

National Planning Guidance - Biodiversity



BRE acknowledges the contribution of Guy Parker towards the preparation of this guidance.

With thanks to NSC Founding Partners



1. Introduction

Solar farms present an excellent opportunity for biodiversity enhancement, as they are often south facing grasslands which with suitable management can provide habitat for a wide variety of wildlife. In most solar farms panels are set on frames and there is minimal disturbance to the ground. The panels have no moving parts and the infrastructure typically covers only 30% of a site. Following construction there is little human activity apart from occasional maintenance visits. Most sites have a lifespan of at least 20 years which is sufficient time for land management to yield real wildlife benefits.

A number of options exist for enhancing biodiversity on solar farms, from hedgerows to field margins to wild flower meadows to bird boxes and ponds. Each site is unique and there is no 'one size fits all' solution. Ultimately the best plans are developed through engagement with the local community, the landowner and local and national conservation organisations.

Biodiversity enhancements should be selected to fit the physical attributes of the site and should tie in with existing biodiversity. Furthermore they should be compatible with the primary purpose of the site – to generate power. If agricultural production is also planned for the site, biodiversity enhancements should aim to dovetail with these goals.

This document aims to provide high level guidance on solar farms and biodiversity, with specific reference to the planning process. This centres on the development of a biodiversity management plan unique to each site. The plan should identify appropriate biodiversity enhancements and define the establishment, management and monitoring activities required to make them successful. A number of biodiversity enhancements are presented in this document as examples but it should be noted that a much wider range of options exists.

2. Biodiversity Management Plan

Each solar farm requires a biodiversity management plan (BMP). The purpose of the BMP is to lay out the specific goals for biodiversity (species and habitats) and the means by which these goals will be achieved, including the establishment of specific habitat enhancements, their maintenance and monitoring.

The BMP should:

- identify key elements of biodiversity, including legally protected species, species of high conservation value and designated areas in close proximity to the proposed site;
- identify any potential impacts arising from the site's development, and planned mitigations
- detail the habitat enhancements that are planned,
- identify species for planting and suitable sources for seed and plants;
- consider wider enhancements such as bird and bat boxes;
- summarise a management regime for each enhancement for the entire life of the site; and,
- provide a plan for monitoring the site.

The BMP should be written by an ecologist and should incorporate recommendations from the Phase 1 Habitat Survey, Environmental Impact Assessment, tree survey or other ecological study, as appropriate. Where specific impacts have been identified and mitigations proposed, these should be detailed in the BMP.

Advice should be sought from local and national conservation stakeholders on how the site could contribute to County and National targets for biodiversity conservation. The landowner should be consulted for their views on the BMP. In addition, the BMP should be presented to the community for their comment as part of the public consultation process.

The BMP should be concise and well written such that land managers, community members, developers and conservation professionals alike can make use of it. The BMP should be prepared and submitted as part of the planning application for the proposed solar farm.

3. Habitat enhancement options

Various options to enhance the habitat value of a site and it should be noted that no 'one size fits all' approach exists. The greatest value for biodiversity will be gained from creating a variety of different habitats within a solar farm, including hedgerows, field margins, wild flower meadows, winter bird crops and many others. In some cases it may be possible to establish just one or two habitat enhancements, but these would still deliver value if properly maintained.

Whatever habitat enhancement is selected it is essential that the species used are native to the UK. Where possible species selected should tie in with local and national biodiversity targets. Seed and plants should be sought from a local supplier who can guarantee local provenance.

Each site is unique in terms of environment, location, existing biodiversity and land use, and these factors all influence which habitat enhancements will be most appropriate. Several of the more common options are presented as examples below. Some guidance documents for the establishment and maintenance of these habitats are included in the reference section at the end.

Boundary features

Boundary features are key features for biodiversity, not only as nesting and foraging areas but also as a means for wildlife to move between habitats. Boundary features include hedgerows, ditches, stone walls and hedgebanks. Field margins are also included here. Usually boundary features can be enhanced with little or no impact upon the solar array. The greatest value is gained when boundary features form a network of connecting features.

Hedgerows

Hedgerows can support a wide variety of wildlife, including plants, invertebrates, birds, mammals and reptiles. In solar farms existing hedges can be strengthened by planting gaps, and sections of new hedge can be planted. It's important that only suitable species (native, found within hedgerows locally) are selected for the planting. Existing hedges should remain intact where possible and good practice should be observed to protect the hedge during construction, e.g. root protection zones.

If removal of a section of hedge is essential, e.g. for improving access, permission may be required from the Local Authority, and this work should be conducted outside the bird breeding season i.e. March 1st -31st July. Hedge maintenance should be carried out to favour birds and other wildlife by cutting every 2-3 years and leaving one side of the hedge intact.

Field margins

Field margins, or buffer strips, are strips of tussocky grassland running along the field boundary which are ideal for nesting bumblebees and ground nesting birds as well as reptiles and small mammals. Solar farms often have an access route between the security fencing and the site boundary which presents an ideal opportunity for establishing tussocky field margins.

Grassland habitat

Grassland habitat can be established at the boundary of the site, under part or all of the solar arrays or some combination of both. Usually the greatest biodiversity value is gained from grassland that contains wild flowers that is left uncut or ungrazed through the spring and summer. It's important to establish some form of grassland cover quite quickly after construction, as bare soil will be prone to colonisation by weeds. There are a number of different grassland options to consider.

Wild flower meadows

A wild flower meadow is a species-rich grassland composed of wild flowers and fine grasses which can support a wide range of invertebrates, small mammals, reptiles and birds. There is a variety of options but the seed mix selected must be suitable for the soil type and should be composed of species that are native to the UK. An ecologist should recommend a suitable seed mix.

A wild flower meadow could be sown beneath the array (successfully implemented at a number of solar farms) or in strips around the edge of the site. Where a meadow is established beneath the array care should be taken to ensure the vegetation will not over-grow and shade the panels.

Establishing a wild flower meadow can take several years and its important good practice is followed. Once established, meadows tend to be quite stable and with suitable management can remain in perpetuity without the need for fertilizers or herbicides. A meadow requires only cutting or grazing at intervals through the year, with the timing of these activities being dependent upon management goals. It's advised that grazing is stopped through the summer to allow wild flowers to flower and set seed. A maintenance plan should be specified in the BMP, including the timing of cutting or grazing.

Pollen and nectar strips

Pollen and nectar strips are designed to provide food for pollinating insects through the summer period. Such mixes are relatively cheap, being composed of more common and agricultural species such as sanfoin, red clover and bird's foot trefoil. Pollen and nectar seeds can be sown in strips, either along rows within the solar farm, or at its edge. Such mixes usually require re-sowing every 3-4 years.

Clover leys

A clover ley is mix of grasses and clovers designed to be grazed by livestock. It can be established beneath the array or at the edge of the site. A clover ley is a common agricultural option so is cheap to establish, but it does require re-sowing at regular (3-4 year) intervals and does require some inputs. This option is lower in biodiversity value than the above grassland options but still provides a nectar source through mid-summer. It is recommended that native red clover is included in the mix as this species is particularly attractive to bumblebees. Reducing or stopping grazing through the summer will maximise benefits to bees. Native wildflower species can be added to the mix to provide nectar over a longer period each year.

Wild bird seed mixes

Wild bird seed mixes are sown in the spring and left standing as a seed crop for birds through the winter. These mixes are usually grown in strips and are ideal for boundaries or wayleaves. Such crops need to be resown annually and usually contain a mix of cereal and oil-rich crop such as quinoa or oilseed rape.



4. Managing the site for biodiversity

Appropriate management is vital to ensuring habitat enhancements deliver biodiversity benefits. If management is not suitable, or is discontinuous, then any benefit may be lost. For example, if a wild flower meadow is seeded but then cut or grazed at the wrong time of year, many of the wild flowers will be lost.

Generally management for biodiversity is less intensive than typical agricultural land management, which means costs are also lower. For example, hedges would be cut every 3 years instead of annually; field margins would be cut every 3-5 years. This reduces disturbance to the habitat, enhances structure and promotes flowering and fruiting.

Consideration must also be given to the control of weeds, especially those injurious weeds which must be controlled by law. Seeding or planting any bare areas of site is usually the best means of preventing weed colonisation. Regular monitoring should be undertaken and if weeds become a problem rapid action should be taken. A variety of guidance exists on this topic.

The BMP should outline a management plan with prescriptions on methodology, timing and frequency. Site management and contractors should be made fully aware of the biodiversity goals for the site and specifically any protected species that occur. Management should follow established good practice such as that provided by Natural England and the Wildlife Trusts, among other sources. A list of references is provided at the end of this document.

Woodland habitat

Woodland may not be suitable within the solar array due to shading, but woodland may be suitable for screening purposes at the site boundary or in areas bordering the solar farm. Any planting should be composed of native species and where possible should tie in with local and national biodiversity targets. The planting pattern should include open glades and rides to provide a variety of structure within the woodland. Alternatively, wood pasture or parkland may be appropriate.

Ponds

Well-designed ponds can be beneficial to amphibians, birds and reptiles. An ecologist should advise on the siting and design of ponds and good practice should be followed.

Hibernacula

Hibernacula are log, rock and stone piles designed to create suitable conditions for reptiles and amphibians to hibernate. Advice on design should be sought from an ecologist.

Bird, bat and small mammal boxes

Bird, bat and small mammal boxes can provide seasonal nesting and roosts for a variety of protected species. The type of box and its location should be specified by an ecologist to increase the chances of success.

It should be noted the habitat enhancements listed here are a selection of the more common options known to be successful within solar farms. Many other options exist (e.g. scrub, heath, wetland, coppice) and well-conceived new approaches, endorsed by wildlife organisations, should be encouraged on solar farms.





Grazing

Grazing enables the land to remain agriculturally productive and provides a low cost means of cutting grass, reducing the need for tractor mounted machinery between the solar panels. At lower intensity, grazing can contribute to conservation goals whereas at higher intensity, grazing provides greater agricultural productivity.

Sheep are the usual choice for solar farms, being generally small enough to pass beneath the rows of panels. They are usually available and easy to handle as well. Sheep have been successfully used at multiple sites for several years. Hardy breeds are usually best suited to autumn and winter grazing where the grazing is less nutritious. Larger stock such as horses and cattle are not considered suitable due to their ability to damage the arrays.

If grazing is being conducted with biodiversity in mind, then a lower stocking density should be maintained and grazing should be stopped for periods of the spring and summer. This approach can lead to a high diversity of wild flowers and invertebrates as well as benefiting ground nesting birds and mammals. As a general rule of thumb the following stocking density is recommended to ensure benefits to biodiversity:

Weeks of the year site is grazed	Stocking density (sheep per Ha)
12	10
24	5
36	3.5

Stopping grazing in the spring (April – June) will favour early flowering plants, whereas summer (July-September) will favour summer flowering herbs. Ceasing grazing April-September will return the greatest biodiversity benefits but it is appreciated this may not always be possible. An ecologist should assist with the development of a conservation grazing regime which is suited to the site’s characteristics and management objectives, which should be incorporated into the BMP. A range of advice exists on conservation grazing.

If grazing is being conducted with agricultural production as the primary goal then the landowner may choose to graze sheep at higher stocking densities through much of the year. This does not preclude the use of other habitat enhancements, such as hedgerows and field margins which can still provide significant benefits to biodiversity.

5. Monitoring biodiversity

Any habitat enhancements should be checked regularly to ensure they are working properly and nothing has gone wrong. For example, any plantings should be assessed in spring and autumn to ensure the plants have taken and remain healthy.

The site should be checked regularly for weeds. Bird and bat boxes should be cleaned and checked for structural integrity outside of the breeding season.

Key elements of biodiversity should be measured at regular intervals. If a protected species is found on site and specific enhancements have been made, this species should be surveyed annually at a suitable time of year to check its status. Monitoring should be undertaken by an ecologist with training in the species or habitat of interest.



6. References

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