

**Monitoring Glow-worms *Lampyris noctiluca* on the Malvern Hills Conservators' land**

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**Background**

In 2015, the Malvern Hills Conservators (MHC) – the organisation that owns and manages the Malvern Hills - set up a glow-worm recording team who carried out extensive glow-worm surveys between mid-June and late July. The aim of the recording effort was to establish the distribution and abundance of glow-worms across the Conservators' holding at historic and known sites. The results could help shape our management and grazing schedules.



01. Female Glow-worm Swinyard Hill. Mel Mason

**The glow-worm *Lampyris noctiluca***

The glow-worm belongs to the *Lampyridae* or firefly family and is in fact a beetle. From eggs hatching into larvae, it takes two years before the larvae are ready to pupate into adults, but spread over three of our calendar years. The adult female is wingless so her only means of attracting a mate is to climb up plant stems and emit a captivating pale green light from her abdomen (01). Adult males have wings and large photosensitive eyes - perfect for scanning vegetation at night and finding a mate. Neither adult feed during their brief several week lifespan, they only exist to mate and lay eggs. After the female has been mated she turns off her light and lays up to 150 eggs within the next few days and then dies. The main diet of the larvae is slugs and snails so their habitat requirements are similar usually consisting of moist dense grassland edges (Tyler, 1994).

Despite not being afforded any protected species status, the glow-worm is undoubtedly a remarkable species that warrants conservation attention. Invertebrates are good barometers of the health of an ecosystem and the glow-worms appealing tendency and easy to identify nature makes them a good indicator species to keep an eye on. Unfortunately, a large body of anecdotal evidence suggests that there has been a steady fall in the British glow-worm population, certainly since the 1950s (Tyler, 1994). Light pollution from street lights, houses and outdoor lights is a serious problem for glow-worms, disrupting mating behaviour: the males are attracted to the lights instead of the females (Wildlife Trust, 2015). On a simpler scale a male glow-worm was attracted to a bat detector green indicator light on Swinyard Hill (06). Intensification of agricultural practices will have also contributed to the decline as will excessive scrub encroachment following reductions of traditional sheep grazing on commons and open spaces.

**Survey method**

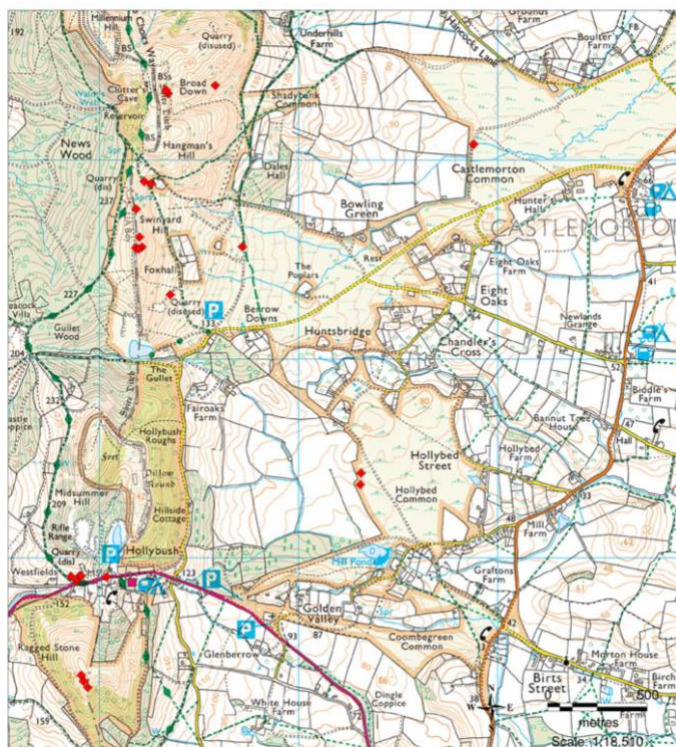
We first collated all known and historic records of colonies and devised a rough survey schedule and transect for each of the locations. Surveys were conducted between 23 June and 30 July, they commenced between 2200hrs and 2300hrs and terminated by midnight. They involved teams of volunteers walking in bands at a steady pace without a torch and carefully scanning the vegetation for green lights in grassland edges. Risk assessments were drawn up and adhered to.

**Results**

Ten colonies of glow-worms were recorded – see table 1 - (Maps 02-05 – sightings marked by red dots). Eight of these colonies inhabited the southern end of the Malvern Hills; one was at the Old Hills, Callow End; and one was at Wood Street, Ox Hill. Over 100 glowing females were recorded over the season.

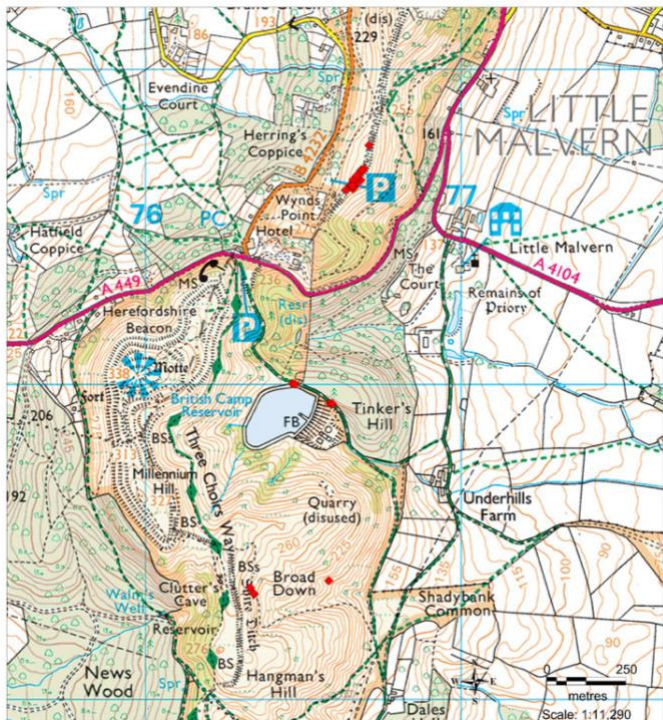
Location	Date/s	Record
British Camp and Broad Down	10 July 2015	15
Black Hill and Berrington Quarry	17 June and 10 July (4 separate surveys) 0 were recorded on 30 July.	24 (Black Hill) 0 (Berrington Quarry)
Swinyard Hill and Gullet Quarry	30 June.	13 (Swinyard) 0 (Gullet Quarry)
Midsummer Hill	16 July 2015	4
Ragged Stone	16 July 2015	4
Hollybed Common and Mill Pond Dam	20 July	2 (Hollybed Common) 0 (Mill Pond Dam)
Castlemorton Common	14 June (earliest phenology & new record)	1
Old Hills	23 July	11
Wood Street		Over 26

Table 1. Records of Glow-worms 2015.

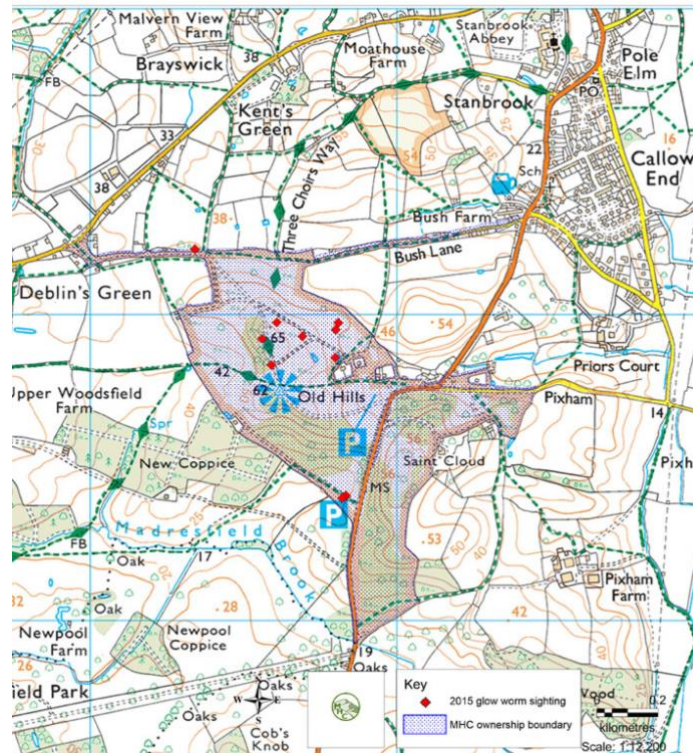


02. Swinyard, Hollybush and Hollybed 2015 Glow worm sightings.





03. Broad Down and nearby 2015 Glow-worm sightings.



05. Old Hills 2015 Glow-worm sightings



04. Bush Lane 2015 Glow-worm sightings.

**Discussion**

On the Hills, the majority of glowing females were recorded on the hill tops at gradual ecotones, generally between short turf and rougher grass such as footpath edges, presumably enabling the females to be more visible to passing males. Over half of the glow-worms recorded were found on either short or long grass (species not specified). They were located between 2 cm and 10cm above the ground surface on varied vegetation types including: fine and coarse grasses, herbs, nettles, brambles and bracken. They also were recorded on walls and even on a railway sleeper at the Swinyard Hill car park. The larvae however occur in thick vegetation where they feed on snails for nearly two years hence glow-worms rely on a mosaic of habitats. The southern hills are managed by extensive sheep grazing, mechanical scrub management and footpath strimming.

Wood Street is a long thin piece of land; its borders are lined with scrub and mature trees and the ground flora consists of grass, bluebells, bracken and bramble. Glow-worms were recorded throughout on varied vegetation types and heights between 24 June and 3 August, peaking at 20 glowing females on the last survey (Steve Price). Wood Street is managed by a late annual cut.

The Old Hills (west) consists of a mosaic of hay meadow, rough grassland, scrub of varying age classes and woodland. Several kilometres of paths are mown twice yearly to facilitate public access and prevent further scrub encroachment. All glow-worms recorded were found on vegetation edge habitats highlighting the importance of the management regime. We are trialling extensive Highland cattle grazing this year to maintain rough grassland habitats on the site so it will be particularly interesting to monitor the glow-worm population in the future. As 2015 is the baseline, this year's eggs will not be adults until 2017 to allow a population comparison. Glow-worm colonies appear to occupy the most rural and darkest parts of the Conservators' holding supporting theories that artificial light has a detrimental impact on their numbers. Since there are no previous records for the northern hills, our recording effort did not focus here but it would be a meaningful exercise to conduct surveys of these northerly hills in future years so that we can be more confident they are not present.

By virtue of their ecology glow-worms are geographically restricted and fragmented placing pressure on the Conservators and our

management to maintain and preserve habitats to help halt their local and national decline. One significant threat to their numbers is the spread of dense bracken stands that are not easily managed due to the steep and undulating terrain of the hills. Now we have baseline data, we can begin to build a picture as to how glow-worms are faring.

The 2015 surveys of the Mill Pond dam and Berrington Quarry (both sites which had glow-worm in the recent past) generated 'nil' records. Essential major repairs of the leaking and dangerous Mill Pond dam in 2013 may well have been the cause of this loss. Whilst this is unfortunate, glow-worms were recorded within 500metres of the site so I am optimistic that they may recolonise the dam. During the 2015 annual botany surveys at Berrington Quarry, Peter Garner (MHC botany recorder) and I observed a reduction in the abundance of notable plants believed to be caused by cattle dung enrichment. This will be rectified by permanent fencing of the quarry but highlights how sensitive sites and their flora and fauna are to changes in grazing regimes.

### Conclusion

The 2015 glow-worm recording exercise has produced valuable baseline data on which to compare future results. On one hand glow-worms appear rather versatile inhabiting a range of vegetation types and aspects, on the other however they are clearly sensitive to changes in management so further survey and monitoring will help us take them into account in the management of the Hills and commons.

### Acknowledgements

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### References

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06. Confused Male Glow-worm attracted to green Bat detector light. Mel Mason

### Images

- 01. Female Glow-worm Swinyard Hill. Mel Mason
- 02. Swinyard, Hollybush and Hollybed 2015 Glow -worm sightings.
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