Appendix 7.15: Great Crested Newt Survey Report

ECOSA
Ecological Survey & Assessment Limited

HAMPSTEAD HEATH, CITY OF LONDON

PHASE 2 GREAT CRESTED NEWT SURVEY

Final Document

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Invertebrate, Bird, Mammal, Reptile, Amphibian and Botanical Surveys
Management Plans • Habitat Appraisal • Marine • NVC • EcIA

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HAMPSTEAD HEATH PONDS PROJECT, CITY OF LONDON

GREAT CRESTED NEWT SURVEY

Table of Contents

EXECUTIVE SUMMARY

- Ecological Survey & Assessment (ECOSA) Limited have been contracted by the City of London Corporation to undertake Phase 2 great crested newt survey work to inform development of the Hampstead Heath Flood and Water Quality Management Works scheme and its accompanying Environmental Impact Assessment (EIA).

- A Habitat Suitability Index (HSI) assessment and Phase 2 great crested newt survey were undertaken for 26 pre-determined waterbodies located across the site during May and June 2013.

- According to one of the Hampstead Heath Rangers who assisted with the surveys, there are no known existing records of great crested newt populations within or adjacent to Hampstead Heath. A desk study did not form part of this commission although two historic water quality reports (dated 2002 and 2004) were reviewed to add background information to the study.

- Hampstead Heath is a 275 hectare open space located within the London borough of Barnet. The site lies within the urban landscape of the city of London surrounded on all sides by residential areas. The Heath represents the largest open space of its kind in the area, supporting a variety of habitats including grassland, wetland areas, mature trees, and woodland. Much of the Heath is used for recreational purposes such as walking, fishing and swimming.

- During the HSI assessment, the majority of waterbodies surveyed were calculated as having a 'poor' score. With these scores in mind, together with considerations of various other factors, a total of 21 waterbodies were considered to be unsuitable for supporting great crested newts and omitted from the Phase 2 presence/likely absence surveys. Phase 2 survey work was therefore carried out on five waterbodies during May and June 2013.

- Phase 2 survey methods considered most appropriate for the waterbodies surveyed involved torching, sweep netting and egg searching. Due to various factors such as pond linings, depth of water and public access, none of the waterbodies were subjected to bottle trapping surveys.

- The surveys did not identify great crested newts within any of the waterbodies included within this study. Smooth newts were observed in all of the waterbodies and

palmate newts in a single waterbody on one of the surveys. Overall, the waterbodies on site are considered to provide sub-optimal conditions for great crested newt. Although it is difficult to prove absence of this species, based upon the results of the HSI, Phase 2 presence/likely absence surveys and communication with the Hampstead Heath Ranger, it is considered highly likely that great crested newt are not supported within the study area.

- Given the likely absence of this species, the proposed Flood and Water Quality Management Works will have a negligible impact on great crested newt.

- The Rangers on site already implement a habitat management plan, aimed at increasing the value of the site for wildlife across the Heath. Detailed recommendations for habitat enhancement for great crested newt were therefore considered unnecessary as part of this commission.

1.0 INTRODUCTION

1.1 Background

Ecological Survey & Assessment (ECOSA) Limited have been contracted by the City of London Corporation (CoL) to undertake a Habitat Suitability Index[1] (HSI) assessment and Phase 2 great crested newt *Triturus cristatus* survey of waterbodies within and adjacent to Hampstead Heath to inform the Hampstead Heath Flood and Water Quality Management Works and inform the accompanying Environmental Impact Assessment (EIA) for the scheme. ECOSA were appointed by CoL on 3rd May 2013.

The CoL, as appointed custodian of the Hampstead Heath site, has an obligation to maintain the area for recreational purposes in its preferred natural state. Within their 2007-2017 Hampstead Heath Management Plan (document reference unknown), the corporation's committees have identified various environmental improvement objectives covering a wide range of ecological issues. As part of this, the CoL intends to enhance the conservation value of the Heath's ponds as well as improve flood management and water quality at the site. Plans for the Hampstead Heath Flood and Water Quality Management Works are currently under development by the CoL in consultation with English Heritage, the owners of the northeast Kenwood area of the site. To inform their production, a detailed programme of surveys is needed develop a comprehensive hydrological management strategy. As part of this, it was deemed necessary to carry out Phase 2 great crested newt surveys at the Hampstead Heath site, to confirm the presence/likely absence of great crested newt in a total of 26 waterbodies potentially affected by hydrological works and help inform the scheme design process.

1.2 Aims and Scope of Report

This report provides an assessment of presence/likely absence of great crested newt within 26 waterbodies located across Hampstead Heath and in land immediately adjacent to Hampstead Heath. This report provides the methodology and results of the 2013 surveys and provides an outline of the potential associated impacts the proposed hydrological management works may have on great crested newts. This report is not an Ecological Impact Assessment (EcIA) but will be in support of, and appended to, the EcIA, which is being written by others.

[1] 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) Herpetological Journal* **10 (4):** 143-155.

1.3 Site Setting and Description

Hampstead Heath comprises a 275 hectare area of open space located within the London Borough of Barnet. Immediately to the northeast lies the London village of Highgate. To the north the Heath is bordered by East Finchley and by Golders Green to the northwest. On the western side is Child's Hill. The London village of Hampstead is located adjacent to the southwest of the site, beyond which lies South Hampstead. Kentish Town borders the southeast of the Heath. Dartmouth Park and Upper Holloway comprise the eastern adjacent areas to the site.

The Hampstead heath site is set within the predominantly urban landscape of the city of London. Barnet is adjoined on three sides by further London Boroughs: Harrow and Brent to the west and Enfield and Haringey to the east. The river Thames runs approximately 8.5 km to the south of the site, beyond the city boroughs of Camden and Westminster. To the north, the city of London extends for at least 10 kilometres before reaching the border towns of Hertford, Cheshunt and St Albans, amongst others. Greenspace areas located within relative proximity to the site include Primrose Hill Park approximately 2 km and Queen Mary's Gardens approximately 2.5 km to the south. Whittington Park and Dartmouth Park lie within 600 m and 1.5 km respectively to the east of the site. Queens Wood and Highgate Wood, to the north of the site, comprise the largest nearby woodland areas. Also to the north is the heavily managed amenity grassland of Highgate Golf Club. Approximately 8km to the west lies Gladstone Park. Few nearby open spaces are of equivalent size to the Heath and most are managed as ornamental parkland.

Hampstead Heath supports a variety of valuable habitats for wildlife such as ancient hedgerows, wetland, grassland, scrub and trees. The site is known to support several protected species including grass snake *Natrix natrix* and a number of bat species. As a public "park", its primary use is for recreational activities such as walking, angling and cycling. Visitor numbers each year are considered to be around 7 million. The area subject to the great crested newt survey comprises approximately 170 hectares, encompassing parts of the Parliament Hill Fields, Cohen's Fields, East Heath and Vale of Health. Waterbodies located within the Kenwood area, owned by English Heritage, and within private land of Highgate properties, which potentially offer suitable aquatic habitat for great crested newt populations, are also included under the Phase 2 great crested newt survey.

1.4 Site Proposals

This report has been provided to inform the Hampstead Heath Flood and Water Quality Management Works scheme, its detailed design and the accompanying EIA. The proposals comprise works to maintain dam structures within the Hampstead Heath site, in the interests of improving flood control such that surrounding residential areas are safeguarded during flooding events. Water quality is also to be improved across the pond system to enhance their ecological value and, for those relevant water bodies, to meet bathing water quality standards.

1.5 Survey Area

The survey area is defined as up to 250m from the Hampstead Heath and Highgate Chain of Ponds, including the Vale of Heath. The survey area and waterbodies included within the great crested newt survey were pre-determined by CoL as part of the EIA process. A total of 18 waterbodies were identified within the Heath and further eight waterbodies outside of the Heath.

2.0 SURVEY METHODS

2.1 Introduction

This section details the methods used during the HSI assessment and Phase 2 great crested newt survey undertaken at 26 waterbodies within and adjacent to Hampstead Heath, City of London between May and June 2013. The survey methods employed included a HSI assessment, sweep netting, torch surveying and egg searching.

Two historic reports were made available to ECOSA which provided information about the water quality of some of the waterbodies involved in the great crested newt survey; where appropriate, information from these reports has been referred to within each of the pond descriptions in Section 3. This information relates to studies undertaken in 2002 and 2004 and so although the information is relatively dated, they do, however, provide useful background information for some of the waterbodies.

Where access was not possible by foot, some of the waterbodies were surveyed by boat during both the HSI and Phase 2 presence/likely absence surveys to ensure full coverage of the larger lakes was obtained and the habitat could be appropriately assessed.

2.2 Habitat Suitability Index (HSI) Assessment

HSI assessment is a technique originally developed by Oldham et al. (2000) for the US fish and Wildlife Service and is now widely employed by organisations such as Froglife to evaluate the quality and quantity of habitat for herpetofauna. The HSI assessment uses the following key habitat criteria to establish the suitability of a pond for supporting great crested newts:

- SI_1 = geographic location
- SI_2 = pond area
- SI_3 = pond permanence
- SI_4 = water quality
- SI_5 = pond shading
- SI_6 = number of waterfowl
- SI_7 = occurrence of fish
- SI_8 = pond density
- SI_9 = proportion of ‘newt friendly’ habitat
- SI_{10} = macrophyte (aquatic plant) content

SI_3, 4, 6, 7 and 9 criteria are assessed semi-quantitatively according to a four point scale. The approximate state of the pond is reflected in a score corresponding to a specific descriptive category. Score values and category descriptions vary so as to be specifically relevant to each criterion. For example, water quality is placed into Good, Moderate, Poor or Bad categories and awarded a corresponding HSI score of 1, 0.67, 0.33 or 0.01. Standardised descriptions of each of these categories are provided to guide scoring decisions. SI_1 is an exception, awarded 3 categories (A, B and C) corresponding the optimal, marginal and unsuitable location areas delineated on a standard map of the UK. SI_2, 5, 8 and 10 are assessed on a continuous scale according to the actual values of each criterion. The HSI score for each is read off a standard curve on a graph displaying HSI score on the y axis and the relevant criterion value i.e. pond area in m^2 etc. along the x. The results are then calculated in a standard formula to give a score, which equates to 'poor', 'below average', 'average', 'good' or 'excellent' habitat suitability categories for great crested newts.

As many of the waterbodies included within the assessment are large lakes, entering the true pond area (criteria $SI_{2)}$ automatically results in a HSI score of 0.00. Therefore, the pond size criterion is omitted from the HSI calculations as per the HSI ARG UK Advice Note 5 instructions. This is applicable to all waterbodies whose surface area is greater than 2000 square metres.

2.3 Phase 2 Great Crested Newt Survey

The following survey techniques were employed and considered the most appropriate for the waterbodies included in the Phase 2 presence/likely absence surveys. Bottle trapping, a popular survey method, was considered inappropriate to use on this site due to the presence of pond liners, high level of public access and the depth of many of the larger waterbodies.

2.3.1 Torch Search

The torch searches consisted of an investigation of each pond after dark using a one million candlepower torch to search for adult great crested newts. All newt species encountered were counted and sexed, where possible to do so. Any other relevant information about the waterbody in terms of invertebrate composition and any other wildlife observed were also recorded.

2.3.2 Egg Search

The egg search surveys consisted of a methodical inspection, during daylight, of all suitable marginal vegetation for folded leaves that may indicate newt egg laying

activity. Due to a lack of vegetation suitable for egg laying, and to increase survey effort, artificial egg laying strips were placed on the edge of the Ladies Bathing pond. These were installed around the edge of the waterbody during the first survey and checked for eggs on each of the subsequent visits.

2.3.3 Sweep Netting

The sweep netting survey consisted of an investigation of each water body using a long-handled net. All newts encountered were counted and sexed, where possible. This survey methodology was employed at dusk during the torching surveys.

2.4 Survey Timing, Weather Conditions and Personnel

The HSI assessment was undertaken on all 26 waterbodies on 8th May 2013. Presence/likely absence surveys were then carried out between May and June 2013. The Phase 2 great crested newt work was led by ECOSA Principal Ecologist Samantha Munslow (Natural England Great Crested Newt Class Licence CLS00877) with field support from a number of other suitably experienced and qualified ECOSA staff. All staff involved in the survey work is members of the Chartered Institute of Ecology and Environmental Management with a suitable level of experience in all methods of great crested newt surveying. The HSI and presence/likely absence survey details are provided in **Table 1**.

Table 1: Survey Dates, Weather and Methodology of the Phase 2 Great Crested Newt Survey, Hampstead Heath, City of London

Survey Date	Survey Technique	Temperature and Weather Conditions
08/05/2013	HSI Assessment	Still, dry, 8°C, 100% cloud cover
15/05/2013	Egg search, torch search and sweep netting	Still, dry, 8°C, 20% cloud cover
22/05/2013	Egg search, torch search and sweep netting	Still, dry, 8°C, 50% cloud cover
05/06/2013	Egg search, torch search and sweep netting	Still, dry, 13°C, 0% cloud cover
12/06/2013	Egg search, torch search and sweep netting	Still, light rain, 18°C, 100% cloud cover

2.5 Survey Equipment

The torch searches were carried out using a one million candlepower torch. The sweep netting survey was carried out using a professional hand net with a 1 millimetre (mm) mesh, 0.3m long bag, a 250mm outer diameter frame with a total frame and handle height of 1.48m. Egg searches and HSI assessments do not require any specialist equipment. For the larger waterbodies, to ensure full coverage of the waterbodies during the HSI assessment and presence/likely absence surveys, a small rowing boat was used to gain access to the edge habitat and vegetated areas which were not possible to access from the shoreline.

2.6 Survey Limitations

Temperatures during great crested newt surveys in 2013 were unusually low for the time of year. It is not, however, considered likely that this would have a significant impact on newt activity as the temperature when the surveys were undertaken was consistently above 5°C. All surveys were undertaken at an optimal time of year using best practice guidelines and recommended techniques. Access was not granted to two waterbodies, namely Fitzroy pond and Athlone House pond; these waterbodies are outside of the Heath on privately owned land for which access was not granted. Both of these waterbodies are off site and it is considered that lack of access to these waterbodies does not have a detrimental effect on the overall great crested newt survey results. No further limitations upon the Phase 2 great crested newt survey.

3.0 RESULTS AND EVALUATION

3.1 Introduction

This section details the results of the HSI assessment and the Phase 2 great crested newt presence/likely absence surveys undertaken at Hampstead Heath, City of London between May and June 2013.

3.2 Pond Descriptions

Within the survey area, a total of 26 pre-determined waterbodies of varying sizes were included within the commission and highlighted as requiring consideration in relation to the hydrological works at the Heath and associated EIA.

The locations of the waterbodies subjected to the HSI are included in **Map 1**. Eighteen waterbodies are locating on the Heath itself and a further eight located on private land adjacent to the Heath.

The waterbodies considered relevant for inclusion in the Phase 2 great crested newt survey comprise the two chains of waterbodies on the Heath, the Hampstead Ponds chain, to the south of the site, and the Highgate Ponds chain, to the east of the site, comprising four ponds and six ponds respectively. These chains of waterbodies were formed following the damming on the Hampstead and Highgate valleys and feed into the River Fleet (**Map 1**). In addition to these larger waterbodies on the Heath, are two ponds within the northwest Kenwood area, known as Wood Pond and Thousand Pound Pond, and several within the Cohen's Fields area and private property in Highgate, both areas are to the northeast of the Heath. The Vale of Heath Pond in the west of the Heath and a small waterbody immediately south of the Heath were also included within the survey. Each of the ponds surveyed is described below:

3.2.1 Bird Sanctuary Scrapes

The Bird Sanctuary Scrapes comprise a series of small waterbodies, or scrapes, of varying sizes (**Figure 1**) which have been created in the last two to three years with the purpose of improving the wildlife value of this area for both amphibians and reptiles. The Bird Sanctuary Scrapes are located to the northeast of the Bird Sanctuary Pond. The ponds are shallow and heavily encroached by soft rush *Juncus effuses*, water mint *Mentha aquatica* and shaded by immature willow *Salix* species. These scrapes offer suitable conditions for breeding great crested newt and the surrounding habitat, comprising wet woodland and scrub, provide suitable terrestrial habitat for amphibians. The area is known to support grass snake, common toad

Bufo bufo and common frog *Rana temporaria*. Refuges (in the form of roofing felt and corrugated metal sheets) laid out around the edges of these scrapes by one of the Hampstead Heath Rangers are regularly checked. Both adult and juvenile grass snakes are frequently found basking.

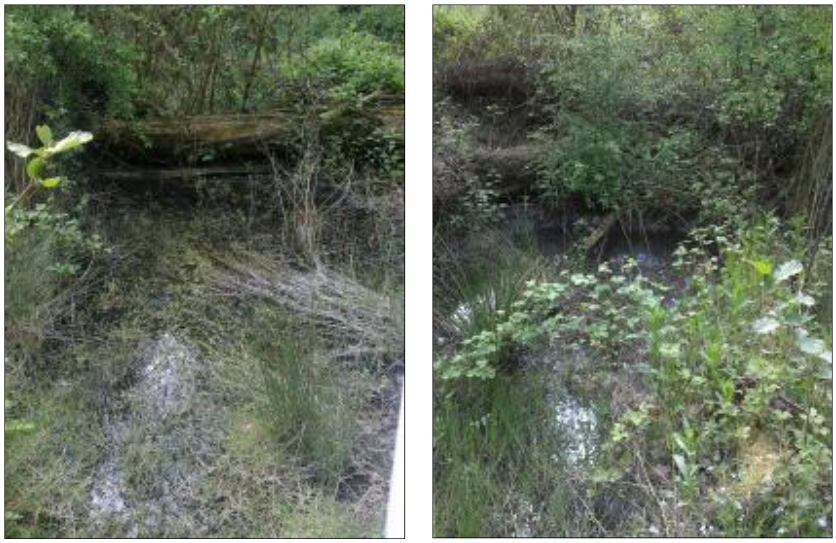

Figure 1: Bird Sanctuary Scrapes: northeast of the Bird Sanctuary Pond at Hampstead Heath, City of London

3.2.2 Meg's Pond

Meg's Pond (**Figure 2**) is a small (approximately 10m^2), shallow pond located to the east of the Bird Sanctuary Pond, the central pond in the Highgate Pond Chain. Water in the pond is highly turbid and little aquatic vegetation is present apart from a small area of yellow flag iris *Iris pseudacorus* and floating sweet-grass *Glyceria fluitans*. The pond is fenced to prevent trampling but is nonetheless subject to frequent disturbance from dogs. The pond is completely open with no shading. The surrounding habitat is managed grassland, heavily used by visitors to the Heath. A great crested newt bottle trapping survey, which took place at the pond during 2010 (personal communication with the Hampstead Heath Ranger, 2013), produced no newt records; the exact details/methodology of this survey are unknown.

Figure 2: Meg's Pond: East of the Bird Sanctuary Pond: the central pond in the Highgate Pond Chain at Hampstead Heath, City of London

3.2.3 Secret Garden Pond

The Secret Garden Pond (**Figure 3**) is a small, man-made, rectangular educational dipping pond located off Brookfield Mansions, Highgate. It supports a considerable diversity of aquatic macrophytes, which have been introduced, including lily *Lilium species*, yellow flag iris, marsh marigold *Caltha palustris* and water mint. Invertebrate diversity within the pond was apparently high prior to the pond being dredged in 2011 (personal communication with the Hampstead Heath Ranger, 2013). The pond is surrounded by native trees and is shaded along its northern edge. A boardwalk, providing pond dipping access, is located along the southern and western edges.

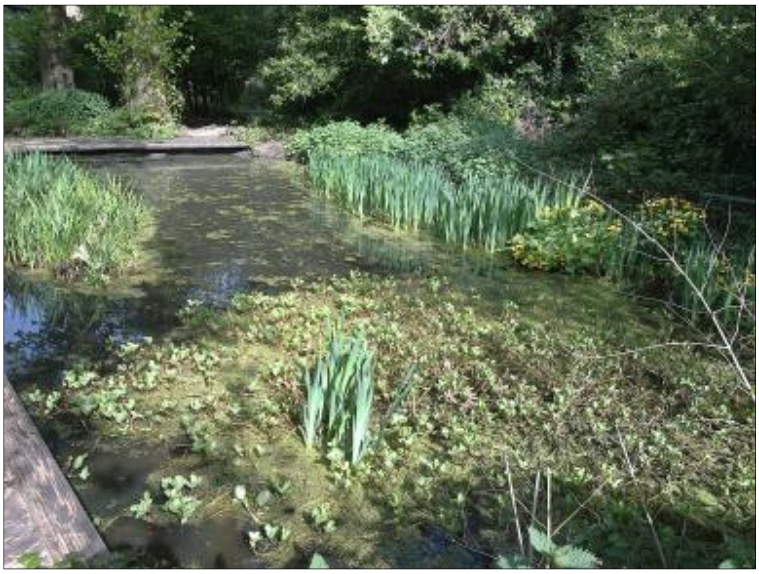

Figure 3: Secret Garden Pond: located off Brookfield Mansions, Highgate at Hampstead Heath, City of London

3.2.4 Cohen's Fields Ponds

Located south of The Orchard in the north-eastern Cohen's Fields area of the Heath, the Cohen's Fields Ponds (**Figure 4**) are two small (each approximately 12m^2), shallow scrapes. One scrape was wet and the other was completely dried during the survey period. Both scrapes were choked with greater pond sedge *Carex riparia,* marsh marigold was also present.

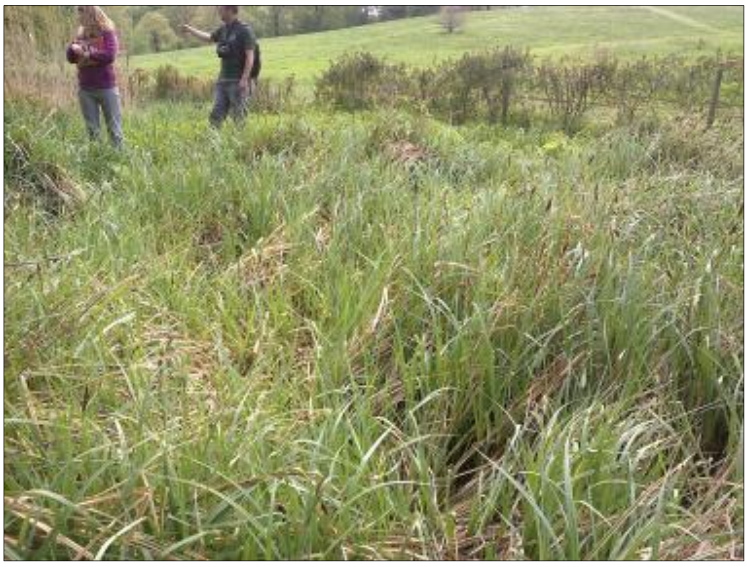

Figure 4: Cohen's Fields Pond: located south of The Orchard at Hampstead Heath, City of London

3.2.5 East Heath Bothy

The East Heath Bothy is a small pond of approximately 3m^2 located off South End Road in Kentish Town immediately south of the Heath. At the time of survey, the pond had dried out completely.

3.2.6 Vale of Health

The Vale of Heath Pond is approximately 9,000m^2 in size and situated on the western edge of the survey area (**Figure 5**). The pond is bordered by residential properties and road to the north and east. Willows overhang the waterbody on the eastern side. Aquatic vegetation coverage is low, restricted to a few patches of lily species *Nymphaea* species and yellow flag iris beds along the pond's southern margin. The lake bed consists of organic silt and sand. The 2002 water quality assessment[2] reported highly turbid conditions, elevated dissolved nutrients and evidence of a dense algal bloom which afforded the lake hypereutrophic status. The study also revealed invertebrate diversity and abundance was low owing to low oxygen conditions and high levels of fish predation. Angling (carp fishing) activity at the lake is prevalent. A large number of waterfowl were present during the 2013 survey.

[2] Corporation of London Hampstead Heath Ponds Survey of Ponds and Corporation of London Survey of Golders Hill and East Heath Chains of Ponds Hampstead Heath, Environmental Advice Centre Limited, 2002

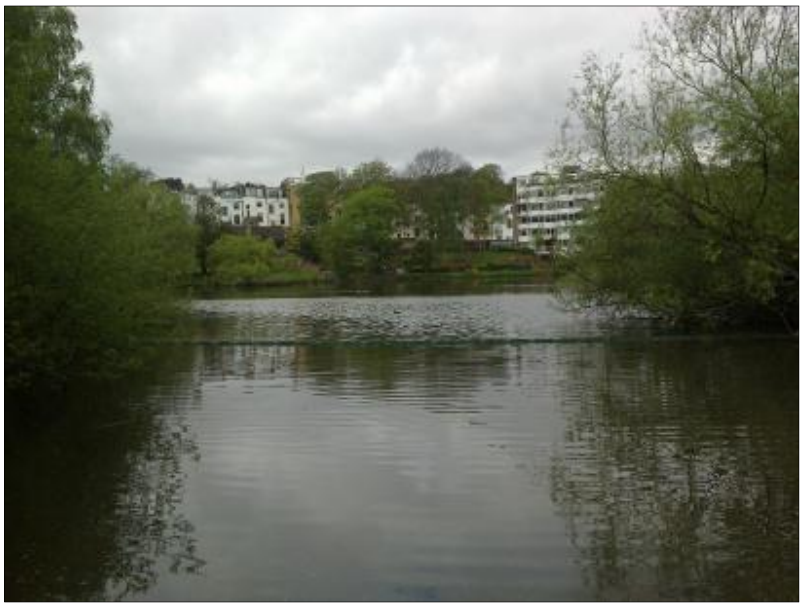

Figure 5: Vale of Health Pond: west of the Vale of Health, Hampstead Heath City of London

3.2.7 Viaduct Pond

Situated in the northern-most position of the Hampstead Pond Chain is the headwater pond, a 3,500m^2 waterbody known as the Viaduct Pond (**Figure 6**). The pond is up to 2m deep in places, but heavy organic silt deposits cover large areas of its bed. Its banks are densely vegetated with willow, shading the majority of marginal water areas. The southern bank of this waterbody is devoid of vegetation due to the pressure of public access. A viaduct crosses the pond at its northern end carrying an access path. The south-east margin supports sedge *Carex* species and canary reed grass *Phalaris arundinacea* beds, whilst its northern and southwest aspects are overgrown with willow. White water lily *Nymphaea alba*, duckweed *Lemna minor/major* and curled duckweed *Potamogeton cripsus* are present in small amounts on the extreme edges of the waterbody. The water is fairly turbid and was classified in 2002 as hypereutrophic owing to elevated dissolved nutrient concentrations. This waterbody is known to suffer oxygen level crashes during the summer months. It was once stocked with fish but low oxygen levels resulted in fish deaths.

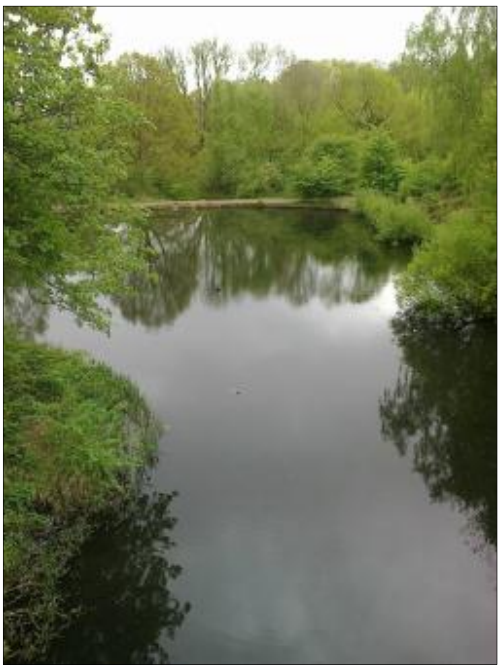

Figure 6: Viaduct Pond: headwater of the Hampstead Pond Chain, Hampstead Heath, City of London

3.2.8 Mixed Bathing Pond

The Hampstead Ponds Chain Mixed Bathing Pond (**Figure 7**) is a triangular, 7,000m^2 recreational pond which lies to the north of Hampstead Ponds 1 and 2. Recreational activities at the lake include bathing and angling. At its northern-most point, the pond is heavily overgrown and its banks are occupied with changing facilities for bathers. The constructed southern bank allows access to the waterbody whilst the eastern and western sides are covered with dense vegetation interspersed with coppiced and mature trees. The pond margins are extensively shaded and aquatic vegetation is restricted to a few patches of water lily. The 2002 hydrological assessment identified turbid water conditions with highly elevated dissolved nutrients. Elevated nitrite levels were indicative of reduced oxygen concentrations. An algal bloom was present at the time of the 2002 hydrological sampling. Overall, the Mixed Bathing Pond was classified as hypereutrophic.

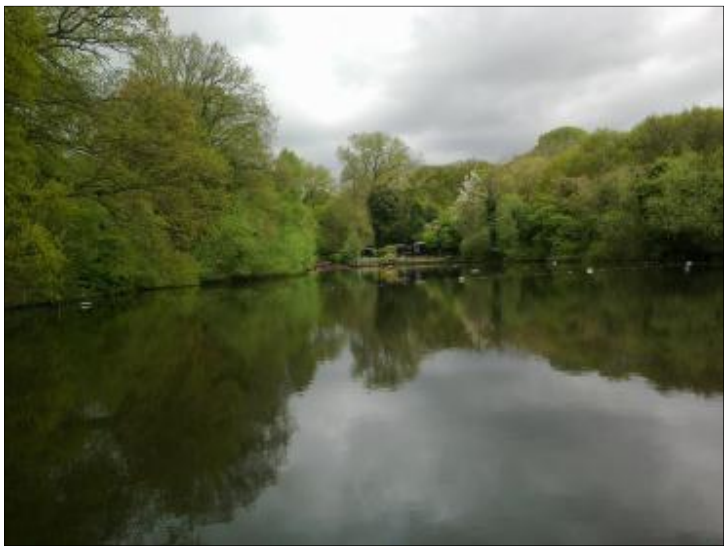

Figure 7: Mixed Bathing Pond: north of Highgate ponds 1 and 2 in the Highgate Pond Chain at Hampstead Heath, City of London

3.2.9 Hampstead Pond Number 2

At 11,000m^2, Hampstead Pond Number 2 (**Figure 8**) is a medium sized waterbody located adjacent to South Hill Park Gardens, Hampstead within the Hampstead Pond Chain. Residential properties are present on the lake's southern edge. The northern and southern banks have been reinforced with concrete and sheet piling. On the north mature trees shade the pond margins to a small extent. Trees and shrubs dominate the east and west pond margins. Bank erosion, due to public access, is considerable in places along the western edge. The eastern margin supports beds of yellow flag iris and common reedmace *Typha latifolia*. Duckweed was present in the southeast corner of the water. Towards the centre of the waterbody, an artificial island supports waterfowl. The water quality sampling report of 2002 recorded a moderate algal bloom, elevated dissolved water nutrient levels and overall, the lake was classed as hypereutrophic. Turkish crayfish *Astacus leptodactylus* and large numbers of fish are known to be present within this waterbody.

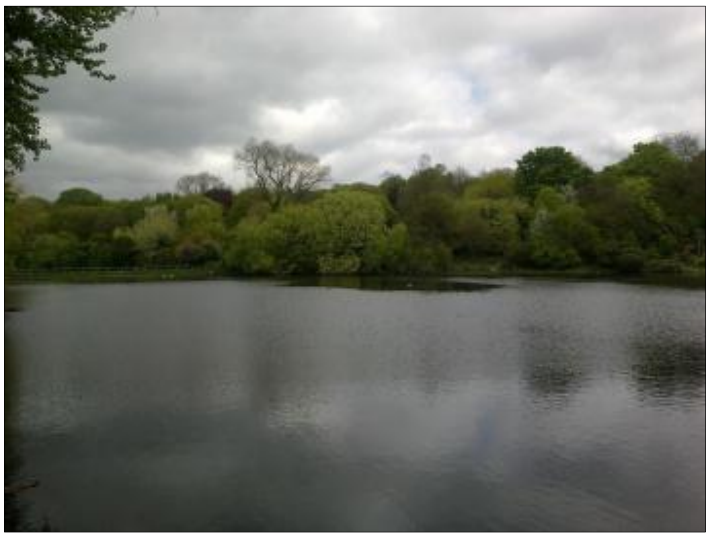

Figure 8: Hampstead Pond Number 2: located off Southill Park Gardens, Hampstead, within the Hampstead Pond Chain at Hampstead Heath, City of London

3.2.10 Hampstead Pond Number 1

At the southern boundary of Hampstead Heath, Hampstead Pond Number 1 (**Figure 9**) occupies the southernmost position in the Hampstead Pond Chain. It is a moderate sized lake of 12,000m^2, bordered by residential gardens to the east. The eastern margins support yellow flag iris and pendulous sedge *Carex pendula*. Both the eastern and southern edges are heavily shaded by mature trees. To the north and west, banks are relatively steep. Erosion has occurred by the public visiting an access point on the reinforced western bank to feed the many waterfowl species. Mute swan *Cygnus olor*, Canada goose *Branta canadensis* and coot *Fulica atra* are known to be present. Submerged hornwort *Ceratophyllum.*species covers around half of the water's surface and mats of duckweed and filamentous algae are also present. According to the 2002 report, water clarity was good and total algae concentrations low; highly elevated dissolved nutrient concentrations awarded the pond hypereutrophic status. The water was recorded reaching a maximum depth of 3.4m. Invertebrate diversity was recorded as being the highest of all the ponds in the Hampstead Chain and large-bodied zooplankton were numerous. This waterbody supports a healthy population of carp *Cyprinus carpio*, bream *Abramis*, gudgeon *Hypseleotris spp* and perch *Perca fluviatilis.*

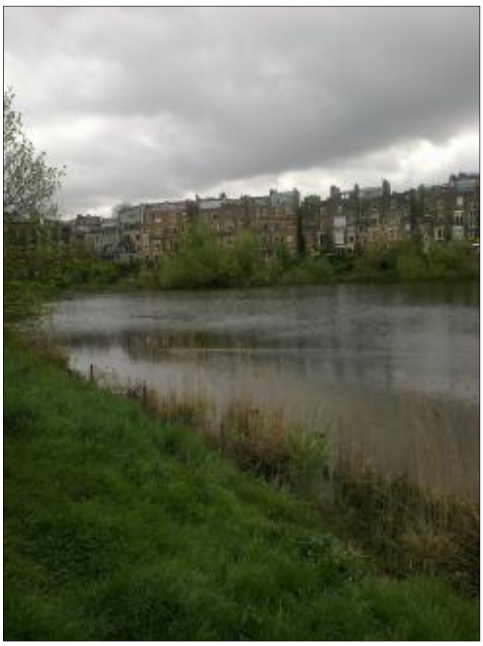

Figure 9: Hampstead Pond Number 1: the southernmost pond in the Hampstead Pond Chain, at Hampstead Heath, City of London

3.2.11 Wood Pond

The Wood Pond waterbody (**Figure 10**) lies within the Kenwood area of the Heath and is under English Heritage ownership. At 10,000m^2, it is a moderate-sized lake bordered on three sides by trees of Kenwood. A landscaping feature, the lake has been constructed using a clay lining. The lake experiences heavy siltation by iron-rich precipitates and leaf litter. Despite dissolved nutrient concentrations which placed the lake within the mesotrophic/eutrophic categories, the water quality assessment of 2002 identified high water turbidity, attributed to iron discoloration, leading to its classification as hypereutrophic. Dissolved oxygen concentrations in the water were, however, within the normal range and invertebrate diversity was recorded as moderate. Aquatic vegetation consists of established beds of yellow flag iris, pendulous sedge and soft rush. There is a small, overgrown, wooded island at the north of the lake and a bridge at the south-western corner. Waterfowl species recorded on the lake during the 2013 survey include mallard *Anas platyrhynchos*, tufted duck *Aythya fuligula*, moorhen *Gallinula chloropus*, coot and mute swan.

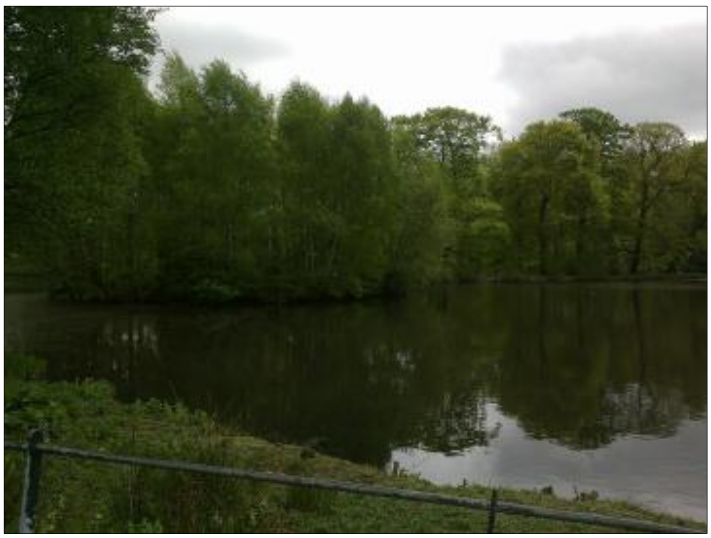

Figure 10: Stone Bridge: located within the northwest Kenwood area at Hampstead Heath, City of London

3.2.12 Thousand Pound Pond

Also under English Heritage ownership, the Thousand Pound Pond waterbody (**Figure 11**) is a lake of 3,000m^2, located to the east of Wood Pond, north of Kenwood. The open northern aspect of the lake is fenced to restrict public access; the tree-lined southern bank is often used to stage drama performances. The 2002 water quality report identified organic rich sediments, reducing the water oxygen concentrations within the waterbody. Nutrient enrichment was the only negative attribute of otherwise good water conditions. Water turbidity placed the pond within hypereutrophic status. Small numbers of mallard and moorhen were present during the 2013 survey and the pond is known to support large numbers of carp. No aquatic plants were recorded during the 2013 survey and all sides of the lake, apart from the southern bank, are shaded by trees.

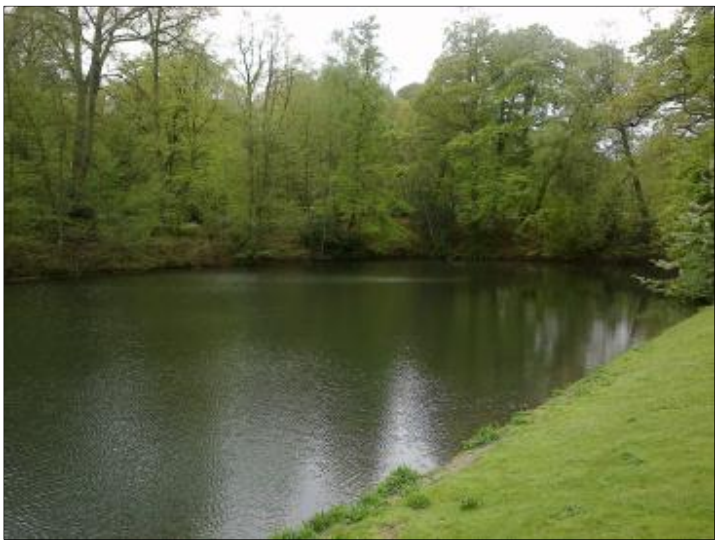

Figure 11: Thousand Pound Pond: located within the northwest Kenwood area at Hampstead Heath, City of London

3.2.13 Stock Pond

The Stock Pond is the northern-most in the Highgate Pond Chain, lying within the north-east Cohen's Fields area of the Heath. A relatively small, shallow lake of approximately 3,000m^2, the Stock Pond, is surrounded by trees, lacks any aquatic vegetation and is heavily silted (**Figure 12**). During the 2002 survey, water quality was assessed as good. Water turbidity was low and dissolved oxygen levels within the normal range. Chemical analysis assessed the lake as having a hypertrophic status and it was noted that the bed of the lake was covered with leaf litter deposits, leading to anoxia in the sediment below. Stock Pond supports a large population of carp, pike *Esox lucius* and roach *Rutilus rutilus*. During the winter months the lake supports a large population of mandarin duck *Aix galericulata*. Kingfisher *Alcedo atthis* is also known to frequent the lake for feeding.

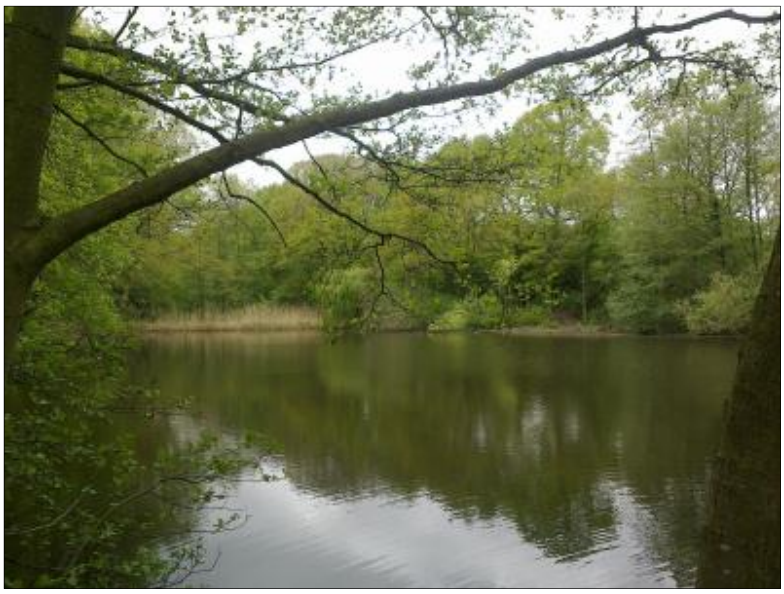

Figure 12: Stock Pond: the northernmost pond in the Highgate Pond Chain at Hampstead Heath, City of London

3.2.14 Ladies Bathing Pond

Located immediately south of the Stock Pond within the Highgate Pond Chain, the Ladies Bathing Pond is a small recreational swimming lake of approximately 6,000m^2 (**Figure 13**). The lake is deep with limited shallow margins. Marginal vegetation includes yellow flag iris, white water lily, yellow water lily *Nuphar lutea,* water mint and sweet rush *Acorus calamus*. Owing to its use for bathing, aquatic macrophytes are regularly cleared from the water body. Dense tree coverage surrounds the lake on three sides; the northern edge is open to grassland which is used for sunbathing during the summer. The 2002 water quality assessment identified populations of swan mussels *Anodonta cygnea* and fish, including roach and perch were also recorded. A dominance of juvenile fish limited zooplanktonic diversity within the waterbody. Invertebrate diversity and abundance was also recorded as low in the 2002 study. Water quality measures identified average oxygen concentrations, despite a sediment bed of high organic content. Although water quality was generally good, the lake was assessed in 2002 as hypereutrophic. Blue-green algal blooms were noted within the lake during 2002 surveys.

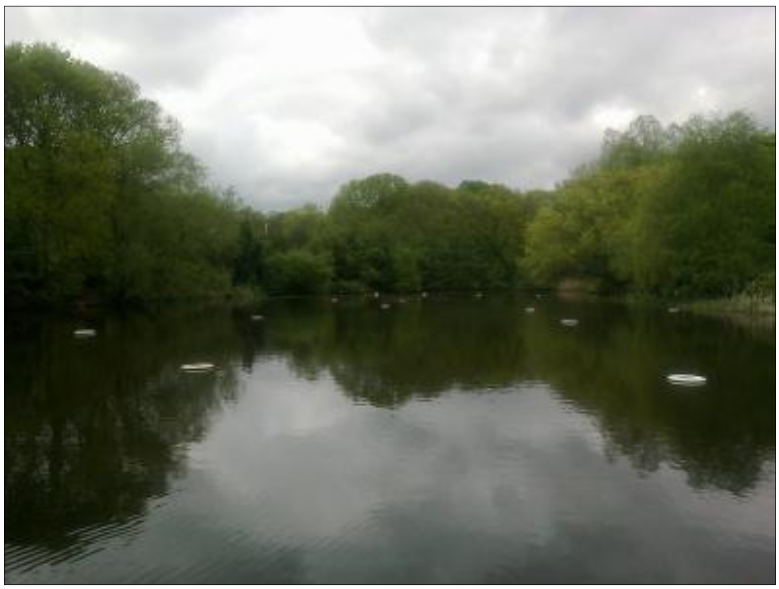

Figure 13: Ladies' Bathing Pond: south of the Stock Pond in the Highgate Pond Chain at Hampstead Heath, City of London

3.2.15 Bird Sanctuary Pond

The main pool of the Bird Sanctuary Pond (**Figure 14**), a relatively small lake approximately 6,000m^2, occupies the central position within the five main ponds of the Highgate Pond Chain. Terrestrial vegetation comprises tree fringes on all sides and marginal aquatic vegetation is abundant, dominated by yellow flag iris and common reed *Phragmites australis*. Hydrological surveys of 2002 noted water turbulence, below average late summer dissolved oxygen levels and nutrient enrichment, despite generally good water quality. The lake bed consists of grey, inorganic silt. Overall, the lake was assessed as hypereutrophic in the 2002 study. The zooplankton community was dominated by small species, reflecting predation by the population of roach and perch. Invertebrate diversity was relatively low. Carp, red swamp crayfish *Procambarus clarkii* and red-eared terrapin *Trachemys scripta elegans* are present in this waterbody. Stands of common reed have been recently planted around the edges to provide cover for waterfowl.

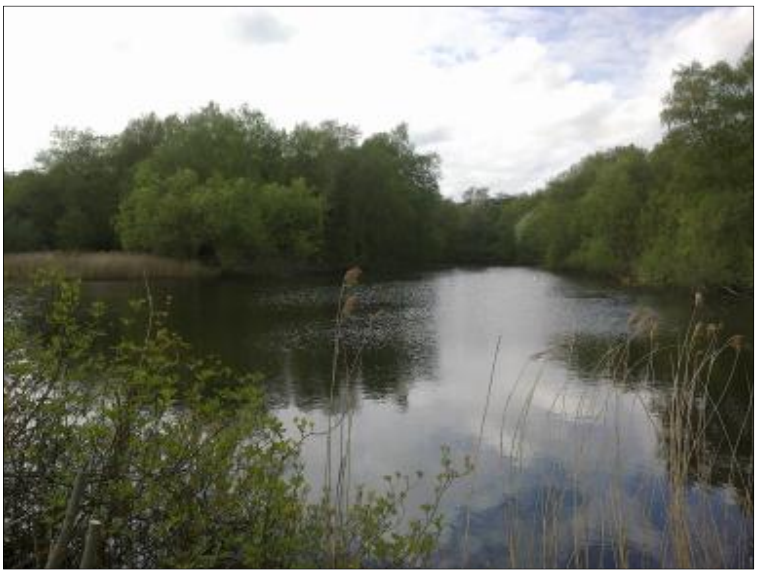

Figure 14: Bird Sanctuary Pond: south central pond in the Highgate Pond Chain at Hampstead Heath, City of London

3.2.16 Model Boating Lake

At 15,000m^2, the Model Boating Lake (**Figure 15**) within the Highgate Pond Chain is one of the largest water bodies on the Heath. It is an amenity lake of approximately 2 metres depth, visited by the public for Koi carp *Cyprinus carpio* fishing and waterfowl feeding. Species of waterfowl include Canada geese, coot, moorhen, mute swan and mallard. The waterbody is surrounded by hard-standing, footpaths and open grassland. No aquatic vegetation was visible during the survey. The lake's banks are artificial, constructed from steel piling with wood trimming. Severe bank erosion has occurred along much of its shoreline. Water quality was assessed as good during 2002 owing to its low turbidity. Dissolved oxygen concentrations were within average but water nutrient concentrations were elevated and the lake was classed as eutrophic in 2002. Algal blooms form during the summer months from species of the *Anabaena* and *Cyanophyta* blue-green algae genuses. The lake's gravel and silt composite bed also supports filamentous algae. High densities of *Daphnia sp.* were supported, but invertebrate diversity and abundance was low.

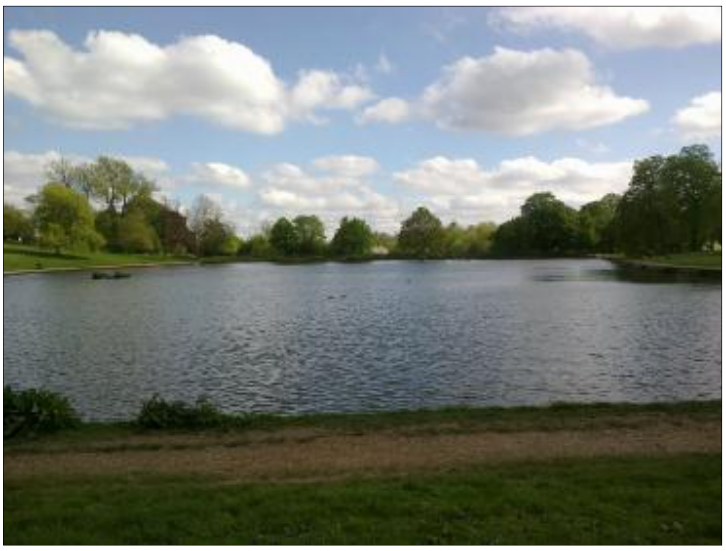

Figure 15: Model Boating Lake: within the Highgate Pond Chain at Hampstead Heath, City of London

3.2.17 Men's Bathing Pond

Adjacent to Millfield Lane, Highgate, within the Highgate Pond Chain, the Men's Bathing Pond (**Figure 16**) is the largest waterbody assessed at Hampstead Heath at 18,000m^2. The waterbody is surrounded by woodland, but is banked by an open grass slope to the north. Its banks have been artificially reinforced via steel piling and wooden supports. The Lake's amenity uses include bathing and course fishing. A bathing clubhouse and lifeguard hut is situated on the eastern bank. Waterfowl frequently visit the lake and carp, red swamp crayfish and Turkish crayfish *Astacus leptodactylus* are present. Yellow flag iris and sweet rush beds are supported by the lake margins. The lake's depth is thought to be considerable, limiting aquatic vegetation. During 2002, water turbidity was moderate. Water oxygen profiles, though within the normal range, indicated oxygen demand from organic silts near the lake bed and algal blooms at the surface. In particular, dredging of the lake during 1991 had triggered the onset of blue-green algal blooms during the summer months. Water nutrient elevations indicated that the waterbody had entered a eutrophic state.

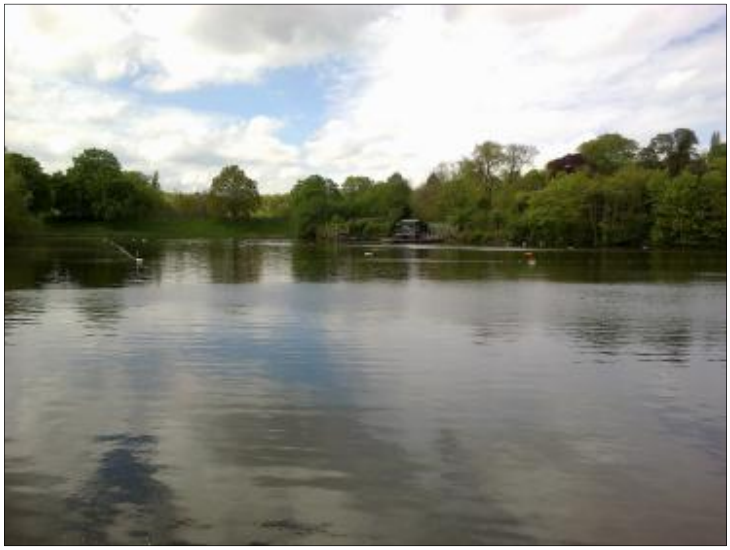

Figure 16: Men's Bathing Pond: west of Millfield Lane, Highgate, within the Highgate Pond Chain at Hampstead Heath, City of London

3.2.18 Highgate Pond Number 1

Occupying the most southerly position in the Highgate Pond Chain, Highgate Pond Number 1 (**Figure 17**) is a large lake of 12,000m^2 located east of Brookfield Mansions, Highgate. Its surroundings largely comprise open grassland with scattered willow trees overhanging the water's edge. The north bank is densely wooded. The banks are artificially reinforced with wooden piling, but are in poor repair, experiencing heavy erosion from public access and extensive waterfowl activity. Species observed on the lake include mute swan, moorhen, coot, mallard and tufted duck. Waterfowl nest upon artificial islands in the centre of the lake which are overgrown and in a state of disrepair. Dogs are also known to frequently swim in the lake. Aquatic vegetation is restricted to the edges, comprising of yellow flag iris, sweet rush, common reed and reedmace *Typha latifolia*. No submerged/floating aquatic vegetation is present. In 2002, water at the lake was turbulent. Dissolved oxygen profiles were within the normal range, but indicated super-saturation by algal activity on the water's surface. Elevated nutrient levels equated to an overall hypereutrophic classification. Blue green algal species known to form toxic scums were identified in the water. The lake bed consisted of sand and clay sediments whose margins supported filamentous green algal species. Invertebrate species diversity was low in the 2002 study.

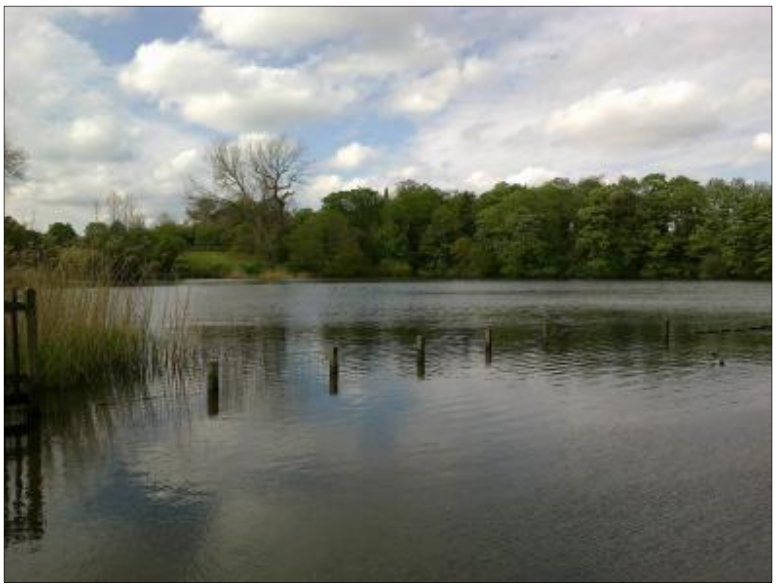

Figure 17: Highgate Pond Number 1: the most southerly within the Highgate Pond Chain at Hampstead Heath, City of London

3.2.19 Orchard Pond

The Orchard Pond (**Figure 18**), located within a small wooded area known as The Orchard adjacent to Hampstead Lane, Highgate, is a heavily silted, small natural water body with an approximate depth of 1m and 350m^2 in size. It is heavily encroached with yellow flag iris, covering much of the water's surface. A small patch of marsh marigold was recorded on the northern edge of the pond. Overhanging willows shade much of the remaining open water.

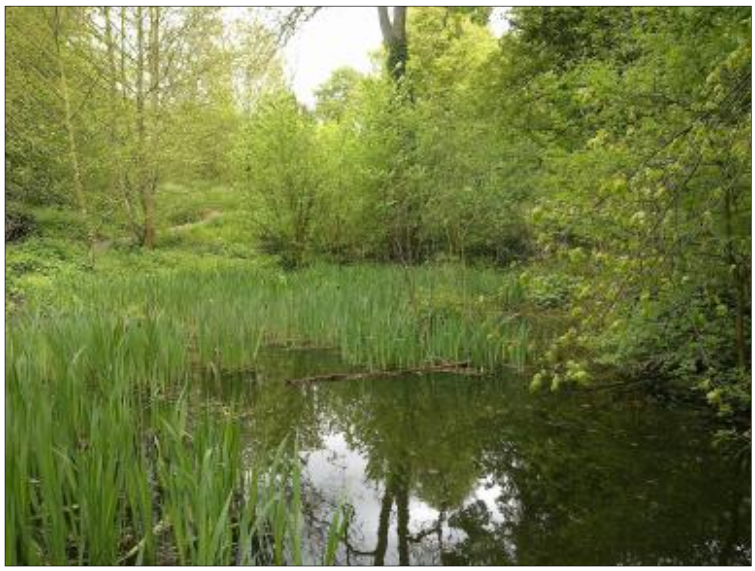

Figure 18: Orchard Pond: Located within The Orchard, south of Hampstead Lane, Highgate, at Hampstead Heath, City of London

3.2.20 Athlone House Pond

A small, privately-owned pond approximately 250m^2 in size, the Athlone House Pond (**Figure 19**) is bordered on all sides by trees. The depth of the water is unknown. No waterfowl were seen at the time of the survey and it is not known whether fish are present. This waterbody lies south of The Orchard in the Cohen's Fields area of the site. The water appeared highly turbid and was covered in tree pollen at the time of the survey. No aquatic vegetation was present. Access was denied to this waterbody for the 2013 survey and so it was observed from afar.

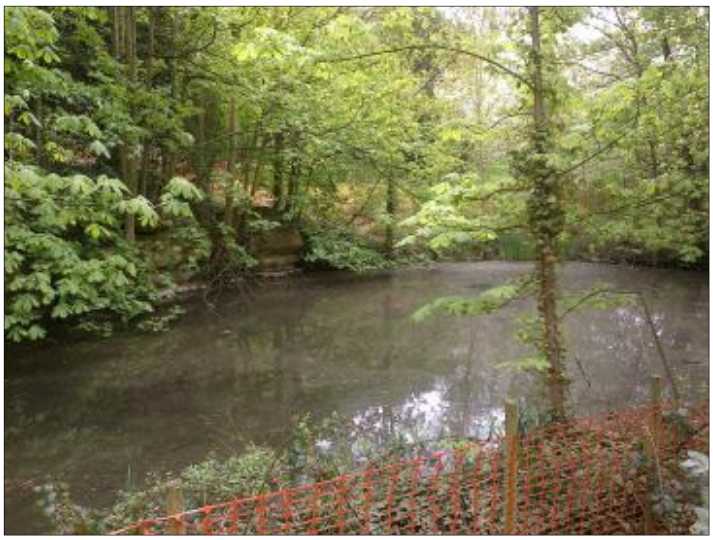

Figure 19: Athlone House Pond: Located south of The Orchard in the Cohen's Fields area at Hampstead Heath, City of London

3.2.21 Athlone Gardens Pond

The Athlone Garden Pond (**Figure 20**) comprises a very small ornamental pond, barely 1m^2 which lies within the privately-owned Athlone gardens in woodland to the west of the Cohen's Fields area of the site. It is artificially constructed and lined with a stone surround. It is bordered on one side by a rockery area and to the other by managed grass. Canadian pondweed *Elodea canadensis* was the only aquatic species recorded within the pond.

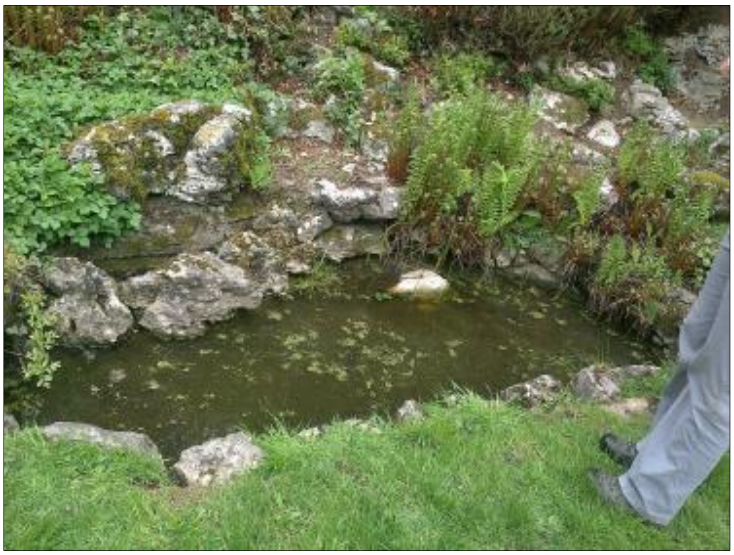

Figure 20: Athlone Gardens Pond: located on private property, east of the Cohen's Fields of Hampstead Heath, City of London

3.2.22 Beechwood Ponds 1, 2 and 3

The Beechwood ponds comprise three ornamental water bodies (sizes unknown as they were viewed from afar and do not appear on OS mapping) located on private Highgate property east of the Cohen's field's area of the site. They are surrounded by a tightly mown lawn and areas of ornamental planting. These ponds have been recently re-excavated and the largest, now contains a fountain. All are devoid of vegetation and offer little value for any type of wildlife.

3.2.23 Catchpit Pond

Catchpit Pond is located within the south-western area of the Heath. It is approximately 100m^2 in size and part of the Hampstead Pond Chain. This waterbody is concrete lined and constructed to act as a silt deposit, intercepting deposits ahead of the downstream Mixed Bathing Pond. The Catchpit Pond is chocked with Canadian pondweed and duckweed. The pond is fenced off from public access and is surrounded by woodland. It is heavily silted, resulting in a shallow water depth of 10-30 cm. During 2002 hydrological surveys, low oxygen conditions within the pond were attributed to this low overall water content in comparison to deep silt deposits. The pond was classed as hypereutrophic due to elevated nutrient levels. Low densities of a blue-green alga *Merismopedia sp.* were recorded. Catchpit Pond supported a moderately diverse invertebrate community with moderate numbers of freshwater shrimp *Gammarus*, indicating good water quality and the absence of fish.

3.2.24 Fitzroy Pond

The Fitzroy Pond is a small, pond situated on private property north-east of the Heath off Fitzroy Park. Access to this waterbody was not granted for the 2013 surveys.

3.3 Survey Results

3.3.1 Habitat Suitability Index Assessment

Results of the HSI assessment carried out on the waterbodies on the 8th May 2013 are provided in the summary table in **Appendix 1**.

Given the results of the HSI assessment it was possible to eliminate many of the 26 ponds from Phase 2 surveys, owing to their negligible potential for and thus, likely absence of great crested newt. A precautionary approach has been taken to the study, and although none of the waterbodies appeared to provide particularly optimal conditions for supporting great crested newt, those considered most suitable were subjected to presence/likely absence surveys. A summary of the justification for presence/likely absence survey for each pond is given below:

3.3.1.1 Bird Sanctuary Scrapes

During the ECOSA HSI survey of April 2013 it was noted that the majority of the Bird Sanctuary Scrapes had already dried out. Water held in the remaining wet scrapes was considered insufficient to support a population of great crested newts. However, the HSI assessment returned an 'average' score of 0.64 for the scrapes and an abundance of suitable macrophyte habitat was observed, including suitable egg-laying plants such as water mint. It was therefore considered that a precautionary approach be adopted and that two of the wet scrapes may have some potential to support great crested newt; these two scrapes were therefore included in the Phase 2 presence/likely absence surveys.

3.3.1.2 Meg's Pond

Due to unsuccessful bottle trapping efforts at the pond during 2010, the current lack of suitable terrestrial and aquatic habitat, high level of disturbance by dogs entering the pond, as well as a 'below average' HSI score of 0.56 at Meg's Pond, it was considered that this waterbody offers negligible potential to support great crested newt and it was therefore excluded from Phase 2 presence/likely absence surveys.

3.3.1.3 Secret Garden

The Secret Garden pond supports a considerable amount of aquatic macrophytes, Its management as an educational dipping pond has maintained good water quality and encourages high invertebrate diversity. An 'average' HSI score of 0.65 was obtained for the pond. It was therefore considered that the Secret Garden Pond offers some potential for supporting great crested newt and it was therefore included in Phase 2 presence/likely absence surveys.

3.3.1.4 Cohen's Fields Ponds

The HSI assessment identified one dry and one wet pond in May 2013. Although the wet pond was heavily choked with greater pond sedge, obscuring all open water, an 'average' HSI score of 0.62 was obtained for the pond. The remaining wet pond was therefore included in the Phase 2 presence/likely absence survey.

3.3.1.5 East Heath Bothy

A visit to the East Heath Bothy for HSI assessment revealed it to be dry in May 2013. The lack of water at this time of the year suggests that this pond is unsuitable for supporting great crested newt and was therefore omitted from Phase 2 presence/likely absence survey.

3.3.1.6 Vale of Health

A large fish (carp) population, presence of a large number of wildfowl and the absence of significant areas of aquatic vegetation within the Vale of Health pond, restricts its suitability for great crested newts. Fish predation rates are likely to be high and egg laying opportunities low. Combined with the 'poor' HSI score of 0.45 obtained for the pond, it was considered highly unlikely that great crested newt would be present in the Vale of Heath waterbody; it was therefore excluded from the Phase 2 presence/likely absence survey.

3.3.1.7 Viaduct Pond

The HSI assessment established that the fish population of the viaduct pond is increasing following widespread fish deaths in 2012. Oxygen levels within the pond are known to fall to extremely low levels by the end each summer. An oily film was observed on the surface of the pond water. The HSI assessment returned a 'poor' rating for the pond of 0.46. Due to the sub-optimal conditions, habitat suitability for great crested newt at the Viaduct pond is considered to be negligible and therefore this waterbody was excluded from the Phase 2 presence/likely absence great crested newt survey.

3.3.1.8 Mixed Bathing Pond

Disturbance generated by swimmers is high, the lake supports a large fish population and provides little refuge and egg laying opportunities for great crested newt. A 'poor' HSI score of 0.29 was also obtained for the pond and it was therefore considered appropriate not to undertake Phase 2 presence/likely absence great crested newt surveys on this waterbody.

3.3.1.9 Hampstead Pond Number 2

Waterfowl presence at the pond during HSI assessment was high. Mute swan, mallard, coot, moorhen and Canada goose were observed. The presence of large numbers of fish and a population of Turkish crayfish were also noted. Taking these factors into account, as well as its overall 'poor' HSI score of 0.30, the pond is considered to offer negligible potential for great crested newt and was not included in the Phase 2 presence/likely absence great crested newt surveys.

3.3.1.10 Hampstead Pond Number 1

Hampstead Pond Number 1 is considered to offer negligible potential for great crested newt. This assessment is based on the presence of a large number of predatory fish, lack of any obvious refuges and egg laying material for amphibians, the presence of Turkish crayfish, level of human disturbance and the resultant 'poor' HSI score of 0.28.

Hampstead Pond Number 1 pond was therefore removed from Phase 2 presence/likely absence surveys.

3.3.1.11 Wood Pond

The large predatory fish population within the Wood Pond reduces the suitability of this waterbody for great crested newt. Much of the edge of the waterbody is constructed with wooden piling and lacks any vegetation or means of access/egress for amphibians as a result. The lake scored a 'below average' HSI score of 0.54. Wood Pond was excluded from Phase 2 presence/likely absence great crested newt surveys due to its general unsuitability.

3.3.1.12 Thousand Pound Pond

Managed as an ornamental pond, the Thousand Pound Pond offers little suitable terrestrial or aquatic habitat for great crested newt. Its large population of predatory fish, frequent waterfowl disturbance and lack of any suitable aquatic plants, further reduce its suitability for supporting newts. In addition, a 'poor' HSI score of 0.43 was obtained for the pond. It was therefore considered appropriate to omit Thousand Pound Pond from Phase 2 presence/likely absence surveys.

3.3.1.13 Stock Pond

As recorded during the 2002 water quality survey, terrestrial vegetation coverage has continued to result in heavy shading of the Stock Pond, limiting aquatic macrophyte growth. The only significant macrophyte recorded during the 2013 HSI assessment, an area of water forget-me-not, was largely exposed above the water level, limiting its suitability as newt egg laying habitat. Evidence of low invertebrate and zooplankton diversity at the lake, together with the observed large fish population, further restricts its suitability to support a newt population. The 0.56 HSI score obtained for the pond is 'below average'. It was considered that the Stock Pond offers negligible potential for supporting great crested newt and it was excluded from Phase 2 presence/likely absence surveys.

3.3.1.14 Ladies' Bathing Pond

The Ladies' Bathing Pond is highly disturbed due to public access during much of the year, fish numbers are relatively high and overall aquatic vegetation coverage is low, restricting suitable newt egg laying habitat. A 'below average' HSI score of 0.54 was obtained for the lake. Some of the more vegetated edges of the lake were considered to provide suitable habitat for newts, where fish predation is potentially lower. During the HSI, newt eggs were found within the water mint on the eastern edge of the lake. This waterbody was included in Phase 2 presence/likely absence surveys.

3.3.1.15 Bird Sanctuary Pond

This pond lacks submerged/emergent aquatic vegetation contains a large number of fish, red swamp crayfish and red-eared terrapin. Owing to the presence of several predatory species, the Bird Sanctuary Pond is considered extremely unlikely to support great crested newt. The pond achieved a 'poor' HSI score of 0.50. The Bird Sanctuary Pond is considered to offer negligible potential for supporting great crested newt and was excluded from Phase 2 presence/likely absence surveys.

3.3.1.16 Model Boating Lake

The Model Boating Lake is heavily stocked with fish and provides an angling and boating resource on the Heath. Aquatic vegetation is absent and it is considered highly unlikely that the Model Boating Lake could support a population of great crested newt; it returned an overall HSI score of 0.30, 'poor'. This waterbody was therefore excluded from any further Phase 2 presence/likely absence surveys.

3.3.1.17 Men's Bathing Pond

Due to bathing activities, angling, the presence of waterfowl, and lack of any aquatic plant species at the Men's Bathing Pond, it was considered that great crested newt would not be supported by this waterbody. The HSI score for the pond is 0.43 'poor' and this waterbody was not subjected to Phase 2 presence/likely absence surveys.

3.3.1.18 Highgate Pond Number 1

Highgate Pond Number 1 has a large population of predatory fish and a high level of waterfowl disturbance. The lake also lacks any aquatic vegetation suitable for egg laying. As such, the lake is considered unsuitable to support great crested newt. A poor HSI score of 0.46 was obtained for the waterbody. All evidence considered, it was deemed highly unlikely that great crested newt would be supported by Highgate Pond Number 1 and it was therefore omitted from Phase 2 presence/likely absence surveys.

3.3.1.19 Orchard Pond

The Orchard pond supports both suitable aquatic and terrestrial habitat for great crested newt and lacks any obvious disturbance/predation pressures, common to many of the larger lakes on the Heath. As expected, a good HSI score of 0.72 was obtained for the pond. Orchard Pond was considered suitable to support great crested newt and was included in the Phase 2 presence/likely absence surveys.

3.3.1.20 Athlone House Pond

Although no access was permitted to this waterbody, it was possible to complete a HSI assessment of the Athlone House pond from adjacent land belonging to the Heath. An 'average' score of 0.66 was obtained for the pond. Access was not granted to the pond and Phase 2 presence/likely absence surveys could therefore not be undertaken.

3.3.1.21 Athlone Gardens Pond

This pond is an ornamental feature set within well-manicured gardens and is extremely limited in size. The waterbody supports no aquatic vegetation suitable for egg laying. The HSI score for this waterbody was 0.66 'average'. Its potential for supporting great crested newt was considered negligible and it was therefore omitted from Phase 2 presence/likely absence surveys.

3.3.1.22 Beechwood Ponds 1, 2 and 3

For ornamental purposes, the Beechwood ponds have recently been cleared and a fountain installed. Marginal vegetation has also been cleared from the waterbodies. No suitable aquatic or terrestrial vegetation remains to support the presence of amphibians and it is considered unlikely that the ponds support great crested newt. The HSI score for this waterbody is 0.47, 'poor'. These waterbodies were discounted from the Phase 2 presence/likely absence surveys.

3.3.1.23 Catchpit Pond

A heavily silted concrete lined waterbody with no suitable aquatic plants for egg laying, absence of any potential access/egress for amphibians and relatively shallow with a 'poor' 0.25 HSI score. This waterbody offers limited opportunity to support great crested newt and it was omitted from Phase 2 presence/likely absence surveys.

3.3.1.24 Fitzroy Pond

The HSI assessment and Phase 2 presence/likely absence surveys could not be completed for the Fitzroy pond as access was not granted to this waterbody by the private owner.

3.3.2 Summary

In total, five waterbodies were assessed as being potentially suitable support great crested newt. These comprise the Secret Garden, Ladies Bathing Pond, Cohen's Fields Ponds, the Orchard Pond and the Bird Sanctuary Scrapes. Each of these was subjected to Phase 2 presence/likely absence great crested newt surveys according to the methods described in Section 2.3.

3.3.3 Phase 2 Survey Results

The results of the Phase 2 presence/likely absence surveys are shown in **Table 2.** The field data sheets are within **Appendix 2.**

In summary, no great crested newts were recorded within any of the waterbodies surveyed. Smooth newt *Lissotriton vulgaris* were recorded in some ponds on each survey occasion and a palmate newt *Lissotriton helveticus* was recorded in the Secret Garden pond during the second survey on 22nd May 2013. The presence of both sexes of smooth newt in the Secret Garden pond and Bird Sanctuary Scrapes and of eggs in the Ladies Swimming Lake indicates that smooth newt breeding occurs in these waterbodies.

Many of the larger waterbodies contain large numbers of fish, waterfowl and invasive species such as Turkish crayfish, red-eared terrapin, pike and carp. Overall, the conditions in the majority of the 26 waterbodies assessed provide limited suitability for great crested newt. Most offer little in the way of safe refuges away from fish predation and lack suitable egg laying material/aquatic plant species.

Table 2: Great Crested Newt Phase 2 Presence/Likely Absence Survey Results

Pond Name and/or Number	Date	Smooth Newt				Palmate Newt				Common Newt Species				Great Crested Newt				Other Species
		Male	Female	Juvenile	Eggs	Male	Female	Juvenile	Eggs	Male	Female	Juvenile	Eggs	Male	Female	Juvenile	Eggs	
3 - Secret Garden	15/05/2013	None				None				19	25	0	0	None				Diving beetle *Dytiscidae* sp., lesser water boatman *Notonectaglanca*
	22/05/2013	6	2	0	0	1	0	0	0	0	2	0	0	None				Leeches
	05/06/2013	12	6	0	0	None				None				None				
	12/06/2013	10	20	0	0	None				None				None				Swan mussel *Anodonta cygnea*
14 - Ladies Swimming Lake	15/05/2013	None				None				None				None				
	22/05/2013	None				None				None				None				
	05/06/2013	0	0	0	10	None				None				None				
	12/06/2013	None				None				None				None				
Bird Sanctuary Scrapes	15/05/2013	None				None				None				None				Common frog tadpoles, whirligig beetles *Gyrinus natator*
	22/05/2013	1	1	0	0	None				None				None				Common frog tadpoles
	05/06/2013	None				None				None				None				
	12/06/2013	None				None				None				None				
Cohen's Field Pond	15/05/2013	0	3	0	0	None				None				None				Common frog tadpoles
	22/05/2013	0	1	0	0	None				None				None				
	05/06/2013	0	1	0	0	None				None				None				
	12/06/2013	None				None				None				None				

Pond Name	Date	Smooth Newt				Palmate Newt	Common Newt Species	Great Crested Newt	Other Species
Orchard Pond	15/05/2013	1	0	0	0	None	None	None	Common frog tadpole
	22/05/2013	None				None	None	None	
	05/06/2013	None				None	None	None	
	12/06/2013	None				None	None	None	

4.0 SUMMARY EVALUATION, CONSIDERATION OF IMPACTS AND RECOMMENDATIONS

4.1 Introduction

This section presents a summary evaluation of the site based on the results of the HSI assessment and the Phase 2 presence/likely absence great crested newt survey. The results and evaluation have been used to provide an assessment of the ecological impacts of the Flood and Water Quality Management Works on great crested newts.

4.2 Summary Evaluation

A total of 26 waterbodies of varying size were included within the commission and highlighted as requiring consideration in relation to the Flood and Water Quality Management Works at the Heath and the associated EIA. Each of these ponds was subjected to an assessment for its potential to support great crested newts.

Of the 26 ponds, five were identified as having the potential to support great crested newts based on the criteria included in the HSI. These ponds are the Secret Garden, Ladies Swimming Lake, Bird Sanctuary Scrapes, Cohen's Field Pond and Orchard Pond. The remaining 21 ponds were considered unsuitable for great crested newt due to their size, water quality, aquatic/adjacent terrestrial vegetation, presence of fish, waterfowl or other predators and their resultant, generally poor, HSI scores.

Further Phase 2 presence/likely absence surveys were carried out on the five ponds identified has having potential to support great crested newts. While small numbers of common newts or their eggs were recorded in all five ponds, no great crested newts, or evidence of, were observed during any of the Phase 2 surveys and therefore great crested newts are considered to be absent within the waterbodies covered by this study. Furthermore, great crested newt are assumed to be absent in the immediate surrounding Hampstead Heath (personal communication with the Hampstead Heath Ranger, 2013).

Table 3: Summary Evaluation of Waterbodies

Pond Name	Suitability for GCN	HSI Score	Phase 2 Survey Carried Out (Yes/No)	GCN Present (Yes/No)
Bird Sanctuary Scrapes	Well-vegetated scrapes, optimal terrestrial habitat, absence of predators and therefore considered suitable for GCN.	0.64	Yes	No
Meg's Pond	Highly disturbed by dogs entering the water, lacks aquatic vegetation, terrestrial habitat sub-optimal and therefore considered unsuitable for GCN.	0.56	No	No
Secret Garden	Suitable aquatic vegetation, absence of predators, suitable terrestrial habitat, little disturbance and therefore considered suitable for GCN.	0.65	Yes	No
Cohen's Fields Ponds	Absence of predators, suitable aquatic/terrestrial habitat and therefore considered suitable for GCN.	0.62	Yes	No
East Heath Bothy	Completely dry	N/A	No	No
Vale of Heath	Heavy levels of predation and lack of aquatic species, considered unsuitable for GCN	0.45	No	No
Viaduct Pond	Heavy shading, no suitable aquatic plant species and considered unsuitable for GCN	0.46	No	No
Mixed Bathing Pond	Heavy levels of disturbance and predation, considered unsuitable for GCN	0.29	No	No
Hampstead Pond Number 2	Heavy levels of predation and lack of suitable aquatic plant species. Unsuitable for GCN	0.30	No	No
Hampstead Pond Number 1	High level of predation and lack of suitable aquatic species. Considered unsuitable for GCN.	0.28	No	No
Wood Pond	No potential access/egress to the pond, high level of predation and lack of aquatic species. Unsuitable for GCN.	0.54	No	No
Thousand Pound Pond	Ornamental pond with high level of predation and lack of aquatic species. Unsuitable for GCN.	0.43	No	No
Stock Pond	Minimal aquatic vegetation and high levels of predation. Unsuitable for GCN.	0.56	No	No
Ladies' Bathing Pond	High level of disturbance and predation. Some suitable aquatic species with refuges from predation present around the edges. Suitable for GCN.	0.54	Yes	No
Bird Sanctuary Pond	High level of predation, no suitable aquatic vegetation and considered unsuitable for GCN.	0.50	No	No
Model Boating Lake	Heavy levels of disturbance and predation and lacking in suitable aquatic species. Considered unsuitable for GCN.	0.30	No	No
Men's Bathing Pond	Heavy levels of disturbance and predation and lacking in suitable aquatic species. Considered unsuitable for GCN.	0.43	No	No

Highgate Pond Number 1	Heavy levels of disturbance and predation and lacking in suitable aquatic species. Considered unsuitable for GCN.	0.46	No	No
Orchard Pond	Lacks disturbance and predation and provides suitable aquatic and terrestrial habitat. Suitable conditions for GCN.	0.72	~~No~~	No
Athlone House Pond	No access	0.66	~~Yes~~	No
Athlone Gardens Pond	Extremely small ornamental pond with no suitable aquatic vegetation. Considered unsuitable for GCN.	0.66	No	No
Beechwood Ponds 1, 2 and 3	Ornamental ponds, recently created with large fountain. No aquatic vegetation and unsuitable terrestrial habitat. Not suitable for GCN.	0.47	No	No
Catchpit Pond	Concrete lined, no obvious access/egress points and lacking in aquatic vegetation. Unsuitable for GCN.	0.25	No	No
Fitzroy Pond	No Access	N/A	No	No

4.3 Potential Impacts of Proposed Works on Great Crested Newt

Given the absence of great crested newt from the site, the proposed Flood and Water Quality Management Works are considered to have a negligible impact on this species. This report is intended to be appended to the Ecological Impact Assessment (EcIA) as part of the overall Environmental Statement (ES). It is understood that the proposed works will lead to an improvement in water quality across the Heath. With this in mind, it is likely that the proposals will have a positive effect on aquatic habitats within Hampstead Heath. Due to the apparent absence of great crested newt within the immediate landscape, it is considered unlikely that this species will colonise Hampstead Heath.

4.4 Recommendations

The survey work undertaken between May and June 2013 has concluded that great crested newt is absent from the Hampstead Heath survey area included within this study. As such, it is considered unnecessary that mitigation will be required with respect to this species in association with the proposed Flood and Water Quality Management Works.

A habitat management plan has been prepared for the Heath and the Rangers on site are responsible for its implementation. The proposed scheme is also aiming to improve water quality across the Heath to enhance the ecological value of the waterbodies on site. Further recommendations are therefore not considered necessary as part of this report.

Habitat enhancement/creation works in some of the less disturbed areas of the Heath where public access is restricted, and their work seems to have increased habitat suitability for amphibians in general; smooth and palmate newt along with common toad and common frog are present within a number of the waterbodies included within this assessment.

In particular, habitat work within the Bird Sanctuary scrapes area on the far eastern side of the site has benefitted both amphibians and reptiles. The planting of reeds around the edges of the some of the large lakes on site provides areas of refuge for amphibians away from fish predation. Continuing to allow “safe refuges” by way of reed planting in the larger lakes should increase the overall value of the waterbody for a range of wildlife including birds, invertebrates and amphibians.

5.0 REFERENCES

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Appendix 1: Habitat Suitability Index Assessment Results in Respect of Great Crested Newts

HSI STATISTIC	POND NAME AND NUMBER																					
	1 – "Bird Sanctuary Scrapes"	2 – "Meg's"	3 – "Secret Garden"	4- "Cohen's Field Ponds"	5 – "East Heath Bothy"	6 – "Vale of Health"	7 – "Viaduct"	8 – "Mixed Bathing"	9 "Hampstead No.2"	10 – "Hampstead No.1"	11 – "Wood"	12 – "Thousand Pound"	13 – "Stock"	14 - "Ladies' Bathing"	15 – "Bird Sanctuary"	16 – "Model Boating"	17 – "Men's' Bathing"	18 – "Highgate No.1"	19 – "Orchard"	20 –"Athlone House"	21 –"Athlone Gardens"	22 – "Beechwood"	23 – "Catchpit"	24 – "Fitzroy"
Location	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Pond Area	0.05	0.05	0.05	0.05		-	-	-	-	-	-	-	-	-	-	-	-	-	0.05	0.3	0.05	0.95	0.2	
Pond Drying	0.5	0.9	0.9	0.5		0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1	0.9	0.9	
Water Quality	0.67	0.33	0.67	0.67		0.33	0.33	0.33	0.33	0.33	1	0.33	1	1	0.33	0.33	0.33	0.33	1	0.67	0.67	0.33	0.01	
Shade	1	1	1	1		1	1	0.6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.2	
Fowl	1	1	1	1	**Dried out**	0.67	0.67	0.01	0.01	0.01	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	1	0.67	1	1	1	**No Access**
Fish	1	1	1	1		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	1	0.67	1	0.67	1	
Pond count SI	1	1	1	1		0.9	1	1	1	0.95	1	1	1	1	1	1	1	1	1	1	1	1	1	
Terrestrial Habitat	1	0.67	0.67	0.67		0.67	0.67	0.67	0.67	0.33	1	0.33	1	1	1	0.01	0.33	0.67	1	0.67	0.67	0.01	0.01	
Macrophytes	0.7	0.3	0.7	0.8		0.3	0.35	0.3	0.35	0.35	0.35	0.3	0.5	0.35	0.5	0.3	0.3	0.35	0.8	0.3	0.3	0.3	0.3	
AVERAGE	0.64	0.56	0.65	0.62		0.44	0.45	0.28	0.30	0.28	0.53	0.42	0.55	0.53	0.49	0.29	0.42	0.45	0.72	0.66	0.61	0.47	0.25	

Appendix 2: Field Data Sheets for Presence/Likely Absence Survey

Great Crested Newt Presence/Absence Survey Form

ECOSA
Ecological Survey & Assessment Limited

Site: Hampstead Heath	Date: 15/5/13	Cloud Cover (%): 20%	Survey Time: 21:10 - 23.30
Grid Ref:	Recorder: S Munslow / R Potter	Weather: Dry	Temp: 8°C
Species: GCN	Technique(s): Torch, Net, Egg search		Wind Speed/Dir: Still
Risk Assessment Checklist completed? ☑			

Pond Number	Vegetation Cover (Score/5*)	Turbidity (Score/5*)	Number of Bottle Traps	Great Crested Newt							Smooth Newt							Palmate Newt							Comments
				Male			Female			Eggs	Male			Female			Eggs	Male			Female			Eggs	
				T	B	N	T	B	N		T	B	N	T	B	N		T	B	N	T	B	N		
Secret Garden	1	2	N/A								19			25											Bogbean, marsh marigold, diving beetle, water boatman, flag iris
Ladies' Bathing Pond	2	3	N/A																						Freshwater pearl mussel and fish
Bird Sanctuary Scrapes	1	2	N/A																						Frog tadpoles, water beetles. Only 2 scrapes were suitable for surveying (all others dry)
Orchard Pond	3	3	N/A																						Frog tadpoles, flag iris, wild garlic
Cohen's Field Ponds	5	1	N/A											3											Frog tadpoles, *Carex tripea*

Great Crested Newt Presence/Absence Survey Form

ECOSA
Ecological Survey & Assessment Limited

Site: Hampstead Heath	Date: 22/5/2013	Cloud Cover (%): 50%	Survey Time: 21:00 – 23:30
Grid Ref:	Recorder: S Munslow	Weather: Calm, dry, still	Temp: 8°C
Species: GCN	Technique(s): Torch, Net, Egg search		Wind Speed/Dir: Still
Risk Assessment Checklist completed? ☑			

Pond Number	Vegetation Cover (Score/5*)	Turbidity (Score/5*)	Number of Bottle Traps	Great Crested Newt							Smooth Newt							Palmate Newt							Comments
				Male			Female			Eggs	Male			Female			Eggs	Male			Female			Eggs	
				T	B	N	T	B	N		T	B	N	T	B	N		T	B	N	T	B	N		
Secret Garden	1	2	N/A								6			2				1							Leeches
Bird Sanctuary Scrapes	1	2	N/A								1			1											Frog tadpoles
Ladies' Bathing Pond	2	3	N/A														numerous	1							Fish, water mint, freshwater pearl mussel, frog tadpoles
Orchard Pond	3	3	N/A																						Frog tadpoles, flag iris, wild garlic
Cohen's Field Ponds	5	1	N/A															1							Frog tadpoles, *Carex tripea*

Great Crested Newt Presence/Absence Survey Form

ECOSA
Ecological Survey & Assessment Limited

Site: Hampstead Heath	**Date:** 5/6/13	**Cloud Cover (%):**0%	**Survey Time:** 21:05 - 23.30
Grid Ref:	**Recorder:** S Munslow	**Weather:** Still, dry	**Temp:** 13°C
Technique(s): Torch, Net, Egg search			**Wind Speed/Dir:** Still
Risk Assessment Checklist completed? ☑			

Pond Number	Vegetation Cover (Score/5*)	Turbidity (Score/5*)	Number of Bottle Traps	Great Crested Newt							Smooth Newt							Palmate Newt							Comments
				Male			Female			Eggs	Male			Female			Eggs	Male			Female			Eggs	
				T	B	N	T	B	N		T	B	N	T	B	N		T	B	N	T	B	N		
Secret Garden Pond	1	2	N/A								5		7	5		1							1		Leeches
Ladies' Bathing Pond	2	3	N/A														10								Fish, water mint, freshwater pearl mussel, frog tadpoles
Orchard Pond	3	3	N/A								1														Frog tadpoles, flag iris, wild garlic
Cohen's Field Ponds	5	1	N/A											1											Frog tadpoles, *Carex tripea,* little open water remaining
Bird Sanctuary Scrapes	N/A	2	N/A																						Little water remaining

Phase 2 Protected Species Survey – Great Crested Newt

ECOSA
Ecological Survey & Assessment Limited

Site: Hampstead Heath	**Date:** 12/6/13	**Cloud Cover (%):** 100%	**Survey Time:** 21:15 - 23.30
Grid Ref:	**Recorder:** D Gillmartin	**Weather:** Overcast, Drizzle	**Temp:** 13°C
Technique(s): Torch, Net, Egg search			**Wind Speed/Dir:** Still
Risk Assessment Checklist completed? ☑			

Pond Number	Vegetation Cover (Score/5*)	Turbidity (Score/5*)	Number of Bottle Traps	Great Crested Newt							Smooth Newt							Palmate Newt							Comments
				Male			Female			Eggs	Male			Female			Eggs	Male			Female			Eggs	
				T	B	N	T	B	N		T	B	N	T	B	N		T	B	N	T	B	N		
Secret Garden Pond	1	2	N/A								4		6	6		9									9 juvenile smooth newts netted
Ladies' Bathing Pond	2	3	N/A								2			1											Fish, water mint, freshwater pearl mussel, frog tadpoles
Orchard Pond	3	3	N/A																						Frog tadpoles, flag iris, wild garlic
Cohen's Field Pond	5	1	N/A																						Frog tadpoles, *Carex tripea,* little open water remaining
Bird Sanctuary Scrapes	N/A	2	N/A																						Little water remaining

**Where 5 = highly turbid/covered*

Map 1: Location of Waterbodies within the Survey Area at Hampstead Heath, City of London (Taken from the 'Welcome To Hampstead Heath' Map)