

Aquatic beetle and bug surveys on our reserves

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December 2016



Water beetle surveys at Pitsford Water (Photo by Josh Hellon)

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Summary

Water beetle and bug surveys were used to assess waterbodies at 21 Wildlife Trust BCN reserves. 8975 specimens were recorded; with 21 Nationally Scarce and 6 IUCN Near Threatened species. Priority waterbodies were selected based on the Community Conservation Index (CCI) and Species Quality Score (SQS) for each site. Suggestions were made for future monitoring and data analysis. Analysis also includes dragonfly and damselfly larvae.

Introduction

A programme of water beetle (Coleoptera) and water bug (Hemiptera) surveys began in 2012. The aim was to use the species present in the samples as an indicator of the ecological quality of waterbodies on reserves.

Water beetles and bugs were chosen because their ecology, status and distribution are well understood; therefore they are excellent indicators of habitat quality. Water beetles in particular are the most diverse group of invertebrates found in ditch and pond environments. Large sites of high quality may support over 50 species, and a sample of a rich ditch or pond taken in spring can have over 20 species.

Analysis also includes dragonfly (Anisoptera) and damselfly (Zygoptera) larvae.

This report will interpret the data from the monitoring and make suggestions for management of sites and waterbodies.

Method

Survey Sites

Table 1 List of survey sites with number of waterbodies sampled

Site	County	waterbodies	NGR
Abington Meadows	Northants	5	SP791 608
Barnes Meadow	Northants	11	SP 770 597
Begwary Brook	Beds	4	TL 169 564
Ditchford Lakes and Meadows	Northants	8	SP 930 678
Dogsthorpe Star Pit	Cambs	12	TF 213 025
Eye Green Brick Pit	Cambs	3	TF 230 034
Godmanchester Nature Reserve	Cambs	7	TL 2639 7149
Higham Ferrers Pits	Northants	4	SP 950 698
Irrthlingborough Lakes & Meadows	Northants	30	SP953699
Kingsthorpe	Northants	8	SP 746 627
Lattersey	Cambs	3	TL 282 966
Old Sulehay	Northants	6	TL 054 980
Pitsford Water	Northants	12	SP787699
Southfield Farm Marsh	Northants	3	SP 886 759
Stanground Wash	Cambs	7	TL 208 975
Storton's Pits	Northants	6	SP 728 600
Summer Leys	Northants	6	SP 866 633
Titchmarsh	Northants	12	TL006 812
Twywell Hills and Dales	Northants	3	SP 938 772
Wilson's Pits	Northants	6	SP 944 680
Woodston Ponds	Cambs	6	TL 175 979

Field Survey

Surveyors used a standard method (Palmer et al 2010) to collect a sample of invertebrates using a long-handled pond net. The samples were sorted on the bankside with specimens taken for identification to species-level. All adult aquatic Coleoptera and Hemiptera were counted and identified to species-level (where possible).

Data analysis

Data was analysed using Community Conservation Index (CCI) and Species Quality Score (SQS). Scores were calculated for each waterbody and combined for each site.

CCI was calculated using the method proposed by Chadd and Extence (2004). Each species was given a Conservation Score (CS) based on its rarity. CCI was calculated from the mean of these scores multiplied by the Community Score (CoS) for the sample/s. The CoS was calculated based on the highest scoring (rarest) species present in the sample/s.

SQS was calculated using the method proposed by Foster et al (1989). Each species was given a quality score based on rarity, and the SQS was produced from the mean of these values.

No analysis was done of change in CCI or SQS over time. Suggestions are made for further analysis at specific sites.

Results & Discussion

The surveys resulted in a total of 8975 species records.

Species of conservation interest.

Table 2 Species of conservation interest recorded during surveys

Species	CCI	current designation	old designation
<i>Agabus undulatus</i>	8	IUCN (2001) - Lower risk - near threatened	
<i>Berosus luridus</i>	8	IUCN (2001) - Lower risk - near threatened	Nationally Notable B
<i>Coenagrion pulchellum</i>	7	IUCN (2001) - Lower risk - near threatened	
<i>Hydrochus carinatus</i>	8	IUCN (2001) - Lower risk - near threatened	
<i>Hydrochus elongatus</i>	8	IUCN (2001) - Lower risk - near threatened	
<i>Limnebius papposus</i>	8	IUCN (2001) - Lower risk - near threatened	
<i>Cercyon bifenestratus</i>	7	Nationally Scarce. Excludes Red Listed taxa	Nationally Notable A
<i>Cercyon granarius</i>	7	Nationally Scarce. Excludes Red Listed taxa	IUCN (pre 1994) - Rare
<i>Chaetarthria seminulum</i>	7	Nationally Scarce. Excludes Red Listed taxa	
<i>Enochrus quadripunctatus</i>	7	Nationally Scarce. Excludes Red Listed taxa	
<i>Graptodytes bilineatus</i>	8	Nationally Scarce. Excludes Red Listed taxa	
<i>Gyrinus distinctus</i>	7	Nationally Scarce. Excludes Red Listed taxa	
<i>Gyrinus paykulli (bicolor)</i>	7	Nationally Scarce. Excludes Red Listed taxa	
<i>Helochaeres punctatus</i>	7	Nationally Scarce. Excludes Red Listed taxa	
<i>Helophorus dorsalis</i>	8	Nationally Scarce. Excludes Red Listed taxa	Nationally Notable B

Species	CCI	current designation	old designation
<i>Helophorus nanus</i>	7	Nationally Scarce. Excludes Red Listed taxa	Nationally Notable B
<i>Helophorus strigifrons</i>	7	Nationally Scarce. Excludes Red Listed taxa	Nationally Notable B
<i>Hydaticus seminiger</i>	7	Nationally Scarce. Excludes Red Listed taxa	
<i>Hydaticus transversalis</i>	7	Nationally Scarce. Excludes Red Listed taxa	
<i>Hydrochus angustatus</i>	7	Nationally Scarce. Excludes Red Listed taxa	
<i>Hygrotus decoratus</i>	7	Nationally Scarce. Excludes Red Listed taxa	Nationally Notable B
<i>Hygrotus nigrolineatus</i>	7	Nationally Scarce. Excludes Red Listed taxa	
<i>Noterus crassicornis</i>	7	Nationally Scarce. Excludes Red Listed taxa	
<i>Oulimnius major</i>	7	Nationally Scarce. Excludes Red Listed taxa	
<i>Rhantus frontalis</i>	7	Nationally Scarce. Excludes Red Listed taxa	Nationally Notable B
<i>Rhantus grapii</i>	7	Nationally Scarce. Excludes Red Listed taxa	Nationally Notable B
<i>Scarodytes halensis</i>	7	Nationally Scarce. Excludes Red Listed taxa	
<i>Anacaena bipustulata</i>	7	none	
<i>Cercyon convexiusculus</i>	7	none	
<i>Cercyon ustulatus</i>	7	none	
<i>Dytiscus circumflexus</i>	7	none	
<i>Enochrus coarctatus</i>	7	none	
<i>Enochrus melanocephalus</i>	7	none	
<i>Haliphus heydeni</i>	7	none	
<i>Haliphus laminatus</i>	7	none	
<i>Helochares lividus</i>	7	none	
<i>Helophorus griseus</i>	7	none	
<i>Hydraena testacea</i>	7	none	
<i>Hydroglyphus pusillus</i>	7	none	
<i>Hygrotus confluens</i>	7	none	
<i>Ilybius chalconatus</i>	7	none	
<i>Laccobius sinuatus</i>	7	none	
<i>Microvelia pygmaea</i>	7	none	Nationally Notable B
<i>Rhantus suturalis</i>	7	none	

Table 2 shows all species with a CCI Conservation score of 7 and above. CCI was initially based on JNCC designation but has been reviewed over time; these analyses are based on the 2014 CCI scores (Chadd 2015 pers. comm.) Surveyors recorded six species that are designated IUCN Lower Risk Near Threatened and 21 species listed as Nationally Scarce (Excluding red listed taxa). See appendix for definitions of these classifications.

The rarest species found were the six IUCN lower risk (near threatened) species:

- *Agabus undulatus* - is a flightless fen relict species found in permanent, well vegetated stagnant water, usually over peat or clay (Foster & Friday 2011). This species was found only at Eye Green Brick Pit.



Figure 1 *Agabus undulatus* (Photo by Dick Belgers)

- *Berosus luridus* - is usually found in acid pools over peat (Duff 2012). The species was found at four sites: Dogsthorpe Star Pit, Lattersey, Stanground Wash and Summer Leys.



Figure 2 *Berosus luridus* (photo by Lech Borowiec)

- *Coenagrion pulchellum* - Variable damselfly has a scattered distribution in England. It is usually found in slow flowing, almost stagnant, pools and ditches (Brooks 1997). The species was found at Abington Meadows, Barnes Meadow and Ditchford Lakes and Meadows.



Figure 3 *Coenagrion pulchellum* (photo by Marc Heath)

- *Hydrochus carinatus* - is a fen species associated with fluctuating meres with much moss in their drawdown areas (Foster & Friday 2011). This species was only recorded at Lattersey.



Figure 4 *Hydrochus carinatus* - (Photo by K.V. Makarov)

- *Hydrochus elongatus* - Is found in shallow, well vegetated ponds, often in beds of common reed *Phragmites australis* on clayish soils (Duff 2012). This species was recorded at six sites: Eye Green Brick Pit, Irthlingborough Lakes & Meadows, Lattersey, Pitsford Reservoir, Summer Leys and Wilson's Pits.



Figure 5 *Hydrochus elongatus* - (Photo by K.V. Makarov)

- *Limnebius papposus* - Is found in mud beside vegetated fen drains and ponds (Duff 2012). The species was found at Dogsthorpe Star Pit and Stanground Wash.



Figure 6 *Limnebius papposus* - (Photo by U.Schmidt)

CCI and SQS scores

Table 3 Number of species of conservation interest recorded at each reserve. Sorted by most species to least.

Reserve	Species of conservation interest
Pitsford Reservoir	16
Eye Green Brick Pit	13
Lattersey	13
Irthlingborough L&M	12
Titchmarsh	12
Barnes Meadow	10
Summer Leys	9
Barnes Meadow - Becks meadow	8
Dogsthorpe Star Pit	8
Storton's Pits	7
Wilson's Pits	7
Woodston Ponds	7
Abington Meadows	6
Ditchford Lakes and Meadows	6
Old Sulehay	5
Stanground Wash	4
Twywell Hills and Dales	4
Higham Ferrers Pits	3
Godmanchester Nature Reserve	2
Kingsthorpe	2
Southfield Farm Marsh	2

The site with the most species scoring CCI=7 and above was Pitsford reservoir with 16 (Table 3). Over 10 species were recorded at Barnes Meadow, Titchmarsh, Irthlingborough, Lattersey and Eye Green brick pit.

Table 4 CCI and SQS scores by reserve - sorted by highest CCI

reserve	CCI	SQS
Lattersey	33.19	3.67
Dogsthorpe Star Pit	29.31	2.85
Eye Green Brick Pit	28.01	3.28
Wilson's Pits	27.72	2.86
Irthlingborough L&M	25.05	2.38
Pitsford Reservoir	24.75	2.83
Stanground Wash	24.49	1.90
Godmanchester Nature Reserve	24.09	2.78
Summer Leys	23.39	2.60
Titchmarsh	18.98	3.18
Higham Ferrers Pits	18.51	3.02
Old Sulehay	18.17	2.17
Woodston Ponds	17.60	2.53
Barnes Meadow - Becks meadow	17.55	2.47
Twywell Hills and Dales	17.50	2.40
Barnes Meadow	16.58	2.15
Abington Meadows	16.27	2.40
Ditchford Lakes and Meadows	15.95	2.19
Storton's Pits	15.53	2.29
Southfield Farm Marsh	12.69	1.43
Kingsthorpe	10.28	1.64
Begwary Brook	5.10	1.60

Nine reserves were considered to be of very high conservation value with a CCI of 20 or above (Table 4): Lattersey, Dogsthorpe Star Pit, Eye Green Brick Pit, Wilson's Pits, Irthlingborough L&M, Pitsford Reservoir, Stanground Wash, Godmanchester Nature Reserve and Summer Leys. These sites also had high species quality scores.

Table 5 Waterbodies with CCI score of 30 and above. Sorted by highest CCI score.

reserve	waterbody	CS	Max CCI	COS	CCI	SQS
Dogsthorpe Star Pit	Pond 3	4.08	8	10	40.77	4.33
Pitsford Reservoir	Walgrave Temporary Pond	3.75	8	10	37.50	3.75
Lattersey	Finger Lake	3.56	8	10	35.60	3.94
Dogsthorpe Star Pit	Area 1	3.29	8	10	32.94	3.28
Lattersey	Temporary pond and/or other temporary wet areas	3.22	8	10	32.16	3.19
Wilson's Pits	Finger Scrapes	3.20	8	10	32.00	3.20
Summer Leys	Scrape	3.12	8	10	31.17	3.00
Dogsthorpe Star Pit	Group of Small Ponds at Edge of Reserve	3.08	8	10	30.77	2.81
Pitsford Reservoir	Walgrave New Pond	3.05	8	10	30.45	3.52
Dogsthorpe Star Pit	Small scrapes	3.04	8	10	30.37	3.05

CCI scores for individual waterbodies (Table 5) were particularly high; with 44 waterbodies scoring 20 or above. Therefore it was considered that CCI >30 should be used to select priority waterbodies. The table shows that 10 waterbodies had a CCI score above 30. This indicates that these waterbodies are of very high conservation value. All of these sites had at least one rare species present with a CCI of 8. These can be considered priority waterbodies for conservation.

Management Suggestions

The following suggestions are made for management and future monitoring:

- It is suggested that routine monitoring is continued at the priority waterbodies identified in this report. Monitoring will not continue at other waterbodies unless a management requirement is identified;
- It is suggested that monitoring is reduced to two visits per year (spring & autumn) at all sites. Surveying in spring and autumn increases the likelihood of catching specimens all species present, due to the different life-cycle stages present throughout the year. Four visits is considered an unnecessarily intensive sampling effort;
- A single sample should be taken at each waterbody – ensuring that all microhabitats are surveyed;
- Where a particularly diverse invertebrate population has been identified, or the presence of national rarities; this may influence future management planning. In

these cases it may be appropriate to identify the invertebrate community as a Feature of the reserve;

- At specific sites the data will be analysed in more detail. Where Reserves staff have identified a requirement, it is possible to identify trends in CCI and SQS over time. This can be used to assess the impact of habitat succession on aquatic invertebrate communities;
- 2016 data will be added when available. This data will be used to review the suggestions made in this report;
- All data from the surveys will be sent to the appropriate Local Biological Record Centre (LRC). Data is now collected in a format that enables it to be uploaded to the LRC databases;
- It is suggested that additional surveys are conducted at the priority waterbodies identified in this report. Freshwater Habitat Trust (2016) methodologies were trialled in 2016 to enable rapid assessment of pond habitat, plants and invertebrates. The results of these surveys can be used to assess the relative ecological status of our waterbodies and allow comparison with national datasets.

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Acknowledgements

Many thanks to all the Wildlife Trust volunteers involved in the surveys and data input – the project would not have been possible without your support.

Particular thanks to Graham Warnes, Kevin Rowley, John Showers, Simon Heyward and Robin Bailey for your support with surveys, training and analysis.

Thanks to Henry Stanier for establishing the project.

Thanks to Richard Chadd and Nathan Hall at the Environment Agency for your support.

Appendices

Appendix 1 Conservation designations

IUCN (2001) - Lower risk - near threatened - Taxa which do not qualify for Lower Risk (conservation dependent), but which are close to qualifying for Vulnerable. In Britain, this category includes species which occur in 15 or fewer hectads but do not qualify as Critically Endangered, Endangered or Vulnerable.

Nationally Scarce - Occurring in 16-100 hectads in Great Britain. Excludes rare species qualifying under the main IUCN criteria

Nationally Notable B - Taxa which do not fall within RDB categories but which are none-the-less uncommon in Great Britain and thought to occur in between 31 and 100 10km squares of the National Grid or, for less-well recorded groups between eight and twenty vice-counties. Superseded by Nationally Scarce, and therefore no longer in use.

Nationally Notable A - Taxa which do not fall within RDB categories but which are none-the-less uncommon in Great Britain and thought to occur in 30 or fewer 10km squares of the National Grid or, for less well-recorded groups, within seven or fewer vice-counties. Superseded by Nationally Scarce, and therefore no longer in use.

Appendix 2 Community Conservation Index (Chadd & Extence, 2004)

To calculate CCI, each macroinvertebrate species in a sample is assigned its predefined conservation score (Table 1). These scores are summed and an average is calculated by dividing by the number of scoring taxa present. The average community score is then multiplied by the community score calculated using Table 2. If different community scores are calculated for BMWP and Highest Conservation Score, the highest value is used to calculate community score. The calculation for CCI is summarised below:

Community Conservation Index (CCI) = Average Conservation Score X Community Score

Table 1 Conservation Scores for UK macroinvertebrates

Conservation Score	Definition
10	RDB1 Endangered
9	RDB2 Vulnerable
8	RDB3 Rare
7	Nationally Notable (But not RDB Status)
6	Regionally Notable
5	Local
4	Occasional - Not in categories 10-5, occur in up to 10% samples from similar habitats
3	Frequent - Not in categories 10-5, occur in 10-25% samples from similar habitats
2	Common - Not in categories 10-5, occur in 25-50% samples from similar habitats
1	Occasional - Not in categories 10-5, occur in 50-100% samples from similar habitats

Designations of categories 1-5 are based on NCC/JNCC Designations

Table 2 Community Score Categories

Community Score	BMWP	Highest Conservation Score
15	301+	10
12	251-300	9
10	201-250	8
7	151-200	7
5	101-150	5 or 6
3	51-100	3 or 4
1	1-50	1 or 2
0	0	Scoring taxa absent

Higher scoring sites are considered to have higher conservation value, with these boundaries providing a guide to interpretation:

Table 3 CCI Interpretation

CCI	Conservation Value
0-5	Low Conservation Value - Only common species and/or low taxon richness
>5-10	Moderate Conservation Value - At least one restricted distribution species and/or moderate taxon richness
>10-15	Fairly High Conservation Value - At least one uncommon species, or several of restricted distribution and/or high taxon richness
>15-20	High Conservation Value - Several uncommon species, one of which may be nationally rare and/or high taxon richness
>20	Very High Conservation Value - Several rare species of national importance or at least one RDB species and/or high taxon richness.

Appendix 3 - results for all sites in alphabetical order by reserve and waterbody

reserve	feature	CS	Max CCI	COS	CCI	SQS
Abington Meadows	Abington Meadows	2.32	7	7	16.27	2.40
Abington Meadows	Compartment 1 additional flood water	3.00	7	7	21.00	2.40
Abington Meadows	Ditch	2.04	7	7	14.26	2.04
Abington Meadows	Far Pond	2.40	7	7	16.82	2.11
Abington Meadows	River	1.86	7	7	12.99	4.34
Abington Meadows	Top Pond	2.45	7	7	17.17	2.35
Barnes Meadow	Barnes Meadow	2.37	7	7	16.58	2.15
Barnes Meadow	Dead Arm	2.21	7	7	15.48	2.15
Barnes Meadow	Island Ditch	2.50	7	7	17.52	2.34
Barnes Meadow	Main Ditch	2.30	7	7	16.10	2.16
Barnes Meadow	Parallel Ditch	2.50	7	7	17.47	2.30
Barnes Meadow	Scrape	2.20	7	7	15.43	1.96
Barnes Meadow	Shallow Lake	2.35	7	7	16.46	2.03
Barnes Meadow - Becks meadow	Barnes Meadow - Becks meadow	2.51	7	7	17.55	2.47
Barnes Meadow - Becks meadow	Hardingstone ditch	1.98	7	7	13.85	2.08
Barnes Meadow - Becks meadow	Hardingstone Dyke	2.13	7	7	14.88	3.00
Barnes Meadow - Becks meadow	Nene River	3.00	7	7	21.00	3.50
Barnes Meadow - Becks meadow	River	2.93	7	7	20.53	3.33
Barnes Meadow - Becks meadow	Scrape	2.85	7	7	19.96	2.51
Begwary Brook	Begwary Brook	1.70	3	3	5.10	1.60
Begwary Brook	Ditch	1.80	3	3	5.40	2.00

reserve	feature	CS	Max CCI	COS	CCI	SQS
Begwary Brook	Far corner	3.00	3	3	9.00	0.00
Begwary Brook	Small Ponds	1.25	2	1	1.25	1.33
Ditchford Lakes and Meadows	Ditchford Lakes and Meadows	2.28	7	7	15.95	2.19
Ditchford Lakes and Meadows	DITCH 01 BETWEEN EAST & WEST MEADOW	1.71	7	7	12.00	1.74
Ditchford Lakes and Meadows	DITCH 02 BETWEEN EAST & SOUTH MEADOW	1.31	4	3	3.92	1.30
Ditchford Lakes and Meadows	New Stream in High Meadow	1.22	2	1	1.22	1.33
Ditchford Lakes and Meadows	NORTH EAST GRAVEL PIT	2.49	7	7	17.41	2.49
Ditchford Lakes and Meadows	North West Gravel Pit	2.54	7	7	17.75	2.34
Ditchford Lakes and Meadows	SOUTH EAST GRAVEL PIT	2.37	7	7	16.58	2.63
Ditchford Lakes and Meadows	STREAM NORTH WEST TIP OF THE RESERVE (PART OF OVERFLOW SYSTEM)	1.73	7	7	12.09	1.40
Dogsthorpe Star Pit	Dogsthorpe Star Pit	2.93	8	10	29.31	2.85
Dogsthorpe Star Pit	Area 1	3.29	8	10	32.94	3.28
Dogsthorpe Star Pit	Area 2	2.38	6	5	11.88	1.92
Dogsthorpe Star Pit	Area 3	2.10	5	5	10.50	2.25
Dogsthorpe Star Pit	Area 4	2.63	7	7	18.42	2.44
Dogsthorpe Star Pit	Far End of Cross Ditch	3.17	7	7	22.17	6.00
Dogsthorpe Star Pit	Group of Small Ponds at Edge of Reserve	3.08	8	10	30.77	2.81
Dogsthorpe Star Pit	Near edge cross ditch	2.06	4	3	6.17	1.90
Dogsthorpe Star Pit	Pond 1	2.63	7	7	18.38	2.50
Dogsthorpe Star Pit	Pond 2	2.87	7	7	20.09	2.56
Dogsthorpe Star Pit	Pond 3	4.08	8	10	40.77	4.33
Dogsthorpe Star Pit	Scrape	3.69	7	7	25.85	5.33
Dogsthorpe Star Pit	Small scrapes	3.04	8	10	30.37	3.05
Eye Green Brick Pit	Eye Green Brick Pit	2.80	8	10	28.01	3.28
Eye Green Brick Pit	Finger Lakes	2.63	8	10	26.32	2.98
Eye Green Brick Pit	Main Lake	2.98	7	7	20.83	3.41
Eye Green Brick Pit	Shallow scrape	2.86	8	10	28.57	3.61
Godmanchester Nature Reserve	Godmanchester Nature Reserve	2.41	8	10	24.09	2.78
Godmanchester Nature Reserve	Cookes Stream	1.60	3	3	4.80	2.67
Godmanchester Nature Reserve	Island Lake	2.33	7	7	16.33	2.57
Godmanchester Nature Reserve	Mouldings Meadow	2.57	8	10	25.65	3.00
Godmanchester Nature Reserve	Peter Prince memorial Lake	2.30	4	3	6.90	2.60
Godmanchester Nature Reserve	Small Pond	1.57	3	3	4.71	2.67
Godmanchester Nature Reserve	Teddies Lake	2.79	5	5	13.93	2.75
Godmanchester Nature Reserve	Widgeon Pond	3.20	4	3	9.60	2.00

reserve	feature	CS	Max CCI	COS	CCI	SQS
Higham Ferrers Pits	Higham Ferrers Pits	2.64	7	7	18.51	3.02
Higham Ferrers Pits	far corner of lake	2.39	6	5	11.93	3.40
Higham Ferrers Pits	First cutting	2.91	7	7	20.38	3.70
Higham Ferrers Pits	left lake edge	2.85	7	7	19.96	2.74
Higham Ferrers Pits	pond and inlet	2.50	7	7	17.50	2.90
Irthlingborough L&M	Irthlingborough L&M	2.51	8	10	25.05	2.38
Irthlingborough L&M	1. Path Ditch	1.97	7	7	13.82	1.79
Irthlingborough L&M	1st Lake	3.00	7	7	21.00	3.07
Irthlingborough L&M	2. Willow ponds	2.54	7	7	17.75	2.27
Irthlingborough L&M	4. Finger Lakes	2.88	8	10	28.78	3.19
Irthlingborough L&M	5. Willow Ponds	2.15	4	3	6.45	1.90
Irthlingborough L&M	6.Lake peninsular	3.29	7	7	23.06	3.00
Irthlingborough L&M	7. lake corner	2.94	6	5	14.69	2.33
Irthlingborough L&M	Causeway	2.86	7	7	20.05	2.62
Irthlingborough L&M	Comp15 (Old Comp16)	2.23	6	5	11.14	2.37
Irthlingborough L&M	Comp9 (Old Comp15)	1.93	4	3	5.78	2.20
Irthlingborough L&M	Cycle Path Lake Margin	2.50	5	5	12.50	3.33
Irthlingborough L&M	Ditch alongside Comp13	2.21	7	7	15.48	1.77
Irthlingborough L&M	Kings Meadow Lake	2.45	4	3	7.35	3.20
Irthlingborough L&M	Lake Margin	2.69	6	5	13.45	2.54
Irthlingborough L&M	Location 10	2.49	8	10	24.87	2.51
Irthlingborough L&M	Location 11	2.37	7	7	16.60	2.00
Irthlingborough L&M	Location 15	2.89	7	7	20.20	3.19
Irthlingborough L&M	Location 16	2.62	7	7	18.35	2.25
Irthlingborough L&M	Location 9	2.39	8	10	23.86	2.64
Irthlingborough L&M	Lock Lake	2.77	7	7	19.41	2.60
Irthlingborough L&M	Meadow Ditch	3.40	7	7	23.80	2.25
Irthlingborough L&M	meadows	2.53	7	7	17.72	2.39
Irthlingborough L&M	New Ditch in Comp12	2.50	7	7	17.50	1.92
Irthlingborough L&M	Old Ditch (in Old Comp9) Side of Cycle Track (NewComp12)	2.30	7	7	16.11	2.13
Irthlingborough L&M	Path edges	1.50	2	1	1.50	2.00
Irthlingborough L&M	Pond Comp13	2.29	5	5	11.44	2.08
Irthlingborough L&M	Ponds Comp13	2.50	4	3	7.50	4.00
Irthlingborough L&M	River Lake Corner	2.00	4	3	6.00	2.00
Irthlingborough L&M	Road Edge Main Side	2.33	4	3	7.00	3.00
Irthlingborough L&M	Road Edge River Side	3.00	7	7	21.00	3.33
Irthlingborough L&M	Stream	1.67	5	5	8.33	1.33
Irthlingborough L&M	Stream between feature 4 and 5	3.00	5	5	15.00	2.67
Irthlingborough L&M	Water Meadow	2.84	7	7	19.89	2.26
Kingsthorpe	Kingsthorpe	1.47	7	7	10.28	1.64
Kingsthorpe	Dipping platform	1.35	7	7	9.43	1.56
Kingsthorpe	Oxbow	1.14	2	1	1.14	1.75
Kingsthorpe	River	1.40	2	1	1.40	1.40
Kingsthorpe	River Entrance	1.40	2	1	1.40	1.00
Kingsthorpe	Scrapes	1.64	7	7	11.45	1.89
Kingsthorpe	Stream entrance	1.75	5	5	8.75	1.43

reserve	feature	CS	Max CCI	COS	CCI	SQS
Lattersey	Lattersey	3.32	8	10	33.19	3.67
Lattersey	Finger Lake	3.56	8	10	35.60	3.94
Lattersey	Main Lake	2.95	8	10	29.51	3.43
Lattersey	Temporary pond and/or other temporary wet areas	3.22	8	10	32.16	3.19
Old Sulehay	Old Sulehay	2.60	7	7	18.17	2.17
Old Sulehay	Flowing marsh	1.33	2	1	1.33	1.50
Old Sulehay	Juncus inflexus mire	2.25	4	3	6.75	1.25
Old Sulehay	Lower Stream	2.75	6	5	13.75	2.00
Old Sulehay	Pond	3.18	7	7	22.25	2.63
Old Sulehay	Upper mire spring	1.00	1	1	1.00	1.67
Old Sulehay	Upper stream	1.33	2	1	1.33	1.50
Pitsford Reservoir	Pitsford Reservoir	2.48	8	10	24.75	2.83
Pitsford Reservoir	Christie's Copse	2.32	7	7	16.26	2.13
Pitsford Reservoir	Holcot NE pond	2.92	8	10	29.25	4.30
Pitsford Reservoir	Holcot Stream	1.78	8	10	17.78	2.35
Pitsford Reservoir	Scaldwell Ditch	1.40	7	7	9.78	1.51
Pitsford Reservoir	Scaldwell Stream	1.87	7	7	13.08	2.15
Pitsford Reservoir	Spring Pond	2.58	8	10	25.79	2.85
Pitsford Reservoir	Walgrave Ditch	1.87	7	7	13.06	1.93
Pitsford Reservoir	Walgrave New Pond	3.05	8	10	30.45	3.52
Pitsford Reservoir	Walgrave Stream	2.07	7	7	14.46	2.33
Pitsford Reservoir	Walgrave stream and ditch	2.23	8	10	22.30	2.55
Pitsford Reservoir	Walgrave Temporary Pond	3.75	8	10	37.50	3.75
Southfield Farm Marsh	Southfield Farm Marsh	1.81	7	7	12.69	1.43
Southfield Farm Marsh	F1 Crescent Ditch	1.72	5	5	8.59	1.26
Southfield Farm Marsh	F2 Diagonal Ditch	1.53	5	5	7.63	1.30
Southfield Farm Marsh	F3 Main Pond	2.10	7	7	14.69	1.68
Stanground Wash	Stanground Wash	2.45	8	10	24.49	1.90
Stanground Wash	Site 1 - ditch	2.06	8	10	20.59	1.85
Stanground Wash	Site 2 - temporary wet areas	3.00	7	7	21.00	2.20
Stanground Wash	Site 3 - ditch	2.31	7	7	16.19	1.50
Stanground Wash	Site 4 - ditch	2.82	7	7	19.76	1.92
Stanground Wash	Site 5 - ditch	2.25	7	7	15.75	1.87
Stanground Wash	Site 6 - ditch	2.92	8	10	29.23	2.36
Stanground Wash	Site 7 - ditch	1.13	2	1	1.13	1.00
Storton's Pits	Storton's Pits	2.22	7	7	15.53	2.29
Storton's Pits	East Lake	2.37	7	7	16.59	2.15
Storton's Pits	Far Pond	2.14	7	7	14.98	2.46
Storton's Pits	New Ditch	2.03	7	7	14.24	2.14
Storton's Pits	Old Ditch	1.63	7	7	11.42	1.79
Storton's Pits	River Ditch	1.54	4	3	4.61	1.56
Storton's Pits	West Lake	2.60	7	7	18.19	2.96
Summer Leys	Summer Leys	2.34	8	10	23.39	2.60
Summer Leys	Brook Main Lake Feeder	1.79	7	7	12.56	2.24
Summer Leys	Ditch railway line	2.09	5	5	10.45	2.46
Summer Leys	Marigold Pond	2.40	7	7	16.79	2.49

reserve	feature	CS	Max CCI	COS	CCI	SQS
Summer Leys	Ryeholme Bridge	1.52	5	5	7.58	1.66
Summer Leys	Scrape	3.12	8	10	31.17	3.00
Summer Leys	Toad Pond	2.63	8	10	26.30	3.04
Titchmarsh	Titchmarsh	2.71	7	7	18.98	3.18
Titchmarsh	Feature 1: Peter Scott Scrape North	2.96	7	7	20.75	3.37
Titchmarsh	Feature 10: North Meadow Scrape 2 (2nd oldest)	2.68	7	7	18.74	3.22
Titchmarsh	Feature 11: North Meadow Scrape 3 (3rd oldest)	2.94	7	7	20.60	4.00
Titchmarsh	Feature 12: North Meadow Scrape 4 (youngest, most easterly)	2.73	7	7	19.09	2.60
Titchmarsh	Feature 2: Peter Scott Scrape South	2.78	7	7	19.49	3.27
Titchmarsh	Feature 3: marsh behind Peter Scott Scrapes	2.25	7	7	15.78	2.35
Titchmarsh	Feature 4: Finger ditches	2.67	7	7	18.67	3.27
Titchmarsh	Feature 5: North Meadow Ring Ditch, West End	2.58	7	7	18.07	2.73
Titchmarsh	Feature 6: North Meadow Ring Ditch East End	2.36	7	7	16.52	2.75
Titchmarsh	Feature 7: Aldwincle Lake outfall to Brancey Brook	2.05	5	5	10.23	2.00
Titchmarsh	Feature 8: Outfall scrape	3.19	7	7	22.33	4.75
Titchmarsh	Feature 9: North Meadow Scrape 1 oldest, most easterly	2.70	7	7	18.90	3.07
Twywell Hills and Dales	Twywell Hills and Dales	2.50	7	7	17.50	2.40
Twywell Hills and Dales	F1 Main Pond	1.94	5	5	9.69	1.82
Twywell Hills and Dales	F2 Whitestones pond 1	3.48	7	7	24.33	3.46
Twywell Hills and Dales	F3 Whitestones pond 2	2.69	7	7	18.80	2.62
Wilson's Pits	Wilson's Pits	2.77	8	10	27.72	2.86
Wilson's Pits	1st Lake Margin	2.63	7	7	18.40	3.06
Wilson's Pits	3rd lake edge	2.90	7	7	20.30	3.25
Wilson's Pits	Bird Hide Scrapes	2.64	7	7	18.51	2.23
Wilson's Pits	Finger Scrapes	3.20	8	10	32.00	3.20
Wilson's Pits	Old Lake Edge	2.81	7	7	19.65	3.20
Wilson's Pits	River	1.52	4	3	4.57	1.00
Woodston Ponds	Woodston Ponds	2.51	7	7	17.60	2.53
Woodston Ponds	Bobs Pond	2.80	7	7	19.62	2.41
Woodston Ponds	Ditch	2.73	7	7	19.09	4.09
Woodston Ponds	Lake	2.00	5	5	10.00	2.33
Woodston Ponds	Large Reed Bed	2.23	7	7	15.62	2.20
Woodston Ponds	Small Reed Bed	1.90	7	7	13.30	2.22
Woodston Ponds	Steep cutting	2.36	6	5	11.82	1.75