



Elite Ecology

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**Land off A539,
Hanmer**



Great Crested Newt eDNA Survey Report

July 2020



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Great Crested Newt eDNA Survey Report

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0. Executive Summary

This report has been prepared at the request of CL Edwards and Son. It relates to the potential presence of great crested newts (*Triturus cristatus*) within a pond on the proposed development site located at the Land off A539, Hanmer, SY13 3EN (Central OS Grid Reference: SJ 46126 40423). To fulfill this brief, Elite Ecology undertook both a desktop study and a field survey.

The plans do involve this pond and due to its close proximity to the site the local council has asked for a great crested newt (*Triturus cristatus*) survey. The current proposals involve the construction of wooden lodges.

The **HSI water body suitability for the surveyed water features** were as follows:

- Pond (P1) = 0.81 = Excellent Suitability.

The results from the eDNA sample of **P1** came back **positive**.

Based on the information gathered during the various site visits, great crested newts (*Triturus cristatus*) are in the surveyed pond.

Due to P1 coming back with a positive result, a full population size class assessment is required. This may affect the measures within the impact assessment, but may also be required to support a mitigation licence if the rapid risk assessment deems this to be necessary. Surveys should also focus on the other ponds identified as per Figure 2, if land access is obtained. This is required to ascertain whether the site will cause any fragmentation to local populations. This involves 6 surveys using 3 survey methods between March and June, with half of these surveys required between mid-April and mid-May.

Some optional site enhancements could be made for amphibians around the surveyed site.

- **Optional:** The site could be enhanced for amphibians through the inclusions of a rough grassland section around the boundary, two [Frogitat Ceramic Frog and Toad Houses](#) and two hibernacula.

Please refer to **Section 6** for a more in-depth description.

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1. Introduction

1.1 Report rationale

This report has been prepared at the request of CL Edwards and Son. It relates to the potential presence of great crested newts (*Triturus cristatus*) within a pond on the proposed development site located at the Land off A539, Hanmer, SY13 3EN (Central OS Grid Reference: SJ 46126 40423). To fulfill this brief, Elite Ecology undertook both a desktop study and a field survey.

The main purpose of this assessment was to identify if any Great Crested Newts (*Triturus cristatus*) or other amphibians were likely to be present or impacted by the proposed works. The initial field survey was undertaken on the 30th of June 2020. The surveyors for this survey were:

Mr. Alex Fitzroy: BSc, Assistant Ecologist.

1.2 Site description and works

The site is situated in a rural area outside of Hanmer, a small village approximately 16km south west of Wrexham in Wrexham County Borough.

The pond in question is located within the site boundaries and so will be directly impacted by any work done. Photographs of the site are found within **Appendix C**.

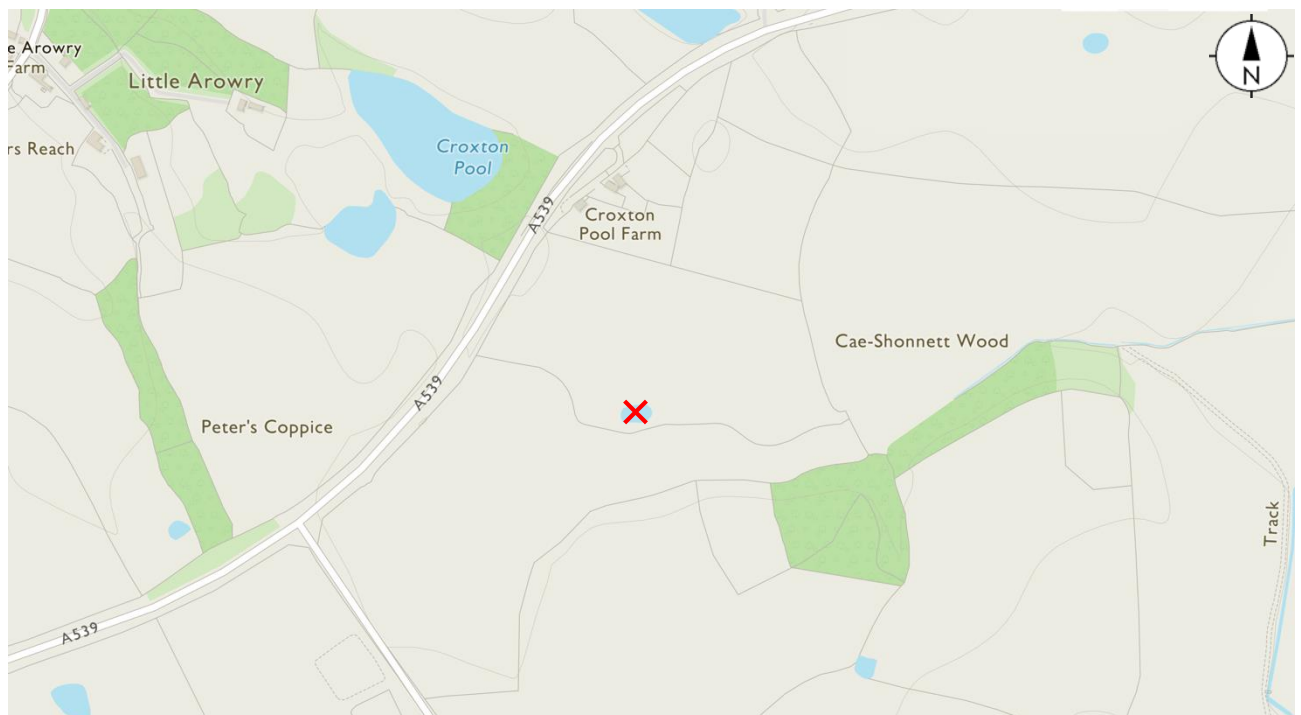
Within the wider landscape, further habitats are present. These come in the form of additional structures (and their associated land), agricultural land, broadleaved woodland and hedgerows. The habitats that surround the site also have the potential to be utilized by a variety of protected species.

The plans do involve this pond and due to its close proximity to the site the local council has asked for a great crested newt (*Triturus cristatus*) survey. The current proposals involve the construction of wooden lodges.

Figure 1: An aerial map showing the approximate location of the pond (yellow star) in relation to the Land off A539, Hanmer (Red X) and some of the local landscape.



Figure 2: An OS Map obtained from ordnancesurvey.co.uk of the pond located at the land off A539, Hanmer.



2. Survey Methodology

2.1 Desktop Survey

A variety of resources were independently consulted to assess the known local records within the nearby area and the importance of the site within the local landscape from an ecological perspective. The resources used were the Local Records Centre, www.naturalengland.org.uk, www.ordnancesurvey.co.uk, Google Maps, Google Earth and Bing Maps. A search of other relevant nature conservation information was made through the use of the Multi-Agency Geographic Information for the Countryside (MAGIC) database.

The local records centre was contacted to provide data on all protected species and designated sites within 2km of the proposed development site. Shropshire Ecological Data Network (SEDN) were the relevant local records centre for this project.

2.2 Field Survey

Walkover Survey:

A walkover survey of the site and adjacent land (up to 250m where land access had been granted) is undertaken to ascertain the presence of habitats and suitable resources that could be utilised by local populations of Great Crested Newt (*Triturus cristatus*) and other amphibians. This process includes a visual inspection of these habitats for any amphibians during their terrestrial phase.

Habitat Suitability Index (HSI):

The Great Crested Newt Habitat Suitability Index (HSI) is a quantitative measure of habitat quality (Source: Oldham R.S., Keeble J., Swan M.J.S. & Jeffcote M. [2000]). This is used in order to evaluate the suitability of aquatic habitats for the Great Crested Newt (*Triturus cristatus*). This form of survey is used to indicate the likelihood of Great Crested Newt (*Triturus cristatus*) being present and should not be used as a replacement for a presence/absence survey. Ultimately, the HSI can be used to evaluate the need for eDNA analyses on the pond(s) of interest or further presence/absence surveys.

Bottle Trapping:

If required, this method involved placing plastic bottles into the surveyed water feature, with the end inverted. This allows for amphibians to enter, but not get out. They are spaced at 2-5m intervals around the water's edge, with them being placed in such a way as to leave an air bubble at the end. These traps are placed out in the evening and left overnight to be collected the following morning. All specimens are identified and sexed for the purpose of this report.

Torch Survey:

If required, the water feature will be surveyed from the perimeter using the beam of a 1,000,000 candle power torch, which is used to penetrate the water's surface once it has gone dark. This enables the surveyor(s) to identify species such as amphibians and aquatic invertebrates that are swimming around in the water. This survey method allows for the presence/absence to be identified within the water features of interest.

Netting Survey:

If required, a hand held net is used to carefully sweep through the inspected water bodies. The net is then emptied into a plastic tray to be assessed by the surveyor(s) present, with all specimens identified to species and gender level. This survey method allows for the identification of amphibians and aquatic invertebrates that are using that water feature.

Egg Searching:

If required, a surveyor with a licence carefully inspects the aquatic vegetation to identify for the presence or absence of any eggs. This is done to ascertain if that water feature is in use as a breeding pond for Great Crested Newt (*Triturus cristatus*).

Environmental DNA (eDNA):

If required, an eDNA survey takes twenty water samples from the perimeter of the surveyed water features. This is done in order to obtain a representative sample of the waterbody and collect as much Great Crested Newt (*Triturus cristatus*) DNA as possible. These samples are taken within close proximity to potentially utilizable Great Crested Newt (*Triturus cristatus*) features (such as emergent vegetation) as well as in open water, to maximise the chances of obtaining Great Crested Newt (*Triturus cristatus*) DNA, if present.

Samples collected with a ladel are then placed into a free-standing Whirl-Pak bag where they are shaken up to mix all samples and all potential DNA to create a representative sample from the water feature. 15ml of water from the Whirl-Pak bag is then extracted with a pipette and placed into a conical tube which is already two thirds full of a base liquid. This process is repeated a further five times to produce six conical tubes in total. The tubes are shaken once again (to mix the base liquid with the water samples). They are then sent off to the laboratory for analysis.

3. Desktop Survey Results

3.1 Ecological Data Results

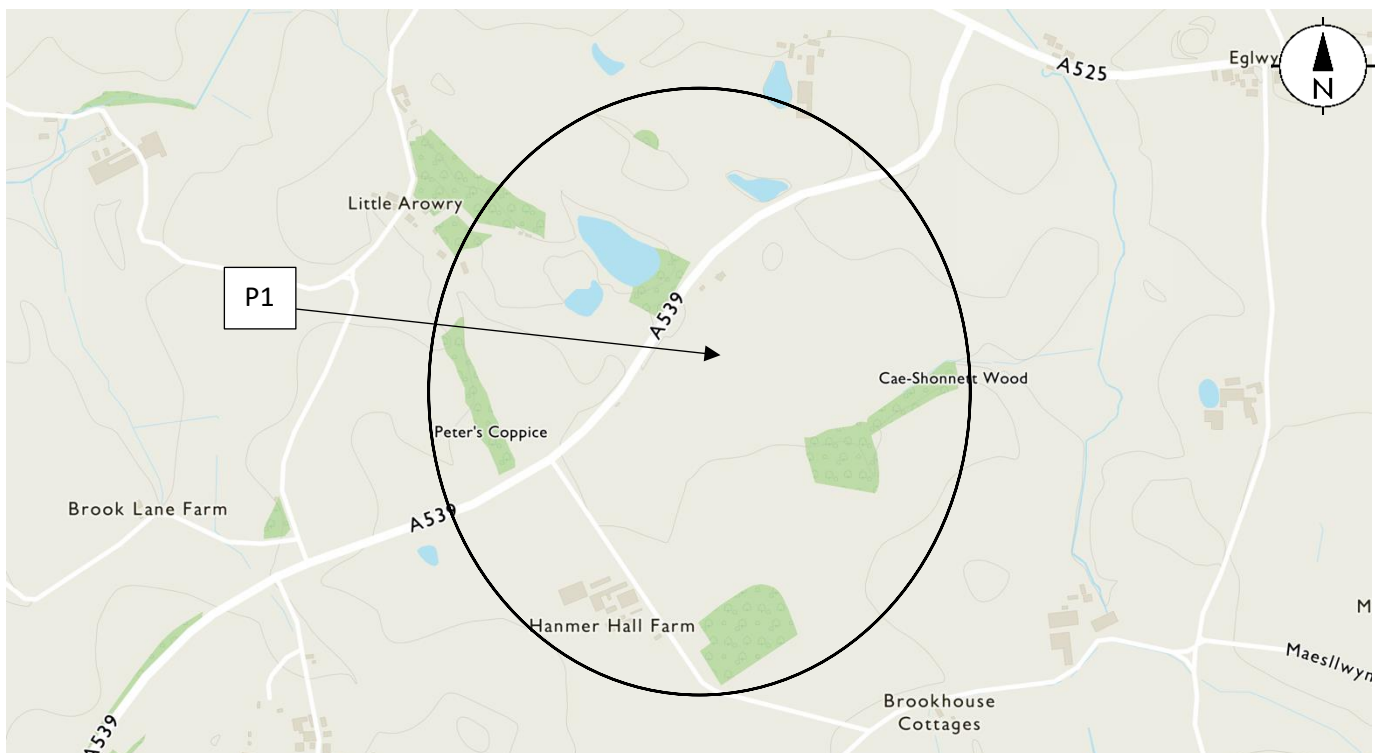
Nine records of amphibians were found by COFNOD within 2km of the site. Species recorded in the search include; smooth newt (*Lissotriton vulgaris*) and great crested newt (*Triturus cristatus*).

The most recent record of great crested newt occurred in 2016.

3.2 Map Analysis

An inspection of both aerial and OS Maps of the local area identified that one pond is present within 250m of the survey area and is located on the survey site itself. In total, there are three ponds in a 500m radius of the site, these ponds are located; 254m to the northwest, 284m to the northwest and 353m to the north. However, all of these have major barriers between their location and the site.

Figure 3: An OS Map obtained from ordnancesurvey.co.uk that illustrates the waterbodies within the 500m radius of the site.



4. Field Survey

4.1 Constraints on Obtaining the Survey Data:

Constraints on:	Survey Information	Equipment Used
Constraint (Yes or No):	Yes	No
Explanation of Constraints:	No land access granted for other ponds within 500m radius	N/A
Action Taken:	None at present. Please see Section 5 recommendations for more information	N/A

4.2 Environmental Variables

Environmental variables	Walkover Survey – 30 th of June 2020. Daytime
Temp Start:	19°C
Temp Finish:	19°C
Humidity Start:	60%
Humidity Finish:	60%
Cloud Cover Start:	100%
Cloud Cover Finish:	100%
Wind Speed Average:	low
Precipitation:	None

4.3 Walkover Survey

The walkover survey of the site and nearby water features were undertaken by Elite ecology on the 30th June 2020.

P1 is approximately 320m², located at the southern boundary of the proposed survey site. The pond shows no signs of drying out. There is moderate invertebrate diversity indicating good water quality. 50% of the pond's perimeter is shaded and 50% of the ponds surface are covered by macrophytes. There is no evidence of waterfowl impact and no evidence of fish. The surrounding habitat provides good opportunities for foraging and shelter consisting of arable land and tall grass.

4.4 Habitat Suitability Index (HSI)

A Habitat Suitability Index Survey (HSI) was conducted on the pond in the proposed development site. The HSI for the water features can be seen in **Table 1**.

Table 1: Habitat Suitability Index (HSI) Results for the water bodies located on and around the site

Water Body Reference:	P1
SI1 – Location	1
SI2 – Pond Area	0.7
SI3 – Pond drying	0.9
SI4 – Water Quality	1
SI5 – Shade	1
SI6 – Fowl	1
SI7 – Fish	0.67
SI8 – Ponds	0.5
SI9 – Terrestrial Habitat	0.67
SI10 – Macrophytes	0.9
HSI Score:	0.81
HSI Category	Excellent

Categorisation of HSI Scores

HSI - Water Body Suitability

<0.50	Poor
0.50 – 0.59	Below average
0.60 – 0.69	Average
0.70 – 0.79	Good
>0.80	Excellent

4.5 Bottle Trapping

No bottle trapping survey was undertaken for the site during the survey visits.

4.6 Torch Survey

No torch survey was undertaken for the site during the survey visits.

4.7 **Netting Survey**

No netting survey was undertaken for the site during the survey visits.

4.8 **Egg Searching Survey**

No egg searching survey was undertaken for the site during this survey visit.

4.9 **Environmental DNA (eDNA) Survey**

An eDNA survey of the waterbodies was undertaken on the 30th of June 2020. These were sent for laboratory testing at SureScreen Scientifics and a summary of the results can be found within **Appendix E**.

P1 came back with a **positive** outcome, with 12 positive replicates. Therefore, it can be concluded that great crested newts (*Triturus cristatus*) are present within this waterbody.

5. Impact Assessment

Based on the information gathered during the various site visits, great crested newts (*Triturus cristatus*) are present in P1. The impacts of the works were put under the GCN Rapid Risk Assessment Tool assuming this is a breeding pond. However, it should be noted that it is unknown without further survey effort as to whether the pond does indeed support a breeding population of great crested newts.

Component	Likely Effect	Notional Offence Probability Score
Great Crested Newt Breeding Pond(s)	No Effect	0
Land within 100m of any breeding pond(s)	0.1 – 0.5ha lost or damaged	0.5
Land 100-250m of any breeding pond(s)	0.1 – 0.5ha lost or damaged	0.1
Land >250m from any breeding pond(s)	0.1 – 0.5ha lost or damaged	0.05
Individual Great Crested Newts	Minor Disturbance of Newts	0.5
Rapid Risk Assessment Result:	Amber: Offence Likely	

The above table should be taken in caution. Before the above result can be finalised, a population count is required, along with ascertaining whether the pond is supporting a breeding population.

6. Recommendations

Due to P1 coming back with a positive result, a full population size class assessment is required. This may affect the measures within the impact assessment, but may also be required to support a mitigation licence if the rapid risk assessment deems this to be necessary. Surveys should also focus on the other ponds identified as per Figure 2, if land access is obtained. This is required to ascertain whether the site will cause any fragmentation to local populations. This involves 6 surveys using 3 survey methods between March and June, with half of these surveys required between mid-April and mid-May.

It has not been confirmed at present as to whether P1 supports a breeding population. Assuming the worst-case scenario that the pond is a breeding pond, the rapid risk assessment has come out with "Amber: Offence Likely". Natural England's guidance on Amber results is as follows:

"Amber: offence likely" indicates that the development activities are of such a type, scale and location that an offence is likely. In this case, the best option is to redesign the development (location, layout, methods, duration or timing; see Non-licensed avoidance measures tool) so that the effects are minimised. You can do this and then re-run the risk assessment to test whether the result changes, or preferably run your own detailed site-specific assessment. Bear in mind that this generic risk assessment will over- or under-estimate some risks because it cannot take into account site-specific details, as mentioned in caveats above. In particular, the exact location of the development in relation to resting places, dispersal areas and barriers should be critically examined. Once you have amended the scheme you will need to decide if a licence is required; this should be done if on balance you believe an offence is reasonably likely.

Further measures will be devised following the additional site surveys.

7. References

Natural England. Great Crested Newt Mitigation Guidelines.

The Conservation (Natural Habitats, etc.) Regulations. HMSO.

Wildlife and Countryside Act.

Williams, P. GCN eDNA Protocol. Freshwater Habitats Trust.

Countryside and Rights of Way Act.

Joint Nature Conservation Committee. Handbook for Phase 1 Habitat Survey.

8. Appendices

Appendix A: Site Plans

Appendix B: Desktop Study Map

Appendix C: Additional Photographic Records

Appendix D: Legislation and Policy

Appendix E: Environmental DNA (eDNA) Results

Appendix A: Site Plans

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REVISIONS

LETTER	REVISION	DATE	BY

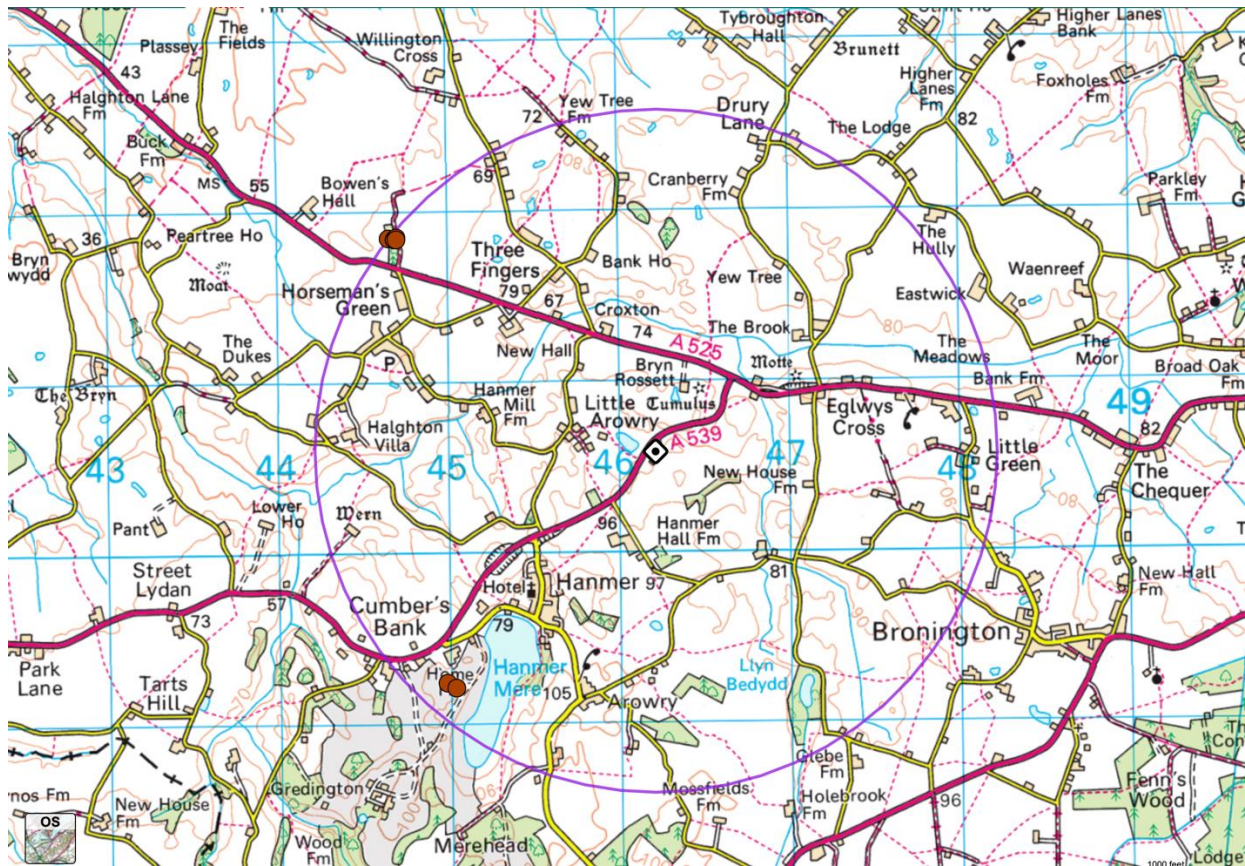
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PROJECT
LAND OFF A539, HANMER

TITLE
SITE LOCATION PLAN

SCALE	1:2500@A3	DRAWN BY	MLT
DATE	APR 2020	STAGE	
DWG NO	6869 04	REVISION	



Appendix B: The Ecological Data Search Map

Appendix C: Photographic Records

Plate 1: Section of the pond covered in Macrophytes.



Plate 2: habitats found around the pond.



Plate 3: Section of the pond with low macrophyte.



Appendix D: Legislation and Policy

The Great Crested Newt (*Triturus cristatus*) is fully protected under a variety of legislation and conventions. These include:

- Bern Convention (Appendix II)
- Conservation (Natural Habitats, &c.) Regulations 1994 (as amended)
- Conservation of Habitats and Species Regulations 2010
- EU Habitats Directive (Annex II and IV)
- Nature Conservation (Scotland) Act 2004
- NERC Act 2006 (Section 41 England; Section 42 Wales)
- Wildlife and Countryside Act 1981 (as amended)

In addition to this, the Great Crested Newt has been listed as a priority species on the UK Biodiversity Action Plan (UKBAP).

This legislation covers all aspects of newt life stages (eggs, efts and adult newts) and makes it illegal to damage, destroy or obstruct access to any structure or place used for shelter, protection or breeding, and to intentionally disturb a great crested newt while it is occupying a structure or place which it uses for that purpose.

Licenses can be obtained from Natural England (DEFRA) under the Conservation (Natural Habitats etc.) Regulations 1994, to permit activities for the purposes of:

- Regulation 44(2)(e): Preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment, or
- Regulation 44(2)(f): Preventing the spread of disease
- Regulation 44(2)(g): Preventing serious damage to any form of property or fisheries

Or

- If there is no satisfactory alternative.

The above regulations allow people to carry out activities which would otherwise be illegal.

Appendix E: Environmental DNA (eDNA) Results

Folio No: E8476
Report No: 1
Purchase Order: Land off A539, Hanmer
Client: ELITE ECOLOGY
Contact: Richard Millington

TECHNICAL REPORT**ANALYSIS OF ENVIRONMENTAL DNA IN POND WATER FOR THE DETECTION OF GREAT CRESTED NEWTS (TRITURUS CRISTATUS)****SUMMARY**

When great crested newts (GCN), *Triturus cristatus*, inhabit a pond, they continuously release small amounts of their DNA into the environment. By collecting and analysing water samples, we can detect these small traces of environmental DNA (eDNA) to confirm GCN habitation or establish GCN absence.

RESULTS

Date sample received at Laboratory: 09/07/2020
Date Reported: 23/07/2020
Matters Affecting Results: None

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
5278	Land off A539, Hanmer - P1	SJ 46249 40364	Pass	Pass	Pass	Positive	12

If you have any questions regarding results, please contact us: ForensicEcology@surescreen.com

Reported by: Sarah Evans

Approved by: Jennifer Higginbottom



METHODOLOGY

The samples detailed above have been analysed for the presence of GCN eDNA following the protocol stated in DEFRA WC1067 'Analytical and methodological development for improved surveillance of the Great Crested Newt, Appendix 5.' (Biggs et al. 2014). Each of the 6 sub-sample tubes are first centrifuged and pooled together into a single sample which then undergoes DNA extraction. The extracted sample is then analysed using real time PCR (qPCR), which uses species-specific molecular markers to amplify GCN DNA within a sample. These markers are unique to GCN DNA, meaning that there should be no detection of closely related species.

If GCN DNA is present, the DNA is amplified up to a detectable level, resulting in positive species detection. If GCN DNA is not present then amplification does not occur, and a negative result is recorded.

Analysis of eDNA requires scrupulous attention to detail to prevent risk of contamination. True positive controls, negative controls and spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared and reported. Stages of the DNA analysis are also conducted in different buildings at our premises for added security.

SureScreen Scientifics Ltd is ISO9001 accredited and participate in Natural England's proficiency testing scheme for GCN eDNA testing. We also carry out regular inter-laboratory checks on accuracy of results as part of our quality control procedures.

INTERPRETATION OF RESULTS

SIC:	Sample Integrity Check [Pass/Fail] When samples are received in the laboratory, they are inspected for any tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to inconclusive results.
DC:	Degradation Check [Pass/Fail] Analysis of the spiked DNA marker to see if there has been degradation of the kit or sample between the date it was made to the date of analysis. Degradation of the spiked DNA marker may lead indicate a risk of false negative results.
IC:	Inhibition Check [Pass/Fail] The presence of inhibitors within a sample are assessed using a DNA marker. If inhibition is detected, samples are purified and re-analysed. Inhibitors cannot always be removed, if the inhibition check fails, the sample should be re-collected.
Result:	Presence of GCN eDNA [Positive/Negative/Inconclusive] Positive: GCN DNA was identified within the sample, indicative of GCN presence within the sampling location at the time the sample was taken or within the recent past at the sampling location. Positive Replicates: Number of positive qPCR replicates out of a series of 12. If one or more of these are found to be positive the pond is declared positive for GCN presence. It may be assumed that small fractions of positive analyses suggest low level presence, but this cannot currently be used for population studies. In accordance with Natural England protocol, even a score of 1/12 is declared positive. 0/12 indicates negative GCN presence. Negative: GCN eDNA was not detected or is below the threshold detection level and the test result should be considered as evidence of GCN absence, however, does not exclude the potential for GCN presence below the limit of detection.



9. Notice to Readers: Conditions of this Report

All reports are certified products and cannot be shown, copied or distributed to third parties without the written permission of Elite Ecology. No liability is accepted for the contents of the report, other than to that of the client(s).

Elite Ecology agrees to supply ecological consulting services and advice of a preliminary or thorough nature as advised or commissioned. Upon commissioning Elite Ecology to undertake the work, the client(s) grant access to the site upon the agreed date. If no site access is available upon this date, Elite Ecology holds the right to charge the client(s) for lost staffing time and additional travel costs.

Elite Ecology undertake all site surveys with reasonable skill, care and diligence, within the terms of the contract that has been agreed with the client and abiding by Elite Ecology's Terms and Conditions. The actions of the surveyors on site, and during the production of the report, were undertaken in accordance with the Code of Professional Conduct for the Chartered Institute of Ecology and Environmental Management.

The latest good practice guidelines put in place by Natural England or the relevant statutory conservation bodies have been followed by the surveyors on site. If those methodologies fail to identify a protected species during the survey efforts, no responsibility can be attributed to Elite Ecology. If any of these guidelines are adapted between the date(s) of the surveys being undertaken and the submission of this report, then Elite Ecology takes no responsibility for this.

Should any equipment be damaged or lost on site at the fault of the client(s), then Elite Ecology withholds the right to charge 100% above the current market value for that exact product or the nearest similar product.

The survey results purport the current status of the site and its potential for protected species utilisation at the time of surveying. It should not be viewed as a complete list of the possible flora and fauna species that could be using the site at different times of the year.

Elite Ecology has been provided with full payment for this report and thus the product has been released to the client(s) for the purpose of their planning application. If any part of the report is lost or altered without the written permission of Elite Ecology, then the entire report becomes invalid. Due to the potential for continual change within the natural world, this report is valid for **2 years only** from the date of the last survey visit. If this report is submitted after the 2 year deadline, then a further updated inspection will be required to ascertain whether the site remains in the same condition as it was when initially inspected.

No reliance should be made on any such comments in relation to the structural integrity of the features located on the surveyed site. All information within the report is based solely on evidence that has been found on site during the service provided. No individual opinion or inference will be made other than that of the suitably qualified ecologist appointed to the project.