broadwater and Harefield Moor Lakes</b> .



## **Appendix 2: A case study of the effectiveness of the refuge area within Broadwater Lake in the Mid-Colne SSSI**

This summary was produced for the 2006/07 study into the waterbirds of the Colne Valley. It is repeated here below as it is still highly relevant to the conservation of Broadwater Lake.

### **A case study of the effectiveness of the refuge area within Broadwater Lake in the Mid-Colne SSSI for birds affected by recreational activity**

The Mid-Colne Valley SSSI supports one of the most important wetland bird assemblages in Greater London, centred on a complex of flooded gravel pits and the river Colne. Broadwater Lake is the largest water body within the SSSI. As well as being important for wintering and breeding waterbirds, the lake is the base for the Broadwater Sailing Club which operates in the northern half of the lake. A defined 'refuge area' has been established in the southern half of the lake into which boating activities are not permitted. Angling is permitted from the shorelines within this refuge area.

A number of studies have been undertaken into the effects of sailing on Broadwater Lake and specifically into the effectiveness of the defined refuge area within the lake. The following studies have been undertaken.

#### **The effects of sailing on the wintering wildfowl of the Mid-Colne Valley SSSI (White 1993).**

This study collected data over the winter of 1992-1993 with the aim of:

1. determining the numbers and distribution of wintering wildfowl;
2. investigating the effects of sailing on the numbers and distribution of the wildfowl; and
3. reviewing the significance of the SSSI for wildfowl populations in the wider context of the Colne Valley.

A total of 31 counts were undertaken throughout the SSSI over 20 weeks from September 1992 to March 1993. Counts were undertaken at weekends, during sailing activity, and during the week when all lakes were as undisturbed as possible.

The study found numbers of Great Crested Grebe, Tufted Duck and Shoveler in the Mid-Colne SSSI that exceeded the threshold level for national significance. Whilst the majority of species were widely distributed around the site in undisturbed periods, there was a marked distribution change for most species when sailing began. Most species (Great Crested Grebe, Teal, Tufted Duck, Pochard, Gadwall, Ruddy Duck, Goldeneye and Shoveler) all re-located within the refuge area around the islands at the southern end of Broadwater Lake without any loss of birds from the site. The re-distribution occurred at the very onset of sailing, usually before boats entered the water. On some occasions, when no sailing took place, the birds moved at the appropriate time without any disturbance.

Two species, Tufted Duck and Pochard, not only all relocated within the refuge but usually increased in total numbers on the lake during the disturbed periods as additional birds arrived

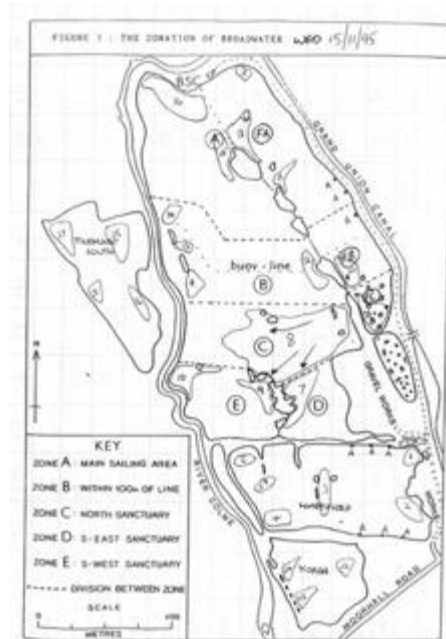
from other sites. Only two species (Mallard and Coot) generally showed minimal response to sailing, merely making short movements towards sheltered lake margins. However, when Coot were at their greatest numbers, a re-distribution to the refuge was more obvious.

The Mid-Colne SSSI was therefore shown to be a highly significant refuge site within this section of the Colne Valley not only for the complex of lakes in the SSSI but for other sites within the valley.

### **An investigation into the effectiveness of the wildfowl refuge within Broadwater Lake (White 1996).**

This study again looked at the numbers and distribution of waterbirds on Broadwater Lake. In particular, the effectiveness of the refuge area was examined, taking into account the cessation of bank-side angling adjacent to the refuge area.

Eleven counts were undertaken between September 1995 and March 1996. One count each month was on a standard WeBS count day, the other on an 'undisturbed' mid-week day. On each count each flock of birds was located on a map and the dominant activity of each flock noted. An example of a completed map is shown to the right.



The results showed that the predominant factor affecting the populations of waterbirds on Broadwater Lake during 1995-96 was the abundant growth of aquatic weeds. Numbers of herbivorous species were high, while by contrast, carnivorous species tended to be low. Three species, Gadwall, Shoveler and Coot, exceeded the level of national significance. Overall the total number of waterbirds using the SSSI in 1995-96 was over twice as many as in 1992-93, with a peak of 2,599 birds in early October.

It was evident that sailing markedly affected the distribution of birds within the site, with the widespread 'undisturbed' distribution changing as birds withdrew into the southern refuge compartments with the onset of sailing. It was also clear that angling affected the distribution of waterbirds to a lesser extent and in particular reduced the effectiveness of the refuge when angling was present on the adjacent banks. Although the refuge area also attracted birds from other sites as in the previous study, this was less evident in the overall numbers of birds.

### **A study of the wintering waterbirds of the Mid-Colne Valley SSSI during the winter of 1998-1999 (White 1999).**

This study had similar aims to the previous studies. A total of 14 counts were undertaken between September 1998 and March 1999. Again, counts were distributed between 'disturbed' and 'undisturbed' days.

Numbers of herbivorous waterfowl were again high. Three species, Gadwall, Shoveler, Tufted Duck, exceeded the level of national significance. The peak number of birds using the site was 2,455, similar to the 1995/96 figure. The patterns of distribution were very similar to those recorded in the previous study.

### Comparison of the three studies.

The three studies all clearly demonstrated the importance of the Mid-Colne Valley for waterbirds, with Gadwall, Shoveler, Tufted Duck, Great Crested Grebe and Coot all reaching levels of national significance in one or more study. In 1995/96 and 1998/99, the abundant growth of submerged aquatic weeds attracted large numbers of herbivorous species such as Gadwall and Coot.

The value of the refuge area at the southern end of Broadwater Lake was also demonstrated. As watersports commenced on the lake, birds moved into the refuge area. Table 1 summarises how the birds re-distributed within the lake during sailing activity at weekends. The shift to the refuge compartments (C, D and E) is evident. The number of birds during the weekdays is likely to reflect the available food resources in each area. The 1995/96 study showed a change in dominant behaviour between feeding (during undisturbed periods) to loafing (during sailing).

**Table 1. The redistribution of waterbirds at Broadwater Lake during watersports activity**

Mean number of birds are given by compartment and the percentage change at weekends. Compartments C, D and E form the refuge. A, B, Fa and Fb have sailing activity.

Compt	1992/93		1995/96		1998/99	
	Weekday (no disturbance) 6 counts	Weekend (sailing) (% change) 11 counts	Weekday (no disturbance) 5 counts	Weekend (sailing) (% change) 4 counts	Weekday (no disturbance) 7 counts	Weekend (sailing) (% change) 7 counts
<b>A</b>	59	11 (-81.4)	131	53 (-59.5)	186	111 (-40.4)
<b>B</b>	88	12 (-86.4)	162	82 (-49.4)	146	93 (-36.3)
<b>C</b>	125	252 (+102)	342	421 (+23.1)	315	403 (+27.9)
<b>D</b>	69	95 (+37.7)	247	179 (-27.6)	108	146 (+35.2)
<b>E</b>	80	416 (+420)	323	581 (+79.8)	295	357 (+21.0)
<b>Fa</b>	57	7 (-87.8)	253	37 (-85.4)	135	49 (-63.8)
<b>Fb</b>	37	23 (-37.9)	168	35 (-79.2)	146	54 (-63.1)
<b>Fc</b>	10	16 (+60)	33	55 (+66.7)	65	59 (-9.3)
<b>Total</b>	525	832 (+58.5)	1642	1445 (-12.0)	1397	1274 (-8.9)

The overall number of birds on the lake during sailing over the 1992/93 winter was greater than during the undisturbed periods. This is because additional birds arrived from other sites, demonstrating the value of the refuge for sites beyond Broadwater Lake itself. By contrast, during the winters of 1995/96 and 1998/99 when many more birds were using the lake; there is a small loss of waterbirds during periods of sailing. However, an analysis of the changes in numbers of individual species (Table 2) shows that while some Gadwall, Shoveler, Mallard and Pochard left the site, there was an arrival of Tufted Duck and Wigeon. These patterns may vary between winters depending on the total numbers of birds in the valley and the

location of available food resource. For example, during 1995/96, the highest counts of Pochard were during weekends within the refuge area, whereas this was not evident in 1998/99 (Table 2). The refuge may be comparatively more effective when food resources (and therefore waterbirds) are lower on Broadwater Lake itself.

In summary, the southern compartments at Broadwater Lake provide an effective refuge for waterbirds using the lake during periods of watersports activity. In addition, the refuge attracts birds (mainly diving duck) that are disturbed from other sites. Thus it allows waterbirds to spread out from Broadwater Lake to exploit food resources in other parts of the valley when disturbance is low.

**Table 2. The redistribution of waterbirds at Broadwater Lake during watersports activity in 1998/99.**

The mean number of birds over 7 counts is shown.

	<b>Weekdays (no disturbance)</b>	<b>Weekend (sailing)</b>	<b>Percentage change</b>
<b>Great Crested Grebe</b>	27.8	28.8	+3.6
<b>Wigeon</b>	76.2	95.4	+25.1
<b>Gadwall</b>	160	133.4	-16.7
<b>Mallard</b>	72.1	57.7	-20.0
<b>Shoveler</b>	71.6	53.6	-25.2
<b>Pochard</b>	129.1	104.1	-19.4
<b>Tufted Duck</b>	312.7	358.8	+14.7
<b>Ruddy Duck</b>	71.4	65.6	-8.2
<b>Coot</b>	534.8	496.4	-7.2