

Biodiversity Enhancements for Solar Farms

J. Miller presentation on 12/11/13 to SBP/NBP planning seminar

1. Intro + scope of talk

- Purpose of talk – discuss potential for enhancements on solar farms and introduce RSPB solar enhancement package – package of measures aimed at providing biodiversity gain on solar farm sites, compatible with practicalities of solar farms, developed by RSPB in E England – Conservation Officers and Farmland Advisers
- Scope of talk – will cover **why** enhancements are desirable, **what** the package comprises, **how** it can be applied
- Important note – package aimed at ‘typical’ solar farm site on former intensive arable in E England with no/low specific wildlife value. High value sites will require separate consideration – this package is for enhancement, not mitigation/compensation.

Why provide biodiversity enhancements?

2. Changes to farmland wildlife

- State of Nature Report released this year, many organisations involved, provides snapshot of state of habitats and species in UK
- On farmland, general decline in birds, butterflies, moths, carabid beetles, arable plants, reptiles, mammals.
- Often related to farming practices – changing management, chemical input, loss of habitat, but also climate change

3. Decline in farmland birds

- Breeding farmland birds declined by 50% since 1970 (Wild Birds Indicators, 2012)
- egs. skylark -37%, turtle dove -88%, grey partridge -79% - all in 25 yrs 1985-2010 from BTO/RSPB data
- Not all bad news - increase in some bat species, some butterfly species, stabilisation of brown hare.
- Wildlife-friendly farming (inc agri-env schemes) shown to be beneficial

4. Opportunities on solar farms

- Space around panels and along margins – potential for beneficial use
- Need for screening often involves hedges which can be managed for wildlife
- Often a desire to make the site attractive – wildlife enhancements can help

5. Policy drivers

- NPPF – sets out government’s planning policies and how these should be applied

- Excerpts from Para 109 – clear steer towards maximising opportunities for biodiversity
- NERC Act (2006) – general biodiversity duty “Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity.”
- Reinforced in Nat Env White Paper (2011) in response to Lawton report - 2020 mission is to halt overall biodiversity loss, support healthy well-functioning ecosystems and establish coherent ecological networks
- Birdlife Europe (2011) can contribute to landscape-scale conservation, climate adaptation, ecological networks, green infrastructure

What type of enhancements are needed?

6. Causes of farmland bird decline

- Need to understand causes of problems in order to identify solutions
- Research has identified 3 major causes of decline of the 10 widespread but BAP or red-listed farmland species:
 - loss of seed rich habitats (winter food)
 - loss of insect-rich habitats (summer food, esp chicks)
 - loss of infield nesting habitat
- from Winspear *et al*, 2010

7. The Farmland Bird Package (FBP)

- FBP was developed as package of Entry Level Stewardship options targeted at reducing decline in farmland birds, and beneficial for range of other wildlife
- Developed by NE, RSPB, FWAG, GWCT, The Wildlife Farming Co., NFU, CLA, CFE
- Comprises options and required hectareage of each to reverse declines (evidence-based)
- Options provide:
 - In field nesting habitat (skylark plots, fallow, extended winter stubble)
 - Insect-rich areas (e.g. nectar flowers, conservation headlands, uncropped margins)
 - Winter seed food (wild bird seed mix, over winter stubble)

8. The RSPB solar package

- Based on the FBP, but elements tailored specifically to solar farms on prior intensive arable
- Utilises space between panels and field margins for core options, also hedgerows

- Developed to be practical with operational and management requirements of solar farms – a solar farm developer provided advice
- Provides same 3 benefits as FBP – contributes to reversal of decline in farmland birds, invertebrates, mammals in particular

9. Package element 1: insect rich habitat

- Nectar flowers – every 1st and 2nd row
- Mix aimed at maximising amount of resource and time period it is available
- Provides habitat for range of invertebrates and foraging for birds (particularly supports breeding birds), small mammals etc.
- Management – top or graze every Sept, review and re-establish as necessary every 4-5 years

10. Package element 2: seed rich habitat

- Wild bird seed mix sown around installation where access dictates
- Provides seed food over winter for birds and small mammals – boosts winter survival of e.g yellowhammer
- Yellowhammer and skylark decline most seriously where no winter stubble or wild bird seed mix
- Wild bird seed mix supports c.8x density of seed eating birds in winter compared to stubbles
- Requires re-sowing annually

11. Package element 3: in-field nesting habitat

- Fine grasses sown between panels, every 3rd row
- Provides nest habitat for priority birds, esp. skylark, also provides habitat for small mammals and larvae of pollinating insects, including butterflies and moths
- Lack of in-field nest habitat has contributed to declines in lapwing, skylark, yellow wagtail, corn bunting
- Management – sow and top on rotation e.g. every other year

12. Further options

- Potential to tailor package for site-specific opportunities (important: still need to assess wildlife interest on site before recommending enhancements)
- Manage hedgerows used for screening sympathetically for wildlife – cut no more than once every 3 years to maximise berry and blossom production (especially good for moths), protect base of hedgerow for mammals, invertebrates, foraging

- Where turtle doves are present/potential exists – replace one margin with mix providing a food source and allow hedges to grow to 4m for nesting
- On light sandy soils, cultivate one margin in autumn or spring to attract naturally occurring arable plants

13. Does it work?

- Early days for results from UK but some research into similar enhancements here and overseas
- Parker and McQueen (2013) preliminary report (due to be released November) – solar parks on arable resown as wildflower meadow support significantly higher numbers of butterflies and bumblebees than prior arable or sites resown as pasture, also greater use by ground nesting birds
- Study by Federal Agency for Nature Conservation in Germany concluded that solar farms on intensively farmed land in particular can improve environmental value of a site
- Reminder that FBP supported by evidence - solar package based on this

14. How should it be applied?

- Incorporate into Ecological Mitigation and Monitoring Plans
- Secure through planning conditions
- RSPB recommend through any pre-app discussions with developers, also at strategic level with developers and industry bodies
- Monitoring may be considered for larger solar farms – assess effectiveness of package, tailor management
- Uptake so far – small numbers of solar farms in Norfolk and Suffolk have incorporated similar measures into EMMP, not aware that any have been constructed yet (package is a recent development)
- Will be developing demonstration sites

15. Further details / contact

- Still under development – may be some final tweaks to options
- Will be on www.farmwildlife.info when complete
- jacqui.miller@rspb.org.uk
- Biodiversity Partnership newsletter for updates

**RSPB enhancement package for solar farms
on former arable land (November 2013)**

Rationale

PV arrays offer an opportunity to provide sizeable wildlife gains as well as benefits to the farmed environment due to the extent of 'unusable area' between panels and bordering the installation. Wildlife habitats can be provided in these areas that will boost numbers of pollinating and predatory insects, and provide feeding and nesting opportunities for birds and small mammals. In managing these habitats, nutrient input to the land and water courses will also be significantly reduced in comparison to arable use. This approach will therefore deliver multi-functional ecosystem services for agriculture and the wider environment and provide support for integrated pest management strategies.

To ensure the requirements of farmland birds and other wildlife are met it is vital to provide insect rich habitat, winter seed rich habitat and in-field nesting habitat. Farmland birds are targeted through these measures as meeting the requirements for farmland birds also benefits a range of other groups including insects, arachnids and small mammals.

In-field management:

- Insect rich habitat (**nectar flowers**) should be sown and managed every first and second row;
- In-field nesting habitat (**fine grasses**) should be sown and managed every third row for priority species such as skylark. This also provides habitat for small mammals and larvae of pollinating insects, including butterflies and moths;
- Seed rich habitat (**wild bird seed mixture**) should be sown around the installation where access dictates and should be managed on an annual basis. This provides vital food for farmland birds and small mammals.



To provide nesting habitat (that will also be suitable for small mammals and insects), a mixture of **fine grasses** should include:

- Common Bent
- Creeping Red Fescue
- Hard Fescue
- Smooth Stalked Meadow Grass

In order to maximise provision of pollen and nectar (both amount of the resource and period it will be available continually from spring to autumn) for a range of insects, a sown mixture of **nectar flower** producing plants should include:

- 20% Red Clover
- 20% White Clover
- 15% Birdsfoot Trefoil
- 15% Black Medick
- 10% Aslike Clover
- 10% Common Vetch
- 10% Phacelia

Sow at 6kg per acre

Or:

- 35% Sainfoin
- 20% Common Vetch
- 10% Lucerne
- 15% Birdsfoot trefoil
- 10% Phacelia
- 5% Sweet clover
- 5% Red clover

Sow at 8kg per acre

Wild bird seed mixture should be managed annually to provide seed food over the winter months.

This should include the following mix:

- 5% Mustard
- 25% Spring wheat
- 20% White / Red Millet
- 20% Triticale
- 30% Barley

Sow at 50kg per ha

Where **turtle doves** are present, or potential to support breeding pairs exists (e.g. based on recent records), at least one margin should be planted with a mix aimed at providing a food source from April to the end of August. The following mix is suitable and should be used at 6kg per acre:

- 25% Early English vetch
- 20% Birds foot trefoil
- 20% Early white clover
- 20% Black medick
- 10% Early red clover
- 5% Common fumitory

Insect rich habitat (nectar flowers)	In-field nesting habitat (fine grasses)	Seed rich habitat (wild bird seed mixture)	Turtle dove seed source margins
<ul style="list-style-type: none"> • 35% Sainfoin • 20% Common Vetch • 10% Lucerne • 15% Birdsfoot trefoil • 10% Phacelia • 5% Sweet clover • 5% Red clover Sow at 8kg per acre	Mix should include <ul style="list-style-type: none"> • Common Bent • Creeping Red Fescue • Hard Fescue • Smooth Stalked Meadow Grass 	<ul style="list-style-type: none"> • 5% Mustard • 25% Spring wheat • 20% White / Red Millet • 20% Triticale • 30% Barley Sow at 20kg per acre	<ul style="list-style-type: none"> • 25% Early English vetch • 20% Birds foot trefoil • 20% Early white clover • 20% Black medick • 10% Early red clover • 5% Common fumitory Sow at 6kg per acre

Management

Post construction, access to the arrays is required less than once a year. Habitats can therefore be left undisturbed, with the exception of necessary habitat management (i.e. topping or re-establishment), as follows:

- Sow and top **fine grass areas** on rotation (i.e. 1 in 2 years)
- Top or graze **nectar flower areas** annually in September to retain flowering species. Review and re-establish as necessary every 4 – 5 years
- To maintain seed production in **wild bird seed mixture** areas, re-sow annually. When the mixture is being re-established, removal of the plant cover and cultivation must not take place before 15th March

- **Turtle dove margins** (where applicable) should be topped from the second year after establishment in late September – October. To maintain their suitability for foraging turtle doves, a mid-summer (ie mid-June to end of the first week in July) cut should be undertaken in strips of c. 3 - 6 m wide, distributed across the plot area
- **Hedges** should be managed to ensure that the production of both berry and blossom for wildlife is made available. The hedge base should be protected and enhanced for nesting birds, insects and small mammals. Where turtle doves are present, hedges should be maintained at a minimum of 4m tall to provide suitable nesting habitat. Cutting hedges on a rotation and no more than once in every three years will ensure optimal berry and blossom production and filling any gaps to restore the hedge line would be beneficial for both landscape and wildlife. Trimming should ideally be carried out in January or February. It is essential that trimming is not carried out during the nesting season (March – September).
- On light, sandy soils, cultivate one margin in autumn or spring to attract naturally occurring **arable plants**

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