



A Review of the
Impact of Artificial
Light on
Invertebrates

Charlotte Bruce-White and
Matt Shardlow
2011

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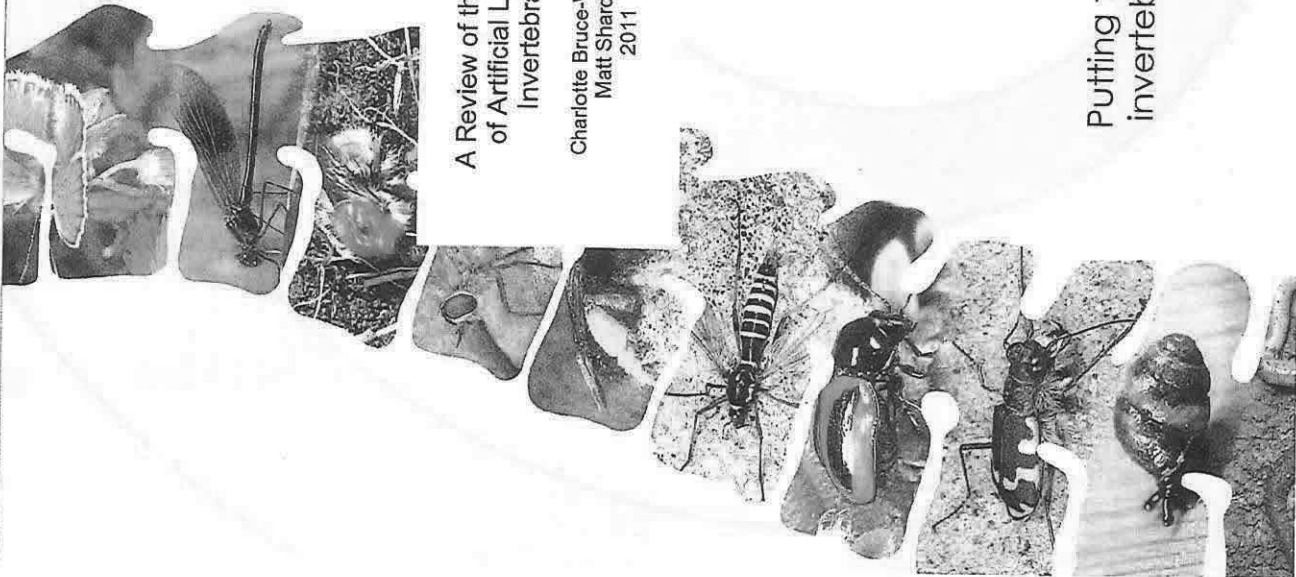
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Putting the backbone into
invertebrate conservation



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1.0 Executive summary

This report reviews the available literature on how humans are changing the light environment and the impact that this has on insects and other invertebrates, makes recommendations and identifies several further research areas.

1.1 Conclusions

1. Developments in lighting technology have led to major increases in the distribution and intensity of artificial light in the past few decades and its growth is continuing largely unchecked.
2. Artificial light has the potential to significantly disrupt ecosystems and it has long been of concern to conservationists. It is widely observed that some invertebrates, such as moths, are attracted to artificial lights at night. In addition the polarisation of light by shiny surfaces is a significant problem as it attracts aquatic insects, particularly egg laying females, away from water, and reflected light has the potential to attract pollinators and impact on their populations, predators and pollination rates.
3. Artificial light can significantly disrupt the natural light/dark patterns. Many invertebrates depend on the natural rhythms of day-night and seasonal and lunar changes to light levels. As a result artificial lighting has several negative impacts on a wide range of invertebrates including disrupting their feeding, breeding and movement which may reduce and fragment populations.
4. Invertebrates make up the majority of biodiversity on earth and are vital to ecosystems. Many invertebrates are also listed as national priority species for conservation under the UK Biodiversity Action Plan (BAP). It is therefore important to minimise the impacts of artificial light on invertebrate populations.
5. Action to reduce artificial light impacts is necessary and justified now. Although further research is required to fully understand the impacts of artificial light on invertebrates and the environment as a whole, the precautionary principle applies and enough is known to take action now. This report makes several recommendations that would reduce and mitigate the negative effects that artificial light has on invertebrates.

1.2 Recommendations

1. Lighting should be kept to a functional minimum in all areas. Better designed lighting, in the right places and at the right times is needed rather than just increasing the amount and brightness of artificial light at night. Those involved in planning lighting schemes should always assess whether lighting is necessary and whether alternative solutions are available. If lighting is deemed necessary then it should be used only where and when it is needed. The number of lights and brightness/wattage should be kept to a minimum and, to avoid light spillage, lamps should not emit light at angles greater than 70°.