

urban areas, with the first recorded population in the UK found in Bedford in 1903 (Beebee & Griffiths, 2000). Since then, the toads have been spread around the country with new populations being recorded frequently. This spread has taken the form of both deliberate and accidental introductions as well as the toads themselves dispersing. In Cambridgeshire, one population is in Cambridge and the second is in the village of Thorney, east of Peterborough. The Cambridge population is quite sizeable, estimated at around 100 individuals, although further surveys are needed to confirm this (Allain & Goodman, 2018). The population at Thorney comes from a record of tadpoles in an agricultural drainage ditch. It is not known whether or not the population is still viable, and further investigation is needed to confirm their presence.

The Cambridge population has been present for over a decade, restricted to the rear gardens of a small number of properties near the city centre (Baker, 2007). Our investigations have primarily focused on population size and disease screening. DNA samples have been taken, which when compared against an online database, show that the toads originated in northern Spain. . Recently it has come to our attention that another long-established population of Midwife Toads exists within Cambridgeshire, in the town of St Neots. The toads are present in a residential area in the north-west of the town, where they are unlikely to spread far.

Being approximately 16 miles away from Cambridge, a separate introduction event in St Neots is more likely than dispersal. Whether this was via the pet trade, either accidentally or intentionally, is not known. In the future we aim to take a DNA sample from the population in order to carry out a similar analysis to that completed with the Cambridge toads. From the data that we have collected so far and from communication with local residents, we believe that the St Neots population is a lot smaller than the Cambridge one. The toads were first identified due to their electronic bell-like call and have been observed to be breeding over the past couple of years. At present they can only be found in a small number of gardens, living in water features and small ponds. All records have been submitted to CPERC and future monitoring of the toads is planned.

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Cambridge Amphibian Survey Report 2017 Steven J. R. Allain & Mark J. Goodman

Introduction

For the past five years, the Cambridgeshire and Peterborough Amphibian and Reptile Group has been actively surveying a number of amphibian sites across Cambridge and the surrounding area. The goal of the ongoing project is to monitor bodies of freshwater for signs of amphibians and gather long-term data on population trends. This mostly involves nocturnal searching for adult amphibians, during the breeding season from March to June (although some preliminary surveys were undertaken to check for early signs of activity).

Other signs of amphibians also include their eggs and larvae which can often be found in ponds after breeding, when the adults themselves have mostly dispersed into the terrestrial environment.

The project is designed to meet standardised guidance protocols (Griffiths *et al.*, 1996; Sewell *et al.*, 2013) with surveys carried out weekly (weather permitting). One aim of this study was to educate local residents on the importance of recording local species; this also included getting them to participate. The surveys also help provide a better understanding of migration patterns towards breeding ponds and may help us better mitigate hazards and dangers to amphibian populations. The species focused on in this ongoing study are the most common of the native amphibian species found in Cambridgeshire, i.e. Common Frog (*Rana temporaria*), Common Toad (*Bufo bufo*), Smooth Newt (*Lissotriton vulgaris*) and Great Crested Newt (*Triturus cristatus*).

Methods

Four sites were surveyed, mostly after nightfall by torchlight, and the detected presence of amphibian species was recorded, along with the occurrence of fish and the size of spawn clump numbers (Common Frog). Other factors that were also analysed were the suitability of each pond to sustain Great Crested Newts. Amphibians were found to be present at three of the four sites, despite their recorded presence at all four sites previously. The sites were surveyed with the help of trained volunteers who were members of the Cambridgeshire and Peterborough Amphibian and Reptile Group (CPARG). Our surveys also allow for the training of additional volunteers, who can then go off and replicate similar surveys within the county.

Survey locations

Site 1: Cambridge City Crematorium (TL39906258)

The City Crematorium has a total of six ponds, of which we surveyed four on a regular basis, as in previous years since 2013. Although they are all concrete-lined with small areas of refugia in the corners, they support a high diversity of pond life. The drainage ditches that surround the main area of the crematorium were also surveyed, as these tend to trap some amphibians on their migration back to breeding ponds. The ponds are also free of fish and are exposed to the elements due to a lack of tree cover.

Site 2: Chesterton (TL46485957)

This site consists of a man-made waterway that has been built behind a block of flats on the old Phillips/Simocco site. The site itself consists of open-water and reeds which is the perfect breeding habitat for amphibians such as the Common Frog or Smooth Newts. The site is close to the River Cam and Logan's Meadow LNR.

Site 3: Regatta Court (TL46685951)

Regatta Court is a small managed housing complex located by the River Cam, off Newmarket Road. The site has a single large concrete-lined pond which is home to fish as well as amphibians. The site was surveyed after we received reports of large numbers of Common Toads in the area. The pond backs onto Stourbridge Common LNR, meaning dispersal for amphibians is relatively easy. The area is also a registered toad crossing site and so some of our time at the site was spent helping toads cross the roads to their breeding pond.

Site 4: Wandlebury Country Park (TL49405340)

Wandlebury Country Park is the site of an Iron Age hill fort and is maintained by Cambridge Past, Present & Future (PPF). Wandlebury contains two ponds, the 'Cherry Pond', on the main path around the ring, and the 'Dew Pond', in the gardens of the residence. Our efforts

were mainly focused on the 'Cherry Pond', with less frequent visits to the 'Dew Pond' when the Ecology Officer was present. The Cherry Pond is used by Cambridge PPF for educational purposes such as pond dipping, because of its high abundance of aquatic invertebrates and other pond life. This was a strong indicator that the pond was a good candidate for amphibian surveys.

Survey Protocol

All four sites were surveyed by shining either LED torches (rated at >200 lumens) and spot lights (rated at 1,000,000 candle light) from the bank and into the water. The torches were shined until approximately three metres across the surface of the pond (if it was large enough) and used to detect amphibians at the water's surface. Closer to the bank, the torches cut much more deeply into the water and so more amphibians were likely to be detected there. This method was reliable for detecting newts and other amphibians within ponds that had little vegetation or those that were shallow. For deeper areas, two or more torches were used to converge the beams to give the column of light a better chance of penetrating the water. The perimeter of each waterbody was surveyed, including a buffer zone of approximately two metres around each body of water. This was designed to count any amphibians that may have left the water body, disturbed by our arrival. Any amphibians found within the buffer zone were also included in the counts. At some sites egg-searching was undertaken if the habitats were favourable, e.g. vegetation growing close to the banks. This involved searching submerged vegetation for folded leaves, indicating presence of newt eggs. A 4-in-1 multifunctional environmental tester was used, when available, to gather water and air temperature data at the sites surveyed.

Results

Signs of adult amphibians were discovered at all four of the sites. A preliminary survey at Bramblefields LNR early in the season revealed that the pond was dry. Occasional visits throughout the season revealed that despite the rain, the pond was not retaining water and so unfortunately this pond was not surveyed in 2017. We can be sure that the amphibians seen in the pond in 2016 did not breed, unless they found somewhere else nearby to do so. At the four sites surveyed, breeding behaviour was observed, although no newt eggs were found during any of the searches.

Peak Count Data

Table 1. Summary of the data collected at four sites surveyed, site name corresponds with the information on each location above.

Site	Date	Species	Peak Count	Air Temp (°C)	Water Temp (°C)
Site 1	18/06/2017	Common Frog	6	18.1	15.7
	27/06/2017	Common Toad	3	20.3	17.18
	27/06/2017	Smooth Newt	47	20.3	17.18
	27/06/2017	Great Crested Newt	33	20.3	17.18
Site 2	08/03/2017	Common Frog	80	8.6	8.6
	08/03/2017	Common Toad	9	8.6	8.6
	12/03/2017	Smooth Newt	69	18.6	18.4
Site 3	20/03/2017	Common Frog	17	N/A	N/A
	12/03/2017	Common Toad	188	16.1	16
	30/03/2017	Smooth Newt	14	17	14.8
Site 4	05/05/2017	Smooth Newt	12	N/A	N/A

HSI Scores

The Habitat Suitability Index (HSI) is a scoring system that analyses ten points of a habitat in order to establish whether or not that habitat is suitable for great crested newts (Oldham *et al.*, 2000). The scoring system works by giving the ten points listed below a number between 0 and 1. The mean of these is then calculated to give the HSI of the pond or water body being studied.

SI1 = The pond's/water body's geographical location.

SI2 = The surface area of the pond/water body.

SI3 = The permanence of the pond/water body.

SI4 = The water quality of the pond/water body.

SI5 = The total area of shading on the pond/water body.

SI6 = The number of waterfowl on the pond/water body.

SI7 = The occurrence of fish in the pond/water body.

SI8 = The density of ponds surrounding the one you are studying.

SI9 = The proportion of newt friendly habitat surrounding the pond being studied.

SI10 = The total macrophyte cover in the pond/water body.

The equation used to work out the HSI for a pond using these ten points is:

$$HSI = (SI1 \times SI2 \times SI3 \times SI4 \times SI5 \times SI6 \times SI7 \times SI8 \times SI9 \times SI10)^{1/10}$$

Table 2. Table showing the HSI scores and ranks of the four locations surveyed. Scores were calculated using knowledge of the ponds, their location and ecology which has been built up over the duration of the project period. † indicates scores taken from the 2014 Cambridge Amphibian Report (Allain & Goodman, 2015), * indicates scores taken from the 2015 Cambridge Amphibian Report (Allain & Goodman, 2017).

Location	Score	Rank
Cambridge City Crematorium†	0.66	Above average
Chesterton*	0.77	Good
Regatta Court*	0.70	Good
Wandlebury Country Park*	0.88	Excellent

Discussion

Adult amphibians were found at all four sites surveyed, with frogspawn and toadspawn also found at two sites, the ones where breeding was observed to be taking place (Chesterton and Regatta Court). Cambridge City Crematorium had recovered well from its maintenance in 2016, with high counts of both species of newt present there. Counts were not as high as in previous years and because the concrete-lined ponds haven't aged well, two were ripped out and relined in late 2017. Hopefully the amphibians will move back in. The other two ponds will be refurbished in the coming years if the replacement of the first two is a success. Unlike the previous year there was no lack of frogspawn at Chesterton, with a peak count of 255 clumps seen on 12th March, the highest seen at the site since we started surveying the site in 2013. We are unsure as to how much of the spawn hatched and metamorphosed due to fluctuating water levels at the site, but can assume that there were high levels of success based on the observations from previous years.

Like most of our native amphibian species, Common Frogs may not breed every year due to the huge metabolic investment needed to produce a clump of spawn. This means that next

year we can expect to see a dip in these numbers, perhaps similar to those seen in previous years. Frogspawn was also seen in abundance at Regatta Court, but counting its exact quantity was made difficult by the density of the vegetation. 2017 was the third year in a row that toadspawn was found on surveys at Regatta Court, which is a promising sign that this population is still thriving. Toadspawn is a lot harder to quantify than frogspawn due to it forming strings rather than clumps. The peak count of 188 toads (most of which were male) is a sign that the toads are doing well and that our mitigation measures, such as toad ladders and toad patrols, are performing the task they were designed to do. The larvae of Great Crested Newts and Smooth Newts (Figure inside back cover) were found in high number at Cambridge City Crematorium, indicating that the newts there had a successful breeding year.

All of the sites had HSI scores above average, meaning that potentially they are all suitable for Great Crested Newts; however one of the main limiting factors will be the presence of fish (Oldham *et al.*, 2000). Unfortunately, it is known that 3-Spined Sticklebacks (*Gasterosteus aculeatus*) are present at the Chesterton site, and this may have a negative effect on local amphibian populations, including deterring Great Crested Newts from colonising the area (if a local metapopulation is ready to expand). The site is already home to Smooth Newts and Great Crested Newts are known to be nearby, the fluctuating water level of the site and the presence of predators may be a reason for the lack of Great Crested Newts. Another factor that affects the distribution of amphibians is the permanence of ponds, i.e. for breeding (Semlitsch, 2008). If ponds dry out too early as observed at Bramblefields, then amphibians can't breed.

CPARG are currently collecting data on the number of ponds in the area, as these may be utilised by amphibians as stepping stones between breeding ponds and hibernation sites. We hope to use these data in future, to inform strategic management and habitat creation and thus increase connectivity between the various amphibian meta-populations within the Cambridge area. At the end of the project all records were submitted to the Cambridgeshire and Peterborough Environmental Records Centre (CPERC).

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Recent notable COLEOPTERA (Beetles)

Bill Mansfield

Below are some notable beetles that have been recorded in Cambridgeshire between 2016 and 2018. Emphasis has been given to the larger or more colourful beetles that are more easily distinguished, although those new to the Vice County * are also listed. Contributors of records are Stephen Boulton (SB), Andrew Brown (AB), Ian Ellis (IE), Martin Fowlie (MF), Peter Kirby (PK), Steve Lane (SL), Bill Mansfield (BM), Mark Telfer (MT) Ceri Watkins (CW) and Stuart Warrington (SW).

Carabidae (Ground beetles)

***Chlaenius nigricornis* (Fabricius, 1787) Nationally Scarce (Nb)**

Recorded from Peterborough and Wicken Fen in 2016, 2017 and 2018. (AB, MF, PK, SL)

***Demetrias imperialis* (Germar, 1824) Nationally Scarce (Nb)**

Recorded yearly from Ely, King's Dyke NR and Rings End LN. (PK, BM)

***Ophonus ardosiacus* (Lutshnik, 1922) Nationally Scarce (Nb)**

This beetle has become quite common in recent years. It can be found in the developing fruiting heads of Wild Carrot (*Daucus carota*). Recorded in 2018 from King's Dyke and Cottenham. (MF, PK)

***Pterostichus macer* (Marsham, 1802) Local**

A local species which can be very abundant where found. Recorded in just three sites at Peterborough and Ely in 2016, 2017 and 2018. (PK, BM)

***Zabrus tenebrioides* (Goeze, 1777) Nationally Scarce (NS)**

Two recent records for this very scarce beetle which feeds on wheat and other grain in arable fields. Recorded in Upware in 2018 (AB, SL)

***Amara majuscula* (Chaudoir, 1850) New to Britain ***

New to Britain in 2015. First recorded in Cambridgeshire in 2015 at Littleport and Cottenham to light. (MF, BM)

***Harpalus froelichii* (Sturm, 1818) * Nationally Rare (NR), IUCN Near Threatened**

A Breckland species thought to be expanding range. Two Cambridgeshire records, 2013 and 2016 to light. (BM, MT)

Histeridae (Clown beetles)

***Saprinus virescens* (Paykull, 1798) Nationally Rare (NR), IUCN Near Threatened**

Not recorded in Cambridgeshire since 2011 until 2018 in same site at Upware. A search in 2018 found 6 new sites, in the same 10km square and 1 in a new 10km square. Very conspicuous beetle found under mats of Knotgrass (*Polygonum aviculare*). (AB, SL, BM)