

Technical Appendix 1

Habitats Regulations and Schedule 2 Species

The Conservation (Natural Habitats & c.) Regulations SI 1994/2716 partially implement the Habitats Directive. This has recently been replaced by the Conservation of Habitats and Species Regulations 2010 (the Habitat Regulations). The Regulations contain provisions relating to the protection of European sites and European protected species. European Sites are defined within the Regulations as Special Areas of Conservation (SACs) or Special Protection Areas (SPAs) whether proposed, candidate or classified. European Protected Species are those species listed in Annex IV of the Directive that occur in the UK, and these have been listed in Schedule 2 of the Regulations.

Species listed under Schedule 2 of the Habitat Regulations were formally afforded protection by Regulation 39 (1994), this is now found under Regulation 41/42 (2010). European protected species include the great crested newt, dormice and all species of bats.

(1) The Habitats Regulations makes it an offence;

(a)deliberately to capture or kill a wild animal of a European protected species;

(b)deliberately to disturb any such animal;

(c)deliberately to take or destroy the eggs of such an animal; or

(d)to damage or destroy a breeding site or resting place of such an animal.

(2)It is an offence to keep, transport, sell or exchange, or offer for sale or exchange, any live or dead wild animal of a European protected species, or any part of, or anything derived from, such an animal.

(3)Paragraphs (1) and (2) apply to all stages of the life of the animals to which they apply.

(4)A person shall not be guilty of an offence under paragraph (2) if he shows-

(a)that the animal had not been taken or killed, or had been lawfully taken or killed, or

(b)that the animal or other thing in question had been lawfully sold (whether to him or any other person).

For this purpose "lawfully" means without any contravention of these Regulations or Part I of the Wildlife and Countryside Act 1981.

(5)In any proceedings for an offence under this regulation, the animal in question shall be presumed to have been a wild animal unless the contrary is shown.

(6)A person guilty of an offence under this regulation is liable on summary conviction to a fine not exceeding level 5 on the standard scale.

The Regulations go on to state exemptions and defences that apply to acts that may contravene the Regulation. Such exemptions include those listed in Regulation 40 (1994) now found at Regulation 42 of the 2010 Regulations

The granting of a licence under Regulation 44 (1994 Regulations) now Regulation 53-55 (of 2010 Regulations).

In order to carry out a lawful operation (e.g. development work which has full planning permission) that may result in any of the offences above, it is necessary to obtain a licence from Natural England to allow the operation to proceed.

However, in accordance with the requirements of the Habitats Regulations 2010, a licence can only be issued after the following conditions have been satisfied:

- *that there is no satisfactory alternative, and*
- *that the action authorized will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.*
- *that the action is required in preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment;*

Full planning permission is required to apply for a Natural England licence (where such a consent is necessary for the work to be carried out). In addition, a method statement which details the survey results, methodology of work to be undertaken, mitigation and compensation measures, must be submitted to Natural England with the licence application.

For Full details of the 2010 Habitat Regulations see:

<http://www.legislation.gov.uk/ukxi/2010/490/regulation/42/made>

Technical Appendix 2

Wildlife & Countryside Act 1981 & Countryside & Rights of Way Act 2000 (CRoW)

Wildlife & Countryside Act

The Wildlife and Countryside Act 1981 (as amended) (WCA) is the principle legislation in Britain for the protection and conservation of our wildlife and its habitats of national importance. The legislation adopts a habitat and species based approach to nature conservation. Habitats and some species are protected in designated Sites of Special Scientific Interest (SSSI). Other species are afforded some protection from harm or disturbance by way of inclusion in either Article 1 (birds), Schedule 1 (specially protected birds), Schedule 5 (specially protected animals) or Schedule 8 (specially protected plants).

(ii) Protection Afforded to SSSIs

The presence of an SSSI on or near to a development is a material consideration, and this is discussed further in policy (see PPS9)

(iii) Law Relating to Protected Species

The WCA provides protection to such species via Section 1 (birds) and Section 9 (animals). These sections provide protection from intentionally:

- killing, injuring or taking any wild bird or taking, damaging or destroying the nest or eggs of a wild bird
- disturbing any wild bird in Schedule 1 whilst building, on or near a nest, or disturbing dependant young of such birds
- damaging, destroying or obstructing access to any structure or place of shelter or protection of a schedule 5 animal, or disturbs any such animal whilst it is occupying a structure or place it uses for that purpose
- killing, injuring or taking any animal listed in Schedule 5
- Having in possession or control any live or dead wild bird or egg, or any wild animal in Schedule 5, or trading in any animal under Schedule 5.

As with European Protected species, there are exemptions from this legislation, and licences for development can be obtained in certain circumstances. Protected species are also a material consideration in planning applications.

Countryside & Rights of Way Act 2000 (CRoW) and Wildlife and Countryside Act 1981

(i) Protected Species & SSSIs

The Countryside and Rights of Way Act 2000 (CRoW Act 2000) adds to protected species legislation in the WCA. The lesser test of 'Recklessness' is added to the protection from disturbance in three circumstances. These are:

- disturbance to Schedule 1 birds and their nests, eggs and dependant young,
- disturbance to Schedule 5 animals in their place of shelter/protection, and
- disturbance to the places of shelter/protection of Schedule 5 animals.

This addition means that any person who deliberately takes an unacceptable risk or fails to notice an obvious risk is falls under the Section irrespective of intention.

The CRoW Act also provides greater protection to SSSIs from operations (and non operations) of owners, occupiers and third party users of an SSSI.

The CRoW Act also provides a basis for Local Authorities to consider Biodiversity within their functions and decision making.

2013-2028 Draft Local Plan Policies

Policy DM 26

Development and Biodiversity

Development schemes shall, in the first instance, protect existing habitats on site. They shall also however incorporate elements of biodiversity including green walls, roofs, bat and bird boxes as well as landscape features minimising adverse impacts on existing habitats (whether designated or not). Development schemes shall also be appropriately designed to facilitate the emergence of new habitats through the creation of links between habitat areas and open spaces. Together, these provide a network of green spaces which serve to reconnect isolated sites and facilitate species movement.

Where there is evidence of a protected species on a proposed development site, planning applications shall include a detailed survey of the subject species, with details of measures to be incorporated into the development scheme to avoid loss of the species. This involves consideration of any impacts that will affect the species directly or indirectly, whether within the application site or in an area outside of the site, which may be indirectly affected by the proposals. All surveys shall be carried out at an appropriate time of year and shall be undertaken by a qualified and, where appropriate, suitably licensed person.

All developments shall have regard to Natural England's standing advice for protected species.

Developments shall also be consistent with all other local plan policies.

Policy SP 23

Natural Environment

Arun District Council will encourage and promote the conservation and enhancement of biodiversity and the natural environment through policies for the protection of both designated and non-designated sites. Where possible it shall also promote the creation of new areas for habitats and species. In relation to designated sites, development will be permitted where it protects sites listed in Tables 19.1-19.6 that are recognised for the species and habitats contained within them.

Name	New Site Code ⁽³⁾
Pagham Harbour	UK 11052

Table 19.1 Ramsar Sites

Name	Site Code
Pagham Harbour	UK 9012041
Arun Valley	UK 9020281

Table 19.2 Special Protection Areas

Name	Site Code
Pagham Harbour	1000243
Bognor Reef	1000219
Felpham	1000357
Climping Beach	1000225

Table 19.3 Sites of Special Scientific Interest

Name	Site Code
Pagham Harbour	1009061
West Beach	1009233

Table 19.4 Local Nature Reserves

Name	Site Code
Ferring Rife & Meadows	Ar12
Littlehampton Golf Course and Atherington Beach, Littlehampton	Ar06
Elmer Rocks	Ar18
Fontwell Park Race Course	Ar01

Table 19.5 Sites of Nature Conservation Importance

Name	Site Code
Felpham Foreshore, Bognor Regis	1475602
Climping Sand Dune System	1475611
Bognor Foreshore	1475600
Pagham Harbour	1475608

Table 19.6 Local Geological Site

Policy DM 34

Designated Nature Sites

It is the policy of the Council to maintain, protect and where possible enhance the conservation value of International, European, National and Local designated sites as listed in Tables 19.1 - 19.6. Development not directly connected with or necessary to the management of the designated site(s) and which is likely to have an adverse effect on the site(s), will generally not be permitted however such development may be permitted where any of the following can be demonstrated:

1. there is no alternative solution (which shall be adequately demonstrated by the developer) or
2. there are reasons of public health or public safety or
3. there are benefits of primary importance to the environment or
4. there are imperative reasons of overriding public interest

Notwithstanding the above however, the presumption in favour of sustainable development does not apply where development requiring appropriate assessment under the Birds or Habitats Directives is being considered, planned or determined.

Where development is permitted, the use of conditions or planning obligations will be used in order to avoid and minimise harm to the site(s). In any event, any adverse impacts shall be minimised and mitigated or compensated in full as agreed with the planning authority.

Developments shall also be consistent with all other local plan policies.

Policy DM 35

Pagham Harbour

1. Within Zone A (<400m) as identified on the Proposals Map, development will only be permitted in exceptional circumstances which shall be demonstrated by the developer. These circumstances shall relate to the impact, type and the effects of any proposed development on Pagham Harbour, including on non-native species.

2. Within Zone B (400m – 5km) all new residential development will be required to:

(a) contribute financially towards improved access management at Pagham Harbour. Access management measures shall be undertaken and shall include wardening, access management and site protection, habitat improvements, provision for interpretation, education and signage and monitoring of wildlife and visitor numbers

and

(b) create easily accessible new green spaces for recreation within or adjacent to the development site, or to make developer contributions towards the provision of such green spaces to serve the area. New spaces shall be capable of accommodating the predicted increases in demand for local walking and dog walking. Good pedestrian links shall be provided between housing areas and new and existing green space in order to discourage car use.

3. Large scale developments taking place outside Zone B and close to its boundary will be considered on a case by case basis for potential effects on Pagham Harbour, and the need for avoidance or mitigation measures.

A tariff will be set to ensure sufficient funds are available to secure the required access management measures and the provision of alternative green space of a suitable size, design and location, where necessary, in advance of the occupation of new development and to ensure it is appropriately managed in perpetuity.

Developments shall also be consistent with all other local plan policies.

Policy DM 36

Appropriate Assessment

An Appropriate Assessment shall be carried out in respect of any plan or project likely to have a significant effect on Pagham Harbour or any other Natura 2000 sites outside the district (where appropriate), either individually or in combination with other plans or projects. If after completing an Appropriate Assessment of a plan or project the Planning Authority is unable to conclude that there will be no adverse effect on the integrity of these sites, the project will not be approved, unless otherwise in compliance with the Habitats Directive.

Projects which may give rise to significant cumulative, direct, indirect or secondary impacts on these sites will only be permitted (either individually or in combination with other plans or projects) for reasons of overriding public interest.

Developments shall also be consistent with all other local plan policies.

Policy DM 37

Non Designated Sites

Within Biodiversity Opportunity Areas (BOA's) and the Marine Conservation Zone (MCZ) (see Proposals Map), development shall

- (i) retain and sympathetically incorporate locally valued and important habitats, including wildlife corridors and stepping stones
- (ii) be designed in order to minimise disturbance to habitats

Where development proposals are likely to have an impact on species or habitats within either the BOA's or recommended MCZ, any application for planning permission shall include a properly conducted survey of the presence of that species and habitat and any impact that development may have on either. Development proposals that do not reasonably address opportunities for enhancing BOA's and the recommended MCZ through their design, layout and landscaping shall not be permitted. Where a development scheme would result in a habitat loss, mitigation measures shall be proposed as part of the proposed scheme and such measures agreed with the planning authority prior to the determination of any planning application.

Developments shall also be consistent with all other Local Plan policies.

Policy DM 38

Protection of Trees

Development will only be permitted where it will not damage or destroy tree(s) protected by a tree preservation order(s), (TPO) identified as ancient woodland, in a conservation area or contributing to local amenity, unless to do so:

- (i) would result in the removal of one or more trees in the interests of good arboricultural practice. This shall be demonstrated by the developer following the advice of a suitably qualified person which shall be guided by BS 5837. Details of any advice received having regard to BS 5837 shall be submitted, in writing, as part of a planning application or
- (ii) would enhance the survival and growth prospects of other protected trees
- (iii) the benefits of the proposed development in a particular location outweigh the loss of trees or woodland, especially ancient woodland

Where planning permission is granted in any of the above instances, conditions shall be used to ensure that, for any trees which are removed as part of a development, at least an equivalent number of a similar species and age (where practical) are planted on the proposed development site. Sufficient space for replacement trees to mature shall be provided. The planting of new trees shall form an integral part of the design of any development scheme.

Proper provision must be made for the protection and management of trees or areas of woodland on-site when undertaking development. A management plan shall be provided as part of a planning application in accordance with BS 5837 in order to ensure that trees are adequately protected during development. Conditions for the continued protection of trees on sites shall be included in any planning consent given.

Where there are existing trees on or adjacent to a development site, developers shall be required to provide:

- (i) land and tree surveys
- (ii) a tree constraints plan
- (iii) an arboricultural implications assessment to include a tree protection plan and arboricultural method statement

These will ensure that development is planned to take a comprehensive view of tree issues at an early stage in the design process and that development works do not have a negative impact on existing trees.

Developments shall also be consistent with all other Local Plan policies.

ARUN LOCAL PLAN POLICIES

Policies Relevant to Ecology saved from the Local Plan 2011 (Adopted 2003)

POLICY GEN3 Protection of the Countryside

Outside the Built-Up Area, as defined on the Proposals Map, the countryside will be safeguarded for its own sake. Development will not be permitted unless:

- (i) it meets the operational needs of agriculture, forestry, the extraction of minerals or the deposit of waste; or
- (ii) for quiet, informal recreation; or
- (iii) for the diversification of the rural economy; or
- (iv) for essential road schemes; or
- (v) it is in accordance with a policy in Sections 2 and 3 of the plan referring to a specific use or type of development.

Permission will not be given for the extension of isolated groups of buildings or the consolidation of linear or sporadic development unless the proposal accords with criteria (i) to (iii) or (v).

POLICY GEN23 The Water Environment

Development will not be permitted if it would have a direct or indirect unacceptable adverse impact on the water environment, notably in relation to rivers, ponds, wetlands, public access in river corridors and water related recreation.

Where appropriate, the Council will support initiatives which seek to restore or enhance the water environment.

POLICY GEN25 Water Resources

Development will only be permitted where the Local Planning Authority is satisfied that adequate water resources are available or will be provided in time to serve the development, and that provision is not considered detrimental to existing abstractions, river flows, water quality, fisheries, amenity or nature conservation.

POLICY GEN26 Water Quality

Development will only be permitted where the Local Planning Authority is satisfied that it would not lead to a deterioration in the quality or potential yield of surface and ground water resources.

POLICY GEN28 Trees and Woodlands

Development will not be permitted if it would damage or destroy one or more trees protected by a tree preservation order, identified as ancient woodland or in a conservation area unless:

- the removal of one or more trees would be in the interests of good arboricultural practice; or
- the benefits of the proposed development outweigh the amenity value of the protected trees.

Conditions may be used to ensure that, for any trees which are removed as part of a development, an equivalent number are planted on the site.

POLICY GEN29 Nature Conservation Across the District

Development will only be permitted on sites which contain semi-natural habitats, features of nature conservation interest, or within wildlife corridors, where these can be largely retained and sympathetically incorporated into the scheme. Legal agreements may be used to offset the loss of, or impact on, any nature conservation resource present on the site prior to development.

POLICY AREA13 Sites of International Importance for Nature Conservation

Proposals for development in, or likely to affect (directly or indirectly) a site of international importance for nature conservation will be subject to the most rigorous examination. Development not directly connected with or necessary to the management of the site which is likely to have an adverse effect on the site, will not be permitted unless: there is no alternative solution, there are reasons of public health or public safety, or there are benefits of primary importance to the environment.

Where such sites do not host a priority habitat or species, development will not be permitted unless there are imperative reasons of overriding public interest.

Where development is permitted, the use of conditions or planning obligations will be considered in order to avoid and minimise harm to the site, to enhance the site's nature conservation interest, and to secure any compensatory or mitigation measures and appropriate management that may be required.

POLICY AREA14 Sites of National Importance for Nature Conservation

Proposals for development in, or likely to affect (directly or indirectly) Sites of Special Scientific Interest will be subject to special scrutiny. Where such development is likely to have an adverse effect, it will not be permitted unless the reasons for the development clearly outweigh the nature conservation value of the site itself and the national policy to safeguard the national network of such sites.

Where the site concerned is a National Nature Reserve, a site identified by the Nature Conservation Review or Geological Conservation Review, particular regard will be paid to the national importance of that site.

Where development is permitted, harm to the nature conservation interest must be minimised. The use of conditions or planning agreements will be considered to ensure the protection and enhancement of the nature conservation interest, and to provide appropriate compensatory or mitigation measures and site management.

POLICY AREA15 Sites of Local Importance for Nature Conservation

Proposals for development in, or likely to have an adverse effect (directly or indirectly) on a Local Nature Reserve, Site of Nature Conservation Importance (including ancient woodlands or wildlife corridors) or Regionally Important Geological/Geomorphological Site will not be permitted unless it can be demonstrated that reasons for the proposal outweigh the need to safeguard the nature conservation value of the site/feature. Where development is permitted which would damage the nature conservation value of the site/feature, such damage should be kept to a minimum.

Conditions or planning obligations will be used to secure necessary compensatory or mitigation measures, enhancement and site management.

Where appropriate, the Authority will consider the use of legal agreements to provide appropriate compensatory measures, enhancement and site management.

Retained Ecology Policies of the West Sussex Structure Plan 2001-2016

Nature conservation

Policy ERA2

(a) Development should not be permitted unless the wide range of habitats, species and geological features of the County will be protected, conserved and, where possible, enhanced particularly through long-term management mechanisms and habitat creation schemes. A particularly high level of protection should be afforded to sites and features of national and international importance. Proposals for the extension or creation of new habitats should be permitted provided that they are consistent with wider environmental objectives.

(b) Local plans will include policies to:

(1) ensure that site evaluation is undertaken to establish the nature conservation importance of proposed development sites;

(2) protect sites or features of nature conservation importance, including those protected under legislation and prevent development unless there are no alternative solutions and there are overriding reasons which outweigh the need to safeguard the value of sites or features;

(3) ensure that where development would result in the loss of an important nature conservation resource, a new resource is provided which is of at least equivalent value, where possible;

(4) where appropriate, secure the restoration, creation and management of habitats through development proposals; and

(5) where necessary, ensure the investigation and recording of sites and features of nature conservation importance, and, where appropriate, the preservation of any finds.

Ecological Appraisal Method

Introduction

The methodology for this appraisal is based on the Guidelines for Ecological Impact Assessment (EcIA) in the United Kingdom published by the Institute of Ecology and Environmental Management (IEEM June 2006). Regardless of whether a statutory Environmental Impact Assessment is required, these guidelines provide a robust framework for ecological assessment at any scale.

Desk Study

The first stage of the appraisal is a desk study of the proposed development site and associated Zone of Influence. This provides background information on the site and local environment so as to more effectively target field survey and further desk research.

The Multi Agency Geographical Information for the Countryside (MAGIC) database and Natural England's 'Nature on the Map' are interrogated for information regarding nationally or internationally designated sites within 1km or 5km of the site respectively. The National Biodiversity Network (NBN) data base is interrogated primarily for any relevant local protected species records within the area. The NBN provides access to a substantial volume of biodiversity data for the UK. Although rarely site specific, it does provide valuable information on the local occurrence of protected species.

Where appropriate, the local environmental Record Centre is approached to provide information regarding locally identified sites and records of protected and/or notable species within and around 1km of the site and European Protected species within 5km of the site.

Site Survey Methodology

The aims of the survey are to record land-use and broad vegetation types present on the site and in the surrounding areas, and to evaluate the habitats and vegetation communities ecological value along with the potential to support protected species, species of principal importance, and any other notable species.

Where relevant, habitat immediately adjacent to the site is also assessed as this can have a bearing on the possible presence of protected species on the site and the ecology of adjacent areas can be affected by development nearby.

Habitats and Vegetation

Habitats and vegetation communities are recorded on a broad scale by visually noting contrasting land uses, vegetation zones and landscape features, such as hedgerows and trees. Dominant plant species are recorded in each of the areas identified, as are any notable plant species, such as protected species and habitats or notifiable weeds.

Protected Species

Many plant and animal species are legally protected in the UK. Some, such as bats, badger, water vole and great crested-newt are commonly encountered on development sites. Protected species law is a serious consideration for developers and land owners, as failure to confirm their presence during initial

project conception can later lead to serious programming delays and their associated costs and to prevent any infringement of the law.

Case law has established (Regina vs. The Cornwall County Council ex parte Hardy 2001) that “It is essential that the presence or otherwise of protected species, and the extent that they may be affected by the proposed development, is established before the planning permission is granted.

For the most regularly encountered protected species, a brief summary of methods follows:

Bats

Bats use buildings and trees for roosting and breeding, and so the potential for any of these features on site to support bats was considered, as was the sites potential for providing bat foraging habitat.

External inspections of the trees and buildings on site were undertaken. The survey looked for the presence of bats as well as signs of their presence such as:

- Bat droppings, e.g. within cavities and buildings;
- Staining at potential roost access points;

Lack of bat evidence cannot be taken to mean the lack of use by bats and an assessment of potential roost sites was therefore also undertaken:

- Signs of bats can be easily washed off by wind or rain;
- Droppings are hard to see where rubble and other floor debris may obscure them;
- Low numbers of droppings can easily be missed especially where they may become damp and deteriorate;
- Evidence of bats may not be apparent where bats roost out of view, such as in tree cavities etc.

Badgers

The site and its boundaries were systematically searched for the presence of Badgers *Meles meles*, in particular badger setts, on or near (30-40m) of the site. The area was also assessed for the presence of badger foraging activity and territorial behaviour. Such signs include foraging trails, foraging scrapes in short grass, which are commonly known as 'snuffle holes' (shallow scrapes in soft ground or even turf rolling created by foraging for ground-dwelling invertebrates such as worms and grubs), footprints, hairs caught under fences, sett entrances, and latrine sites.

Dormice

The presence of Dormouse on or near the site was considered during the survey, principally through habitat suitability, combined with data on occurrence within the area. Where suitable habitat occurs, further survey for feeding signs on hazel nuts and honeysuckle where it occurs along with searches for arboreal nests. If it a site is considered suitable, further survey may be recommended.

Other Mammals

Consideration is also given to the potential for habitats to support other legally protected mammals and those of nature conservation importance. Where any water bodies occur on or near to the site species including Water Vole *Arvicola terrestris* and Otter *Lutra lutra* are considered, both are legally protected species under the Wildlife & Countryside Act 1981 (as amended) with their habitats also

being protected. Otter are also afforded protection under the Habitats Directive 92/43/EC. Depending upon the geographic location consideration is also given to species such as Red Squirrel.

Breeding Birds

Any notable bird species seen during the survey are recorded. The type and quality of breeding, foraging and roosting habitats available for birds is also considered and interpreted with particular reference to protected or more notable bird species.

Consideration is given to any features which could support nesting birds, (Buildings and other structures, and areas of vegetation) that will be cleared or disturbed as a result of the development.

Reptiles

Any areas of habitat considered suitable for supporting reptiles were noted (for example, areas of rough grassland and scrub, banks, burrows, and rubble piles, compost heaps).

Great Crested Newt

Due to declines in numbers predominantly due to habitat loss and restricted European range, Great Crested Newts *Triturus cristatus* are protected under Section 9 of the Wildlife and Countryside Act, 1981 (as amended) and Regulation 39 of the Conservation (Natural Habitats &c) Regulations 1994, which protects Great Crested Newts from harm, injury and deliberate capture, killing, disturbance, damage and destruction of eggs, breeding site or resting place. This includes deliberate or reckless damage or disturbance.

Survey was by habitat suitability (the occurrence of suitable ponds and terrestrial habitat) combined with knowledge on their distribution from biological records for the area. If a site is considered suitable, further survey is usually required if an impact is considered likely.

Invertebrates

A very small proportion of invertebrates are afforded legal protection under the Wildlife and Countryside Act 1981 (as amended), although a relatively high number of invertebrates are included within the UK and local BAPs, and many more species are identified as being Nationally Scarce. Most invertebrates require specialist knowledge in order to identify them, although some groups, including butterflies and dragonflies, can be readily identified by generalists. Therefore, apart from recording any species of these readily identifiable groups, the survey concentrated on recording the presence of any key habitats of nature conservation importance considered suitable for supporting more scarce and restricted invertebrates, for example bare ground, dead wood and botanically rich habitats.

Survey Constraints and Limitations

Walkover surveys are carried out during a brief window of time. And therefore, the survey will provide only a snapshot of the range of plants and animals that might be present. However, professional judgement is used to interpret the habitat features recorded, and their likely value for supporting protected and notable species, including species of principal importance. Where timing is likely to significantly affect the results of a survey, further survey work is often recommended. Survey can also be restricted through land access, especially land adjacent to the site.

Assessment Guidelines

Introduction

The IEEM guidelines (2006) provide three principal reasons for an ecological feature being valued and therefore included within the EcIA: biodiversity value, social/community value, and economic value.

The evaluation and assessment undertaken assigns one of a number of value labels based on a geographic scale as follows:

- International
- National
- Regional
- County
- District
- Local (Parish)
- Within the zone of influence

Value is determined with reference to the following factors:

- level of designation (sites) or biodiversity-based protection (legal and policy);
- biodiversity value (e.g. inclusion in Biodiversity Action Plans, rarity, position in ecosystem, assemblages and communities, size and diversity);
- social and economic value;
- legal issues (eg protected sites).

All impacts of the scheme on features of local importance or greater are assessed in the impact assessment stage

Assessment of Likely Impacts

The ecological impact assessment methodology used is based on the following considerations.

Characterisation of Likely Impacts

The potential impacts identified as a result of the proposals are characterised according to the following parameters:

- Positive or negative
- Magnitude (and extent if not synonymous)
- Duration
- Reversibility
- Timing and frequency

Significance of Impact

A significant impact on a valued ecological feature (whether negative or positive) is defined in IEEM's guidelines as an impact on the integrity of a defined site or ecosystem, and/or the conservation status of habitats or species within a given geographical area. These terms are defined below.

Integrity

Integrity is defined as follows. *'The integrity of a site is the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified.'* A site or ecosystem that achieves this is considered to be at favourable conservation status.

Conservation Status

For habitats, conservation status is determined by the sum of the influences acting on the habitat and its typical species, which may affect its long-term distribution, structure and functions as well as the long-term survival of its typical species within a given geographical area.

For species, conservation status is determined by the sum of the influences acting on the species, which may affect the long-term distribution and abundance of its populations within a given geographical area.

Impact Prediction

For guidance as to whether an impact is likely to result in an adverse effect on the integrity or conservation status of a feature, reference has been made to the conservation objectives for that feature where they are available, for example in habitat and species action plans. Otherwise professional judgement has been made based on available information.

The confidence in the prediction that an activity will give rise to a significant adverse impact on a valued ecological feature is given based on a four point scale:

- Certain (or near-certain);
- Probable;
- Unlikely; and
- Extremely unlikely

Drawing Assessment Together

The above factors – value, integrity and conservations status of the feature, prediction and characterisation of the impact and overall significance of the impact is brought together in the final assessment. This is done without additional mitigation measures that may be proposed. An impact is then summarised as significant or not.

Mitigation, Compensation and Enhancement

Where impacts are characterised as significant mitigation or compensation may be offered to prevent, reduce or offset such impacts. In addition enhancement measures may be built into a scheme to ensure that the scheme is compliant with the proactive measures outlined in the latest Government policy on nature conservation (PPS 9).

SPA Citation Designated Sites Map

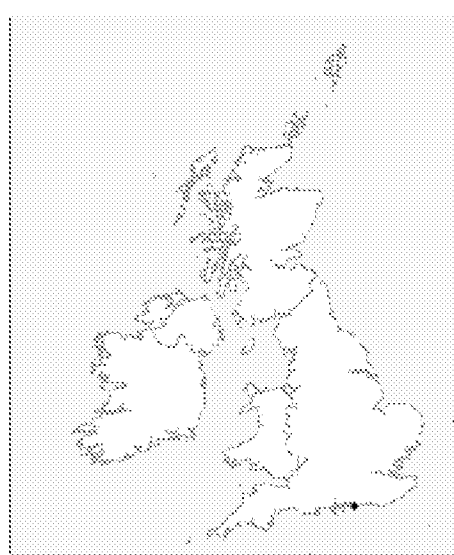
SPA description

(information as published 2001)

Pagham Harbour

Country	England
Unitary Authority	West Sussex
SPA status	Classified 30/03/1986
Latitude	50 45 48 N
Longitude	00 45 38 W
SPA EU code	UK9012041
Area (ha)	636.68
Component SSSI/ASSIs	Pagham Harbour

Pagham Harbour is located on the south coast of England in West Sussex. It is an estuarine basin that comprises an extensive central area of saltmarsh and intertidal mud-flats, surrounded by lagoons, shingle, open water, reed swamp and wet permanent grassland. The mud-flats are rich in invertebrates and algae, and provide important feeding areas for birds. The lower saltmarsh is dominated by Common Cord-grass *Spartina anglica*, with patches of Glasswort *Salicornia* spp. The area supports breeding Little Tern *Sterna albibifrons* in summer, as well as wintering concentrations of Ruff *Philomachus pugnax* and Pintail *Anas acuta*.



Qualifying species

For individual species accounts visit the [Species Accounts](#) section

This site qualifies under **Article 4.1** of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive:

During the breeding season;

Little Tern *Sterna albibifrons*, 12 pairs representing 0.5% of the breeding population in Great Britain (Count as at 1995)

Over winter;

Ruff *Philomachus pugnax*, 160 individuals representing at least 22.9% of the wintering population in Great Britain

This site also qualifies under **Article 4.2** of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species:

Over winter;

Pintail *Anas acuta*, 628 individuals representing at least 1.0% of the wintering Northwestern Europe population (5 year peak mean 1991/2 - 1995/6)

Note:

Many designated sites are on private land: the listing of a site in these pages does not imply any right of public access.

Note that sites selected for waterbird species on the basis of their occurrence in the breeding, passage or winter periods also provide legal protection for these species when they occur at other times of the year.

Designated Site Map (ESD/13/350)

Land at Summer Lane, Pagham + 2km radius

Prepared for Gareth Knass (Aluco Ecology Ltd) - 27/06/2013



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Key to Map:

- Enquiry area
- Species search area
- LGS
- LNR
- Marine SSCI
- Ramsar
- SPA
- SSSI

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SITE OF SPECIAL SCIENTIFIC INTEREST (SSSI)

Site Name:	Pagham Harbour		
County:	West Sussex		
District:	Chichester, Arun		
Local Planning Authority:	Chichester District Council, Arun District Council		
Size:	615.9 hectares (1521.9 acres)		
National Grid Ref:	SZ875970		
Date Notified (Under 1949 Act):	1954	Date of last revision:	1980
Date Notified (Under 1981 Act):	1986	Date of last revision:	-
Other Information:	This site lies within the South Coast Plain. Pagham Harbour is a proposed NCR site. This site contains Pagham Harbour GCR site and part of Bognor Regis (Palaeobotany) GCR site. This is also a proposed Ramsar/SPA site.		

Reason for Notification

This site comprises an extensive central area of salt-marsh and tidal mudflats with surrounding habitats including shingle, open water, reed swamp and wet permanent grassland. Pagham Harbour is of national importance for wintering wildfowl and waders and also for breeding birds both within the Harbour and the surrounding grazing pasture. The site supports nationally important communities of plants and invertebrates.

Pagham Harbour was reclaimed for agriculture in the late nineteenth century but was flooded again by a storm in the early twentieth century. The extensive intertidal mudflats are rich in algae and invertebrates and provide important feeding areas for birds.

Salt-marsh is a habitat threatened nationally through reclamation for agriculture. The lower part of the salt-marsh is dominated by the hybrid common cord-grass *Spartina anglica* with patches of the glassworts *Salicornia* spp. Above this zone sea-purslane *Halimione portulacoides* covers large areas with other species such as sea aster *Aster tripolium* in the periphery. At one part of the site within a mixed salt-marsh community greater sea-spurrey *Spergularia media* and sea lavender *Limonium vulgare* are found. The upper margin of the salt-marsh has developed a narrow strip of grassland dominated by sea couch *Elymus pycnanthus*.

Vegetated shingle is a nationally rare community. At Pagham, the type and extent of plant cover is dictated by the shifting nature of the substrates, the sea defence works, and by its relative exposure to the elements. In sheltered areas a diverse grass sward has developed with herbs such as early forget-me-not *Myosotis ramosissima*, biting stonecrop *Sedum acre* and the nationally endangered childing pink *Petrorhagia nanteuilli*. This contrasts with the sparse vegetation of the shingle ridge where the uncommon sea-kale *Crambe maritima* and yellow-vetch *Vicia lutea* are found.

Pagham Harbour has a wide variety of wetland habitats. Brackish drainage ditches dissect the land where common reed *Phragmites australis* dominates. This forms fairly extensive swamps in some areas including the Severals to the west of the Harbour which are important for breeding and migrating reed and sedge warblers. Sidlesham ferry to the north-west provides high water feeding and roosting areas for waders while Pagham Lagoon in the east is a stormy weather sheltering site for sea duck. Here may also be found the nationally endangered startlet sea anemone *Nematostella vectensis*.

The small amount of woodland at Pagham Harbour is dominated by willow and oak. One of these areas supports a small heronry. In contrast, the ancient woodland at Norton Priory is drier with oak standards and a rich ground flora. Scrub is found both in the form of hedges and as more extensive patches with hawthorn *Crataegus monogyna* and gorse *Ulex europaeus* being the main constituents. The damp unimproved grassland surrounding the Harbour is used as a major wader roost and is grazed by large numbers of Brent Geese. Some fields of improved grassland are included in the site as they too, support nationally important populations of birds.

Pagham Harbour is an overwintering area for over 120 species of bird. The numbers of wintering pintail,

ringed and grey plover and black-tailed godwit regularly reach 1% of British populations and the site is of international importance for wintering ruff and Brent Geese. The mudflats also provide food for a diverse breeding community of birds including oystercatcher, shelduck and redshank.

Notable invertebrates include the sand dart *Agrotis ripae*, Matthew's wainscot moth *Mythimna favicolor* and the long-winged conehead grasshopper *Conocephalus discolor*.

Geology

Pagham Harbour is a key site for coastal geomorphology. It is significant both as a classic shingle spit landform and for the links that have been demonstrated between the coastal near shore and offshore forms and sediments. The shingle spit system comprises a series of sub-parallel ridges and recurves, marking different phases of extension and frontal accretion. Shingle reaches the beach via the intertidal zone, and the so-called "Pagham delta" and the behaviour of the spits and delta are intimately linked with water and sediment circulation around the Setsey peninsula. The area also provides an excellent example of the role of weed rafting of shingle in coastal sediment budgets.

This site also includes, at the north-eastern end, part of a key site for plant fossils from the London Clay (divisions B₁ and B₂). It is the only locality in the Hampshire Basin to yield abundant London Clay plants and the only site known to have yielded plants from the B₂ division of this formation. The site has yielded examples of some one hundred and thirty species (representing seventy families), including numerous type specimens. Dominant families include the Vitaceae, Menispermaceae and Burseraceae. The genera *Bagneria* and *Aldwichia* are only found here, as are some thirty species. An outstanding palaeobotanical site of great importance to studies of Tertiary floras.

Habitat Map (ESD/13/350)

Land at Summer Lane, Pagham + 2km radius

Prepared for Gareth Knapp (Aluco Ecology Ltd) - 27/06/2013



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Key to Map:

- Enquiry area
- Species search area
- Coastal & floodplain grazing marsh
- Coastal saltmarsh
- Coastal vegetated shingle
- Intertidal mudflat
- Open Water
- Reedbed
- Saline lagoon
- Traditional orchard

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Ancient woodland, traditional orchards, segmented shingle and saline lagoon data reproduced with permission of Natural England. Revised coastal and floodplain grazing marsh data remains provisional and is also reproduced with permission of Natural England. Shingle grassland data supplied by Natural England and South Downs Institution Board. Black boggy data supplied by Sussex Rivers & Fivers Partnership. Shrub wetland data supplied by Dr Francis Rose. Reedbed data funded by Environment Agency and West Sussex County Council is provided by Sussex Biodiversity Record Centre and maintained by SBR. Headland data funded by West Sussex County Council, RSPB and High Weald AONB Unit. Ancient/overgrown tree data derived from results of the Ancient Tree Hunt Project and the Tree Register of the British Isles (TRBI). South East Coastal Habitat Mapping data reproduced with permission of Environment Agency. © Crown Copyright. All rights reserved 2013.

This map contains ancient woodland data revised under the Woodland and Green Ancient Woodland Program (2010) on behalf of Natural England. Whilst every effort has been made to make this revision as accurate as possible, the inventories contain limitations and remain provisional. Further revisions are still pending within East Sussex. Habitat data held by Sussex Biodiversity Record Centre (SBR) are created in-house or obtained from a variety of dataset providers. SBR continues to strive to further improve and update these data wherever possible. However, this map should be treated as indicative rather than definitive data may be generated from a range of field survey and/or predictive methods, each of which may have its own inherent limitations. In some situations a recent ground survey may be required to establish definitively the current status of a particular habitat at a specific location.

COUNTY: WEST SUSSEX

SITE NAME: BOGNOR REEF

DISTRICT: ARUN

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981.

Local Planning Authority: ARUN DISTRICT COUNCIL

National Grid Reference: SZ 912982

Area: 64.4 (ha.) 159.1 (ac.)

Ordnance Survey Sheet 1:50,000: 197

1:10,000: SZ 99 NW, SZ 89 NE

Date Notified (Under 1949 Act): 1980

Date of Last Revision: –

Date Notified (Under 1981 Act): 1988

Date of Last Revision: –

Other Information:

This site will be listed in 'A Geological Conservation Review'.

Reasons for Notification:

This site comprises a long stretch of foreshore of great geological interest and an extensive area of vegetated shingle, a habitat type which is rare in Britain. At the western end is a small area of old sand dune with an interesting flora including a specially protected species listed on Schedule 8 of the Wildlife and Countryside Act 1981.

Biological Interest

The shingle strip which runs along the beach at Bognor develops into an extensive shingle beach west of SZ 915982. In the shelter of the main bank shingle plant communities have developed, typically with yellow horned poppy *Glaucium flavum*, sea beet *Beta vulgaris*, and the uncommon sea kale *Crambe maritima*. Small grassy patches occur infrequently, with false oat-grass *Arrhenatherum elatius* and red fescue *Festuca rubra*.

The small outlying area of sand dune at The Green is all that remains of a once much more extensive dune system. The grassland, scrub and small marsh support a number of interesting plants and invertebrates including the long-winged conehead grasshopper *Canacephalus discolor* and the nationally endangered chiding pink *Petrorhagia nanteuilii*.

Geological Interest

The foreshore here is one of the few places where the whole thickness of the London Clay can be studied in sequence, although favourable tides occur infrequently and some exposures remain constantly under water. Most of the rocks are clays or sands but there are two sequences of more resistant rocks: calcareous sandstones which form the main Bognor Reef and glauconitic sandstones which comprise the less substantial Barn Rocks to the west. The fossil flora and fauna of these beds is outstanding.

The site is a key site for plant fossils from the London Clay (divisions B₁ and B₂) and is of great importance to the study of Tertiary floras. It is the only locality in the Hampshire Basin to yield abundant London Clay plants and the only site known to have yielded plants from the B₂ division of this formation. The site has yielded examples of some one hundred and thirty species (representing seventy families), including numerous type specimens. Dominant families include the Vitaceae, Menispermaceae and Burseraceae. The genera *Bognoria* and *Aldwychia* are found only here, as are some thirty species. An outstanding palaeobotanical site of great importance to studies of Tertiary floras.

The eastern foreshore is a valuable site which has yielded a diverse Lower Eocene avifauna, including a significant number of small species which are only rarely preserved. Seven

species (representing seven orders) have been recorded from the site. For five species this is the type locality. Three orders, the Charadriiformes, Columbiformes and Apodiformes, are unique to Great Britain at this time.

Finally the most important site in the world for pyritised fossil insects (especially beetles) is on the foreshore at Aldwick. This mode of fossilisation preserves insects uncrushed and they can be extracted simply by sieving. The insects are allochthonous, being derived from the land and associated with a marine fauna (of Lower Eocene age) after death. One species of beetle belongs to a genus, *Pactopus*, now confined to western North America, and otherwise unknown in a fossil state. Other beetles include representatives of modern tropical genera, as well as the earliest known members of the families Eucnemidae and Anobiidae.

Breeding Bird Survey Methods

Legislation Relating to Birds

Part 1 of the Wildlife & Countryside Act, 1981 (as amended) protects any wild bird from intentional killing, injuring or taking whilst on the nest. In addition, it is an offence to take, damage or destroy the nest or eggs, whilst being built or in use. Furthermore 79 species listed on Schedule 1 of the Act have been afforded special protection from disturbance at the nest by way of their rarity, endangered, declining or vulnerable status.

At an international level a number of Conventions and European Union Directives have aimed to provide legal protection for wild bird species. These include the European Union Directive on the Conservation of Wild Birds, Directive 79/409/EEC, and the Berne Convention on the conservation of European wildlife and natural habitats.

The Wild Birds Directive provides across the EU a general protection for all birds occurring in a wild state, and additional protection for further species listed under Annex I of the Directive. The Directive requires the designation of Special Protection Areas (SPAs) in the most suitable habitats for Annex 1 species, and outside these areas Member States should also strive to avoid pollution or deterioration of habitats of birds.

Under the Berne Convention contracting parties are also required to take requisite measures to maintain the population of wild flora and fauna at, or adapt it to, a level which corresponds in particular to ecological, scientific and cultural requirements, while taking account of economic and recreational requirements and the needs of sub-species, varieties or forms at risk locally.

Under Article 6 Each Contracting Party shall take appropriate and necessary legislative and administrative measures to ensure the special protection of the wild fauna species specified in Appendix II (including certain listed bird species). The following will in particular be prohibited for these species:

- (a) all forms of deliberate capture and keeping and deliberate killing;
- (b) the deliberate damage to or destruction of breeding or resting sites;
- (c) the deliberate disturbance of wild fauna, particularly during the period of breeding, rearing and hibernation, insofar as disturbance would be significant in relation to the objectives of this Convention.

Field Survey

Breeding bird survey work is undertaken in the spring time when birds are holding territories and are relatively easy to detect and monitor. A standard methodology involves visiting each part of a site on a minimum of two occasions at least 7-10 days apart (for large sites), or up to 10 visits for complex sites.

The breeding bird survey methods used were similar to the standard Common Bird Census (CBC) techniques adopted by the British Trust for Ornithology (BTO) and set out in Marchant (1983), Marchant *et al.* (1990), Bibby *et al.* (2000).

Time is spent on recording species present and identifying territory centres, territory range and size. This is done by noting what activity the birds recorded are undertaking. Sightings are noted on individual survey maps using standard codes for behaviour and species. Over a number of visits these maps can be collated and territories of species determined to a relative degree of accuracy. Further advice is also obtained from the methodology used by the BTO for their Breeding Bird Survey (BBS).

Visits are usually carried out one to two hours after dawn, as this is when the majority of species are most active and holding territory. A number of visits are usually also made at dusk in order to record species that are more visible at this time of day.

Categorisation of Records

The nomenclature used follows Knox, A.G., Collinson, M., Helbig, A.J., Parkin, D.P. and Sangster, G. 2002. Taxonomic recommendations for British birds. Ibis 144 : 707-710.

For site evaluations reference is given to BAP species, species listed in Schedule 1 of the Wildlife & Countryside Act 1981, and species listed under birds of Conservation Concern in the UK (Eaton et al, 2009). The criteria for the latter is given below:

Red listed species are those that meet the following criteria:

IUCN Global Conservation Status. Species listed by BirdLife International as being Globally Threatened using IUCN criteria.

HD Historical Decline. A severe decline in the UK between 1800 and 1995, without substantial recent recovery.

BDp Breeding Population Decline. Severe decline in the UK breeding population size, of more than 50%, over 25 years (BDp1) or the entire period used for assessments since the first BoCC review, starting in 1969 ("longer-term") (BDp2).

WDp Non-breeding Population Decline. Severe decline in the UK non-breeding population size, of more than 50%, over 25 years (WDp1) or the longer-term (WDp2).

BDr Breeding Range Decline. Severe decline in the UK range, of more than 50%, as measured by number of 10 km squares occupied by breeding birds, over 25 years (BDr1) or the longer-term (BDr2).

Amber listed species are those that meet the following criteria and not also Red List criteria:

SPEC European Conservation status. Categorised as a Species of European Conservation Concern (SPEC 1, 2 or 3).

HDrec Historical Decline – Recovery. Red listed for Historical Decline in a previous review but with substantial recent recovery (more than doubled in the last 25 years).

BDMp Breeding Population Decline. As for red list criteria BDp1 and BDp2, but with moderate decline (by more than 25% but less than 50%).

WDMp Non-breeding Population Decline. As for red list criteria WDp1 and WDp2, but with moderate decline (by more than 25% but less than 50%).

BDMr Breeding Range Decline. As for red list criteria BDr1 and BDr2, but with moderate decline (by more than 25% but less than 50%).

BR and **WR** Rarity. UK breeding population of less than 300 pairs (BR), or non-breeding population of less than 900 individuals (WR).

BL and **WL** Localisation. At least 50% of the UK breeding (BL) or non-breeding (WL) population found in 10 or fewer sites.

BI and **WI** International Importance. At least 20% of the European breeding (BI) or non-breeding (WI) population found in the UK.

References

Bibby, C, Burgess N, Hill D, Mustoe S (2000) “Bird Census Techniques”

Eaton MA, Brown AF, Noble DG, Musgrove AJ, Hearn R, Aebischer NJ, Gibbons DW, Evans A and Gregory RD (2009) Birds of Conservation Concern 3: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man. British Birds 102, pp296–341

Marchant J H (1980) “Common Bird Census Instructions” BTO

Full List of Birds Recorded On Site or Flying Over

Little Egret <i>Egretta garzetta</i> A
Grey Heron <i>Ardea cinerea</i> A
Eurasian Sparrowhawk <i>Accipiter nisus</i> A
Common Buzzard <i>Buteo buteo</i> A
Common Kestrel <i>Falco tinnunculus</i> A
Mediterranean Gull <i>Larus melanocephalus</i> A
Black-headed Gull <i>Larus ridibundus</i> A
Lesser Black-backed Gull <i>Larus fuscus</i> A
Herring Gull <i>Larus argentatus</i> A
Common Wood Pigeon <i>Columba palumbus</i> A
Eurasian Collared Dove <i>Streptopelia decaocto</i> A
Tawny Owl <i>Strix aluco</i> A
Common Swift <i>Apus apus</i> A
Green Woodpecker <i>Picus viridis</i> A
Great Spotted Woodpecker <i>Dendrocopos major</i> A
Barn Swallow <i>Hirundo rustica</i> A
House Martin <i>Delichon urbicum</i> A
White / Pied Wagtail <i>Motacilla alba</i> A
Winter Wren <i>Troglodytes troglodytes</i> A
Hedge Accentor <i>Prunella modularis</i> A

European Robin <i>Erithacus rubecula</i> A
Common Blackbird <i>Turdus merula</i> A
Song Thrush <i>Turdus philomelos</i> A
Blackcap <i>Sylvia atricapilla</i> A
Common Whitethroat <i>Sylvia communis</i> A
Common Chiffchaff <i>Phylloscopus collybita</i> A
Goldcrest <i>Regulus regulus</i> A
Long-tailed Tit <i>Aegithalos caudatus</i> A
Blue Tit <i>Cyanistes caeruleus</i> A
Great Tit <i>Parus major</i> A
Coal Tit <i>Periparus ater</i> A
Black-billed Magpie <i>Pica pica</i> A
Eurasian Jackdaw <i>Corvus monedula</i> A
Carion Crow <i>Corvus corone</i> A
Common Starling <i>Sturnus vulgaris</i> A
House Sparrow <i>Passer domesticus</i> A
Chaffinch <i>Fringilla coelebs</i> A
European Greenfinch <i>Carduelis chloris</i> A
European Goldfinch <i>Carduelis carduelis</i> A
Common Linnet <i>Carduelis cannabina</i> A

Nomenclature follows - Knox, A.G., Collinson, M., Helbig, A.J., Parkin, D.P. and Sangster, G. 2002. Taxonomic recommendations for British birds. *Ibis* 144 : 707-710.

Key

A Species that have been recorded in an apparently natural state at least once since 1 January 1950.

Bat Tree Survey, Emergence and Activity Monitoring

1) Trees Survey Method

Introduction

All bat species and their roosts are fully protected in Britain under the Wildlife and Countryside Act 1981(as amended) and the Conservation (Natural Habitats &c.) Regulations 1994 (as amended).

Initial Survey

Tree survey methodology involves looking for any suitable holes, cracks, niches or crevices which could be used by bats for roosting. In addition, large or apparently unhealthy trees which have a dense covering of Ivy possibly covering holes or crevices also have some potential to support bats. These are all termed potential roost features.

A survey for signs of residence by bat species consists of a slow methodical search of all aspect of the tree for actual roosting bats and their signs. Droppings around holes, on the tree trunk or on the ground beneath can be used to identify species. Scratch marks and staining at roost entry and exit holes. The presence of spider webs at a potential roost can often indicate their absence at that time although does not mean that the hole is not used at all. Careful attention is given to any sounds indicating the presence of a breeding bat roost (i.e. audible social calls). The survey is completed using binoculars from ground level and high powered torch and endoscope to inspect cavities with ladder where safe access permits.

Tree Survey Evaluation

Trees are assessed for their potential to support bat roosts either in the summer (nursery) or winter (hibernation) based on previous experience of bat occupancy at other sites, and upon the presence of suitable roost sites and access points. In particular, the presence of potential roost sites which are hidden from view are considered.

The potential for trees to support roosting or breeding bats is evaluated under the following protocol for the visual inspection of trees:

Tree category and description	Stage 1 Initial survey requirements	Stage 2 Further measures to inform proposed mitigation	Stage 3 Likely mitigation
Known or confirmed roost	Follow SNCO guidance and these guidelines wherever possible, to establish the extent to which bats use the site. This is particularly important for roosts of high risk species and/or roosts of district or higher importance and above		The tree can be felled only under EPS licence following the installation of equivalent habitats as a replacement.
Category 1* Trees with multiple, highly suitable features capable of supporting larger roosts	Tree identified on a map and on the ground. Further assessment to provide a best expert judgement on the likely use of the roost, numbers and species of bat, by analysis of droppings or other field evidence. <i>A consultant ecologist is required</i>	Avoid disturbance to trees, where possible. Further dusk and pre-dawn survey to establish more accurately the presence, species, numbers of bats present and the type of roost, and to inform the requirements for mitigation if felling is required.	Felling would be undertaken taking reasonable avoidance measures' such as 'soft felling' to minimise the risk of harm to individual bats.
Category 1 Trees with definite bat potential, supporting fewer suitable features than category 1* trees or with potential for use by single bats	Tree identified on a map and on the ground. Further assessed to provide a best expert judgement on the potential use of suitable cavities, based on the habitat preferences of bats. <i>A consultant ecologist required</i>	Avoid disturbance to trees, where possible. More detailed, off the ground visual assessment. Further dusk and pre-dawn survey to establish the presence of bats, and if present, the species and numbers of bats and type of roost, to inform the requirements for mitigation if felling is required.	Trees with confirmed roosts following further survey are upgraded to Category 1* and felled under licence as above. Trees with no confirmed roosts may be downgraded to Category 2 dependent on survey findings
Category 2 Trees with no obvious potential, although the tree is of a size and age that elevated surveys may result in cracks or crevices being found; or the tree supports some features which may have limited potential to support bats.	None. <i>A consultant ecologist is unlikely to be required</i>	Avoid disturbance to trees, where possible. No further surveys.	Trees may be felled taking reasonable avoidance measures. Stop works and seek advice in the event bats are found, in order to comply with relevant legislation.
Category 3 Trees with no potential to support bats	None. <i>A consultant ecologist is not required unless new evidence is found</i>	None.	No mitigation for bats required.

Adapted from a protocol by Corylus Ecology Ltd in BCT (2012)

Detailed Tree survey

Where the value of an individual tree or woodland area is found to be high during a preliminary survey, a more comprehensive survey in order to fully assess the likely value of the potential bat feature is undertaken. The scope of additional work will vary depending on a range of environmental factors.

Survey techniques are likely to include:

- Emergence survey during early evening (i.e. prior to emergence and at emergence), with the aid of a bat detector for ultrasonic calls.
- Climb-and-inspect assessment of selected trees to check for cavities and inspection with an endoscope or mirrors if appropriate.
- Foraging and transect walks through habitat surrounding potential tree roosts to understand local bat use of the site.

Survey work is tailored to each individual case, and the degree of evening emergence and foraging work undertaken is based on the following factors:

- size of the site;
- number of trees to be affected;
- habitats on site (eg water features/woodland);
- habitats and protected sites in the wider countryside;
- knowledge of bat use in local area;
- geographical range of rare species;
- proximity to known or suspected roosts.

Limitations of Tree Survey

Bats may move regularly between different tree roosts, and if used infrequently, signs to indicate the use of such trees by bats are unlikely to be evident. In addition, any signs which are left on trees by bats as a result of their use of a roost site (e.g. droppings below a roost exit) may be washed off as a result of wind and rain. Consequently, it is often difficult to confirm the presence of a bat tree roost. Surveys are best described as a sampling tool to assess presence of different bat species using the site at that time and place and general use of the area by bats.

Best practice methods for Tree Work

Works to trees used by bats (even if the bats are not present at the time) may result in an offence being committed under this law. If bats or bat roosts are found to be present in a tree, a European Protected Species (EPS) license from Natural England is likely to be required to legally undertake works on that tree. Where a satisfactory survey has resulted in no evidence of bats being found, and bats are then incidentally discovered during work, it is a legal requirement that the activities are halted immediately and Natural England consulted.

To reduce the chance of disturbing a bat roost it is important to avoid the summer (breeding season) and winter (hibernation) months. Works to trees with potential for bats is best done in September when young bats are mobile and on the wing, female bats are unlikely to be pregnant and the hibernation season has not yet begun. March is also a suitable time, (although careful survey is required for nesting birds as these are legally protected during this period).

Bats may move regularly between different tree roosts, and if used infrequently, signs to indicate the use of such trees by bats are unlikely to be evident. In addition, any signs which are left on trees by bats as a result of their use of a roost site (e.g. droppings below a roost exit) may be washed off as a result of wind and rain.

Consequently, it is often difficult to confirm the presence of a bat tree roost, and as a result an assessment of the trees to identify those with potential to support a bat roost is usually undertaken with trees with bat potential categorised into three categories.

There are a number of procedures that can be used by tree surgeons to ensure that best practice is maintained when undertaking tree felling/pruning operations. These are detailed below. The application of these principals apply to both Category 1 and Category 2 listed trees (see BCT, 2007). These methods should be used on these trees during the suitable tree felling periods (September and March).

- Keep tree work to a minimum retaining all potential roosts where possible.
- A precautionary inspection of the tree(s) by the tree surgeon looking for signs of bats should be carried out before starting work. This should include an inspection of all holes and niches using a torch and preferably an endoscope. If bats or signs of bats are found no work should start and Natural England should be contacted for further advice.
- Where possible avoid cross cutting in proximity to cavities or hollows.
- Limbs with internal fissures should be pruned carefully to maintain integrity of features as potential roost sites.
- Any sections felled containing cavities should be lowered carefully and left on the ground (preferably for 24 hours) with the openings clear, allowing anything inside an opportunity to escape.
- Split limbs that are under tension may need to be wedged open to prevent their closure when pressure is released, potentially trapping bats.
- Where ivy covers areas of a tree's trunk or branches, there may be hidden roosting potential behind it. Dealing with ivy covered trees depends on the amount of ivy. If there is a thick mass of ivy growth it may be practical to consider felling the tree on the basis

that the thickness of the foliage will soften the fall and reduce the shock. This tree can then be inspected on the ground and if possible left for 24 hours, before section cutting. If the tree is only partially covered, pruning or sectioning may be more appropriate. If the works are not urgent cutting the ivy at its base and completing the work when the ivy is dead, thus reducing the bat roosting potential should be considered. However where stems of ivy create a dense mass against the trunk there will always be roosting potential.

If bats or evidence of bats are found at anytime, all works must stop immediately and Natural England contacted for further advice.

(2) Bat Activity Survey

Introduction

The value of a site to bats can be arrived at using activity surveys to understand how many bats use the site, the degree of use and what species are involved.

Timing

An activity survey is undertaken in conditions when bats are likely to be active. Evening surveys commenced from sunset, often beginning with monitoring certain potential bat roost trees or woodland areas where such trees exist, for any emerging bats.

Dawn survey work may also be undertaken, usually recording activity up to two hours before, and sometimes up to an hour after sunrise.

Activity surveys are undertaken during the period when bats are not hibernating, this is usually between the end of April to October.

Methods

Line transects are carried out by a surveyor carrying a bat detector/s (example used, Bat box Duet, Petterson D240x, Anabat SD1) who walks at a constant speed along a planned route and records sound for subsequent analysis, and/or bat passes or species. The data collected can be used to provide an index of bat activity along the transect. Line transects are best suited to open habitats with linear features, such as hedgerows, field boundaries and woodland rides. Transect surveys, when repeated should be undertaken in opposite directions and, if possible, started from different points along the route. The number of transects required to cover the main habitat features depend on the size and complexity of the site. Transects should be sampled within 2-3 hours after sunset. The transect methodology should consider, for example identifying listening points where a minimum of 3 minutes recording is undertaken along the route and or combined with activity monitoring with recording equipment left for longer periods recording all bat passes. (BCT, 2012)

Since different species of bats echolocate using different frequencies, there is a risk that certain species will be missed if the bat detector is not tuned to the frequency used by that species at the time. Therefore, during the majority of the survey period, a surveyor scans through different frequency ranges to ensure as many bats were recorded as possible. The main frequency ranges used were as follows:

- 32-55khz to detect the smaller species of bats, such as Pipistrelle spp, Myotis spp, etc.
- Around 22-30 khz to detect the larger bat species, including Noctule and Serotine bats.

In addition the Anabat SD1/Songmeter SM2 Automated recorders were used to allow greater survey intensity than with manual bat detector surveys. They can allow longer periods of time coverage than could be practically and economically covered by manual survey, providing more comparable results, or be used to provide a more flexible timetable for surveying. Automated systems are triggered by sound (via a detector) and these sounds are then recorded as event / bat passes.

Assessment of Landscape for Potentially Good Bat Foraging sites or Flight Lines

The habitats across the site are surveyed and assessed on their likely use by bats for foraging and for use in commuting across the landscape. This assessment is based upon the following main factors:

- Sheltered areas where insects are likely to gather;
- Presence of rough grassland or other habitats likely to result in higher insect numbers;
- Provision of linear links across otherwise open habitat to allow bats to following features within shadows (i.e. hidden from predators), while also providing foraging potential.

Data Collected

Time, flight direction and species of bat are recorded for each bat heard or seen and these were mapped on individual site maps. Time of sunset/sunrise and weather conditions are also recorded for each survey.

The following data is gathered for bat passes recorded:

- Location of observation (data highlighted on a map);
- Whether the bat was foraging or commuting (if commuting, in which direction was it travelling and whether the bat was following any landscape features);
- Species of bat observed (where possible).

(3) Bats in Buildings Survey Method

Introduction

Bats use buildings and trees for roosting and breeding, and so the potential for any of these features on site to support bats needs to be considered in an ecological assessment of a development site. Building survey methodology is provided below.

Methods

The survey for signs of residence by bat species consists of undertaking a slow methodical search both internally and externally for actual roosting bats and their signs which could indicate the presence of a bat roost including:

- Bat droppings – e.g. on floors, stored articles, walls, beams, tiles, windowsills entry / exit points etc. These can be used to aid species identification.
- Dark staining at well-used roost sites (e.g. ridge boards & timber joints, etc) or entry / exit points.
- Wear marks at bat roost sites and entry / exit points.(This can be a polishing and smoothing of rough wood surfaces and masonry or slight scuffing of very smooth wooden surfaces)
- Urine spots or streaking in the vicinity of bat roosts and entry / exit points.
- Similarly the presence of spider webs at a potential roost can often indicate their absence at that time, but requires careful interpretation combined with other evidence

All internal spaces of the buildings are searched, including gaps at the roof timber frame joints. External surfaces of the building are also examined for evidence of use of any potential bat access points. The surveyor uses a strong torch in dark internal areas and shaded outdoor areas, endoscope for inaccessible spaces, binoculars and, where appropriate, a ladder to examine the buildings externally.

The potential to support bat roosts either in the summer (nursery) or winter (hibernation) based previous experience of bat occupancy at other sites and upon the presence of suitable roost sites and access points is also considered. In particular, the potential for roost sites which are hidden from view is noted.

Survey Constraints and Limitations

Lack of bat evidence cannot always be taken to mean the lack of use by bats as signs of bats can be easily washed off by wind or rain. Droppings are hard to see where rubble and other floor debris may obscure them. Low numbers of droppings can easily be missed especially where they may become damp and deteriorate. Evidence of bats may not be apparent where bats roost out of view, such as in wall cavities etc.

Surveys are carried out during a brief window of time, and therefore, provide only a snapshot of the site use. As bats regularly move between different roost sites, particularly to satisfy their varying requirements at different times of the year, a bat survey often concentrates upon searching for signs to indicate the presence of roosting bats at any time of the year. Due to these survey limitations an assessment using professional judgement is also used to interpret the findings and the potential for

supporting bats and is used to guide any recommendations for precautionary approaches to carrying out the proposed work.

Reference

Bat Conservation Trust. (2012) Bat Surveys Good Practice Guidelines. 2nd Edition. Bat Conservation Trust. March 2012. ISBN-13: 9781872745985

Mitchell-Jones ed. (2006) “Bat Conservation Handbook” Third Edition, English Nature

Survey Methods for Otter and Water Vole

Introduction

Both Otter *Lutra lutra* and Water Vole *Arvicola terrestris* are afforded protection under the Wildlife & Countryside Act 1981 (as amended). Otters are also afforded protection under Annex II and IV of the Habitats Directive, which is implemented in the UK through the Habitat Regulations 1994. Water Voles and their habitat are protected under the Wildlife & Countryside Act, which was amended in 1998 and 2008 to protect their habitat and individuals from harm (respectively); whilst both Otters and their habitat are protected under the Habitat Regulations.

Survey Techniques for Water Vole

Site surveys for water vole will again begin with a desk top survey to understand the local area populations of Water Vole. This will then allow a field survey to be targeted.

Field survey work involves identifying all potential Water Vole habitat, rivers, wetlands, watercourses and ditches and surveying in detail each area of habitat within the study area/development site. The field survey examines habitat for the following signs of Water Vole presence:

1. Faeces;
2. Latrines;
3. Feeding Stations;
4. Signs of feeding on marginal aquatic vegetation;
5. Burrows.
6. Footprints

Water Vole reduce their activity during the winter period, therefore survey work during winter will need to be aware of this potential issue. The optimum time for survey is between March and October.

Survey Techniques for Otter

A desk top survey is the first part of an Otter survey to determine whether Otters have been recorded within 5km of a site.

The second stage of an Otter survey is to identify all areas of Otter habitat within a study area, and determine where Otters may move to and from along watercourses. Any on site and study area survey will be undertaken in the light of Otter habitat and known records in the local area.

Field survey work will involve identifying all rivers and watercourses which may potentially be affected by the proposals, and that these watercourses are then included in the Otter assessment. Watercourses will be surveyed within 2km of the proposed development. Signs of Otter will be searched for including trackways, holts and spraint sites. All accessible banks of a watercourse should be surveyed and spot checks will be made of all bridge and other potential sprainting features along a watercourse.

Otter survey work will be undertaken over as long a period of time to understand and account for seasonal variation as Otters may use different stretches of watercourses at different times of year.

References

Design Manual for Roads & Bridges (DMRB) (1999) Volume 10 Section 1 Part 9 HA 81/99 Nature Conservation Advice in Relation to Otters.

English Nature (2001) Water Voles and Development A Good Practice Guide, English Nature, Peterborough

Strachen et al (2012) Watervole Conservation Handbook third Edition. WILDCRU

Dormouse Survey Methodology

Introduction

Dormice *Muscardinus avellanarius* are protected under UK and European law. They are a mostly arboreal mammal, living in hedgerows, scrub and woodland where there is usually a diversity of plant species for them to feed on and nest within.

Quality of habitat

An assessment of the quality of the habitat for Dormice involves examining all woody habitat present on a site and connected to the site. Features looked for include:

- Presence of a high diversity of native woody plant species at a suitable nectaring and fruiting stage of their life cycle or lower diversity habitat with good food resources (nectar, insects, or fruit);
- Presence of good connectivity of wooded habitat in an area on a linear and vertical level;
- Presence of key plant species preferred by Dormice (such as Hazel coppice);
- Well structured habitat that provides niches for nesting and hibernating;
- Proximity to ancient woodland, large hedgerows, ancient scrub and any other ancient woody habitat;
- Habitat that has had consistent management over a period of time.

Nut Searches: identification of Dormouse feeding signs on Hazel Nuts

Nut searches are best carried out from mid September until late December, when the Hazel is in mast. Hazel nuts degrade over time but can persist on the woodland floor for over a year. Stands of fruiting Hazel are targeted, and nuts are searched for beneath each tree for approximately 20 minutes. Any Hazel nuts thought to have been opened by Dormice are collected.

Nest Tube Survey

Nest tubes are corrugated plastic tubes with a wooden platform that Dormice utilise to build day nests. The presence of Dormice within a habitat can be ascertained using tubes placed in intervals along the habitat. Uptake of tubes by Dormice is not fully understood, but this method provides a reliable way of determining whether Dormice utilise a given area.

Uptake in marginal habitats may be more consistent as these habitats tend to have fewer natural cavities for Dormice to be present. The Dormouse Conservation Handbook (Bright et al 2006) provides data for determining how much effort should be put into Tube survey work. The optimum period for recording use of boxes by Dormice is in spring and autumn. The use of boxes at certain times of year may be influenced by consideration of how Dormice use various habitat types. A tube survey in autumn may be more likely to locate Dormice if tubes are placed in species that Dormice use at that time of the year (eg Hazel for nut crops). In spring they are more likely to utilise species that provide high nectar sources (eg Lime).

Nest tube survey work on a site usually involves erecting of tubes in all potentially suitable and connected habitat. Areas with high and lower potential are both surveyed, as Dormice in high

potential areas may have suitable nesting opportunities and may not therefore use the tubes as regularly. The placing of the tubes is important, to ensure that Dormice are both likely to use them and that they are out of sight from tampering by the public. Dense and well concealed sites, that are sheltered, are always used in preference.

Boundaries Surveyed on Site using Tubes 2014

Tree Species	Location	May	Jun	July	Aug	Sept	
Tubes							
1 Bramble	B1						
2 Bramble							
3 Elder							
4 Elder							
5 Elder							
6 Bramble							
7 Elder		AC		AN			
8 Elder							
9 Bramble					AC		
10 Bramble							
11 Hawthorn							
12 Blackthorn							
13 Blackthorn							
14 Blackthorn							
15 Blackthorn							
16 Hawthorn							
17 Blackthorn							
18 Bramble							
19 Blackthorn							
20 Blackthorn							
21 Bramble	B4 & scrub						
22 Hawthorn							
23 Bramble			AC				
24 Hawthorn							
25 Willow							
26 Willow						AC	
27 Willow							
28 Blackthorn							
29 Blackthorn							
30 Bramble							
31 Hawthorn							
32 Blackthorn							
33 Blackthorn							
34 Hawthorn							
35 Oak				AC		AC	
36 Blackthorn							
37 Hawthorn							

Tree Species	Location	May	Jun	July	Aug	Sept	
38 Hawthorn			AC				
39 Oak							
40 Elder							
41 Hawthorn	B5 & B6						
42 Hawthorn							
43 Hawthorn							
44 Field Maple							
45 Field Maple		AN					
46 Blackthorn							
47 Blackthorn							
48 Blackthorn							
49 Elder							
50 Blackthorn							

Key: AN = *Apodemus Mouse nest*, AC = *Apodemus Mouse Cache*, AS = *Wood Mouse*, MN = *Dormouse Nest*, MC = *Dormouse Cache*, UC = *unknown cache*.

References

Bright, P., Morris, P. & Mitchell-Jones, T. (2006) *Dormouse Conservation Handbook*. English Nature Species Recovery Programme. English Nature, Peterborough.

Chanin, P and Woods, M (2003) *Surveying dormice using nest tubes. Results and experiences from the South West Dormouse Project*. English Nature, Peterborough.

Morris, P. A. (1993) *A Red Data Book for British Mammals*. The Mammal Society, London

Technical Appendix 10

Reptile Survey Methodology For Common Reptile Species

Introduction

All of the common reptile species (Grass Snake, Adder, Common Lizard and Slow-worm) native to Britain are protected by the 1981 Wildlife & Countryside Act 1981 (as amended) under Sections 9(1) and 9(5). This legislation makes it illegal to intentionally kill or injure a common reptile and also, to sell, barter, exchange or transport for sale these animals or parts of them. However, their habitat is not directly protected.

Survey Methods

Survey work involves the placing of cut up roofing felt or other flat materials such as corrugated iron sheeting, wood or plastic that reptiles hide under. The reptiles use these artificial refugia as they warm faster than the surrounding environment and are attractive to shelter beneath. In order to be effective, refugia need to be placed in the most suitable habitat and in the best locations within those habitats for reptiles. Survey refugia are placed at a minimum of 10/ha.

Reptiles can be surveyed using this technique between early spring and late autumn. The times of the year that provide optimum survey are April to late June, and late August to the end of September.

Survey work is undertaken during suitable weather conditions (i.e. between 9 and 18°C with little or no wind and no rain). High temperatures in late June to late August mean that suitable weather conditions occur the morning / late afternoon, after and even during rain in warm weather, and on overcast days.

Refugia survey is always complemented by visual searching for reptiles which are not utilising refugia.

Population Size Assessment

In order to assess the importance of a population the population size needs to be assessed. This uses standard numbers from the Herpetofauna Groups of the British Isles (HGBI, 1999) advisory notes for Amphibian and Reptile Groups (ARGs) **Table T1** below.

Table T1: Assessing Reptile Populations

Species	Population size (adult density)		
	High	Medium	Low
Slow-worm	(> 100 / ha)	(> 50 / ha)	(< 50 / ha)
Common lizard	(> 80 / ha)	(> 40 / ha)	(< 20 / ha)
Adder	(> 4 / ha)	(2 - 4 / ha)	(< 2 / ha)
Grass snake	(> 4 / ha)	(2 - 4 / ha)	(< 2 / ha)

References

Herptofauna Groups of the British Isles (HGBI) Guidelines (1998) “Evaluating Local Mitigation/Translocation Programmes: Maintaining Best Practice and Lawful Standards.” HGBI Advisory notes for Amphibian and Reptile Groups (ARGs). HGBI, c/o Froglife, Halesworth, personal collection.

Froglife, 1999. Froglife Advice Sheet 10. Reptile Survey. An introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife, Halesworth, Suffolk.

Great Crested Newt Survey Methodology

Introduction

Natural England guidance recommends, that in order to confirm the presence/absence of Great-crested Newt *Triturus cristatus* (GCN) on a site it is necessary to perform three different survey methods over a minimum of four visits in suitable weather conditions.

Ideal survey time is between mid-March to mid-June, with two visits during mid-April to mid-May. These timing restrictions are in order to monitor the newts during the peak breeding season, when most of the population is within the water body.

Torchlight searching

The water's edge of a pond is scanned systematically at night using a powerful halogen lamp with 500,000 candlelight power. All water was searched systematically and repeatedly. It is possible through torch surveys to distinguish newt species and sex from external patterning. Torch survey is undertaken during night time where weather conditions are good for amphibian activity: night-time air temperature > 5 °C, no/little rain.

Egg searching

Examination of submerged vegetation for eggs is an effective method for detected the presence of GCN. GCN eggs are characteristic in size and colour, laid singly and folded within pliable material such as that of aquatic plants and plastic debris.

Netting

Netting is carried out using a sturdy net, with a 4 mm mesh. A slow sweeping action is used to explore areas of aquatic vegetation and leaf litter. Netting can be standardised so that it is consistent with guidelines on SSSI selection to produce relative abundance scores. These method uses fifteen minutes of netting per 50m. This survey technique causes vegetation disturbance, and other methods are a preferable technique to determine relative abundance especially in smaller ponds or ponds within gardens.

Bottle Trapping

Both adult and larval newts can be trapped by the use of bottle traps. Newts find their way into the bottles but usually cannot leave because of how the bottles are positioned. Bottle traps are an effective way of detecting a population but need to be used with care. Bottle traps are set in the evening, followed by an early morning visit to check them. The traps are checked within two hours of dawn where they are set within direct sunlight.

Observation

Vigilant and prolonged daytime observation, for example, watching for GCNs to surface for air and for GCN movement within the water body can be a very effective in locating GCN in water bodies.

Terrestrial search

Suitable terrestrial habitat such as logs, rubble, discarded carpet and wood are carefully inspected underneath and then replaced.

Survey Work was undertaken by a licensed GCN surveyor (AB), (CC), and with additional assistance (GK).

Great Crested Newt Survey in 2014

Survey Details	Date (2014)			
Water Body	07/04	14/04	27/04	29/04
	10c	14c	13c	11c
Onsite ditches B7 & 8	Turbidity 1 T,E,O TV = 0 LH = 3	Turbidity 1 T,E,O TV = 0 LH = 8	Turbidity 1 T,E,O TV = 0 LH = 6	Turbidity 1 T,E,O TV = 0 LH = 10
Off Site ditches	Turbidity 1 T,E,O TV 0 LH 4	Turbidity 1 T,E,O TV 0 LH 6	Turbidity 1 T,E,O TV 0 LH 7	Turbidity 2 T,E,O TV = 0 LH = 8
Pond 1: Barton Mill Pond	Turbidity 1 T,E,O TV = 23 LH = 2	Turbidity 1 T,E, ES, O TV = 6 LH = 1	Turbidity 1 T,E, ES, O TV = 17 LH = 2	Turbidity 2 T,E, ES, O TV = 30 LH = 10
Pond 2: Lake Way	Turbidity 4-5 T,E,O TV = 4 LH = 0	Turbidity 4 T,E, ES, O TV = 6 LH = 0 RT = 5	Turbidity 4-5 T,E,ES,O TV = 3 LH = 0	Turbidity 4 T,E, ES, O TV = 14 LH = 0
Pond 3: Rookery Fm House	Turbidity 0 T,E,O TV = 22 LH = 5	Turbidity 0 T,E,O TV = 20 LH = 16	Turbidity 0 T,E,O TV = 19 LH = 10	Turbidity 1 T,E,O TV = 40 LH = 10

Key:

Methods used *Te* = Terrestrial, *O* = Observation *T* = Torch Survey, *E* = Egg Checking, *ES* = Egg strips *N* = Netting, *BT* = Bottle Trapping

BB = Common Toad, *RT* = Common Frog, *TC* = Great Crested Newt; *TV* = Smooth Newt, *LH* = Palmate Newt *NA* = Access not permitted by landowner

References

Frog Life (Langton, T., Beckett, C. & Foster, J.) (2001) Great Crested Newt Conservation Handbook. Halesworth

English Nature (2001). Great Crested Newt Mitigation Guidelines. English Nature, Peterborough.

Reptile Translocation Methodology

Translocation of Reptiles

In summary, translocation is the movement of animals, usually deliberately, from one location to another (Gent *et al*, 1998). The receptor site is the site to which reptiles are moved, the donor site (or in this case development site) is where they are moved from.

The aim of the mitigation strategy is to ensure that an ‘equivalent population’ is maintained to that which existed before (Gent *et al*, 1998). Reptile mitigation strategies usually involve translocations and habitat management which is implemented between March and October once any reptiles on site have emerged from hibernation.

Receptor sites must be assessed prior to the translocation of any reptiles, against criteria provided as good practice guidance. This ascertains the existing population of reptiles on the receptor site and identifies any habitat management needs in order to provide the optimum habitat for translocated reptiles.

HGBI (1998) and Gent *et al* (1998) recommend that ‘reasonable effort’ should be undertaken to clear a site of reptiles prior to any works being carried out. Interpretation of what ‘reasonable effort’ translates as in minimum trapping days and capture methodologies is provided in **Table 1** below.

Table A1: Minimum Capture Effort for Common Reptiles

Species	Population size (adult density)	Tin density (tins/ha)	Minimum number of trapping days in good weather
Slow-worm	High (> 100 / ha)	100	All suitable days between March & September or a full year (min. 90 suitable days)
	Medium (> 50 / ha)	100	All suitable days between March & September or a full year (min. 70 suitable days)
	Low (< 50 / ha)	50	60 suitable days
Common lizard	High (> 80 / ha)	100	All suitable days between March & September or a full year (min. 90 suitable days)
	Medium (> 40 / ha)	100	All suitable days between March & September or a full year (min. 70 suitable days)
	Low (< 20 / ha)	50	60 suitable days
Grass snake	High (> 4 / ha)	100	All suitable days between March & September or for two years (min. 90 suitable days)
	Medium (2 - 4 / ha)	100	All suitable days between March & September or two years (min. 70 suitable days)
	Low (< 2 / ha)	50	60 suitable days

Monitoring is necessary in the medium and long term in order to assess the success or otherwise of the translocation programme.

Capture Areas Assessment

The areas of the site to be developed have either very low or no reptile populations over most parts, and a translocation has already occurred over the main area of the site.

Receptor Area Assessment

A receptor site for reptiles needs to meet certain criteria to ensure that the conservation status of the populations of reptiles on the capture site and any on the receptor site are maintained. In order that a receptor site is sustainable in the long term the following assessment criteria recommended by HGBI (1998) have been used to find a site:

- A receptor site should be local to the donor site, and as close as possible to it (at least within the same county or similar administrative area, with similar geology/habitat);
- Not currently supporting a viable breeding population of the species to be translocated, for known reasons, or be capable of supporting them given suitable habitat management and creation;
- Not be subject to planning or other threats in the foreseeable future;
- Subject to a written, agreed and funded pre- and post-translocation management agreement;
- Subject to a written, agreed and funded pre- and post-translocation monitoring programme.

There have been various translocation programmes which have assessed the populations and carrying capacities of a range of different reptile habitats particularly in relation to slow-worms. It is widely recognised that slow-worms can, in their ideal habitat, regularly occur at 1000+ per hectare but are usually present at lower densities. However it should always be carefully considered that few sites have large areas of continuous good slow-worm habitat capable of supporting such high populations although smaller, localised areas of a site may do so. When estimating the carrying capacity of a release site and considering the number of reptiles to be translocated, a precautionary approach will be used. The mitigation strategy will provide a larger area of suitable habitat at the receptor site than at the capture site.

The receptor site that is most fits the criteria above based on knowledge of populations on site, is the retained public open space woodland area on the site. The long term management of this area can be prescribed to cater for the small populations of reptiles, as well as other informal recreational activities and the other nature conservation interests.

Translocation Methodology

In order to fulfil a translocation of reptiles from the development site to the receptor sites, the animals must be caught, or in the case of a very low population discouraged from the areas of the site to be

lost. The most effective method for capture involves the placing of cut up roofing felt or other materials such as corrugated iron sheeting, wood or plastic that snakes and lizards hide under. Refugia/Tins are best placed in locations which will be attractive to reptiles (e.g. 'sun-traps').

The most profitable time for capturing reptiles is generally between late April and late June, and again between late August and late September. The suggested number of days required to catch reptiles for a reasonable effort to remove the population is described in **Table A1** above.

Capture Site Preparation

The development site must be prepared in order to facilitate the successful removal of reptiles. Sheets of roofing felt and tin will be placed across the site to act as refugia for the reptiles. They will be placed at a high density in suitable habitat. Areas of suitable reptile habitat with a high reptile density may have a tin density of up to 5 refugia per 10m², in line with the guidance in **Table A1**. The placement of a higher number of refugia on site will increase the efficiency of capture and can reduce the number of trapping days required to clear the site of reptiles.

Capture Effort

Table A1 above provides the suggested capture effort for Slow Worms, based on good practice guidance, whereby 60 trapping visits can be required to clear common reptiles from a site such as present, during periods of suitable weather conditions (HGBI, 1998). Reptile translocation can require at least one season (March to October), and sometimes longer, to ensure that all reptiles are removed from the development site.

The purpose of this type of translocation is to make reasonable effort to remove all reptiles from a site prior to a development. Where reptile populations are low or on small sites, Natural England often provide additional guidance that reasonable effort has been made and translocation to be considered complete in any area. The capture rate needs to have declined to zero over at least three consecutive trapping visits in suitable weather conditions.

Habitat Manipulation

The areas of habitat affected by the development will be modified to reduce their suitability for reptiles. This will encourage reptile movement within the site to increase capture in key areas around refugia and may also encourage some dispersal to suitable retained habitats. The grass height will be reduced by cutting to no less than 10cm on the first cut and will be phased in bands and habitat areas across the site. The location and timing of this process will be guided by capture rates in the different areas of the site.

Translocation programme

The development site will be inspected regularly and any reptiles will be captured and moved, using the methods described above to the receptor site. For the translocation to be considered complete in any area, the capture rate needs to have declined to zero over at least three consecutive trapping visits in suitable weather conditions.

The guidance on indicative trapping effort that may be required suggests this may take 60 trapping visits (HGBI, 1998). Close monitoring of the capture rate will allow a judgement to be made of the

number of visits considered to be necessary. The site will be walked very slowly in order to search for basking reptiles and by carefully lifting each refugia, an attempt will be made to catch any reptiles basking beneath.

All reptiles will be transported to the receptor site in a secure ventilated container. At the end of each visit all reptiles caught will be released in suitable conditions at the receptor site. Details of all captures and releases will be recorded.

Exclusion Fencing

Reptile fencing will be used where required to prevent reptiles returning to cleared areas, and where populations are considered sufficient to warrant it.

Supervised site clearance

Following the completion of the translocation in any areas of the site, a supervised site clearance will be carried out. This will take place outside of the hibernation season usually between April- early October (November – February is the main hibernation period dependent on weather conditions). The technique is a last method used and requires very careful specialist supervision. Normal destructive search rates are between 0.1 and 1.0 ha per day depending on machine size and habitat type.

The search will begin by dismantling rubble piles and other debris by hand. Reptiles may be found sheltering in these structures. Following this, the vegetation will be stripped using an excavator and bucket. Firstly, the top few centimetres of the ground or first layer of rubble should be removed, to expose reptiles sheltering in crevices just below the surface. At least one experienced reptile handler should be positioned to catch any remaining reptiles as they are disturbed. Following this, larger and deeper excavations can be made, concentrating on areas which afford shelter to reptiles, such as tree stumps and buried rubble. Particular care should be taken when emptying the bucket in case any reptiles are dug up with the spoil. It is not anticipated that many reptiles (if any) are discovered as the reptile populations will have almost completely been moved by this stage.

Prior to starting works, the contractors will be alerted to the presence of protected species on the site and provided with the method statement and plans. The contractors will be shown reptiles, so that they are familiar with their identification, should they come across them during vegetation works.

Monitoring

Following completion of the work, monitoring of the reptile population at the receptor site will be completed by Aluco Ecology during the following two years, in order to determine the success of the translocation project.

Natural England (English Nature, 1998) suggests the following guidance which may determine the ‘success’ of a mitigation strategy:

- Removal of a ‘reasonable proportion’ of animals from a development site or no significant impact from development where in situ conservation is involved;
- Establishment and maintenance of a range of suitable habitats: with the presence of ‘good’ features and absence of ‘negative’ features;

- Breeding and successful recruitment;
- Re-establishment of animals in a range of habitat or spread of the animals throughout a site or to adjacent sites;
- Establishment of an appropriate age structure in the population;
- Survival of a large proportion of the animals that were moved;
- Establishment of:
 - A viable population
 - An expanding population
 - An ‘equivalent’ population to that which previously occurred
 - A population that is fluctuating in size within acceptable limits;
- Persistence of individual animals over a number of years.

References

Herpetofauna Groups of the British Isles (HGBI) Guidelines (1998) “Evaluating Local Mitigation/Translocation Programmes: Maintaining Best Practice and Lawful Standards.” HGBI Advisory notes for Amphibian and Reptile Groups (ARGs). HGBI, c/o Froglife, Halesworth, personal collection.

Froglife, 1999. Froglife Advice Sheet 10. Reptile Survey. An introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife, Halesworth, Suffolk.