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11th June 2018

Dr Tony Cowling
Reading Hydro CBS / The Reading Sustainability Centre
c/o RISC
35 – 39 London Street
Reading
RG1 4PS

Application 151715 Footpath next to Caversham Weir, Caversham, Reading, RG1 8BP - The installation of two Archimedean Screw Turbines with a hut covering the generators, gearboxes and the control system (hydropower infrastructure). Great crested newt surveys.

Dear Dr Cowling

This letter provides the details of great crested newt (*Triturus cristatus*) (GCN) surveys undertaken to discharge planning condition 5 of the above planning permission.

Planning condition 5 states:

5. No works to the fish pass shall commence until a licence for works affecting great crested newts has been obtained from the Statutory Nature Conservation Organisation (Natural England) and a copy has been submitted to the Council. Thereafter mitigation measures approved in the licence shall be implemented in accordance with the approved details. Should the applicant conclude that a licence for development works affecting great crested newts is not required the applicant is to submit a report to the Council detailing the reasons for this assessment and this report is to be approved in writing by the Local Planning Authority.

Reason: To ensure that the Council fulfils its duties under the Conservation (Natural Habitats &c.) Regulations 1994 (as amended) and to ensure that great crested newts, which are a protected species and a material consideration, are not adversely impacted upon by the proposed development.

Background

The above planning condition was imposed based on the findings of a GCN assessment undertaken by Ecoconsult Ltd in 2015. During that assessment, water from two ponds ('Pond 1' and 'Pond 2') on View Island were sampled to confirm the presence or likely absence of GCN using an environmental DNA (eDNA) survey technique. In this initial eDNA survey, Pond 1 tested positive for the presence of GCN and Pond 2 tested negative. Full details are provided in the document *Extended Phase 1 Habitat Survey. Land at View Island, Reading, Berkshire, July 2015* (Ecoconsult Ltd, 2015) that was submitted in support of the planning application.

Follow-up surveys of Ponds 1 and 2 were undertaken by Dave Jones in 2017 to confirm the presence of GCN and to determine the size of any population present. The results of these surveys would inform the need for a European Protected Species Mitigation Licence (EPSML) from Natural England.

Dave is acting on a voluntary basis on behalf of The Reading Sustainability Centre. He has over 15 years' experience as a professional ecologist, eight of which have been in the consultancy sector. He is a Chartered Environmentalist and a Full member of the Chartered Institute of Ecology and

Environmental Management. Dave has held a Natural England survey licence (Level 1) for GCN for over ten years and has been the holder of several GCN EPSMLs for development projects.

Methodology

The follow-up surveys comprised a combination of Habitat Suitability Index (HSI) assessment, further eDNA sampling, bottle trapping, torch surveys, egg searching and refuge searching.

The HSI was undertaken on the 4th April 2017 in accordance with the methodology described by Oldham *et al* (2000)¹. An HSI is a numerical index between 0 and 1, where 0 indicates unsuitable habitat and 1 represents optimal habitat. A score is calculated based on the results of ten suitability indices, all of which are factors thought to affect GCN presence. The resulting score categorises the pond based on its 'suitability' to support GCN and can be used to influence the decision as to whether further detailed survey work is required.

Bottle trapping, torch surveys, egg searches and refuge searches were undertaken on 4th April and 9th May 2017.

The eDNA survey was completed on the 29th June 2017 in accordance with the protocol set out by Biggs *et al* (2014)². The water samples collected were sent to a Nature Metrics laboratory for analysis.

For their duration, the remaining survey techniques were undertaken as per English Nature (2001)³ on the above dates.

Limitations

Pond 1 was almost entirely dry during the survey visit on the 4th April 2017, and was completely dry on the 9th May 2017 and 29th June 2017. There was insufficient water present to obtain a sample for eDNA analysis or to undertake bottle trapping. There was no macrophyte vegetation for GCN to lay eggs onto and so an egg search could not be completed.

Full access to the perimeter of Pond 2 could not be achieved due to the presence of dense scrub. This meant that bottle trapping, torching and egg searching was restricted to the margins of approximately 80% of the pond. However, there were no limitations to the eDNA survey as the water samples were collected from the margins of the entire pond using an extension pole.

Only two survey visits were undertaken during which bottle trapping, torching, egg searching and refuge searching were undertaken at Pond 2. Good practice guidelines (English Nature, 2001) recommend that a minimum of four survey visits should be undertaken to confirm presence/likely absence, with an additional two surveys being required to ascertain a population estimate. These surveys were abandoned following a decision to undertake an eDNA survey as this method alone can be used to establish the presence or likely absence of GCN in any given pond without the need for using additional survey techniques (Natural England, 2015⁴).

The weather conditions during each survey were dry and calm, with none of the surveys being immediately preceded by heavy rain. The water clarity in Pond 2 was very good, although parts of the pond were concealed by submerged vegetation which did limit the effectiveness of torching.

Nature Metrics reported no limitations to the processing of the water samples within their laboratory.

¹ Oldham R.S., Keeble, J., Swan, M.J.S. & Jeffcote, M. (2000). Evaluating the suitability of habitat for the Great Crested Newt (*Triturus cristatus*). *Herpetological Journal* 10 (4), 143-155.

² Biggs, J., Ewald, N., Valentini, A., Gaboriaud, C., Griffiths, R.A., Foster, J., Wilkinson, J., Arnett, A., Williams, P. & Dunn, F. (2014). *Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (Triturus cristatus) environmental DNA*. Freshwater Habitats Trust, Oxford.

³ English Nature (2001). Great crested newt mitigation guidelines. English Nature, Peterborough

⁴ Natural England (2015) [online]. Great crested newts: surveys and mitigation for development projects. Standing advice for local planning authorities who need to assess the impacts of development on great crested newts. Available at: <https://www.gov.uk/guidance/great-crested-newts-surveys-and-mitigation-for-development-projects>. Accessed April 2018.

Results

Pond 1

At the time of the first survey on 4th April 2017, Pond 1 supported little more than a puddle of water less than 5m in length, 2m in width and 50mm in depth. The pond was totally dry during the second survey visit on 9th May 2017 and on 29th June 2017. The pond was found to generally align with the description provided by Ecoconsult Ltd in 2015⁵ and is considered to have 'poor' suitability for GCN using HSI criteria.

Pond 1 could not be sampled for eDNA analysis as the water level was too low during the survey visits. The low water levels and an absence of macrophyte vegetation also meant that bottle trapping and egg searching methods could not be undertaken.

Pond 2

Pond 2 was found to be as per the description provided by Ecoconsult Ltd. This pond is considered to have 'excellent' suitability for GCN using HSI criteria.

The eDNA survey result for Pond 2 was negative for GCN. The laboratory results from Nature Metrics can be found in Appendix 1.

Pond 2 was subject to bottle trapping, torch surveys, egg searches and refuge searches on the 4th April 2017 and 9th May 2017. No GCN were recorded during these surveys, although smooth newt (*Lissotriton vulgaris*) was abundant.

Discussion

The results of eDNA surveys in 2015 were positive for GCN in Pond 1 but negative for GCN in Pond 2. The 2017 surveys could not corroborate these findings for Pond 1 as the pond was dry. However, the 2017 surveys re-confirmed the absence of GCN from Pond 2.

The HSI survey results from 2017 support those obtained by Ecoconsult Ltd in 2015 i.e. Pond 1 has poor suitability for GCN and Pond 2 has excellent suitability for GCN.

Pond 1 is located within an ephemeral channel linking the main channel of the River Thames to a backwater on the northern side of View Island. It is assumed that this channel floods during periods of high flow but periodically retains water to form a pond. Pond 1 supports very few favourable features that are typically associated with GCN presence. However, apparently 'unsuitable' ponds commonly do support GCN if they are located within the vicinity of other ponds that support this species, especially if these ponds are linked by good quality terrestrial habitat and there are no barriers that might limit the movement of newts between them (e.g. main roads or rivers).

Pond 1 is located approximately 20m from Pond 2, with the HSI score for the latter indicating that it has excellent suitability for GCN. The terrestrial habitats between the two ponds are optimal for GCN (woodland, scrub and rough grassland) and there are no barriers that would inhibit GCN movement between the two. It would therefore be expected for GCN to be present in Pond 2 if they were present in Pond 1. However, the results of the eDNA surveys from both 2015 and 2017 indicate that GCN are absent from Pond 2.

No other ponds are present on View Island and Ordnance Survey maps do not show any other ponds within 500m of the site that might provide a source population of GCN. Furthermore, Pond 1 is located on an island separated from surrounding habitat by the River Thames (a likely barrier to GCN dispersal), and so there are very limited opportunities for GCN to reach Pond 1 if they are not present within Pond 2.

⁵ Ecoconsult Ltd (2015). Extended Phase 1 Habitat Survey Land at View Island, Reading, Berkshire. July 2015

Furthermore, the positive eDNA result in 2015 was based on one positive replicate and 11 negative replicates of the water samples collected (each replicate equates to an individual sample of water collected during the survey) (SureScreen Scientifics, 2015⁶). The number of positive replicates is likely to be positively correlated with the concentration of DNA in the water sample (although the link between this and the population of GCN is not so well established) (Bruce, 2017⁷) i.e. a weak DNA concentration was present in Pond 1. Given the very small size of Pond 1, it would be expected that more of the replicates should have tested positive for GCN presence as DNA should be well distributed throughout the small volume of water contained within the pond.

Based on the above, the 2015 eDNA survey results from Pond 1 are considered to be questionable and it is possible that a 'false positive' was recorded. This is a very rare occurrence but can arise as a result of cross-contamination, most likely in the field (e.g. introduced by surveyors' wellingtons). As such, GCN are therefore thought likely to be absent from Pond 1 and Pond 2, or at least present in such low numbers that they are below the limit of detectability using eDNA methods.

Impact assessment and recommendations

The fish pass works would require the removal or modification of a very small area of woodland habitat approximately 0.02ha in area. Impacts to terrestrial habitat are considered to be negligible given the very minor scale of works proposed.

The dry ditch 'downstream' of Pond 1 would be re-wetted. It is possible that Pond 1 would be inundated during periods of high flow within the fish pass/ditch, although this already occurs under the current conditions. As such, the proposed works are considered unlikely to adversely affect Pond 1.

Given the nature of the proposals and as GCN are considered unlikely to be present (or at least present in extremely low numbers), it is not considered necessary to obtain a EPSML prior to any works taking place. This is because an offence under the *Conservation of Habitats and Species Regulations 2017* would not likely arise.

However, as a precaution it is recommended that a fingertip search be undertaken prior to the removal of any terrestrial habitat that would be suitable as a refuge for GCN. Examples of such habitat includes log piles, leaf litter, and tree stumps. In the extremely unlikely event that GCN are discovered, all works likely to result in an offence (i.e. activities that would damage or destroy woodland habitat) must cease immediately and further advice sought from an ecologist.

I hope that this information is of assistance.

Yours sincerely



Dave Jones CEnv MCIEEM

⁶ SureScreen Scientifics (2015). Technical Report. Examination of environmental DNA in pond water for the detection of great crested newts. 2nd July 2015.

⁷ Bruce, K. (2017) [Online]. Interpretation of 1/12 eDNA scores when GCN are not found on the follow-up survey. <https://www.linkedin.com/pulse/interpretation-112-edna-scores-when-gcn-found-follow-up-kat-bruce/>

Appendix 1 – eDNA results

Report: 17146-RSC01SR-1

Great Crested Newt eDNA Results

Company: Reading Sustainability Centre
Address: SSEN - No. 1 Forbury Place, 43 Forbury Road, Reading, RG1 3JH
Contact: Sarah Rigby
Project No: Community Projects
Date of Report: 14 July 2017
Number of samples: 1

Thank you for sending your sample for analysis by NatureMetrics. Your sample has been processed in accordance with the protocol set out in Appendix 5 of Biggs et al. (2014).

DNA was precipitated via centrifugation at 14,000 x g and then extracted using Qiagen Blood and Tissue extraction kits.

qPCR amplification was carried out in 12 replicates per sample, using the primers and probe described by Biggs et al. (2014), in the presence of both positive and negative controls.

Results indicate GCN absence in your sample. No degradation or inhibition was detected, and all controls performed as expected. Conclusive results are therefore presented.

Results are based on the samples as supplied by the client to the laboratory. Incorrect sampling methodology may affect the results. Note that a negative result does not preclude the presence of Great Crested Newts at a level below the limits of detection.

Sample	Pond ID	Date arrived	GCN status	eDNA Score	Inhibition	Degradation
GCN17-1405	'Pond 2'	3-Jul-2017	Negative	0	No	No

End of report

Report issued by: Dr. Cuong Tang
Date: 14 July 2017
Email: ct@naturemetrics.co.uk
Phone Number: 0203 876 7350

Understanding your results

- Positive:** GCN DNA has been detected in this sample, meaning that at least one of the 12 replicates has amplified. Remember that this is not a quantitative test, so you should not interpret a high eDNA score (e.g. 12/12) as necessarily indicating a larger population of GCN than a low eDNA score (e.g. 1/12)
- Negative:** No GCN DNA has been detected in this sample, and the internal and external controls worked as expected. This tells us that if there had been GCN DNA in the sample, we would have detected it, so we can be confident in its absence from the sample provided.
- Inconclusive:** No GCN DNA was detected in the sample, but the internal controls failed to amplify as expected. This means that any GCN DNA in the sample might also have failed to amplify properly, so we cannot have confidence in this negative result. Inconclusive results can be caused by degradation of the DNA (when the DNA marker contained in the ethanol in the kits fails to amplify) or by inhibition of the reaction (when the marker added in the lab fails to amplify) caused by certain chemicals or organic compounds that may be present in the water sample.