



West Winch Housing Access Road

Environmental Statement Chapter 8: Biodiversity Annex 8.16 Great Crested Newt Survey Report

Author: WSP

Document Reference: NCC/3.08.20

Version Number: 01

Date: December 2023



Contents

1	Introduction	3
1.1	Methodology	3
1.2	Results	14
1.3	References	20

Tables

Table 1-1	– Pond suitability categorisation based upon HIS score	4
Table 1-2	– Survey Dates.....	9
Table 1-3	– Summary of HIS and eDNA results.....	17
Table 1-4	– Summary of presence/likely absence survey results.....	19



1 Introduction

1.1 Methodology

Overview

- 1.1.1 Great Crested Newt (GCN) *Triturus cristatus* surveys were undertaken for the Proposed Scheme within 500m of the (previous) Scheme Boundary (all maps have been updated with the latest Scheme Boundary (October 2023)).
- 1.1.2 Habitat Suitability Index (HSI), Environmental DNA (eDNA) and Population Size Class Assessment (PSCA) surveys were undertaken in 2019. Further Habitat Suitability Index, eDNA and Population Size Class Assessment surveys were undertaken in 2021. Water bodies which received positive eDNA results in 2019 were not subject to further eDNA survey in 2021 and population survey were undertaken for those waterbodies.
- 1.1.3 Population Size Class Assessments were undertaken over six visits in 2021. One pond that was dry in 2021 and was subsequently surveyed using eDNA in 2023 but was not surveyed to determine the population size class.
- 1.1.4 The Survey Area in relation to GCN comprised a 500m buffer from the Scheme Boundary. All suitable water bodies, where no significant barriers preventing GCN dispersal into the Proposed Scheme, identified as having potential to support GCN populations were surveyed. The Proposed Scheme and Survey Area are presented in Appendix A.

Habitat Suitability Index (HSI) Assessment

- 1.1.5 All water bodies within the Scheme Boundary and within a 500m radius of the Scheme Boundary to which access was possible, were assessed for their suitability to support GCN, using standard HSI assessment method (ARG UK, 2010) and (Oldham, Keeble, Swan, & Jeffcote, 2000). Water bodies were identified using 1:25,000 OS mapping; this was also cross referenced against aerial photography.



1.1.6 Water bodies were assessed and scored on ten key variables which are known to influence breeding populations of GCNs, in accordance with standard methods (ARG UK, 2010). These variables are;

- Geographic location;
- Water body area;
- Water body permanence;
- Water quality;
- Water body shading;
- Impact of waterfowl;
- Fish stocks;
- Number of water bodies within 1km;
- Terrestrial habitat around the water body; and
- Macrophyte cover of the water body.

1.1.7 Scores for each of the above variables were used to calculate an overall HSI value for each water body. This was then cross referenced with the guidelines (ARG UK, 2010) to assign the pond to one of five categories, poor, below average, average, good or excellent, as shown in Table 1-1.

Table 1-1 – Pond suitability categorisation based upon HIS score

HSI score	Pond suitability
<0.5	Poor
0.5 – 0.59	Below average
0.6 – 0.69	Average
0.7 – 0.79	Good
>0.8	Excellent



eDNA Water Sampling

- 1.1.8 All water bodies found to provide suitable habitat for GCN e.g., those ranging from poor to excellent suitability (see Table 1 above), to which access was possible, were subject to further survey to determine the presence or likely absence of this species. Water bodies found not to provide any suitable habitat or where isolated by sufficient barriers to dispersal were not subject to further survey.
- 1.1.9 The survey comprised eDNA (eDNA refers to environmental deoxyribonucleic acid. The genetic material of organisms found within the environment) water sampling. Sampling of eDNA was undertaken concurrently with the HSI survey. Professional judgement gained from previous experience and knowledge of GCN ecology, was exercised in selecting water bodies appropriate for sampling.
- 1.1.10 Research published in 2013 established a technique for reliably detecting newt eDNA in water bodies, and Natural England subsequently approved a protocol for this to become a survey method. The surveys were undertaken following survey techniques described in Biggs et al (Biggs, et al., 2014):
- A single visit to each target water body was made between mid-April and late-June, during the newt breeding season.
 - Twenty sub-samples of water were taken from each water body using sterile sampling equipment provided by the laboratory (NatureMetrics).
 - The locations of the 20 sub-samples were spaced as evenly as possible around the water body margin, and where possible targeted areas of vegetation which could be used as egg laying substrate and open water areas which newts could use for displaying.
 - The sub-samples were mixed and pipetted into six sample tubes containing an alcohol and pH buffer solution.



- The samples were sent to NatureMetrics for laboratory testing using real time Polymerase Chain Reaction (PCR) to amplify part of the cytochrome 1 gene found in mitochondrial DNA.
- The water samples from each water body were assigned a positive or negative result as well as a score between 0 and 12 representing the number of positive replicates from a series of 12.

1.1.11 A positive eDNA result concludes that GCN DNA is present in the water sample, whilst a negative result concludes that the presence of GCN is considered unlikely within that water body. Negative eDNA results cannot conclusively say that GCN are not present within the water body, rather that DNA from the species was not detected. GCN expel DNA into the ponds in which they live when they deposit; skin cells, faeces, mucus, sperm or eggs into the water. The DNA in this material can persist, and be detected, in the water for several weeks. A negative eDNA result for the purposes of this report provides a conclusion of 'likely absent'.

Population Size Class Assessment

1.1.12 Population Size Class Assessment surveys were completed on water bodies where GCN presence were confirmed following laboratory analysis of eDNA samples. Population Size Class Assessment surveys were undertaken on a small number of water bodies without an eDNA survey being undertaken. This was due the water bodies being discovered within the survey period and the discovery of GCN eggs within those ponds, negating the need for eDNA surveys. The water bodies were not shown on aerial photography and OS maps. Population Size Class Assessment surveys were also undertaken on one pond without an eDNA survey being undertaken, because GCN presence was confirmed during the HSI survey where GCN eggs were discovered.

1.1.13 Population Size Class Assessment involved completing six survey visits to each waterbody, spread across the recommended survey period (Gent & Gibson, 2003) (English Nature, 2001) (mid-March to mid-June, with at least three of the visits falling between mid-April and mid-May). Survey visits were



completed in suitable weather conditions, when overnight temperatures were above 5°C and wind and rain were not sufficient to affect the torch survey results (through disturbance to the water surface).

1.1.14 Surveys were carried out with reference to good practice guidance (English Nature, 2001) with three survey methods used during each survey visit to enable an assessment of the population size class present. The methods consisted of:

- **Torchlight searching** - each water body was searched systematically for amphibians after dark using a bright torch; all amphibians observed were recorded, with the number of male, female and juvenile newts of each species noted. The duration of the torchlight survey was determined by the time taken to walk slowly around the water body perimeter; and
- **Bottle-trapping** – each water body was trapped using bottle traps constructed and set in accordance with standard guidance (JNCC, 1998). Traps were set at a ratio of approximately one for every 2m of water body perimeter, where access allowed. The traps were set prior to dusk and checked and removed the following morning.
- **Egg searching** - suitable vegetation in each water body was searched for newt eggs which are laid on submerged or floating leaves and folded around the egg. The duration of the egg search was either the amount of time required to search thoroughly all vegetation present, or a maximum of 15 minutes per survey visit (Once a great crested newt egg had been recorded, no egg searching occurred on subsequent visits to avoid unnecessary uncovering of eggs which would then be at an increased risk of predation);

1.1.15 The resultant peak counts of GCN were then cross referenced with standard guidelines (English Nature, 2001) to establish the population size class (The maximum number of adult GCN counted at a waterbody on any one visit



through either torch survey or bottle trapping). The population size class categories within the guidelines are reproduced below for information:

- Small – maximum peak adult counts of up to 10;
- Medium – maximum peak adult counts of between 11 and 100; and
- Large – maximum peak adult counts over 100.

Dates of Survey and Personnel

1.1.16 Lead surveyors were competent and experienced in conducting these surveys and each hold a Natural England survey licence for this species (licence numbers can be made available on request).

1.1.17 The dates for each survey visit are displayed in Table 1-2 below.

Table 1-2 – Survey Dates

Water Body Ref.	Date of HSI	Date of eDNA	Dates of Population Survey
1	16/04/2021	16/04/2021	N/A
2	N/A	N/A	10/05/2021 17/05/2021 24/05/2021 01/06/2021 07/06/2021 10/06/2021
3	N/A	N/A	10/05/2021 17/05/2021 24/05/2021 01/06/2021 07/06/2021 10/06/2021
4	N/A	N/A	10/05/2021 17/05/2021 24/05/2021 01/06/2021 07/06/2021 10/06/2021
5	18/04/2023	18/04/2023	N/A
6	16/04/2021	N/A	N/A
7	16/04/2021	N/A	N/A

Water Body Ref.	Date of HSI	Date of eDNA	Dates of Population Survey
8	16/04/2021	16/04/2021	N/A
9	16/04/2021	N/A	N/A
10	17/04/2019	17/04/2019	27/04/2021 07/05/2021 12/05/2021 26/05/2021 03/06/2021 08/06/2021
11	16/04/2021	N/A	27/04/2021 10/05/2021 17/05/2021 24/05/2021 01/06/2021 07/06/2021
12	11/05/2021	11/05/2021	N/A
13	11/05/2021	11/05/2021	N/A
14	16/04/2021	16/04/2021	N/A
15	16/04/2021	16/04/2021	N/A
16	16/04/2021	16/04/2021	N/A
17	16/04/2021	16/04/2021	N/A

Water Body Ref.	Date of HSI	Date of eDNA	Dates of Population Survey
18	16/04/2021	16/04/2021	24/04/2021 10/05/2021 17/05/2021 24/05/2021 01/06/2021 07/06/2021
19	17/04/2019	17/04/2019	16/03/2021 31/03/2021 27/04/2021 10/05/2021 24/05/2021 01/06/2021
20	16/04/2021	16/04/2021	17/05/2021 24/05/2021 01/06/2021 07/06/2021 10/06/2021 14/06/2021
21	16/04/2021	16/04/2021	N/A
22	16/04/2021	16/04/2021	N/A

Water Body Ref.	Date of HSI	Date of eDNA	Dates of Population Survey
23	17/04/2019	17/04/2019	16/03/2021 31/03/2021 27/04/2021 10/05/2021 17/05/2021 24/05/2021
24	16/04/2021	16/04/2021	N/A
25	N/A	N/A	N/A
26	N/A	N/A	N/A



Notes and Limitations

- 1.1.18 Pond 19 was only subject to bottle-trapping for three surveys due to a water shrew *Neomys fodiens* being trapped during the third survey. Egg searching was carried out during the first survey, however suitable vegetation for eggs was not present, so this method was no longer considered effective. Torchlight survey was the sole method used throughout the Population Size Class Assessment surveys and therefore higher numbers of GCN may have been recorded if bottle trapping were possible for all six surveys within this water body. The population size class has therefore been provided with consideration to data from other waterbodies surveyed and the availability of terrestrial habitat within 500m of Pond 19. The population size is considered robust and sufficient for use in a licence application to Natural England.
- 1.1.19 A thorough egg search was completed during the first Population Size Class Assessment survey, however if GCN eggs were not discovered during this survey a thorough fingertip search of vegetation was not undertaken during each Population Size Class Assessment survey. GCN eggs were observed while undertaking subsequent bottle-trapping surveys as a thorough search during each survey was not practicable. This is not considered to be a limitation.
- 1.1.20 Pond 11 was not subject to bottle-trapping during the first Population Size Class Assessment survey as the water body had been identified as unsuitable for bottle-trapping due to its size and depth during the HSI assessment. Between the HSI assessment and first Population Size Class Assessment survey the water body increased in size and depth which meant that it became suitable for bottle-trapping and was bottle trapped in subsequent surveys. During the first survey Pond 11 was only subject to a torchlight survey, however this is not considered to be a limitation.
- 1.1.21 At the time of the HSI and eDNA surveys, a total of two water bodies were found to be dry. Sampling took place within the recommended period (mid-April – late June). It is considered highly unlikely these dry water bodies support viable populations of GCN, even if they hold water from time to time.



1.1.22 Population Size Class Assessment surveys were undertaken on a small number of water bodies without a HSI and eDNA survey being undertaken. For some of the water bodies this was due to them being discovered within the survey period, meaning there was limited time to undertake a HSI and eDNA survey and receive the results. The water bodies were not shown on aerial photography, OS maps or in the Extended Phase 1 Habitat Survey, undertaken by WSP in 2019. This was the case for three ponds. Population Size Class Assessment surveys were also undertaken on three ponds without an eDNA survey being undertaken, as GCN eggs were discovered during the HSI survey, confirming the presence of GCN.

1.2 Results

Overview

- 1.2.1 In total, 21 water bodies were visited as part of the HSI assessment. Of these two were dry and one had been filled in, while the other 18 attained results ranging from 'poor' to 'good'. A total of 18 of these water bodies were then subject to eDNA testing. Three water bodies were not subject to eDNA testing as GCN eggs were discovered during the HSI assessment which confirmed the presence of GCN. Three ponds were subject to PSCA surveys without a HSI assessment or eDNA survey.
- 1.2.2 GCN were detected within ten ponds through either positive eDNA results or egg searches. Eleven returned a negative result indicating the likely absence of GCN and four returned a positive result indicating presence of GCN.
- 1.2.3 Ponds 2, 3, 4, 10, 11, 18, 19, 20 and 23 were subject to Population Size Class Assessment surveys. GCN were identified in Pond 2, 3, 4, 5, 10, 11, 18, 19, 20 and 23 (as shown in Table 4). The adult GCN peak count results ranged from 3 to 24, constituting small and medium populations associated with individual ponds. GCN were not recorded in Pond 19, however due to limitations (see Notes and Limitations) it is considered that a "small" population size class was present.



1.2.4 Newts were confirmed present within Pond 5 through eDNA survey in 2023. No PSCA was undertaken for this waterbody.

Habitat Suitability Index Assessment

1.2.5 A summary of the HSI results and location information for the water bodies is included in Appendix A. The HSI calculation is included in Appendix B and the water body numbers correspond to those in Appendix A.

1.2.6 A total of 24 water bodies required a HSI survey. Of these water bodies, a total of two were found to be dry (Pond 6 and 7), and one water body had been filled in (Pond 9), therefore only 21 water bodies were able to be subject to HSI survey. The water bodies in each category are as follows;

- **Poor** – seven water bodies (Pond 1, 8, 12, 13, 14, 21, 22);
- **Below average** – one water body (Pond 18);
- **Average** – five water bodies (Pond 2, 3, 4, 11, 15, 16, 17, 19);
- **Good** – four water bodies (Pond 5, 10, 20, 23, 24);
- **Excellent** – zero water bodies.

1.2.7 Two ponds (Pond 25 and 26) did not require a HSI assessment as they were located west of the A10, which acts as a significant barrier to dispersal of GCN into the Scheme, therefore are geographically isolated from the Scheme.

eDNA Water Sampling

1.2.8 A summary of the 2019 and 2021 eDNA results is provided alongside the HSI scores in Table 1-3 and are shown in Appendix C.

1.2.9 Water sampling for eDNA analysis was undertaken immediately following the HSI assessment and of the 21 water bodies visited, 14 were able to be subject to eDNA sampling during the optimal period (mid-April – late-June). Two water bodies could not be sampled due to being dry, and one pond had been filled in. Three water bodies were not subject to eDNA testing due to GCN eggs being discovered during the HSI assessment which confirm the



presence of GCN. One water body was subject to Population Size Class Assessment without an eDNA test being undertaken.

Table 1-3 – Summary of HIS and eDNA results

Water body Ref.	Grid Reference	Proximity to Scheme (m)	Connectivity to Scheme Boundary	HSI Score	HSI Category	eDNA Result
Pond 1	TF 63955 18118	365	Over 250m from Scheme Boundary	0.46	Poor	Negative
Pond 2	TF 63456 17986	0	Within Scheme Boundary	0.65	Average	N/A – eggs present
Pond 3	TF 63361 17977	0	Within Scheme Boundary	0.65	Average	N/A – eggs present
Pond 4	TF 63392 17964	0	Within Scheme Boundary	0.65	Average	N/A – eggs present
Pond 5	TF 63546 17936	0	Within Scheme Boundary	0.71	Good	Positive
Pond 6	TF 63417 17842	20	Good	Dry	Dry	Not suitable for eDNA testing - dry
Pond 7	TF 63427 17838	25	Good	Dry	Dry	Not suitable for eDNA testing - dry
Pond 8	TF 63368 17835	10	Good	0.46	Poor	Negative
Pond 9	TF 64003 17772	225	Good	Filled in	Filled in	Not suitable for eDNA testing – pond filled in
Pond 10	TF 63619 17741	44	Good	0.70	Good	Positive
Pond 11	TF 63595 17130	300	Over 250m from Scheme Boundary	0.62	Average	Positive
Pond 12	TF 64130 16994	30	Good	0.464	Poor	Negative
Pond 13	TF 64138 16980	16	Good	0.49	Poor	Negative
Pond 14	TF 63633 16952	270	Over 250m from Scheme Boundary	0.35	Poor	Negative
Pond 15	TF 63372 16889	440	Over 250m from Scheme Boundary	0.62	Average	Negative
Pond 16	TF 63993 16807	6	Good	0.65	Average	Negative
Pond 17	TF 63995 16794	6	Good	0.65	Average	Negative
Pond 18	TF 64177 16614	190	Good	0.55	Below average	Positive
Pond 19	TF 64369 16423	410	Over 250m from Scheme Boundary	0.61	Average	Positive
Pond 20	TF 64403 16150	350	Over 250m from Scheme Boundary	0.72	Good	Positive
Pond 21	TF 63257 15721	335	Over 250m from Scheme Boundary	0.32	Poor	Negative
Pond 22	TF 63952 15615	170	Good	0.48	Poor	Negative
Pond 23	TF 64179 15587	390	Over 250m from Scheme Boundary	0.75	Good	Positive
Pond 24	TF 64111 15328	345	Over 250m from Scheme Boundary	0.79	Good	Negative
Pond 25	TF 63083 14443	251	Over 250m from Scheme Boundary – geographically isolated	N/A	N/A	N/A
Pond 26	TF 63359 14424	388	Over 250m from Scheme Boundary – geographically isolated	N/A	N/A	N/A



Population Size Class Assessment

- 1.2.10 GCN were present in Ponds 2, 3, 4, 5, 10, 11, 18, 20 and 23 as shown in Appendix D. The results of the GCN presence/likely absence and Population Size Class Assessment survey are summarised in Table 1-4 below. GCN presence was detected in Pond 19 from eDNA surveys undertaken in 2019, however they were not detected during population surveys in 2021. GCN were detected through eDNA survey of Pond 5 in 2023 and PSCA surveys were not undertaken for this pond.
- 1.2.11 Pond 11 was only subject to bottle-trapping for three surveys due to a water shrew being trapped during the third survey (see Notes and Limitations). No GCN were observed within this waterbody during the three bottle trapping surveys, torchlight survey and GCN eggs were not found during the egg searches. It is acknowledged that GCN may have been recorded using bottle-trapping methods for six surveys had these been possible, however it is not expected that the number observed would have exceeded the upper limit for a small population (ten GCN) and it was therefore considered that a “small” population size class was present.



Table 1-4 – Summary of presence/likely absence survey results

Water body ref.	Adult GCN peak count	Breeding activity recorded	GCN population size class
Pond 2	24	Yes	Medium
Pond 3	3	No	Small
Pond 4	3	No	Small
Pond 5	N/A	N/A	Unknown
Pond 10	22	Yes	Medium
Pond 11	3	Yes	Small
Pond 18	8	Yes	Small
Pond 19	0	No	Small
Pond 20	9	No	Small
Pond 23	13	Yes	Medium

1.2.12 All surveys were completed under appropriate conditions, with overnight minimum temperatures ranging between 5°C and 15°C and pond conditions suitable for methods used to be effective. Full details of the surveys, including weather and pond conditions on each survey visit, are included in Appendix E.

1.2.13 A map summarising the likely presence/absence results of the 2021 ponds is shown in Appendix F.



1.3 References

- ARG UK, (2010). ARG UK Advice Note 5: Great Crested Newt Habitat Suitability Index. UK: Amphibian and Reptile Groups of the United Kingdom.
- Biggs, J., Ewald, N., Valentini, A., Gabouriaud, C., Griffiths, R., Foster, J., Dunn, F. (2014). Analytical and methodological development for improved surveillance of great crested newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (*Triturus cristatus*) environmental DNA. Oxford: Freshwater Habitats Trust.
- CIEEM, (2019). Advice Note on the Lifespan of Ecological Reports and Surveys. Winchester: CIEEM.
- English Nature, (2001). Great Crested Newt Mitigation Guidelines. Peterborough: English Nature.
- Gent, A., & Gibson, S. (2003). Herpetofauna Workers Manual. Peterborough: Joint Nature Conservation Committee.
- Oldham, R., Keeble, J., Swan, M., & Jeffcote, M. (2000). Evaluating the suitability of habitat for the great crested newt. *Herpetological Journal* (10), 143-155.
- WSP, (2021). West Winch Housing Access Road Environmental Impact Assessment – Scoping Report. Cambridge.