

Great Crested Newt Monitoring Survey 2021

Cinderford Northern Quarter, Forest of Dean



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1.0 Introduction

1.1 Background

- 1.1.1 Nicholas Pearson Associates (NPA) was commissioned by Forest of Dean District Council (FDDC) to undertake Great Crested Newt (GCN) *Triturus cristatus* pond monitoring at Cinderford Northern Quarter (CNQ), in Gloucestershire in 2019 and 2021.
- 1.1.2 The Cinderford Northern Quarter (CNQ) is located to the north-west of Cinderford in the Forest of Dean. An Area Action Plan (AAP) for the Northern Quarter was published in 2012. The AAP seeks to enable significant regeneration opportunities within the area whilst respecting the ecological importance of the area. Great Crested Newt surveys undertaken by Johns Associates in 2012 and 2013 to inform the planning application, identified a number of ponds on site (34 in 2012, 33 in 2013) and confirmed GCN presence within 17 of these.
- 1.1.3 In 2014 the Homes and Community Agency (HCA) was granted planning permission to build a new education facility, hotel, office and industrial space, new homes and spine road within the AAP area. A Great Crested Newt Master Plan was prepared to satisfy Natural England European Protected Species Licence (EPSL) in relation to phased or multi-plot developments. The document describes the impacts associated with the licence phases within the CNQ including an indication of potential impacts for future licence phases. The document also provides an overview of the mitigation, compensation and monitoring requirements for Great Crested Newt that will be adopted for each licence phase.
- 1.1.4 The planning permission also includes a Section 106 which is the mechanism for delivering the mitigation set out in the GCN master plan and licence.
- 1.1.5 The first phase of the spine road and the new college has now been completed. Also as part of the permission, conifer plantation on land to the south of the AAP area has been removed and replaced with new ponds, grassland and broadleaf woodland, in order to avoid net loss of habitat for a variety of protected and important species including GCN.

1.2 Previous monitoring surveys

- 1.2.1 In 2015, Ecus Ltd surveyed 20 ponds and recorded confirmed presence of GCN within 15, of which six were noted as breeding ponds.

1.2.2 In addition to these known ponds, a series of new ponds N1, N2, N3 and N4, were constructed as part of the EPSL mitigation provisions. As such, the total number of ponds surveyed during the monitoring surveys undertaken by Ecus Ltd in 2017 was 42 individual ponds or pond complexes. GCN were recorded in 23 ponds, with breeding noted in four of these.

1.2.3 The hydrology of the site is highly changeable, and therefore during subsequent surveys, additional ponds have been discovered and/or lost during the on-going monitoring. In 2018, 38 ponds were identified and surveyed by Ecus Ltd. GCN were recorded in 23, with breeding noted in 10 of these.

1.2.4 In 2019, NPA carried out the monitoring surveys. 31 ponds were surveyed, of which GCN were recorded in 21, with breeding noted in 11 of these.

1.3 Purpose and Scope of Report

1.3.1 This report sets out the findings of the 2021 surveys required under the EPSL mitigation licence and the Section 106. It will inform the future development of the CNQ and monitor the effectiveness of the habitat creation.

1.3.2 The monitoring includes the following for all ponds included within the assessment:

- Population size class surveys
- Condition assessment of ponds including Habitat Suitability Index (HSI)
- Condition assessment of surrounding terrestrial habitat

1.3.3 Monitoring also began in the Old Engine Brook underpass (SO 64617 15348), which is located underneath the spine road approaching the college. The purpose of this was to understand whether GCN and other amphibians are dispersing safely through the underpass guided by a newt fencing 'funnel' on either side which guides animals towards the underpass, and to what extent they are dispersing onto the spine road and into the road gully pots.

1.3.4 This data will be used to review the effectiveness of the compensatory provision for GCN and assess its success or otherwise and, if necessary, recommend remedial measures.

2.0 Methodology

2.1 Introduction

2.1.1 Surveys were undertaken under the appropriate Natural England GCN licence and were overseen by Dave Harvey (class licence CL08 registration number: 2016-20243-CLS-CLS). Survey dates and weather conditions are provided in Appendix 3. Pond locations were provided by the client and are shown in Figure 1 & 2.

2.2 Habitat Suitability Index Assessment

2.2.1 All ponds were assessed for their potential to support GCN using the Habitat Suitability Index Assessment (HSI) methodology (Oldham et al., 2000). The HSI assessment process provides an effective assessment of the suitability of the pond for great crested newts, based on ten suitability indices, such as water quality and pond size (ranging from 0 to 1), which indicates the suitability of a waterbody for supporting GCN. The higher the HSI score, the more suitable (or closer to optimum habitat conditions) the waterbody is considered to be for GCN. On the basis of the HSI score, the pond is assessed as having 'poor', 'below average', 'average', 'good', or 'excellent' suitability for supporting GCN.

Table 2.1 Habitat Suitability Index Scores

HSI Score	Suitability for GCNs
<0.5	Poor suitability
0.5 – 0.59	Below average suitability
0.6 – 0.69	Average suitability
0.7 – 0.79	Good suitability
> 0.8	Excellent suitability

2.2.2 However, it is important to recognise that a low suitability score does not necessarily mean that GCN will not be present.

2.2.3 The HSI scores are provided in Appendix 1.

2.3 Pond Condition and Terrestrial Habitat Assessment

2.3.1 A pond condition and terrestrial habitat assessment was carried out for all ponds to be monitored, following the approach set out by Ecus Ltd in its 2017 & 2018 monitoring reports. Pond condition was assessed with regard to the presence of invasive species, silt levels and evidence of pollution

incidence, fire or damage, in order to give a broader assessment of the condition of each of the ponds.

2.3.2 Pond condition was scored into four categories: 'poor', 'fair', 'good' and 'excellent'. The scores were based on criteria set out below in Table 2.2. The detailed matrix used to assess each pond is provided in Appendix 2.

Table 2.2: Pond Condition Score Methodology

Pond Condition Score			
Poor	Fair	Good	Excellent
<p>-If non-native invasive species are present, pond condition is considered poor.</p> <p>- If non-native invasive species are absent but silt levels are high and dumped rubbish is present, then pond condition is considered poor</p>	<p>-Non-native invasive species are absent.</p> <p>- High silt levels but dumped rubbish is absent, or</p> <p>- Moderate silt levels but dumped rubbish is present.</p>	<p>-Non-native invasive species are absent.</p> <p>- Moderate silt levels and dumped rubbish is absent, or</p> <p>- Low silt levels but some dumped rubbish is present.</p>	<p>- Non-native invasive species and dumped rubbish is absent.</p> <p>- Silt levels are low.</p>

2.4 GCN Population Size Class Estimate Survey

2.4.1 GCN surveys of 30 ponds on site (those that were able to be surveyed) were undertaken following methodologies described in the GCN Mitigation Guidelines (English Nature, 2001). In accordance with best practice guidelines, each pond was visited six times with at least three visits occurring between mid-April and mid-May, on nights when air temperatures exceeded 5°C.

2.4.2 Surveys used a combination of techniques appropriate to the site conditions at the time of survey. Techniques used included;

- trapping with bottle traps (hand netting used as replacement method in one pond),
- torchlight searches,
- egg searches; and
- hand netting.

2.4.3 The survey techniques used varied between water bodies and visits, with at least three techniques employed on each visit.

2.4.4 Records were made of the weather conditions, vegetation cover and turbidity of the water.

Bottle trapping

2.4.5 The number of bottle traps placed in each pond was determined based upon best practice guidelines, utilising a density of one trap per two meters of shoreline to ensure consistency in survey effort. Traps were deployed in groups of fives to minimise the risk of leaving traps. The number of traps used in each survey visit is provided in the table in Appendix 3.

2.4.6 Bottles were left in place overnight, and checked the following morning before 11:00 am or earlier, when air temperatures were warmer. Any animals found in the bottle traps were recorded and then and immediately released. Any animals found, where possible the species, sex and an assessment of age, was recorded.

2.4.7 As part of the standard survey protocols, biosecurity measures were taken to prevent the possible spread of disease.. This was to prevent the spread of chytrid fungus (*Batrachochytrium dendrobatidis*), a known fungal disease harmful to amphibians. Virkon deactivates quickly in the environment once activated and is an industry recognised bio-control measure.

Torch survey

2.4.8 Torch surveys were completed using 1 million candle power torches, within the shallow water around the perimeter of each pond.

2.4.9 A systematic approach was followed to ensure full coverage of the ponds. Records of observations were made onto field survey data forms that included species, sex and an assessment of age, where possible.

Egg Search

2.4.10 Surveyors undertook a search of aquatic vegetation to determine presence of GCN eggs. Searches were undertaken during the bottle trapping process and were conducted systematically around the pond to ensure all sections of suitable vegetation were searched, where access allowed.

2.4.11 Surveyors looked for the eggs that are laid individually and enclosed in a folded leaf. They can be quite conspicuous as GCN often use vegetation that is near the surface of the water. Searches were undertaken for a minimum of 15 minutes per pond by two surveyors, or until the presence of eggs was confirmed. Once GCN egg presence was confirmed in a pond, no further egg searches were conducted during subsequent surveys, in order to minimise disturbance to any laid eggs.

Netting

2.4.12 Netting was also undertaken as an alternative method where one of the others listed above could not be implemented. This involved carefully sampling the pond at night with use of long handled dip net.

2.5 Old Engine Brook Underpass Monitoring

2.5.1 In order to establish whether Great Crested Newts are utilising the Old Engine Brook underpass, the range of survey techniques set out below were employed.

Artificial refugia

2.5.2 A total of 10 no. artificial refugia (tin, felt, carpet, onduline) were placed in the underpass and outside the underpass on both sides of the bridge, and checked on 10 occasions in April – May. In October 20 no. artificial refugia (carpet tiles) were placed and checked on a further 10 occasions for GCN and other amphibians.

Torchlight night searching

2.5.3 During April - May and October, the underpass and vegetation either side of the bridge, the road, pavements and gully pots were all searched on 10 nights (with one pre-dawn check during October) with a Clulite torch to observe any dispersal through the underpass, and any presence of GCN and other amphibians on the road/in gully pots.

Trail camera

2.5.4 A trail camera was positioned in the underpass for 20 nights in October (from the 7th-27th) to try and recorded movement through the underpass of amphibians and any other wildlife.

2.6 Survey limitations

2.6.1 As documented in previous reports, the hydrology of the land is unstable. In comparison with the 2017, 2018 and 2019 surveys, there has been changes in a number of the waterbodies, with some ponds drying out or others reforming into individual ponds. Table 3.4 summarises the survey results since 2017 and also highlights the variations in water level, with 2018 maintaining largest number of suitable ponds.

2.6.2 The only changes in ponds surveyed in 2021 compared with 2019 were that Pond 23a had connected to Ponds 23b, 23c and 17, and these were all surveyed as a single large waterbody.

- 2.6.3 After excluding the dry ponds and combining the ponds considered as single water bodies, the total number of ponds surveyed was 30.
- 2.6.4 In Ponds 24, 25 and 26, bottle trapping was suspended after visit 2 because a Water Shrew *Neomys fodiens* was found in one of the bottles in Pond 25. The hand netting method was used as a replacement in these ponds on the subsequent visits.
- 2.6.5 It was unusual that consistently fewer animals were recorded torching than trapping. Temperatures were quite cool during April and May 2021 which could account for fewer animals being active in the margins during torching.
- 2.6.6 The forestry commission were conducting thinning operations for several weeks in the areas around the clusters of ponds 2-5 and 12-15 including removal of some bank-side trees. The heavy machinery may have caused some disturbance during the peak survey period.

3.0 Results

3.1 Habitat Suitability Index

3.1.1 HSI assessments were carried out on all the ponds. Table 3.1 shows an overview of the individual pond scores, with detailed information presented in Appendix 1.

Table 3.1 Habitat Suitability Index Assessment Summary

HSI Condition	Pond Number	Number of Ponds
Excellent	3, 4, 6, 8, 11, 14, 21, 23abc&17, 24, 25, 26, N1	12
Good	1&19, 2, 5, 9, 16, 20, 27c, 31, N2, N3	10
Average	27b, 28, 30, N4	4
Below Average	13, 27a	2
Poor	18a, 18b	2

3.1.2 Of the 30 ponds surveyed, 22 were scored as being excellent or good, 4 as being average, and 4 as being below average or poor.

3.2 Pond condition and terrestrial habitat assessment

3.2.1 The pond condition and terrestrial habitat assessment graded nearly all of the suitable ponds (those that were not dry) as 'Fair' condition or above. The summary of the results are shown in Table 3.2 below and the complete pond condition assessment is presented in Appendix 2.

Table 3.2 Pond Condition and Terrestrial Habitat Assessment Summary

Condition	Pond Number	Number of Ponds
Excellent	26, 31	2
Good	3, 5, 9, 13, 14, 21, 24, 25, 27a, 27c, 28, 30, N1, N2, N3, N4	16
Fair	2, 4, 6, 8, 11, 16, 23abc&17	7
Poor	1 &19, 18a, 18b, 20, 27b	5

3.3 Great Crested Newt Surveys (Population Size Class Estimate)

3.3.1 Of the 30 ponds surveyed, presence of GCN was confirmed in 17 ponds, of which 9 ponds were confirmed as breeding ponds (red text). The results are shown in Table 3.3, with full survey

information in Appendix 3. The locations of the ponds with confirmed GCN presence are shown in Figure 2.

Table 3.3 Summary of Population Size Class Assessment Surveys

Pond Number	GCN Found	Eggs Found	Peak Count (Method)
1 & 19	No	No	-
2	No	No	-
3	Yes	No	3 (bottle traps)
4	Yes	No	6 (torching)
5	Yes	Yes	2 (torching)
6	Yes	Yes	25 (torching)
7	Dry		
8	Yes	Yes	17 (torching)
9	No	No	-
10	Does not require monitoring		
11	Yes	Yes	1 (torching & bottle traps)
12	Unsuitable – stocked fishing lake		
13	No	No	-
13a	Dry		
14	No	No	-
15	Dry		
16	No	No	-
17	Now forms part of Pond 23b&c		
18a	No	No	-
18b	No	No	-
19	Now part of Pond 1		
20	No	No	-
21	Yes	No	2 (bottle traps)
22	Dry		
23a,b,c&17	Yes	Yes	14 (bottle traps)
24	No	No	-
25	No	No	-
26	Yes	Yes	7 (hand net)
27a	No	No	-
27b	Yes	No	13 (bottle traps)
27c	Yes	No	1 (bottle traps)

Pond Number	GCN Found	Eggs Found	Peak Count (Method)
28	No	Yes	-
29	No longer present		
30	Yes	Yes	8 (torching)
31	Yes	Yes	5 (torching)
32	Dry		
33	Dry		
34	Dry		
N1	Yes	No	14 (torching)
N2	Yes	No	3 (torching)
N3	Yes	No	4 (bottle traps)
N4	No	No	-

3.4 Comparison between GCN surveys undertaken in 2017, 2018 and 2019 to 2021

3.4.1 Table 3.4. provides the results of the population size class estimate surveys undertaken over the last three years. In summary:

- 2017 – 21 ponds (from 32) supported GCN, of which breeding was confirmed in 4;
- 2018 – 23 ponds (from 36) supported GCN, of which breeding was confirmed in 10;
- 2019 – 21 ponds (from 31) supported GCN, of which breeding was confirmed in 11;
- 2021 – 17 ponds (from 30) supported GCN, of which breeding was confirmed in 9.

Table 3.4 Comparison between 2017, 2018, 2019 and 2021 Population Size Class Assessment Surveys

Pond Number	2017		2018		2019		2021	
	GCN Found & No & method	Eggs Found	GCN Found & No & method	Eggs Found	GCN Found & No & method	Eggs Found	GCN Found & No & method	Eggs Found
1 & 19	No	No	No	No	No	No	No	No
2	Yes (1 torch)	No	Yes (1 torch)	No	No	No	No	No
3	Yes (1 bottle)	No	Yes (4 bottle)	No	No	No	Yes (3 bottle)	No
4	Yes (2 bottle)	No	Yes (9 bottle)	Yes	Yes (6 bottle)	Yes	Yes (6 torch)	No
5	Yes (5 bottle)	No	Yes (5 bottle)	No	Yes (2 bottle)	No	Yes (2 torch)	Yes
6	Yes (55 bottle)	No	Yes (41 bottle)	No	Yes (31 torch)	Yes	Yes (25 torch)	Yes
7	Dry		Yes (2 bottle)	No	Dry		Dry	
8	Yes (27 bottle)	No	Yes (16 bottle)	Yes	Yes (34 bottle)	Yes	Yes (17 torch)	Yes
9	No	No	Yes (26 bottle)	No	No	No	No	No

Pond Number	2017		2018		2019		2021	
	GCN Found & No & method	Eggs Found	GCN Found & No & method	Eggs Found	GCN Found & No & method	Eggs Found	GCN Found & No & method	Eggs Found
10	Unsuitable		Unsuitable		Does not require monitoring		Does not require monitoring	
11	Yes (5 torch)	No	Yes (12 bottle)	No	Yes (3 torch)	Yes	Yes (1 bottle/1 torch)	Yes
12	No	No	No	No	Unsuitable – stocked fishing lake		Unsuitable – stocked fishing lake	
13	Dry		Yes (1 torch)	No	Yes (1 bottle)	No	No	No
13a	Dry		No	No	Dry		Dry	
14	No	No	No	No	Yes (1 bottle)	No	No	No
15	No	No	No	No	Dry		Dry	
16	No	No	No	No	No	No	No	No
17	N/A – Unsuitable for surveys as flowing ditch		N/A – Unsuitable for surveys as flowing ditch		Now forms part of Pond 23b, c		Now part of larger waterbody that includes 23a, 23b, & 23c	
18a	No	No	No	No	No	No	No	No
18b	No	No	No	No	No	No	No	No
19	Now part of Pond 1		Now part of Pond 1		Now part of Pond 1		Now part of Pond 1	
20	No	No	No	No	No	No	No	No
21	Yes (6 bottle)	No	Yes (11 torch)	No	Yes 6 (bottle)	No	Yes (2 bottle)	No
22	Dry		Dry		Dry		Dry	
23a	Part of 23 b & c		Part of 23 b & c		No	No	Now part of 23b, 23c & 17	
23b, 23c	Yes (5 torch)	Yes	Yes (5 torch)	Yes	Yes (6 torch)	No	Yes (14 bottle)	Yes
24	Yes (2 torch)	No	Yes (6 bottle)	No	Yes (2 bottle)	No	No	No
25	Yes (5 bottle)	Yes	Yes (5 bottle)	Yes	Yes (1 bottle)	No	No	No
26	Yes (6 torch)	No	Yes (11 torch)	Yes	Yes (9 torch)	Yes	Yes (7 hand net)	Yes
27a	No	No	Yes (1 torch)	No	Yes (1 torch)	Yes	No	No
27b	Yes (1 bottle)	No	Yes (3 bottle)	Yes	Yes (7 bottle)	No	Yes (13 bottle)	No
27c	No	No	No	No	No	No	Yes (1 bottle)	No
28	Yes (2 bottle)	No	Yes (2 bottle)	Yes	Yes (2 bottle)	Yes	No	Yes
29	Dry		Dry		Dry		Dry	
30	Yes (5 torch)	No	Yes (6 bottle)	No	Yes (4 torch)	Yes	Yes (8 torch)	Yes
31	Yes (3 bottle)	No	Yes (11 bottle)	No	Yes (7 bottle)	Yes	Yes (5 torch)	Yes
32	Yes (1 bottle)	No	No	No	Dry		Dry	
33	Dry		No	No	Dry		Dry	
34	Dry		Dry		Dry		Dry	
N1	Yes (9 bottle)	Yes	Yes (8 bottle)	Yes	Yes (11 torch)	Yes	Yes (14 torch)	No
N2	Yes (9 bottle)	No	Yes (8 bottle)	Yes	Yes (4 bottle)	No	Yes (3 torch)	No
N3	Yes (9 bottle)	Yes	Yes (3 bottle)	Yes	Yes (28 torch)	Yes	Yes (4 bottle)	No
N4	Dry		No	No	Yes (3 torch)	No	No	No

3.5 Additional species recorded

- 3.5.1 Numerous incidental records of Smooth Newt *Lissotriton vulgaris*, Palmate Newt *Lissotriton helveticus*, Common Frog *Rana temporaria* and Common Toad *Bufo bufo* were recorded in the majority of the ponds.
- 3.5.2 Many of the ponds had fish species present, including Three-spined Stickleback *Gasterosteus aculeatus* in various ponds throughout the site and an unidentified fish species in Pond 2.
- 3.5.3 A Water Shrew *Neomys fodiens* was found in a bottle trap in Pond 25; bottle trapping was thereafter ceased in this pond.

3.6 Old Engine Brook underpass monitoring

- 3.6.1 The April-May checks recorded just one amphibian, that being a Common Toad under a carpet tile on the 14th May. Two Field Voles were recorded, along with lots of recent signs of Wild Boar and deer through the underpass (Table 3.6).

Table 3.6 April-May 2021 Old Engine Brook underpass refugia and torchlight checks

Artificial Refugia	08 April	18 April	20 April	26 April	27 April	07 May	09 May	14 May	15 May	29 May
1 Tin										
2 Felt										
3 Carpet Tile										
4 Onduline										
5 Tin			Field vole					Field vole		
6 Felt										
7 Onduline										
8 Carpet Tile								Common Toad		
9 Tin										
10 Onduline										
Torch search	Recent boar activity	Recent boar activity	Recent boar and deer activity		Recent boar activity	Recent boar and deer activity		Recent boar activity	Recent boar activity	Recent boar activity

3.6.2 In October, whilst no GCN were recorded underneath the artificial refugia, they were observed by torchlight on four nights, with juveniles observed either in or very near the underpass on three nights, and adults being observed in gully pots on the road on one night.

3.6.3 On nine out of ten nights, adult and juvenile Common Toads and Common Frogs were observed either in or on gully pots on the road and on the bridge, with a toad observed on the road tarmac on one night. Palmate Newts were observed dispersing through or very near the underpass on four out of ten nights. Table 3.6 below summarises the results and weather conditions of the October 2021 surveys.

3.6.4 The trail camera recorded a single individual wild boar passing through the underpass on one night, and deer activity on multiple nights. No amphibians were recorded with this survey technique.

Table 3.6 October 2021 Old Engine Brook underpass surveys

Date of visit	Weather conditions	GCN presence (✓) or absence (X)	No. of individuals	Specific location	Other amphibians observed
06/10/21	Dry, mild	✓	1 juvenile	Outside underpass at SE corner	N/A
07/10/21	17°C, dry	X	N/A	N/A	x2 Palmate Newts just outside underpass, x1 frog in underpass
12/10/21	14°C, dry	✓	2 adults	In road gully pots east of bridge	x1 toad in underpass, x1 toad in gully pot east of bridge
13/10/21	14°C, dry	✓	1 juvenile	In underpass	x1 Palmate Newt in underpass, x1 Smooth Newt on bridge pavement
18/10/21	16°C, very light rain	X	N/A	N/A	x1 Palmate Newt on road pavement east of bridge, x3 toads on bridge road & in gully pots, x2 frogs just outside underpass & in bridge gully pot.
20/10/21	12-13°C, steady rain	X	N/A	N/A	x2 Palmate Newts in underpass and under refugia, x9 toads in gully pots on bridge and east of bridge.
21/10/21	8°C, dry	X	N/A	N/A	x1 toad on bridge gully pot.
26/10/21	13°C, dry, windy	✓	2 juveniles	In underpass moving north	x1 Palmate Newt in underpass, x2 toads and x3 frogs in gully pots east of bridge.
27/10/21 (pre-dawn)	12°C, light rain, windy	X	N/A	N/A	x2 toads and x1 frog in gully pots east of bridge.
27/10/21	14°C, dry, windy	X	N/A	N/A	x1 toad and x1 frog in/on gully pots east of bridge.

4.0 Assessment and Recommendations

4.1 Legislation

- 4.1.1 GCNs are a European Protected Species (EPS) and as such receive protection under The Conservation of Habitats and Species Regulations 2017 (as amended), also known as the Habitat Regulations, and the Wildlife and Countryside Act 1981 (as amended).
- 4.1.2 It is illegal to kill, injure, capture, handle or disturb EPS, and the places they use for breeding, resting, shelter and protection are protected from being damaged or destroyed. GCN are a Species of Principal Importance under Section 41 of the Natural Environment and Rural Communities Act 2006 (NERC Act).
- 4.1.3 Smooth newt, palmate newt, common frog and common toad are included in Section 9(5) of the Wildlife and Countryside Act 1981 (as amended) which prohibits sale, barter, exchange, transporting for sale and advertising to sell or to buy these species. Common toad is also a Species of Principal Importance under Section 41 of the NERC Act.

4.2 GCN Population Size Class Assessment

- 4.2.1 The CNQ continues to support a good population of GCN with numbers relatively comparable to previous surveys undertaken (JNCC, 1998). It is considered that the population is favouring similar ponds during 2021, compared to 2019. There were slight decreases in the peak counts within 6 ponds, and slight increases within 3 ponds, although this only relates to small numbers (<10 individuals) and generally does not affect the population class assessment (English Nature, 2001).
- 4.2.2 5 ponds which recorded low presence (peak counts of 1 or 2) of GCN in 2019, did not record any presence of GCN in 2021. This includes Ponds 24 and 25, which had GCN presence (low numbers) in 2017, 2018 and 2019. Part of the reason may be that bottle trapping was halted in Ponds 24 and 25 due to the discovery of a Water Shrew on visit 2. However, GCN are still present in the 'cluster' of ponds 24, 25 and 26 since a peak count of 7 GCN were recorded in Pond 26.
- 4.2.3 As in 2017 and 2019, GCN were recorded absent in Pond 9 (a peak count of 26 was recorded in 2018). There is no clear explanation for this.
- 4.2.4 GCN were recorded again in Pond 3, after not being recorded in 2019. Pond 2 continues to be absent of GCN, most likely due to the presence of fish.

4.2.5 In terms of waterbodies where breeding GCN had been confirmed (through identification of GCN eggs), there was a slight decrease in the number, since GCN were not found breeding in Ponds N1 and N3, as they had been in 2019. This brought the total number of breeding ponds to 9 out of 30 surveyed.

4.3 Pond habitat suitability and condition assessments

4.3.1 Of the 30 ponds assessed using the recognised HSI methodology, 22 were scored as being 'good' or 'excellent', 4 as 'average' and 4 as 'below average' or 'poor'.

4.3.2 The project specific pond condition assessment produced 5 ponds being scored as 'poor' and 7 ponds being scored as 'fair'. 16 ponds were scored as 'good' and 2 as 'excellent'. Many ponds have reduced their scores due to the presence of litter and major damage caused by boar wallowing.

4.3.3 While the condition assessment makes note of poaching by Wild Boar *Sus scrofa* as damage, it should be noted that the actions of the Wild Boar are typically improving conditions at many ponds by creating wide shallow margins with increased diversity in plants and invertebrates found in these marshy areas.

4.4 Compensatory provision for GCN assessment

4.4.1 Ponds N1-3 continue record GCN presence, but as in 2017 and 2018 no GCN were recorded at Pond N4 (a peak count of 3 recorded in 2019).

4.4.2 Over the monitoring period to date there has been a small increase in peak counts at N1 and a slight decrease in peak counts at N2. As in 2017 and 2018, a small population size class (peak count of 4) was recorded at Pond N3 (a peak count of 28 was recorded in 2019).

4.4.3 No evidence of breeding was recorded in any of the new ponds (N1-4). This may reflect the limited suitable egg laying habitat present due to the ponds having steep margins. It is considered that some positive intervention management would be beneficial to these ponds as discussed below.

4.4.4 All four ponds recorded smooth and palmate newts.

4.5 Old Engine Brook Underpass

4.5.1 The surveys confirmed that GCN are using the underpass to disperse, however the surveys also recorded GCN and other amphibians on the road and down gully pots. Whilst there are ladders

within the gully pots it's likely this just allows amphibians back onto the road where, because of the dropped kerbs, it would be difficult for them to access adjacent habitat. As such it is considered that some positive intervention would create more use of the underpass by amphibians, and less use of the road, as discussed below.

4.6 Recommendations

4.6.1 It is considered that the following recommendations would benefit GCN, as well as other species of amphibians and reptiles. It incorporates the recommendations set out in previous monitoring reports.

Re-establishment and maintenance of ponds

4.6.2 As in 2019 a number of ponds remain dry during the GCN breeding season, and as such the recommendation in the 2018 Monitoring Report (Ecus, 2018) to consider additional clay lining is still applicable.

4.6.3 N4 still retained little water in 2021. The soil excavated from the pond is banded around the margin and could be stopping run-off from reaching the pond resulting in the low water levels.

4.6.4 It is likely that a number of the ponds have dried out due to the fluctuating hydrology of the site. It may be beneficial to scrape out these ponds to increase the likelihood of them holding water in the future. However, a pond that dries out seasonally during hot summer, can be highly beneficial within a wider network of ponds as it can prevent the establishment of predators, such as a fish.

4.6.5 In addition, those ponds that do not hold water and have become a marshy hollow, may still provide excellent habitat for a range of other species. Therefore, repair work which would improve the ponds for GCN may not necessarily improve conditions for other wildlife.

Pond de-vegetation

4.6.6 Sensitive, gentle removal of vegetation will be beneficial to prevent encroachment. This will also increase breeding display areas and may allow re-establishment of other plants species that can be favourable egg laying plants for GCN. Ponds that would benefit the most from this include ponds 24 and 25.

Removing the fish species from ponds

- 4.6.7 Fish, including three-spined stickleback, are known to predate the eggs and larvae of GCN. Therefore, removing fish from the ponds would potentially increase the survival rate of newt eggs and larvae and have the positive impact of increasing over time the amount of breeding adults.
- 4.6.8 Ponds 1, 18a and 18b all had larger fish, notably perch that is often introduced to waterways by anglers. These ponds are next to Steam Mills Lake (pond 10), which is a coarse fishing pond. It is considered that removing the fish stock from these would not have a lasting positive impact as they are likely to be restocked by anglers. Signage may be beneficial adjacent to these ponds to help educate the anglers on the sensitive nature of the ponds. Pond 12 is the managed Meadowcliffe Fishing Lake and is stocked with coarse fish.
- 4.6.9 Electrofishing can be an effective method to remove fish; however, they can make a return to the ponds. For this to be effective, the process may need to be repeated over a number of years.

Pond shading

- 4.6.10 The thinning of trees and scrub around ponds will allow for sufficient light to reach the pond in improve conditions for emergent plant species within the shallows. This in turn would also stimulate plant growth at the ground level, improving habitat connectivity and foraging habitat for a variety of animals including GCN and other amphibians and reptiles. This is recommended in particular for pond 30, as also recommended in 2018.

Aquatic plant introduction

- 4.6.11 The planting of suitable aquatic flora within several ponds is recommended to increase egg laying opportunities and daytime cover for GCN and other amphibians. Species could include a mix of grasses (e.g. sweet or flote grasses *Glyceria spp.*), small wide-leaved plants (e.g. water mint *Mentha aquatica*), or narrow-leaved plants (e.g. water forget-me-not *Myosotis scorpioides* (Froglife, 2001). Ponds that would benefit from this are those suggested in 2018: 5, 13, 16, 30 and 31, and N1, N2, N3 and N4.
- 4.6.12 However, a large percentage of the ponds, in particular ponds N1, N2, N3, N4, have very steep banks unsuitable for the small forbs usually preferred by GCN for egg deposition. Re-profiling of banks to create shallow margins should be considered to create more suitable conditions. This re-profiling of the banks would allow forbs to colonise naturally rather than be planted, planting

without re-profiling would likely result in forbs not taking hold. Any spoil from re-profiling should not be banded by the pondside where it might restrict run-off to pond.

Pollution Incidences

- 4.6.13 There continues to be a large amount of litter throughout the site mostly discarded drink and food containers. A reporting mechanism for pollution and tipping incidences, as well as general site and pond conditions is recommended. The appointment of a site inspector to periodically inspect the entirety of the site and to report on any degradation to the habitats there. It is recommended that litter, such as containers and cans, plastic bags and glass, are cleared up as those items have potential to cause harm to a variety of animals including GCN.

Provision for GCN and amphibian road dispersal

- 4.6.14 To allow GCN and other amphibians a means of escape from the road a means of allowing them onto the pavement and then adjacent habitat should be considered. This could be achieved by introducing speed bumps which are flush or ramp up to the top of the kerb and/or dropped kerbs.

Extension of newt fencing

- 4.6.15 Amphibians, especially toads, may be coming from the clusters of ponds 1, 10 and 18, therefore extending newt fencing, especially on southwestern side of road, could prevent amphibians getting onto the road.
- 4.6.16 Additionally extending the newt fencing further down the underpass should be considered to prevent the possibility of amphibians accessing the bridge from here and then onto the road.

References

Ecus (2017) Cinderford Northern Quarter – Great Crested Newt Monitoring Survey. A report to Forest of Dean Council. December 2017.

Ecus (2018) Cinderford Northern Quarter – Great Crested Newt Monitoring Survey. A report to Forest of Dean Council. July 2018.

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

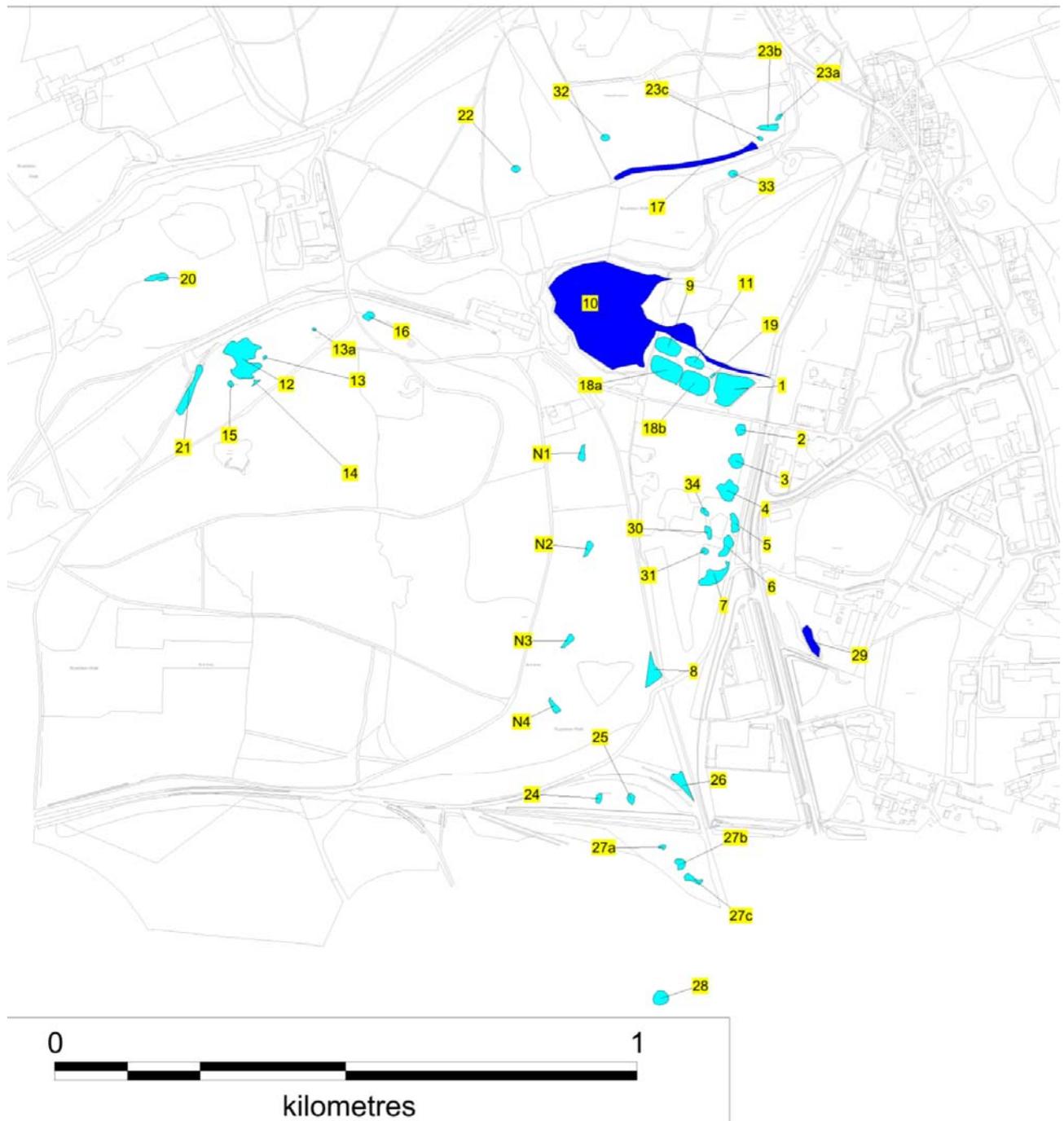
JNCC (1998) Guidelines for the Selection of Biological SSSI's, JNCC Peterborough

Langton, T.E.S., Beckett, C.L., and Foster, J.P. (2001) Great Crested Newt Conservation Handbook, Froglife, Halesworth.

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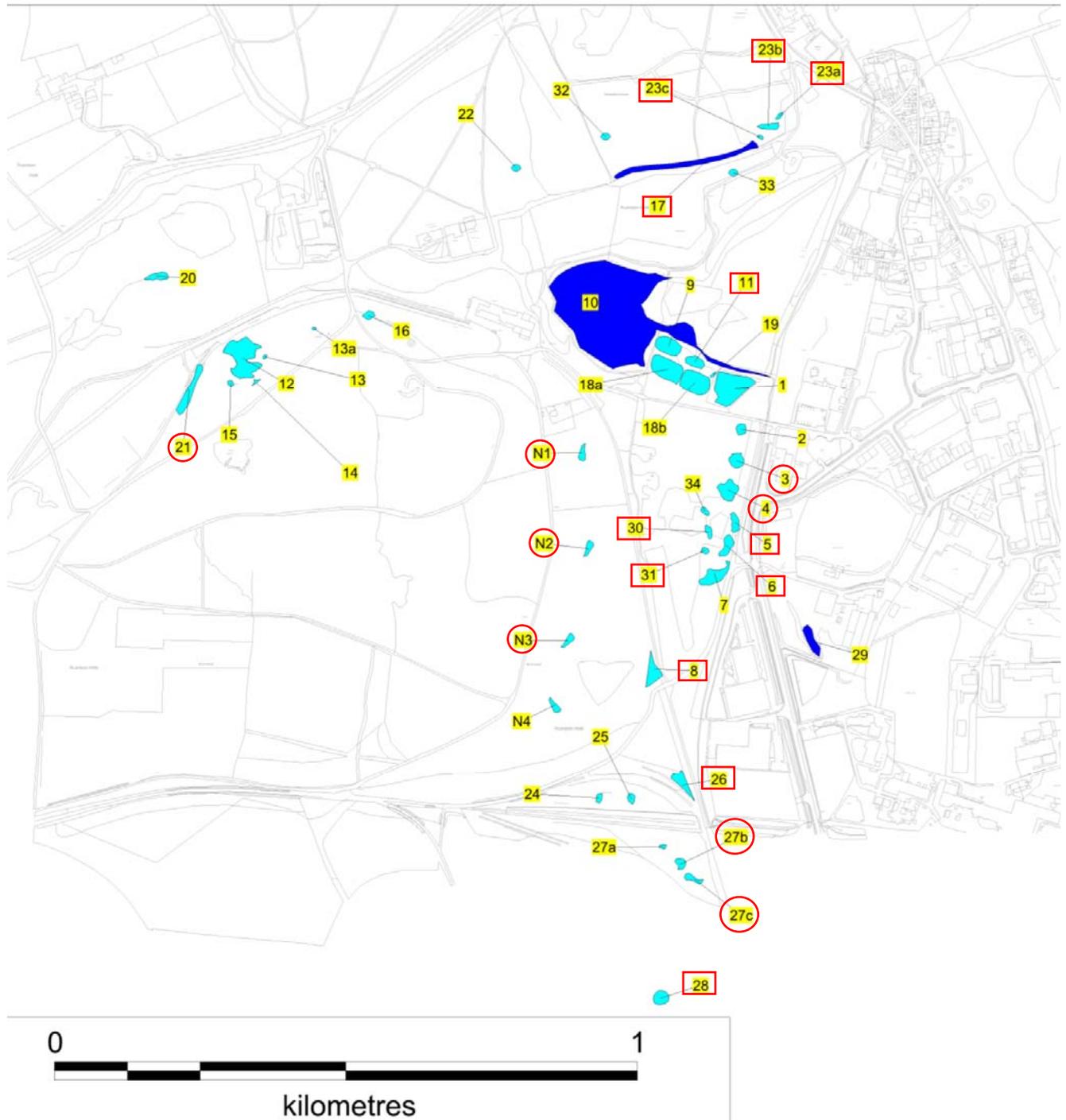
Oldham, R.S; Keeble, J; Swan, M.J.S. and Jeffcote, M. (2000) Evaluating the suitability of habitat for the great crested newt (*Triturus cristatus*).

Figure 1: Pond Location Plan



Legend

-  Ponds to be monitored
-  Ponds not to be monitored



Legend

-  GCN present
-  GCN breeding

Figure 2: Confirmed GCN pond location plan

Appendix 1: Habitat Suitability Index Assessment

H.S.I 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

POND	location	pond area	long - evity	water quality	shading	water-fowl	fish presence	nos ponds in 1km	terr habitat present	macro-phyte cover	H.S.I SCORE	Pond suitability
	SI1	SI2	SI3	SI4	SI5	SI6	SI7	SI8	SI9	SI10		
1	1	0.85	0.9	0.67	0.6	0.67	0.33	1	0.67	0.8	0.72	Good
2	1	1	0.9	1	0.4	1	0.33	1	1	0.5	0.75	Good
3	1	0.8	0.9	1	1	1	1	1	1	1	0.97	Excellent
4	1	0.6	0.9	1	0.9	1	1	1	1	1	0.93	Excellent
5	1	0.1	0.9	1	0.6	1	1	1	1	0.7	0.72	Good
6	1	0.7	0.9	1	1	0.67	1	1	1	1	0.92	Excellent
8	1	0.92	0.5	1	0.6	0.67	1	1	1	0.7	0.82	Excellent
9	1	0.2	0.9	1	0.4	0.67	1	1	0.67	0.9	0.70	Good
11	1	1	0.9	1	1	0.67	1	1	0.67	0.9	0.90	Excellent
13	1	0.1	0.1	0.67	0.8	1	1	1	1	0.95	0.59	Below average
14	1	0.4	0.5	0.67	1	1	1	1	1	1	0.82	Excellent
16	1	0.6	0.9	0.67	0.6	1	1	1	0.67	0.3	0.73	Good
18a	1	0.85	0.9	0.33	0.8	0.01	0.01	1	0.33	0.7	0.29	Poor
18b	1	0.92	0.9	0.33	1	0.01	0.01	1	0.33	0.8	0.31	Poor
20	1	0.3	1	0.33	1	1	1	1	0.33	0.9	0.70	Good
21	1	1	0.5	1	0.9	1	1	1	1	0.9	0.91	Excellent
23abc&17	1	0.85	1	1	1	0.67	1	1	1	0.7	0.91	Excellent
24	1	0.4	1	1	1	1	1	1	1	0.8	0.89	Excellent
25	1	0.4	1	1	1	1	1	1	1	0.9	0.90	Excellent
26	1	1	0.5	1	1	0.67	1	1	1	0.9	0.89	Excellent
27a	1	0.05	0.1	1	1	1	1	1	1	0.85	0.58	Below average
27b	1	0.4	0.5	1	1	0.67	0.33	1	1	0.4	0.67	Average
27c	1	0.5	0.5	1	1	0.67	0.33	1	1	1	0.75	Good
28	1	0.3	0.1	1	0.6	1	1	1	1	0.6	0.64	Average
30	1	0.1	0.9	1	0.4	1	1	1	1	0.3	0.64	Average
31	1	0.1	0.9	1	1	1	1	1	1	1	0.79	Good
N1	1	0.4	0.9	0.67	1	1	1	1	1	0.7	0.84	Excellent
N2	1	0.4	0.9	0.67	1	1	1	1	1	0.4	0.79	Good
N3	1	0.4	0.9	0.67	1	1	1	1	1	0.4	0.79	Good
N4	1	0.1	0.5	0.67	1	1	1	1	1	0.7	0.69	Average

Appendix 2: Pond Condition and Terrestrial Habitat Assessment (Methodology taken from Ecus Ltd, 2017/2018, as shown below)

All possible combinations of the pond condition criteria outcomes and the corresponding pond condition score				
Pond Condition Score	Pond Condition Criteria			
	Invasive Species	Major Damage	Silt Levels	Dumped Rubbish
Poor	Present	Absent	Low	Present
Poor	Present	Absent	Low	Absent
Poor	Present	Absent	Moderate	Present
Poor	Present	Absent	Moderate	Absent
Poor	Present	Absent	High	Present
Poor	Present	Absent	High	Absent
Poor	Absent	Present	Low	Present
Poor	Absent	Present	Low	Absent
Poor	Absent	Present	Moderate	Present
Poor	Absent	Present	Moderate	Absent
Poor	Absent	Present	High	Present
Poor	Absent	Present	High	Absent
Poor	Present	Present	Low	Present
Poor	Present	Present	Low	Absent
Poor	Present	Present	Moderate	Present
Poor	Present	Present	Moderate	Absent
Poor	Present	Present	High	Present
Poor	Present	Present	High	Absent
Poor	Absent	Absent	High	Present
Fair	Absent	Absent	High	Absent
Fair	Absent	Absent	Moderate	Present
Good	Absent	Absent	Moderate	Absent
Good	Absent	Absent	Low	Present
Excellent	Absent	Absent	Low	Absent

Pond Number	Pond Description	Photo	Pond Condition Assessment Criteria	Score per Index	Total HSI score and overall pond condition score
1 & 19	<p>Grid reference:</p> <p>Pond 1: SO 64515 15221 Pond 19: SO 64493 15282</p> <p>Pond 1 is a large man-made pond said to have been created following open cast mining of coal and set within a cluster of man-made ponds and fishing lakes.</p> <p>Pond 19 is a small channel joined to the NW corner and often dry. Surrounding terrestrial habitat is largely alder and willow carr providing good habitat for newts but not extensive and home to a resident sounder of wild boar. Fish including carp are present and the pond regularly occupied by small numbers of waterfowl. The pond is used by breeding common toads.</p>		Location	1	<p>Total HSI Score: 0.72</p> <p>Good suitability with poor pond condition</p>
			Pond area	0.85	
			Pond drying	0.9	
			Water quality	0.67	
			Shade	0.6	
			Fowl	0.67	
			Fish	0.33	
			Pond count	1	
			Terrestrial habitat	0.67	
			Macrophytes	0.8	
			Invasive species	Present – Montbretia on western bank	
			Major damage	Absent	
			Silt levels	Moderate	
Dumped Rubbish	Present – plastics and food containers on banks, access poor possibly blown				
2	<p>Grid reference: SO 64535 15182</p> <p>Northernmost pond of cluster south of forestry track and alongside Forest Vale Road. Set within dense coniferous woodland thinning of woodland was taking place during surveys creating disturbance. Three</p>		Location	1	<p>Total HSI Score: 0.75</p> <p>Good suitability with fair pond condition</p>
			Pond area	1	
			Pond drying	0.9	
			Water quality	1	
			Shade	0.4	
			Fowl	1	

Pond Number	Pond Description	Photo	Pond Condition Assessment Criteria	Score per Index	Total HSI score and overall pond condition score
	spine sticklebacks are present along with some unidentified 4-5" fish in low numbers.		Fish	0.33	
			Pond count	1	
			Terrestrial habitat	1	
			Macrophytes	0.5	
			Invasive species	Absent	
			Major damage	Absent	
			Silt levels	Moderate	
			Dumped Rubbish	Present – Car seats, drink and food containers, CD's.	
3	Grid reference: SO 64537 15150 Part of cluster south of forestry track and to west of Forest Vale Road. Set on eastern edge of dense coniferous woodland, thinning of woodland is taking place during surveys creating some disturbance. Abundant foals water cress and water forget me not provide excellent GCN egg laying opportunity.		Location	1	Total HSI Score: 0.97 Excellent suitability with good pond condition
			Pond area	0.8	
			Pond drying	0.9	
			Water quality	1	
			Shade	1	
			Fowl	1	
			Fish	1	
			Pond count	1	
			Terrestrial habitat	1	
			Macrophytes	1	
			Invasive species	Absent	
			Major damage	Absent	
			Silt levels	Moderate	

Pond Number	Pond Description	Photo	Pond Condition Assessment Criteria	Score per Index	Total HSI score and overall pond condition score
			Dumped Rubbish	Absent	
4	Grid reference: SO 64536 15076 Part of cluster south of forestry track and to west of Forest Vale Road. Set on eastern edge of dense coniferous woodland, thinning of woodland was taking place during surveys creating some disturbance. Water mint, foos water cress, sweet grass, and water forget me not provide excellent GCN egg laying opportunity. Water levels remained high throughout surveys.		Location	1	Total HSI Score: 0.93 Excellent suitability with fair pond condition
			Pond area	0.6	
			Pond drying	0.9	
			Water quality	1	
			Shade	0.9	
			Fowl	1	
			Fish	1	
			Pond count	1	
			Terrestrial habitat	1	
			Macrophytes	1	
			Invasive species	Absent	
			Major damage	Absent	
			Silt levels	Moderate – high accumulation of leaf litter	
			Dumped Rubbish	Present – plastics and cans	
5	Grid reference: SO 64529 15020 Part of cluster south of forestry track and to west of Forest Vale Road. Set on eastern edge of dense coniferous woodland, thinning of woodland was taking place during surveys creating some disturbance. Abundant foos		Location	1	Total HSI Score: 0.72 Good suitability with good pond condition.
			Pond area	0.1	
			Pond drying	0.9	
			Water quality	1	
			Shade	0.6	
			Fowl	1	

Pond Number	Pond Description	Photo	Pond Condition Assessment Criteria	Score per Index	Total HSI score and overall pond condition score
	water cress and water mint provide excellent GCN egg laying opportunity.		Fish	1	
			Pond count	1	
			Terrestrial habitat	1	
			Macrophytes	0.7	
			Invasive species	Absent	
			Major damage	Absent	
			Silt levels	Moderate	
			Dumped Rubbish	Absent	
6	Grid reference: SO 64523 14975 Sited in a woodland clearing this pond is the most biologically diverse of all ponds surveyed having the highest abundance of macrophytes and invertebrates. Surrounded by tussocky grassland and coniferous woodland terrestrial habitat is good, however being located next to a forestry gate used by dog walkers this pond suffers from disturbance and litter more than the other ponds.		Location	1	Total HSI Score: 0.92 Excellent suitability with fair pond condition.
			Pond area	0.7	
			Pond drying	0.9	
			Water quality	1	
			Shade	1	
			Fowl	0.67	
			Fish	1	
			Pond count	1	
			Terrestrial habitat	1	
			Macrophytes	1	
			Invasive species	Absent	
			Major damage	Absent	
			Silt levels	Moderate	

Pond Number	Pond Description	Photo	Pond Condition Assessment Criteria	Score per Index	Total HSI score and overall pond condition score																												
			Dumped Rubbish	Present – wet wipes, food and drink containers, car tyre, plastics and polystyrene																													
8	<p>Grid reference: SO 64393 14797</p> <p>A large pond on the junction of two forestry tracks. Water levels fluctuated dramatically throughout the surveys.</p>		<table border="1"> <tr><td>Location</td><td>1</td></tr> <tr><td>Pond area</td><td>0.92</td></tr> <tr><td>Pond drying</td><td>0.5</td></tr> <tr><td>Water quality</td><td>1</td></tr> <tr><td>Shade</td><td>0.6</td></tr> <tr><td>Fowl</td><td>0.67</td></tr> <tr><td>Fish</td><td>1</td></tr> <tr><td>Pond count</td><td>1</td></tr> <tr><td>Terrestrial habitat</td><td>1</td></tr> <tr><td>Macrophytes</td><td>0.7</td></tr> <tr><td>Invasive species</td><td>Absent</td></tr> <tr><td>Major damage</td><td>Absent</td></tr> <tr><td>Silt levels</td><td>Moderate</td></tr> <tr><td>Dumped Rubbish</td><td>Present – plastic, glass and metal food and drink containers</td></tr> </table>	Location	1	Pond area	0.92	Pond drying	0.5	Water quality	1	Shade	0.6	Fowl	0.67	Fish	1	Pond count	1	Terrestrial habitat	1	Macrophytes	0.7	Invasive species	Absent	Major damage	Absent	Silt levels	Moderate	Dumped Rubbish	Present – plastic, glass and metal food and drink containers	<p>1</p> <p>0.92</p> <p>0.5</p> <p>1</p> <p>0.6</p> <p>0.67</p> <p>1</p> <p>1</p> <p>1</p> <p>0.7</p> <p>Absent</p> <p>Absent</p> <p>Moderate</p> <p>Present – plastic, glass and metal food and drink containers</p>	<p>Total HSI Score: 0.82</p> <p>Excellent suitability with fair pond condition.</p>
Location	1																																
Pond area	0.92																																
Pond drying	0.5																																
Water quality	1																																
Shade	0.6																																
Fowl	0.67																																
Fish	1																																
Pond count	1																																
Terrestrial habitat	1																																
Macrophytes	0.7																																
Invasive species	Absent																																
Major damage	Absent																																
Silt levels	Moderate																																
Dumped Rubbish	Present – plastic, glass and metal food and drink containers																																
9	<p>Grid reference: SO 64410 15323</p> <p>Part of a cluster of man-made ponds including ponds 1, 19, 11, 18a & 18b said to have been created following</p>		<table border="1"> <tr><td>Location</td><td>1</td></tr> <tr><td>Pond area</td><td>0.2</td></tr> <tr><td>Pond drying</td><td>0.9</td></tr> <tr><td>Water quality</td><td>1</td></tr> </table>	Location	1	Pond area	0.2	Pond drying	0.9	Water quality	1	<p>1</p> <p>0.2</p> <p>0.9</p> <p>1</p>	<p>Total HSI Score: 0.70</p> <p>Good suitability with good pond condition.</p>																				
Location	1																																
Pond area	0.2																																
Pond drying	0.9																																
Water quality	1																																

Pond Number	Pond Description	Photo	Pond Condition Assessment Criteria	Score per Index	Total HSI score and overall pond condition score
	open cast mining of coal. Surrounding terrestrial habitat is largely alder and willow carr providing good habitat for newts and home to a resident sounder of wild boar, some thinning of alder carr on the southern banks would be beneficial. Banks of the pond are lightly poached by the actions of wallowing boar.		Shade	0.4	
			Fowl	0.67	
			Fish	1	
			Pond count	1	
			Terrestrial habitat	0.67	
			Macrophytes	0.9	
			Invasive species	Absent	
			Major damage	Absent. Some minor poaching by wallowing boar.	
			Silt levels	Low	
			Dumped Rubbish	Present – plastic food and drink containers	
11	Grid reference: SO 64462 15299 Part of a cluster of man-made ponds including ponds 1, 19, 9, 18a & 18b said to have been created following open cast mining of coal. Surrounding terrestrial habitat is largely alder and willow carr providing good habitat for newts and home to a resident sounder of wild boar. Banks of the pond are lightly poached by the actions of wallowing boar.		Location	1	Total HSI Score: 0.90 Excellent suitability with fair pond condition.
Pond area	1				
Pond drying	0.9				
Water quality	1				
Shade	1				
Fowl	0.67				
Fish	1				
Pond count	1				
Terrestrial habitat	0.67				
Macrophytes	0.9				
Invasive species	Absent				

Pond Number	Pond Description	Photo	Pond Condition Assessment Criteria	Score per Index	Total HSI score and overall pond condition score
			Major damage	Absent. Some minor poaching by wallowing boar.	
			Silt levels	Moderate	
			Dumped Rubbish	Present – plastic food and drink containers	
13	Grid reference: SO 63744 15322 A small shallow pond that dried out during surveys although vegetation indicate it usually holds water.		Location	1	Total HSI Score: 0.59 Below average suitability with good pond condition.
			Pond area	0.1	
			Pond drying	0.1	
			Water quality	0.67	
			Shade	0.8	
			Fowl	1	
			Fish	1	
			Pond count	1	
			Terrestrial habitat	1	
			Macrophytes	0.95	
			Invasive species	Absent	
			Major damage	Absent	
			Silt levels	Moderate	

Pond Number	Pond Description	Photo	Pond Condition Assessment Criteria	Score per Index	Total HSI score and overall pond condition score
			Dumped Rubbish	Absent	
14	Grid reference: SO 63762 15290 A wet ditch alongside a forestry track.		Location	1	Total HSI Score: 0.82 Excellent suitability with good pond condition.
			Pond area	0.4	
			Pond drying	0.5	
			Water quality	0.67	
			Shade	1	
			Fowl	1	
			Fish	1	
			Pond count	1	
			Terrestrial habitat	1	
			Macrophytes	1	
			Invasive species	Absent	
			Major damage	Absent	
			Silt levels	Moderate	
			Dumped Rubbish	Absent	
16	Grid reference: SO 63811 15384 Set within a depression this pond has steep banks and is surrounded by coniferous woodland home to a small sounder of boar. The pond is heavily silted and contains no macrophytes.		Location	1	Total HSI Score: 0.73 Good suitability with fair pond condition.
			Pond area	0.6	
			Pond drying	0.9	
			Water quality	0.67	
			Shade	0.6	
			Fowl	1	
			Fish	1	
			Pond count	1	

Pond Number	Pond Description	Photo	Pond Condition Assessment Criteria	Score per Index	Total HSI score and overall pond condition score
			Terrestrial habitat	0.67	
			Macrophytes	0.3	
			Invasive species	Absent	
			Major damage	Absent	
			Silt levels	High	
			Dumped Rubbish	Absent	
18a	<p>Grid reference: SO 64475 15247</p> <p>Large man-made pond part of a cluster including ponds 1, 19, 9, & 18b said to have been created following open cast mining of coal, a channel in the centre joins the pond with 18b. Home to a resident sounder of wild boar the banks are heavily poached. Large carp were noted and discussion with local fisherman indicates that other coarse fish are likely present. Mallard and Canada goose were observed regularly. The pond is used by breeding common toads. <i>Ophrydium versatile</i> algae was also noted.</p>		Location	1	<p>Total HSI Score: 0.29</p> <p>Poor suitability with poor pond condition.</p>
			Pond area	0.85	
			Pond drying	0.9	
			Water quality	0.33	
			Shade	0.8	
			Fowl	0.01	
			Fish	0.01	
			Pond count	1	
			Terrestrial habitat	0.33	
			Macrophytes	0.7	
			Invasive species	Absent	
			Major damage	Present – banks heavily poached by boar	

Pond Number	Pond Description	Photo	Pond Condition Assessment Criteria	Score per Index	Total HSI score and overall pond condition score
			Silt levels	Moderate	
			Dumped Rubbish	Present – clothing, food and drink containers, metal, glass, and plastics.	
18b	<p>Grid reference: SO 64475 15247</p> <p>Large man-made pond part of a cluster including ponds 1, 19, 9, & 18a said to have been created following open cast mining of coal, a channel in the centre joins the pond with 18a. Home to a resident sounder of wild boar the banks are heavily poached. Large carp were noted and discussion with local fisherman indicates that other coarse fish are likely present. Mallard and Canada goose were observed regularly. The pond is used by breeding common toads. <i>Ophrydium versatile</i> algae was also noted.</p>		Location	1	Total HSI Score: 0.31
			Pond area	0.92	Poor suitability with poor pond condition.
			Pond drying	0.9	
			Water quality	0.33	
			Shade	1	
			Fowl	0.01	
			Fish	0.01	
			Pond count	1	
			Terrestrial habitat	0.33	
			Macrophytes	0.8	
			Invasive species	Present – Montbretia on eastern bank	
			Major damage	Present – banks heavily poached by boar	
			Silt levels	Moderate	
			Dumped Rubbish	Present – clothing, food and drink containers, metal, glass, and plastics.	
20	Grid reference: SO 63543 15446		Location	1	Total HSI Score: 0.70

Pond Number	Pond Description	Photo	Pond Condition Assessment Criteria	Score per Index	Total HSI score and overall pond condition score
	Man-made pond set within former open cast coal mine, surrounding soil heavy in clay and coal. Home to a resident sounder of boar the banks are heavily poached. Surrounding mixed woodland is young and lacks structural heterogeny. Water levels were consistently low throughout the surveys.		Pond area	0.3	Good suitability with poor pond condition.
		Pond drying	1		
		Water quality	0.33		
		Shade	1		
		Fowl	1		
		Fish	1		
		Pond count	1		
		Terrestrial habitat	0.33		
		Macrophytes	0.9		
		Invasive species	Absent		
		Major damage	Present – banks heavily poached by boar		
		Silt levels	Moderate		
		Dumped Rubbish	Absent		
21	Grid reference: SO 63594 15248 A long pond with steep banks and extensive area of sphagnum moss at the southern end doubling pond size at high water. Water levels were consistently high throughout the survey period.		Location	1	Total HSI Score: 0.91 Excellent suitability with good pond condition.
		Pond area	1		
		Pond drying	0.5		
		Water quality	1		
		Shade	0.9		
		Fowl	1		
		Fish	1		
		Pond count	1		

Pond Number	Pond Description	Photo	Pond Condition Assessment Criteria	Score per Index	Total HSI score and overall pond condition score
			Terrestrial habitat	1	
			Macrophytes	0.9	
			Invasive species	Absent	
			Major damage	Absent	
			Silt levels	Moderate	
			Dumped Rubbish	Absent	
23a,b,c&17	<p>Grid reference: SO 64630 15702</p> <p>A single large waterbody comprising ponds 17, 23a, b, & c. Water levels fluctuated during survey window but remained as one waterbody. Pond is alongside forestry track regularly used by dogwalkers, dogs were observed entering the pond on several occasions and litter is high.</p>		Location	1	<p>Total HSI Score: 0.91</p> <p>Excellent suitability with fair pond condition.</p>
		Pond area	0.85		
		Pond drying	1		
		Water quality	1		
		Shade	1		
		Fowl	0.67		
		Fish	1		
		Pond count	1		
		Terrestrial habitat	1		

Pond Number	Pond Description	Photo	Pond Condition Assessment Criteria	Score per Index	Total HSI score and overall pond condition score
			Macrophytes	0.7	
			Invasive species	Absent	
			Major damage	Absent	
			Silt levels	Moderate	
			Dumped Rubbish	Present - Motorbike frame and wheel in pond, plastic food and drink packaging	
24	<p>Grid reference: SO 64298 14549</p> <p>Man-made rectangular pond forming part of a cluster with 25 & 26 set within tussocky wet grassland of Laymoor Quag nature reserve north of the disused railway line. Dominated by broad leaved pondweed with some Typha and rush. Bottle trapping was halted following the discovery of water shrew at pond 25.</p>		Location	1	<p>Total HSI Score: 0.89</p> <p>Excellent suitability with good pond condition.</p>
			Pond area	0.4	
			Pond drying	1	
			Water quality	1	
			Shade	1	
			Fowl	1	
			Fish	1	
			Pond count	1	
			Terrestrial habitat	1	
			Macrophytes	0.8	
			Invasive species	Absent	
			Major damage	Absent	
			Silt levels	Moderate	

Pond Number	Pond Description	Photo	Pond Condition Assessment Criteria	Score per Index	Total HSI score and overall pond condition score
			Dumped Rubbish	Absent	
25	<p>Grid reference: SO 64357 14548</p> <p>Man-made rectangular pond forming part of a cluster with 24 & 26 set within tussocky wet grassland of Laymoor Quag nature reserve north of the disused railway line. Dominated by broad leaved pondweed with some Typha and sweet grass. Bottle trapping was halted following the discovery of water shrew.</p>		Location	1	<p>Total HSI Score: 0.90</p> <p>Excellent suitability with good pond condition.</p>
			Pond area	0.4	
			Pond drying	1	
			Water quality	1	
			Shade	1	
			Fowl	1	
			Fish	1	
			Pond count	1	
			Terrestrial habitat	1	
			Macrophytes	0.9	
			Invasive species	Absent	
			Major damage	Absent	
			Silt levels	Moderate	
Dumped Rubbish	Absent				
26	<p>Grid reference: SO 64457 14548</p> <p>Located at the side of the forestry track and forming part of a cluster with 24 & 26 set within tussocky wet grassland of Laymoor Quag nature reserve north of the disused railway line. Abundant crowfoot and sweet grass with some broad-leaved pondweed. Bottle trapping was halted following the discovery of water shrew at pond 25.</p>		Location	1	<p>Total HSI Score: 0.89</p> <p>Excellent suitability with excellent pond condition.</p>
			Pond area	1	
			Pond drying	0.5	
			Water quality	1	
			Shade	1	
			Fowl	0.67	
			Fish	1	
			Pond count	1	

Pond Number	Pond Description	Photo	Pond Condition Assessment Criteria	Score per Index	Total HSI score and overall pond condition score
			Terrestrial habitat	1	
			Macrophytes	0.9	
			Invasive species	Absent	
			Major damage	Absent	
			Silt levels	Low	
			Dumped Rubbish	Absent	
27a	<p>Grid reference: SO 64412 14465</p> <p>Forming part of a cluster of ponds south of Laymoor Quag with ponds 27b & c. This small pond dried out during surveys while surrounding water levels remained high.</p>		Location	1	<p>Total HSI Score: 0.58</p> <p>Below average suitability with good pond condition.</p>
			Pond area	0.05	
			Pond drying	0.1	
			Water quality	1	
			Shade	1	
			Fowl	1	
			Fish	1	
			Pond count	1	
			Terrestrial habitat	1	
			Macrophytes	0.85	
			Invasive species	Absent	
			Major damage	Absent	
			Silt levels	Moderate	

Pond Number	Pond Description	Photo	Pond Condition Assessment Criteria	Score per Index	Total HSI score and overall pond condition score
			Dumped Rubbish	Absent	
27b	<p>Grid reference: SO 64439 14438</p> <p>Forming part of a cluster of ponds south of Laymoor Quag with ponds 27a & c. Water levels remained high throughout the survey period. A resident sounder of boar was observed on many occasions, banks are poached through wallowing.</p>		Location	1	<p>Total HSI Score: 0.67</p> <p>Average suitability with poor pond condition.</p>
			Pond area	0.4	
			Pond drying	0.5	
			Water quality	1	
			Shade	1	
			Fowl	0.67	
			Fish	0.33	
			Pond count	1	
			Terrestrial habitat	1	
			Macrophytes	0.4	
			Invasive species	Absent	
			Major damage	Present – banks poached and denuded, extensive boar wallowing at northern end	
			Silt levels	Moderate	
			Dumped Rubbish	Absent	
27c	<p>Grid reference: SO 64462 14409</p> <p>Forming part of a cluster of ponds south of Laymoor Quag with ponds 27a & b. Water levels remained high throughout the survey period. A</p>		Location	1	<p>Total HSI Score: 0.75</p> <p>Good suitability with good pond condition.</p>
			Pond area	0.5	
			Pond drying	0.5	
			Water quality	1	
			Shade	1	

Pond Number	Pond Description	Photo	Pond Condition Assessment Criteria	Score per Index	Total HSI score and overall pond condition score
	resident sounder of boar was observed on many occasions.		Fowl	0.67	
			Fish	0.33	
			Pond count	1	
			Terrestrial habitat	1	
			Macrophytes	1	
			Invasive species	Absent	
			Major damage	Absent – only minor poaching by boar	
			Silt levels	Moderate	
			Dumped Rubbish	Absent	
28	Grid reference: SO 64457 14205 A small pond on the woodland edge south of ponds 27a-c, surrounded by many depressions and with much coal at the surface indicating likely result of open cast mining.		Location	1	Total HSI Score: 0.64 Average suitability with good pond condition.
			Pond area	0.3	
			Pond drying	0.1	
			Water quality	1	
			Shade	0.6	
			Fowl	1	
			Fish	1	
			Pond count	1	
			Terrestrial habitat	1	
			Macrophytes	0.6	
			Invasive species	Absent	
			Major damage	Absent	
			Silt levels	Low	

Pond Number	Pond Description	Photo	Pond Condition Assessment Criteria	Score per Index	Total HSI score and overall pond condition score
			Dumped Rubbish	Present – Plastic bucket and lid in pond	
30	Grid reference: SO 64496 15041 Part of a cluster with ponds 2-5. Heavily shaded within woodland and with no macrophytes.		Location	1	Total HSI Score: 0.64 Average suitability with good pond condition.
			Pond area	0.1	
			Pond drying	0.9	
			Water quality	1	
			Shade	0.4	
			Fowl	1	
			Fish	1	
			Pond count	1	
			Terrestrial habitat	1	
			Macrophytes	0.3	
			Invasive species	Absent	
			Major damage	Absent	
			Silt levels	Low	
			Dumped Rubbish	Present – Glass, tin and plastic drink containers	
31	Grid reference: SO 64478 14996 Sat alongside pond 6 in the woodland clearing surrounded by tussocky grassland. This small pond has one of the most biologically diverse invertebrate communities of all ponds monitored.		Location	1	Total HSI Score: 0.79 Good suitability with excellent pond condition.
			Pond area	0.1	
			Pond drying	0.9	
			Water quality	1	
			Shade	1	
			Fowl	1	

Pond Number	Pond Description	Photo	Pond Condition Assessment Criteria	Score per Index	Total HSI score and overall pond condition score
			Fish	1	
			Pond count	1	
			Terrestrial habitat	1	
			Macrophytes	1	
			Invasive species	Absent	
			Major damage	Absent	
			Silt levels	Low	
			Dumped Rubbish	Absent	
N1	<p>Grid reference: SO 64279 15152</p> <p>One of four man-made ponds at the east of the site. Banks are steep with little vegetation, the pond lined with clay and excavated soil banded around the pond. Surrounding habitat is rank grassland with bracken and scrub, habitat piles have been created nearby and a variety of whips / saplings planted. The pond would benefit from re-profiling of banks to form shallower margins.</p>		Location	1	<p>Total HSI Score: 0.84</p> <p>Excellent suitability with good pond condition.</p>
			Pond area	0.4	
			Pond drying	0.9	
			Water quality	0.67	
			Shade	1	
			Fowl	1	
			Fish	1	
			Pond count	1	
			Terrestrial habitat	1	
			Macrophytes	0.7	
			Invasive species	Absent	
			Major damage	Absent	
			Silt levels	Moderate	

Pond Number	Pond Description	Photo	Pond Condition Assessment Criteria	Score per Index	Total HSI score and overall pond condition score
			Dumped Rubbish	Absent	
N2	<p>Grid reference: SO 64291 15022</p> <p>One of four man-made ponds at the east of the site. Banks are steep with little vegetation, the pond lined with clay and excavated soil banded around the pond. Surrounding habitat is rank grassland with bracken and scrub, habitat piles have been created nearby and a variety of whips / saplings planted. The pond would benefit from re-profiling of banks to form shallower margins, some wallowing by boar is helping to establish shallows at the northern end.</p>		Location	1	<p>Total HSI Score: 0.79</p> <p>Good suitability with good pond condition.</p>
			Pond area	0.4	
			Pond drying	0.9	
			Water quality	0.67	
			Shade	1	
			Fowl	1	
			Fish	1	
			Pond count	1	
			Terrestrial habitat	1	
			Macrophytes	0.4	
			Invasive species	Absent	
			Major damage	Absent – only minor poaching of banks	
			Silt levels	Moderate	
			Dumped Rubbish	Absent	
N3	<p>Grid reference: SO 64279 14912</p> <p>One of four man-made ponds at the east of the site. Banks are steep with little vegetation, the pond lined with clay and excavated soil banded around the pond. Surrounding habitat is rank grassland with bracken and scrub, habitat piles have been created nearby and a variety of</p>		Location	1	<p>Total HSI Score: 0.79</p> <p>Good suitability with good pond condition.</p>
			Pond area	0.4	
			Pond drying	0.9	
			Water quality	0.67	
			Shade	1	
			Fowl	1	
			Fish	1	

Pond Number	Pond Description	Photo	Pond Condition Assessment Criteria	Score per Index	Total HSI score and overall pond condition score
	whips / saplings planted. The pond would benefit from re-profiling of banks to form shallower margins, poaching by boar at northern and southern ends of the pond is aiding the establishment of macrophytes.		Pond count	1	
			Terrestrial habitat	1	
			Macrophytes	0.4	
			Invasive species	Absent	
			Major damage	Absent – only minor poaching of banks	
			Silt levels	Moderate	
			Dumped Rubbish	Absent	
N4	Grid reference: SO 64245 14723 One of four man-made ponds at the east of the site. Banks are steep with little vegetation, the pond lined with clay and excavated soil banded around the pond. Surrounding habitat is rank grassland with bracken and scrub, habitat piles have been created nearby and a variety of whips / saplings planted. The pond would benefit from re-profiling of banks to form shallower margins, poaching by boar at northern and southern ends of the pond is aiding the establishment of macrophytes.		Location	1	Total HSI Score: 0.69
			Pond area	0.1	Average suitability and good pond condition.
			Pond drying	0.5	
			Water quality	0.67	
			Shade	1	
			Fowl	1	
			Fish	1	
			Pond count	1	
			Terrestrial habitat	1	
			Macrophytes	0.7	
			Invasive species	Absent	
			Major damage	Absent	
			Silt levels	Moderate	

Pond Number	Pond Description	Photo	Pond Condition Assessment Criteria	Score per Index	Total HSI score and overall pond condition score
			Dumped Rubbish	Absent	

Appendix 3: Full GCN Population Size Class Estimate

VISIT ONE												
Pond no.	Date	Air Temp °C		Rain	Vegetation cover (0-5)	Turbidity	No. of traps	Torching (male.female.juvenile)	Bottle trap (male.female.juvenile)	Hand net	Eggs found?	Notes
		Max	Min									
1	08-09.04.21	8	5	0	2	3	10	Nil	Bb tadpoles	-	No	Carp & moorhen
2	04-05.04.21	9	5	0	1	3	15	sticklebacks + 4" unidentified fish	Sticklebacks	-	No	
3	04-05.04.21	9	5	0	1	2	30	Nil	4.1.0Lh, 1.0.0Lv	-	No	
4	04-05.04.21	9	5	0	2	0	15	2.0.0Lh, 1.0.0Lv	0.1.0Tc, 2.1.0Lh, 1.2.0Lv	-	No	
5	04-05.04.21	9	5	0	2	0	30	10.6.0Lh	16.11.0Lh, 1.1.0Lv	-	No	
6	04-05.04.21	9	5	0	2	0	25	6.2.0Tc, 12.5.0Lh	4.8.0Tc, 15.11.0Lh, 1.1.0Lv	-	No	
7	Dry											
8	04-05.04.21	9	5	0	0	1	50	15.2.0Tc, 7.6.0Lh	1.0.0Tc, 4.10.0Lh, 1.1.0Lv	-	Tc	
9	08-09.04.21	8	5	0	4	2	20	Nil	2.3.0Lv	-	No	
10	Does not require monitoring											
11	08-09.04.21	8	5	0	4	2	20	0.1.0Lv	1.0.0Tc, 1.2.0Lh, 1.0.0Rt	-	Tc	
12	Stocked fishing lake											
13	18-19.04.21	8	6	0	5	1	10	Nil	Nil	-	No	
13a	Dry											
14	18-19.04.21	8	6	0	3	4	15	2.0.0Lh	3.0.0Lh, 1.0.0Lv	-	No	
15	Dry											
16	18-19.04.21	8	6	0	0	4	15	Nil	1.1.0Lh	-	No	
17	Now part of larger waterbody that includes 23a, 23b, & 23c											
18a	08-09.04.21	8	5	0	3	1	30	Nil	0.1.0Lh, 1.0.0Lv, Bb tadpoles	-	No	Carp
18b	08-09.04.21	8	5	0	2	1	30	Nil	0.1.0Lh, 2.1.0Lv, Bb tadpoles	-	No	Canada goose & carp
19	Now part of pond 1											

20	18- 19.04.21	8	6	0	3	0	20	Nil	Nil	-	No	
21	18- 19.04.21	8	6	0	1	3	30	Nil	1.2.0Lh	-	No	
22	Dry											
23a,b,c	18- 19.04.21	8	6	0	1	0	25	1.0.0Tc, 1.6.0Lv	1.0.0Tc, 2.0.0Lh	-	Tc	
24	08- 09.04.21	8	5	0	4	0	15	Nil	1.0.0Lh	-	No	
25	08- 09.04.21	8	5	0	5	0	20	Nil	Nil	-	No	
26	08- 09.04.21	8	5	0	3	1	35	2.1.0Lh	1.5.0Lh	-	Tc	
27a	08- 09.04.21	8	5	0	4	3	5	Nil	1.0.0Lh	-	No	
27b	08- 09.04.21	8	5	0	1	1	20	Nil	0.1.0Lh, 0.2.0Lv	-	No	
27c	08- 09.04.21	8	5	0	3	2	20	1.0.0Lh	0.1.0Lh, 1.0.0Lv, sticklebacks	-	No	
28	08- 09.04.21	8	5	0	1	1	15	Nil	Nil	-	Tc	
29	Dry											
30	04- 05.04.21	9	5	0	0	4	10	Nil	0.1.0Tc	-	Tc	
31	04- 05.04.21	9	5	0	2	1	15	0.4.0L	0.2.0Tc, 1.6.0Lh, 0.2.0Lv	-	No	
32	Dry											
33	18- 19.04.21	8	6	0	1	1	0	Nil	Too shallow to trap	Nil	No	Pair of mallard & pair of mandarin
34	Dry											
N1	04- 05.04.21	9	5	0	1	3	25	12.2.0Tc, 0.5.0L, 1.0.0Bb	2.0.0Tc	-	No	
N2	04- 05.04.21	9	5	0	1	2	30	0.3.0Tc, 6.0.0Lh, 1.0.0Lv, 1.0.0Bb, 1.0.0Rt	1.0.0Rt, Bb tadpoles	-	No	
N3	04- 05.04.21	9	5	0	1	3	30	1.0.0Tc	Nil	-	No	Pair of mallard

N4	04-05.04.21	9	5	0	1	0	10	10.5.0Lh, 2.1.0Lv, 1.0.0Rt	6.1.0Lh, 3.0.0Lv, Rt tadpoles	-	No	
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VISIT TWO												
Pond no.	Date	Air Temp °C		Rain	Vegetation cover (0-5)	Turbidity	No. of traps	Torching	Bottle trap	Hand net	Eggs found?	Notes
		Max	Min									
1	26-27.04.21	12	5	0	3	3	10	Nil	Bb tadpoles	-	No	Carp & moorhen
2	19-20.04.21	9	8	0	1	3	15	4-5" fish & sticklebacks	0.1.0Lv DOA great diving beetle predation	-	No	
3	19-20.04.21	9	8	0	1	2	30	Nil	Sticklebacks	-	No	
4	19-20.04.21	9	8	0	2	0	15	1.0.0Tc, 1.1.0Lh, 0.3.0Lv	1.2.0Tc, 1.4.0Lh, 1.1.0Lv	-	No	
5	19-20.04.21	9	8	0	2	0	30	2.0.0Tc, 1.3.0Lh, 2.1.0Lv	1.1.0Lh	-	No	
6	19-20.04.21	9	8	0	2	0	25	14.2.0Tc, 5.2.0Lh, 2.2.0Lv	0.1.0Tc, 0.4.0Lh, 1.0.0Lv	-	No	
7	Dry											
8	20-21.04.21	8	5	0	0	2	30	12.8Lh, 6.0.0Lv	3.2.0Lh	-	Tc	Water level dropped since last visit
9	19-20.04.21	9	8	0	4	2	20	Nil	1.1.0Lv	-	No	
10	Does not require monitoring											
11	19-20.04.21	9	8	0	4	2	20	1.0.0Tc, 1.0.0Rt	0.1.0Lh	-	Tc	
12	Stocked fishing lake											
13	Dry											
13a	Dry											
14	26-27.04.21	12	5	0	4	2	15	Nil	7.1.0Lh, 4.0.0Lv	-	No	
15	Dry											
16	26-27.04.21	12	5	0	0	5	15	2.1.0Lh	13.2.0Lh,	-	No	
17	Now part of larger waterbody that includes 23a, 23b, & 23c											

18a	18-19.04.21	8	6	0	3	1	30	Nil	2.0.0Lv, Bb tadpoles	-	No	Carp
18b	18-19.04.21	8	6	0	2	1	30	1.0.0Lv	Bb tadpoles	-	No	Carp
19	Now part of pond 1											
20	26-27.04.21	12	5	0	3	1	20	Nil	Nil	-	No	
21	26-27.04.21	12	5	0	1	3	30	Nil	0.1.0Lh	-	No	
22	Dry											
23a,b,c	26-27.04.21	12	5	0	1	0	40	1.4.0Tc, 0.9.0L	1.0.0Tc, 2.0.0Lh	-	Tc	Water level risen
24	20-21.04.21	8	5	0	5	0	15	Nil	1.2.0Lh, 1.0.0Lv	-	L	
25	20-21.04.21	8	5	0	5	0	20	Nil	DOA water shrew, 6.4.0Lh, 4.1.0Lv	-	L	
26	20-21.04.21	8	5	0	3	1	35	1.1.0Tc, 4.1.0Lh, 1.0.0Lv	1.0.0Tc, 7.6.0Lh, 0.1.0Lv	-	Tc	
27a	20-21.04.21	8	5	0	4	3	5	Nil	Nil	-	No	
27b	20-21.04.21	8	5	0	1	2	20	11.10.0Lh, 3.0.0Lv	0.2.0Tc, 20.14.0Lh, 4.2.0Lv	-	No	
27c	20-21.04.21	8	5	0	3	4	20	Nil	1.0.0Lh, 1.3.0Lv, sticklebacks	-	No	
28	20-21.04.21	8	5	0	1	1	5	Nil	Nil	-	Tc	Water level dropped since last survey
29	Dry											
30	19-20.04.21	9	8	0	0	4	10	0.1.0Tc, 2.1.0Lh	Nil	-	Tc	
31	19-20.04.21	9	8	0	2	1	15	4.1.0Tc, 1.3.0Lh, 0.2.0Lv	0.1.0Tc, 5.3.0Lh, 3.2.0Lv	-	Tc	
32	Dry											
33	Dry											
34	Dry											
N1	19-20.04.21	9	8	0	1	3	25	3.1.0Tc	1.0.0Tc, 3.1.0Lh	-	No	

N2	19-20.04.21	9	8	0	1	2	30	Nil	1.0.0Lh	-	No	
N3	19-20.04.21	9	8	0	1	2	30	1.0.0Tc, 3.3Lh	4.3.0Lh	-	No	
N4	19-20.04.21	9	8	0	1	0	0	Nil	Too shallow to trap	Nil	No	Water level dropped since last visit

VISIT THREE												
Pond no.	Date	Air Temp °C		Rain	Vegetation cover (0-5)	Turbidity	No. of traps	Torching	Bottle trap	Hand net	Eggs found?	Notes
		Max	Min									
1	26-27.04.21	12	5	0	3	2	10	Nil	Bb tadpoles	-	No	Carp & moorhen
2	07-08.05.21	10	5	0	1	3	15	Sticklebacks	Nil	-	No	
3	07-08.05.21	10	5	0	1	2	30	Nil	0.2.0Lv	-	No	
4	07-08.05.21	10	5	0	2	0	15	3.0.0Lh, 2.0.0Lv	10.0.0Lh, 4.0.0Lv	-	No	
5	07-08.05.21	10	5	0	2	0	30	10.4.0Lh	11.3.0Lh, 3.0.0Lv	-	Tc	
6	07-08.05.21	10	5	0	2	0	25	3.4.0Tc, 6.2.0Lh, 2.0.0Lv	10.7.0Tc, 5.5.0Lh, 7.1.0Lv	-	Tc, L	
7	Dry											
8	27-28.04.21	7	5	0	0	2	30	5.2.0Tc, 4.5.0Lh	1.2.0Tc, 0.1.0Lh, 1.0.0Rt	-	Tc	
9	26-27.04.21	12	5	0	4	2	20	Nil	0.1.0Lv	-	No	
10	Does not require monitoring											
11	26-27.04.21	12	5	0	4	2	20	1.0.0Tc, 2.1.0Lh, 1.0.0Lv	0.1.0Tc, 0.1.0Lv	-	Tc	
12	Stocked fishing lake											
13	Dry											
13a	Dry											
14	09-10.05.21	14	6	0	4	2	15	3.0.0Lh, 6.1.0Lv	9.3.0Lh, 7.3.0Lv	-	No	
15	Dry											

16	09-10.05.21	14	6	0	0	4	15	Nil	Nil	-	No	
17	Now part of larger waterbody that includes 23a, 23b, & 23c											
18a	26-27.04.21	12	5	0	3	3	30	Nil	1.0.0Lv, Bb tadpoles	-	No	Carp
18b	26-27.04.21	12	5	0	2	3	30	Nil	4.0.0Lv, Bb tadpoles	-	No	Carp
19	Now part of pond 1											
20	09-10.05.21	14	6	0	3	1	20	Nil	Nil	-	No	
21	09-10.05.21	14	6	0	1	3	30	7.5.0Lh, 4.0.0Lv	1.1.0Tc, 12.4.0Lh, 14.0.0Lv	-	No	
22	Dry											
23a,b,c	09-10.05.21	14	6	0	1	0	40	1.2.0Tc, 4.2.0Lh, 2.2.0Lv	10.4.0Tc, 5.0.0Lh, 1.7.0Lv	-	Tc	Water level risen
24	27-28.04.21	7	5	0	5	0	15	Nil	No trapping	1.0.0Lh	L	
25	27-28.04.21	7	5	0	5	0	20	Nil		2.1.0Lh + larvae	L	
26	27-28.04.21	7	5	0	3	1	35	3.0.0Tc, 4.4.0Lh, 1.0.0Lv		Nil	Tc	
27a	Dry											
27b	27-28.04.21	7	5	0	1	1	20	4.1.0Lh	0.1.0Tc, 10.3.0Lh, 2.0.0Lv	-	No	
27c	27-28.04.21	7	5	0	3	2	20	Sticklebacks	0.3.0Lh, sticklebacks	-	No	
28	27-28.04.21	7	5	0	1	1	5	Nil	Nil	-	Tc	
29	Dry											
30	07-08.05.21	10	5	0	0	4	10	Nil	0.1.0Tc	-	Tc	
31	07-08.05.21	10	5	0	2	1	15	12.3.0Lh	3.10.0Tc, 11.4.0Lh, 0.1.0Lv	-	Tc, L	
32	Dry											
33	Dry											
34	Dry											
N1	27-28.04.21	7	5	0	1	2	25	1.1.0Tc, 1.4.0Lh, 1.0.0Bb	Nil	-	No	

N2	27-28.04.21	7	5	0	1	2	30	2.1.0Lh, 1.0.0Rt	Nil	-	No	
N3	27-28.04.21	7	5	0	1	2	30	1.0.0Tc, 0.3.0L	Nil	-	No	
N4	27-28.04.21	7	5	0	1	0	5	1.0.0Bb, 1.0.0Rt	Nil	-	No	Water level risen since last visit

VISIT FOUR												
Pond no.	Date	Air Temp °C		Rain	Vegetation cover (0-5)	Turbidity	No. of traps	Torching	Bottle trap	Hand net	Eggs found?	Notes
		Max	Min									
1	07-08.05.21	10	5	0	3	2	10	Nil	Bb tadpoles	-	No	Carp & moorhen
2	14-15.05.21	12	6	0	1	3	15	0.3.0Lh	2.1.0Lh	-	No	
3	14-15.05.21	12	6	0	1	2	30	0.1.0Tc, 2.4.0Lh, 1.2.0Lv	10.1.0Lh, 2.0.0Lv	-	No	
4	14-15.05.21	12	6	0	2	0	15	2.1.0Tc, 1.3.0Lh	0.1.0Tc, 4.0.0Lh, 1.0.0Lv	-	No	
5	14-15.05.21	12	6	0	2	0	30	4.3.0Lh	2.1.0Lh	-	Tc	
6	14-15.05.21	12	6	0	2	0	25	13.12Tc, 4.11.0Lh	5.2.0Tc, 2.5.0Lv	-	Tc, L	
7	Dry											
8	14-15.05.21	12	6	0	0	2	15	1.0.0Tc, 8.0.0Lh	4.0.0Lh	-	Tc	Water level dropped
9	07-08.05.21	10	5	0	4	2	20	0.1.0L	Nil	-	No	
10	Does not require monitoring											
11	07-08.05.21	10	5	0	4	2	20	0.1.0L	Nil	-	Tc	
12	Stocked fishing lake											
13	Dry											
13a	Dry											
14	15-16.05.21	12	7	0	4	2	15	3.1.0Lh, 6.0.0Lv	2.2.0Lh, 4.0.0Lv	-	No	
15	Dry											
16	15-16.05.21	12	7	0	0	4	15	Nil	Nil	-	No	

17	Now part of larger waterbody that includes 23a, 23b, & 23c											
18a	07-08.05.21	10	5	0	3	3	30	Bb tadpoles	Bb tadpoles	-	No	Carp
18b	07-08.05.21	10	5	0	2	3	30	Bb tadpoles and fish	Bb tadpoles	-	No	Carp
19	Now part of pond 1											
20	15-16.05.21	12	7	0	3	2	20	Nil	Nil	-	No	
21	15-16.05.21	12	7	0	1	3	30	3.1.0Lv	1.0.0Lv	-	No	
22	Dry											
23a,b,c	15-16.05.21	12	7	0	1	0	40	1.5.0Tc, 1.0.0Lv	4.3.0Tc, 1.1.0Lh, 0.1.0Lv	-	Tc	Water level risen
24	15-16.05.21	12	7	0	5	0	15	Nil	No trapping	2.0.0Lh	L	
25	15-16.05.21	12	7	0	5	0	20	Nil		3.1.0Lh, 1.0.0Lv	L	
26	15-16.05.21	12	7	0	4	0	35	1.0.0Tc		2.2.0Lh	Tc	
27a	Dry											
27b	09-10.05.21	14	6	0	2	3	20	11.3.0Lh, 1.2.0Lv	0.1.0Tc, 9.10.0Lh, 1.6.0Lv	-	No	
27c	09-10.05.21	14	6	0	3	4	20	6.2.0Lh	0.1.0Tc, 0.2.0Lh, 1.1.0Lv	-	No	
28	09-10.05.21	14	6	0	1	1	5	Nil	Nil	-	Tc	
29	Dry											
30	14-15.05.21	12	6	0	0	4	10	3.1.0Tc, 9.20.0Lh, 1.6.0Lv	0.4.0Tc, 1.0.0Lh	-	Tc	
31	14-15.05.21	12	6	0	2	1	15	1.11.0Lh	4.6.0Tc, 2.1.0Lh, 0.2.0Lv	-	Tc, L	
32	Dry											
33	Dry											
34	Dry											
N1	14-15.05.21	12	6	0	1	3	25	Nil	3.1.0Tc, 0.1.0Lh	-	No	
N2	14-15.05.21	12	6	0	1	2	30	0.3.0L, 1.0.0Rt	1.0.0Tc, 5.0.0Lh	-	No	

N3	14-15.05.21	12	6	0	1	2	30	2.0.0Tc, 0.2.0L	1.3.0Tc, 5.0.0Lh, 1.0.0Lv	-	No	
N4	14-15.05.21	12	6	0	1	0	5	Nil	Nil	-	No	

VISIT FIVE												
Pond no.	Date	Air Temp °C		Rain	Vegetation cover (0-5)	Turbidity	No. of traps	Torching	Bottle trap	Hand net	Eggs found?	Notes
		Max	Min									
1	No further survey as GCN not present											
2	29-30.05.21	17	8	0	1	3	15	Nil	1.4.0Lh	-	No	
3	29-30.05.21	17	8	0	1	2	30	0.1.0L	1.2.0Tc, 3.5.0Lh, 2.3.0Lv	-	No	
4	29-30.05.21	17	8	0	2	0	15	3.1.2Tc, 3.3.0Lh, 1.0.0Lv	3.2.0Tc, 2.4.0Lh	-	No	
5	29-30.05.21	17	8	0	2	0	30	5.3.0Lh, 2.0.0Lv	3.2.0Lh	-	Tc	
6	29-30.05.21	17	8	0	2	0	25	4.6.0Tc, 2.1.0Lh	7.6.0Tc, 3.6.0Lh	-	Tc, L	
7	Dry											
8	29-30.05.21	17	8	0	0	2	20	3.0.0Tc, 2.0.0Lh, 1.0.0Lv	1.0.0Lv	-	Tc	
9	No further survey as GCN not present											
10	Does not require monitoring											
11	29-30.05.21	17	8	0	4	2	20	Nil	0.1.0Lv	-	Tc	
12	Stocked fishing lake											
13	Dry											
13a	Dry											
14	No further survey as GCN not present											
15	Dry											
16	No further survey as GCN not present											
17	Now part of larger waterbody that includes 23a, 23b, & 23c											
18a	No further survey as GCN not present											
18b	No further survey as GCN not present											
19	Now part of pond 1											
20	No further survey as GCN not present											
21	16-17.05.21	12	5	0	1	3	30	Nil	Nil	-	No	

22	Dry											
23a,b,c	16-17.05.21	12	5	0	1	0	40	Nil	1.0.0Tc, 1.0.0Lv	-	Tc	Water level risen
24	No further survey as GCN not present											
25	No further survey as GCN not present											
26	16-17.05.21	12	5	0	4	0	35	2.2.0Tc, 2.1.0Lh	No trapping	4.3.0Tc, 1.1.0Lh, 0.1.0Lv	Tc	
27a	Dry											
27b	16-17.05.21	12	5	0	2	3	20	5.1.0Lh, 2.2.0Lv	2.2.0Lh, 4.0.0Lv	-	No	
27c	16-17.05.21	12	5	0	3	4	20	3.6.0Lh, sticklebacks	6.2.0Lh	-	No	
28	16-17.05.21	12	5	0	1	1	5	Nil	Nil	-	Tc	
29	Dry											
30	29-30.05.21	17	8	0	0	4	10	3.5.0Tc	3.1.0Tc, 4.9.0Lh, 6.1.0Lv	-	Tc	
31	29-30.05.21	17	8	0	2	1	15	1.4.0Tc, 2.3.0Lh	1.6.0Lh	-	Tc, L	
32	Dry											
33	Dry											
34	Dry											
N1	29-30.05.21	17	8	0	1	2	25	3.4.0Tc, 1.0.0Lh	3.5.0Tc	-	No	
N2	29-30.05.21	17	8	0	1	2	30	1.0.0Tc, 2.0.0Lh	0.2.0Tc, 1.0.0Lv, 1.0.0Rt	-	No	
N3	29-30.05.21	17	8	0	1	2	30	3.2.0Lh	8.2.0Lh	-	No	
N4	No further survey as GCN not present											

VISIT SIX												
Pond no.	Date	Air Temp °C		Rain	Vegetation cover (0-5)	Turbidity	No. of traps	Torching	Bottle trap	Hand net	Eggs found?	Notes
		Max	Min									
1	No further survey as GCN not present											
2	04-05.06.21	18	8	0	1	3	15	Sticklebacks	Sticklebacks	-	No	
3	04-05.06.21	18	8	0	1	2	30	2.0.0Lv	Nil	-	No	

4	04-05.06.21	18	8	0	2	1	15	Nil	0.1.0Tc	-	No	
5	04-05.06.21	18	8	0	3	0	30	1.0.0Tc, 0.6.0L	5.2.0Lh, 2.0.0Lv	-	Tc	
6	04-05.06.21	18	8	0	2	0	25	2.2.0Tc	0.1.0Tc, 0.1.0Lh, 0.2.0Lv	-	Tc, L	
7	Dry											
8	04-05.06.21	18	8	0	0	2	15	0.2.0Tc, 3.4.0Lh	1.1.0Tc, 8.1.0Lh	-	Tc	
9	No further survey as GCN not present											
10	Does not require monitoring											
11	05-06.06.21	18	10	0	4	2	20	Nil	Nil	-	Tc	
12	Stocked fishing lake											
13	Dry											
13a	Dry											
14	No further survey as GCN not present											
15	Dry											
16	No further survey as GCN not present											
17	Now part of larger waterbody that includes 23a, 23b, & 23c											
18a	No further survey as GCN not present											
18b	No further survey as GCN not present											
19	Now part of pond 1											
20	No further survey as GCN not present											
21	05-06.06.21	18	10	0	1	3	30	Nil	Nil	-	No	
22	Dry											
23a,b,c	05-06.06.21	18	10	0	1	0	40	0.1.0Tc	2.0.0Tc, 1.2.0Lv	-	Tc	Water level still high
24	No further survey as GCN not present											
25	No further survey as GCN not present											
26	04-05.06.21	18	8	0	4	0	35	Nil	No trapping	Nil	Tc	
27a	Dry											
27b	05-06.06.21	18	10	0	2	3	20	6.5.0Lh, 1.0.0Lv	1.1.0Tc, 16.12.0Lh, 4.1.0Lv	-	No	
27c	05-06.06.21	18	10	0	3	4	20	1.0.0Lh, sticklebacks	3.0.0Lh, 0.1.0Lv	-	No	

28	05-06.06.21	18	10	0	1	1	5	Nil	Nil	-	Tc	
29	Dry											
30	04-05.06.21	18	8	0	0	4	10	Nil	Nil	-	Tc	
31	04-05.06.21	18	8	0	2	1	15	0.1.0Tc, 5.2.0Lh	2.3.0Lh	-	Tc, L	
32	Dry											
33	Dry											
34	Dry											
N1	04-05.06.21	18	8	0	1	2	25	2.0.0Tc, 1.0.0Lh	3.5.0Tc	-	No	
N2	04-05.06.21	18	8	0	1	2	30	1.2.0Tc	Nil	-	No	
N3	04-05.06.21	18	8	0	1	2	30	2.1.0Lh	1.0.0Lh	-	No	
N4	No further survey as GCN not present											

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