2013 updated reptile survey) may only use part of a site for a period of time within a survey season.

2.55 In addition, the detection of reptiles may have been hindered by the high levels of both public and dog disturbance to artificial reptile refugia, with surveyors reporting on a number of occasions that reptile refugia had been interfered with. Nevertheless, the surveys have been completed in accordance with best practice guidance[11], and it is considered that a sufficient survey effort has been applied to estimate the reptile populations present in the study area.

Updated Badger Survey

2.56 [redacted]

2.57 [redacted]

Water Vole and Otter Survey

2.58 No significant evidence of the presence of water voles or otters has been recorded during any of the previous survey efforts applied to the study area. In order to satisfy the responses received from consultees during the original Scoping exercise, an updated water vole and otter walkover survey was undertaken of Langford Brook on 11 June 2013. The survey comprised a visual inspection of Langford Brook for characteristic signs of water voles, such as latrines, footprints, feeding caches, runs, holes and lawns. A visual search of Langford Brook for use by otters, which included evidence of prints, tracks, spraints, feeding remains and resting sites/holts, was also undertaken. Features considered to have the potential to be used as holts were also documented during the survey. The walkover survey was completed from the northern bank of Langford Brook at sections of the ditch where the surveyor could safely access the bank edge. Access to the southern bank was restricted by the presence of dense tree cover immediately adjacent to the brook.

[11] Froglife (1999) Reptile survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10, Froglife, Halesworth; DMRB (2005) Nature conservation advice in relation to reptiles and roads. Volume 10, Section 4, Part 7, HA/116/05. DMRB

Harvest Mouse Survey

2.59 To establish the presence, or likely absence, of harvest mice on the study area a hand search of tall grassland/ruderal vegetation for the presence of harvest mouse nests was undertaken by a team of five surveyors on 12 November 2013. The weather conditions during the survey were dry, sunny (5-10% cloud cover) and relatively mild for the time of year (8 to 10°C). The survey area broadly covered the whole study area, but owing to the significant amount of time and effort required in detecting harvest mouse nests, hand searches were largely confined to areas of the study area which supported a tall grassland/ruderal vegetation interface with scrub such as along hedgerow and wooded field boundaries and within areas of notably 'tussocky' grassland, which are generally considered to be offer preferred nesting locations for harvest mice[12]. Surveyors visually examined and thoroughly hand searched areas of suitable habitat to detect characteristic woven harvest mouse nests, with the location and description of any nests found recorded.

Detailed Invertebrate Assessment

2.60 A detailed assessment of the invertebrate species assemblage present on the study area was undertaken by an experienced entomologist to update the baseline data gathered during 2005. The assessment comprised terrestrial and aquatic invertebrate sampling; the methodologies for which are discussed in turn below as extracted from the invertebrate survey report provided in full in **Annex EDP 4**.

Terrestrial Invertebrate Sampling

2.61 Terrestrial invertebrate sampling was undertaken on 6 occasions between June and October 2013 and included direct observation of invertebrates and the following active sampling methods:

i. Sweep-netting

- A stout hand-held net is moved vigorously through vegetation to dislodge resting insects. The technique may be used semi-quantitatively by timing the number of sweeps through vegetation of a similar type and counting selected groups of species.

ii. Beating trees and bushes

- A cloth tray, held on a folding frame, is positioned below branches of trees or bushes and these are sharply tapped with a stick to dislodge insects. Black or white trays are used depending upon which group of invertebrates has been

[12] Creswell, W. J. *et al.* (2012) UK BAP Mammals. Interim Guidance for Survey Methodologies, Impact Assessment and Mitigation. Southampton, UK

targetted for search. Insects are collected from the tray using a pooter – a mouth-operated suction device.

iii. Suction Sampling

- Consists of using a converted leaf blower to collect samples from grass and other longer ground vegetation. The sample is then everted into a net bag and the invertebrates removed with a pooter. The advantage of suction sampling is that it catches species, which do not fly readily or which live in deep vegetation. It is particularly productive for Coleoptera, some Diptera and Arachnida.

2.62 Passive sampling of terrestrial invertebrates was also undertaken by means of pitfall trapping:

i. Pitfall trapping

- Vending-machine cups or similar are placed in the ground with the rim flush with, or slightly below, the surface. A fluid is added, containing ethylene glycol, sodium chloride and formalin with a little detergent to reduce surface tension. Traps may be covered or uncovered and are typically left in position for a month at a time. Invertebrates simply fall into the traps. This is the single most effective means of recording ground beetles (*Carabidae*) but is also effective for rove beetles (*Staphylinidae*), some other beetle groups, spiders and most non-insect soil-dwelling arthropods. Unlike pan traps, pitfall can be left *in* situ for a couple of weeks before they need to be examined;

- Traps were established on the second survey visit (18 June 2013) and operated throughout the survey period with samples collected during each survey visit; and

- Pitfall traps were operated in fields 2, 4, 6, 7 and 12. An extensive network of pitfall traps was not established in every site compartment as pitfall trapping was designed only to obtain a representative sample of the invertebrate fauna.

Aquatic Invertebrate Sampling

2.63 Sampling of aquatic habitats presented a small challenge. Former ponds were either dry or nearly so during the sampling period such that the aquatic invertebrates normally present would have either migrated away or else entered dormant phases deep in the damp mud. Water was present in some ditches and as temporary flooding on terrestrial fields. These areas were sampled using a pond net, with mesh diameter 0.75mm) as an underwater sweep net, taking care to ensure that as many potentially different habitat types were included (e.g., shaded and exposed, shallow and deep). In the ditches, which were deemed likely to be wet on a semi-permanent basis debris was dredged to the bank and sifted through by hand to collect any invertebrates that were visible.

2.64 Samples of aquatic invertebrates were preserved in dilute alcohol and retained for laboratory examination.

Updated Butterfly Surveys

2.65 A range of targeted surveys have been undertaken throughout the study area with respect to the following UK BAP priority and/or notable butterfly species:

- Marsh fritillary (Euphydryas aurinia);
- Brown hairstreak (*Thecla betulae*);
- Black hairstreak (*Satyrium pruni*);
- White-letter hairstreak (*Satyrium w-album*); and
- Small heath (*Coenonympha pamphilus*).

2.66 The need for such surveys was informed by desk study records and/or in consultation with the local branch of Butterfly Conservation (BC), Cherwell District Council's Ecologist and Natural England.

2.67 The species in question have varying annual life cycles and life strategies, such that differing survey techniques were employed to maximise the likelihood detecting their presence and distribution within the study area. The survey methodologies employed for each species are described in turn below.

Marsh Fritillary

2.68 Following an apparent sighting of a single adult marsh fritillary butterfly on the 30 May 2005 by a member of the public, a further six visits were completed to the study area between the 2 June 2005 and 3 July 2005. No further adults were identified during these further visits. A larval web survey completed on the 26 August 2005 identified a single larval web on a food plant located in Field F7.

2.69 As part of an annual life cycle, the female adult marsh fritillary lays batches of up to 200 eggs on the underside of leaves of their host plant devil's-bit scabious (*Succisa pratensis*). The resulting larvae remain together and form a conspicuous silken web, on the leaves of the host plant, which is visible from July until mid-late September (depending on weather conditions). A larval web survey is therefore a very reliable method of detecting the presence of the marsh fritillary on a site, and also gives a good indication of breeding status.

Larval Web Searches

2.70 Between 2006 and 2013, a suitably experienced EDP surveyor has undertaken annual surveys to search for larval webs. Each survey involved hand searching of each devil's-bit scabious plant in the study area to check for the presence of larval webs. The survey dates are as follows:

- 11 - 12 September 2006;
- 11 - 12 September 2007;
- 17 September 2008;
- 22 September 2009;
- 27 September 2010;
- 31 August 2011;
- 14 September 2012; and
- 29 August 2013.

2.71 The search centred on Field F7, where the density of devil's-bit scabious is highest, but all fields were searched for presence of host plant and larval webs.

2.72 The surveys were undertaken at an appropriate time of year, and in suitable weather conditions. The late September visits in 2009 and 2010 could have potentially missed larval webs if the larvae had dispersed in preparation for hibernation, however due to the mild temperatures at the time, this is unlikely. Therefore there are no significant seasonal or climatic limitations to the survey, particularly in view of the 8 year monitoring period.

Adult Searches

2.73 In addition to the annual larval web searches, surveys were undertaken in 2013 aimed at recording the adult butterfly (if present). The marsh fritillary butterfly can be readily detected and identified in its adult stage. Three survey visits were undertaken in warm, dry conditions spanning the typical flight period for the species, namely 5, 12 and 18 - 19 June 2013. The final survey was combined with the first black hairstreak and small heath adult counts (more detail provided below) and therefore required two survey visits to cover the whole study area.

2.74 All open grassland habitats within the study area were surveyed for the species by walking a zig-zag route to observe/flush any marsh fritillary butterflies present.

2.75 The surveys were undertaken at an appropriate time of year, and in suitable weather conditions. While it is conceivable that a very small population could be overlooked using the method employed, this is very unlikely and even more so when coupled with the 8 years of larval web searches.

Brown Hairstreak

Records Collation

2.76 Members of Upper Thames Branch of Butterfly Conservation (BC UTB) were known to have recorded black hairstreak adults and brown hairstreak adults and eggs within the study area in recent years. Thus, the Branch was contacted for its detailed records of eggs/adults of these species. The data, covering the period 2005-2010 was received and reviewed on 18 July 2011.

2.77 A request to BC for any updated information was made in 2013, however no further surveys had been undertaken, or records had been collated, since 2010.

Egg Search

2.78 Adult brown hairstreaks are extremely difficult to survey, spending much of the time up in tree canopies and occurring at low densities. Egg searches of blackthorn (*Prunus spinosa*), the larval foodplant, during winter are a far more practical and reliable method of detecting the presence of this species. In this context, and given the quantity of existing egg search information, no adult searches were undertaken, however a targeted egg search was undertaken by EDP on 26 February 2013.

2.79 The egg search focussed on likely breaches of hedgerows and scrub lines containing blackthorn, with reference to the emerging masterplan at the time (see **Plan EDP 11**). The masterplan has subsequently changed, and the potential breach locations have therefore altered (and mostly reduced), however this data still provides a useful sample of the study area as a whole.

2.80 Black hairstreak eggs can also occasionally be found during brown hairstreak egg searches, and therefore the 2013 survey provided an opportunity to search for eggs of both species.

Black Hairstreak

Records Collation

2.81 As described above, BC UTB were known to hold a small number of black hairstreak records from within the study area. Further details of the sightings were therefore obtained.

Egg Search

2.82 As noted above, a sample of the blackthorn within the study area was searched for brown and black hairstreak eggs in February 2013.

Adult Searches

2.83 Black hairstreaks are also extremely elusive, and all of their life stages are difficult to find, however surveying for adults is considered the most appropriate technique to establish their presence, distribution and abundance. The adults spend nearly all their time in the canopies of trees or dense scrub but at certain times they make short looping flights in and out of the tree tops. Butterflies can be seen from early morning to early evening with a peak of activity around midday.

2.84 Within the study area the majority of potential breeding habitat, namely tall dense stands of blackthorn, occurs within the hedgerows/scrub bands on the field boundaries. Thus the survey involved mapping all potentially suitable areas of blackthorn and then undertaking timed searches of the blackthorn patches and surrounding scrub and trees. The searches were conducted by undertaking visual sweeps for black hairstreaks over the canopy of the scrub and trees and using high power close focussing binoculars to investigate potential sightings further. In addition potential nearby nectar sources such as the flowers of bramble (*Rubus fruticosus* agg.), knapweed (*Centaurea nigra*) and thistles (*Cirsium* spp.) were searched for the butterfly.

2.85 The patches, or groups of patches, of blackthorn which were the focus of the survey are shown on **Plan EDP 11** appended to this report. The survey was focussed on the area of the study area to the east of the Langford Brook, as the presence of blackthorn in the area to the west was limited to a few scattered specimens.

2.86 The study area was first surveyed over four days in 2011, namely 28, 29 and 30 June and 5 July. An updated survey was undertaken on three days in 2013, namely 18 -19 and 26 June and 5 July.

2.87 Surveys were timed to coincide with the likely peak flight period for black hairstreak and determined by the most suitable weather conditions. Surveys were undertaken no earlier than 10.30hrs and no later than 15.00hrs to coincide with highest levels of adult flight activity. The timings and conditions of the surveys are set out in **Table EDP 2.7**.

Table EDP 2.7: Timings and Weather Conditions during Butterfly Surveys

Survey Date	Air Temp (°C)	Cloud cover (%)	Wind (Beaufort)
28.06.11	18 - 20	100	1 - 3
29.06.11	18 - 23	40 - 90	1 - 4
30.06.11	17 - 20	50-65	0 - 3
05.07.11	24- 27	70-100 (hazy)	0 - 1
18.06.13	18 - 22	100	0 - 1
19.06.13	23 - 26	75	0 - 1

Survey Date	Air Temp (°C)	Cloud cover (%)	Wind (Beaufort)
26.06.13	20 - 23	70	0 - 2
05.07.13	19 - 22	10	0 - 2

2.88 The weather conditions were generally very suitable for recording butterflies. The overcast conditions on 28 June 2011 and 18 June 2013 may have reduced flight activity by some species, including hairstreaks, although the temperatures were warm so this is unlikely to have been a significant limitation.

2.89 In addition to the above, separate adult searches were undertaken for white-letter hairstreak in 2013 (see below for more detail). This species has an overlapping flight period with black hairstreak and therefore provided a further opportunity to record the presence of black hairstreak.

White-letter Hairstreak

2.90 Targeted survey work for white-letter hairstreak butterflies was undertaken by BC specialist surveyors.

Elm Survey and Condition Assessment

2.91 The larval food plant of white-letter hairstreak is elm (*Ulmus* sp.). In preparation for a white-letter hairstreak egg search in 2011 (described in more detail below), all elms on the study area and the 50m buffer zone around the study area were counted and data collected on species and quality.

2.92 In May 2013, elm type, quantity and quality were also surveyed. The majority of elms were thought to be English elm (*Ulmus procera*) or an elm hybrid or type resembling English elm. Within this category there was, as is usual, a fairly wide range of hybrid material. There were also occasional trees which were much larger-leaved (with bolder stems, twigs and buds) 3 resembling the qualities of wych elm (*Ulmus glabra).* There were also a few examples of a smooth-leaved kind.

2.93 Following the visits in 2011 and 2013 elm was categorised into four quality levels in terms of suitability for white-letter hairstreak; poor, moderate, good or excellent (**Table EDP 2.8**). There was no elm on the study area or buffer zone considered to be excellent quality. In the 2011 study it was noted that elm in the study area was still being affected by Dutch Elm Disease (DED).

Table EDP 2.8: Elm Quality Definitions

Quality	Definition
Good	Usually a medium to larger tree, maybe with flower buds developing and wych elm-like qualities. All trees identified to this level of quality were felt to be able to support white-letter hairstreak even if eggs were not found.
Moderate	A medium sized elm or of sufficient, sheltered quality that could possibly be suitable for egg laying, more so if in a favourable location.

Quality	Definition
Poor	Tree not favourable for egg-laying due to a combination of small size, poor health (canker, DED), very small leaves and buds, and/or poor, exposed location.
Variable	A group of elms showing a combination of the above qualities.

Egg Searches

2.94 Searches of elm for white-letter hairstreak eggs were undertaken during 2011 and updated in 2013. During the first survey, undertaken between 7 and 10 November 2011, elms were systematically sampled by using a long-handled pruner to remove several branches form the top and sides of the elm trees and then searching the samples intensively for eggs.

2.95 An update egg search was undertaken on the 20 and 26 February 2013. The use of the long handled pruner to remove branches was limited during this survey, and instead elms were examined in reach of the ground or by ladder. Once an egg was found in a particular section (i.e presence confirmed) no further elm was searched in that area.

Adult Searches

2.96 Adult surveys targeted areas where elm was of sufficient quality to support the butterfly but where no eggs had been recorded, where elm was inaccessible or where good stands of elm with ash were present.

2.97 The first survey was conducted on the 30 June 2013 at the beginning of the typical white-letter hairstreak flight period (and during the black hairstreak flight period). Two further surveys were conducted during the white-letter hairstreak flight period on the 11 July and 20 July 2013. Adult surveys were conducted by watching key ash trees, along with blackthorn and elm (respective larval foodplants for black hairstreak and white-letter hairstreak) in suitable weather conditions.

Small Heath

Field Survey

2.98 The small heath butterfly can be readily detected and identified in its adult stage. All open grassland habitats within the study area were surveyed for small heath by walking a zig-zag route to observe/flush any small heath butterflies present (see **Plan EDP 11**).

2.99 The study area was surveyed for this species in June-July 2011, and again in June-July 2013. In both years the surveys were undertaken in combination with the black hairstreak adult surveys (generally while walking from one blackthorn patch to the next) since their peak adult flight periods coincide. Thus the timings, conditions and study area coverage of the small heath survey follows that described above in relation to the black hairstreak survey.

Night-flying Macro and Micro Moth Survey

2.100 A detailed survey and evaluation of the night-flying macro and micro moth fauna occurring within fields to the east of Langford Brook within the study area was undertaken, as detailed in full in **Annex EDP 5**. The assessment sought to evaluate the study area's value for moths in the context of local designations and habitats and to conclude on the overall value of the study area and its' habitats for the moth species assemblage present. In summary, the assessment involved the following:

Desk Study

2.101 A desk-based review of freely available web-based literature and information supplied by TVERC in 2013 on designated sites within the potential zone of influence of the study area was undertaken. The existing entomological survey report for terrestrial and aquatic invertebrates produced by Colin Plant Associates (2013) was also consulted.

Field Surveys

2.102 Field surveys comprising five sampling events, undertaken in suitable weather conditions, spaced evenly between mid-June to early October 2014 were completed in accordance with best practice guidance. Surveys involved overnight light trapping of moths with the use of Robinson traps fitted with 125W mercury vapour (MV) bulbs and on one occasion with the use of two actinic Heath traps. Light traps were deployed from dusk until the following dawn with the contents of each trap emptied and examined early in the morning following a night of trapping. The number of individuals of each species recorded per trap was recorded. Individuals were identified to species level in the field (*in situ*) wherever possible; specimens of certain taxa difficult to identify in the field were collected from the study area for the purpose of *ex situ* identification.

Data Analysis and Evaluation

2.103 Species data were analysed through the 'Invertebrate Species-Habitats Information System' (ISIS), full details of which are provided within **Annex EDP 5**. To determine the value of the study area, and the habitats supported, for moths a qualitative approach as presented by Colin Plant Associates: 'Criteria used to define significance of invertebrate habitat' (available via the CIEEM website[13]) was consulted.

[13] http://www.cieem.net/data/files/Resource_Library/Technical_Guidance_Series/SoSM/Colin_Plant_-_Invertebrates.pdf

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Section 3
Results

3.1 This section sets out the findings of the desk study, updated Extended Phase 1 survey and detailed Phase 2 survey work undertaken in the study area during 2012 to 2013. The following should be read in conjunction with the related plans and appendices referenced throughout. The field, woodland, pond and hedgerow numbers used throughout this section refers to those illustrated on the **Plan EDP 1**.

Designated Sites

Statutory Designations

3.2 Internationally important statutory designated sites include Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and Ramsar Sites. Nationally important statutory designations are termed Sites of Special Scientific Interest (SSSIs) and locally important statutory designations are termed Local Nature Reserves (LNRs).

3.3 The study area is not covered by any statutory designated sites, nor do any exist within the search area surrounding the study area. However, the following two nationally important designations which lie downstream of the study area have been identified through correspondence with Natural England to be Valuable Ecological Receptors (VERs) with potential for downstream impacts via adverse changes in water quality and/or flow within the Langford Brook:

i. Wendlebury Meads and Mansmoor Closes (SSSI); and

ii. Otmoor SSSI.

Non-Statutory Designations

3.4 Information on non-statutory designations has been received from TVERC, and is provided in full within **Annex EDP 1**.

3.5 Within Oxfordshire, non-statutory designations for nature conservation are known as 'Local Wildlife Sites' (LWSs) and LNRs. The study area lies partly within the Ray Conservation Target Area (CTS) (**Annex EDP 6**), and is covered in part by Gavray Drive Meadows LWS (the designation for which is included in **Annex EDP 7**). Based on the LWS citation, the site is notable for the following:

i. Supports lowland meadow which is a UK priority BAP habitat;

ii. Supports reed bunting (*Emberiza schoeniclus*), song thrush (*Turdus philomelos*),

bullfinch (*Pyrrhula pyrrhula*), linnet (*Carduelis cannabina*) and great crested newts (*Triturus cristatus*) which are UK Priority BAP species;

iii. Supports the nationally scarce ground beetle, *Bembidion gilvipes*; and

iv. Supports Birds of Conservation Concern[14], namely: bullfinch, reed bunting, song thrush, yellow hammer (*Emberiza citrinella*), linnet, dunnock (*Prunella modularis*) and willow warbler (*Phylloscopus trochilus*).

3.6 Three other LWSs lie within 2km of the study area[15], namely:

i. Graven Hill – which lies approximately 2km to the south west of the study area is notable for its woodland habitat and the species that it supports, namely grasshopper warbler (*Locustella naevia*) and willow warbler (*Phylloscopus trochilus*), and a number of ancient woodland indicator species;

ii. Bicester Airfield – which lies approximately 1.6km to the north of the study area and is designated due to areas of species-rich grassland; and

iii. Meadows NW of Blackthorn Hill – which lies approximately 1.5km to the south east of the study area and is designated due to meadow habitat.

3.7 In addition to the above, the south-east corner of Bure Park LNR lies approximately 2km to the north-west of the study area, and is designated for its grass meadow, young broad leaved woodland, hedgerows and scrub habitats.

3.8 The following 'Proposed Local Wildlife Sites and Extensions' are also located within 2km of the study area:

i. Bicester Airfield Proposed Extension – a proposed extension to the aforementioned Bicester Airfield;

ii. Skimmingdish Lane Fields - There is little information on this area although it includes rough grassland on old allotments, and was previously part of the proposed Bicester Airfield Site; and

iii. Jarvis Lane – a linear strip of trees and shrubs along a public right of way in Bicester, with a good range of woody species and a species-rich hedgerow. The site may have value for birds also.

[14] Gregory RD, Wilkinson NI, Noble DG, Robinson JA, Brown AF, Hughes J, Procter DA, Gibbons DW, and Galbraith CA (2002) The population status of birds in the United Kingdom, Channel Islands and Isle of Man: an analysis of conservation concern 2002-2007. *British Birds* 95: 410 – 450

[15] Information supplied by the Thames Valley Environmental Records Centre during 2004

3.9 The locations of the above non-statutory designated sites within 2km of the study area are shown in a plan provided by the Thames Valley Environmental Records Centre, which is included as **Annex EDP 8**.

Evaluation

3.10 Gavray Drive Meadows LWS partially covers the study area and requires consideration within an Ecological Impact Assessment (EcIA) as a VER of county value. The remaining non-statutory designations discussed above are not considered to be affected by the proposed development and would be scoped out of an EcIA as a VER owing to their spatial separation and/or lack of ecological connections with the study area.

Habitats

3.11 The study area is predominantly comprised of fields of semi-improved grassland, the majority of which are species-rich, with discrete areas of marshy grassland present within a number of the fields, often associated with ponds. Scrub encroachment has occurred across the study area in recent years (post-2006), resulting in an overall reduction in both the quantity and quality of grassland (as discussed in further detail below).

3.12 The north west third of the study area supports two fields that were under arable cultivation at the time of the Update Extended Phase 1 survey. A network of hedgerows; a number of which have become outgrown and now form bands of dense scrub, border the fields and are mostly species-poor in nature. Narrow strips of broadleaved woodland border the railway embankment adjacent to the northern boundary and along the roads adjacent to the southern and eastern boundaries. In addition, within the study area, broadleaved woodland borders the stream separating the larger of the two arable fields from the remainder of the study area and along the northern and western boundaries of Field F7.

3.13 A more detailed description of the habitats present within the study area is set out below. The following descriptions should be read in conjunction with **Plan EDP 1** which illustrates the approximate extent of the habitat features on the study area.

Semi-improved Grassland

3.14 Grassland fields occupy approximately two thirds of the study area and have mostly been unmanaged in recent years, with the exception of Fields F3, F8 and F9 which are cut for hay. These fields support species-poor semi-improved grassland with a low diversity of herbaceous species and a relative lack of scrub encroachment in comparison to other fields within the study area.

3.15 The remaining fields support species-rich semi-improved grassland of varying quality, with discrete areas of marshy grassland present within Fields F1, F2, F3, F10 and F11.

3.16 The most species-rich areas of grassland occur in Fields F6, F7, F11 and F12, where a number of species indicative of Lowland Meadow were recorded including great burnet (*Sanguisorba officinalis*), betony (*Stachys officinalis*) and devil's-bit scabious (*Succisa pratensis*).

3.17 As previously detailed, a number of the grassland fields (namely the entirety of Fields F5, F6, F11 and F12 and a portion of Fields F8 and F9) are designated as Gavray Drive Meadows LWS. This designation was attributed to the grassland habitats that these fields supported at the time of designation, which fell within the LBAP criteria for Lowland Meadow.

3.18 The detailed botanical survey of these and the other grasslands in the study area has determined that these fields continue to support grassland communities consistent with the criteria set out for the selection of County Wildlife Sites, and that two additional fields not currently within the LWS boundary are also considered to meet this criteria, namely Fields F1 and F3. However, at a national level, none of the grasslands are considered to meet the criteria for the UK BAP Priority Habitat Lowland Meadow since the criteria at a national level is much stricter. Full details of the grassland survey are set out within **Annex EDP 2**.

3.19 The grasslands within Fields F1, F3, F5, F6, F11 and F12 are considered to be of County value owing to them meeting the criteria for CWS selection as LBAP Lowland Meadow habitat. Although they do not currently meet the stricter criteria applied to the UK BAP Priority Habitat Lowland Meadow, which encompasses the NVC communities MG5, MG4 and MG8, a number of the grasslands were shown to have weak affinities with the MG4 community which could indicate that prior to the cessation of management, these fields supported a much more valuable grassland community which would be expected to return with the initiation of a suitable management regime.

3.20 The remaining grasslands within the study area are of lower botanical value, although are still considered to be of at least local value. Those grasslands supporting marshy areas would also fall within the criteria for the UK BAP Priority Habitat Coastal and Floodplain Grazing Marsh. This Priority habitat is, however, designated for its value to species such as wading birds rather than because it is floristically valuable.

Broadleaved Woodland and Mature Trees

3.21 Within the interior of the study area, only two bands of broadleaved woodland are present. The broadleaved woodland which lines the stream bordering the eastern boundary of the large arable field is narrow in width and comprised of numerous mature trees, including willow (*Salix* sp.) and ash (*Fraxinus excelsior*), with a limited understorey. The strip of woodland bordering the western and northern boundaries of Field F7 has a shaded ride through the centre. The woodland canopy is dominated by ash, oak (*Quercus robur*) and field maple (*Acer campestre*), with an understorey comprised predominantly of hawthorn (*Crataegus monogyna*). This woodland has an impoverished groundflora comprised of dock (*Rumex* sp.) and chickweed (*Stellaria*

media), with lots of bare earth present, although a small number of ancient woodland indicator (AWI) species were also recorded, comprising herb Robert (*Geranium robertianum*) and wood false brome (*Bracyhpodium sylvaticum*).

3.22 Other strips of broadleaved woodland occur along the study area's southern and eastern boundaries and are likely to have originated from landscape planting alongside the roads. The southern woodland strips are discontinuous and dominated by ash and oak with an understorey of blackthorn (*Prunus spinosa*) and bramble (*Rubus fruticosus* agg.). The woodland strip along the eastern boundary is continuous, with a greater diversity of woody species, including hornbeam (C*arpinus betulus*) and dog rose (*Rosa canina*).

3.23 Mature trees occur not only within the woodland strips, but also within a number of hedgerows within the study area. A number of these trees were determined to be of potential suitability to roosting bats, as discussed in further detail below.

3.24 The broadleaved woodland strips are considered to be of at least local value and fall within the criteria for both the LBAP and UK BAP Priority habitat Lowland Mixed Deciduous Woodland.

Hedgerows and Scrub

3.25 The hedgerows located within the study area are not under regular management, and subsequently have become very dense and overgrown, resulting in a number now appearing as thick bands of scrub rather than hedgerows. The hedgerows and areas of scrub are predominantly species-poor, typically dominated by hawthorn, midland hawthorn (*Crataegus laevigata*) and blackthorn (*Prunus spinosa*), with willow occurring frequently where hedgerows/scrub are located alongside the study area's ditch network. Scrub encroachment has affected a number of fields, with the densest areas present within the eastern portion of the study area, although scattered scrub occurs throughout, with the exception of the three fields that are under active management (Fields F3, F8 and F9). These areas of dense and scattered scrub comprise mostly of hawthorn and bramble.

3.26 The network of hedgerows are of at least local value and fall within the criteria for both the LBAP and UK BAP Priority Habitat Hedgerows. The scrub, whilst of limited floristic value is of value for a range of protected/notable species, as detailed below.

Tall Ruderal

3.27 Areas of tall ruderal vegetation occur throughout the southern fields and comprises mostly willowherb (*Epilobium* sp.), with some common nettle (*Urtica dioica*) and thistles (*Cirsium* sp.). The areas of tall ruderal vegetation do not support any notable species of plant and as such are considered to be of negligible intrinsic value.

Arable

3.28 The north western third of the study area comprises one large and one small arable field, separated by a species-poor hedgerow. Both fields had been recently ploughed at the time of the Update Extended Phase 1 survey.

3.29 The arable fields have been ploughed close to the field boundaries and did not support any valuable assemblages of arable weeds at the time of the Update Extended Phase 1 survey. As such, they are considered to be of negligible intrinsic value.

Aquatic Habitats

Ponds

3.30 The study area supports a number of ponds as illustrated on **Plan EDP 3**. As discussed in greater detail in the relevant species section below, all ponds in the study area were found to be breeding ponds for great crested newts. Individual pond descriptions for those ponds located in the study area are given below.

Pond 1 (P1)

3.31 This is a relatively small field pond located in the north east corner of Field F8. The pond is broadly circular; approximately 5m wide and long. The pond has shallow sloping sides with approximately a water depth of 0.5m toward the centre. The pond consists mainly of open water with a thick layer of dead vegetative material in the bottom. The margins of the pond are vegetated with small amounts of floating sweet grass, creeping bent and soft rush with an immature willow overhanging the eastern perimeter of the pond.

Pond 2 (P2)

3.32 Pond P2 lies within the eastern extent of Field F7. The pond is elongated and oval in shape, and approximately 5m long and 2m wide. The pond is overhung by dense willow scrub and is heavily shaded. The extent of open water is negligible and the macrophytes diversity is low, consisting of predominantly floating sweet grass, soft rush and creeping bent. The bottom of the pond consists of a dense accumulation of dead vegetative material, and the pond is heavily silted up, deoxygenated and turbid. The deepest part of the pond is characterised by water depths of approximately 0.25m, and it is considered that the pond is subject to frequent drying out. The abundance of macroinvertebrate fauna within the pond is negligible owing to the heavy shading, and poor water quality, of the pond.

Pond 4 (P4)

3.33 Pond P4 is located within Field F1 and constitutes a small (0.5m x 0.5m) pond. There is almost entirely no open water and the pond is full of floating sweet grass, reed mace, sedges and common duckweed. During periods of high water, adjoining small

depressions and hollows created following disturbance to the field fill with water to increase the overall area of the pond. Hence, water depth within the pond varies, but within the small pond itself water depth is a maximum of 0.5m.

Pond 5 (P5)

3.34 Pond P5 is located in the south eastern portion of Field F2, adjacent to a line of mature standard oak trees. The pond consists of approximately five linear water bodies which seem to have formed within the furrows of the evident ridge and furrow system. Water levels within the pond fluctuate significantly and during dry periods the ponds hold little to no water. Aquatic vegetation consists of locally dominant floating sweet grass and dense algal growth. The ponds are heavily shaded by overhanging willow trees.

Pond 6 (P6)

3.35 Pond P6 lies along the western boundary of Field F9, within Hedgerow H4. The pond is broadly oval, approximately 4m long and 3m wide. The hedgerow encompasses and overhangs the western half of the pond. The eastern margin of P6 has shallow, sloping margins. During the course of the 2013 great crested newt surveys, the water depth of the pond fluctuated significantly. Generally water depth was no greater than approximately 20cm. The pond supports a dense sediment layer and is heavily silted and turbid. Aquatic vegetation within the pond was dominated by a dense mat of floating sweet grass.

3.36 In addition to the above, there are 6 ponds located outside of the study area within 250m of the boundary as illustrated on **Plan EDP 3**.

Ditches

3.37 The study area supports a number of ditches, most of which are considered to be seasonally wet, as illustrated on **Plan EDP 1**. These ditches are generally located along field boundaries at the base of hedgerows and are of no greater than 0.5m in depth. At the time of survey all of the ditches were dry (with the exception of the wet ditch located within Field F10); although it was considered that these could hold some water during periods of high water, certainly not year round.

Evaluation

3.38 Ponds are considered a UK BAP Priority Habitat and are afforded a local BAP. Collectively, the ponds are of relatively low quality in their own right, having been subject to a neglect of appropriate management over many years resulting in low macrophyte and macroinvertebrate fauna, however owing to the confirmed presence of breeding great crested newts within each of the ponds, as discussed further below, ponds are considered of local to district value.

Species

3.39 The following descriptions of the populations of protected/notable species supported by the study area is based on a combination of records received from the desk study, the findings of targeted Phase 2 surveys and incidental observations of species noted while undertaking unrelated field surveys.

Bats

Desk Study

3.40 The 2013 updated desk study returned few records of bats within 2km of the study area. Records included a single record of common pipistrelle (*Pipistrellus pipistrellus*) and brown long-eared bat (*Plecotus auritus*), and three records of pipistrelle sp., none of which were from within the study area.

Field Surveys

Bat Roosting in Trees

3.41 During the day-time assessment of mature trees within the study area a total of 29 trees were identified as having the potential to support roosting bats. The overall distribution of these trees, and their level of bat roost potential, is summarised on **Plan EDP 6**. In addition, detailed descriptions of these trees, and their respective features with potential to support bat roost, are tabulated in **Annex EDP 9**.

3.42 Of the individual trees that occur within the study area, four were identified as having high potential, 10 were identified as having medium potential and 15 were identified as having low potential. With the exception of areas of the study area to the west of Langford Brook, trees with bat roost potential were relatively evenly distributed across the study area, but with a high concentration of medium potential trees within the strip of broadleaved woodland along the northern boundary of Field F7, and a concentration of mostly low potential trees with a single medium potential tree within Hedgerow H6. No conclusive evidence of roosting bats was encountered in any of the trees during the daytime assessments.

Bat Foraging/Commuting Activity

3.43 The following should be read in conjunction with Bat Transect Survey Results Plans (**Plans EDP 7**, **8** and **9**) which show the distribution of bat species across the study area. During the 2013 update survey, six species of bat were recorded foraging and commuting within the study area including common pipistrelle, soprano pipistrelle (*Pipistrellus pygmaeus*), *myotis sp.*, a long-eared species (*Plecotus sp.*), noctule (*Nyctalus noctula*) and leisler's bat (*Nyctalus leisleri*).

3.44 During 2013, common pipistrelle (*Pipistrellus pipistrellus*) bats were the most frequently encountered species and were recorded widely across the study area. No distinct preference for particular fields within the study area is notable from the survey results, although hedgerows and woodland 'edge' habitats, along with areas of semi-improved grassland, are considered to provide moderate foraging and commuting opportunities.

3.45 During the transect surveys, soprano pipistrelle (*Pipistrellus pygmaeus*) bats were also recorded across the study area but not as widely, nor in as great an abundance, as common pipistrelle bats.

3.46 With respect to Myotis species, due to the difficulties in identifying species of this genus to species level based on their echolocation calls no attempt is made to differentiate which species of *Myotis* bat were recorded within the study area. Low numbers of myotis recordings were made during the transect surveys, with a slightly greater concentration in and around Field F11, a large, unmanaged semi-improved grassland field.

3.47 Noctule bats were infrequently recorded across the study area; due to the height at which this species forages it is difficult to relate or attribute their distribution to specific habitat features on the ground.

3.48 Two recordings of long-eared species were made during the course of the 2013 update survey. It is likely that this species is more widespread across the study area than this as their quiet echolocation calls are often not detected by bat detectors.

3.49 A single recording of a Leisler's bat was made along Hedgerow H8 as shown on **Plan EDP 1**.

3.50 The range of bat species encountered during the surveys undertaken at the study area between 2002 and 2013 are summarised within **Table EDP 3.1**. The species encountered during the 2013 surveys are broadly similar to those recorded during the surveys undertaken within previous years. The main differences being that Serotine bats have not been recorded since the 2002 surveys, and whilst long-eared bat was not recorded during 2002 and 2004 it has subsequently been recorded in 2010 and 2013. Furthermore, Leisler's bat was only recorded in 2013, and not in previous surveys.

Table EDP 3.1: Summary of Bat Species Recorded in the Study Area During 2002 to 2013 Sampling Periods

	2002	**2004**	**2010**	**2013**
Common pipistrelle	✓	✓	✓	✓
Soprano pipistrelle	✓	✓	✓	✓
Myotis sp.	✓	✓	✓	✓
Noctule	✓	×	✓	✓
Serotine	✓	×	×	×
Long-eared sp.	×	×	✓	✓
Leisler's bat	×	×	×	✓

Evaluation

3.51 Detailed surveys have confirmed that the study area supports a typical assemblage of common and widespread bat species, which has not changed significantly throughout the period in which surveys have been undertaken. Despite the presence of good quality foraging habitats throughout the study area, the abundance of bats recorded was generally relatively low, which is considered to be a reflection of the study area's urban edge location and the resulting high levels of artificial illumination of habitats. In summary, the overall bat assemblage in the study area is considered to be of no more than local value.

Breeding Bird Surveys

Desk Study

3.52 Relatively few records of birds were returned by TVERC during the course of the desk study. Records of the following species were returned from within the study area, including the Red Listed common songthrush and Amber Listed kestrel, green woodpecker, dunnock, common whitethroat and kingfisher.

3.53 In addition to those records directly from the study area, records of Red List species pertinent to those habitats supported by the study area include the Red Listed grasshopper warbler, and Amber Listed willow warbler and common bullfinch.

Species Richness

3.54 A total of 37 species of bird were recorded within the study area during the three breeding bird survey visits. Of those, 23 (i.e. 62%) were confirmed as breeding, based on the behaviour that they exhibited during the survey visits. In addition, a further nine species (i.e. 24%) were recorded as possible breeders because direct evidence of breeding was not observed, but the species was found to occur within suitable habitat. The remaining 5 species (i.e. 14%) were regarded as non-breeders because they were not observed to display any territorial behaviour and/or because there was a lack of appropriate breeding habitat for them within the boundary of the study area.

3.55 Those species recorded during the survey that receive legal protection under Schedule 1 of the Wildlife and Countryside Act (1981), and those that are of conservation concern, in terms of being listed as UK BAP Priority Species or Red/Amber Listed Species of Conservation Concern are listed, along with their breeding status within the study area, in **Table EDP 3.2**. **Annex EDP 10** defines the breeding status within the study area, and provides further details on the on-site population (where possible) and distribution of each species recorded.

Table EDP 3.2: Legal Protection and Conservation Status of Birds Recorded During the Survey

Species	Schedule 1	UK BAP	Conservation Status	Status within Study Area
Barn owl (*Tyto alba)*	✓		Amber List	Non-breeder
Red kite *(Milvus milvus)*	✓	-	Amber List	Non-breeder
Song thrush (*Turdus philomelos*)	-	✓	Red List	Breeding
Starling (*Sturnus vulgaris*)	-	✓	Red List	Breeding
Cuckoo (*Cuculus canorus*)	-	✓	Red List	Possibly breeding
House sparrow (*Passer domesticus*)	-	✓	Red List	Possibly breeding
Dunnock (*Prunella modularis*)	-	✓	Amber List	Breeding
Bullfinch (*Pyrrhula pyrrhula*)	-	✓	Amber List	Breeding
Common whitethroat (*Sylvia communis*)	-	-	Amber List	Breeding
Green woodpecker (*Picus viridis*)	-	-	Amber List	Breeding
Willow warbler (*Phylloscopus trochilus)*	-	-	Amber List	Breeding
Mallard (*Anas platyrhynchos*)	-	-	Amber List	Possibly breeding
Stock dove (*Columba oenas*)	-	-	Amber List	Possibly breeding
Swallow (*Hirundo rustica*)	-	-	Amber List	Non-breeder
Swift (*Apus apus*)	-	-	Amber List	Non-breeder

Abundance

3.56 In terms of abundance, two breeding species were found to have confirmed on-site populations recorded in double-figures with a further five species possibly present in double figures. These species were comprised of both common resident passerines and migrant songbirds; wren (*Troglodytes troglodytes*) and common whitethroat both had populations of at least 10 pairs. The following species were also present in good numbers: blackbird (*Turdus merula*), dunnock, robin (*Erithacus rubecula*), black cap (*Sylvia atricapilla)* and chiffchaff (*Phylloscopus collybita)*. Common whitethroat, chiffchaff and blackcap are largely migrant species.

Distribution

3.57 In terms of distribution, it was clear that a greater assemblage and diversity of birds was present across the mosaic of habitats to the east of the brook. The variety of habitats present offers greater opportunities for nesting and foraging birds and for a wider range of species in comparison to the western Fields F13 and F14. Fields F13 and F14 do provide some foraging opportunities, but nesting sites are limited to the boundary habitats and the short section of Hedgerow H2. The fields to the west of the brook are more disturbed by humans, particularly dog walkers. The central and eastern sections of the study area are less disturbed due to the density of undergrowth, with the main footpath being used along the southern boundary of the study area.

3.58 The distribution of birds throughout the hedgerow network and areas of woodland to the east of the brook are rather heterogeneous. Some key areas of the study area in terms of both assemblage and frequency were noted in the semi-improved grassland fields which contain a high percentage of scrub and tall ruderal vegetation bounded by mature hedgerows and/or mature trees. These areas comprise of Fields F1, F4, F5, F6, F10, F11 and F12.

3.59 The following paragraphs evaluate the importance of 'breeding' and 'potentially breeding' species of conservation concern, together with the overall bird assemblage of the study area. The current national and local conservation status of the birds recorded during the survey, along with details regarding their breeding status and distribution, is detailed in **Annex EDP 10**.

Schedule 1 Species

Barn Owl

3.60 In relation to the survey work undertaken for barn owls, no direct evidence of barn owls nesting in the study area was recorded during the daytime assessments of mature trees or during the Breeding Birds Survey (BBS) surveys. However, due to their age and structure many of the mature trees in the study area, including those trees identified as having potential to support roosting bats, also have the potential to support nesting barn owls. Incidentally, during one of the great crested newt torchlight surveys on 4 June 2013 a pair of barn owls were flushed out of T2, a mature oak tree, located along Hedgerow H8. Subsequent inspection of the tree in daylight found no further evidence to confirm that barn owls were nesting in the tree, although it was considered that that nesting/roosting of barn owls in the tree cannot be ruled out.

3.61 The study area is also considered to support foraging opportunities for barn owls particularly in the drier areas of grassland which are likely to support a good abundance of small mammals as prey items.

3.62 Barn owl is considered a Schedule 1 bird species and an Amber List Species of Conservation Concern. Within Oxfordshire, Oxfordshire Ornithological Society (OOS)

consider the species an 'uncommon breeding resident.' Owing to the lack of direct evidence of barn owl nesting within the study area and only the single sighting of two individuals, the population of barn owls on the study area is considered of site value.

Red Kite

3.63 A single red kite was observed potentially foraging over the study area during the BBS, flying across Field F11. Red kite has also been observed flying over the study area during other ecological surveys. There is no evidence to suggest that this species was breeding on the study area in 2013, although suitable habitat in the form of mature trees is present and there is potential for this species to use the study area for nesting in the future. This species is now widely established across the county and birds will forage and nest close to residential areas. The population of red kites using the study area is therefore considered of site value.

Red List Species

Breeding Species

Starling

3.64 One pair of starlings was confirmed breeding within a cavity in a mature oak tree at the eastern end of Hedgerow H6, and the study area is considered likely to provide nesting opportunities for a greater number of pairs within cavities in mature trees. The study area also provides some foraging opportunities; a group of ten birds were seen aerial hawking for insects above Field F13.

3.65 Starling is a UK BAP species. OOS (2012) state that starlings are still a common resident across the county but recognise that there has been a decline in the breeding population. The on-site breeding population is considered of no more than local value.

Song Thrush

3.66 The study area provides both good nesting and foraging opportunities for song thrush through the mature hedgerow boundaries and strips of broadleaved. Between five and eight pairs of song thrush were recorded in the study area.

3.67 Song thrush is Red List for its long-term 'severe' decline in the UK breeding population (Eaton *et al*., 2009). The species is a UK BAP species. At a county level it is considered a common resident but the OOS speculate that there may be a decline of this species in sub-urban areas.

3.68 Due to the recognition of the habitats supported by the study area in the context of the local area, and the common status of the species locally, the population of the species recorded in the study area is considered of local value.

Possible Breeders

House Sparrow

3.69 House sparrow was seen across the study area, foraging and calling but no breeding was confirmed. Although suitable nesting habitat is present in the form of areas of hedgerow and scrub, the species is considered more likely to be nesting within adjacent residential properties, and the study area is considered more important as a foraging resource. A group of approximately eight birds recorded in and around Field F11 represents the greatest level of activity recorded in the study area, with smaller groups or pairs observed along the southern boundary of Field F6, foraging in Field F10 and in Hedgerow H10.

3.70 This species is Red List for its 'severe' decline (greater than 50%) in the UK breeding population over both the last 25 years, and also over the 'long-term' (since 1969) (Eaton *et al*., 2009). The species is afforded a UK BAP. Within Oxfordshire, house sparrows are considered an '*abundant resident*' though populations are showing a recent decline. From the BBS findings it is considered that the on-site population is of no more than local value.

Cuckoo

3.71 A single cuckoo was observed in Hedgerow H8 and heard calling just to the east of the study area during the same survey visit. The study area is suitable for this species in that it supports a good population of dunnocks (one of the preferred host species of cuckoos), although no evidence to confirm breeding was confirmed.

3.72 Nationally the species is Red Listed due to a breeding decline of more than 50% over the last 25 years as well as longer term decline observed since 1969. The species is also subject to a UK BAP. At a county level, the cuckoo is classed as a 'declining summer visitor'; the OOS (2012) recorded a total of 85 records across the whole county in 2008.

3.73 It is considered that the study area is suitable to support a low number of this species. Considering the decline of this species and the habitats available locally, the population of cuckoo in the study area is deemed of no more than local level.

Amber List Species

Breeding Species

Green Woodpecker

3.74 The on-site breeding population of green woodpecker is considered to be between one and two pairs. Birds displaying breeding behaviour were recorded within the woodland close to the railway embankment to the north of the study area. A bird was also recorded along Hedgerow H6.

3.75 The species is amber-listed due to being a 'Species of European Conservation Concern'. However, it is not considered to be of conservation concern within the UK and, on a regional level, OOS (2012) describe this species as a, '*fairly common resident*'. The population supported by the study area is assessed to be of no greater than site value.

Willow Warbler

3.76 During the BBS, two to four pairs of willow warblers were recorded across the study area, with birds observed in the eastern section of the study area within scrub and wooded areas.

3.77 Willow warbler is Amber List for its 'moderate' decline (between 25-50%) in the UK breeding population over both the last 25 years, and also over the 'long-term' (since 1969) (Eaton *et al.*, 2009). The OOS class the species as a '*common summer resident with evidence of a recent decline*'. Despite the decline, this species was still Oxfordshire's commonest breeding warbler in 2008. Considering the above, the on-site population is considered to be of no more than local value.

Common Whitethroat

3.78 Common whitethroat was one of the most numerous breeding species recorded in the study area, with an estimated 10-18 pairs. The mosaic of habitats present to the east of Langford Brook and the availability of dense scrub for nest sites makes the study area ideal habitat for this species.

3.79 The species is amber-listed due to recent moderate (i.e. 25-50%) declines in their UK breeding populations (Eaton *et al.*, 2009). Within Oxfordshire, it is considered to be a 'common summer visitor' OOS (2012) but there is no estimation of the number of pairs across the county. Due to the high numbers of pairs supported by a relatively small area of habitat the population of common whitethroats is considered to be of local to district value.

Dunnock

3.80 The study area provides good breeding habitat for dunnock, particularly with regard to the areas of dense scrub throughout the study area. The on-site breeding population was considered to be between 7 and 14 pairs.

3.81 Dunnock are an Amber List species owing to recent moderate (i.e. 25-50%) declines in their UK breeding populations (Eaton et al., 2009). Within Oxfordshire, OOS (2012) maintain the species to be a 'common and widespread resident'. It is therefore considered that the study area supports a population of local value.

Bullfinch

3.82 At least one pair of bullfinch is considered to have nested in the study area along the central Hedgerow H6. Bullfinch are quite a secretive species and it can be hard to get accurate estimations of breeding pairs. The study area is very suitable for this species which prefers habitats with large areas of scrub so it is likely that the on-site population is greater than one pair. The central and eastern sections of the study area also provide a good foraging resource for this species.

3.83 Bullfinch are a UK BAP species and are also Amber Listed due to recent moderate declines in populations. They are classed as a '*common resident*' in the county. The on-site population of this species recorded is considered of no more than local value.

Possible Breeders

Mallard

3.84 Mallard was only seen in the study area during the BBS during the April visit. The study area does not support optimal habitat for this species to nest, but there is some limited potential along Langford Brook and water bodies across the study area.

3.85 Mallard is Amber List for its 'moderate' decline (between 25-50%) in its UK non-breeding population size (i.e. wintering population) over both the last 25 years and also over the 'long-term' (since 1969) (Eaton *et al*., 2009). OOS (2012) describe mallard as a '*very common resident* '. The population of mallard recorded in the study area is considered to be of site value.

Stock Dove

3.86 A single stock dove was recorded singing along Hedgerow H6. The only other observation was of a pair of birds foraging in Field F13.

3.87 Stock dove is Amber List as a result of at least 20% of the European breeding population being found in the UK (Eaton *et al*., 2009). At a county level, OOS (2012) consider this species to be a '*numerous resident'*. The population of stock dove recorded is considered of no more than site value.

Non-breeding Species of Conservation Concern

Amber List

Swifts and Swallows

3.88 For both species, only single birds were seen on one occasion. One swift was seen flying over Field F2 on visit 3 and one swallow was seen over Field F1; both appeared to be foraging. As both species use buildings for breeding, there is no suitable nesting habitat

available in the study area. Overall, the study area seems to be of low value for these species.

The Overall Assemblage

3.89 The assemblage of breeding bird species recorded at the study area is considered to be typical for the range and quality of habitats present, and for its geographic and topographic location. Despite the study area's location within a relatively urban/residential area, the study area supports a range and abundance of species more commonly associated with wider areas of countryside. For its size and location, the study area supports a relatively high diversity of species owing to the range of semi-natural, largely undisturbed habitats present, though it is recognised that many of these species are common and widespread in the local area.

3.90 Due to the mosaic of habitats within a small area, the study area supports good numbers of migrant songbirds such as common whitethroat, blackcap, chiffchaff and, as part of this 'migrant assemblage', small numbers of willow warbler (*Phylloscopus trochilus)* and lesser whitethroat (*Sylvia curruca).* Many of these species will also be present on the surrounding farmland but are unlikely to be present together over a similar area in the numbers found in the study area.

3.91 No Schedule 1 bird species have been recorded breeding in the study area and indeed only 2 Red Listed species were confirmed to be breeding during the BBS. However, as discussed previously, the diversity, and abundance of some species of conservation concern in a study area of this size is of note, particularly in a relatively urban setting and a number of bird populations of local value have been recorded. The breeding bird assemblage in the study area is therefore considered to be of no more than district value.

Winter Bird Surveys

3.92 The results of the six wintering bird surveys undertaken to date are summarised below and provided in detail in **Annex EDP 11**, including the species conservation status (both locally and nationally), their abundance and their on-site distribution.

3.93 A total of 42 species of bird were recorded within the study area including twelve notable species that either receive legal protection under Schedule 1 of the Wildlife and Countryside Act (1981) or are of conservation concern, in terms of being listed as UK BAP Priority Species or Red/Amber Listed[16] Species of Conservation Concern, as summarised in **Table EDP 3.3**.

[16] Eaton et al *Birds of Conservation Concern 3: the Population and Status of Birds in the United Kingdom, Channel Islands and the Isle of Man*, British Birds, 102, Pages 296-341 (2009)

Table EDP 3.3: Legal Protection and Conservation Status of Birds Recorded during the Survey

Species	Schedule 1 WCA (1981)	UK BAP	Conservation Status
Fieldfare *(Turdus pilaris)*	✓	-	Red List
Redwing *(Turdus iliacus)*	✓	-	Red List
Red kite *(Milvus milvus)*	✓		Amber List
Reed Bunting (*Emberiza schoeniclus*)	-	✓	Red List
Linnet (*Carduelis cannabina*)	-	✓	Red List
Starling (*Sturnus vulgaris*)	-	✓	Red List
Song thrush (*Turdus philomelos*)	-	✓	Red List
House sparrow (*Passer domesticus*)	-	✓	Red List
Dunnock (*Prunella modularis*)	-	✓	Amber List
Bullfinch (*Pyrrhula pyrrhula*)	-	✓	Amber List
Snipe (*Gallinago gallinago*)	-	-	Amber List
Black headed gull (*Chroicocephalus ridibundus*)	-	-	Amber List
Common Gull *(Larus canus*)	-	-	Amber List
Woodcock (*Scolopax rusticola*)	-	-	Amber List
Mistle thrush (*Turdus viscivorus*)	-	-	Amber List
Green woodpecker (*Picus viridis*)	-	-	Amber List

3.94 A relatively diverse range of species were recorded in the study area reflecting the variety of habitats that are present. In addition to common generalist species and winter migrants, a small number of more 'specialist' notable farmland, wetland and woodland species were also recorded in low numbers, namely red kite, linnet, reed bunting, black-headed gull, common gull, snipe and woodcock.

3.95 The majority of species were recorded regularly across the survey visits however numbers of certain species fluctuated significantly reflecting their migratory and/or gregarious flocking nature. The highest species counts related to flocks of over wintering redwing (peak count approximately 75 over one survey visit) and common residents which consistently returned double figure counts per survey, including, in order of prevalence, woodpigeon, blackbird, blue tit, magpie, great tit, crow and robin.

Flocks of up to 19 black headed gulls were also recorded while records of pied wagtail and fieldfare ranged from none to eight and eleven respectively, reflecting the transient behaviour of these species over winter.

3.96 The distribution of records and species reflects the diversity and extent of habitats in the study area and the foraging/shelter opportunities that they provide. The most notable of these include the dense fruit bearing hawthorn and blackthorn scrub bounding the fields within the centre of the study area and along the southern boundary which were found to support mixed flocks of overwintering thrushes (e.g. redwing, fieldfare, song thrush, mistle thrush and blackbird) and small groups of finches (e.g. bullfinch, chaffinch, goldfinch, greenfinch and linnet). In addition, the arable field within the study area's western extent (Field F13) also supported foraging flocks of redwing, black headed gull and pied wagtail while the grassland fields and woodland provide foraging opportunities for a variety of species. Most notably this included a single woodcock flushed from the roughly the same location in Field F12 on 3 out of the 6 visits and two snipe from Field F3 on the fifth visit. Urban species such as starling and house sparrow were predominantly recorded flying over the study area or along the southern boundary associated with the nearby residential gardens and housing while the raptors (buzzard, red kite and sparrowhawk) were only recorded on a small number of occasions hunting adjacent to the railway line along the study area's northern boundary.

Red List Species

3.97 Of the Red Listed species only redwing, fieldfare and song thrush were recorded consistently across the surveys in association with the dense fruit bearing scrub habitat bounding the fields throughout the study area and the arable field within the study area's western extent. The majority of the thrush flocks recorded comprised of redwings, including a flock of approximately 50 birds foraging within the arable field on the fourth visit. Fieldfares and song thrushes were recorded in smaller groups or individually with a peak count of 7 and 8 birds respectively. The numbers within these winter flocks dropped off markedly on the final two visits. Both redwing and fieldfare are listed on Schedule 1 of the WCA and the Red List of birds of conservation concern owing to the small and restricted breeding population present within the UK. They are, however, common winter visitors and passage migrants both locally and nationally and as such the wintering populations recorded are considered to be of only local value. Song thrush has been Red-Listed and is subject to its own BAP owing to a significant decline in population over the last 50 years, however, it is considered to be a common resident in Oxfordshire and the numbers recorded are not considered to be significant within more than a local context.

3.98 Four other Red List species were sporadically recorded in the study area in low numbers including: linnet on three occasions (max count 3 birds); reed bunting on two occasion (3 and 2 birds); starling foraging within Field F8 and flying over the study area (max count 20 birds); and house sparrow on three occasions. All of these species are considered to be common residents in Oxfordshire and the habitats present are therefore only considered to be of site to local level value to these species in winter.

Amber List Species

3.99 All of the amber-listed species recorded in the study area, with the exception of snipe, woodcock, black-headed gull and common gull, are common year-round residents which were also recorded during the breeding bird surveys and have been evaluated accordingly. Bullfinch was the only species recorded in significantly higher numbers during the winter surveys (max total count of 13 on any survey) which may reflect their inconspicuous nature making them harder to record when trees are in leaf and/or an additional influx of birds in winter owing to the rich foraging opportunities afforded by the scrub habitat in the study area. The habitats in the study area are therefore considered to be of local importance to this species in winter.

3.100 Two snipe were flushed from the wet depressions within Field F3 on a single occasion and it is likely that the study area is sporadically used by this species for foraging in winter. However, given the recreational use of the study area by dog walkers and limited extent of suitable marshy grassland habitat, the study area is not considered to be of significant value to this common resident and winter visiting species.

3.101 A single woodcock was flushed on three occasions from marshy grassland and encroaching scrub habitat located at the eastern end of Field F12. Woodcock is Amber Listed due to it being a species of conservation concern in Europe, however, it is common and widely distributed in the UK and there is known to be an over wintering population in Oxfordshire. The scrub, woodland and marshy grassland in the study area is therefore considered to be at most of local importance to this species.

3.102 Flocks of black-headed gulls were recorded on three of the visits foraging within the arable field around areas of inundation with a maximum count of 19 birds. A single common gull was recorded in the same field on the fourth visit. Both of these species although experiencing non breeding population declines in recent times, hence their amber listing, are common winter visitors in Oxfordshire and the arable habitat utilised for foraging is considered to be of at most local level importance to this species in winter.

Over Winter Assemblage

3.103 The winter bird assemblage supported by the study area is considered to be relatively typical of an urban edge locality in lowland England being biased towards common generalist resident species and common winter migrants. However, owing to the quality of winter foraging afforded by the habitats present, in particular the dense fruit bearing scrub habitat, the species present are generally in relatively high abundance. The unmanaged, and relatively undisturbed areas (in the field centres) of the sward within the large semi-improved grassland fields immediately to the east of Langford Brook (Fields F11 and F12) were found to support a greater number of foraging birds than those managed grassland fields elsewhere in the study area (Fields F3, F8 and F9). A small number of species that would be more readily associated with the wider countryside are also present in low numbers reflecting the diversity but limited extent of

habitats within the study area. While none of the species recorded are considered to be of significant ecological value at more than a local level, given the urban context of the study area and the relative diversity and abundance of species recorded the overall wintering bird assemblage is considered to be of local value.

Updated Great Crested Newt Survey

Desk Study

3.104 The updated desk study returned 9 records from 2003 of great crested newts from a location at pond P9 as shown on **Plan EDP 3**.

Field Surveys

3.105 The findings of the 2013 survey are set out in **Annex EDP 12** and a summary of the data compared to the previous surveys undertaken as discussed at paragraph 2.43 is summarised in **Table EDP 3.4**.

Table EDP 3.4: Comparison of the 2002 to 2013 Great Crested Newt Surveys

Pond	**Great crested newts**				
	2002	**2004**	**2010**	**2012**	**2013**
P1	0	1	1	2	4
P2	2	1	2	2	2
P3	2	10	0	No access	
P4	3	9	5	3	1
P5	0	1	1	3	1
P6	4	3	6	3	5
P7	-	-	-	26	65
P8	-	-	-	0	0
P9	-	-	-	24	5
P10	-	-	-	0	0
P11	-	-	-	26	22
Channel	4	1	-	0	Dry
Total Site Count	**15**	**26**	**15**	**89**	**105**

3.106 In comparison with earlier survey efforts applied to the study area, the 2012 and 2013 surveys comprised a greater number of ponds (including those off-site ponds located within 250m of the study area boundary). The overall population of great crested newts increased significantly between the 2010 and 2012 sampling periods, which is considered to be a factor of the above. However, comparison between 2012 and 2013 surveys shows that, at the meta-population level (inclusive of all ponds), there has been an increase in the 'total site count' of great crested newts from a peak count of 89 ('*medium population'*) in 2012 to 105 ('*large population'*) in 2013.

3.107 The peak count of great crested newts recorded at individual ponds within the study area in 2013 has not changed significantly from that recorded in 2012, suggesting that, despite any apparent evidence of management, ponds in the study area remain of value as aquatic habitats. Indeed, during 2013 great crested newts were recorded in each of the on-site ponds. Although great crested newt eggs were only found within ponds P1 and P2 on-site, it is considered that all ponds in the study area are breeding ponds.

3.108 With respect to those ponds located outside of the study area surveyed in 2013, a significantly greater number of great crested newts were recorded in pond P7 along with a reduction in the number within pond P9. This is considered to be partly due to the continued declining quality, and habitat suitability, of pond P9 as opposed to pond P7.

3.109 The population of great crested newts supported by the study area is considered of district value.

3.110 In addition to the records of great crested newts gathered as discussed above, those ponds surveyed were found to support a number of smooth newts, and some palmate newts. A summary of the populations recorded throughout the 2002 to 2013 sampling periods is provided in **Table EDP 3.5**.

Table EDP 3.5: Comparison of the Results of the 2002 to 2013 Great Crested Newt Surveys in Respect of Smooth Newt and Palmate Newt

Pond	**Smooth Newt**					**Palmate newt**				
	2002	**2004**	**2010**	**2012**	**2013**	**2002**	**2004**	**2010**	**2012**	**2013**
P1	1	7	9	11	6	0	0	1	0	0
P2	1	3	1	5	0	0	0	0	0	0
P3	3	5	0	No access		0	0	0	No access	
P4	9	12	3	4	3	0	0	0	0	0
P5	35	10	21	2	4	0	0	0	0	0
P6	8	9	18	14	6	0	0	1	0	0
P7	-	-	-	3	1	-	-	-	0	0
P8	-	-	-	0	0	-	-	-	0	0
P9	-	-	-	6	1	-	-	-	0	0
P10	-	-	-	0	4	-	-	-	0	0
P11	-	-	-	2	4	-	-	-	0	0
Channel	4	2	-	3	Dry	2	0	-	0	Dry
Total Site Count	**61**	**48**	**52**	**50**	**29**	**2**	**0**	**2**	**0**	**0**

Updated Reptile Survey

Desk Study

3.111 No records of reptiles were returned by TVERC during the 2013 updated desk study. Common lizards (*Zootoca vivipara*) were observed on site by a member of the public on at least two occasions on 2 June 2013 and 16 August 2013. A grass snake (*Natrix natrix*) was also sighted on the same visit on 2 June 2013.

Field Surveys

3.112 Reptile surveys undertaken throughout the study area confirmed the presence of common lizard and grass snake. Full details of the number of individuals of each reptile species recorded within each of the fields surveyed within the study area are given in **Annex EDP 13**. The distribution and abundance of the reptiles recorded are discussed in detail below, and should be read in conjunction with **Plan EDP 10** which illustrates the reptile survey results in terms of the relative importance of individual fields with respect to widespread reptiles.

Common Lizard

3.113 Common lizards were widely distributed across the study area being recorded within every field to the east of Langford Brook. However, the relative abundance of common lizards varied throughout the study area. Fields F1, F7, F11 and F12 supported the greatest abundance of common lizards and are considered of high importance to the population supported by the study area. These fields show no sign of management over several years and are subject to very low levels of disturbance. Field F1 has an informal footpath along its northern boundary, as do Fields F11 and F12 along their western and eastern boundaries. The field centres however show evidence of public disturbance which is considered to be a major contributing factor to the high numbers of common lizards recorded within these fields. Fields F1 and F7 support a relatively low, open sward which significantly increases UV penetration to the ground thus favouring basking and foraging reptiles. Conversely, Fields F11 and F12 are dominated by tall growing grasses and ruderal species, resulting in a well-developed 'thatch' layer from previous year's fallen growth, which is considered to provide an invertebrate rich food source for common lizards to predate.

3.114 The following fields supported a lower abundance of common lizards but were still considered of relative medium importance due to the presence of peak survey counts of between 5 to 20 common lizards: Fields F3, F5, F6, F8, F9 and F10. The lowest abundance of common lizards was recorded within Field F2 which is considered due to the frequent flooding of this field, and the density of scattered trees and scrub as illustrated on **Plan EDP 1** which significantly reduces light levels in the field.

Grass Snake

3.115 The distribution of grass snakes within the study area was poor; no sightings of grass snakes were made within many of the fields surveyed, with only Fields F1, F5, F8, F11 and F12 found to support grass snakes. However, given the mobility, and large home range, of this species it is considered likely that the species would use many of the other fields within the study area also at certain times of the year. Certainly, owing to the grass snake's diet, which consists primarily of common frogs, it is likely that the species would forage across the whole study area as all of the fields are subject to seasonal flooding and can support sufficient aquatic resources to support common frogs, and other amphibians.

3.116 In terms of abundance, grass snakes were recorded only in low numbers within the study area, which is partly considered due to the low population size of this species in general. The peak survey count of grass snakes was recorded within Field F12 suggesting this is of greater importance for the species, although the peak count was only higher than Fields F1, F5, F8 and F11 by one individual. Of note is the presence of grass snakes within Fields F1, F11 and F12 which were also found to be of importance to common lizards as discussed above.

Evaluation

3.117 The survey effort applied to the study area during the 2013 update reptile survey was designed to include a sufficient number of survey visits to estimate the population size of the species recorded, based on peak survey counts (as discussed in **Section 2**). The peak survey count of common lizards recorded across all twenty visits was 146, which represents a *large population*. The peak survey count of grass snakes was three, representing a *small population*. Within the wider context of the study area, the population of widespread reptiles present is considered to be of district level importance.

Updated Badger Survey

3.118 [redacted]

3.119

3.120 [redacted]

Water Vole Survey

Desk Study

3.121 The 2013 desk study returned four records of water vole within 2km of the study area, the nearest record, dated 2000, being immediately north of the northern boundary of the large arable field located to the west of Langford Brook (Field F13).

Field Surveys

3.122 No evidence of water vole activity was recorded during the detailed survey for this species. The following paragraphs detail observations made on the section of Langford Brook within the study area subject to survey in relation to its potential to support water voles.

3.123 The brook is a relatively small stream flowing north to south through the centre of the study area. The ditch contains steep sides and areas of scrubby vegetation, with some mature trees which have exposed root systems close to the watercourse. The vegetation along the banksides varied greatly from areas which were almost entirely bare soil, to grassy banks and some areas of more ruderal vegetation. Water voles prefer sites with wide swathes of riparian vegetation[17] and as such the conditions along the ditch are considered unfavourable.

3.124 Furthermore, despite the suitability of the banks for burrow excavation, the majority of the banks lacked sufficient vegetation cover and were heavily shaded. The northern end of the Brook was found to be culverted under the railway embankment. It was considered that the ditch may be prone to seasonal drying out, or low water depth, at certain times of the year. The preferred water depth for water voles is approximately 1m which suggests that the ditch would not support suitable water depth throughout the breeding season, and as such the likelihood of the ditch supporting a breeding population is heavily reduced.

Otter Survey

Desk Study

3.125 No records of otters were returned from TVERC in the updated desk study.

[17] Strachan, R. et al. (2011) *Water Vole Conservation Handbook Third Edition*. Abingdon, UK

Field Surveys

3.126 The walkover survey concluded that the areas of dense scrub, woodland and rough grassland to the east of the brook may be of interest to otters 'lying up' during the day. In addition, the Brook was considered to offer some suitable foraging opportunities for otters but this would be dependent on the presence of a sufficient fish stock.

3.127 No direct evidence of otters was identified during the walkover survey and otters were not considered to offer a constraint to the development of the study area.

Harvest Mouse Survey

Desk Study

3.128 No records of harvest mouse were returned by TVERC during the 2013 updated desk study.

Field Surveys

3.129 The study area is considered to support suitable habitat for harvest mice throughout. The presence of large areas of tall, unmanaged grassland with a significant scrub interface including dense patches of bramble interspersed with grassland provides an abundance of suitable habitats for foraging and nest building harvest mice.

3.130 The detailed hand search of the study area, as discussed in paragraph 2.59, found four harvest mouse nests in the following locations (field numbers represent those illustrated on **Plan EDP 1**):

i. South-east corner of Field F13;

ii. Along the southern boundary of Field F11;
iii. On the eastern boundary of Field F10; and

iv. In the south-west corner of Field F1.

3.131 Although only a small number of harvest mouse nests were recorded, it is considered that, as discussed above, the study area supports an abundance of suitable habitats and as such it is expected that harvest mice would be present throughout the study area. Particular fields considered to be of value to harvest mice include those fields supporting rough tussocky grassland, uncut fields, and particularly those interspersed or bordered with scrub, as such habitats are favourable to harvest mice[18].

[18] Creswell, W. J. *et al.* (2012) UK BAP Mammals. Interim Guidance for Survey Methodologies, Impact Assessment and Mitigation. Southampton, UK

Invertebrates

3.132 The study area supports a varied mosaic of grassland, woodland, scrub and edge habitats that combine to satisfy the multiple requirements of a wide range of invertebrate species.

3.133 No invertebrate species that are afforded direct legal protection under any UK or European legislation were encountered during the survey. Full details of the notable species recorded during the 2013 detailed invertebrate survey are provided within the attached invertebrate survey report (**Annex EDP 4**).

3.134 Overall it is considered that the invertebrate species assemblage supported by the study area is of regional value.

3.135 Specific discussion of the value of the study area for butterflies is provided below.

Butterflies

3.136 A number of records of relatively common and widespread butterfly species have been submitted to EDP via a local resident as detailed in full in **Annex EDP 1**. In addition, a single record of grizzled skipper (*Pyrgus malvae*) from within the study area has been submitted.

Marsh Fritillary

3.137 No marsh fritillary larval webs have been found in any parts of the study area during the annual larval web searches undertaken between 2006 and 2013. No adults were recorded during the targeted survey in 2013.

3.138 During the course of the annual larval web searches it was noted that the habitat quality for the marsh fritillary was deteriorating owing to vegetation succession in the absence of any management. The devil's bit scabious (primary larval foodplant) had disappeared from some parts of the study area where it was recorded in the early years of monitoring, having been shaded out by surrounding vegetation. In addition, where stands of the food plant persist, these are becoming increasingly overgrown with coarse grasses and bramble and, as a result, the basal leaves are less accessible to egg-laying females.

<u>Evaluation</u>

3.139 No evidence of marsh fritillary has been recorded within the study area since 2005, and the deterioration of habitat quality reduces the likelihood of natural colonisation. In addition, no additional records of this species have been identified within a 15km radius of the study area during the course of the updated desk study. It is therefore considered highly unlikely that population of this butterfly persists at the study area.

Brown Hairstreak

Records Collation

3.140 The brown hairstreak records for the study area received from the BC UTB are included in **Annex EDP 14** to this report and summarised below.

3.141 BC UTB's most comprehensive search of the study area for brown hairstreak eggs was undertaken during winter 2010/2011. The results of this search are detailed within **Annex EDP 14**, and summarised graphically on **Plan EDP 12**. The search found eggs in many of the hedgerows and blackthorn scrub in the eastern half of the study area, with 478 eggs recorded during 40hrs of search effort. The highest egg count for one hedgerow section was 91, recorded along the southern edge of the scrub band which forms the northern boundary of Field F10 (see **Plan EDP 12**). Comparisons with previous years are not straightforward, as the study area coverage and survey effort during previous searches was different, however there is a strong indication that the numbers of eggs present increased significantly over the period 2005-2010.

3.142 Adult sightings are rare, however between 2005 and 2010 three sightings of adult brown hairstreaks were made by recorders from BC UTB. Their locations and dates are detailed within **Annex EDP 14**, and illustrated on **Plan EDP 12**.

3.143 A member of the public recorded brown hairstreak within the study area on three occasions in 2013 including a female in the process of laying eggs and a caterpillar, which was confirmed by a member of BC UTB. These records were subsequently submitted to BC UTB, and are included within **Annex EDP 1**.

Egg Search

3.144 During the 2013 egg search, a total of 8 brown hairstreak eggs were recorded in four different blackthorn stands. The full details of the search, including minutes of survey effort, are provided in **Table EDP 3.6**, which should be read in conjunction with **Plan EDP 11** showing the search areas.

Table EDP 3.6: Summary of Brown Hairstreak Egg Search 2013

Blackthorn Patch ID (ref Plan EDP 11)	Total Survey Effort (Minutes)	No. Eggs Found
A	20	1
E	30	2
F	20	0
G	40	2
I	20	0
M	20	0
N	20	0
P	10	0
R	5	2

Blackthorn Patch ID (ref Plan EDP 11)	Total Survey Effort (Minutes)	No. Eggs Found
S & T	30	0
V	30	0
W	40	1

3.145 The findings of BC UTB's brown hairstreak egg search during winter 2010/11 confirm that the study area supports a strong colony of this species. Eggs were found in low numbers in many of the hedges and in moderate to high numbers in a smaller number of hedges. The abundance of young unmanaged blackthorn, together with mature trees (particularly ash and oak and nectar sources), within the study area provide optimal conditions for adults, eggs and larvae of the species.

3.146 It is not possible to compare the results of the 2013 egg search with the collated records due to the differences in sampling and surveyor effort; however the 2013 survey findings confirm the presence of the breeding colony. The abundance of eggs (and size of colony) is likely to fluctuate significantly from year to year depending on the weather conditions experienced during the preceding summer (i.e. during the adult flight period). It is likely that the poor/wet summer in 2012 reduced breeding success resulting in lower egg numbers the following winter, however conditions in the study area continue to be suitable and numbers may have recovered following the warm summer in 2013.

Evaluation

3.147 Brown hairstreak is a UK BAP priority species owing to its population decline. The strong colony present within the study area, which appears to have expanded in recent years as the area has fallen into neglect, is considered to be of value at the county level.

Black Hairstreak

Records Collation

3.148 Between 2006 and 2010 recorders from BC UTB made eleven sightings of adult black hairstreaks. Their locations and dates are detailed within **Annex EDP 14**, and illustrated on **Plan EDP 12**. Eight of these eleven sightings were made near the scrub band at the eastern end of Field F12 (see **Plan EDP 12**). No records of black hairstreak eggs were reported.

Egg Search

3.149 No black hairstreak eggs were recorded during the 2013 brown hairstreak egg search.

Adult Searches

3.150 During the 2011 survey, one possible black hairstreak was observed on 5 July 2011 (at approximately 12.55hrs) between the two sections of blackthorn patch D (see **Plan EDP 11**). The butterfly was small and dark and is considered to have been either

black hairstreak or white-letter hairstreak. The butterfly flew briefly over the blackthorn and then disappeared into a young elm tree *(Ulmus* spp.) before it could be identified. This behaviour suggests it is marginally more likely to be white-letter hairstreak, which breeds on elm, however this cannot be taken as definitive.

3.151 No black hairstreak butterflies were recorded during the three targeted surveys in 2013; however two adults were recorded during the first white-letter hairstreak adult search on 30 June 2013. Both butterflies were seen beside a large ash tree on the western boundary of Field F9 (see **Plan EDP 14**).

3.152 It is not possible to reliably estimate the size of the black hairstreak population supported by the study area based on the available data. However, the 2013 survey findings provide confirmation of continued presence and, taken with 11 further adult sightings between 2006 and 2010, suggest that a relatively stable breeding colony is present although no eggs have been found. Of the total of 13 known sightings, 10 of these were in close proximity to the large scrub band dividing Fields F12 and F13 from Field F9, suggesting this is a key habitat area for the species.

Evaluation

3.153 While not a UK BAP priority species, the black hairstreak has a very restricted distribution in the UK and Oxfordshire and is at the western edge of its range. In this context the supported by the study area is considered to be of value at county level.

White-letter Hairstreak

Elm Assessment and Egg Searches

3.154 **Table EDP 3.7** summarises the findings elm assessments and white-letter hairstreak egg searches undertaken in 2011 and 2013. These findings, together with the locations of the sample areas (A-P), are illustrated on **Plan EDP 13** and **14**.

Table EDP 3.7: Summary of White-Letter Hairstreak Elm Assessment and Egg Searches

Sample Area (Plan EDP 13 & 14)	Elm Group Size*	No. Elms (2013)	Elm Quality (2013)	No. Eggs Found (2011)	No. Eggs Found (2013)
A	L	16	Moderate	0	0
B	SG	1	Good	2	3
C	L	2	Poor	0	0
D	L	25	Moderate	4	0
E	L	9	Good	1	1
F	L	15	Moderate	0	1
G	L	23	Good	6	2
H	SG	2	Good	0	1
I	SG	7	Moderate	3	0
J	L	20	Moderate	0	0
K	L	14	Moderate	2	0

Sample Area (Plan EDP 13 & 14)	Elm Group Size*	No. Elms (2013)	Elm Quality (2013)	No. Eggs Found (2011)	No. Eggs Found (2013)
L	L	12	Poor	0	0
M	L	12	Moderate	1	0
N	L	5	Poor	0	0
O	SG	5	Moderate	1	0
P	LG	Not surveyed		5	Not surveyed
			Total:	**25**	**8**

* *Elm group size*: SG = Small Group (2-9); LG = Large Group (>9); L = Large Linear Groups

3.155 The 2013 assessment found most elms within the study area to be of sufficient quality to support white-letter hairstreak. The majority of elms were in large linear groups. All eggs found in 2013 were recorded on elms of good or moderate quality. The eggs were located in five (33%) of the surveyed sample areas (A – O), compared to nine sample areas in 2011. However eggs were recorded in two sample areas (H and F), where they were not recorded in 2011. Eggs were not found in sample areas D, I, K, M or O where they were recorded in 2011.

Adult Searches

3.156 Four white-letter hairstreak adults were recorded in three sample areas (A, E and G) on the 11 and 20 June 2013 (see **Plan EDP 14**). No eggs had been recorded in section A but elms were of sufficient quality for egg laying.

3.157 Overall, eggs and adults have been found in eleven (69%) of the sample areas around the study area in during 2011 and 2013. This suggests a relatively strong and stable breeding colony of the species is present.

Evaluation

3.158 White-letter hairstreak is a UK BAP priority species owing to its population decline but is still relatively widespread in England and Wales. The colony present within the study area is considered to be of value at the district level.

Small Heath

3.159 A member of the public recorded small heath in June 2013, as detailed in **Annex EDP 1**.

3.160 No small heath butterflies were observed in the study area during any of the surveys in 2011. However, a total of 5 adults were recorded during the 2013 surveys, as detailed in **Table EDP 3.8** and illustrated on **Plan EDP 11**.

Table EDP 3.8: Summary of Small Heath Adult Searches 2013

Survey Date	No. Adults Seen	Location
18.06.13	1	Boundary between Fields 11 and 12 (gap at western end
19.06.13	1	Eastern edge of Field F12
	2	Centre of Field F9
26.06.13	1	Eastern edge of Field F12
05.07.13	0	-

3.161 The lack of recordings in 2011, and small numbers recorded in 2013 (a 'peak adult count' of 3), suggest that a relatively small population is present. Based on the availability of suitable breeding habitat within the study area, together with a general lack of suitable habitat in the immediate surroundings, it is likely that the species is breeding within the study area.

Evaluation

3.162 Small heath is a UK BAP priority species owing to its population decline but is still relatively widespread in the UK. The seemingly small colony present within the study area is therefore considered to be of value at the district level.

Night-flying Macro and Micro Moth Survey

3.163 Local resident's records of moths supplied to EDP, as provided in full in **Annex EDP 1**, included two species of moth listed as Species of Principal Importance under Section 41 of the NERC Act, namely latticed heath (*Chiasmia clathrata*) and blood vein (*Timandra comae*).

3.164 Full detailed results of overnight moth trapping undertaken within the study area are discussed in **Annex EDP 5**.

3.165 In total, 293 species of moth were recorded within the study area over the survey period comprising 174 macro moths and 119 micro moth species.

3.166 Of the species recorded, the following are considered noteworthy in terms of their conservation status:

- 24 species listed as Species of Principal Importance under Section 41 of the NERC Act (2006);
- One species of micro moth the Bulrush veneer (*Calamotropha paludella*) currently classified under the Nationally Scarce B category on the JNCC Taxon Designations spreadsheet (JNCC, 2014);

- A species of micro moth (*Mompha lacteella*) formerly listed as proposed Nationally Rare (pRDB3) has been revised in a 2012 review of the status of microlepidoptera in Britain (Davis, 2012), but is awaiting formal approval;

- Two species of micro moth Willow ermine (*Yponomeuta rorrella*) and Leek moth *(Acrolepiopsis assectella*) had been proposed (post 1984) as being Nationally Rare (pRDB3), but have been putatively revised to Nationally Local in Davis (2012); and

- 49 species (51 if willow ermine and leek moth are included) classed as Nationally Local in the UK.

3.167 In terms of Invertebrate Species-Habitats Information System (ISIS) analysis, as stated by Mellings (2014) (see **Annex EDP 5**), the following Broad Assemblage Types (BATs) were identified as comprising more than "*the requisite number of species needed to exceed the threshold of 15 species required for Rarity Scores, which are subsequently used to assess Favourable Condition Status, to be assigned*": 'Arboreal Canopy' and 'Grassland and Scrub Matrix'. However, neither BAT was sufficiently valuable to achieve 'Favourable Condition Status' in the context of SSSI monitoring standards. 'Arboreal Canopy' was the most represented Broad Assemblage Type within the study area implying that a large number of the macro moth species recorded are associated with tree and scrub species, which would provide moths with larval foodplants.

3.168 Furthermore, two Specific Assemblage Types (SATs) were identified as comprising more than the threshold of 15 species as discussed above: 'Epiphyte Fauna' and 'Reedfen and Pools'. The Epiphyte Fauna SAT achieved a sufficiently high Rarity Score such that if it was set as a feature or attribute of an SSSI it would achieve the 'Favourable Condition Status.'

3.169 Overall, taking into consideration the species recorded and the ISIS analysis as summarised above, the moth species assemblage present within the study area is considered of regional value.

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Annex EDP 1
Thames Valley Environmental Records Centre
Data Return & Local Resident Records

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