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Bat Tree Climbing Survey: Horndean Road, Emsworth, PO10 7TD

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1st October 2014



Introduction

The Ecology Co-op was instructed to undertake a tree climbing bat survey of the mature trees to the east of the site at Horndean Road proposed for development. A previous initial scoping survey by Wychwood Environmental assessed the trees and classified them as Category 1* trees, which are defined by the Bat Conservation Trust (BCT)¹ as those which offer high suitability for roosting bats. The land at Horndean Road is proposed for a housing development, with the mature trees to the east of the site, detailed within this report, to be retained, without any lopping, felling or other direct impacts. This assessment has been requested in order to better appraise the likelihood that these trees are used by roosting bats and subsequently guide appropriate mitigation to ensure that no potential bat roosting habitat is lost.

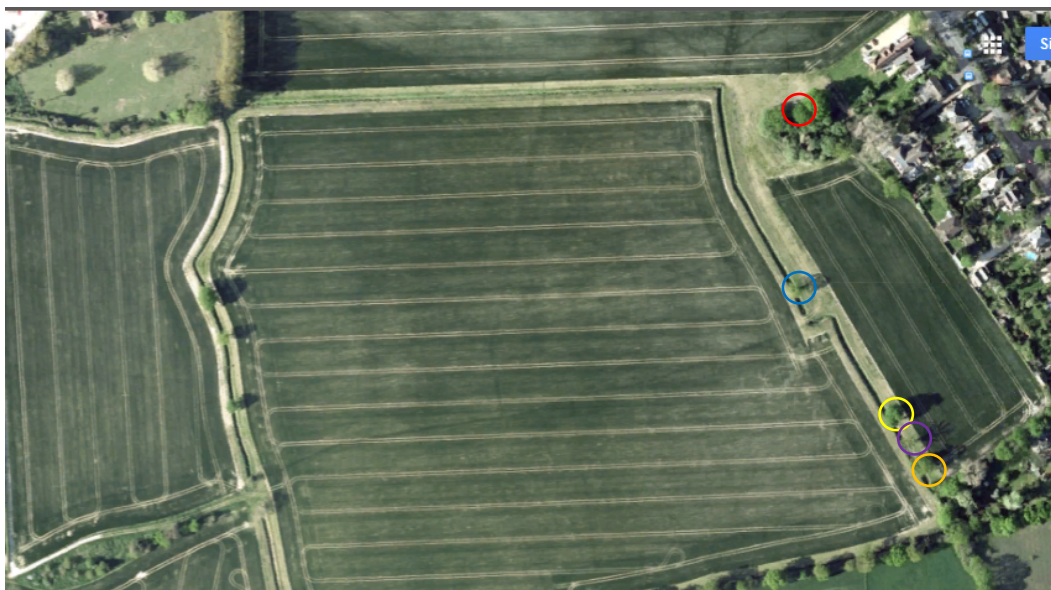


Figure 1. Google Earth screen grab of the locations of the five trees surveyed. red circle = location of tree 1; blue circle = location of tree 2; yellow circle = location of tree 3; purple circle = location of tree 4 and orange circle = location of tree 5. Figure orientated from north to south.

All species of bats within the UK are protected via The Conservation of Species and Habitats Regulations (2010) and also the Wildlife and Countryside Act (1981), as amended. Therefore, it is an offence to kill or injure a bat or interfere with any roosting or resting site. A bat roost is interpreted as "any structure or place used for shelter or protection by bats" whether or not bats are present at the time. Details of legislation and legal protection afforded to all species of British bats are given in Appendix 1.

Survey Methods

The climbing survey of the trees for bats was undertaken on the 26th of September 2014 by Dr Ryan Walker, MCIEEM, CEnv (Natural England license holder: CLS0 1385 - Bat Survey Level 2) and Mr Mike Cummings MCIEEM (Natural England license holder: SCI 0077). Both surveyors are qualified to access trees using ropes and harnesses through a City and Guilds qualification. The survey was conducted following best practice survey techniques as outlined by the Bat Conservation Trust.

¹ Hundt, L (2012) *Bat Surveys: Good Practice Guidelines, 2nd edition*. Bat Conservation Trust, London.

Category 1* = Trees with multiple highly suitable features able to potentially support larger roosts.

Category 1 = Trees with defined bat potential, supporting fewer suitable features than Category 1* trees or with potential to support single bats.



Each tree was inspected from the ground using binoculars for features that could potentially support roosting habitat for bats. Features of interest include woodpecker holes, loose bark, cracks and splits in limbs, natural holes and hollows and cavities. Following this, each tree (with the exception of tree 1) was climbed and each feature was inspected with the use of an endoscope for evidence that might suggest the feature has been or is currently used by roosting bats. The survey also assessed the likelihood for the tree or feature to potentially support roosting bats even in the absence of any physical evidence. Each feature was categorised as supporting a high, medium, low or negligible suitability to support roosting bats. Tree 1 is clad in thick ivy, making it difficult to climb this tree safely and therefore was not assessed.

Results

The site is set within a rural setting upon the edge of the town of Emsworth. The site is currently arable land, fringed with hedges and currently of moderate to low value to bats owing to the poor value of cultivated land for invertebrates that make up the entire diet of bats. The trees to the east of the site support the only potentially valuable bat foraging and roosting habitat within the site. All of the trees surveyed are mature English Oak trees (*Quercus robur*), supporting multiple features with the potential to support roosting bats. No bats were recorded currently using the trees as roosting habitat within any of the features inspected (Figs. 4-6).



Figure 2. Tree 1, supporting thick ivy, with a moderate potential to support roosting bats.



Figure 3. Tree 2, supporting peeling bark upon a large lower limb, with a high potential to support roosting bats.

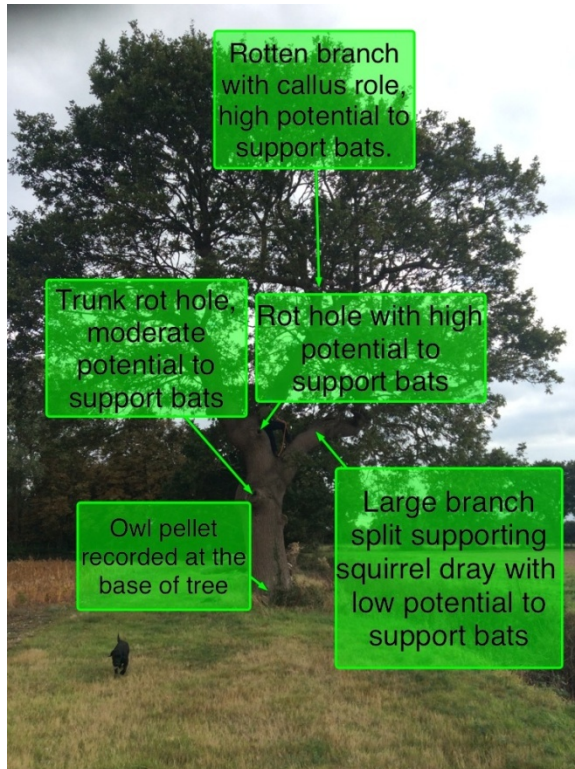


Figure 4. Tree 3 with two high, one medium and one low feature suitable for supporting roosting bats.

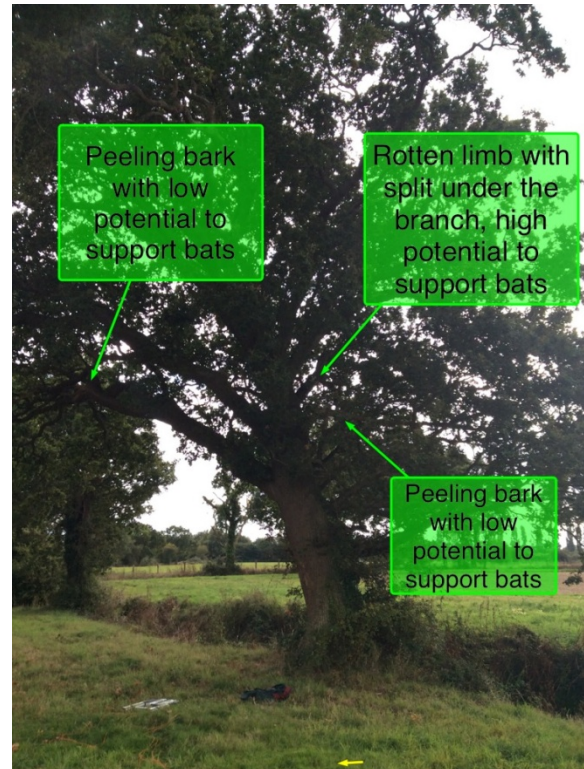


Figure 5. Tree 4 with one high and two low features suitable for supporting roosting bats.

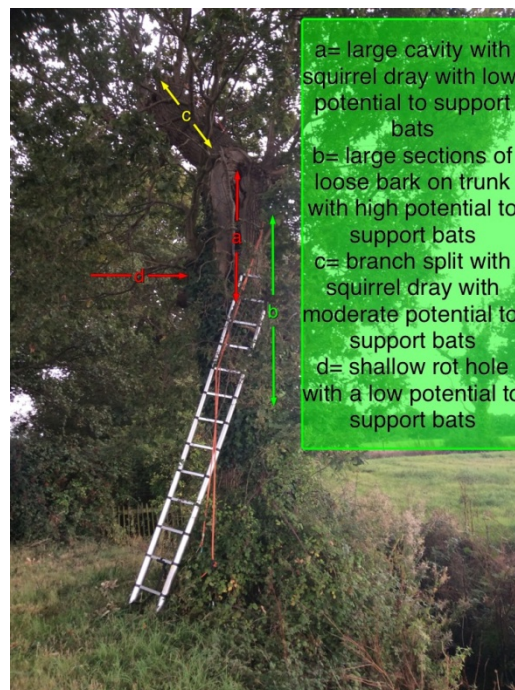


Figure 6. Tree 5 supporting one high, one medium and two low features suitable for supporting roosting bats.

Trees 2, 3, 4 and 5 all support features that were considered to have a high potential for supporting roosting bats (Figs 3-6). At the time of this assessment no droppings, rub marks, staining or feeding remains were identified that suggested these trees had been used by roosting bats in the very recent past. It must be noted however that such evidence often does not last long in such exposed situations, with bat



BAT CLIMBING SURVEY, HORNDEAN ROAD

droppings consumed by a variety of invertebrates and evidence of rub marks potentially washed away. It remains possible therefore that these trees could have been used at other times of the year, but are not perhaps used throughout the year, given that this assessment was undertaken at a time when bats are readily active. It is likely (though not certain) that if a large regularly used bat roost were present, then some field signs would have been visible.

Discussion and Recommendations

The results of the survey suggest that all of the trees surveyed support features that could be considered suitable for a number of species of roosting bats. It is important that all of the trees are retained as potential roosting and foraging habitat for bats as well as other wildlife. Oak trees support the greatest amount of associated biodiversity of any of the UK's floral species, supporting 423 species of associated insects². It is important that potential light pollution from the proposed new development is managed correctly within the vicinity of these trees by following the advice in the Azure Ecology Habitat Management Plan³, particularly the advice in Appendix 2. Further to this, it is important that the habitat is enhanced around these trees to enable connectivity from this area to further areas of other potential bat foraging habitat as outlined within the Azure Ecology Habitat Management Plan.

Should you need any further advice on the information provided above please do not hesitate to contact us.

² Kennedy, C.E.J. and Southwood, T.R.E. (1984) The number of species of insects associated with British trees: a re-analysis. *J. Animal Ecology* 53: 455 -478

³ Azure Ecology - Habitat Creation and Management Plan and Outline Mitigation Proposals Land off Horndean Road, Emsworth, November 2013.



Appendix 1 - Legislation and Policy

Bats

All species of British bat are fully protected under the Wildlife and Countryside Act 1981 as amended through inclusion in Schedule V. All bat species in the UK are also included in Schedule II of the Habitats Regulations 2010 which transpose Annex II of the Council Directive 92/43/EEC 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora ("EC Habitats Directive") which defines European protected species of animals.

Bat species are afforded further protection by the Countryside and Rights of Way (CROW) Act 2000; and the Natural Environment and Rural Communities Act 2006.

Under the above legislation it is an offence to:

- kill, injure or take an individual;
- possess any part of an individual either alive or dead;
- intentionally or recklessly damage, destroy or obstruct access to any place or structure used by these species for shelter, rest, protection or breeding;
- intentionally or recklessly disturb these species whilst using any place of shelter or protection; or
- deliberate disturbance in such a way as to be likely to impair their ability to:
 - survive, to breed or reproduce, or to rear or nurture their young; or
 - in the case of animals of a hibernating or migratory species, to hibernate or migrate; or
 - to affect significantly the local distribution or abundance of the species to which they belong;
- keep (possess), transport, sell or exchange, or offer for sale or exchange, any live or dead bat, or any part of, or anything derived from a bat.

It is also an offence to set and use articles capable of catching, injuring or killing bats (for example a trap or poison), or knowingly cause or permit such an action. In the case all species of British bat there is also protection under *Schedule 6 of The Wildlife and Countryside Act 1981* (as amended) relating specifically to trapping and direct pursuit of these species.

A European Protected Species License (EPSL) in relation to bats is required from Natural England for any work that would result in an otherwise unlawful activity (e.g. damage to a bat roost). A license can only be issued to permit otherwise prohibited acts if Natural England are satisfied that all of the following three tests are met:

- The proposal is for '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';
- There is no satisfactory alternative; and
- The action authorised by the license will not be detrimental to the maintenance of bat populations at a favourable conservation status in their natural range.

A bat roost is defined by the Bat Conservation Trust publication *Bat Surveys—Good Practice Guidelines 2nd Edition* as "*the resting place of a bat*"¹. Generally however, the word roost is interpreted as "*any structure or place, which any wild bat uses for shelter or protection.*"

Bats tend to re-use the same roosts; therefore legal opinion is guided by recent case law precedents, that a roost is protected whether or not the bats are present at the time. This can include for summer roosts, used for breeding; or winter roosts, used for hibernating.



Appendix 2 - Artificial lighting and wildlife; Interim Guidance from the Bat conservation Trust: Recommendations to help minimise the impact of artificial lighting

Wherever human habitation spreads, so does artificial lighting. This increase in lighting has been shown to have an adverse effect on our native wildlife, particularly on those species that have evolved to be active during the hours of darkness. Consequently, development needs to carefully consider what lighting is necessary and reduce any unnecessary lighting, both temporally and spatially. When the impacts on different species groups are reviewed, the solutions proposed have commonalities that form the basis of good practice. These are outlined in the following document.

Overview of impacts

Invertebrates

Artificial light significantly disrupts natural patterns of light and dark, disturbing invertebrate feeding, breeding and movement, which may reduce and fragment populations. Some invertebrates, such as moths, are attracted to artificial lights at night. It is estimated that as many as a third of flying insects that are attracted to external lights will die as a result of their encounter.¹ Insects can become disoriented and exhausted making them more susceptible to predation. In addition, the polarisation of light by shiny surfaces attracts insects, particularly egg laying females away from water. Reflected light has the potential to attract pollinators and impact on their populations, predators and pollination rates. Many invertebrates natural rhythms depend upon day-night and seasonal and lunar changes which can be adversely affected by artificial lighting levels.

It is not always easy to disentangle the effects of lighting on moths from other impacts of urbanisation. However, it is known that UV and green and blue light, which have short wavelengths and high frequencies, are seen by most insects and are highly attractive to them. Where a light source has a UV component, male moths in particular will be drawn to it. Most light-induced changes in physiology and behaviour are likely to be detrimental. They discern it to be 'light', so they do not fly to feed or mate.²

Birds

There are several aspects of changes to bird behaviour to take into account. The phenomenon of robins and other birds singing by the light of a street light or other external lighting installations is well known, and research has shown that singing did not have a significant effect on the bird's body mass regulation. However, it was felt that the continual lack of sleep was likely to be detrimental to the birds' survival and could disrupt the long-term circadian rhythm that dictates the onset of the breeding season³. Many species of bird migrate at night and there are well-documented cases of the mass mortality of nocturnal migrating birds as they strike tall lit buildings. Other UK bird species that are particularly sensitive to artificial lighting are long-eared owls, black-tailed godwit and stone curlew.⁴

¹ Bruce-White C and Shardlow M (2011) A Review of the Impact of Artificial Light on Invertebrates - See more at: <http://www.buglife.org.uk/advice-and-publications/publications/campaigns-and-reports/review-impact-artificial-light#sthash.s7GPA1vL.dpuf>

² As above

³ Pollard A. (2009) Visual constraints on bird behaviour. University of Cardiff

⁴ Rodriguez A., Garcia A.M., Cervera F. and Palacios V. (2006) Landscape and anti-predation determinants of nest site selection, nest distribution and productivity in Mediterranean population of Long-eared Owls, *Asio otus*. *Ibis*, 148(1), pp. 133-145



Mammals

A number of our British mammals are nocturnal and have adapted their lifestyle so that they are active in the dark in order to avoid predators. Artificial illumination of the areas in which these mammals are active and foraging is likely to be disturbing to their normal activities and their foraging areas could be lost in this way. It is thought that the most pronounced effect is likely to be on small mammals due to their need to avoid predators. However, this in itself has a knock-on effect on those predators.

The detrimental effect of artificial lighting is most clearly seen in bats. Our resident bat species have all suffered dramatic reductions in their numbers in the past century. Light falling on a bat roost exit point, regardless of species, will at least delay bats from emerging, which shortens the amount of time available to them for foraging. As the main peak of nocturnal insect abundance occurs at and soon after dusk, a delay in emergence means this vital time for feeding is missed. At worst, the bats may feel compelled to abandon the roost. Bats are faithful to their roosts over many years and disturbance of this sort can have a significant effect on the future of the colony. It is likely to be deemed a breach of the national and European legislation that protects British bats and their roosts.

In addition to causing disturbance to bats at the roost, artificial lighting can also affect the feeding behaviour of bats and their use of commuting routes. There are two aspects to this: one is the attraction that short wave length light (UV and blue light) has to a range of insects; the other is the presence of lit conditions.

As mentioned, many night-flying species of insect are attracted to lamps that emit short wavelength component. Studies have shown that, although noctules, serotines, pipistrelle and Leisler's bats, take advantage of the concentration of insects around white street lights as a source of prey, this behaviour is not true for all bat species. The slower flying, broad-winged species, such as long-eared bats, barbastelle, greater and lesser horseshoe bats and the *Myotis* species (which include Brandt's, whiskered, Daubenton's, Natterer's and Bechstein's bats) generally avoid external lights.

Lighting can be particularly harmful if it illuminates important foraging habitats such as river corridors, woodland edges and hedgerows used by bats. Studies have shown that continuous lighting along roads creates barriers which some bat species cannot cross⁵. It is also known that insects are attracted to lit areas from further afield. This could result in adjacent habitats supporting reduced numbers of insects, causing a further impact on the ability of light-avoiding bats to feed.

These are just a few examples of the effects of artificial lighting on British wildlife, with migratory fish, amphibians, some flowering plants, a number of bird species, glow worms and a range of other invertebrates all exhibiting changes in their behaviour as a result of this unnatural lighting.

Recommendations

Survey and Planning

The potential impacts of obtrusive light on wildlife should be a routine consideration in the Environmental Impact Assessment (EIA) process⁶. Risks should be eliminated or minimised wherever possible. Some locations are particularly sensitive to obtrusive light and lighting schemes in these areas should be carefully planned.

In August 2013, Planning Minister Nick Boles launched the new National Online Planning Guidance Resource aimed at providing clearer protection for our natural and historic environment. The guidance looks at when lighting pollution concerns should be considered and is covered within one of the on line planning practice

⁵ Stone E. L., Jones G and Harriss (2009) Street lighting disturbs commuting bats. *Current Biology*, 19, pp 1-5

⁶ See also: Institution of Lighting Professionals – Professional Lighting Guide (PLG 04) Guidance on undertaking lighting environmental impact assessments)



guides⁷. The guide provides an overview for planners with links to documents that aim to give planners an overview of the subject through the following discussion points:

1. When is obtrusive light / light pollution relevant to planning?
2. What factors should be considered when assessing whether a development proposal might have implications for obtrusive lighting / light pollution?
3. What factors are relevant when considering where light shines?
4. What factors are relevant when considering how much the light shines?
5. What factors are relevant when considering possible ecological impact?

This can help planners reach the right design through the setting of appropriate conditions relating to performance and mitigation measures at the planning stage.

The Institution of Lighting Professionals (ILP) recommends that Local Planning Authorities specify internationally recognised environmental zones for exterior lighting control within their Development Plans⁸. In instances lacking classification, it may be necessary to request a Baseline Lighting Assessment/Survey conducted by a Lighting Professional in order to inform the classification of areas, particularly for large-scale schemes and major infrastructure projects.

When assessing or commissioning projects that include the installation of lighting schemes, particularly those subject to the EIA process, the following should be considered and relayed to applicants:

- **Ecological consultants should confirm the presence of any sensitive fauna and flora**, advising the lighting designers of bat routes and roosts and other areas of importance in order to ensure that reports correspond with each other.
- **Ecological consultants should consider the need for quantitative lighting measurements**. In some instances it may be necessary for further lighting measurements to be taken. For example, outside an important bat roost. These should follow best practice guidance from the ILP and would ideally be conducted by a Lighting Professional.
- **Where appropriate, professional lighting designers should be consulted** to design and model appropriate installations that achieve the task but mitigate the impacts. This should be done at the earliest opportunity. Early decisions can play a key role in mitigating the impact from lighting.
- **Reports submitted should outline the impacts of lighting in relation to ecology**, making clear reference to the ecological findings, highlighting any sensitive areas and detail proposed mitigation. Consideration should also be given to internal lighting where appropriate.
- **Post –installation checks and sign off upon commissioning should be carried out** by the lighting designer to ensure that the lighting installation has been installed in accordance with the design, that predictions were accurate and mitigation methods have been successful.

Principles and design considerations

Do not

- **provide excessive lighting**. Use only the minimum amount of light needed for the task.
- **directly illuminate bat roosts** or important areas for nesting birds

Avoid

- **installing lighting in ecologically sensitive areas** such as: near ponds, lakes, rivers, areas of high conservation value; sites supporting particularly light-sensitive species of conservation significance (e.g. glow worms, rare moths, slow-flying bats) and habitat used by protected species.
- **using reflective surfaces under lights**.

<http://planningguidance.planningportal.gov.uk/blog/guidance/light-pollution/when-is-light-pollution-relevant-to-planning/>
<http://planningguidance.planningportal.gov.uk/blog/guidance/light-pollution/when-is-light-pollution-relevant-to-planning/>

⁸ Institution of Lighting Professionals (2014). Guidance Notes for the Reduction of Obtrusive Light (GN04-2014)

Do

- **consider employing a competent lighting designer** who will apply the principals of providing the right light, in the right place, at the right time and controlled by the right system.
- **minimise the spread of light** to at, or near horizontal and ensure that only the task area is lit. Flat cut-off lanterns or accessories should be used to shield or direct light to where it is required.
- **consider the height of lighting columns.** It should be noted that a lower mounting height is not always better. A lower mounting height can create more light spill or require more columns. Column height should be carefully considered to balance task and mitigation measures.
- **consider no lighting solutions where possible** such as white lining, good signage and LED cats eyes. These options can also be effective. For example, light only high-risk stretches of roads, such as crossings and junctions, allowing headlights to provide any necessary illumination at other times.
- **use temporary close-boarded fencing until vegetation matures**, to shield sensitive areas from lighting.
- **limit the times that lights are on to provide some dark periods.** The task being lit often varies, for example roads are less used after 23.00hrs and car parks are empty. A lighting designer can vary the lighting levels as the use of the area changes reducing lighting levels or perhaps even switching installations off after certain times. This use of adaptive lighting can tailor the installation to suit human health and safety as well as wildlife needs.

Technological specifications

Research from the Netherlands has shown that spectral composition does impact biodiversity.

- **Use narrow spectrum light sources** to lower the range of species affected by lighting.
- **Use light sources that emit minimal ultra-violet light**
- **Lights should peak higher than 550 nm**
- **Avoid white and blue wavelengths of the light spectrum** to reduce insect attraction and where white light sources are required in order to manage the blue short wave length content they should be of a warm / neutral colour temperature <4,200 kelvin.

Further guidance on the spectral composition of artificial lighting will be made available following the publication of research from the Netherlands.

Further reading:

- A review of the impact of artificial light on invertebrates. Buglife. 2011
- Royal Commission on Environmental Pollution. 2009. Artificial light in the environment. London, HMSO
- The Ecological Consequences of Artificial Night Lighting" edited by Longcore and Rich
- Shedding Light: A survey of local authority approaches to lighting in England. CPRE 2014