

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



**Graham J White & Alan J Harris
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Herts & Middlesex



**ENVIRONMENT
AGENCY**

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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. The study included all the water-bodies in the Colne Valley from Rickmansworth south to the A40.

Counts were undertaken on designated Wetland Bird Survey (WeBS) count dates throughout the year. Count times were varied to look for different patterns of behaviour and for roost sites. Additional counts were undertaken on midweek mornings to assess variations in distribution patterns between ‘disturbed’ and ‘undisturbed’ days.

The Colne Valley supported between 3,400 and 4,600 waterbirds during the 2006/07 non-breeding period. The peak total count was of 4,618 birds in December 2006. Two species (Coot and Tufted Duck) formed over 50% of these birds, both having peak counts into four figures. Shoveler, Mallard, Gadwall, Pochard Great Crested Grebe and Cormorant all had peak counts of over 200.

Counts of six species (Gadwall, Shoveler, Tufted Duck, Smew, Great Crested Grebe and Cormorant) were above the figure set for the level of national significance when the valley was considered as a whole. No individual sites recorded counts above the level of national significance.

Stocker’s Lake and Broadwater Lake are the most important sites, both supporting over 1,000 birds at peak periods. Lynsters Lake peaked at near 700 birds, while most sites peaked at around 200-300. Broadwater Lake held most birds from March through to October, while Stocker’s Lake takes over from November through to February.

Stocker’s Lake and Broadwater Lake were the two most significant refuge/roost sites, attracting almost the whole range of species in the valley. These major refuge sites are critical in that they enable birds to exploit a much wider area. The key breeding sites were Stocker’s, Broadwater and Maple Lodge. Broadwater Lake and Maple Lodge are important for concentrations of moulting birds. Whilst diving duck appear to distribute amongst the various water-bodies, the aquatic weed feeders concentrate on those lakes that have abundant weeds on a regular or periodic basis – Stocker’s, Springwell, Inn’s, Bury, Lynsters, Pynesfield and Broadwater Lakes.

A qualitative scoring was devised for each water-body on its sensitivity to low water levels, both in the short term and for prolonged periods. Low water levels are considered to have a high impact for one site (Maple Lodge) and a moderate impact for a further seven sites.

A number of management recommendations are made for the Colne Valley in general and for some individual sites.

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, sailing and water-skiing. A large local populace 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.

Many species of wintering wildfowl are attracted to the extensive water areas of the valley; the numbers of Tufted Duck and Gadwall are known to reach levels of national importance, and Pochard, Great Crested Grebe and Shoveler occasionally reach levels of similar significance. In winter Broadwater Lake's islands are also the site of a large Cormorant roost and in recent years a breeding colony has become established. The gravel pits and river Colne are thought to attract one of the most important wetland breeding bird communities in Greater London: Coot, Little Ringed Plover, Kingfisher, Great Crested Grebe, Mute Swan and Tufted Duck all nest regularly, while others such as Gadwall, Pochard and Shoveler breed less frequently. A heronry is established on the islands in Broadwater Lake.

Although Broadwater Lake and Stocker's Lake are reasonably well studied, it is clear that little is recorded about the ecological significance of other water bodies in the Colne Valley and how they are used by waterbirds throughout the seasons.

This study aims to increase our understanding of how the Colne Valley functions as a wetland system and how birds strategically use the many water bodies to fulfill their requirements for feeding, breeding and moulting. In addition there are significant pressures for water abstraction in the Colne Valley which may result in prolonged falls in water levels within the lakes. It is anticipated that the study will identify which lakes are most sensitive to such changes in relation to use by waterbirds and if these changes have a negative impact upon the bird populations within the Mid-Colne SSSI.

1.2 Project brief

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

1.3 Project outputs

The project outputs are as follows:

1. Monthly counts of the Colne Valley water-bodies for 12 months, from September 2006 to August 2007, using the Wetland Bird Survey (WeBS) methodology.
2. Monthly records of water levels to be noted at the time of the bird counts.
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 for each species, and for each lake to identify the main use by waterbirds eg feeding, roosting, breeding, moulting. Initial conclusions to identify if there are any observed links between water levels and bird numbers/species recorded on each water body.
4. An ecological evaluation of the water-bodies, describing:
 - Location (OS grid reference).
 - Size and topography.
 - Habitats and key species (to include fish where data available)
 - Key waterbird species.
 - Ecological links.
 - A qualitative scoring for each water body on its sensitivity to low water levels, in the short term and also to a prolonged drop eg impact on marginal plants, shelves, reedbeds and wet woodlands.
 - Recreational use and impacts on water birds.
 - 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 is captured within the report. As an appendix to the main report and using data collected in the 1990s, a case study of the effectiveness of the refuge area within Broadwater Lake for birds affected by recreational activity is included.
6. Based on the data collected and analysed, the report should make basic recommendations for future management of the water-bodies.

2. Analysis of wetland bird counts in the Colne Valley

2.1 Details of the counts

The weather conditions during the winter of 2006/2007 were generally mild and wet. The first half of the winter saw above average rainfall. This was followed by a dry early spring but by May wet weather had returned and remained above average for the summer. The winter had only one or two very brief spells of colder weather, with partial freezing of some waters being recorded in early February. However, the weather was not harsh enough to initiate any significant movements of birds.

Counts were undertaken on the designated WeBS count dates throughout the year. 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. As all the WeBS counts are at weekends, two additional counts were undertaken on midweek mornings to assess variations in distribution patterns between ‘disturbed’ and ‘undisturbed’ days. These counts were undertaken in December and February. The counts were undertaken by Graham White, Alan Harris and the existing WeBS counters, Paul Lewis and Geoff Lapworth. An attempt was made to seek to recruit new volunteer counters for those water bodies not currently counted.

2.2 The waterbird community of the Colne Valley

The Colne Valley supported between 3,400 and 4,600 waterbirds during the 2006/07 non-breeding period. The peak total count was of 4,618 birds in December 2006 (see Table 1 for species included). Two species, Coot and Tufted Duck, formed over 50% of these birds, both having peak counts into four figures. Shoveler, Mallard, Gadwall, Pochard Great Crested Grebe and Cormorant all had peak counts of over 200. The total count is significantly below the criterion for international importance, when a site regularly holds 20,000 or more waterbirds.

Counts of six species (Gadwall, Shoveler, Tufted Duck, Smew, Great Crested Grebe and Cormorant) 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. No individual site recorded counts above the level of national significance.

Table 2 shows the total number of waterbirds recorded at each site on the count dates. Stocker’s Lake and Broadwater Lake are the most important sites, both supporting over 1,000 birds at peak periods. Lynsters Lake peaked at near 700 birds, while most sites peaked at around 200-300. An interesting feature of this table is that Broadwater Lake is the peak site from March through to October, while Stocker’s Lake takes over from November through to February. This pattern of distribution has been recorded in previous studies (White 1994) and is discussed in more detail in the summary.

Table 1. Counts of waterbirds in the Colne Valley September 2006 to August 2007

Counts are weekend WeBS count dates except for 2 midweek counts marked *. Counts of national significance are emboldened.

	17 Sep	08 Oct	19 Nov	17 Dec	21 Dec*	21 Jan	09 Feb*	24 Feb	18 Mar	15 Apr	13 May	17 Jun	15 Jul	12 Aug
Great Crested Grebe	204	218	178	100	81	92	90	91	84	108	95	106	146	213
Little Grebe	3	10	9	12	6	4	3	6	8	8	7	7	8	10
Cormorant	262	289	189	185	289	162	129	171	116	106	118	97	145	154
Little Egret	0	0	4	1	26	0	2	27	2	0	0	0	0	0
Grey Heron	35	48	37	33	29	40	30	49	49	36	31	27	28	44
Mute Swan	138	85	98	85	83	84	81	92	102	99	100	137	124	152
Canada Goose	226	107	181	77	91	154	107	207	205	192	151	374	234	383
Greylag Goose	5	5	86	1	1	65	0	36	11	24	38	71	10	53
Egyptian Goose	0	0	1	3	2	0	0	0	0	0	2	0	0	2
Wigeon	81	96	107	85	106	74	67	114	19	0	1	2	1	1
Gadwall	134	178	177	264	235	194	216	151	24	75	52	50	83	88
Teal	80	45	33	17	18	12	25	12	7	17	1	2	1	7
Mallard	212	247	263	279	294	353	304	284	227	221	224	181	258	285
Garganey	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Shoveler	75	150	74	123	103	62	133	128	42	6	1	3	0	9
Pintail	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Red-crested Pochard	1	2	8	14	0	4	1	5	6	9	9	0	1	0
Pochard	83	81	323	399	343	218	329	194	84	10	11	15	26	34
Tufted Duck	665	530	1003	1116	1078	1021	896	626	668	395	186	231	434	811
Goldeneye	0	0	16	25	32	34	47	72	35	0	0	0	0	0
Smew	0	0	0	0	0	1	3	8	0	0	0	0	0	0
Goosander	0	0	0	3	2	23	13	20	2	0	0	0	0	0
Ruddy Duck	4	12	96	165	94	111	103	47	21	2	2	0	2	3
Coot	1162	1467	1606	1527	1369	1458	1223	929	691	500	433	620	903	1098
Moorhen	82	90	110	95	99	54	43	76	58	46	42	32	39	53
Kingfisher	9	7	11	9	5	1	2	9	4	6	3	5	8	6
TOTAL	3463	3667	4610	4618	4386	4221	3847	3354	2465	1860	1508	1960	2451	3406

Table 2. Counts of total waterbirds at sites in the Colne Valley September 2006 to August 2007

Counts are weekend WeBS count dates except for 2 midweek counts marked *. The peak count on each date is emboldened.

	17 Sep	08 Oct	19 Nov	17 Dec	21 Dec*	21 Jan	09 Feb*	24 Feb	18 Mar	15 Apr	13 May	17 Jun	15 Jul	12 Aug
Stocker's complex	862	943	1263	1354	1431	1207	1098	1068	649	465	339	513	593	817
Springwell	162	248	276	210	220	132	123	115	99	48	67	44	28	66
Maple Lodge	85	58	45	50	34	80	65	124	75	90	107	91	135	151
Lynsters	129	148	662	582	608	616	433	455	271	188	145	165	92	144
Pynesfield	182	192	214	206	203	158	263	141	92	40	33	17	56	53
North Troy	53	40	92	93	107	56	74	95	37	22	25	32	31	27
Troy Mill	206	178	282	73	358	169	369	73	123	158	90	110	94	75
Tilehouse	157	155	88	174	226	217	196	207	158	84	36	55	102	149
Broadwater complex	1160	1047	948	1163	699	966	748	663	655	512	408	656	1043	1499
Savay	186	288	386	319	395	251	158	161	105	58	77	93	90	95
Harefield No 2	25	92	88	91	105	95	81	59	55	54	62	67	71	94
Denham complex	256	278	266	303	0	274	239	193	146	141	119	117	116	236
TOTAL	3463	3667	4610	4618	4386	4221	3847	3354	2465	1860	1508	1960	2451	3406

2.3 Individual species accounts

2.3.1 Mute Swan

The population of Mute Swans in the Colne Valley is of low national significance but the key sites are of importance in the regional context. The peak total count for the valley of 152 in August 2007 was way below the threshold for national significance (375). The Stocker's Lake complex (notably Bury Lake where the birds are fed by visitors to the Aquadrome) is the most important site, with a peak of 91 birds in June 2007. Birds gather at Bury Lake to form moulting and wintering flocks. The site also holds the major flock of non-breeding birds during the summer months.

The local population is relatively stable throughout the year, peaking in late summer with the addition of the young of the year, a pattern that mirrors the national situation. Such a pattern is typical of a resident species that has no significant immigration during the winter. Mute Swans in the UK are generally very sedentary with local movements to wintering or moulting sites. Movements of birds from the continent are more likely in cold weather conditions. The national trend is of a steady increase since the mid-1980s.

Fifteen breeding pairs were recorded, four at the Stocker's Lake complex. This is no doubt a significant under-estimate, with the river Colne and backwaters likely to hold a number of birds. The national breeding population is estimated at 6,150 pairs.

Table 3. Counts of Mute Swan in the Colne Valley September 2006 to August 2007

	17 Sep	08 Oct	19 Nov	17 Dec	21 Dec	21 Jan	09 Feb	24 Feb	18 Mar	15 Apr	13 May	17 Jun	15 Jul	12 Aug	BR
Stocker's complex	79	51	44	44	45	51	51	55	58	77	61	91	76	85	4
Springwell	24	5	11	6	4	0	2	2	2	2	2	6	2	4	1
Maple Lodge	0	0	0	0	0	0	0	0	2	2	2	2	1	1	1
Lynsters	3	0	25	16	18	13	8	10	6	2	2	5	5	8	1
Pynesfield	2	3	4	4	4	2	2	3	4	1	2	2	2	6	1
North Troy	4	0	0	2	0	3	2	4	2	3	0	2	2	0	0
Troy Mill	2	2	2	2	2	2	2	2	2	1	1	0	0	0	0
Tilehouse	6	6	0	2	2	0	2	2	2	0	2	0	2	2	2
Broadwater comp.	4	6	4	3	2	0	2	3	12	5	15	17	23	26	1
Savay	8	5	8	4	4	6	0	5	4	0	2	6	2	4	1
Harefield No 2	0	2	0	2	2	1	2	0	2	2	4	4	4	5	1
Denham complex	6	5	0	0	0	6	8	6	6	4	7	2	5	11	2
TOTAL	138	85	98	85	83	84	81	92	102	99	100	137	124	152	15

2.3.2 Greater Canada Goose

The Colne Valley does not support particularly large numbers of Canada Geese. Peak total counts for the valley were in late summer; 374 in June and 383 in August 2007. No threshold levels for national significance are set for this naturalised introduced species but the WeBS report sets a qualifying level of 600 for inclusion in the tables. Three sites in the valley regularly hold double figures of Canada Geese; the Stocker's complex, Lynsters and Broadwater. At Bury Lake in the Stocker's Lake complex, a flock is regular with the Mute Swans seeking food from visitors (peak count 222 in August 2007). At Lynsters, geese are regular on the grazed fields

of the farm adjacent to the lake (58 in November 2006) and at Broadwater Lake, moulting and roosting birds are present in late summer (131 in June, 133 in August).

Eight Canada Geese carrying Darvic rings were encountered at Bury Lake on 15 July 2007. All had been ringed as adults at Bury Lake in July or September 2001. Subsequent sightings were exclusively in the Colne Valley from Bury Lake or nearby sites (Stocker's Lake, Rickmansworth Aquadrome, Little Britain Lake) indicating the sedentary nature of the population and its longevity.

A total of 21 broods were noted during the summer counts. This is likely to be an under-estimate due to visits being made only monthly. The true breeding population may be around 30-40 pairs throughout the valley.

Nationally the population shows a continuing increase and is now estimated to be over 90,000 birds. The annual pattern typically shows a late summer peak followed by a decline during the winter, a pattern typical of a largely resident species. The Colne Valley counts reflect this to a degree but are somewhat erratic, no doubt due to local movements of birds in and out of the valley to farmland where they may be missed on counts.

Table 4. Counts of Canada Goose in the Colne Valley September 2006 to August 2007

	17 Sep	08 Oct	19 Nov	17 Dec	21 Dec	21 Jan	09 Feb	24 Feb	18 Mar	15 Apr	13 May	17 Jun	15 Jul	12 Aug	BR
Stocker's complex	176	94	111	42	50	86	105	140	136	104	79	189	128	222	8
Springwell	0	0	0	1	0	0	0	8	4	2	0	0	0	0	0
Maple Lodge	0	0	0	0	0	0	0	0	0	3	2	0	0	0	0
Lynsters	0	2	58	28	32	35	0	49	40	25	26	47	0	21	2
Pynesfield	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0
North Troy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Troy Mill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tilehouse	0	2	0	0	0	0	0	0	0	2	0	0	8	0	1
Broadwater comp.	48	0	4	2	3	18	2	2	17	40	27	131	70	133	6
Savay	0	2	8	4	6	15	0	6	6	10	12	7	26	5	1
Harefield No 2	0	0	0	0	0	0	0	0	2	2	2	0	2	2	1
Denham complex	0	5	0	0	0	0	0	2	0	4	3	0	0	0	2
TOTAL	226	107	181	77	91	154	107	207	205	192	151	374	234	383	21

2.3.3 Greylag Goose

The Colne Valley supports small numbers of Greylag Geese. Peak total counts for the valley were 86 in November 2006 and 71 in June 2007. No threshold levels for national significance are set for this naturalised introduced species but the WeBS report list sites with mean peak counts of 500 or more. The fields by Lynsters Lake and farm are the most regular place in the valley for Greylag Geese. Like Canada Geese, birds are also frequent at the Stocker's Lake complex and a few gather to moult at Broadwater Lake. On 24 February, 28 birds flew into Broadwater at dusk to roost. The very erratic total counts suggest birds are moving between the Colne Valley and other sites.

Seven pairs were noted attempting to breed and four broods were recorded.

Table 5. Counts of Greylag Goose in the Colne Valley September 2006 to August 2007

	17 Sep	08 Oct	19 Nov	17 Dec	21 Dec	21 Jan	09 Feb	24 Feb	18 Mar	15 Apr	13 May	17 Jun	15 Jul	12 Aug	BR
Stocker's complex	1	0	0	0	0	0	0	2	2	8	0	0	0	0	2
Springwell	0	0	0	0	0	0	0	0	0	2	12	0	0	0	2
Maple Lodge	0	0	0	0	0	0	0	0	0	0	4	0	5	0	0
Lynsters	0	0	86	1	0	65	0	6	9	14	16	52	0	9	3
Pynesfield	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North Troy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Troy Mill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tilehouse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Broadwater comp.	4	5	0	0	1	0	0	28	0	0	6	19	5	44	0
Savay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harefield No 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Denham complex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	5	5	86	1	1	65	0	36	11	24	38	71	10	53	7

2.3.4 Egyptian Goose

Up to three Egyptian Geese were recorded on the counts during the survey year with casual sightings suggesting that up to five were present in the Colne Valley during this period. One pair appeared to be resident in the valley, most frequently seen in the Lynsters Farm area but also ranging between Stocker's Lake and Broadwater Lake and out to adjacent farmland. There was no evidence of breeding.

Table 6. Counts of Egyptian Goose in the Colne Valley September 2006 to August 2007

	17 Sep	08 Oct	19 Nov	17 Dec	21 Dec	21 Jan	09 Feb	24 Feb	18 Mar	15 Apr	13 May	17 Jun	15 Jul	12 Aug	BR
TOTAL	0	0	1	3	2	0	0	0	0	0	2	0	0	2	0

2.3.5 Wigeon

Numbers of Wigeon in the Colne Valley are of very low significance. The maximum total count was only 114 in February 2007, with the peak site count being 65 at Lynsters in February and 64 at the Stocker's Lake complex in December and January. The threshold for national significance is 4,060. Wigeon generally gather where there is abundant food in the form of suitable grassland for grazing or submerged aquatic weeds. During 2006-2007, the key concentration in the early winter was on Inn's Lake, with birds moving to and from Stocker's Lake. There were initially smaller numbers at Lynsters but the peak count occurred here in February. At Broadwater Lake very low numbers only were recorded in September and October, showing a very poor year for aquatic weed on this lake. Injured birds summered on Lynsters Lake and Broadwater Lake.

The occurrence pattern is typical; a sharp arrival and increase in September, followed by a slight increase up to midwinter, particularly if there is a cold spell, and then a decline. The overall national trend has been of stability, albeit with some annual fluctuations up and down.

Overall, Wigeon tend to move little from site to site in the valley unless disturbed, with birds tending to disperse from a site when the food resource is depleted. Numbers in the past have been higher (see section 2.4) but appear to have never been close to levels of national significance. Within the Colne 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 weeds, which are not only cyclical in abundance but also seem to have declined, perhaps again through successional changes within the water bodies. When weed stocks are eaten out, birds move on, as unlike grass they are not replenished until the following summer.

Table 7. Counts of Wigeon in the Colne Valley September 2006 to August 2007

	17 Sep	08 Oct	19 Nov	17 Dec	21 Dec	21 Jan	09 Feb	24 Feb	18 Mar	15 Apr	13 May	17 Jun	15 Jul	12 Aug	BR
Stocker's complex	0	47	57	54	64	64	16	42	0	0	0	0	0	1	
Springwell	0	0	16	0	0	0	0	0	0	0	0	0	0	0	
Maple Lodge	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Lynsters	0	0	29	24	32	4	21	65	6	0	1	1	0	0	
Pynesfield	49	30	1	0	0	0	23	0	0	0	0	0	0	0	
North Troy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Troy Mill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Tilehouse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Broadwater comp.	32	17	4	7	10	6	7	7	13	0	0	1	1	0	
Savay	0	2	0	0	0	0	0	0	0	0	0	0	0	0	
Harefield No 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Denham complex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL	81	96	107	85	106	74	67	114	19	0	1	2	1	1	0

2.3.6 Gadwall

Numbers of Gadwall in the Colne Valley are of national significance. The maximum total count was 264 in December 2006, with the peak site count being 138 at the Stocker's Lake complex in January. The threshold for national significance is 171. Gadwall generally gather where there is abundant food in the form of submerged aquatic weeds. During 2006-2007, the key concentration was on Inn's Lake, with birds moving to and from Stocker's Lake, with smaller numbers at Lynsters, Pynesfield and Springwell. As with Wigeon, birds tend to disperse from a site when the food resource is depleted, or may be forced out by hard weather. At Broadwater Lake, moderate numbers only were recorded in September and October, showing a very poor year for aquatic weed on this lake.

The occurrence pattern is typical; a sharp arrival and increase in September, followed by a slight increase up to midwinter and then a decline. Increasing numbers now summer and breed and a post-breeding gathering for moult has occurred at Maple Lodge and Broadwater Lake in recent years. Four broods were recorded, with breeding noted at Maple Lodge, Stocker's Lake and Broadwater Lake. The overall national trend has been of a long-term, steady increase in population.

In the past, high numbers of Gadwall have been recorded on Stocker's, Springwell, Troy Mill and Broadwater Lakes (see section 2.4), reflecting the abundance of available food.

Table 8. Counts of Gadwall in the Colne Valley September 2006 to August 2007

	17 Sep	08 Oct	19 Nov	17 Dec	21 Dec	21 Jan	09 Feb	24 Feb	18 Mar	15 Apr	13 May	17 Jun	15 Jul	12 Aug	BR
Stocker's complex	32	42	61	120	129	138	119	39	4	5	2	0	2	13	1
Springwell	12	24	36	15	6	0	0	0	0	10	8	0	0	0	0
Maple Lodge	0	0	0	2	0	4	2	51	9	13	17	11	12	19	2
Lynsters	7	15	24	39	45	9	16	5	2	7	4	1	2	7	0
Pynesfield	38	25	25	37	32	12	48	36	1	0	0	0	0	0	0
North Troy	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Troy Mill	0	5	0	0	2	0	7	2	0	24	8	10	0	0	0
Tilehouse	0	4	0	7	6	12	6	4	0	0	0	0	0	6	0
Broadwater comp.	42	38	16	18	4	15	12	6	6	16	13	28	67	43	1
Savay	0	16	12	8	9	2	4	8	2	0	0	0	0	0	0
Harefield No 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Denham complex	3	9	3	18	0	2	2	0	0	0	0	0	0	0	0
TOTAL	134	178	177	264	235	194	216	151	24	75	52	50	83	88	4

2.3.7 Teal

The Teal is a relatively scarce bird in the Colne Valley. The maximum valley count of 80 is way below the national significance threshold of 1,920. The most important site in the Colne Valley is Maple Lodge, which is virtually the only site which provides its favoured shallow muddy habitats. Numbers here are lower than in the past due to the decreasing habitat and the loss of adjacent flooded fields. Broadwater Lake usually has a few birds. This site also is poorer than in the past as the favoured silt lagoon area has now succeeded to willow and alder scrub.

The national figures generally show a midwinter peak in numbers. In the Colne Valley the figures showed an autumn passage peak of 80 in September (74 at Maple Lodge) with the low winter numbers again reflecting the lack of suitable habitat.

A single bird summered at Maple Lodge, as has happened in recent years, but there has been no indication of breeding.

Table 9. Counts of Teal in the Colne Valley September 2006 to August 2007

	17 Sep	08 Oct	19 Nov	17 Dec	21 Dec	21 Jan	09 Feb	24 Feb	18 Mar	15 Apr	13 May	17 Jun	15 Jul	12 Aug	BR
Stocker's complex	0	0	0	1	3	1	0	0	0	0	0	0	0	0	0
Springwell	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maple Lodge	74	41	23	13	4	11	12	10	5	17	1	2	1	7	
Lynsters	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pynesfield	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North Troy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Troy Mill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tilehouse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Broadwater comp.	4	4	6	3	11	0	13	2	2	0	0	0	0	0	0
Savay	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
Harefield No 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Denham complex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	80	45	33	17	18	12	25	12	7	17	1	2	1	7	0

2.3.8 Mallard

Numbers of Mallard in the Colne Valley are of low significance. The maximum total count was only 353 in January 2007, with the peak site count being 129 at the Stocker's Lake complex in August 2007. The threshold for national significance is 3,520. 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. During 2006-2007, the key concentration was at the Stocker's Lake complex, the only site where three-figure counts were recorded.

The local occurrence pattern is typical of the national situation; a peak in early autumn reflecting local breeding population and then a later mid-winter peak. The overall national trend has been of a steady decline in numbers since the late 1980s.

A total of 53 broods of Mallard were recorded. Mallards breed at low densities throughout the Colne Valley and they are the commonest breeding duck. Most sites support a few breeding pairs reflecting their non specialised requirements. They are likely to have been under recorded as broods also occur on small ponds, rivers and streams not covered by the survey.

Table 10. Counts of Mallard in the Colne Valley September 2006 to August 2007

	17 Sep	08 Oct	19 Nov	17 Dec	21 Dec	21 Jan	09 Feb	24 Feb	18 Mar	15 Apr	13 May	17 Jun	15 Jul	12 Aug	BR
Stocker's complex	118	98	88	95	119	123	96	109	77	82	20	54	114	129	8
Springwell	3	6	2	6	8	21	10	18	16	12	13	0	6	13	4
Maple Lodge	2	0	4	11	2	37	32	14	9	11	23	19	19	17	14
Lynsters	5	5	26	45	36	39	42	35	15	37	41	6	23	15	0
Pynesfield	12	0	1	0	4	9	16	2	6	2	2	0	2	0	0
North Troy	0	0	0	0	4	2	4	6	8	1	3	0	2	0	0
Troy Mill	0	0	0	4	6	0	0	0	10	6	10	13	6	0	3
Tilehouse	12	14	8	8	24	20	12	12	4	2	12	8	8	23	2
Broadwater comp.	24	56	89	40	50	30	35	28	37	39	53	30	31	37	12
Savay	24	32	25	35	32	24	16	16	8	8	16	23	10	17	3
Harefield No 2	0	11	2	10	9	12	14	12	9	11	16	18	21	23	2
Denham complex	12	25	18	25	0	36	27	32	28	10	15	10	16	11	5
TOTAL	212	247	263	279	294	353	304	284	227	221	224	181	258	285	53

2.3.9 Garganey

A single drake Garganey was at Maple Lodge nature reserve from April until June. It was recorded on the May count. The Garganey is a scarce passage visitor to the Colne Valley, either in spring or autumn but with more records in the autumn.

2.3.10 Shoveler

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 in sites 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.

Numbers of Shoveler in the Colne Valley are of national significance. The maximum total count was 150 in October 2006, with the peak site counts being 92 at Broadwater Lake in October and 87 at the Stocker’s Lake complex in February. The threshold for national significance is 148. Stocker’s and Broadwater Lakes are consistently the most favoured locations, with birds being rather sparse elsewhere. During the survey year, there was a shift in birds from Broadwater to Stocker’s Lake during the course of the winter, a pattern recorded in previous years. The counts on mid-week days revealed no difference in occurrence pattern. This may suggest no movements are taking place. However, Shoveler are known to feed nocturnally in disturbed environments and it may be that are using Stocker’s and Broadwater Lakes as daytime roosts whilst foraging at other sites during the night. This highlights the requirement for undisturbed daytime roosts and that disturbed, seemingly unsuitable sites can be more valuable to wildfowl than daytime observations suggest.

The occurrence pattern is typical; a peak in autumn, usually in October, followed by a decline through to March as most Shoveler pass through in autumn to winter further south. A small spring peak of returning birds is often evident. The overall national trend has been of relative stability over the last decade after a period of increase. A small number of birds summered at Maple Lodge but no breeding attempts were noted.

Table 11. Counts of Shoveler in the Colne Valley September 2006 to August 2007

	17 Sep	08 Oct	19 Nov	17 Dec	21 Dec	21 Jan	09 Feb	24 Feb	18 Mar	15 Apr	13 May	17 Jun	15 Jul	12 Aug	BR
Stocker's complex	3	12	16	28	31	40	83	87	14	0	0	0	0	0	
Springwell	1	0	0	0	1	0	0	0	0	0	0	0	0	0	
Maple Lodge	1	12	0	0	0	1	0	7	5	3	1	3	0	9	
Lynsters	0	0	6	6	4	0	5	0	0	0	0	0	0	0	
Pynesfield	0	0	0	0	0	2	2	0	0	0	0	0	0	0	
North Troy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Troy Mill	0	0	0	2	2	0	2	0	0	0	0	0	0	0	
Tilehouse	0	0	0	0	0	0	0	4	0	0	0	0	0	0	
Broadwater comp.	70	92	42	85	63	19	39	28	23	3	0	0	0	0	
Savay	0	16	8	0	2	0	0	0	0	0	0	0	0	0	
Harefield No 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Denham complex	0	18	2	2	0	0	2	2	0	0	0	0	0	0	
TOTAL	75	150	74	123	103	62	133	128	42	6	1	3	0	9	0

2.3.11 Pintail

Two Pintail were noted at Broadwater Lake in September 2006. These were the only birds recorded on the survey. The Pintail is a scarce winter and passage visitor to the Colne Valley.

2.3.12 Red-crested Pochard

The presence of up to 14 Red-crested Pochard on the counts and the confirmation of successful breeding at Maple Lodge support the presence of a small population of this naturalised species in the Colne Valley. No national thresholds are set but the WeBS report list sites with mean peak counts of ten or more. The birds were

concentrated in the northern part of the valley from Bury Lake down to Lynsters Lake, with the peak count of nine at Stocker’s Lake on 17 December 2006. Counts are variable but this species can be surprisingly elusive.

Table 12. Counts of Red-crested Pochard in the Colne Valley September 2006 to August 2007

	17 Sep	08 Oct	19 Nov	17 Dec	21 Dec	21 Jan	09 Feb	24 Feb	18 Mar	15 Apr	13 May	17 Jun	15 Jul	12 Aug	BR
Stocker's complex	0	2	6	9	0	2	1	5	6	4	4	0	0	0	0
Maple Lodge	0	0	0	0	0	0	0	0	0	3	4	0	0	0	2
Lynsters	1	0	2	5	0	2	0	0	0	2	1	0	1	0	0
TOTAL	1	2	8	14	0	4	1	5	6	9	9	0	1	0	2

2.3.13 Pochard

Numbers of Pochard in the Colne Valley were below the level of national significance in the survey year. The maximum total count was 399 in December 2006, with the threshold for national significance being 595. The peak site counts were 199 at the Stocker’s Lake complex and 153 at Broadwater Lake, both in December. These two sites regularly held the key concentrations during the survey year.

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 sites with smaller numbers dispersed throughout the valley, this masks considerable mobility within and probably outside the valley. After only 12 birds on Stocker’s Lake on 8th October, there were 65 actively feeding there on the 14th. The mid week counts both show the wider distribution of birds at quieter periods, most notable on 21st December when Broadwater birds were clearly dispersed through the valley.

The national occurrence pattern shows a mid-winter peak and also seen clearly in the Colne Valley. The national trend has been of steady decline since the 80s. A female at Broadwater Lake on 8th October 2006 with a pale green nasal disc probably originated from a Czech colour ringing scheme.

Seven broods were recorded, six of these at Maple Lodge.

Table 13. Counts of Pochard in the Colne Valley September 2006 to August 2007

	17 Sep	08 Oct	19 Nov	17 Dec	21 Dec	21 Jan	09 Feb	24 Feb	18 Mar	15 Apr	13 May	17 Jun	15 Jul	12 Aug	BR
Stocker's complex	41	12	134	199	187	46	85	72	0	1	1	0	0	1	1
Springwell	1	2	8	7	4	7	10	1	0	0	0	0	0	0	0
Maple Lodge	0	0	0	0	0	0	0	1	1	2	6	7	6	3	6
Lynsters	0	0	12	6	24	5	35	18	6	0	0	0	0	2	0
Pynesfield	0	2	12	1	2	2	32	1	0	0	0	0	0	0	0
North Troy	0	0	5	0	2	0	2	6	0	0	0	0	0	0	0
Troy Mill	0	2	0	0	15	0	34	0	0	0	3	2	0	1	0
Tilehouse	0	2	0	8	16	2	8	14	2	0	0	0	0	0	0
Broadwater comp.	39	55	139	153	51	135	99	68	66	7	1	6	20	27	0
Savay	0	0	12	11	34	14	14	8	5	0	0	0	0	0	0
Harefield No 2	0	0	0	2	8	5	2	0	2	0	0	0	0	0	0
Denham complex	2	6	1	12	0	2	8	5	2	0	0	0	0	0	0
TOTAL	83	81	323	399	343	218	329	194	84	10	11	15	26	34	7

2.3.14 Tufted Duck

Numbers of Tufted Duck in the Colne Valley are of national significance. The maximum total count was 1,116 in December 2006, but the peak site count was 569 at Broadwater Lake in August 2007. The threshold for national significance is 901. These counts reflect the two peak periods for Tufted Duck nationally; an August peak of moulting birds and a later mid-winter peak. During 2006-2007, the key concentrations were at Broadwater Lake and Stocker's Lake, although Tufted Duck are well distributed throughout the valley and highly mobile. At Broadwater Lake the August peak of moulting birds were predominately males. This figure is far in excess of the local breeding population and indicates how important this moulting site is in a national context.

The mid-week distribution in December shows birds spreading out from the weekend refuges; from Broadwater Lake to neighbouring Troy Mill and Savay, and increases at the Stocker's complex with birds utilising the lakes suffering heavy human recreational disturbance at weekends (notably Bury and Batchworth Lakes). Similar patterns are evident in the mid-week February count but are less apparent due to the gradual decline in numbers in the second half of the winter.

The overall national trend has been of a long-term, steady increase in both wintering and breeding populations. A total of 32 broods was recorded, with Maple Lodge (14 broods) and Broadwater (11) holding most of the breeding pairs. Tufted Duck prefer large shallow water-bodies with islands for breeding. At Broadwater Lake several islands have been managed in a way which suits the Tufted Duck; dense, low waterside vegetation without tree or bramble cover. The nest is usually within a metre of the water in dense grasses.

Table 14. Counts of Tufted Duck in the Colne Valley September 2006 to August 2007

	17 Sep	08 Oct	19 Nov	17 Dec	21 Dec	21 Jan	09 Feb	24 Feb	18 Mar	15 Apr	13 May	17 Jun	15 Jul	12 Aug	BR
Stocker's complex	48	83	173	188	266	148	146	110	144	52	35	41	39	68	4
Springwell	34	48	52	57	65	32	38	27	36	0	0	2	0	8	2
Maple Lodge	0	0	0	1	4	6	2	14	16	14	11	17	11	16	14
Lynsters	10	0	101	111	139	128	85	109	73	27	5	4	5	12	0
Pynesfield	1	9	33	37	36	21	41	21	15	4	0	1	4	0	1
North Troy	0	0	19	30	38	11	26	23	0	0	9	5	4	2	0
Troy Mill	77	9	95	0	168	52	152	1	7	48	8	28	12	23	0
Tilehouse	24	26	6	24	49	64	49	55	59	16	3	4	32	38	0
Broadwater comp.	347	139	250	452	119	374	231	155	254	163	59	100	318	569	11
Savay	32	86	128	87	149	76	36	45	24	4	10	6	0	6	0
Harefield No 2	0	32	36	34	45	27	23	12	6	7	12	5	7	15	0
Denham complex	92	98	110	95	0	82	67	54	34	60	34	18	2	54	0
TOTAL	665	530	1003	1116	1078	1021	896	626	668	395	186	231	434	811	32

2.3.15 Goldeneye

The Goldeneye is present in the Colne Valley in low numbers. The maximum valley count of 72 is below the national significance threshold of 249. The most important sites in the Colne Valley are Broadwater Lake and Stocker's Lake, both sites functioning as a roost. The general pattern is 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. This pattern is most obvious

in late winter when much display occurs in these gatherings. The largest roost count was of 32 birds at dusk on 24th February at Broadwater Lake.

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. In the Colne Valley the figures match this national pattern with a peak of 72 on 24th February (an afternoon count designed to record birds at the roosts). The national annual index shows a recent decline after a long period of increase.

A hybrid Goldeneye x Hooded Merganser (locally known as ‘Mergeye’) was recorded at Broadwater Lake in September and October. Later in the winter, this bird was present at Hilfield Park Reservoir in Hertfordshire. This ‘marker’ bird may hint at linkages between this site and the Colne Valley for other birds.

Table 15. Counts of Goldeneye in the Colne Valley September 2006 to August 2007

	17 Sep	08 Oct	19 Nov	17 Dec	21 Dec	21 Jan	09 Feb	24 Feb	18 Mar	15 Apr	13 May	17 Jun	15 Jul	12 Aug	BR
Stocker's complex	0	0	5	10	10	13	5	29	0	0	0	0	0	0	0
Springwell	0	0	1	4	9	6	7	3	4	0	0	0	0	0	0
Maple Lodge	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lynsters	0	0	0	0	1	1	4	4	0	0	0	0	0	0	0
Pynesfield	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
North Troy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Troy Mill	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0
Tilehouse	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Broadwater comp.	0	0	7	10	8	13	21	32	28	0	0	0	0	0	0
Savay	0	0	3	1	2	1	6	2	2	0	0	0	0	0	0
Harefield No 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Denham complex	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
TOTAL	0	0	16	25	32	34	47	72	35	0	0	0	0	0	0

2.3.16 Smew

Although the numbers of Smew wintering in the Colne Valley are only low, they are of national significance, with the national threshold set at just 4 birds. The maximum count was of eight birds, with all eight being recorded at Stocker’s Lake. Tilehouse and Denham Lakes also recorded birds during the winter.

As in many complexes of water bodies, Smew are mobile within the Colne Valley. They tend to have a dispersed daytime feeding pattern, visiting favoured locations, before gathering to roost in the late afternoon. In the Colne Valley, small lakes such as Tilehouse, Korda and Denham traditionally have birds during the day, although the larger Stocker’s and Broadwater Lakes are likely to be the favoured roost sites. With the national top site for Smew at Wraysbury gravel pits being only a few miles away, there are likely to be movements of birds between that site and the upper Colne Valley.

Table 16. Counts of Smew in the Colne Valley September 2006 to August 2007

	17 Sep	08 Oct	19 Nov	17 Dec	21 Dec	21 Jan	09 Feb	24 Feb	18 Mar	15 Apr	13 May	17 Jun	15 Jul	12 Aug	BR
Stocker's complex	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0
Tilehouse	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Broadwater comp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Denham complex	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	1	3	8	0	0	0	0	0	0	0

2.3.17 Goosander

The numbers of Goosander wintering in the Colne Valley are low. The maximum count was of 23 birds, with a maximum of 11 at Denham Lakes in January and eight at Stocker’s Lake in February. The national significance threshold is 161. An interesting result of this survey is the liking of Goosander for the Denham Lakes, a relatively disturbed site unfavoured by other species. It is assumed that fish stocks in these lakes must be attracting the birds.

As in many wintering locations, Goosander are mobile in the Colne Valley, gathering to roost on favoured sites after a more dispersed feeding pattern during the day. As in other urban wetland complexes such as the Lee Valley in north-east London, Goosander appear to feed from dawn in rivers and smaller lakes before being disturbed to the roosts. They return to feed at dusk in many areas. In the Colne Valley, a roost occurs at Stocker’s Lake. However, the survey counts do not reflect this as most were taken in the mornings. Whether the birds from the more southerly lakes at Denham move up to Stocker’s or to roosts out of the area in west London is unclear. No roosts were noted on Broadwater during this survey period although two flew south over the lake on the evening of 24 February.

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. The national wintering pattern generally shows a gradual build up to a mid winter peak after an arrival from November onwards. The males have a late summer moult migration to northern Norway.

Table 17. Counts of Goosander in the Colne Valley September 2006 to August 2007

	17 Sep	08 Oct	19 Nov	17 Dec	21 Dec	21 Jan	09 Feb	24 Feb	18 Mar	15 Apr	13 May	17 Jun	15 Jul	12 Aug	BR
Stocker's complex	0	0	0	3	2	4	2	8	0	0	0	0	0	0	
Broadwater comp.	0	0	0	0	0	3	1	2	2	0	0	0	0	0	
Savay	0	0	0	0	0	1	2	4	0	0	0	0	0	0	
Harefield No 2	0	0	0	0	0	4	0	0	0	0	0	0	0	0	
Denham complex	0	0	0	0	0	11	8	6	0	0	0	0	0	0	
TOTAL	0	0	0	3	2	23	13	20	2	0	0	0	0	0	0

2.3.18 Ruddy Duck

The well publicised control programme of Ruddy Duck has seen their numbers fall sharply in some areas. However, a peak in numbers is seen in mid-winter as birds gather on the larger waters after being rather elusive (and increasingly so!) on smaller water during the summer months.

The peak total count of Ruddy Duck of 165 in December 2006 will put the Colne Valley amongst the remaining sites holding significant numbers. Broadwater (133 in December) and Stocker’s Lake (32 in December) both hold wintering flocks, and a few pairs breed, notably at Maple Lodge. The birds are clearly mobile however, as the mid-week count at Broadwater on 21 December shows a sharp drop from the

previous weekend count of 133. However, these ‘missing’ birds were not picked up on the survey at other sites and must be assumed had moved out of the valley. Ruddy Duck are active nocturnal feeders, and were seen to spread out over Broadwater Lake from the refuge area at dusk.

Table 18. Counts of Ruddy Duck in the Colne Valley September 2006 to August 2007

	17 Sep	08 Oct	19 Nov	17 Dec	21 Dec	21 Jan	09 Feb	24 Feb	18 Mar	15 Apr	13 May	17 Jun	15 Jul	12 Aug	BR
Stocker's complex	0	0	0	32	22	5	4	10	1	2	0	0	0	0	0
Maple Lodge	0	0	0	0	0	0	0	0	0	0	2	0	2	3	2
Broadwater comp.	4	12	96	133	72	106	99	37	20	0	0	0	0	0	0
TOTAL	4	12	96	165	94	111	103	47	21	2	2	0	2	3	2

2.3.19 Little Grebe

Numbers of little Grebe in the Colne Valley are of very low significance. The maximum total count was only 12 in December 2006, with the peak site count being eight at Maple Lodge in August. Maple Lodge is the most important site but the population here is primarily a breeding population. From autumn into winter numbers are very low and scattered with just a maximum of four at Lynsters Lake in November and Savay Lake in October. Most of the records were of single birds. During the summer months, most birds were recorded at Maple Lodge, where eight broods were recorded.

The threshold for national significance is 78, with the annual index showing a steady long-term increase. The national peak is usually in September or October as birds gather after the breeding season. Numbers then decline in the early part of the winter but the wintering location of many birds is uncertain.

Little Grebes prefer shallow, well-vegetated water with abundant invertebrate or small fish as prey. Early succession gravel pits are often favoured but older sites, such as the Colne Valley, generally support few birds. The many river channels in the valley will no doubt support as many, if not more, birds than the counts on the larger waters revealed.

Table 19. Counts of Little Grebe in the Colne Valley September 2006 to August 2007

	17 Sep	08 Oct	19 Nov	17 Dec	21 Dec	21 Jan	09 Feb	24 Feb	18 Mar	15 Apr	13 May	17 Jun	15 Jul	12 Aug	BR
Maple Lodge	0	0	0	1	0	2	2	2	4	4	6	6	7	8	8
Broadwater comp.	2	3	1	3	1	1	0	3	3	3	1	1	1	2	2
TOTAL	3	10	9	12	6	4	3	6	8	8	7	7	8	10	10

2.3.20 Great Crested Grebe

The Colne Valley is of national significance for wintering Great Crested Grebe. The peak total count of 218 in October 2006 is above the threshold for national significance (159). Although Great Crested Grebes are well distributed throughout the valley, the key sites are the Stocker's complex (46 on 8 October), the Broadwater complex (89 on 19 November) and the Denham Lakes (32 on 12 August). Birds tend not to be mobile between sites but rather stay until the resources or conditions force

them to move. A feeding frenzy of Cormorants and Great Crested Grebes was noted in at Broadwater Lake in October, suggesting an abundance of small fish. Numbers were high at this site at this time but rapidly declined as the winter progressed, suggesting this resource was no longer available.

The national annual index shows a steady long-term rise in the wintering population, with a peak usually between August and October. At this time the population is boosted by birds of the year, and adults will move to wintering locations to form moult gatherings. The total of 203 birds in the Colne Valley in August may suggest that the population is mainly resident. Peak gatherings at Broadwater and Stockers lakes in September-October are likely to be moulting birds.

A total of 42 breeding pairs was noted, this compares with a national population of 8000 adults in the breeding season (British Birds Jan 2006: 32 p99). A small non-breeding summering flock developed on Broadwater Lake. If the breeding birds produced 2 young per year this would account for a total valley population of around 160 birds. The counts therefore suggest some extra passage or dispersal through the Colne Valley with (probably) the juveniles having moved off by the end of the year and the counts dropping to roughly the breeding population by January.

Table 20. Counts of Great Crested Grebe in the Colne Valley September 2006 to August 2007

	17 Sep	08 Oct	19 Nov	17 Dec	21 Dec	21 Jan	09 Feb	24 Feb	18 Mar	15 Apr	13 May	17 Jun	15 Jul	12 Aug	BR
Stocker's complex	32	46	23	20	22	24	20	23	15	24	17	17	36	41	4
Springwell	5	8	4	2	2	2	2	2	2	2	8	3	2	2	3
Maple Lodge	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lynsters	12	7	6	10	9	10	8	8	8	12	8	8	9	11	2
Pynesfield	4	6	4	3	4	3	3	3	3	2	3	4	8	10	3
North Troy	9	4	3	3	3	2	2	4	3	2	3	1	6	10	1
Troy Mill	10	8	4	5	5	1	6	2	8	5	6	8	8	10	3
Tilehouse	11	10	5	6	6	4	5	4	7	4	4	6	6	15	2
Broadwater comp.	81	79	89	25	14	17	12	16	11	40	30	39	45	59	14
Savay	2	4	8	3	3	3	4	4	5	2	2	3	8	9	1
Harefield No 2	16	26	14	12	13	10	10	8	7	7	5	8	7	14	3
Denham complex	22	20	18	11	0	16	18	17	15	8	9	9	11	32	6
TOTAL	204	218	178	100	81	92	90	91	84	108	95	106	146	213	42

2.3.21 Cormorant

The numbers of Cormorant within the Colne Valley are of national significance. The peak total count of 289 in October and December 2006 is beyond the national significance threshold of 230. The numbers are boosted by a significant breeding colony and winter roost at Broadwater Lake. The winter roost peaked at 227 in October and the colony totalled 55 occupied nests in 2007. Broadwater is also an important feeding site, as evidenced by the feeding frenzy of Cormorants and Great Crested Grebes noted in October. One or two pairs have also nested at the second-most important site, Stocker's Lake, in recent years. A small number of birds also roost here but it is mainly used as a day-time roost.

The national annual index has seen a steady long-term rise. The annual pattern is generally a late autumn peak followed by a steady decline through the winter.

Table 21. Counts of Cormorant in the Colne Valley September 2006 to August 2007

	17 Sep	08 Oct	19 Nov	17 Dec	21 Dec	21 Jan	09 Feb	24 Feb	18 Mar	15 Apr	13 May	17 Jun	15 Jul	12 Aug	BR
Stocker's complex	27	14	38	31	59	52	32	26	10	2	14	7	14	12	2
Springwell	0	2	2	2	2	2	3	0	0	1	0	0	0	0	0
Maple Lodge	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Lynsters	3	7	18	15	8	9	2	11	13	4	3	0	0	2	0
Pynesfield	0	0	0	0	4	0	7	2	2	1	2	0	0	0	0
North Troy	0	2	3	3	4	1	2	1	1	0	0	0	0	0	0
Troy Mill	0	3	1	4	4	3	12	0	3	4	1	12	4	10	0
Tilehouse	48	23	2	3	4	18	5	0	1	3	0	1	0	0	0
Broadwater comp.	126	227	97	102	190	37	45	122	72	79	92	67	121	113	55
Savay	56	8	12	11	8	24	7	2	7	8	5	7	4	6	0
Harefield No 2	1	3	11	8	6	9	8	2	4	2	1	2	0	5	0
Denham complex	1	0	5	6	0	7	6	5	2	2	0	1	2	6	0
TOTAL	262	289	189	185	289	162	129	171	116	106	118	97	145	154	57

2.3.22 Little Egret

The increase of the Little Egret has been one of the most remarkable ornithological events of the past decade or so. The 2004/05 WeBS report reveals a total count of just fewer than 3,000 birds with 68 sites supporting in excess of ten birds. The figures show a strong post-breeding peak in September. The pattern in the Colne Valley however is of a wintering population with birds occupying an important roost at Broadwater Lake. During the survey the roost was specifically counted on two dates and account for the peak totals of 26 and 27 birds. However, these roosting birds rarely feed by day in the Colne Valley. Flight-lines to the north lead many miles up the Chess and Gade valleys, where birds are regularly noted by day. The roost watches also noted around half of the birds arriving from the south, and the feeding location of these is unknown but the top ends of river valleys must be suspected.

Table 22. Counts of Little Egrets in the Colne Valley September 2006 to August 2007

	17 Sep	08 Oct	19 Nov	17 Dec	21 Dec	21 Jan	09 Feb	24 Feb	18 Mar	15 Apr	13 May	17 Jun	15 Jul	12 Aug	BR
Broadwater comp.	0	0	4	1	24	0	1	27	0	0	0	0	0	0	0
TOTAL	0	0	4	1	26	0	2	27	2	0	0	0	0	0	0

2.3.23 Grey Heron

There are two significant heronries within the Colne Valley; at Stocker's lake and Broadwater Lake. These heronries held 31 and 15 breeding pairs of Grey Herons respectively in 2007. These two sites not unexpectedly dominate the counts and the low scattering of birds elsewhere probably breed at one of these sites. The first fledged young were noted at Stocker's Lake on 24 February, a remarkably early date even in a mild winter. In winter, young herons may disperse away from the natal area, particularly towards the coast, and there is an arrival of birds from northern Europe. Any of these movements are masked by the resident birds of the local heronries in the Colne Valley.

The national annual index for Grey Heron has been very stable in recent years, with just a slight increase over the last ten years. This is no doubt due to the lack of hard

winters. The figures tend to show an autumn peak followed by a steady decline over the winter, a typical pattern for a largely resident breeding bird.

Table 23. Counts of Grey Heron in the Colne Valley September 2006 to August 2007

	17 Sep	08 Oct	19 Nov	17 Dec	21 Dec	21 Jan	09 Feb	24 Feb	18 Mar	15 Apr	13 May	17 Jun	15 Jul	12 Aug	BR
Stocker's complex	5	7	2	5	9	18	11	28	27	18	7	7	7	7	31
Springwell	0	0	1	1	0	0	0	0	0	1	0	0	0	1	0
Maple Lodge	0	0	0	1	1	1	0	0	0	1	2	1	3	1	0
Lynsters	0	0	3	3	2	2	0	0	1	3	1	0	0	1	0
Pynesfield	3	1	1	0	1	0	0	0	0	0	1	1	0	2	0
North Troy	0	1	2	1	2	0	1	0	0	0	0	0	0	0	0
Troy Mill	1	5	5	3	4	1	2	0	0	0	4	6	2	3	0
Tilehouse	0	1	0	0	2	1	2	0	0	0	0	0	1	0	0
Broadwater comp.	20	23	16	12	6	8	8	18	15	9	13	6	11	24	15
Savay	2	7	4	3	2	7	1	2	3	0	0	3	2	1	0
Harefield No 2	2	1	1	0	0	0	2	0	1	3	1	3	1	1	0
Denham complex	2	2	2	4	0	2	3	1	2	1	2	0	1	3	0
TOTAL	35	48	37	33	29	40	30	49	49	36	31	27	28	44	46

2.3.24 Coot

The peak total count for Coot of 1606 birds in November 2006 was somewhat lower than the threshold for national significance (1730). Coot are well distributed throughout the valley with several sites holding winter populations in excess of 100 birds. Stocker's, Lynsters, Troy Mill, and Broadwater all hold significant numbers with the peak count being 468 at the Stocker's lake complex in November. Numbers at Broadwater in 2006 were low and the peak winter counts (298 in September) quickly declined, suggesting a very poor year for aquatic weeds on the lake. 2007 may have been better, as the August count was already, at 404, above the previous winter's peak. Coot are generally remain on a site while food resources last, being amongst the most tolerant of waterbirds to disturbance. However, they may move around significantly at night.

Coot generally show an increase into the winter months, peaking between October and December. The Colne valley population follows this pattern. The national annual index is relatively stable following an increase in the 90's. Following breeding, British Coot may be sedentary or, particularly the young birds, dispersive. In addition, large numbers move out of western Europe to winter in the UK. Breeding birds may be territorial all year, especially on smaller waters, or where there is fierce competition for favourable nest sites, and for this reason winter immigrants tend to gather on the larger waters.

A total of 113 pairs were located during the summer, and although this is likely to be an under-estimate, it would indicate that a significant non breeding population is present in early summer. Coot pairs are easy to locate but it is likely that some breeding pairs were missed on the wider rivers and channels or smaller unsurveyed water bodies. Coot may breed early with young often hatched in April and are often double-brooded. Counts from July will undoubtedly include fledged young of the year, whilst young continue to be produced late into the autumn. From August, young birds and failed breeders from outside the Colne may arrive, to be joined by continental immigrants from September onwards.

Table 24. Counts of Coot in the Colne Valley September 2006 to August 2007

	17 Sep	08 Oct	19 Nov	17 Dec	21 Dec	21 Jan	09 Feb	24 Feb	18 Mar	15 Apr	13 May	17 Jun	15 Jul	12 Aug	BR
Stocker's complex	283	414	468	447	395	376	311	248	137	72	92	99	167	228	11
Springwell	74	145	135	101	110	56	50	48	32	14	24	27	18	36	3
Maple Lodge	0	0	0	0	0	15	10	19	19	12	17	15	57	52	20
Lynsters	82	109	255	262	243	288	203	129	90	51	34	41	45	52	6
Pynesfield	63	101	131	122	112	106	85	71	57	30	23	9	40	31	9
North Troy	37	30	55	53	50	37	35	49	22	13	6	22	15	13	2
Troy Mill	115	142	174	53	138	110	146	66	91	68	48	30	60	24	5
Tilehouse	56	64	59	104	102	90	102	107	81	56	13	36	45	63	8
Broadwater comp.	298	273	64	98	63	180	110	69	64	93	87	209	320	414	23
Savay	56	102	142	145	138	72	68	48	34	26	28	34	36	45	5
Harefield No 2	6	10	21	20	18	25	18	21	18	15	18	23	27	26	5
Denham complex	92	77	102	122	0	103	85	54	46	50	43	75	73	114	16
TOTAL	1162	1467	1606	1527	1369	1458	1223	929	691	500	433	620	903	1098	113

2.3.25 Moorhen

The numbers of Moorhen recorded are only likely to represent a small proportion of the birds present within the valley. As well as many being present on the river, streams and small pools, Moorhens are often difficult to record and some will have been missed on the main waters. Locally breeding birds are highly sedentary and are joined in winter by the young birds of the year and an unknown number of migrants from north-western Europe.

Table 25. Counts of Moorhen in the Colne Valley September 2006 to August 2007

	17 Sep	08 Oct	19 Nov	17 Dec	21 Dec	21 Jan	09 Feb	24 Feb	18 Mar	15 Apr	13 May	17 Jun	15 Jul	12 Aug	BR
Stocker's complex	15	16	35	23	16	15	11	25	16	12	7	8	10	9	4
Springwell	8	8	6	5	6	6	0	4	3	2	0	6	0	2	
Maple Lodge	7	4	18	20	22	3	4	6	4	5	7	6	10	14	6
Lynsters	6	3	6	10	12	6	4	3	1	4	3	0	2	2	
Pynesfield	5	13	2	2	4	0	2	1	4	0	0	0	0	3	
North Troy	2	3	3	1	2	0	0	2	1	1	4	2	2	2	
Troy Mill	1	2	1	0	8	0	4	0	0	1	1	0	2	3	
Tilehouse	0	2	4	9	13	6	2	4	2	1	2	0	0	1	
Broadwater comp.	10	16	17	11	6	4	10	10	10	13	8	2	5	7	
Savay	6	4	12	6	6	6	0	11	5	0	2	4	2	2	
Harefield No 2	0	7	2	2	4	2	2	4	4	5	3	4	1	3	
Denham complex	22	12	4	6	0	6	4	6	8	2	5	0	5	5	
TOTAL	82	90	110	95	99	54	43	76	58	46	42	32	39	53	10+

2.3.26 Kingfisher

Kingfishers are present in low numbers throughout the Colne Valley, with a peak survey count of 11 in November 2006. Kingfishers are not monitored well by the standard WeBS counts as they are not only elusive but frequently occur away from the open water sites. No national thresholds are set but the WeBS report list sites with mean peak counts of seven or more. The Colne Valley is thus in the top tier of sites. Broadwater, Stocker's and Denham Lakes are the most regular sites and have the highest counts.

Table 26. Counts of Kingfisher in the Colne Valley September 2006 to August 2007

	17 Sep	08 Oct	19 Nov	17 Dec	21 Dec	21 Jan	09 Feb	24 Feb	18 Mar	15 Apr	13 May	17 Jun	15 Jul	12 Aug	BR
Stocker's complex	2	3	1	2	1	0	0	2	1	2	0	0	0	1	1
Springwell	0	0	2	1	0	0	0	2	0	0	0	0	0	0	
Maple Lodge	1	1	0	1	1	0	1	0	0	0	1	2	1	1	
Lynsters	0	0	1	0	1	0	0	2	1	0	0	0	0	0	
Pynesfield	0	0	0	0	0	1	0	1	0	0	0	0	0	1	
North Troy	1	0	2	0	0	0	0	0	0	2	0	0	0	0	
Troy Mill	0	0	0	0	0	0	0	0	0	0	0	1	0	1	
Tilehouse	0	0	1	0	1	0	0	0	0	0	0	0	0	1	
Broadwater comp.	3	2	2	2	1	0	1	0	0	2	1	0	5	1	
Savay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Harefield No 2	0	0	1	1	0	0	0	0	0	0	0	0	1	0	
Denham complex	2	1	1	2	0	0	0	2	2	0	1	2	1	0	1
TOTAL	9	7	11	9	5	1	2	9	4	6	3	5	8	6	2+

2.3.27 Other species

A number of other notable species were recorded as follows;

- Two Black-necked Grebes were at Broadwater Lake on 18 March.
- A single White-fronted Goose with the Greylag flock from February to mid-April.
- Common Terns – seven pairs nested at Stocker’s Lake and 13 pairs at Broadwater Lake. A single pair attempted at Maple Lodge.
- The gull roost was observed at Broadwater Lake on 24 February. At 15.30 pm there were four Great Black-backed Gulls, six Lesser Black-backed Gulls, 35 Herring Gulls, 19 Common Gulls and 660 Black-headed Gulls. They were restless and dispersed on a number of occasions, roughly 25%, including most of the larger gulls, leaving to the south (possibly to Staines Reservoir?), and 15% to the north (possibly to Hilfield Park Reservoir?). The final roost was four Lesser Black-backed Gulls, 14 Herring Gulls, 15 Common Gulls and 970 Black-headed Gull. Most late arrivals (exclusively Black-headed Gulls) came from the SSE.

Gulls use several sites for daytime resting or washing during the winter and Lesser Black-backed Gulls are present throughout the year. Maximum counts at the Broadwater complex were: Black-headed Gull 144 (19 November), Mediterranean Gull 1 (17 September), Common Gull 38 (9 February), Herring Gull 26 (14 April) and Lesser Black-backed Gull 13 (19 November).

- **Waterside birds.** The Colne valley seems particularly poor for waterside passerines. The Broadwater complex for example held: nine singing male Reed Warblers, one singing male Reed Bunting but no Sedge Warblers. This is likely to be due to the habitat succession in most sites where trees have replaced marginal aquatic vegetation.
- **Wading birds.** No waders were found nesting in the Colne Valley, although two pairs of Lapwings held territory on recently cleared islands in Broadwater Lake but did not breed. A pair of Little Ringed Plovers were at Harefield Moor on 17 June 2007. Passage waders were also very scarce due to the lack of suitable habitat. Single Common Sandpiper, Dunlin and Snipe were recorded on autumn passage at Broadwater Lake with up to 17 Lapwing.

2.4 Assessment of historical WeBS counts within the Colne Valley

The historical record of waterbird counts for the lakes in the Colne Valley is generally poor with few sites regularly counted as part of the WeBS scheme. The following summaries have been compiled from data taken from available WeBS counts, county bird reports and individual studies. Tables have been assembled for the two most important sites; Stocker's Lake and Broadwater Lake.

Stocker's Lake. Table 27 shows the peak winter counts for the main waterbird species over the 20 years from 1987/88 until 2006/07. Although the site is clearly important in a regional (county) context for a range of species, only two species (Shoveler and Gadwall) have exceeded national significance levels during this period.

Shoveler numbers have declined over the 20 year period, with the peak counts of 250 and 238 both occurring in the first five years of this period. Latter years have been well below the current level of national significance (148). The reason for this decline is unclear and is set in the context of relative stability at the national level. Gadwall numbers have tended to increase, with the peak count of 266 occurring in the middle of the period. Since then, numbers have been typically erratic, usually reflecting the abundance of aquatic weeds.

Wigeon and Coot have both also tended to increase and have peaked at the same time as Gadwall, again reflecting the available food resource. Other increasing species include Mute Swan (reflecting the trend at the national level) and both Smew and Goosander. These species peak in cold winters (note the 1996/97 winter in Table 27) and then remain at higher levels for a number of years as a pattern of returning to traditional wintering sites is established.

By contrast, both Canada and Greylag Goose have shown a decline in numbers over the years. Canada geese have shown signs of stabilising at a national level but Greylag have not. The trend at Stocker's (and typical of the valley) is probably due to the increasing tree cover around the lakes. Twenty years ago, flocks of geese would graze the margins of Stocker's Lake, such areas today are isolated from the water by marginal bands of trees and the grasslands themselves are rank and overgrown. After the first successful breeding of Canada Goose in Hertfordshire at Stocker's Lake in 1969, the site regularly held some of the largest flocks in the county during the 1980s. Mallard and Teal have also declined. Mallard follows the pattern nationally whilst the decline in Teal is probably due to the increasing unsuitability of Maple Lodge and the lack of cold winters (when birds were frozen out of Maple Lodge onto Stocker's).

The numbers of Great Crested Grebe, Cormorant, Pochard, Tufted Duck and Goldeneye have all remained relatively stable at Stocker's Lake over the 20 year period.

Counts from the smaller sites adjacent to Stocker's Lake are generally sparse, and in most cases (especially Bury Lake) are included within the Stocker's Lake counts given. **Batchworth Lake** is noted for good counts of Mallard with 100 in January 2005 being typical of recent years.

Maple Lodge. 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. The site has changed much over the decades and this is reflected in the counts. Some counts suggest the recording area may also have changed.

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 (excepting 250 in February 1991). Peak counts of Shoveler were all in the 1980s, with 138 in February 1986 and 239 in January 1989. Recent counts are all low.

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. The peak count is of 160 in July 2003.

Lynsters and Pynesfield Lakes. There are generally few counts from these sites due to the difficulties with access. WeBS counts at Lynsters are available from the mid 1990s but are generally unremarkable and comparable to counts in the present study. Peak counts include 426 Coot and 209 Tufted Ducks in December 1994, and 100 Gadwall, 50 Pochard and 280 Wigeon in January 1997. Counts of other species are insignificant.

Occasional higher counts at Pynesfield presumably correspond to the abundance of aquatic weeds. There were 102 Gadwall in January 1996 and November 1997, and a peak count of 146 in February 2004. Similarly, Coot peaked at 191 in January 1997 and 187 in February 2004. Pochard reached 54 in January 1996.

Troy Mill. Troy Mill is an accessible lake with a good record of attracting passage birds, so has a greater volume of associated data, with WeBS counts from the early 1990s. This shallow, weedy lake had some high counts of Coot during the 1990s, with 500 in December 1991, 500 in November 1994 and 670 in October 1997. The highest recent count is of 301 in December 2001. Gadwall have also been attracted to the weeds in more recent 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.

The adjacent **North Troy Lake** (counted since the mid 1990s) generally has low numbers of birds, although some remarkable counts were made in February 1996; 194 Gadwall, 195 Coot and 166 Pochard. The peak Tufted Duck count is 163 in August 1995.

Tilehouse Lakes. These small lakes were noted as a regular site for Smew 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). Up to 100 Gadwall were present in January 1991.

Broadwater Lake. Table 28 shows the peak winter counts for the main waterbird species over the 20 years from 1987/88 until 2006/07. The site is clearly important in a regional (county) context for a range of species. Five species (Great Crested Grebe, Cormorant, Tufted Duck, Shoveler and Gadwall) have exceeded national significance levels during this period. However, numbers of several species have dwindled (and significance levels have been raised) and it is likely that only Cormorant has exceeded the level in recent years.

Shoveler numbers were highest in the middle of the 20 year period, with peak counts of 311 and 220. There is a suggestion that recent totals have been lower, and below the current level of national significance (148), but counts have been sporadic and a trend is difficult to discern. Gadwall numbers have tended to increase, with the peak counts of 405 and 398 occurring in the middle of the period. Since then, numbers have been typically erratic, usually reflecting the abundance of aquatic weeds. As at Stocker's Lake, other weed-eating species such as Wigeon and Coot, typically peak in the same years as Gadwall, with the peak Coot count of 1210 coinciding with the peak Gadwall year. Interestingly, the peak weed years at Broadwater do not match the peak years at Stocker's Lake.

Smew and Goosander tend to peak in cold winters but both appear to have increased generally at Broadwater over the 20 year period. However, the most dramatic increase is of Little Egret, which has established a winter roost at the site since 2000.

As at Stocker's Lake, Canada Goose has shown a decline in numbers over the years. However, this is not true of Greylag, where numbers have been stable. Mallard again follows the national pattern of decline, while Teal is only present in large numbers in colder winters.

The numbers of Great Crested Grebe, Mute Swan, Cormorant, Pochard, Tufted Duck and Goldeneye have all remained relatively stable at Broadwater Lake over the 20 year period.

Counts for the adjacent **Harefield Moor Lake** are often included within the Broadwater total and many birds 'spill over' from the larger lake. However, some outstanding counts for the lake include 1,000 Mallard in January 1979 with 300 Pochard and 700 Tufted Duck. This was presumably during a period of severe winter weather. Likewise, 607 Tufted Duck were noted in January 1985. **Korda Lake** has regularly been noted as a site that attracts feeding Smew, with nine noted in February/December 1998 and ten in January 2002.

South of Broadwater Lake, published counts for the remaining lakes are few and far between and WeBS counts have at best been sporadic. The history of site name changes has also not helped in tracking data. However, a record of 16 Goosander at **Denham Country Park** in December 2001 supports the relative importance of these waters for this species noted in the current study.

Table 27. Peak counts of waterbirds at Stocker’s Lake from 1987/88 to 2006/07

nc = no count available.

	87/88	88/89	89/90	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00	00/01	01/02	02/03	03/04	04/05	05/06	06/07
Great Crd Grebe	48	41	32	17	25	19	20	31	27	14	21	17	16	18	17	23	28	39	34	46
Little Grebe	6	7	4	4	6	3	4	6	6	5	4	5	1	2	4	nc	3	1	1	2
Cormorant	29	23	50	48	85	46	49	61	43	47	68	41	40	44	58	46	72	62	61	59
Mute Swan	22	28	57	48	41	55	78	68	88	95	93	87	87	53	99	96	68	67	67	79
Canada Goose	350	500	389	410	460	225	260	410	293	191	160	198	152	123	124	139	217	256	218	176
Greylag Goose	40	47	nc	16	37	40	55	61	nc	nc	nc	33	nc	nc	nc	nc	nc	nc	nc	8
Egyptian Goose	0	0	0	0	0	0	3	0	0	0	1	0	0	0	1	5	2	0	0	0
Wigeon	28	36	35	32	10	5	9	0	1	256	24	13	14	26	447	70	20	324	10	64
Gadwall	36	29	27	100	110	29	110	60	35	266	130	112	94	128	128	94	80	59	47	138
Teal	12	15	20	99	110	82	50	5	81	140	20	36	6	2	1	0	0	2	0	3
Mallard	175	140	140	250	263	136	134	88	180	351	105	138	83	123	96	91	99	108	117	123
Shoveler	170	250	170	238	95	205	104	107	132	71	92	85	69	17	90	24	95	154	77	87
Red-crd Pochard	0	1	1	0	0	0	1	2	0	0	0	0	0	0	0	2	1	2	8	9
Pochard	95	275	112	230	92	180	135	163	111	188	122	226	100	104	98	129	146	162	158	199
Tufted Duck	212	175	204	252	139	240	159	277	152	231	319	184	219	193	346	234	359	227	197	266
Goldeneye	29	20	24	29	11	23	21	30	21	41	20	14	14	18	24	18	25	17	10	29
Smew	0	0	1	0	0	4	9	1	9	18	8	18	3	3	7	9	11	10	5	8
Goosander	0	1	0	3	1	0	13	3	1	56	28	15	10	12	13	15	17	11	11	8
Ruddy Duck	4	13	21	19	19	15	11	11	26	37	1	0	0	1	5	3	12	33	1	32
Coot	276	196	176	385	230	256	410	167	208	880	342	304	360	357	640	430	481	427	282	468

Table 28. Peak counts of waterbirds at Broadwater Lake from 1987/88 to 2006/07

Counts for 2005 and 2006 are unpublished so remain unavailable. nc = no count available.

	87/88	88/89	89/90	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00	00/01	01/02	02/03	03/04	04/05	05/06	06/07
Great Crd Grebe	nc	nc	123	70	nc	113	nc	nc	86	nc	nc	48	72	nc	nc	Nc	143	?	?	89
Cormorant	202	188	219	259	300	316	nc	nc	250	nc	172	nc	nc	nc	153	194	397	?	?	227
Little Egret	0	0	0	0	0	0	0	0	2	0	0	0	0	3	12	15	20	?	?	27
Mute Swan	nc	24	43	77	68	6	nc	104	69	51	nc	58	8	nc	69	nc	nc	?	?	26
Canada Goose	300	nc	153	141	350	519	103	nc	nc	nc	nc	150	55	nc	nc	nc	nc	?	?	133
Greylag Goose	78	58	38	56	70	61	51	nc	33	nc	34	35	37	nc	98	105	88	?	?	44
Wigeon	223	Nc	76	63	140	147	302	295	170	72	325	300	243	282	314	624	nc	?	?	32
Gadwall	113	106	109	100	60	81	400	nc	405	85	102	398	64	nc	80	120	Nc	?	?	67
Teal	50	0	43	100	nc	25	25	nc	40	0	8	13	nc	0	0	0	0	?	?	13
Mallard	400	nc	111	118	nc	146	nc	108	87	nc	78	135	78	nc	nc	nc	nc	?	?	89
Shoveler	100	Nc	22	43	200	311	46	180	200	100	220	109	190	nc	70	nc	nc	?	?	92
Red-crd Pochard	0	1	1	1	1	0	1	0	1	0	1	0	0	0	0	0	0	?	?	0
Pochard	nc	nc	195	287	154	385	200	500	265	350	235	300	74	100	230	190	250	?	?	153
Tufted Duck	679	930	903	933	200	773	1200	650	650	700	529	604	378	210	500	nc	nc	?	?	569
Goldeneye	15	10	19	28	33	22	24	21	31	21	36	53	10	32	38	30	7	?	?	32
Smew	2	1	1	2	3	3	2	5	11	1	24	7	5	4	9	9	Nc	?	?	0
Goosander	0	0	0	0	0	0	0	0	0	0	35	5	0	0	5	11	Nc	?	?	3
Ruddy Duck	52	50	47	91	70	71	75	113	196	69	141	210	142	114	100	100	53	?	?	133
Coot	nc	0	938	570	nc	232	232	nc	1210	515	320	763	270	nc	630	nc	500	?	?	414

2.5 Summary of waterbird usage and importance within the Colne Valley

2.5.1 Summary points from this study.

The Colne Valley supported between 3,400 and 4,500 waterbirds during the 2006/07 non-breeding period. The peak total count was of 4,610 birds in November 2006. Two species, Coot and Tufted Duck, formed the majority of these birds, both having peak counts into four figures. Shoveler, Mallard, Gadwall, Pochard Great Crested Grebe and Cormorant all had peak counts of over 200.

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. No individual sites recorded counts above the level of national significance.

Stocker's lake and Broadwater Lake are the most important sites, both supporting over 1,000 birds at peak periods. Lynsters Lake peaked at near 700 birds, while most sites peaked at around 200-300.

Stocker's Lake and Broadwater Lake were the two most significant refuge/roost sites, attracting almost the whole range of species in the valley. The key breeding sites were Stocker's, Broadwater and Maple Lodge. Broadwater Lake and Maple Lodge are important for concentrations of moulting birds. Whilst diving duck appear to distribute amongst the various water-bodies, the aquatic weed feeders concentrate on those lakes that have abundant weeds on a regular or periodic basis – Stocker's, Springwell, Inn's, Bury, Lynsters, Pynesfield and Broadwater Lakes.

2.5.2 Discussion

Each species of waterbird will exhibit a different pattern of movement and behaviour, 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, Teal, and Goosander 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 roosts 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 two major refuge sites are Stocker's Lake and Broadwater Lake. The evidence from this study is that species such as Tufted Duck, Pochard and Goldeneye at least spread out in the valley (and perhaps 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. Other species, such as Shoveler, Goosander and Smew, may also follow this pattern but the evidence was not clear in this study. These major refuge sites are therefore critical in that they enable birds to exploit a much wider area.

An interesting feature of the study was that Broadwater Lake attracted most birds from March through to October, while Stocker's Lake takes over from November through to February. This pattern of distribution has been recorded in previous studies. Although Broadwater can provide an excellent feeding resource and does have a functional refuge area within the lake, it seems that some species, notably dabbling duck, move out as soon as the food resource is eaten out. This suggests that either the refuge area is not ideal for these species or that equally good refuge areas exist near to alternative food sources. 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. It may be that the level of recreational activity on Broadwater Lake makes the site less suitable as a refuge for some species. However, the diving duck seem to continue to use the refuge as they exploit the food resources of the southern part of the valley. Stocker's Lake, with its greater range of sheltered islands may provide an overall better refuge site.

The historical WeBS data and past studies reveal some trends amongst the species. A number of species appear to be increasing, amongst these are the herbivorous waterbirds; Gadwall, Wigeon and Coot. However, peaks of these species are sporadic as the birds exploit abundant weed resources on individual lakes. The peak of weed growth is usually on different lakes in different years. The abundant growth of weed 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. Fish stocking with species such as Carp and Bream which may drive the water to an algal dominated state is also a factor. Older lakes are more likely to be dominated by cyprinid fish which may cause a reduction in submerged aquatic weeds.

Both Canada and perhaps Greylag Goose show a declining trend in the valley. The habitat is certainly less suitable for them in some areas as scrub and tree growth around the lakes has continued. However, wider factors cannot be ruled out and it is known that control of these species is undertaken elsewhere in the London area. The decline in Mallard appears to follow the national trend.

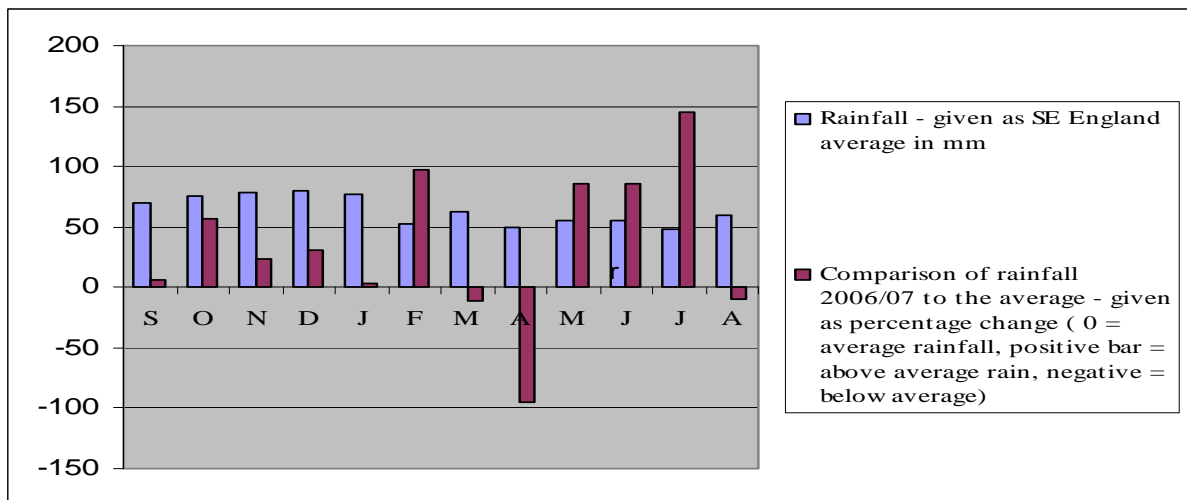
Finally, the trend in Shoveler is unclear but more recent counts are certainly lower, perhaps suggesting a decline. Reasons for any decline are often difficult to determine but food resources often play a key role. The changing nature of the aquatic environment of the Colne Valley lakes as they mature over the years, as discussed above, may play a part. Shoveler may be affected by factors that cause a decline in available invertebrate food.

3. Water levels

3.1 Rainfall during the survey period

Rainfall figures for the period September 2006 to August 2007 were taken from Met Office data published on their website. September 2006 was warm and sunny with rainfall slightly above average. October continued this theme but with rainfall increasing to well above average at 157%. November and December were still mild and wet but with rainfall back closer to the average. 2007 started with a very warm January, around 1.5 degrees above average and temperatures remained above average through February and March. Rainfall was close to the average figure in January but February was a very wet month with almost double the expected amount. From March through April, rainfall was very low, especially in the latter month, resulting in water levels in many wetlands dropping sharply. However, from May through to July rain came thick and fast, with up to three times the expected amount; a very wet summer indeed. The survey year ended with a slightly drier than average August. Figures for rainfall compared with the average are shown in Figure 1 below. The overall wetness of the year is obvious, apart from an exceptionally dry April.

Figure 1. Rainfall in west London during the survey period compared to the average.



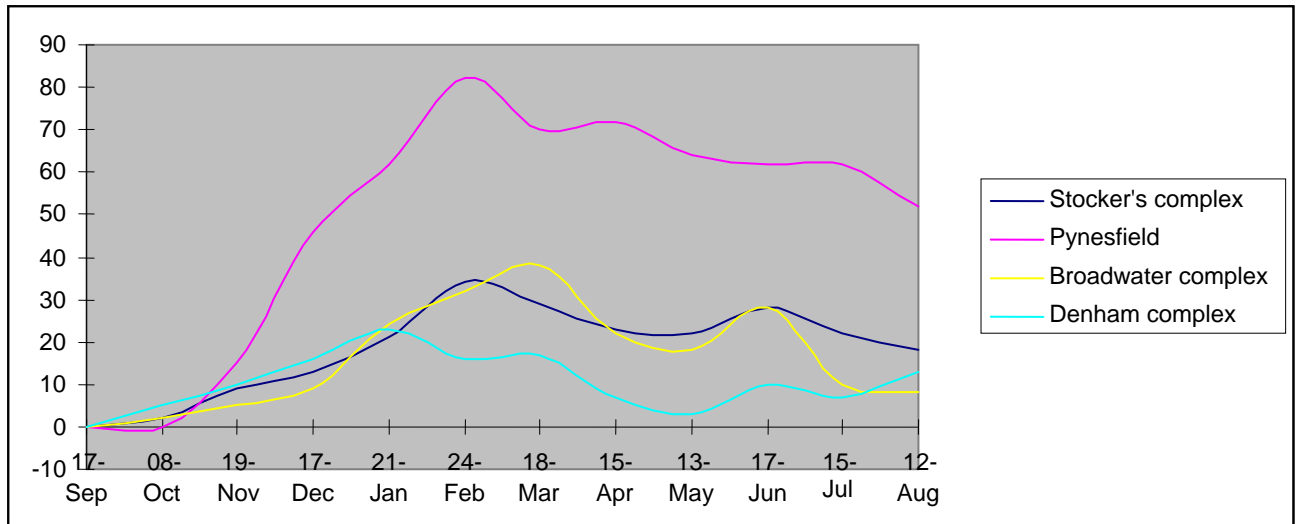
3.2 Water levels in the Colne Valley water-bodies

Water levels were recorded at four sites in the Colne Valley, with the results shown in Figure 2. It was decided to be impractical to record all waters so key sites were selected throughout the valley and recorded monthly. Notes were made on each visit of any abnormal situations on any other waters within the survey area.

To allow comparison, the first count at each site in September 2006 was set as a baseline 'zero', with changes from this initial level shown in the graph. Water levels were very low at all sites in this month. Broadwater Lake was approximately 300mm below normal levels in September 2006, with some gravel edgings and gravel islets exposed. Pynesfield was estimated to be 400mm below normal levels with extensive gravel islands exposed and the water well away from marginal

vegetation. Lynsters also had exposed gravel islands with water estimated to be 300mm below normal.

Figure 2. Water levels at four sites in the Colne Valley from Sept 2006 until Aug 2007.



The graph shows that water levels on all sites increased from October over the early winter period to peak early in the New Year. Water levels began to drop in spring but mostly increased again as a result of the heavy summer rainfall. Pynesfield Lake had the greatest variation in water levels of the recorded sites, starting from a very low level. Water levels peaked in February and then declined slowly during the summer despite the summer rainfall. The conditions here are likely to be heavily influenced by the adjacent pumping station. Broadwater Lake, Stocker's Lake and Denham Country Park all show similar patterns. All three sites have outflows that regulate top water levels. However at Denham Lakes water flows directly out via a stream as opposed to pipes at the other sites and peak levels are moderated more quickly. By the end of the year all sites were well above where they started in the previous year, reflecting the exceptionally wet conditions during the previous 12 months.

3.3 The ecological effects of varying water levels in the Colne Valley

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 potential effects are summarised in Table 29.

Table 29. Potential ecological effects of low water levels on wetlands.		
	Potential effects	Examples of issues in the Colne Valley
Vegetation and habitat: submerged macrophytes	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 Maple Lodge may be serious.
Vegetation and habitat: marginal aquatic vegetation	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 Stocker's Lake, Maple Lodge, Springwell Lake, Tilehouse South and Denham Lakes .
Vegetation and habitat: water-dependant associated habitat	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 Stocker's Lake, Pynesfield Lake and Denham Lakes . The reedbed adjacent to Springwell Lake is dependant on high water levels.
Lake topography and area: bare mud and islands	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 Stocker's or Broadwater Lakes . Very shallow sites such as Maple Lodge benefit for only short periods and prolonged drying quickly becomes detrimental.
Lake topography and area: water area	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 Pynesfield Lakes will be affected more.
Security: shoreline access by predators	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: Stocker's Lake, Broadwater Lake and Maple Lodge .
Security: shoreline access by people	Increased access to shorelines or islands will allow disturbance by humans.	Unprotected sites with access will be most affected, particularly those with unregulated angling.
Water quality	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 Broadwater and Harefield Moor Lakes .

3.4 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 30 and explained in more detail in Section 4.

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

4. Ecological evaluation of the Colne water-bodies

4.1 Batchworth Lake

- **Location (TQ057940).**

Batchworth Lake is the northern-most lake within the Rickmansworth Aquadrome complex. It is located south of the River Colne and A404 road in Rickmansworth.



- **Size and topography.** An oblong shaped lake of around ten hectares, with one major wooded island.

- **Habitats.** The lake is largely surrounded by tall trees, mainly willows and Alder although a number of ornamental trees are also present. Although a few marshy corners are present, there is generally very little marginal aquatic vegetation around the lake. Some attempts have been made to increase vegetation by fencing some sections along the bank. Very little submerged aquatic vegetation was noted.

- **Key waterbird species.** The lake currently attracts only low numbers of the commoner and more tolerant waterfowl to feed on the lake. Mallard are the most numerous as they gather here to be fed by visitors. Goosander have previously been noted (but not in this study) and may flight to feed here at quieter periods.

- **Ecological links.** With little bird usage, known links are few but birds have been noted to move from Batchworth to the adjacent Stocker's and Bury Lakes.

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

- **Recreational use and impacts on water birds.** Batchworth Lake is used for water-skiing on a regular basis. A large extent of the lake is utilised and waves affect all of the water area. Only small numbers of the most tolerant species remain on the lake. The paths around the margins are heavily used by visitors, particularly at weekends.

4.2 Bury Lake

- **Location (TQ053938).** Bury Lake is located between Batchworth Lake and Stocker's Lake; separated from the latter by a narrow causeway.



- **Size and topography.** 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 recently been sealed.
- **Habitats.** Short, species-poor grassland is found around much of the lake. Although there are scattered trees by the water's edge, there is more extensive wet woodland habitat away from the lake towards the River Colne. This is largely dominated by willows. Lesser Spotted Woodpeckers were noted in this area on two surveys. The lake margins have scattered stands of emergent vegetation, mainly Branched Bur-reed, Reed Sweet-grass and Greater Pond Sedge. Recent work around the margins has been undertaken to try and enhance marginal stands of reed. Aquatic weeds are abundant in some years with Nuttall's Pondweed appearing to be the dominant species.
- **Key waterbird species.** Bury Lake is an important feeding site for waterbirds when it is not in use for water sports, many birds flight in from Stocker's Lake, including diving duck and weed feeders such as Gadwall. Bury Lake is a key site for Mute Swan within the valley, with up to 100 birds gathering to be fed by visitors to the Aquadrome. Birds gather throughout the year, including a summer non-breeding flock, but numbers peak during the moult and the winter months.
- **Ecological links.** 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 extensively for water sports, mainly sailing. The lake is also used for model boat sailing and for angling. The margins are perhaps the most disturbed of any lake in the valley, the circular route around the lake being very popular with visitors to the Aquadrome.

4.3 Stocker's Lake

- **Location (TQ 045934).** Stocker's Lake is located just to the south of Rickmansworth and forms the central and largest lake within the Rickmansworth Aquadrome collection of lakes.



- **Size and topography.** Stocker's Lake has a water area of around 28 hectares.

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 water is therefore relatively shallow. 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 a wooded cover over the years.

- **Habitats.** A range of habitats are represented within and around the lake, including open water, marsh, reed and sedge swamp, rough grassland, scrub and woodland. 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 Waterplantain 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.

The lake supports a range of fish, including Tench, but as in many lakes, Carp are also present. A lack of fry has been perceived as a problem in the past, possibly because of the poor underwater habitat quality that is typical of most gravel pits.

- **Key waterbird species.** One of the two major waterbird refuges in the Colne Valley, significant for Shoveler, Mallard, Pochard and Tufted Duck. A significant site for breeding waterbirds, notably geese, Grey Heron, Cormorant, Pochard, Tufted Duck and Common Tern. The Heronry is probably the largest in the county. An important feeding site for several species, including Wigeon and Gadwall when aquatic weeds are abundant. A roost site for Goldeneye, Goosander and Smew.
- **Ecological links.** As a major refuge, birds flight out from Stocker's Lake to other lakes in the area. Although the extent of the flights is uncertain, birds

certainly move to Bury, Batchworth, Inn's, 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, although a number of large Carp are present.

4.4 Inn's Lake

- **Location (TQ 042934).** Inn's Lake is located immediately to the north of Springwell Lane (and Springwell Lake) and to the south of Stocker's Lake.
- **Size and topography.** Inn's Lake is 6.7 hectares in extent and oblong in shape. The lake is relatively shallow with several small islands and a large number of gravel bars which are exposed when water levels are low.
- **Habitats.** Aquatic weeds, mainly Nuttall's Pondweed, are abundant within the lake. Marginal vegetation is present in a sporadic and thin band around the lake. Branched Bur-reed, Reed Sweet-grass, Greater Pond Sedge, Greater Yellow-cress and Common Reed are among the prominent species. A stand of Lesser Reedmace is present along the eastern bank.

Scattered trees are found around the lake margins and beyond this a more continuous cover of increasingly mature trees borders the site, and has a screening effect on the lake. These include self-set trees such as Crack and other willows and Alders, as well as a range of planted trees. The majority of the vegetation on the surrounding banks is species-poor grassland, dominated by False Oat-grass and rank herbaceous plants.

- **Key waterbird species.** A moderately important site for feeding waterbirds, notably for Gadwall and Wigeon when aquatic weeds are in abundance. Breeding birds are also well represented for such a small lake with three broods of Tufted Duck in 2007. A survey in 1994 found four-eight pairs of Tufted Duck, a pair of Gadwall and 14 pairs of Coot (White 1994).
- **Ecological links.** Clear links to both Stocker's Lake and Springwell Lake, with birds moving between the three sites. Stocker's Lake provides a refuge for birds disturbed from Inn's Lake.
- **Sensitivity to low water levels.** Score 2, minor impact.
- **Recreational use and impacts on water birds.** Inn's Lake is fished by the Three Valleys Water angling society and has public access via a bank-side footpath over around 10% of the bank length; the remainder is accessible only to the angling club. A section is retained as a non-fishing bank. Birds appear relatively tolerant of the current level of recreational use but when larger numbers of duck are present, high levels of recreational use cause the birds to re-locate, usually to Stocker's Lake.

4.5 Springwell Lake

- **Location (TQ 042930).** 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 set in mown grassland by the eastern bank of the lake.



- **Size and topography.** Springwell Lake has a relatively long, thin shape and extends to 16 hectares. The lake was excavated in the first half of the 20th 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.** The lake surrounds are largely wooded with mature planted trees. The site supports a range of habitats including wet woodland, marginal sedge and reed swamp, marsh and grassland. A long list of plants has been recorded including several locally scarce species. Aquatic weeds are known to be abundant in some years, with Nuttall's Pondweed being recorded. The islands are covered with a variety of willows over an under-storey of marshy vegetation including Hemp Agrimony and Great Water Dock.

The majority of the lake margins support a thin band of marginal aquatic vegetation. The dominant species are Lesser and Greater Pond Sedge, Reed Canary-grass, Branched Bur-reed, Reed Sweet-grass, Hairy Willowherb and Stinging Nettle. Stands of these species are to be found alternating more open areas, around fishing swims for example. Scarce species include Hemlock water-dropwort, Dittander, Orange Balsam 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. A further marshy area is found at the northern end of the lake. Although damaged by trees planting, a range of interesting species including Valerian are present here.

Although most of the trees have a planted origin, some small areas of more natural 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.

- **Key waterbird species.** Springwell Lake is favoured by feeding waterbirds when weed is abundant within the lake, notably Gadwall and Wigeon but otherwise attracts only a low number of birds. For example, in January 1992 up to 210 Gadwall 35 Wigeon and 30 Mute Swan were recorded. Goldeneye are regularly to be found feeding on the lake but only in low numbers. Small numbers of the commoner species breed.

- **Ecological links.** Clear movements of birds from Stocker's Lake (where they roost) to Springwell Lake (where they feed). This includes Goldeneye and weed-feeding species such as Wigeon and Gadwall when aquatic weeds are abundant. 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 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 or Inn's Lakes.

4.6 Maple Lodge

- **Location (TQ 036925).** Maple Lodge is located to the east of Maple Cross village, adjacent to the Thames Water sewage works.
- **Size and topography.** Maple Lodge nature reserve extends to around 16 hectares, of which up to half is water. The lakes are all shallow.



- **Habitats.** 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 larger of the two lakes, being quite shallow, began to dry out and was being rapidly colonized by herbaceous growth.

The margins of the pools support a diversity of marginal aquatic vegetation, including Common Reed, Reed Canary-grass, Yellow Iris, Gypsywort, 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 dryer, 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. Over 180 species of moth have been recorded.

- **Key waterbird species.** Maple Lodge attracts a distinctive range of key species because of its contrasting nature to adjacent sites. 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.
- **Ecological links.** When the shallow waters of Maple Lodge 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 lose its value rapidly.
- **Recreational use and impacts on water birds.** The only recreational use is as a nature reserve; with the observation hides provided and the screened pathways, this probably has a minimal effect on waterbirds.

4.7 Lynsters Lake

- **Location (TQ 035918).**

Lynsters Lake is 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.



- **Size and topography.** A large lake of around 23 ha with several peninsulas and islands.

A number of ridges just below the surface are exposed as islands at lower water levels.

- **Habitats.** Lynsters Lake has 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. These areas are attractive to geese and Wigeon. 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 open water supports abundant submerged aquatic weeds in many years, mainly Nuttall's Pondweed. Huge numbers of Common Blue Damselflies are noted during the summer months.

- **Key waterbird species.** The fields adjacent to the lake are a regular haunt of both Greylag and Greater Canada Geese on one of the few sites where grazed grassland occurs adjacent to water bodies. Other wild geese occasionally join them. Waterbird numbers are generally unremarkable but increase when aquatic weed forms an abundant food resource, notably for Coot, Wigeon and Gadwall. Moderate counts of feeding Tufted Duck and Pochard are regular. Smew are regular visitors and, in recent years, this is one of the favoured locations for the small population of Red-crested Pochard in the valley.

- **Ecological links.** Movements 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.

4.8 Pynesfield Lakes

- **Location (TQ 037910).** Pynesfield lakes are located east of the village of West Hyde and south of Coppermill Lane. A public footpath runs between the two lakes.
- **Size and topography.** 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 some time 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.** The lakes and their surrounds support a range of habitats including the open water, marshy margins, scrub, short-grassland and increasingly, wet woodland. The lakes are mostly surrounded by mature trees, limiting the extent of marginal aquatic vegetation. Some small stands of Branched Bur-reed, Yellow Iris and Greater Pond Sedge are present. The aquatic vegetation includes several large beds of Fringed Water-lily as well as Yellow Water-lily. Extensive mats of submerged aquatic weeds are also present, many Nuttall's Pondweed. Large numbers of damselflies were noted; Common Blue Damselflies were abundant, with smaller numbers of Red-eyed Damselfly and Black-tailed Skimmer. Islands that had been exposed at low water levels are now covered in young willows.

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.

- **Key waterbird species.** Due to the small size and disturbed nature, the lakes do not support large numbers of wintering waterbirds. However, birds do flight in to feed. The weedy lakes attract moderate numbers of Coot, Gadwall and Wigeon in peak years, and low numbers of diving duck such as Pochard and Tufted Duck are regular. Breeding birds include the usual local residents; Great Crested Grebe, Coot, Mallard and occasionally a pair or two of Tufted Duck.
- **Ecological links.** Waterbirds flight in to feed, particularly on the aquatic weeds. 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, However, water fluctuations on this lake seem to be the most extreme and the new islands are already being colonised by willows. Longer-term events may

lead to an impact on the wet woodland habitats 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.

4.9 North Troy

- **Location (TQ 038908).** North Troy Lake is located between Pynesfield and Troy Mill Lakes to the west of Harefield.



- **Size and topography.** 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 Colne Valley lakes.
- **Habitats.** Aquatic weeds may be abundant in some years (but not in 2006/07). 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. Only a few clumps of marginal aquatic vegetation exist.
- **Key waterbird species.** Generally poor for waterbirds, with only a few birds of the commoner species noted during the study. Birds probably flight here to feed when resources are available, particularly aquatic weeds, and this probably accounts for occasional higher numbers of Coot and Gadwall.
- **Ecological links.** Diving duck that feed here, principally Tufted Duck and Pochard, will flight to 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. Heavy disturbance around the banks results in all but the most tolerant birds leaving.

4.10 South Troy

- **Location (TQ 040905).** South Troy Lake (also known as Troy Mill) is located to the west of Harefield and is separated from Broadwater Lake to the south by the river Colne.
- **Size and topography.** A 22 ha almost circular lake with no islands. Some areas retain the ‘ridge and furrow’ topography typical of older mineral workings.
- **Habitats.** Like most of the other lakes in the valley, South Troy 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.
- **Key waterbird species.** The lake is a favoured feeding site for diving duck, particularly Tufted Duck, when undisturbed by water sports. In years when aquatic weeds are abundant, Coot and Gadwall may reach significant numbers. Traditionally the site attracts passage birds such as terns and occasional scarcer visitors, probably because of the size and open-ness of the lake.
- **Ecological links.** Birds flight south to Broadwater Lake when water sports activity begins. This occurs even when water sports are already active on Broadwater because of the significant refuge area at the southern end of the lake.
- **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, nearly all the waterbirds leave the site with generally only Coot and Great Crested Grebes remaining. The open structure of the lake with the 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.



4.11 Tilehouse Lakes

- **Location (TQ 038895– Tilehouse South).** The two Tilehouse lakes are located to the west of the River Colne, either side of the Three Valleys Water Company pumping station.
- **Size and topography.** Tilehouse North is the smaller lake at around five hectares, while Tilehouse south is around eight hectares. The North lake is roughly circular, shallow and with some small islands. The south lake is wedge-shaped and deeper. It has a series of recently created small islands in one corner designed as a refuge area from the water-skiing activity.



Tilehouse North



Tilehouse South

- **Habitats.** Tilehouse North is now a manicured lake attached to a house. Much of the lake margin is now mown grassland with scattered trees, both planted and self-set. Around 40% of the lake has wooded margins, mainly willows and Alders. Thin and sporadic bands of marginal vegetation are found around the lake. There appears to be little submerged aquatic vegetation, although some Yellow Water-lily beds are present.

Tilehouse South has some excellent mixed woodland of willow, Alder, Sycamore and Ash woodland towards its southern end, rising onto the valley sides. The lake formerly had extensive short grassland around the banks but this has now largely succeeded to large stands of bramble. The lake itself has a band of mixed emergent vegetation including several stands of Common Reed. The newly created islands have quickly become covered in young willow scrub.

- **Key waterbird species.** Both lakes are now less important than in the past. Water-skiing is now present on Tilehouse South during the summer months and Tilehouse North also appears disturbed. However, when these activities are not taking place the lakes still attract small numbers of feeding waterbirds. Previously the counts of Gadwall, Shoveler and Pochard were higher, and it was a regular site for Smew through the 1980s and 1990s. The lake was also used by loafing gulls and had a wintering Long-tailed Duck for a number of years.
- **Ecological links.** Birds move from both lakes to Broadwater Lake when disturbed.
- **Sensitivity to low water levels.** Score 3, minor impact. The impact on Tilehouse South may be more significant, either on the wet woodland or on the

marginal vegetation as a result of physical disturbance by the water-skiing, which may itself be affected.

- **Recreational use and impacts on water birds.** Tilehouse North appears to have no recreational use but some shooting activity was strongly suspected. Water-skiing is present on Tilehouse South but is only active during the summer months. Some islands were created to provide a refuge area during water-skiing and, to a certain extent, this works, as small numbers of grebes, coot and duck (mainly Mallard) loaf around the islands.

4.12 Broadwater Lake

- **Location (TQ 045895).** Broadwater Lake is located to the north of Moorhall Lane and to the east of the River Colne.
- **Size and topography.** 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.



- **Habitats.** The site has a high diversity of wetland habitats, including lowland clay river, alluvial grasslands, freshwater lakes of varying size and depth, gravel islands and wet alder woodland. However, these are in varying conditions at the current time. Habitat diversity is declining following the cessation of mineral extraction and natural succession continues. 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 and Alder scrub with a little Common Reed along the margins. Formerly very open and attractive to waders and duck such as Teal, this now provides an area of wet woodland.

Recent work by HMWT has reduced the amount of mature trees on the western bank adjacent to the River Colne and introduced several beds of Common Reed which are currently establishing. Several islands had the scrub and trees removed in spring 2007 providing some temporary bare ground.

Local anglers state that there has been a tremendous increase in Signal Crayfish over recent years, but which may now have stabilised or even began to decline. The Crayfish are caught and removed from the lakes. Although these non-native Crayfish certainly provide food for such species as Great Crested Grebes, Grey Heron, Cormorants and Otters, they also can have a serious impact on invertebrate and fish populations in waters where they become abundant.

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 Floating Pennywort.

- **Key waterbird species.** One of the two major waterbird refuges in the Colne Valley, significant for Shoveler, Pochard and Tufted Duck. The lake is significant for moulting waterbirds, notably Tufted Duck but also including Great Crested Grebe, Canada and Greylag Geese. Tufted Duck first established a moult refuge at Broadwater in the 1970s. A significant site for breeding waterbirds, notably Grey Heron 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 the current total of 55 nests. 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 aquatic weeds are abundant. The islands and open water provide roost sites for Little Egret, Cormorant, Goldeneye, gulls and geese.
- **Ecological links.** Birds appear to flight out widely from Broadwater to feed on other sites during the day. Little Egrets are known to flight north up the Hertfordshire valleys, notably along the Gade to beyond Hemel Hempstead.
- **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. A significant bloom of blue-green algae was present in September 2006.
- **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 1). When sailing is occurring birds relocate to the southern half of the lake in the refuge area around the wooded islands. In 2006-07 sailing was possible daily, but organised race events were held on Sundays from 10.00am and Wednesday evenings in the summer. Broadwater Lake is principally fished for Carp, with low stocking levels of specimen fish. The other main target species is the Pike. All the lakes in the Broadwater complex have high populations of Signal Crayfish as discussed above. Broadwater Lake has no angling close season.

4.13 Harefield Moor Lake

- **Location (TQ045888).** Harefield Moor Lake is located immediately to the south of Broadwater Lake, separated only by a narrow causeway.
- **Size and topography.** An oblong lake with a large number of islands, mostly with willow scrub and an active silt delta on the eastern shore. The lake has numerous shallow areas and ridges which are exposed at low water levels.
- **Habitats.** With the ongoing silting, the water remains rather turbid and water levels fluctuate so aquatic plants are scarce. Exposed muddy islands and margins have been a feature of this lake. Many of the banks are steep so emergent aquatic vegetation is scarce. However, Common Reed has been deliberately established along the western shore and is now present in several stands, although it is being shaded by rapidly growing willow. The colonising silt margin has some early successional plants but is mainly dominated by young willow. The lake is noted for specimen Carp and Signal Crayfish are present.
- **Key waterbird species.** Often favoured by diving duck and grebes for feeding, with Smew in colder winters. Little Ringed Plover and Common Tern have both nested on exposed islands in the past. Grey Heron have attempted to nest on at least one island.
- **Ecological links.** Disturbed birds move to Broadwater Lake.
- **Sensitivity to low water levels.** Score 4, moderate impact. At low water levels access to the exposed spits and islands by anglers (and probably predators such as Fox) results in disturbance to breeding birds notably, but probably also to feeding waterbirds.
- **Recreational use and impacts on water birds.** The lake is heavily used for angling, with target species being Carp and Pike. A close season is operated from March until June. This has its greatest impact at lower water levels when anglers move out onto muddy peninsulas and islands if they can. The Carp within the lake will have a significant effect on the ecology, maintaining the turbid nature of the waters and depleting the invertebrate food resource.

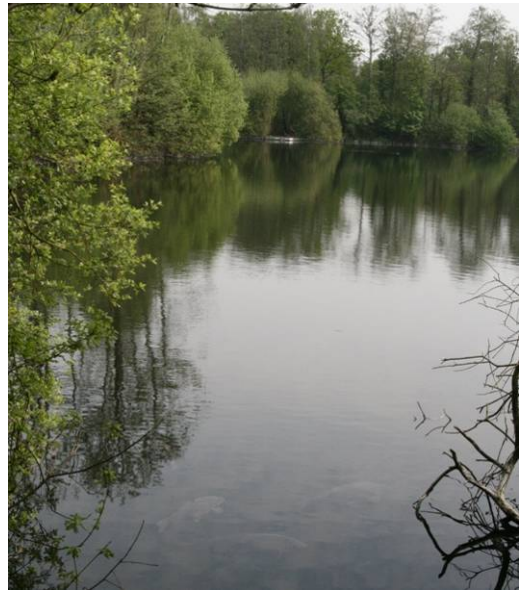
4.14 Korda Lake

- **Location (TQ045886).** Korda Lake is located at the southern end of the Broadwater Lake complex, immediately north of Moorhall Lane.
- **Size and topography.** A largely oval lake with a thin string of small islands along the western shoreline. Fairly evenly deep.
- **Habitats.** Korda is now surrounded by mature trees, mainly Alders but with a mixed belt of older woodland on its southern margin. The islands are covered in willow scrub. The western margin, adjacent to the river Colne, supports a more mixed woodland, with more obviously planted trees, and has a variety of non-native species amongst the vegetation. This lake, like others in the complex, has a large population of Signal Crayfish.
- **Key waterbird species.** Korda Lake generally only supports low numbers of birds, although it has been favoured by feeding Smew over the years. Other diving ducks, notably Tufted Duck and Goldeneye, are found feeding here at quieter times.
- **Ecological links.** Disturbed birds move to Broadwater Lake.
- **Sensitivity to low water levels.** Score 2, minor impact.
- **Recreational use and impacts on water birds.** Angling takes place on the lake, and being a smaller water body, the activity usually will disturb most of the birds located there. Korda's main quarry species are Carp and Tench (currently 'the best Tench water in the UK' according to a local angler). There is no close season.



4.15 Savay Lake

- **Location (TQ 050880).** Savay Lake is located to the south of Moorhall Lane and to the west of the Grand Union Canal.
- **Size and topography.** A large lake dissected by numerous islands and long peninsulas, forming rather narrow water areas. Much of the lake appears to be shallow.



Savay Lake – note Carp at bottom of picture!

- **Habitats.** 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 weeds are present in the shallows and patches of Yellow and White Water-lily are present, presumably planted by the anglers. In the low water levels of late 2006, some areas of shallows were exposed as islands and colonised by vegetation, such areas attracted many waterbirds.
- **Key waterbird species.** Although readily disturbed by angling activities, Savay Lake forms an important feeding site for several species. Diving Duck are well represented and more dabblers when water levels are low or submerged aquatic vegetation is available. Goosander use the site in low numbers and a small day-time roost of Cormorants is present.
- **Ecological links.** 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.

4.16 Harefield No. 2 Lake

- **Location (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.
- **Size and topography.** A large oblong lake with no islands. It appears to be rather uniformly deep.
- **Habitats.** 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. Several Hornet nests were noted in the surrounding woodland.
- **Key waterbird species.** Only low numbers of commoner species were generally noted on the lake. A few diving duck feed here, notably a few Goosander visit. Great Crested Grebe, Coot and Mallard breed.
- **Ecological links.** It was suspected that higher numbers of birds would be found flying to the lake at dawn or dusk to make use of feeding opportunities. However, no such movements were noted during the survey period. If it does occur, birds are likely to make use of the refuge area at Broadwater Lake.
- **Sensitivity to low water levels.** Score 2, minor impact.
- **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.

4.17 Denham Country Park (four water-bodies)

- **Location (TQ 055867).** Denham Country Park is located to the north of the A40, east of the village of Denham.
- **Size and topography.** 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 islands are present. An overflow channel takes water from the largest lake to the river.



The small, south-eastern lake.

- **Habitats.** The lakes all have extensively wooded surrounds, mostly Alder and willows. There is a typical understorey of damp secondary woodland, including much Pendulous Sedge. Aquatic vegetation is varied and abundant within the largely clear waters, with Fringed, White and Yellow Water-lily (presumably introduced by anglers). Nuttall's Pondweed is frequent in all lakes and Amphibious Bistort and Hornwort are also present. Marginal aquatic vegetation includes small stands of Common Reed, Greater Reedmace and Branched Bur-reed. The woodland has numerous Blackcaps, Garden warblers and Chiffchaffs. Dragonflies are abundant and include Red-eyed Damselfly and Black-tailed Skimmer. A few pairs of Reed Warblers nest in the stands of reed and a breeding pair of Kingfisher are present.
- **Key waterbird species.** Although dabbling duck were generally sparse, moderate numbers of diving duck were usually present. Notably, Goosander and Smew were both recorded as flighting to these lakes to feed. Breeding birds include good numbers of Great Crested Grebe and Coot.
- **Ecological links.** No clear links established but Tufted Duck and Pochard are likely to move to Broadwater if disturbed. The refuge/roost areas for the Goosander and Smew that frequent the lakes are unknown but may be Broadwater or the larger waters in the west of London.
- **Sensitivity to low water levels.** Score 4, moderate impact. The marginal stands of aquatic vegetation and the surrounding areas of damp 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 an issue. It is unknown if the lakes are stocked but Carp are present and they can conflict with wildlife.

5. Management recommendations

5.1 Proposals for priority use

In a wetland complex that has 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 will be difficult in practice in the Colne, with already established uses, this section proposes a priority use for each site, based primarily on the nature conservation importance as outlined in this report. The leisure use of each lake and a proposal for priority use is given in Table 31, 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.

Table 31. Proposals for priority use			
Site	Nature conservation importance	Leisure uses	Proposal for priority use
Batchworth Lake	Low	Public access Water sports Angling	Recreation
Bury Lake	Medium	Public access Water sports Angling	Integrated use
Stocker's Lake	High	Public access Angling	Nature conservation
Inn's lake	Medium	Public access Angling	Integrated use
Springwell Lake	Medium	Public access Angling	Integrated use
Maple Lodge	High	Controlled access	Nature conservation
Lynsters Lake	Medium	Angling	Integrated use
Pynesfield lake	Medium	Angling	Recreation
North Troy	Low	Angling	Recreation
South Troy	Medium	Water sports Angling	Recreation
Broadwater Lake	High	Public access Water sports Angling	Nature conservation
Tilehouse Lakes	Medium	Water sports	Integrated use
Harefield Moor	Medium	Angling	Integrated use
Korda	Medium	Public access Angling	Nature conservation
Savay	Medium	Angling	Recreation
Harefield No2	Low	Water sports Angling	Recreation
Denham Lakes	Medium	Public access Angling	Integrated use

5.2 Habitat management recommendations

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 watersports (anti-erosion). A number of management recommendations are common to many waters in the valley; these are detailed below. Following these, some site-specific recommendations are given.

5.2.1 General recommendations

Reduction of tree cover to enhance marginal aquatic vegetation. 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 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 wildfowl in conservation sites or in refuge areas.

Creation of waterbird refuge areas. Where sites are heavily 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 area, which can also be managed to enhance the survival of fish fry.

Maintenance of a natural fish population. All but one of the sites studied in the Colne Valley had 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. It is important that natural fish communities are maintained in the most important sites for waterbirds.

Reduction in Signal Crayfish. Signal Crayfish will compete for food resources with wildfowl and with fish. They appear to be abundant in the Broadwater complex of lakes and although elimination may be extremely difficult, measures should continue to reduce the population.

5.2.2 Site-specific recommendations

Batchworth Lake: enhancement of the marginal vegetation, combined with tree reduction, will help to reduce wave erosion from the water sports and improve the aesthetic appeal of the lake.

Bury Lake: enhancement of the marginal vegetation will help to reduce wave erosion from the water sports and improve the aesthetic appeal of the lake. Maintaining the openness of the causeway between Stocker's and Bury Lakes by reducing tree growth will be beneficial.

Stocker's Lake: the present regime of reducing tree cover on islands and banks to allow marginal vegetation to re-establish is beneficial and should be continued.

Inn's Lake: the rate of tree growth has been rapid in recent years and a programme of tree reduction or pollarding, especially along the Springwell Lane side would be beneficial.

Maple Lodge: the removal of colonising willow and herbaceous vegetation following recent drying of the pools is urgent. Further scrub reduction would be beneficial. A review of the hydrology and means of maintaining appropriate water levels should be undertaken.

Tilehouse South: the tree growth on the refuge islands requires coppicing.

Broadwater Lake: continuing the present programme of reduction in tree cover, especially to restore the open marshy character of the silt lagoon area. Investigate removal of the non-native Floating Pennywort.

Harefield Moor: restriction of access to spits at low water levels (refuge areas) will reduce disturbance and the removal of willow from the developing reed fringe is required.

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.

Appendix 1: 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.

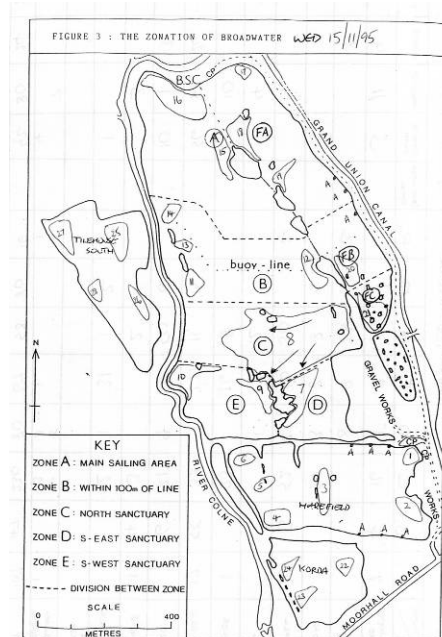
Two species, Tufted Duck and Pochard, not only all relocated within the refuge but usually increased in total numbers on the lake during the disturbed periods as additional birds arrived from other sites. Only two species (Mallard and Coot) generally showed minimal response to sailing, merely making 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
A	59	11 (-81.4)	131	53 (-59.5)	186	111 (-40.4)
B	88	12 (-86.4)	162	82 (-49.4)	146	93 (-36.3)
C	125	252 (+102)	342	421 (+23.1)	315	403 (+27.9)
D	69	95 (+37.7)	247	179 (-27.6)	108	146 (+35.2)
E	80	416 (+420)	323	581 (+79.8)	295	357 (+21.0)
Fa	57	7 (-87.8)	253	37 (-85.4)	135	49 (-63.8)
Fb	37	23 (-37.9)	168	35 (-79.2)	146	54 (-63.1)
Fc	10	16 (+60)	33	55 (+66.7)	65	59 (-9.3)
Total	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 1. The redistribution of waterbirds at Broadwater Lake during watersports activity in 1998/99.

The mean number of birds over 7 counts is shown.

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

Colne Valley Lakes

1. Batchworth Lake
2. Bury Lake
3. Stocker's Lake
4. Inns Lake
5. Springwell Lake
6. Lynsters Lakes (East & West)
7. Pynesfield Lake
8. Blue Circle Lake
9. Troy Lake
10. Broadwater Lake
11. Tilehouse Lake (North & South)
12. Harefield Lake
13. Korda Lakes
14. Harefield Marina
15. Savay Lake
16. Denham Quarry Lakes (A-E)
17. Black Park Lake
18. Cape Boards Lake
19. Langley Park Lake
20. Little Britain Lake
21. Farlows Lakes
22. Iver Water Treatment Works
23. Thorney
24. Lakes at The Common
25. Old Slade Lake
26. The Queen Mother Reservoir
27. Sunnymeads Lake
28. Kingsmead
29. Wraysbury Reservoir
30. Wraysbury Lakes (A-G)
31. King George VI Reservoir
32. Moor Lane Nature Reserve
33. Staines Reservoirs
34. Hythe End

