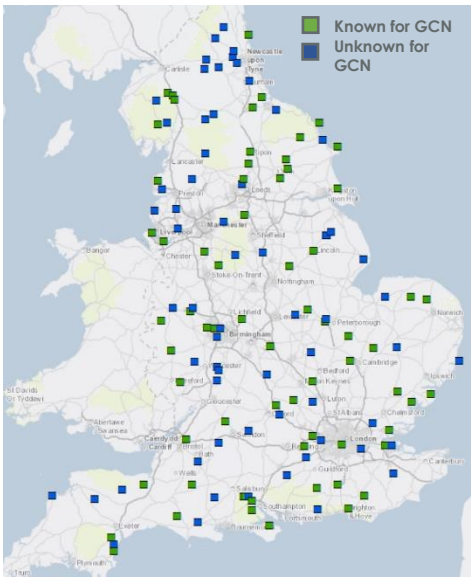
EDNA MONITORING FOR GREAT CRESTED NEWTS 2018

Great Crested Newt monitoring in England

The PondNet monitoring network for Great Crested Newts, is an annual survey of 131 randomly selected 1 km grid squares spread throughout England. Stratification between known and unknown squares in the survey design increases the power to detect change in Great Crested Newt.

The 380 ponds which are encompassed by this network, are surveyed by volunteers and project officers using eDNA (environmental DNA). The presence of Great Crested Newts is detected during laboratory analysis of a water sample, which is collected using a standardised methodology from each pond in May and June.



GCN eDNA monitoring network – Enaland

Monitoring metrics

There are a number of ways to monitor change in Great Crested Newts. PondNet uses three different metrics along with environmental data to provide a picture of status and change at a national level.

The number of occupied 1km grid squares. Possible because we aim to survey all (at least 75%), of the ponds in each 1km grid square. Square occupancy is a standard unit for national biological monitoring and can be used for EC Habitats Directive Article 17 reporting[1].

The number of occupied ponds. Based on the analysis of a sub-set of ponds from the grid square design, using the pond nearest the south-west corner of each square. Pond occupancy has been used is previous national Great Crested Newt surveys and is therefore useful for comparison over longer timescales.

The number of occupied ponds per square. A new metric which aims to capture the strength of Great Crested Newt populations. For example, newt occupancy in only one pond in squares with multiple ponds may be more vulnerable than populations able to colonise more of the available habitat.

Environmental data. Pond habitat and landuse data are collected at each pond, including Habitat Suitability Index metrics and nutrient pollution scores. These data can then be used to understand reasons for change.

[1] Every six years, Member States of the European Union are required (by Article 17) to report on implementation of the Habitats Directive. The current report focuses on assessment of the conservation status of all habitats and species of Community interest.

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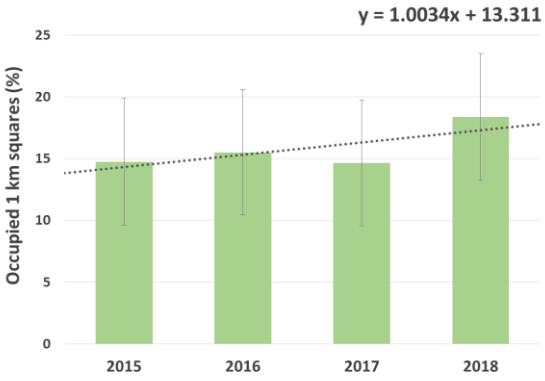
Results

We have now completed 4 years of survey (2015-2018), visiting the same ponds annually to build a picture of status and change. Whilst this is still a relatively short timescale, we can begin to report with greater certainty on the current status of Great Crested Newts in England. Predictions for longer term trends has greater uncertainty and would benefit from at least 2 years further survey.

The number of occupied 1km grid squares

The results show that 2018 was a good year for Great Crested Newts. Only 1 grid square which supported Great Crested Newts 2015-2017 had lost them, and unfortunately this is likely to be as a result of fish introductions to ponds on the edge of an urban area. Newts returned to 6 grid squares where they had been absent in 2017. This can be attributed to the warm wet spring of 2018, as opposed to the dry spring of 2017. In addition, 7 squares with no Great Crested Newts in any of the previous year's surveys, now had them[2].

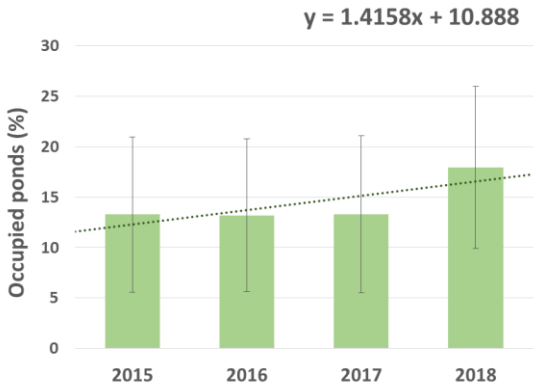


Square occupancy results 2015-2018

We estimate that between 11-21% of 1 km grid squares in England are occupied by Great Crested Newts (95% confidence), and in the short term this isn't changing.

The number of occupied ponds

The results for the number of Great Crested Newt occupied ponds per year in England, showed a similar trend to those for square occupancy. Pond occupancy 2015-2017 had been consistent at around 13% occupancy per year, but in 2018, this increased to 18% occupancy.



Pond occupancy results 2015-2018

However, there was a great deal of variability between years. Only 50% of positive ponds were occupied year on year (2015-2018). The remaining 50% of occupied ponds only had Great Crested Newts in some years. There was no significant difference in the average HSI score of ponds which had newts every year (HSI=0.66) and those which had a turnover of newts (HSI=0.62). Ponds with a turnover in newts between years had more ponds with very low HSI scores (35% of ponds with

[2] With a note of caution that 3 of these squares had ponds with very low eDNA scores (1/12) to indicate presence, and may been false positives. eDNA samples from the 2015-2017 surveys were analysed by SpyGen laboratory France, whilst the 2018 samples were analysed by Fera UK. The labs use the same standardised methodology but there could a risk that one lab is more effective at detecting newts at low density, or a risk that one lab is making errors, false negatives or false positives. We cannot know for certain without work on interlab comparison.

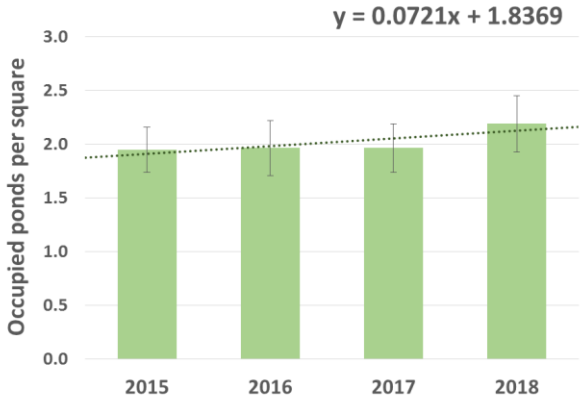
below average or poor scores) compared with ponds which retained newts year on year (24% of ponds with below average or poor scores).

We estimate that between 7-22% of 1 km grid squares in England are occupied by Great Crested Newts (95% confidence), but there is no significant trend, increasing or decreasing, over the four years of survey.

The number of occupied ponds per square

The number of occupied ponds per square has been consistent, at around 2 ponds per square on average for the last three years. This increased slightly in 2018 to 2.2 ponds per square, but the increase was not significant.

The eDNA results tell us that Great Crested Newts are not able to occupy all the ponds available to them. On average, in 49% of positive squares, Great Crested Newts occupied less than 50% of the ponds in the square.



Number of occupied ponds per square results 2015-2018

In squares with multiple ponds, Great Crested Newts do not necessarily remain in the same ponds every year, but move between ponds, between years. Unsurprisingly, squares with multiple ponds were more likely to have Great Crested Newts, and more likely to support newts every year. Squares with no Great Crested Newts in any year had on average 2.3 ponds per square; squares with Great Crested Newts at least once in the four years of survey (satellite squares) had on average 3.3 ponds per square; and squares with Great Crested Newts every year (core squares) had on average 3.8 ponds per square.

Summary

The results have shown that there is no significant change in the number of occupied squares, occupied ponds, or occupied ponds per square over the four years of survey 2015-2018. We would not expect to see significant change over short timescales, and are likely to be seeing lower occupancy than would have occurred historically (c.50 years ago).

At least one square appears to have lost newts due to introduction by fish, but this loss has been temporarily masked by gains in other squares. 2018 was a good year for Great Crested Newts, showing movement to new ponds within occupied squares and to previously unoccupied squares. Further surveys will reveal if this movement is temporary or permanent.

Freshwater Habitats Trust
October 2018