Response from the
INSTITUTE OF ECOLOGY AND ENVIRONMENTAL MANAGEMENT
regarding the
ROYAL COMMISSION STUDY ON ARTIFICIAL LIGHT IN THE ENVIRONMENT
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Bats

Impacts of artificial lighting on bats are complex, due to varying species- and behaviour-specific responses. Some bat species are generally light averse. Several species are known to forage around white mercury street lighting, which is more attractive to insects than other more widely used lighting types. However, even these species may be light averse on emergence from roosts, and when commuting between their roosts and foraging areas. The Bat Conservation Trust and the Institute of Lighting Engineers have jointly produced a guidance document on bats and lighting.

As an example of behaviour-specific effects of lighting on bats, work undertaken by Cresswell Associates on a road-widening scheme in south Wales identified use of a stream culvert beneath the existing road by greater horseshoe bats throughout the summer months. Peak numbers of bat passes in the spring and autumn were due to seasonal movement of bats between their maternity and hibernation roosts, in addition to nightly commuting behaviour. Following construction of the scheme (which involved extending the culvert) upgrading of lighting associated with an adjacent road junction increased the light levels over approximately 20m of the watercourse at one end of the culvert. Subsequent monitoring found that greater horseshoe bats had stopped using this feature as a nightly commuting route, but that they continued to do so for seasonal movements. Monitoring between completion of the culvert and upgrading of the lighting had confirmed the extended culvert itself did not affect the bats' behaviour.

Research undertaken by Cresswell Associates for the National Trust, studying foraging behaviour and range of lesser horseshoe bats using radio-tracking found that even this species, considered to be highly dependent on linear features for commuting, sometimes foraged extensively in open areas of countryside. There were indications from this research (though sadly not enough to be tested statistically) that foraging behaviour over open fields was more common in the weeks around the new moon, rather than around the full moon. It is therefore possible that even low levels of artificial light affecting foraging areas may have impacts on the behaviour of this species, on their own or as part of cumulative impacts with natural light sources.

Work undertaken for a gas pipeline project in Wales, which involved severance of a number of hedgerow commuting routes for bats, found that bats of all species adapted surprisingly well to creation of 25m gaps. However the impact of artificial lighting at some of these locations significantly affected bats' behaviour, resulting in shifting of commuting routes.

Badgers

There is extensive published information on increased light levels delaying emerge of badgers from sett entrances. Research on badgers undertaken by Warren Cresswell, of Cresswell Associates, strongly indicated that foraging badgers remain highly sensitive to changes in light levels (e.g. novel light sources within foraging areas) and moderately sensitive to artificial lighting per se. Radio-tracking observations of badgers indicate that wherever animals have a choice of using lit and un-lit areas they will choose un-lit areas, even when more abundant food sources are available in lit areas. For example, badgers have been observed feeding exclusively in the un-lit margins of sports fields until lighting was switched off later in the night, despite an abundance of available earthworm prey in the lit areas (and depleted availability of earthworm prey in the un-lit areas).

Dormice

Work undertaken on a number of highways schemes has shown that dormice can become habituated to high artificial light levels, and/or intermittent lighting from vehicle headlights. On a number of schemes dormouse nests have been discovered close to road carriageways, including immediately adjacent to the hard shoulder of the M5, and on the verge of the M4. Work undertaken by Paul Chanin in Devon has confirmed presence of dormice in vegetation within the central reserve of the A30 – a location where nesting and foraging dormice would have no means of avoiding regular illumination by vehicle headlights.

Amphibians

We are aware of a lack of research into how light-averse newts are whilst using terrestrial habitats, in particular great crested newts, which range widely from their natal ponds. Specifically, research is needed to determine the impacts of lit corridors (such as footpaths through green spaces within a development) which may function as barriers to movement of great crested newts even within retained green spaces, as the population fragmentation effects this may have are not known.

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