

Protected Species Advice Document



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Appendix 1

NERC Act Section 40 Species

Revised 07/01/11

Part 1 Legislation, Policy & Guidance

1.0 Introduction - Species Conservation

- 1.1 Many species of animal and plant are subject to legal protection and in some cases this extends to their habitat and to disturbance while they are using that habitat. Other species are identified as priorities for conservation nationally, regionally or locally through Biodiversity Action Plans and through legislation that requires public authorities to take account of, or further, their conservation. The presence of a protected species is a 'material consideration' when a planning authority is considering a development proposal that, if carried out, would be likely to result in harm to the species or its habitat.
- 1.2 This document provides guidance on means of complying with legal provisions when carrying out work that might affect a protected species or its habitat and on how protected and priority species should be taken into account in the development control process.
- 1.3 It is essential that the presence or otherwise of protected species, and the extent that they may be affected by the proposal is established before planning permission is granted or development proceeds. It is also important to establish whether protected species may be affected by project at an early stage to allow this to inform project planning, timescales and design. Protected species need to be considered not only when they are known to be present on a site, but also when their presence is likely. Ecological survey and the incorporation of conservation advice early in the project planning stage helps in avoiding conflicts and potentially costly delays and allows the requirements of protected species to be incorporated into project design.
- 1.4 Survey(s) should be completed, impact assessments carried out and any necessary measures to protect the species and its habitat incorporated into a scheme before preparation of final plans and/or permissions are sought. Where possible, the proposals should include measures to enhance the environment for protected species or other elements of biodiversity.
- 1.5 Options for protection of species and their habitat should be considered in the following order of preference:
1. Avoidance of impact
Consideration of alternative location, layout and design.
 2. Mitigation*
This means conservation *in situ* by means of project design, timing and management.
 3. Compensation*
This often means conservation by species translocation, usually preceded by habitat creation or enhancement at the receptor site
- *NB. These two terms are often misused or misapplied

- 1.6 In the case of species protected by the Conservation of Habitats & Species Regulations 2010, it must be demonstrated that alternatives that involve avoidance of damage have been considered, that the project will not have an adverse effect on the species' population, and that the project involved is of environmental as well as social and economic benefit.
- 1.7 Natural England is party to Joint Nature Conservation Council guidelines for the translocation of species and considers that relocation of species is not an equivalent alternative to *in situ* conservation. Though translocation of species is increasingly common, techniques are relatively new and success is not guaranteed. Where a development or project involving species translocation is given approval relocation of the species should be considered as a means of partial, rather than complete, compensation. Translocations must comply with relevant legal and licensing provisions. Monitoring is always a key element of species translocation work and may be required for a number of years.
- 1.8 To ensure that protected species are taken fully into account when undertaking work requires effective forward planning. This should ensure early recognition of potential issues, identify opportunities to avoid or minimise harm and identify potential mitigation, compensation and enhancement measures. To allow for species seasonal requirements, licensing provisions and effective planning, surveys to ascertain the presence of a protected species are usually needed at least 12 months in advance of the commencement of work. Additional site inspections immediately prior to the work commencing are also advisable. Early consultation with ecological advisors is recommended.
- 1.9 Section 2 sets out the strict controls that apply to European protected species and provides further explanation of the requirements applying to other species of animal, plant and bird. Section 3 covers guidance related to protected species and planning applications while sections 4 and 5 give guidance on how to incorporate consideration of protected species into project planning and the development control process. Part 2 of this document gives species-specific guidance for the protected species found in the County.
- 1.10 The guidance will be periodically updated as legislation changes, new guidance is brought in and new species are recorded in Staffordshire.

2.0 Legal Protection

2.1 Summary

- 2.1.1 The two principal pieces of legislation protecting wild species are the Wildlife and Countryside Act (WCA) 1981 (as amended) and the Conservation of Habitats & Species Regulations 2010 which are generally known as the 'Habitats Regulations'. The Habitats Regulations implement the requirements of the EU Habitats Directive for species listed in Annex IV(a) of the Directive (European protected species). All European protected species are also protected under the Wildlife and Countryside Act 1981. Badgers and their setts are protected under the Protection of Badgers Act 1992. Additional relevant legislation includes the Natural Environment and Rural Communities Act 2006, which imposes duties on public bodies, including local authorities, in regard of certain priority habitats and species; and the Countryside & Rights of Way Act 2000 that amends the WCA, strengthening protection of species and increasing penalties for breaches of the legislation.
- 2.1.2 In the case of species protected under the Conservation of Habitats & Species Regulations 2010 and some birds, work or development likely to affect individuals or their resting or breeding habitat may require a licence from Natural England.
- 2.1.3 In the case of planning applications, protected species survey and assessment should not be covered by conditions, except in exceptional circumstances, but must be carried out prior to approval so that adequate mitigation can be designed into the application. This requirement is included in ODPM Circular 06/2005 – Biodiversity and Geological Conservation – Statutory Obligations and their Impact on the Planning System, paragraph 99.
- 2.1.4 Prior to granting planning consent the Council needs to be satisfied that the development authorised incorporates measures to ensure that it will not have an adverse effect on protected species.
- 2.1.5 A list of protected species found in Staffordshire and their legislative and policy status is found in Table 1.

2.2 Protection afforded to species by the Conservation of Habitats & Species Regulations 2010

- 2.2.1 The following species found in Staffordshire are protected under the Conservation of Habitats & Species Regulations 2010:
- Bats (all species) (most species generally widespread across the county)
 - Otters (widespread across the county; restricted to waterways and wetlands)
 - Dormice (recently rediscovered in the north-west of the county)
 - Great Crested Newts (widespread across the county)

- Natterjack Toads (restricted to one small introduced population)
- Floating Water Plantain (restricted distribution and known from just a few locations).

2.2.2 Under the provisions of Regulations 40 to 43, with certain exceptions and in the absence of a licence, it is unlawful to kill, harm or capture a European protected species, to disturb it while in a breeding or resting place, or to damage or destroy its breeding or resting place even while unoccupied. This legislation applies to all life stages of the species, including eggs. In terms of plants, Regulations 44 and 45 prohibit the deliberate picking, collecting, cutting, uprooting or destruction of any species (listed in Annex IV(b)), in their natural range throughout their life cycle. .

2.2.3 If a European protected species is likely to be affected by a proposal which is authorised by the County Council, for example through planning consent, or undertaken by the authority; the County Council is the 'competent authority' within the meaning of Regulation 7 of the Habitats Regulations. This means that the authority has a statutory duty, under Regulation 9, to have regard to the requirements of the Habitats Directive in the exercise of its functions.

2.2.4 Where European protected species or their breeding or resting places, e.g. bat roost sites, great crested newt ponds or terrestrial habitat, are likely to be affected by development or by any project that is not purely for their conservation, this can only take place if a derogation from the protection given by the Regulations has been agreed in the form of a licence, issued by Natural England as outlined below.

2.2.5 Under Reg. 53, there are three tests that must be met before a licence can be issued for work affecting European protected species and their resting, and breeding habitat. These need to be considered in project design and in the planning application process and information needs to be submitted with planning applications to allow assessment of these three factors.

2.2.6 Regulation 53 states that licences may be granted for the purposes of "preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature **and** of beneficial consequences of primary importance for the environment."

2.2.7 Regulation 53 states that a licence may not be granted unless Natural England is satisfied "that there is no satisfactory alternative". and that the action proposed "will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range". Natural England have advised that they assess this requirement at the local population level – i.e. the mitigation proposed will need to be sufficient to avoid impacts on the population of the species using the development site and immediate area.

2.2.8 Natural England is also the licensing authority for the purposes of surveys which are likely to affect a European protected species and consultants employed to carry out protected species survey should hold an appropriate licence.

2.2.9 Licence applications must be prepared by an experienced and licensed ecological consultant and are determined following, and separately from, the granting of planning permission (where required). The planning authority must be provided with sufficient information to be assured that Natural England is likely to issue a licence before granting planning consent.

2.3 Protection afforded to species by the Wildlife and Countryside Act 1981.

2.3.1 Protection of Birds

Part I of the Wildlife and Countryside Act 1981 (as amended) makes it an offence (with certain limited exceptions and in the absence of a licence) intentionally to kill, injure or take any wild bird, to intentionally to damage, take or destroy its nest whilst it is being built or is in use, or to take or destroy its eggs. Consequently, even common birds such as blackbirds or robins, and their nests and eggs, are protected in this way. Further, the Act affords additional protection to certain species of birds listed in Schedule 1 (see below). In respect of these species it is unlawful intentionally or recklessly to disturb such a bird whilst it is nest-building or is at or near a nest with eggs or young; or to disturb their dependent young.

Schedule 1 species recorded or possibly breeding in Staffordshire

- Barn Owl
- Black Redstart
- Black-necked Grebe
- Cetti's Warbler
- Crossbill
- Dartford Warbler
- Firecrest
- Goshawk
- Hobby
- Honey Buzzard
- Kingfisher
- Little (ringed) plover
- Merlin
- Peregrine
- Quail
- Woodlark

2.3.2 Protection of Animals

Part I of the Wildlife and Countryside Act 1981 (as amended) affords protection to specific species of animals listed in Schedule 5 of the Act. This also provides overlapping but separate protection for European protected species covered by the Habitats Regulations. With certain exceptions, and in the absence of a licence, it is an offence in respect of any species listed in Schedule 5 to:

- i. intentionally kill, injure or take any wild animal of such a listed species;
- ii. intentionally or recklessly damage or destroy or obstruct access to any structure or place which any animal of a listed species uses for shelter or protection;
- iii. intentionally or recklessly disturb an animal of a listed species whilst it is occupying such a structure or place;
- iv. trade in an animal of a listed species whether alive or dead, or any part of it or anything derived from it;

Schedule 5 species most likely to be found in Staffordshire

Full protection - i, ii, iii & iv above

- Bats (all species found)
- Dormouse
- Great Crested Newt
- Natterjack Toad
- Otter

Places of shelter (burrows) protected - ii & iii above

- Water Vole

Protection from killing, injury or sale - i & iv above

- Adder
- Common Lizard
- Grass Snake
- Slow Worm

Protection from sale - iv above

- Common Toad
- Common Frog
- Palmate Newt
- Smooth Newt
- Purple Emperor butterfly
- White-letter Hairstreak butterfly

2.3.3 Protection of Plants

Part I of the Wildlife and Countryside Act 1981 (as amended) affords protection to certain species of plants listed in Schedule 8. This also provides overlapping but separate protection for European protected species from the

Habitats Regulations. In the absence of a licence or a reasonable excuse, it is an offence to;

- i. intentionally pick, uproot or destroy a wild plant listed in Schedule 8;
- ii. not being an authorised person, intentionally uproot any wild plant not included in Schedule 8; or
- iii. sell, offer or expose for sale, or have possession of or to transport for the purpose of sale, any live or dead wild plant, or any part of or anything derived from a wild plant listed in Schedule 8

Schedule 8 species most likely to be found in Staffordshire

- Floating water plantain
- Bluebell (protected against sale only)

2.4 Protection of Badgers

2.4.1 Although the badger is not a rare animal over most of England, there is specific legislation for its protection under the Protection of Badgers Act 1992, due to the widespread incidence of persecution and cruelty suffered by this species. With certain exceptions it is unlawful to kill, injure, take, possess or cruelly ill-treat a badger, or attempt to do so. It is also an offence, with certain exceptions, to intentionally or recklessly destroy or damage a badger sett, obstruct access to it, or disturb a badger while using the sett.

2.4.2 Natural England is responsible for issuing licences under section 10(1)(d) of the Act where it is necessary to interfere with a badger sett in the course of development, which can include demolition, building, construction, mining and engineering operations and material changes of use. Licences are not normally issued during the badger breeding season (Dec-June). Defra are responsible for licensing in respect to agricultural operations, forestry and drainage works.

2.4.3 The likelihood of disturbing a badger sett, of adversely affecting badgers' foraging territory, or of severing or damaging links between them, or of increasing the likelihood of road or rail casualties amongst badger populations, are capable of being material considerations in planning decisions. Although consideration of the case for granting a licence is separate from the process of applying for planning permission, a planning authority should advise anyone submitting an application for development in an area where there are known to be badger setts that they must comply with the provisions of the Act. Local authorities and all other public bodies also need a licence in respect of any development which they themselves carry out if it involves interfering with a badger sett.

2.5 Duties in regard to species of principal importance for biodiversity

2.5.1 Under the provisions of the Natural Environment and Rural Communities Act 2006 section 40 all public bodies, including local authorities, are required to take account of the conservation of species and habitat types of principal importance for biodiversity. Under s.41 of the Act the Secretary of State is

required to maintain a list of these species and habitats. The list of species subject to this duty and likely to occur within Staffordshire is provided in Appendix 1.

- 2.5.2 In addition, the effects of a proposal on species (and habitats) listed as priorities in national, regional and local Biodiversity Action Plans (BAPs) should also be taken into account even though not all of these species are legally protected.
- 2.5.3 Regulation 39 of the Habitats Regulations seeks to encourage the management of features of the landscape that are of major importance for wild flora and fauna. These features include rivers with their banks, hedgerows, ponds and small woods, where they may assist in the migration, dispersal and genetic exchange of plants and animals.

2.6 Additional protection afforded to species by European Directives through site designation

- 2.6.1 Annex II of the European Habitats Directive lists the animals and plants of European interest whose conservation status requires the designation of Special Conservation Areas (SCAs). In Staffordshire the River Mease is designated a SCA for its populations of spined loach, bullhead and white-clawed crayfish, and the Cannock Canal Extension for its population of floating water-plantain.
- 2.6.2 Article 4 of the Birds Directive aims to preserve habitats for particular species of birds (listed in Annex I) whose populations are considered to require special conservation measures by designating Special Protection Areas (SPAs). The South Pennines Moors SPA is designated for breeding golden plover, merlin, peregrine and short-eared owls and for the numbers of breeding dunlin.
- 2.6.3 In addition to the designation of SPAs Article 4(4) of the Birds Directive requires Member States to strive to avoid pollution and deterioration of all habitats used either by Annex I species or by any regularly occurring migratory species. SPAs have not been designated for all birds listed in Annex I or for all migratory species so care is required when assessing the implications of any proposals potentially affecting these species.

Annex I Bird species that may occur in Staffordshire

- Red-Throated Diver (infrequent visitor, non breeding)
- Black-Throated Diver (very scarce on passage, non breeding)
- Great Northern Diver (very scarce on passage, non breeding)
- Bittern (Rare winter visitor, non breeding)
- Whooper Swan (scarce winter visitor, non-breeding)
- Bewick's Swan (regular winter visitor, non breeding)
- Honey Buzzard (scarce summer visitor, may breed)
- Marsh Harrier (very scarce non breeding passage migrant)
- Merlin (Regular passage migrant, very rare breeding)

- Peregrine (Scarce passage migrant, may breed very rarely)
- Hen Harrier (wintering, unlikely breeding)
- Common Tern (Regular passage migrant, scarce breeder)
- Black Tern (passage, non breeding)
- Short Eared Owl (scarce winter visitor and rare breeder)
- Nightjar (uncommon, but has an internationally important breeding population on Cannock Chase)
- Kingfisher (uncommon but breeds throughout Staffordshire)
- Woodlark (recently established breeding population on Cannock Chase).
- Black Redstart (Scarce visitor, may breed)
- Dartford Warbler.

3.0 Planning Guidance and Protected Species

Planning Policy Statement 9 Biodiversity and Geological Conservation includes a set of Key Principles that should be applied to all planning decisions. These include:

- Planning decisions should be based upon up-to-date information;
- Planning decisions should give due weight to protected species and to biodiversity interests within the wider environment;
- Planning decisions should aim to maintain biodiversity interests and to enhance, restore or add to these;
- The aim of planning decisions should be to prevent harm to biodiversity interests. Where significant harm may ensue from planning consent, planning authorities should be satisfied that the development cannot be alternatively located. Should alternatives not be available, adequate mitigation must be put in place before planning permission is granted, or, if mitigation is not feasible, appropriate compensation measures must be included in development proposals.
- Planning consent should be refused if harm cannot be prevented and adequate mitigation or compensation cannot be secured.

In addition to legally protected species, PPS9 (paragraph 16) advises that local authorities should ensure that species of conservation priority and their habitat are protected from the adverse effects of development. A list of these species was drawn up in response to section 74 of the Countryside and Rights of Way Act 2000 and can be found on the Defra website. This list is also referenced by sections 40 and 41 of the Natural Environment & Rural Communities Act 2006 (see s.2.5 and Appendix 1).

Guidance on the application of legislation related to planning and nature conservation is found in Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impact within the Planning System (ODPM Circular 06/2005, Defra Circular 01/2005) which complements PPS9. Paragraph 98 advises that the presence of a protected species is a material consideration in considering planning proposals. Paragraph 116 advises that the presence of a European protected species should be given due weight in making planning decisions and may justify refusal of planning consent.

Paragraph 99 states that the presence or otherwise of a protected species, and the extent to which it might be affected by a proposed development, must be established prior to the granting of permission, otherwise all material considerations may not have been addressed. This means, as the Circular advises, that ecological surveys should be carried out prior to consent and should not be conditioned except in exceptional circumstances.

Measures for species protection should be incorporated into planning proposals prior to consent and be implemented through conditions and/or planning agreements. While the presence of a protected species does not need to be already recorded, survey should only be required where there is a reasonable likelihood of the species being affected by the development. It should be noted that planning consent does

not provide derogation from the requirements of protected species legislation which must still be met, including through the acquisition of licences where relevant.

Policies in respect of protected species are found in the Staffordshire and Stoke-on-Trent Minerals Local Plan, the Staffordshire and Stoke-on-Trent Waste Local Plan, and the Staffordshire and Stoke-on-Trent Structure Plan.

Policy 17 in the Minerals Local Plan requires planning applications that may have an adverse effect on legally protected species or their habitat to include provisions for the protection of the species, to include translocation in exceptional circumstances. Policy 3 in the Waste Local Plan states that planning consent for waste management facilities will not be granted where there are materially harmful impacts on protected wildlife unless there are over-riding benefits. The Waste Local Plan also includes reference to Structure Plan policy NC5 *Biodiversity* which refers to seeking to meet the objectives of the UK and Staffordshire Biodiversity Action Plans by safeguarding and increasing key species.

4.0 Protected Species and the Development Control Process

4.1 Good practice

'Planning for Biodiversity and Geological Conservation: A Guide to Good Practice' accompanies PPS9. This gives advice on protection of biodiversity through Development Control. The following procedures are recommended:

- Adopting a five point approach of information, avoidance, mitigation, compensation and new benefits;
- Ensuring adequate information is submitted with applications and that surveys and consultations are carried out;
- Securing protection, enhancement, mitigation and compensation through conditions and obligations
- Planning enforcement of these conditions and obligations
- Identifying means of incorporating biodiversity into new development.

4.2 Pre-application consultation

It is the duty of the applicant to provide sufficient information to support a planning application. Pre-application consultation is recommended to identify information and survey requirements, prevent delays caused by insufficient information, and discuss protected species requirements.

4.3 Information required for submission with the planning application

Where protected species are recorded, reliably reported, or thought likely to be present on, or in the vicinity of, a site, the Council will require applicants to carry out appraisal of the effects of the development on the species breeding, feeding, resting and/or hibernating requirements, consisting of:

- **Records search.**

To include Staffordshire Ecological Record (SER) - the local biological records centre, SCC Ecologist, Natural England, Staffordshire Wildlife Trust, and local and specialist conservation groups where appropriate.

- **Ecological survey.** Consultation should take place with the LPA regarding the level of detail and coverage required. Requirements are likely to include identification of: population status, breeding status and location, hibernation/roosting/resting sites, feeding habitat, habitual routes of movement and the habitat features required to sustain these. Surveys should be carried out in suitable conditions at the appropriate time of year (see table 1) and should extend beyond the application site as species' ecology dictates. Appropriately qualified and experienced, and, where appropriate, licensed, surveyors/consultants should be utilised. Recognised survey techniques and published guidelines should be used, for example, Natural England bat* and great crested newt guidelines. The Council may require additional survey if detail provided is deemed inadequate.

- **Ecological assessment** covering the effect of the proposed development on breeding, feeding, resting and hibernation habitat and on the species' populations using the site and local area.

* Detailed guidance has been prepared in regard of information requirements and survey standards for bats. This is found on the web-site and can be obtained from the County Ecologist

- **Mitigation and/or compensation** measures proposed where impacts cannot be avoided, and how they will be incorporated into development and maintained through the lifetime of the development.

Table 1 Optimum times for species survey

Species		J	F	M	A	M	J	J	A	S	O	N	D
Birds	Breeding												
	Wintering												
Reptiles	Breeding												
	Basking												
Great crested newt	Breeding												
	Habitat												
Badger	Setts												
	Habitat												
Water vole	Presence												
	Habitat												
Bats	Breeding												
	Hibernating												
Otter	Presence												
	Habitat												
Crayfish													
<i>Lurionium natans</i>													
<i>Lepidoptera</i>	Presence												
	Habitat												

4.4 Assessment of the effects of development

The appraisal of effects of development and design proposals, should address the following:

- Avoiding, mitigating (reducing/minimising) impact and compensating for loss of habitat;
- Accommodation of the species within design and layout of development, including by considering alternatives in terms of design, layout, and location;
- Timing of work to avoid disturbance during the breeding or hibernating season;
- Protection of the species and its habitat during development;
- Opportunities for enhancement, such as by the creation of new breeding or resting sites or feeding habitat;
- Consideration of the aims and objectives of relevant national and/or local Biodiversity Action Plans;
- The management necessary to ensure the ongoing viability of habitat and/or features important to the species after development. Where possible long term management should be secured;
- Monitoring and reporting the impacts of development on the species;
- Monitoring and reporting the success of habitat restoration, creation or translocation schemes carried out as part of mitigation works.

4.5 Additional information required for species protected under the Conservation of Habitats & Species Regulations 2010

The applicant will need to supply information to show that the development meets these criteria:

‘That the development for public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature **and** of beneficial consequences of primary importance for the environment ‘

This means showing how the development meets national, regional and local planning policy; showing the economic, social and environmental benefits of the proposal such as improvements to the environment of redevelopment of previously used land, reuse or extension of use of buildings; better incorporation of biodiversity into design; how the new proposal will benefit the environment, local economy and local community.

‘That there is no satisfactory alternative‘

The applicant should show that alternative sites have been considered and/or that alternatives, in terms of design and layout, to development that would result in damage to European Protected Species’ habitat have been considered, justifying the option selected.

‘That the proposal will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range’

The applicant will need to show that adequate mitigation will be provided in terms of protection of the species population, habitat protection or replacement, feeding and commuting habitat protection, creation and enhancement, timing of works, precautions taken during demolition, site preparation, construction or other works and that appropriate monitoring will be carried out to allow assessment of the effectiveness of mitigation measures.

The information submitted will help the Council to prepare suitable conditions and planning obligations as appropriate. It will also allow assessment of whether the planning application will meet Natural England licence requirements.

4.6 Protected Species Planning Application Checklist for Applicants and Development Control Officers

4.6.1 Prior to submission of application:

- Is there a reasonable likelihood of a protected species being present on site or being affected by the development? (If uncertain request a survey or seek further advice)
- Has adequate information about the presence of a species or otherwise, the potential impact on the species and potential mitigation/ compensation been obtained to inform the planning application? Developments affecting European Protected Species should, as a minimum, include a Method Statement and Mitigation Strategy.
- Has the County Ecologist, Natural England and Staffordshire Wildlife Trust been consulted and have they commented?
- Has appropriate mitigation and/or compensation, incorporating the results of consultation, been incorporated into the development proposal?

4.6.2 Submission and determination of application

- Following submission of the application it may be that further information is required. The need for this can be minimised by pre-application discussions.
- Once all information is received and mitigation and/or compensation proposals agreed, the planning application can be determined. This may result in conditions and/or planning obligations being attached to provide for implementation of protection, mitigation and compensation measures.

4.6.3 After determination of application

- Has Natural England been informed about the permission and the details of conditions?
- Natural England may now have to issue a licence in order for work connected with the development to proceed.
- Occasionally, a protected species may be found, where not previously anticipated, when work to implement a planning application has begun. Works on-site should stop immediately and the steps above should be taken.

4.7 Further detail regarding species' ecology and survey and assessment requirements is found in Part 2 of this guidance.

5.0 Dealing with Protected Species when Planning and Carrying Out Maintenance and Repair Work

5.1 Early Consultation and Forward Planning.

The best way of avoiding conflict and delay caused by protected species issues when undertaking work is to plan well ahead. Long-term planning allows early identification of issues and appropriate planning to avoid damage, incorporate mitigation and, where possible, provide enhancements. Due to the seasonal requirements of some protected species survey, and seasonal limitations to carrying out work affecting breeding and resting sites, initial consultation should be undertaken at least 12 months in advance of the commencement of work. It is recommended that consultation and follow up requirements be incorporated into work programmes.

5.2 The Service offered by Environment & Countryside

The Principal Ecologist can provide the following assistance:

- Identification of protected species issues related to proposals;
- Guidance regarding legal and planning requirements and what is required to satisfy these;
- Interpretation of records and survey information;
- Advice on survey requirements, scope, methodology and timing;
- Assistance in preparation of briefs for consultants to carry out surveys and assessments;
- A list of local ecological consultants;
- Assessment of survey reports and mitigation or compensation proposals;
- Advice on planning of works to avoid or minimise damage to protected species and their habitat;
- Advice on potential for incorporating biodiversity enhancement into schemes to help deliver environmental/sustainable benefits;
- Liaison with consultants at all stages;
- Liaison with Natural England on behalf of other Council departments;
- Advice on licence applications;
- Advice on monitoring the effect of works.

5.3 Ongoing issues

5.3.1 Changes in species' distribution

There may be substantial lapses in time between planning and implementing projects. The location, distribution and population levels of protected species may change during this time. A site inspection should be undertaken by a qualified ecologist shortly prior to work commencing to ensure that the situation has not changed appreciably since the last full survey. These pre-commencement surveys are recommended in all circumstances where suitable habitat is present, even where a previous survey did not reveal any issues.

Occasionally these additional surveys will reveal unforeseen problems which may disrupt the work programme and where possible other work may have to

be implemented instead. Project planning should always consider the possibility of such unforeseen issues arising.

Work may be undertaken in advance to avoid species colonising sites and creating problems, for example making the working areas less attractive for species to colonise, or undertaking the certain work ahead of schedule to avoid ecologically sensitive periods, e.g. site clearance outside of the bird breeding season.

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6.0 Mammals

6.1 Bats

6.1.1 Introduction

Bats are protected under the Conservation of Habitats & Species Regulations 2010 (see Section 2.2) and a Natural England licence is required where works are likely to disturb, damage or destroy their place of rest or breeding site. Surveyors must hold a Natural England licence where it is necessary to enter a roost site or where the survey is likely to disturb bats. Seasonal restrictions on survey timing and work that affects bat roosts mean that it is important to consider bats early in the planning process if delays are to be minimised.

6.1.2 Ecology

There are several aspects of the life cycle of bats that make them a difficult group to work with when planning development or maintenance works. Bat behaviour is both seasonal and habitual and this imposes restrictions upon what may be done, and when, to structures or features that bats may use.

Along with dormice, bats are the only other British mammals to truly hibernate, which they often undertake colonially. All British bats are insectivores; therefore they are only active when their insect food is available. Activity usually takes place between the end of March and the beginning of October but can occur outside these periods dependent on weather conditions. Climate change may extend bat activity periods. The balance between fat reserves and winter survival is critical and very finely balanced. Bats go into torpor during hibernation to conserve energy reserves. The implication of this is that to disturb bats when they are hibernating depletes these reserves at a time when no food is available to make good the shortfall. Thus disturbance of a hibernation roost could result in the bat or colony of bats failing to survive the winter.

Colonial behaviour is not restricted solely to hibernation. Bats may form nursery colonies or simply roost colonially and they may form pre-hibernation roosts before moving *en masse* to their hibernation roost. Under the provisions of the law, even these temporarily occupied sites are recognised as bat roosts and are as a result protected. Bats are creatures of habit and may return to the same roost for many years and they may use several different roost sites during a season.

Several bat species roost out of sight in cracks and crevices and there may be few signs that bats inhabit a structure. Signs of use include mouse-like droppings and staining round holes.

Greater Horseshoe Bats in a cave

Picture courtesy of English Nature's on-line image library



6.1.3 Survey

Surveys are required where work is planned that might affect locations where it is considered that bats are, or are likely to, be present. This includes;

- Tree works including limb removal, crown lowering, safety felling and any other arboricultural process to mature trees carrying features suitable as roost sites such as fissures, loose bark, rot holes etc., or trees covered with ivy.
- Bridge demolition, replacement, repairs and renovation including any work to brickwork/stonework, pointing, repointing, rendering or weather treatment, grouting, pressure grouting and painting that requires scaffolding that is keyed into the brickwork.
- Demolition, alteration, extension or repair of any building or structure likely to be used by bats including modern building and in particular any works to roofs.
- Work affecting cellars, tunnels, caves and disused mines and their entrances.

Where bats are known to be present, either roosting or habitually foraging, or where their presence is suspected, sufficient information will be required to ensure that an accurate and reasonable opinion can be reached about the importance of the site to bats and likely impacts should the development or project go ahead.

This should cover:

- Type of roost-hibernation/maternity/summer/temporary and timing of occupation;
- Foraging habitat and commuting routes used by bats;
- In the case of foraging habitat, its importance to the local bat population;
- Impacts of the development on roosts, foraging habitat, commuting routes;
- Mitigation proposals;
- Monitoring provision for mitigation work.

Some surveys can potentially disturb bats and are termed 'intrusive'. These include surveys that involve the surveyor entering structures such as bridges, tunnels, derelict buildings, old icehouses, cellars and roof spaces, or investigating old trees using a probe or spectroscope. These surveys should be carried out or supervised by a licensed surveyor. It is recommended that only licensed consultants should be engaged to carry out bat work. Possession of a licence demonstrates that bat workers have undergone appropriate training and work experience.

6.1.4 Practical Application

The ecology of bats and the nature of the protective legislation makes commissioning specialist survey work for some routine maintenance operations inevitable. The most effective solution for enabling work programmes to be carried out without undue delay is to plan a timetable of operations that takes account of the requirements of bats and how they use roosts. In order to achieve this it is recommended that the project manager consults SCC Environment & Countryside and engages a specialist bat consultant to devise safeguarding strategies. In addition the consultant may help to design work schedules that best address the issue of bat protection and to recommend emergency operating procedures as well as providing training for appropriate site staff.

Many bat species are closely associated with the built environment. Different bat species utilise different features for their roosts. Pipistrelles, for example, tend to use confined spaces such as behind soffit boards or under tiles or eaves; Natterer's bats are often found in wooden beam joints; brown long-eared bats and horseshoe bats generally use open roof voids. Noctules are almost always associated with trees. Several species hibernate in underground sites. In general areas warmed by the sun are used as maternity roosts; hibernation requires cool temperatures.

Knowledge of bat ecology is incomplete and exceptions to the rule are not unusual. There are features that can either increase or decrease the likelihood of bats using a structure, and these are summarised in table 6.1. Simple things to look for are cracks, rot holes and dense ivy on trees, cracks in brickwork or missing mortar that is big enough to accommodate an index finger, gaps under tiles and eaves, loose soffit boards or cladding. Also important to consider is the availability of bat foraging and commuting habitat

in the vicinity. Bat roosts are often found near open land especially where there are features such as woodland, tree bands, hedgerows, pools, rivers or canals. Parks, gardens and linear features such as disused railways provide good bat habitat.

Table 6.1 Extract from Natural England “Bat Mitigation Guidelines”

Factors affecting the probability of a building being used by bats in summer	
Increase probability	Disused or little used; largely undisturbed Large roof void with unobstructed flying spaces Large dimension roof timbers with cracks, joints and holes Uneven roof covering with gaps, though not too draughty Entrances that bats can fly in through Hanging tiles or wood cladding, especially on south-facing walls Rural setting Close to woodland and/or water Pre-20 th century or early 20 th century construction Roof warmed by the sun Within the distribution area of horseshoe bats and serotine
Decrease probability	Urban setting or highly urbanised area with few feeding places Small or cluttered roof void Heavily disturbed Modern construction with few gaps around soffits or eaves (but be aware these may be used by pipistrelles in particular) Prefabricated with steel and sheet materials Active industrial premises Roof shaded from the sun
Factors affecting the probability of underground sites being used by roosting bats	
Increase probability	Large enough to develop stable temperature in winter High humidity Undisturbed Close to woodland or water (but note that bats will also use upland sites) Many cracks and crevices suitable for bats
Decrease probability	Small and draughty Heavily disturbed In urbanised areas Smooth surfaces with few roosting opportunities

6.1.5 Recommended working practices

Many species of bat are very small and will use gaps and fissures that may look impossible to our eyes. So work on a structure which has gaps or fissures such as loose mortar, bricks, slates etc., should proceed with caution.

If bats or signs of their use are seen work should be suspended and advice sought. Survey is advised before commencing works where these features are present. Where bats or their roosts are found, professional supervision of some operations may be necessary as may licences. Early consultation with the staff of the Environment and Countryside Unit can help to identify issues and avoid unplanned delay to works.

It is not possible to provide general mitigation advice, as this will always be site specific. Timing of works to avoid roost occupation periods is generally critical, but this will vary dependent on the type of roost present. Roosts that are affected by works must either be protected (the preferable option) or replaced. There are a variety of techniques available for incorporation of purpose-built structures for bats to use, such as leaving cavities within the structure or by building "bat bricks" or other specialised features into the structure.

Bat populations have suffered over recent decades from loss of roost sites. In line with planning policy, the Staffordshire Biodiversity Action Plan, and Natural England and Environment Agency policy, ECU encourages the incorporation of bat roost features into new or refurbished structures where they are close to bat feeding habitat. Bridges and other structures near water are a priority for such enhancement work.

6.2 Otter

6.2.1 Introduction

Otters are protected under the Conservation of Habitats & Species Regulations 2010 (see Section 2.2) and a Natural England licence is required where works are likely to disturb, damage or destroy their place of rest or breeding site. Given adequate survey information it is generally not difficult to design work and/or developments that will not damage otters or their habitat as long as appropriate mitigation is provided. A Natural England licence is required for survey work which causes disturbance to otters such as checking of known holts. Where development proposals are likely to impact on otters, Natural England and the Environment Agency should be consulted when full survey information has been obtained.

6.2.2 Ecology

Otters occupy large territories and travel extensively within them, often using rivers and watercourses as “highways”. Otters lie up and protect their cubs within underground holes called holts, which often have a long history of occupancy. Holts are often found in riverbanks within complexes of tree roots or natural rock formations, which support the structure and strengthen and disguise the entrance. Otters will lie up in man-made structures too, but probably do not shelter young in them. Otters move overland through their large territories as well as along water-courses. They may cross from one area of habitat to another over relatively open land, leaving them vulnerable to any danger, like roads, which divide their territory. Areas of semi-natural vegetation such as scrub and reed-beds provide cover, and lying up places (couches) so these features, which allow the otters to move through their territories under cover, are important. Also of great importance are natural river/stream banks with riparian cover, overhanging vegetation, and natural scour holes, and a natural riffle and pool structure. Structural features, islands, fallen trees (log piles), boulders, reeds and dense rushes appear to provide otters with their favoured lying up places. Otters feed mainly on fish therefore suitable water quality and fish breeding habitats need to be present as well as appropriate otter breeding and resting habitat.

Otters are sensitive to anything that impedes free movement through their territories and to activities that disrupt their ability to feed by scaring or obscuring their prey (turbidity, chemical pollution etc), or to changes to natural pools and riffles where they hunt. In addition, certain activities may cause the otter to leave the river to cross roads (the greatest current cause of death). Therefore, activities that remove holts or lying up places and passing places beneath bridges or along culverts (either temporarily or permanently) may severely disrupt an otter’s ability to exploit its territory. Engineered rivers and streams provide few refuges for otters to exploit for both shelter/protection and for feeding. An additional problem facing the otter is traversing their territories when the integral rivers and streams are in spate, where the high waters effectively block bridges and culverts, forcing the otter to seek alternative overland routes, which may expose them to traffic or public disturbance.

The preferred prey item for otter in Staffordshire is the European Eel, *Anguilla anguilla*, a scavenging fish species with oily flesh, which makes it doubly susceptible to accumulating high concentrations of pollutants such as insecticides and other toxins.

Otter populations underwent a drastic decline until the late 80's and 90's when a recovery in their populations began. The reasons behind the decline are not clear, but they appear to be linked to habitat degradation, water pollution, DDT use and persecution. The otter, in eating eels, is exposed to high concentrations of toxins that build up in eel fat, which either make it susceptible to disease and disturbance, or may reduce fertility.

Environmental improvements and the control of some of the most toxic agricultural chemicals have to some extent overcome the poisoning problems facing the otter. Legal protection has reduced the levels of persecution. Since the otter has become more widely re-established road-kills are responsible for about 60% of early death. Maintenance and improvement of otter habitat is therefore now key to protection and enhancement of otter populations.

European Otter

Picture: Steve Chadd / English Nature



6.2.3 Survey

In Staffordshire we are fortunate that otters have been recorded systematically for many years and we are reasonably well aware of the watercourses that they have been known to use. The type of work involved will determine the degree of survey required. The operations that need the closest scrutiny are those which involve effects on riparian trees with exposed roots at water level

or trees with an open root structure on the river bank, on streamside vegetation that can provide cover, and works that affect structures at, or near water level that may provide a refuge for otters. Survey will be required for any work that remodels the river or its banks, including flood defence structures, culverting, straightening, reprofiling, or deepening the main channel, or which may disrupt or divide established otter territories, or move barriers within known or suspected otter territories.

Sprints are used to mark territories and are a key sign of an otter's presence. They are most likely to be found in dry weather when the water level has been steady or is falling. Since they are used as a form of communication, sprints will be left in obvious locations such as under or near bridges, at tributary junctions and on prominent bank-side or mid-stream features including boulders, tree stumps and sand bars. Winter surveys are easier because bank-side vegetation will have died back, but heavy rains can wash signs away. In addition to looking for sprints, surveys should record other signs of the presence of otters such as footprints, feeding remains and bank slides, and should provide a general assessment of habitat condition and potential for improvement.

All developments involving watercourses, especially those which affect the integrity of river/canal corridors or impact upon waterside habitat, should provide the following information:

- Otter presence and status, including recent survey information and past records;
- As otters are rarely seen, surveys should be based on the presence of characteristic signs along the watercourse and adjacent habitats which may be used for lying up. Signs should be recorded on a detailed map.
- Records of otters for adjacent stretches of any watercourse or canal affected;
- If present, appraisal of the effect of the development on otters and details of mitigation.

Surveys can be carried out at any time of the year, but best results are achieved in dry periods between November and January. Recognised and competent ecological consultants, with experience of otter work, should undertake survey work and the development of mitigation proposals.

6.2.4 Practical Application

Records searches and, where advised, surveys should take place at least 12 months ahead of works that may affect water-courses or their banks and associated vegetation. Due to the wide-ranging movement of otters and their need for secluded resting places, mitigation often needs to be incorporated into works affecting water-courses even where holts are not found. Holts and resting places need to be retained or replaced.

If work involves activities which may impede natural movement along watercourses and may result in risk of road casualties it may be necessary to provide a permanent or temporary safe alternative crossing point, for example ledges under bridges or in culverts or a large bore pipe strategically placed to allow the animals free movement. Disturbance can be reduced by limiting works to as few days as possible and removing any obstacles to free movement up or down the watercourse every evening. Long term planning and flexibility to work with the animals' natural behaviour will yield the most satisfactory results. Where possible all schemes should consider providing additional alternative habitat and features that aid otter movement through the landscape and reduce the need to cross roads.

6.2.5 Maintaining and improving habitat for otters

Road, bridge and waterway schemes should be evaluated in the wider context of their setting within the ecological landscape to identify possible sources of increased danger for otters as well as opportunities to encourage them. A valuable contribution towards otter survival, persistence and population recovery can be made by providing better sources of food through water-channel management, by providing fish breeding and holding habitat and good foraging sites for the otters. Habitat can be improved by increasing riverbank vegetation cover, creating reed-beds and marsh areas, riverside tree management, and in some circumstances by providing artificial holts and lying-up places.

When providing improved otter habitat it is vitally important to make provisions to limit the chances of road death and/or public disturbance as much as possible. This may take the form of providing links, such as hedges or ditches with cover, between areas of habitat within the territory. This will allow the otters to move to new areas whilst avoiding roads and other potential dangers. There is a need to provide underpasses above flood levels, which will afford safe passage when rivers or streams are in spate.

6.3 Dormouse

6.3.1 Introduction

Otters are protected under the Conservation of Habitats & Species Regulations 2010 (see Section 2.2) and a Natural England licence is required where works are likely to disturb, damage or destroy their place of rest or breeding site. Licences will also be required for surveys where the survey is likely to disturb this species.

6.3.2 Ecology

Dormice have only recently been rediscovered in Staffordshire, having been thought extinct in the county. The size of the current population is unknown, but they appear to be concentrated in the west and north-west of the Staffordshire where it abuts parts of the rural counties of Shropshire and Cheshire. Although little is known about the habits of dormice there appears to be the opportunity to maintain and enhance populations through habitat protection, enhancement and creation and through appropriate habitat management.

Traditionally it was thought that dormice were only to be found in woods with very high proportions of mature, traditionally managed hazel, but they are now known to persist in a wider range of habitats. Dormice require woods with a wide range of ground flora, understorey and tree species which provide a continuous source flowers, pollen, nectar and nuts throughout the late spring, summer and autumn when the dormouse, which hibernates from October to April, is active. Dormice will also use areas of scrub, bramble and hedgerows.

A critical feature of dormouse behaviour is that it rarely travels overland, where it is extremely vulnerable to predators, therefore gaps between woodland blocks are effectively barriers to movement. This renders dormice exceedingly vulnerable to habitat fragmentation and isolation. Where dormice are found, woods should be managed so that there are always arboreal connections between woodland blocks. This requirement may impose significant constraints upon construction which may affect a wood which contains dormice. At the same time the ability to connect fragmented habitats provides great opportunities for biodiversity conservation.

6.3.3 Survey

Survey is required when a proposed scheme may affect known dormouse woods and other potential habitat with continuous connections with known sites, as well as any isolated potential habitat fragments greater than 1 ha in the locality (within 500m to 1 km). Surveys are seasonally dependant and may take some time to complete so records searches and, where advised, surveys should be planned at least 12 months ahead of works. Survey must generally be conducted by an appropriately qualified and licensed operator. Some unlicensed survey may be achieved by collecting discarded nutshells and seeking specialist opinion whether dormice or other rodents have gnawed them. Almost all other effective survey methods will have to be carried out under licence if the presence of dormice is suspected. The amount of survey

required and the extent of the mitigation needed will depend upon the nature of the proposed development.

6.3.4 Practical Application

Long-term planning is key to any scheme that may involve dormice. Any work which will affect, or has the potential to affect, dormice or dormouse habitat will require a licence which will involve the preparation of a detailed scheme of mitigation. Essential to this will be the need for good survey data well in advance of the development. Dormice are vulnerable to fragmentation of their habitat and so development should be planned to leave as much of their habitat intact as possible. Opportunities should be sought to link separate habitat blocks together as part of any scheme and to provide habitat enhancement and management where possible. In habitat creation, care should be taken in designing planting schemes to yield appropriate food sources over as wide a seasonal range as possible.

6.4. Water Vole

6.4.1 Introduction

Water voles and their burrows are protected under the Wildlife and Countryside Act, access to burrows must not be blocked and voles are protected from disturbance whilst in occupation. Development and maintenance works that affect water voles or their habitat are not given exceptions from legal protection by licensing but require an appropriate mitigation plan approved by Natural England to allow consent to be given. There is an obligation for all who maintain waterways to have measures in place to minimise the risk of adverse effects on water voles. Environment Agency advice should be sought for any work that affects a watercourse.

6.4.2 Ecology

Water Voles are colonial hole dwellers, and are less dependent upon structures and trees than otters. Colonies of water voles can comprise an extensive subterranean network of interconnected tunnels that extend some way from the bank of the watercourse into the surrounding vegetation. Water voles depend upon the presence of earth banks, into which they can dig their holes, and abundant, diverse, layered vegetation including grasses, reeds and other aquatic plants. Colonies may relocate from time to time and so apparently abandoned holes does not mean a permanently absent colony.

Water voles are shy and rarely seen; though the characteristic ‘plop’ as they dive into the water may sometimes be heard. They are associated with rivers, streams, brooks, canals, ditches and sometimes ponds and larger water bodies. . Though they do not hibernate, water voles are not very active above ground in the winter. Characteristic signs of vole activity include latrines (collections of droppings), feeding stations and burrows. Burrows can be surrounded by grazed ‘lawns’.

Water voles are one of the most threatened mammal species in the country, having declined from past relative abundance to a few scattered colonies. Populations are estimated to have declined by over 90% since 1990, largely due to predation by introduced mink, but also due to habitat loss. Changes in riparian management and riparian agricultural practice have removed marshy margins and riparian vegetation or reduced them to narrow strips, limiting habitat and escape routes for voles. This makes them more vulnerable to predation and increases the vulnerability of the supporting habitat to change and destruction.

In recent times water voles have been recorded in the banks of urban watercourses and canals, possibly as mink are less prevalent in urban habitats. Occupation of urban habitats may put voles into greater conflict with redevelopment of land and engineering operations such as bank strengthening and flood alleviation works. So great is water vole sensitivity to habitat change that it is difficult to conserve water vole populations *in situ* during development; in past schemes few populations have experienced greater than 50% survival. Even strimming of supporting vegetation can significantly and negatively affect water voles and may encourage them to

desert their burrows, which could destroy the colony if there is no alternative suitable habitat nearby for them to occupy, so timing and extent of such work is an important issue. It is also important to maintain links between colonies to facilitate easier movement of animals.

6.4.3 Survey

In Staffordshire water voles have been recorded systematically for many years and the records provide a reliable guide as to whether further survey work is required. Survey will be required for development affecting waterside habitat within known water vole locations, such as watercourse engineering or bank modification, or strengthening, and bridge works, particularly where the work affects the bank itself e.g. bank side vegetation clearance, installing shuttering, or where support structures for construction work (scaffolding, cranes etc.) are keyed into the bank or supported by it. Operations that also require survey include bridge construction and repair, bend straightening, dredging, flood defence work and reprofiling.

All developments involving waterside habitat, should provide the following information:

- Water vole presence and status, including recent survey information and past records, on the site and affected stretch of the watercourse;
- As water voles are rarely seen, surveys should be based on the presence of characteristic signs up to 2m away from the banks and edges of watercourses and ponds. Signs should be recorded on a detailed map.
- Records of water voles for adjacent stretches of any watercourse or canal affected;
- If present, appraisal of the effect of the development on water voles and details of mitigation.

An obvious indicator of the potential presence of water voles is the tennis-ball sized holes in the riverbank.

6.4.4 Practical Application

Where possible water voles and their habitat should be left undisturbed. A stand-off zone of at least 3, preferably 6, metres from the waters' edge should be provided where people, vehicles and storage of materials are not permitted. Steel piling and concrete revetments should be avoided where possible and instead coir rolls or more natural features such as willow spiling should be used. Projects should be planned so that they do not sever suitable habitat or isolate existing colonies.

Water Vole

Picture: Hugh Clarke / English Nature



6.4.5 Mitigation

Long term planning and early survey at least 12 months before undertaking works which affect watercourses and their banks will allow for the development of mitigation schemes which are most likely to succeed. Preferred mitigation would be non-intervention in the location of burrows and feeding habitat. Should this be impossible, replacements should be provided prior to loss of existing habitat and undisturbed water vole refuges created. Where possible, schemes should include improvement of bank-side vegetation so that there is more food and shelter available.

6.5 Badger

6.5.1 Introduction

The main legislation relating to badgers is the Protection of Badgers Act 1992, which is primarily concerned with the prevention of ill-treatment of this much persecuted animal, rather than with its conservation. The result is that both the animal and its dwelling, the sett, are very strongly protected. The presence of badgers on site or the use of a site by them for foraging may constrain the activities planned for it. A licence from Natural England will be required for any activity likely to disturb badgers or their setts. The reproductive lifecycle of the badger imposes significant constraints on the timing of works as licences are not issued during the badger breeding season – December-June. Road casualties represent a high proportion of badger mortality especially where new or widened roads sever habitual pathways.

6.5.2 Ecology

Badgers are large territorial hole-dwelling mammals which occupy setts. The setts may take several forms. Main setts are used for breeding, may be very large and can have been used for hundreds of years as badgers are very much creatures of habit. Other setts, variously called annex, subsidiary, outliers or satellite setts are used less intensively and are often occupied periodically or by fewer members of the badger clan. Young are born underground usually towards the end of January and emerge from the setts for the first time in about 8 weeks. The young remain dependent upon the sow for several weeks more. Badgers are creatures of habit, regularly using the same runs, foraging within a favourite area and sticking rigidly to a family territory. Badgers favour foraging in open areas, especially grasslands rich in earthworms, the main component of their diet.

6.5.3 Survey

Certain development activities will require licences depending on the type of operation and the distance from an active sett. The proximity of operations to badger setts is an important issue when judging whether a licence is required. Depending on their nature works up to 30 metres from a sett require a licence. This means that survey should be carried out by a specialist ecologist who should identify all active setts; foraging areas and habitual routes used by badgers.. In order to avoid unnecessary conflicts, survey should be carried out before the detailed planning stage of a project. Repeat surveys immediately prior to the commencement of work should also be undertaken where timescales are extended as new setts are often excavated.

The amount of information required in support of a planning application or other project will depend on the potential impact that the work is likely to have on the local badger population. This information should address:

- The status and occupancy of all setts affected or not, available to the social group(s);
- Effects of the development on setts and on the badger social group(s);
- The presence and location of badger walkways and pathways;

- The extent and location of foraging habitat;
- The scale, nature and timeframe of badger activity;
- Mitigation required to avoid damage to badgers and to comply with legal requirements.

Given this species' liability to persecution, it is of utmost importance that the issues relating to development proposals are dealt with in a confidential manner.

6.5.4 Practical Application

The reproductive lifecycle of the badger means that it is unlikely that any works near to or directly affecting a badger sett will be licensed between the beginning of December and the end of June. However it is generally the case that mitigation in terms of timing, working practices and protective measures can be incorporated into schemes that allow them to be implemented while protecting the badger population.

In planning development and other works, badger foraging requirements should be considered so that severance of access to foraging habitat can be avoided and habitual pathways maintained. This can be particularly critical in planning new roads, where fencing and underpasses may need to be incorporated into schemes to reduce casualties.

6.5.5 Mitigation

Development footprints and working areas should, where possible avoid impact on setts. Layout of new development should aim to keep built development as far from setts as possible, for example by location of green spaces, lawns, shrubberies, gardens or shelter belts.

Annex, outlier and satellite setts may not be crucial to a badger population but impacts on main breeding setts should be avoided wherever possible. As a last resort Natural England may licence destruction of a main sett. Prior to this, construction of a suitable alternative sett within the existing territory of the affected badger family is required, and evidence must be provided that this sett has been occupied by the same badger clan. Often detailed badger territory mapping is required to provide supporting information for this course of action.

Where a development may damage or isolate foraging territory it is essential to plan to demonstrate the availability of alternative resources that are not part of another badger family's territory.

7.0 Amphibians and Reptiles

7.1 Great crested (warty) newt

7.1.1 Introduction

Great crested newts are protected under the Conservation of Habitats & Species Regulations 2010 (see Section 2.2) and a Natural England licence is required where works are likely to disturb, damage or destroy their place of rest or breeding site. Surveyors should hold Natural England licences where the survey is likely to disturb great-crested newts or prevent their movement. Great crested newts spend much of their time outside water; therefore terrestrial habitat is important to their survival. All development proposals that affect land need to include consideration of the potential of the land to support great crested newts. Seasonal restrictions on survey timing and work that affects great crested newts mean that it is important to consider this species early in the planning process if delays are to be minimised.

7.1.2 Ecology

Great crested newts remain fairly widespread in Staffordshire, despite a national and European contraction of their population, which has prompted the current high level of protection. Population contraction appears to be mainly the result of habitat loss; largely the loss of breeding sites through destruction of ponds and through natural succession, in conjunction with degradation of terrestrial habitat through development, agriculture, and fragmentation.

Great crested newts need both terrestrial habitats for feeding and shelter and aquatic habitats for breeding. The aquatic habitat is an essential component of their habitat, used for reproduction and larval development, but most of their life is spent feeding or hibernating on land within close proximity to the breeding site.

Terrestrial habitat includes wet grassland and marsh, rough tussocky grassland, scrub and woodland and areas providing crevices including old walls, rubble piles and old root systems which provide shelter from desiccation in summer and freezing in winter. The habitat requirements of great crested newts frequently include those found on 'brownfield' sites particularly those with standing water (either permanent or temporary/seasonal) nearby.

Newts emergence from winter dormancy, which is largely dependent upon temperature and rainfall, generally between February and March and adult newts begin to move towards their breeding sites. Occupation of breeding ponds by adult newts may be staggered and can extend into May or June. During this period adults will leave the water to forage for food, underlining the importance of terrestrial habitat adjacent to the breeding site. Distance travelled in foraging and to find rest and hibernation sites commonly covers 250 metres from a breeding pond, but may occur up to 500m or further if habitat connectivity is present. Hibernation generally commences in October, depending on weather conditions. Great-crested newts will often live as small

groups breeding in a number of ponds within reach of each other as a 'meta-population'.

Great crested (or warty) newt

Picture courtesy English Nature's online image Library



Breeding ponds should be free of fish and have few waterfowl. The pond area should ideally be 100 - 300sq.m, have variable depth and preferably be one of a number within 250m of each other. Ponds supporting a wide range of invertebrates with a quantity of floating and submerged vegetation and areas of open water are ideal for successful breeding. High levels of human or animal disturbance, pollution and shading by surrounding trees and shrubs can cause considerable damage.

Great crested newts can, however, be found in ponds of all kinds, including in small temporary pools and even man-made features such as settling lagoons and wheel-washes. Newts can survive infrequent drying out of the breeding pond. Eggs are laid on underwater leaves near pond margins. After four weeks the eggs hatch as tadpoles, which then take a further three months to develop into a young newt capable of leaving the water. At this time the young newts will leave the water to spend between one and three years in surrounding terrestrial habitat while they become sexually mature.

7.1.3 Survey

Although the records for great crested newts in Staffordshire are fairly good, it should be borne in mind that 'Froglife'; a national conservation body, estimates that nationally only between 16-20% of great crested newt breeding sites are known and recorded.

All land, including long-standing post industrial/demolition sites, with suitable established vegetation and potential refuge features, such as rubble, within 500m of standing water bodies (these do not necessarily have to be on-site) may support great crested newts. Survey should cover all potential breeding sites within 250 metres of the proposal site, and include ponds up to 500 metres distance if habitat connectivity and quality are good.

Surveys should be undertaken between mid-March and mid-June when newts are more usually present within their breeding sites. At least four surveys of all potential breeding sites are required to ascertain presence or absence. A range of methods should be used. Surveys may only be carried out under licence from Natural England by a qualified licence holder.

In some circumstances hand searches can be carried out to establish presence within terrestrial habitat but this generally occurs under licence where aquatic survey has already identified a breeding population in the locality.

The following aspects should be investigated:

- Long term records of species use of the site, if available;
- Population size;
- Breeding status;
- Breeding site(s);
- The nature and size of feeding habitat;
- Routes of movement;
- For terrestrial habitat, the importance of the site to the species;
- An assessment of the impact of the proposed scheme and proposals for mitigation;
- Opportunities for habitat creation or enhancement.

The Herpetofauna Workers' Manual produced by the Joint Nature Conservation Committee in 1998 provides the most comprehensive digest of surveying and management practice. In addition English Nature published 'Great Crested Newt Mitigation Guidelines' (2001). This is available on the Natural England website.

7.1.4 Practical Application

The ecology of great crested newts and the nature of the protective legislation make commissioning specialist survey work inevitable where there is likelihood of newt presence. Expert advice is usually necessary to establish the potential impact of development and develop suitable mitigation proposals

that will meet legal requirements. Forward planning is the best means to prevent delays. It is essential to give enough time to undertake a full survey, to prepare a mitigation strategy and, where necessary to apply for a Defra licence.

The following should be considered:

- Natural England and Defra requirements;
- Timing of work;
- Retention and/or provision of breeding ponds;
- Links to other breeding ponds/newt populations in the immediate area;
- Location of features such as drains and culverts which can be used by newts and means of mitigating against impacts of these;
- Retention and/or provision of suitable terrestrial habitat;
- Protection of populations and habitat during development;
- Management of ponds and terrestrial habitat;
- Monitoring of the effect of the development on newt populations.

7.1.5 Mitigation

The extent of mitigation required will be dependent upon the scale of the impact and the size of population affected. A Natural England licence will be required for any mitigation proposed. Natural England's "Great Crested Newt Mitigation Guidelines" provides guidance on all aspects of survey, impact assessment and mitigation, including translocation and habitat enhancement for newts. Breeding ponds and terrestrial habitat should be protected where possible. Where there is no alternative to loss or disturbance of these areas, translocation can be carried out, under licence, to a nearby location. This involves prior creation of a suitable receptor site and clearance of newts, often over several months. Suitable management of receptor sites must be secured prior to development to ensure that the newts have the best chance of survival. Post development monitoring is also required.

7.2 Other amphibians - common frog, common toad, smooth newt and palmate newt

7.2.1 Introduction

All these four species are protected under the Wildlife and Countryside Act 1981 (as amended). Although only protected from sale only, these species are indicators of good habitat. Their populations are known to have declined significantly over recent decades and therefore they deserve consideration beyond the level of protection that the law affords. It is therefore good practice to be aware that any of these species may be present around wetlands and to take account of the effects that any proposed operation and/or new development may have on these species.

7.2.2 Ecology

All four species are associated with wetland habitats. Wetlands, including rivers, canals and ponds and their associated habitats such as swamps, fens, wet and marshy grassland have become greatly modified over the past few decades and the wildlife that relies upon them have shown the great declines across the county.

All breed at roughly the same time, with frogs being earliest, sometimes mid-late February, but most often spawning during early March, when the water reaches 4°C, toads often come next when the water reaches 5-6 °C. Smooth newts may begin to enter the water at 4°C, but the majority of the breeding population arrives when the water is between 10-15 °C. Palmate newts present a slightly different situation in that they may hibernate in the breeding pond and be present from the preceding November, and they may be active by the second week of February.

7.2.3 Survey

No licences are necessary for conducting surveys for common frogs, common toads, smooth and palmate newts. Therefore all that is necessary for a survey is some experience in amphibian recognition, and the best way to confirm the presence of amphibians is to visit the relevant water body several times during mid March to mid April. Observations can take place during the day, or visits can be made at night, using torches. Surveyors should note of the presence of great crested newts but should not try to catch these to confirm identity, as this requires a licence. The suspected presence of GCN will bring into operation a whole range of further responsibilities (see Section 7.1).

7.2.4 Practical Application

In general, habitat replacement in compensation for the loss of any amphibian breeding-habitat would be recommended for any development which may destroy part or all of an amphibian breeding site. It would be desirable to remove as many of the potentially affected animals away from the site as possible to a place of safety before commencing work. It may be necessary to trap the animals systematically and remove them to a place of safety behind a fence designed to prevent them from re-entering the working area. In practice

most amphibian survey, mitigation and translocation works is carried out as part of great crested newt work.

7.2.5 Mitigation

In general mitigation procedures for other amphibians are the same as those for great crested newts. Amphibians, and toads in particular may be found lying up among brickwork and stone walls, at ground level, where crevices and loose joints are present. Care should be taken in dismantling old brickwork and walls and any amphibians, apart from great crested newts (if in doubt seek advice) may safely be moved away and placed in dense vegetation a reasonable distance away from the working area.

Amphibians should not be handled for too long as human hands, especially when dry, may harm their skin. Where a large number of amphibians are likely to be encountered a cool container of some sort, preferably with damp vegetation may be used to transport them.

7.3 Grass Snake

7.3.1 Introduction

The Wildlife and Countryside Act 1981 (as amended) protects grass snakes from killing injury and sale. Restricted to England and Wales, this is the largest species of British snake growing up to 100cm long. It has an olive green body with a distinct yellow and black collar behind the head.

7.3.2 Ecology

The grass snake is generally a shy and retiring animal and will probably slip away quickly once work is started near to it. Grass snakes are not venomous and feed on a range of prey including small mammals, young birds, amphibians, invertebrates such as slugs and snails, fish and other aquatic prey. They are often found in damp habitats associated with ponds, streams, dykes, rivers, wet ditches and wet grassland. They also seek prey on land and in shrubs, which they climb and in which they also bask. Mating takes place between the end of March and June with young hatching about the end of August or early September. The laying site can be as far as 1000m from the usual feeding habitat and several females may lay at one site. Egg-laying sites include dunghills and compost heaps, meaning that gardens potentially provide vital habitat during the grass snake life cycle. Hibernation takes place in piles of dead vegetation, holes, burrows and even stone walls located as far as 2000m from their usual habitat.

Grass Snake

Picture: English Nature/Peter Wakely



7.3.3 Survey

Survey for reptiles is notoriously unreliable. A good indicator for the presence of grass snakes will be from the biological records centre or local knowledge. April, May and September are the best months for surveying, when animals are most likely to be seen basking. Use of artificial refugia is a useful survey technique in certain situations. 'The Herpetofauna Workers Manual' produced by the Joint Nature Conservation Committee in 1998 provides the most comprehensive digest of surveying.

Patches of bare ground with a south facing aspect or where openings in woodland canopy/overhanging vegetation allows direct sunlight to reach the ground, particularly where there is nearby cover for them to slip into if disturbed, are potential sites for grass snakes. Grass snakes rely upon aggregations of vegetation which can include garden compost heaps, for both hibernation and for incubating their eggs. Surveys should highlight any possible hibernation or breeding sites as well as looking for the animals on site. One way to survey for reptiles is to place artificial shelters (tin sheets or rubber mats) across the site as snakes and other reptiles will shelter beneath these, particularly in the morning to warm up.

7.3.4 Practical Application

The critical factor is recognising that grass snakes may be present sufficiently far ahead of the planned operations to allow incorporation of protection measures into working practices. The objective is to prevent or minimise killing or injury and so it is important to make certain that no grass snakes are present on site before the work begins, or that those that are present can escape injury as much as possible. Grass snakes are timid animals and will try to avoid people and activity but are particularly vulnerable in winter and in periods of cool weather. Works potentially affecting grass snakes should be, where possible, scheduled to avoid these periods.

Care must be taken in regard of any works which will involve the removal or disturbance of vegetation piles, especially near to water-bodies during the hibernation and incubation periods for grass snakes.

7.3.5 Mitigation

On a small site it may be possible to clear vegetation by hand before commencing operations. When clearing vegetation, work should move outward from the core area of planned activity so that retreating animals move off the site. Alternatively, vegetation stripping can be undertaken at the end of the previous summer, so that the ground may be kept clear until work begins to prevent snakes from using the site immediately prior to the commencement of works.

Piles of stripped vegetation can be retained in undisturbed areas to provide refuges. It is important to ensure that there are no likely breeding sites available within the working area as moving the eggs or disturbing vegetation containing grass snake eggs can prevent them from hatching or could easily kill tiny hatchlings. Artificial shelters (tin sheets or rubber mats) might provide

a mechanism to encourage snakes away from the proposed working area, although this will not remove the need to remove surface vegetation by hand before beginning work.

Where feasible, thought should be given to making the completed site more suitable for reptiles, such as by the provision areas of rough vegetation with a combination of dense and open areas. Thought might be given to placing piles of wood chip within the habitat to allow a suitable substrate for hibernation and egg incubation to develop. Alternatively a suitable receptor site should be provided for translocation of grass snakes and managed appropriately.

7.4 Adder

7.4.1 Introduction

The Wildlife and Countryside Act 1981 (as amended) protects Adders from killing injury and sale. The adder is a species of dry habitats including heathlands, but it is generally a shy and retiring animal and, as long as it has an opportunity, will probably slip away quickly once work is started near to it.

7.4.2 Ecology

Adders are found in many habitats, more frequently in heathy and scrubby sites with suitable habitats for hibernation (old rabbit holes, fissures in collapsed walls, or the burrows of small mammals in dry well drained and sunlit banks. Although the adder is not truly a woodland animal, it is frequently seen alongside rides or at the edge of woods, particularly those with an open structure and dry, often heathy, ground flora. They may also be found in wet habitats, especially bogs, where they favour the taller dryer tussocks. Adders are one of the last reptiles to enter hibernation and one of the first to emerge in spring. Typically they are active between late February and early November; they hibernate during the deep winter months. Adders give birth to live young and so there are few issues with respect to disturbing natal sites.

7.4.3 Survey

Survey for reptiles is notoriously unreliable. A good indicator for the presence of adders will be from the biological records centre or local knowledge. April, May and September are the best months for surveying, when animals are most likely to be seen basking. Use of artificial refugia is a useful survey technique in certain situations. 'The Herpetofauna Workers Manual' produced by the Joint Nature Conservation Committee in 1998 provides the most comprehensive digest of surveying.

Survey generally involves observing the animals at basking sites and so specialists familiar with adder behaviour will generally be required to undertake these surveys. Adders bask in patches of bare ground with a south facing aspect or where openings in woodland canopy/overhanging vegetation allow direct sunlight to reach the ground, particularly where there is nearby cover for them to slip into if disturbed. They tend to use more open basking sites than grass snakes. Adders will use artificial shelters (tin sheets or rubber mats) and placing such artificial refuges can be a good way to find out whether they are on site or not. The young of adders are secretive and very hard to survey.

7.4.4 Practical Application

The critical factor is recognising that adders may be present sufficiently far ahead of the planned operations to allow incorporation of protection measures into working practices. The objective is to prevent or minimise killing or injury and so it is important to make certain that no adders are present on site before work begins, or that those that are present can escape injury as much as possible. Adders are particularly vulnerable in winter and in periods of cool weather when they may be torpid and unable to escape harm. Works

potentially affecting adders should be, where possible, scheduled to avoid these periods.

7.4.5 Mitigation

Adders being timid animals, careful hand clearance of vegetation before commencing major groundwork can be effective as the activity will probably drive them off site. Prior to clearance work all artificial and natural refugia or shelters should be removed from working areas to prevent disturbed animals seeking refuge. Placing artificial shelters offsite, around the perimeter of the working area may encourage the adders offsite and keep them off during the working phase.

On a small site it may be possible to clear vegetation by hand before commencing operations. When clearing vegetation, work should move outward from the core area of planned activity so that retreating animals move off the site. Alternatively, vegetation stripping can be undertaken at the end of the previous summer, so that the ground may be kept clear until work begins to prevent snakes from using the site immediately prior to the commencement of works. Piles of stripped vegetation can be retained in undisturbed areas to provide refuges. Artificial shelters (tin sheets or rubber mats) might provide a mechanism to encourage snakes away from the proposed working area, although this will not remove the need to remove surface vegetation by hand before beginning work.

Where major habitat loss is inevitable, a suitable receptor site should be provided for translocation of adders and managed appropriately. If habitat remains, if possible suitable shelters/hibernaculae, basking sites and foraging vegetation for adders should be provided once the project has been completed.

7.5 Slow Worm

7.5.1 Introduction

The Wildlife and Countryside Act 1981 (as amended) protects slow worms from killing injury and sale. The slow worm is associated with dry habitats such as grassland and scrub, particularly along railway and canal corridors in urban areas and other places where disturbance is at a minimum such as churchyards, allotments and gardens. They require thick vegetation, especially grasses, along with loose soil to burrow in and plenty of refugia.

7.5.2 Ecology

The slow worm differs from other reptiles in that it rarely basks in the open and spends more time under cover, deep in the vegetation and below ground making surveying and monitoring for them quite difficult. Hibernation takes place underground through the autumn and winter and the species is active from early spring to mid-October though is often scarcely noticed. The normal diet is slugs and snails though other invertebrates are eaten as well. The breeding season lasts from May to September. Slow worms seem to occupy relatively small territories, with the young favouring damper sites while the adults prefer dry ground

7.5.3 Survey

Observing basking slow worms in the open is difficult therefore the most reliable survey method is to place tins or other artificial shelters across the site and to regularly monitor these and remove animals to a safe receptor. 'The Herpetofauna Workers Manual' produced by the Joint Nature Conservation Committee in 1998 provides the most comprehensive digest of surveying.

7.5.4 Practical Application

Once slow worms are detected on site a reptile specialist may be able to advise on the likely territory used. As the territory is likely to be relatively small there may sometimes be scope to incorporate it undisturbed within the development. The slow worm has a predominantly subterranean lifestyle and so disturbance is likely to drive it underground where it will be vulnerable to excavation and construction work. Where leaving the territory intact within a development is not possible then the only safe means to deal with slow worms will be to remove them from the site and to translocate them to a suitable safe habitat away from the works.

7.5.5 Mitigation

Ideally mitigation should be achieved by layout and working practices that allow retention of slow worm territory undisturbed. Where this is not possible, a suitable receptor site should be provided for translocation of slow worms and managed appropriately. Design of projects should consider potential for retention and/or provision of dry grassland and scrub where disturbance is minimal and provision of habitat piles of stones and logs, which provide resting/hibernation sites.

8.0 Invertebrates

8.1 White-Clawed Crayfish

8.1.1 Introduction

The white-clawed crayfish is a lobster-like crustacean that grows to 12cm in length. It is Britain's only native freshwater crayfish and is mainly restricted to England and Wales. The white-clawed crayfish is a rare species across Europe and is listed in Annex II of the 1992 92/43/EEC Directive. SSSIs and SACs have been designated to protect this species. In Staffordshire these include Stowe pool and Walk Mill clay pit SSSI, the River Mease SAC and the Peak District Dales SAC. The Conservation of Habitats & Species Regulations 2010 impose a duty to protect such species within the wider countryside. It is an offence to remove this species from the wild without a licence and it is also illegal to introduce non-native crayfish to sites.

Once widespread in suitable conditions, populations have now contracted significantly due to the combined influence of crayfish 'plague' (a disease thought to have been introduced by the non-native Signal Crayfish) and competition with more aggressive introduced species of crayfish. The UK crayfish population is internationally important and the national strongholds for the native crayfish are now concentrated in central and northern England, which makes the Staffordshire populations both nationally and internationally important. Therefore it is important to consider these animals during any works to rivers, streams and large ponds.

Particular care must be exercised where work is likely to harm a crayfish or disturb, damage or destroy their place of rest or breeding site. The objective is largely to protect the habitat of the crayfish and therefore the animals themselves. Moving (translocating) crayfish from a threatened area to a safer one requires a licence. Appropriate surveys are therefore required to assess whether these animals are present.

8.1.2 Ecology

Crayfish typically prefer shallow streams and rivers, but they will sometimes live in deeper water. Typically the water will be clean and slightly alkaline, with a mix of cobbles, gravel and boulders with undercut banks, roots and riparian/emergent vegetation - not untypical of the supports of older bridges. Crayfish, however, appear able to thrive in many apparently sub-optimal habitats. Crayfish feed on a wide range of vegetable and animal matter. Shelter such as rocks or stones, aquatic vegetation, tree roots or a bank to burrow into, is important for survival as crayfish are predated on by the larger species of fish as well as birds and otters.

One of the most significant threats to freshwater crayfish is the spread of a lethal disease known as "Crayfish Plague". To prevent the spread of this the Environment Agency has proposed a code of practice, the "Crayfish Code", (see 8.1.6). Protected, and other significant, populations often persist due to

isolation from other water bodies or catchments where non-native crayfish are present. Therefore an important element in protecting these populations is maintenance of this isolation.

Crayfish are sensitive to pesticides and other pollutants particularly those lowering the oxygen content of the water so accidental spills or persistent inflows such as discharges from road surfaces may have a negative influence on crayfish populations. They are also susceptible to conditions of persistent high turbidity and siltation, such as may occur with construction work.

White-clawed Crayfish in a stream

Picture: Paul Glendell / English Nature



8.1.3 Survey

A survey will be required for all sites known or thought to support native crayfish particularly for work that involves:

- Reshaping the banks of a river, stream or large pond.
- Activities that require work that takes place below the water line or involves permanent or temporary removal or diversion of flow.
- Work that involves siting equipment in the riverbed.

Information required to inform project design includes:

- Records of white-clawed crayfish for the watercourse concerned and the catchment as a whole;
- Up-to date survey where records indicate crayfish presence anywhere on the watercourse or within its immediate catchment;
- Measures to protect crayfish populations and habitat should they be present;
- Monitoring proposals.

When surveying for crayfish, it is important that competence and confidence in identification can be demonstrated. Survey work and the development of mitigation measures and monitoring work should be undertaken by suitably experienced surveyors or ecological consultants. It is also important that the personnel are licensed by Natural England to carry out any survey work that would contravene the legislation protecting crayfish.

8.1.4 Practical Application

Works affecting SACs or SSSIs will require Natural England consent. Including appropriate measures in working practices when working on watercourses and associated structures such as bridges will go a long way to protecting crayfish and other plants and animals that depend upon the water environment. Habitat disturbance should be minimised as far as possible. Work procedures should ensure that any spills, paint thinners, setting agents or construction chemicals are contained and dealt with appropriately and are not allowed to pollute the watercourse. Rubble and building spoil should be removed from site and should not be tipped into the water body. Vehicles, cranes etc., associated with the work should not be allowed to traverse the riverbed freely unless any native crayfish present have been removed and excluded from the working area. All equipment previously used in other rivers and water bodies should be disinfected or thoroughly dried before being used including wet/dry suits, scaffolding, excavators etc.

8.1.5 Mitigation and enhancement

Proposals affecting crayfish habitat should consider the following.

- Maintenance of suitable water quality and chemistry;
- Measures to avoid sediment or other polluting material entering the watercourse/water body;
- Protection or provision of refuges within and along the edge of water bodies, together with aquatic vegetation

Work on bridges can provide opportunities for positive action to help crayfish. Even simple measures, such as the inclusion of small cavities or ventilation bricks can provide refuges.

Case study – Morfe Mill Bridge.

A deep scour hole threatens the safety of the bridge



At Morfe Mill a large scour hole threatened the safety of the bridge. Repairs were required to the bridge, where a supporting wall had begun to collapse allowing the current to erode the banks and to scour cavities around the base. The engineers retained a sandstone scour hole behind the repaired brickwork and constructed purpose-built access ports to allow the crayfish to pass through the wall into their own private water-filled cavity, providing them with a place of protection and shelter.

The cavity has been left open behind the repaired brickwork and access holes left for crayfish once the cavity has flooded



8.1.6 Environment Agency Crayfish Code

Protect Crayfish Habitat Native crayfish are protected by law, but their habitat too must be conserved. Always seek advice before carrying out works in or near water which may disturb crayfish or their habitat.

Help Stop Crayfish Plague Plague can be spread accidentally on damp equipment such as fishing tackle. If you've fished where alien crayfish are present, please dry or disinfect equipment before taking a trip to another water.

Never Use Crayfish as Bait It is illegal to take native crayfish from the wild, and is an offence under national fisheries bylaw to use any crayfish (alive or dead) or any crayfish part as bait.

Don't Introduce Crayfish It is illegal to introduce non-native crayfish anywhere in England or Wales. To do so could accelerate the spread of disease and introduced populations are extremely difficult to control.

Report Any Sightings If you see a crayfish (in the wild or for sale alive) please contact the Environment Agency on 0845 933 3111 and ask for Fisheries, Ecology and Recreation.

9.0 Fish

9.1 Bullhead

9.1.1 Introduction

The bullhead is a small fish species which is not individually protected by legislation in the UK but is listed in Annex II of the Habitats Directive for protection through site designation. The bullhead is comparatively rare at a European scale, making the UK population of European significance. SSSIs and SACs have been designated specifically to protect bullhead. In Staffordshire these include parts of the River Mease SAC and Peak District Dales SAC. The Conservation of Habitats & Species Regulations 2010 impose a duty to protect such species within the wider countryside. Measures taken to ensure the protection of bullhead are likely to safeguard other aquatic species contributing towards the County Council's commitment towards sustainable development.

9.1.2 Ecology

The bullhead is a small territorial bottom-dwelling fish that inhabits rivers, and streams, particularly those with fast-flowing, clear, shallow water with a hard substrate (gravel/ cobbles/ pebbles), is frequently found in the headwaters of upland streams, but also at times in lakes. The habitat preference of the bullhead is considered synonymous with habitat used by juvenile salmonids, which require riffle/pool sequences with the presence of boulders and cover. Spawning habitat is coarse substrate with large stones, juvenile habitat shallow stony riffles, and adult habitat cover with the presence of large stones.

However, it can also occur in lowland situations on softer substrates so long as the water is well oxygenated and there is sufficient cover, such as in the case of the River Mease where submerged aquatic plants form important cover.

The bullhead has traditionally been considered to be a good indicator for water quality. Recent records have indicated that it may be more tolerant of pollution than first thought but eutrophication and lowered oxygen levels are limiting factors. The bullhead is largely nocturnal, spending much of the daytime hiding beneath stones and foraging around gravel, cobbles and weed within streams and rivers, coming out at dusk and night to feed.

Bullheads have a very limited home range, and genetically discrete populations exist in small sections of rivers or in individual tributaries. Consequently, several distinct populations of bullheads may exist within each SAC river catchment and these do not genetically mix. This means that the stock in each river cannot necessarily be treated as one population.

9.1.3 Survey

Specialist expertise is required for bullhead survey as suitable techniques depend on circumstances such as habitat quality and extent. Electro-fishing is a common means of establishing bullhead presence and estimating population levels. In small areas the presence of bullheads may be detected by lifting stones or disturbing weed beds within the water course. The fish then may be seen trying to escape. Survey may only be required where major works are planned but Natural England and the Environment Agency should always be consulted in regard of requirements.

9.1.4 Practical Application

Works affecting SACs or SSSIs will require Natural England consent. The best option is to minimise disturbance to the watercourse, especially to riffle areas. Retention of cover and shade are important for this species. Adverse effects on water quality should be avoided. Including appropriate measures in working practices when working on watercourses and associated structures such as bridges will go a long way to protecting bullhead. Habitat disturbance should be minimised as far as possible. Work procedures should ensure that any spills, paint thinners, setting agents or construction chemicals are contained and dealt with appropriately and are not allowed to pollute the watercourse. Rubble and building spoil should be removed from site and should not be tipped into the water body. Vehicles, cranes etc., associated with the work should not be allowed to traverse the riverbed freely where bullheads are present.

River engineering works should avoid creating increased siltation where bullheads are present and should preserve varied stony substrates and vegetation cover. Introduction of vertical structures over 18 cm in height should be avoided on a bullhead river as these form barriers to movement and therefore population mixing and genetic exchange.

Channelisation, involving straightening, widening, deepening, removal or modification of natural features and isolating the channel from its floodplain (including lateral connections), is likely to be of detriment to bullhead populations. All such actions change natural flow regimes and sediment dynamics. Removal of any hard substrate during dredging operations reduces the habitat available to bullhead. Excessive management of riparian trees and the clearance of woody debris/leaf litter from the channel during routine operations to maintain flood defence capacity are also likely to be detrimental to bullhead abundance.

9.1.5 Mitigation

In consultation with Natural England and the Environment Agency, work should be planned to minimise disturbance. Measures to protect water quality, prevent siltation and retain a natural river bed should be incorporated into projects. Opportunities to improve river morphology should be explored.

9.2 Spined Loach

9.2.1 Introduction

As with the bullhead the spined loach is not protected by legislation but is listed in Annex II of the Habitats Directive. SSSIs and SACs have been designated specifically to protect spined loach populations. In Staffordshire these include parts of the River Mease SAC. The Conservation of Habitats & Species Regulations 2010 imposes a duty to protect such species within the wider countryside.

In the UK, spined loach are believed to be restricted to just five east-flowing river systems– the Rivers Trent, Welland, Witham, Nene and Great Ouse, with their associated waterways. Within these catchments it appears to occur patchily in a variety of water bodies, including small streams, large rivers and both large and small drainage ditches. Little is known about its occurrence in open water, although it is known from a number of small lakes and gravel-pits. With limited means of dispersal, the UK populations are largely genetically isolated from each other.

9.2.2 Ecology

The spined loach is a little known species of fish with a very restricted distribution in the UK, being confined to parts of the Midlands and eastern England. It occurs in a number of discrete scattered populations, which are susceptible to local extinction. There is some evidence that some UK populations may comprise different species or sub-species.

The fish requires a combination of patches of stony substrate/ vegetation in shallow water, in which to lay its eggs, and areas dominated by sand or silt in which it both feeds and lies partly buried when it is not feeding. Because the silty habitat and submerged plants that this fish requires are usually only available in localised patches, the fish tends to have a clumped population distribution in the waterways where it occurs. The spined loach is vulnerable

to operations which result in sediment stripping, vegetation loss or the canalisation of streams.

The spined loach has a short lifecycle and is therefore dependent upon high rates of recruitment to maintain its population and as a consequence is extremely vulnerable to chance events such as pulses of pollution or inappropriate habitat management during the spawning or larval stages of its reproductive cycle. Because of its benthic (bottom-dwelling) lifestyle the spined loach is vulnerable to the effects of artificially high populations of bottom-feeding fish, like carp and bream. .

9.2.3 Survey

The spined loach is only likely to be found in the River Mease and its tributaries. The Environment Agency and Natural England should be consulted concerning survey requirements and techniques which may be needed prior to working on this river system.

9.2.4 Practical Application

Where work might affect this species Natural England and the Environment Agency should be consulted. Management practices such as weed cutting and dredging, for land drainage and flood defence purposes, have been implicated as having potentially deleterious impacts on spined loach.

9.2.5 Mitigation

In channel works on rivers where spined loach have been recorded should seek to maintain or create a mosaic of submerged vegetation and bare sandy substrate, with a good range of water depths and active growth of marginal vegetation. Since these habitats must be available continually to spined loach populations, it is crucial that any such activity at sites where the species occurs (or is to be encouraged) is undertaken in a patchy manner on a rotational basis, always leaving frequent suitable habitat for egg development, juveniles and adults.

Loss of habitat diversity through canalisation should be avoided, while channels badly affected by historical works should be considered for restoration using sympathetic engineering techniques. Dredging should be largely restricted to mid-channel with a long return period for rotational dredging frequency. Weed cutting should be undertaken to retain approximately one third of the submerged macrophyte beds at any one time, in a patchy distribution that encourages natural flow diversity.

10.0 Plants

10.1 Floating water-plantain

10.1 Introduction

Floating water-plantain (*Luronium natans*), is protected under Schedule 8 of the WCA 1981 and listed in Schedule 4 of the Conservation of Habitats & Species Regulations 2010. It is an offence for any person, including the landowner, to intentionally pick, uproot or destroy these specially protected wild plants. The Cannock Extension Canal has been notified as a SSSI and SAC for this species. Floating water-plantain is a priority species in the UK Biodiversity Action Plan and the Staffordshire Biodiversity Action Plan. Objectives are to maintain its current range, protect it and its habitat and increase population size where possible.

A licence is required from Natural England for any survey or research work affecting this species, including the taking of samples for survey and identification purposes. Natural England should be consulted should floating water-plantain be found. Activities associated with development are controlled by means of licences issued by Natural England.

10.1.2 Ecology

Floating water-plantain is a European endemic aquatic plant that is rare and threatened across its whole range. It occurs in a range of freshwater situations but thrives best in water of low nutrient status with open areas with a moderate degree of disturbance, where the growth of emergent vegetation is held in check. Floating water-plantain grows as a submerged aquatic, a floating-leaved aquatic, and on exposed mud where water levels fluctuate.

All aspects of canal restoration, improvement and management works and proposals that have implications for water quality can potentially impact on this species. The main threat to canal populations is from the re-opening of waterways, with subsequent high levels of motorised recreational boat traffic. This can directly suppress growth of the plant through increased turbidity of the water.

10.1.3 Survey

All proposals affecting canals and associated water-bodies that are known or suspected to support floating water-plantain, especially dredging, restoration or alterations to the channel, should provide the following information:

- Evidence of a records search;
- Aquatic plant survey;
- Should floating water-plantain be found, measures to protect the population.

The plants die back in the autumn and winter so survey should be carried out between May and August. A competence in botanical identification, especially

of submerged and floating aquatic plant species, is a prerequisite when surveying for this species which must be identified in the field as samples cannot be taken. Verification of the identification by a licensed surveyor will be required.

10.1.4 Practical Application and Mitigation

If floating water-plantain might be affected by planning or engineering proposals, the following should be incorporated into scheme design:

- Protection of individual plants during works affecting the habitat;
- Creation of refuges within and alongside water bodies to protect against disturbance;
- Protection of water quality.

11.0 Birds

11.1 All Wild Birds

11.1.1 Introduction

All wild birds are protected under the Wildlife and Countryside Act 1981 (as amended). Additional protection is afforded to a number of birds listed on Schedule 1 of the Act. Operations likely to injure or kill any wild bird or damage its nest and operations likely to disturb a Schedule 1 species must be avoided. There are no exceptions and no licence can be granted which allows this to occur. There are a limited number of birds, potentially considered pest species, where a licence may be granted but then only for specific reasons. No licence may be given for the purposes of development.

11.1.2 General Ecology

Detailed notes on a range of species potentially encountered in Staffordshire are provided in Section 11.2. Protection generally relates to the nesting season. Although the breeding cycles of most birds are well known, because they are triggered by seasonal changes, there are no fixed dates which dictate when site work may be carried out. The breeding season for most species is usually between March and August but due to climate change this may be extended to February to and September for certain species. Despite the variation in choice of breeding cycle it is still probably safe in Staffordshire to undertake site work between 1 September and 1 March, except where bird species with unusual breeding dates may be present or the weather is unusually mild.

The choice of nest sites and the timing of their breeding are as varied as the species of birds themselves. Although most people think that birds nest in trees, almost any feature on a site could potentially harbour a nest. Many small birds are ground nesting and so operations that avoid hedgerows, scrub and trees may not themselves be safe. Tree-nesting birds are often restricted to mature trees with rot-holes, splits, cracks, broken limbs and flaking bark, rather than young vigorous trees, but some will nest at the base of such trees. Below is a rough guide for timing operations which may affect tree, ground and hedgerow nesting birds.

Jan		No restrictions on operations
Feb		
Mar	Birds Nesting	Operations must include measures for avoidance of damage to breeding birds
Apr		
May		
Jun		
Jul		
Aug		
Sep	Birds feeding on fruits and seeds	Operations permitted but leave as late as possible
Oct		
Nov		
Dec		

Adapted from the Guidance note published by Derbyshire C.C.

The following protocol should be followed if work is deemed to be necessary within or close to the core nesting season, or may affect the habitat of species known to nest outside the core season.

- Before works commence a suitably qualified or experienced person should undertake a careful survey of the proposed working area to ensure there are no nesting birds. Potential locations include scrub, bushes, open grassland, mature or dense canopy trees, open water, tall herbs etc. Each area should be observed for at least 30 minutes and note taken of whether any birds are nesting or preparing to nest (e.g. carrying nest building materials and/or food for the young). The observations should take place from a reasonable distance from the proposed working area, to avoid disturbance to any possible nesting birds, and it may be necessary to observe the area from more than one vantage point.
- Birds incubating eggs are extremely elusive and therefore a more detailed search of the areas may be necessary but care must be taken not to disturb nesting birds particularly where a Schedule 1 species may be present. Searches for possible nest sites may be conducted using angled mirrors or similar to avoid flushing birds off hidden nests.
- If no signs of nesting birds are observed then works may start but the site must be constantly monitored during the working period.
- A record of the observations and any results should be made and retained for reference.

The protocol does not apply where it is suspected that a Schedule 1 species may be present and specific advice must be sought in these circumstances.

If at any time nesting birds are observed, works which may disturb them must cease immediately and advice sought. An additional consideration is the effect that any work may have on over-wintering species. Some sites within Staffordshire have been selected for protection for their populations of over-wintering birds such as waterfowl (ducks and geese) and for Schedule 1 species such as birds of prey. Although at this time of year these birds are not explicitly protected by law, it would be good practice to minimise disturbance where possible. In addition some habitats provide over-wintering food such as the seeds and fruits of trees and hedgerows adjoining road verge and plants on derelict land. Where possible food sources should be preserved on site for as long as possible.

11.2 Bird Species of Particular Interest in Staffordshire

The following is a selected list of species that could be encountered when carrying out work in Staffordshire. It is not an exhaustive list of bird species of conservation concern in the county. The egg laying or fledging times listed below are not fixed and do not replace the need to conduct a proper survey before commencing work on a site where there is any possibility of nesting birds present.

Hobby

Listed in Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). Usually nesting in the old nest of other species like carrion crow, or, but rarely, on cliffs. Hobbies are usually single-brooded and begin laying mid to late June with a total time for incubation to fledging of around 65 days and so they are likely to have cleared the nest site by September.

**Peregrine**

Listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). Their population was historically affected by persecution and agrichemicals it is now governed by the availability of breeding sites. They nest on cliff or quarry faces, ledges on buildings, chimneys, ruins and occasionally old nests in trees. Typically single-brooded, they begin laying mid-March and should be finished nesting by the end of July.



Picture: Courtesy of Mr Tommy Holden:
Peregrine

Barn Owl

Listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and a Staffordshire BAP target species. The range of this species is governed by the availability of breeding sites. It will nest in old trees with suitable holes and cavities, in suitable (often old) and sometimes occupied/frequently used buildings and nest boxes.

In Britain the only month when barn owls have not been recorded breeding is January. Protecting the scarce nesting sites of this bird is of critical importance for its protection and meeting SBAP targets. The nest sites are legally protected when they are in use, which may be nearly year-round. Therefore survey of barns and other buildings that may support barn owls should always be required prior to demolition or conversion.



Picture: Courtesy of Mr Tommy Holden:
Barn Owl

Little Ringed Plover

Listed in Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). A ground-nesting species with a preference for land reclamation, extraction and civil engineering sites. Typically they begin laying in April and frequently raise two broods. Each brood may take 50 days from laying to fledging and so they are likely to have cleared the nest by August. It is important to note that prior to fledging these young birds are not confined to the nest, but wander widely around the surrounding land, foraging for food.



Picture: courtesy of Phil Jones (WMBC):
Little Ringed Plover

Black Redstart

Listed in Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). Nests in walls and roofs, buildings, outbuildings and a wide range of other structures, generally near to canals and feeds on insects. This species is closely associated with the activities of humans. As its natural habitat is scarce the black redstart has adopted derelict land, rubble-strewn development or reclamation sites as a foraging habitat. It likes open spaces with prominent song posts, scattered debris, interspersed with weeds and patches of bare soil. The black redstart begins laying between the middle and end of April and appears generally to be single-brooded with a total time from incubation to fledging of about 36 days and so the black redstarts should be clear of the nest site by July.



Picture: courtesy of Phil Jones (WMBC):
Black Redstart

Kingfisher

Listed in Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). Generally nests in a tunnel excavated into the soil of a vertical faced bank overlooking water, usually a stream or river. Kingfishers may nest in one location and hunt in another, therefore fish presence or absence is not always an indicator. In Staffordshire kingfishers are known to excavate their nests in river or stream banks adjacent to bridges, where scour undercuts the banks, thereby keeping the faces free of vegetation. Kingfishers begin laying in April, incubation to fledging may take 48 days and so the nest holes should be clear by July.



Picture: Courtesy of Mr Tommy Holden: Kingfisher

Woodlark

Listed in Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) & Staffordshire BAP target species. Woodlarks favour nesting in "clear fells" in commercial forestry, especially with heathy vegetation. Woodlarks are a ground-nesting species, which begin laying around mid March, but due to seasonal variation may delay laying until June and the time from incubation to fledging is about 28 days and so nest sites should be clear by August.



Picture: Courtesy of Steve Welch: Woodlark

Nightjar

Listed in Annex 1 of Birds Directive (79/409/EEC) and a Staffordshire BAP target species. A ground-nesting species with similar habitat preferences to woodlark including a strong preference for dry, open well drained habitats but that also exploits open woodland. The nightjar begins laying towards the end of May and can produce two broods, which may take 35 days from incubation to fledging, and so the nest sites should be clear by September.



Picture: Courtesy of Mr Martin Godfrey: Nightjar

Skylark

A national BAP target species with a costed action plan and a Staffordshire BAP target species. Ground nesting in grassland or low vegetation including crops. Skylarks require open areas with an absence of features such as trees and hedgerows that act as perches for potential predators. They will not nest in confined areas. Spring planting is key where arable land is used for nesting. The skylark begins laying between late March and late April and may produce four broods, each taking between 21 and 30 days to fledge and therefore they have usually cleared the nest site by August.



Picture: Courtesy of Mr Tommy Holden: Skylark

Snipe

Listed in Annex II of the Bonn Convention and a Staffordshire BAP target species. A ground nesting species in short sward grassland, the snipe favours land with impeded drainage with rich organic soil and easy access to either fresh or brackish shallow water. Snipe begin laying from early April and they usually produce only one brood that may take 41 days from incubation to fledging and therefore they have usually cleared the nest site by July. It is important to note that prior to fledging young snipe are not confined to the nest, but wander widely around the surrounding land, foraging for food.



Picture: Courtesy of Mr Tommy Holden: Snipe

Lapwing

A Staffordshire BAP target species. A ground nesting species of open spaces, often choosing a slightly raised area such the ridge between furrows and in a dry raised spot in a crop field. Lapwings begin laying mid-late March and they usually produce only one brood that may take 68 days from incubation to fledging. Therefore they have usually cleared the nest site by July. It is important to note that prior to fledging young lapwings are not confined to the nest, but wander widely around the surrounding land, foraging for food.



Picture: Courtesy of Mr Tommy Holden: Lapwing

Grey Partridge

A national BAP species with a full, costed action plan and a Staffordshire BAP target species. A ground nesting species, in long grass/thick vegetation, headlands and hedge bottoms. Field margins and the presence of a varied community of agricultural weeds and other seed-bearing species are important for this species. Partridges may begin laying from early April and continue through to September. They may produce many broods that may take 35 days from incubation to fledging and therefore they have usually cleared the nest site by October. It is important to note that prior to fledging young partridges are not confined to the nest, but wander widely around the surrounding land, foraging for food.



Picture: Courtesy of Mr Tommy Holden: Grey Partridge

Tree Sparrow

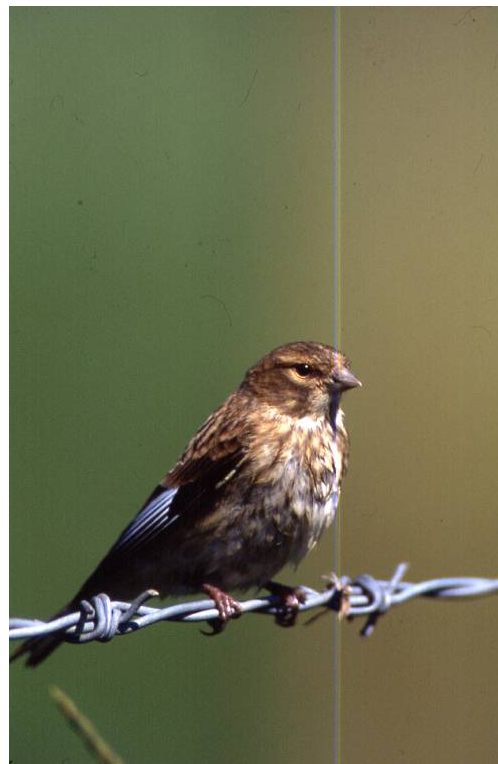
Staffordshire BAP target species, subject to considerable decline nationwide. Predominantly a hole nester, usually in trees, earth banks (it will exploit abandoned sand martin holes), buildings and sometimes in the foundations of large nests such as those of crows, grey herons or birds of prey. The tree sparrow lays between mid April and July and frequently produces two-three broods, each taking up to 34 days to fledge and therefore they have usually cleared the nest site by September.



Picture: Courtesy of Mr Tommy Holden: Tree Sparrow

Linnet

Staffordshire BAP target species. Nests very low in dense thorny scrub, bushes, hedges or trees, or on the ground. The linnet lays its eggs between mid April to early August and frequently produces two and sometimes three broods, each taking up to 31 days to fledge and therefore they have usually cleared the nest site by mid September.



Picture: Courtesy of Mr Tommy Holden: Linnet

Bullfinch

UK BAP priority species and Staffordshire BAP target species. Nests in thick bushes, hedges and sometimes in the branches of dense conifers. The bullfinch begins laying between late April and May, with third broods possible in August. Each brood may take up to 30 days to fledge and therefore they have usually cleared the nest site by mid September.



Picture: Courtesy of Mr Tommy Holden: Bullfinch

Yellowhammer

UK BAP species of conservation concern and Staffordshire BAP target species. Nearly always nests on the ground, if not, always close to it hidden among grass and herbage, typically against a bank or at the base of a hedge, small tree or bush. The yellowhammer begins laying from April to early August and frequently produces two and sometimes three broods, each taking up to 28 days to fledge and therefore they have usually cleared the nest site by mid September.



Picture: Courtesy of Mr Tommy Holden: Yellowhammer

Corn bunting

Staffordshire BAP target species. Generally a ground nesting species, in tangled vegetation or dense shrubs, sometimes building the nest on bare ground in arable fields. The corn bunting lays its eggs between late May and early August and generally produces a single brood, taking up to 27 days to fledge. Therefore they have usually cleared the nest site by mid September.



Picture: Courtesy of Mr Tommy Holden: Corn Bunting

House sparrow

Staffordshire BAP target species. A hole nesting species, usually in a building or other man-made structure, sometimes in holes in banks (will occupy disused sand martin holes), cliffs, the foundation of occupied or unoccupied large nests, i.e. of crows. The house sparrow begins laying in April and usually produces two-three broods, occasionally four, each taking up to 33 days to fledge and therefore they have usually cleared the nest site by end September.



Picture: Courtesy of Mr Tommy Holden: House Sparrows

Reed bunting. Staffordshire BAP target species. Nests usually on the ground in sedge tussocks or heaps of dead rushes or reeds close to water and occasionally up to 4m high in willow or alder trees. The reed bunting begins laying from late April to July or early August and frequently produces two and sometimes three broods, each taking up to 25 days to fledge and therefore they have usually cleared the nest site by September.



Picture: Courtesy of Mr Tommy Holden: Reed Bunting

Sand Martin.

A UK BAP target species. Nests in burrows in river banks, sand quarries and sand piles, it will occupy artificial nest sites like drainpipes etc. The sand martin is a bird of open country, rather than urban areas; it is often associated with wetland vegetation such as reed beds, where it 'hawks' small flying insects. The sand martin begins laying at the end of April or early May and usually produces two broods, each taking up to 38 days to fledge and therefore they will usually have cleared the nest site by August.



Picture: Courtesy of Mr Tommy Holden: Sand Martins

Appendix 1

Section 74 species which do, and some which may occur in Staffordshire:

Scientific Name	Common Name
Mammals	
<i>Lutra lutra</i>	Otter
<i>Barbastella barbastellus</i>	Barbastelle (A Bat)
<i>Pipistrellus pipistrellus</i> 45kHz	45kHz Pipistrelle (A Bat)
<i>Pipistrellus pipistrellus</i> 55kHz	55kHz Pipistrelle (A Bat)
<i>Pipistrellus pygmaeus</i>	Soprano Pipistrelle (A Bat)
<i>Rhinolophus hipposideros</i>	Lesser Horseshoe Bat
<i>Lepus capensis</i>	Brown Hare
<i>Arvicola terrestris</i>	Water Vole
<i>Muscardinus avellanarius</i>	Common Dormouse
Amphibians	
<i>Triturus cristatus</i>	Great Crested (Warty) Newt
<i>Bufo calamita</i>	Natterjack Toad
Fish	
<i>Lota lota</i>	Burbot
Birds	
<i>Caprimulgus europaeus</i>	Nightjar
<i>Botaurus stellaris</i>	Bittern
<i>Streptopelia turtur</i>	Turtle Dove
<i>Acrocephalus palustris</i>	Marsh Warbler
<i>Alauda arvensis</i>	Skylark
<i>Carduelis cannabina</i>	Linnet
<i>Emberiza schoeniclus</i>	Reed Bunting
<i>Lullula arborea</i>	Woodlark
<i>Miliaria calandra</i>	Corn Bunting
<i>Muscicapa striata</i>	Spotted Flycatcher
<i>Passer montanus</i>	Tree Sparrow
<i>Pyrrhula pyrrhula</i>	Bullfinch
<i>Turdus philomelos</i>	Song Thrush
<i>Nitella gracilis</i>	Slender Stonewort
Invertebrates	
<i>Austropotamobius pallipes</i>	Freshwater Crayfish
<i>Gryllotalpa gryllotalpa</i>	Mole Cricket
<i>Cryptocephalus sexpunctatus</i>	A beetle
<i>Ernoporus tiliae</i>	A beetle
<i>Panagaeus cruxmajor</i>	A beetle
<i>Procas granulicollis</i>	A beetle
<i>Asilus crabroniformis</i>	A two-winged fly
<i>Bombylius discolor</i>	A two-winged fly
<i>Doros conopseus</i>	A two-winged fly
<i>Lipsothrix nervosa</i>	A two-winged fly

Scientific Name	Common Name
<i>Bombus ruderus</i>	Large Garden Bumble Bee
<i>Argynnis adippe</i>	High Brown Fritillary
<i>Boloria euphrosyne</i>	Pearl Bordered Fritillary
<i>Mellicta athalia</i>	Heath Fritillary
<i>Lycaena dispar</i>	Large Copper
<i>Cosmia diffinis</i>	White-Spotted Pinion
<i>Hemaris tityus</i>	Narrow-bordered Bee Hawkmoth
<i>Hydrelia sylvata</i>	Waved Carpet
<i>Hypena rostralis</i>	Buttoned Snout
<i>Noctua orbona</i>	Lunar Yellow Underwing
<i>Pechipogon strigilata</i>	Common Fan-foot
* <i>Polia bombycina</i>	Pale Shining Brown
<i>Rheumaptera hastate</i>	Argent and Sable
* <i>Trichopteryx polycommata</i>	Barred Tooth-striped
* <i>Pisidium tenuilineatum</i>	A mollusc with no common name
<i>Segmentina nitida</i>	Shining Ram's-horn (a snail)
Plants	
<i>Juniperus communis</i>	Juniper
<i>Xylena exsoleta</i>	Sword Grass
<i>Luronium natans</i>	Floating Water Plantain
<i>Potamogeton compressus</i>	Grass-wrack Pondweed
<i>Centaurea cyanus</i>	Cornflower
* <i>Filago lutescens</i>	Red-tipped Cudweed
<i>Galeopsis angustifolia</i>	Red Hemp-nettle
<i>Mentha pulegium</i>	Pennyroyal
<i>Scandix pecten-veneris</i>	Shepherd's-needle
* <i>Torilis arvensis</i>	Spreading Hedge-parsley
<i>Riccia huebeneriana</i>	Violet Crystalwort
* <i>Bacidia incompta</i>	A Lichen
* <i>Collema dichotomum</i>	River Jelly Lichen
<i>Pilularia globulifera</i>	Pillwort
* <i>Trichomanes speciosum</i>	Killarney fern

* No Staffordshire Records, but based on habitat and distribution there is a remote chance that they may occur in the county.

Possibly nationally extinct.

\$ Probably locally extinct.

% No breeding records, but occasionally winters in Staffs, a target species for breeding habitat creation projects.

+Rare Passage Migrant

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